



Desert Sky Observer

Volume 29

Antelope Valley Astronomy Club Newsletter

November 2009

Up-Coming Events

November 13: Club Meeting*

November 14: New Moon Walk @ [Prime Desert Woodlands](#)

November 16: Board Meeting

November 21: Star Party @ [Saddleback Butte](#)

* Monthly meetings are held at the S.A.G.E. Planetarium on the Cactus School campus in Palmdale, the second Friday of each month. 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*



President

Don Bryden

Join me in welcoming our new executive board! Doug Drake is your new Vice President, Frank Moore will continue as Secretary, Steve Trotta takes over as Treasurer and Rose Moore will move from V.P. to Director of Community Development. The board is full of members who have held positions before. In fact yours truly, who will serve another term as president, is the least experienced member of the board! Congratulations one and all.

We have some great events coming up and I'm sure Rose and Karole will tell you all about our Prime Desert outings, November speakers and the Christmas party. I would like to mention the upcoming star parties. Due to a conflict with Prime Desert, the November Star party will be on the 21st at Saddleback Butte. Come early for some crescent moon viewing and stay late for some deep sky observing. We'll be at the group site from about 4pm on. See the website for more information.

In December, we will be going out to Red Rock Canyon State Park on the 19th. The skies can be excellent out there and ranger Tom is allowing us to set up in the Parking lot at the main entrance rather than at one of the dusty camp grounds. Get there early and explore the trails and sites of Red Rock.

Some possible upcoming events include a joint star party with the LA Astronomical Society at their private site near Mt. Pinos and our rescheduled Mt. Wilson trip in August. Of course many of us will be making the trip up to Big Bear for the annual RTMC. Be aware that this coming year, RTMC will not be on Memorial weekend but the New moon preceding it. It was decided to try to keep it as a dark sky event much to the dismay of many attendees who prefer Memorial weekend. From what I hear the weather can be wet and cold in early to mid May but it still should be a great event.

One last thing, I'll be putting in a large order of hats and shirts to B's Stitchery & Design so anyone who is interested in some AVAC logo clothing, drop me an email or sign up at the November meeting. Of course you can order stuff from B's at any time but this may be easier to have a signup sheet and just give them one big order. See the website for more info.

The winter constellations are back so let's get out among the stars!

-Don



Vice President

Rose Moore

November is almost upon us! Coming this month is Jeremy Amarant's and Matt Leone's presentation on the Messier Objects for our club meeting on Nov. 13th. Please come out for our last club meeting for 2009!

December brings us our Annual Club Christmas Party. This is being held on Saturday, December 12th at 6:00 pm. Dinner, raffles, and silent auctions to be held! If you haven't heard, the Antelope Valley Inn facility has been taken over by the University of Antelope Valley. They will have banquet rooms and a 5 Star restaurant with meals prepared and served by upperclassmen in their culinary arts department! The facility is currently being renovated and will be ready in time for our club Christmas Party. Further details will be coming in the next couple of weeks, and emails will be sent out to all, giving details. Please stay tuned! A sign-up sheet will be at November's meeting to get an approximate head count.

I've recently sent out emails to several prospective speakers for next year. We will be hosting Luisa Rebull, a research scientist and astronomer with the Spitzer Space Telescope Team, in either July or August. We will be confirming a definite date as we enter the spring months. I'm currently waiting for replies from a few other prospective speakers.

We have a few club events coming up for the end of the year, please check other Board members DSO entries and find out what your club is doing the end of 2009! Come out and attend and support your club!

Clear skies!



Director of Community Development

Karole Barker

The turnout for Prime Desert Woodlands on 10/17/2009 was 125 people and 11 club members. The last Prime Desert Woodlands for 2009 will be held on November 14th @ 6:00 p.m. We still need volunteers to bring out scopes those nights. Please let me know if you can make it.

We had 100 people show up for the L-Cross event on 10/9/2009 at the Sage Planetarium, including 15 club members. The Sage was filled with people ready to view the NASA feed of the event, along with club members outside viewing through their scopes.

Since our 1/2 night at Mt. Wilson on Saturday September 19th was canceled due to the Station Fire, we had to reschedule. We are now scheduled for Saturday, August 7th 2010. Signups will start early next year.

Our start party at Devil's Punch Bowl Saturday the 17th turned into a public star party, since it was their monthly star viewing. We even had a Cub Scout pack show up. A total of 45 people showed up. About 11 club members attended the star party. We set up on the Saturn pad, a concrete pad in the shape of Saturn, for the party.

Saturday, November 7th, is Super Science Saturday @ Joe Walker Middle School from 8:00 a.m. to 12:30 p.m. Please let me know if you can come out for this event. It is a lot of fun.

Clear skies.



Secretary

Frank Moore

Ever since becoming involved with this “hobby” of astronomy as some would call it, or in the case off others this “passion”, I have been constantly amazed at the the willingness of most amateur astronomers to help others.

Rose and I first became involved with the Antelope Valley Astronomy Club when Lou Figueroa introduced us to Darrel Bennet. Darrel had an older Meade 2080 similar to Rose’s. Rose never had a manual for her scope as she bought it used and we were having problems using it. Though not knowing us from “Adam”, Darrel loaned us the owner’s manual for his scope so we could copy it. His caveat, “Return it to me at the next AVAC meeting.” That we did, and the rest is history. Darrell continued that mentoring when, at the first club picnic we attended at Crystal Air Country Club, he gave us further instruction and it all finally came into place.

When Rose bought her new telescope, she gave that old Meade to Lou, along with the copy of the manual that Darrell loaned us, and it lives on and continues to serve and gaze at the stars. One good deed deserves another.

Once again, when we bought Rose’s new scope, with a completely foreign to us equatorial mount, it was former club member Paul Miller, with an identical mount, who took time from his observing to answer our many questions about and to fill in the gaps in our understanding of the manual (which must have been translated from Chinese).

There are many others, Terry Pedroza, Don Bryden, Bill Riedhart, Matt Leone, Tom Koonce, Doug Drake, Jeremy Amarant, and others too numerous to mention, who have nurtured our understanding of not only the use of our equipment, but also the universe and fundamentals of astronomy. We thank all of you.

When we, as a club or as individuals, travel to dark sky sites such as Mount Pinos, it is the members of the Antelope Valley Astronomy Club that I constantly see taking time from their own personal observing to help others with their equipment, to explain the fundamentals of astronomy, and/or to allow the public to observe through our equipment. While other groups or individuals may accommodate some ot this, their friendliness and willingness to do so pales in comparison to that of the AVAC members.

This past weekend, while assisting Lee Bush with the “Glory Of The Universe” event in Rosamond, I had the most satisfying time helping others with their astronomy equipment. After getting our telescope and mount dialed in, and turning it over to Rose for public viewing and outreach (which she does so well). Out of the darkness I heard, “Who’s Frank?” (how they got MY name I don’t know). When I responded, I was greeted by a man and his FIVE little kids. They were having trouble with their modest, but surprisingly competent, Meade DS-2000 Series 5" Alt-azimuth Reflector. Though not familiar with Meade’s AutoStar Controller, and via trial and error with ample laughter, I was able to get the scope and controller dialed in well enough for them to locate and view Jupiter and few deep space objects. In like manner, I was able to help a group of gentlemen in setting up and using their used, but new to them, 8" Celestron Newtonian Reflector on a CG-5 mount. In this case, I was familiar with Celestron’s NextStar controller and AllStar Alignment from helping Duane Lewis with his new Celestron telescope and mount.

I’m sure we will agree that the thrill, and wonder, on the faces of those we help is far more important than the gratitude. We all learned somewhere, and isn’t it great to “Pay It Forward”.

Dark Skies

Aerospace Committee Report Jeff Riechmann and Roswell (co-chairbeings)

Vandenberg Launch Schedule: As of 2009 September 30

Date	Launch Time/Window (PST/PDT)	Vehicle	Pad/Silo
-----	-----	-----	-----
OCT 30	Evening	Minotaur IV	SLC-8
First-ever Minotaur IV launch. Payload is the Space-Based Space Surveillance (SBSS) satellite.			
NET DEC 7	06:10-06:23	Delta II	SLC-2W
Payload is the WISE scientific satellite. Launch occurs before sunrise and may provide a Twilight Effect			
NET APR 1	To be announced	Taurus	576-E
Payload is the Glory scientific satellite.			
Unknown	To be announced	GBI	---
Missile defense Ground-based Interceptor. Delayed from SEP 27			

JEFF'S REPORT:

- Membership in the Aerospace Committee is open to any active member of the Antelope Valley Astronomy Club, especially those with an interest in rocket ships!

ROSWELL'S REPORT: Greetings to all earthlings from Belluckleonia (or as you pronounce it, Belt Buckle)!

Extraterrestrial Tidbits by Jeff Riechmann

Laika the Space Dog

With the success of Sputnik 1, the Soviets decided to take space travel to the next step by launching a dog into orbit on Sputnik 2. All of the dogs selected for the space program were light-colored mongrel bitches – light color so that the cameras would see them better, mongrels because they were thought to be tougher animals and bitches because it helped in the design of the “diapers” they would be required to wear in the space capsule. The first dog selected for the program was named Laika, which in Russian means *Barker*. (Not to be confused with Shane!) Laika blasted off on November 3, 1957 with only one problem: no way to return to earth! A system was developed to put Laika to sleep after ten days, prior to her running out of food, water and oxygen. The space capsule sent out regular updates until November 7, when no further transmissions were received. It was assumed that Laika had died of natural causes. The Soviet Space Agency declared November 10, 1957 the official date of her death.

45 years later we would learn the truth. After launch, several glitches resulted in the temperature in the capsule reaching 104°F. In addition, Laika's heart rate started to climb. Six hours into the flight, Laika succumbed to a combination of heat and stress.

Space Place

Staring at Lightning

There's something mesmerizing about watching a thunderstorm. You stare at the dark, dramatic clouds waiting for split-second bursts of brilliant light — intricate bolts of lightning spidering across the sky. Look away at the wrong time and (FLASH!) you miss it.

Lightning is much more than just a beautiful spectacle, though. It's a window into the heart of the storm, and it could even provide clues about climate change.

Strong vertical motions within a storm cloud help generate the electricity that powers lightning. These updrafts are caused when warm, moist air rises. Because warmth and lightning are inextricably connected, tracking long-term changes in lightning frequency could reveal the progress of climate change.

It's one of many reasons why scientists want to keep an unwavering eye on lightning. The best way to do that? With a satellite 35,800 km overhead.

At that altitude, satellites orbit at just the right speed to remain over one spot on the Earth's surface while the planet rotates around its axis — a “geostationary” orbit. NASA and NOAA scientists are working on an advanced lightning sensor called the Geostationary Lightning Mapper (GLM) that will fly onboard the next generation geostationary operational environmental satellite, called GOES-R, slated to launch around 2015.

“GLM will give us a constant, eye-in-the-sky view of lightning over a wide portion of the Earth,” says Steven Goodman, NOAA chief scientist for GOES-R at NASA's Goddard Space Flight Center. Once GLM sensors are flying on GOES-R and its sister GOES-S, that view will extend 18,000 km from New Zealand, east across the Pacific Ocean, across the Americas, and to Africa's western coast.

With this hemisphere-scale view, scientists will gather an unprecedented amount of data on how lightning varies from place to place, year to year, and even decade to decade. Existing lightning sensors are either on the ground — which limits their geographic range — or on satellites that orbit much closer to Earth. These satellites circle the Earth every 90 minutes or so, quickly passing over any one area, which can leave some awkward gaps in the data.

Goodman explains: “Low-Earth orbit satellites observe a location such as Florida for only a minute at a time. Many of these storms occur in the late afternoon, and if the satellite's not overhead at that time, you're going to miss it.”

GLM, on the other hand, won't miss a thing. Indeed, in just two weeks of observations, GLM is expected gather more data than NASA's two low-Earth orbiting research sensors did in 10+ years.

The new data will have many uses beyond understanding climate change. For example, wherever lightning flashes are abundant, scientists can warn aircraft pilots of strong turbulence. The data may also offer new insights into the evolution of storms and prompt improvements in severe weather forecasting.

(FLASH!) Did you miss another one? The time has come for GLM.

Want to know how to build a weather satellite? Check the “how to” booklet at scijinks.jpl.nasa.gov/weather/technology/build_satellite.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

The Life Cycles of Stars by Tom Koonce

“The bigger they are, the harder they fall...” This is certainly true of stars. When single stars condense from a star forming nebula, their life history is pre-written based upon their initial mass and the cloud’s composition. High mass stars burn very hot, have very short stellar lifetimes then explode in spectacular Supernovae, forming either Neutron Stars or Black Holes. On the other end of the mass scale, low mass single stars have relatively cool temperatures, but live extremely long lifetimes and may radiate dimly for many, many billions of years

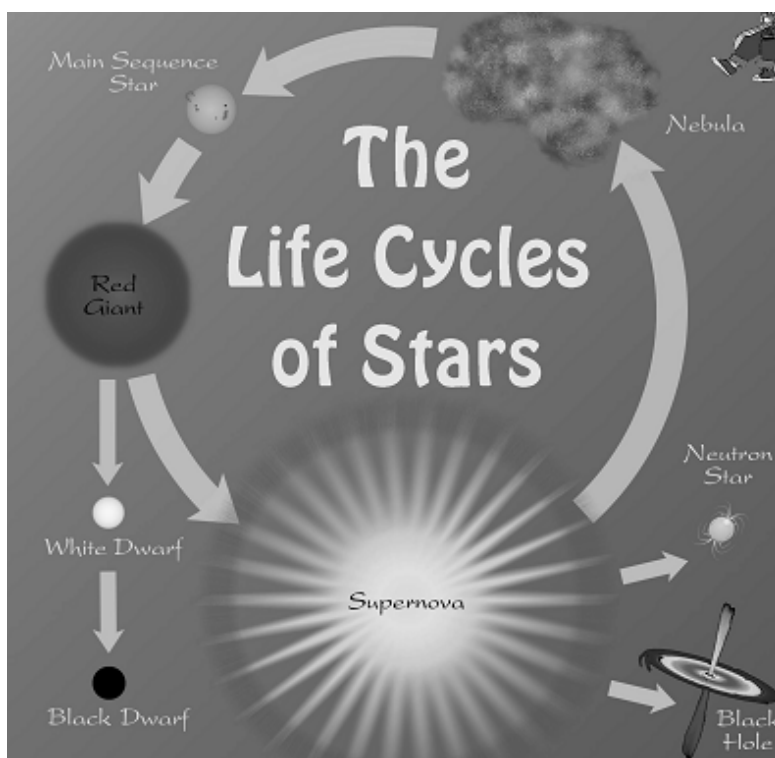


Over time, higher density regions within giant nebulae like the Orion Nebula or the Eagle Nebula begin to contract gravitationally, and as they do, the cloud rotates. As the gas contracts and rotates faster, the gas begins to heat up to become a Protostar. Once its temperature reaches approximately 15,000,000 Celsius, nuclear fusion initiates in the cloud’s center causing the Protostar to begin to radiate brightly. The smallest stellar objects that form in the star forming regions are called Sub-Stellar Objects. These form with masses between 0.013 and 0.08 times the mass of our own Sun (our Sun = one solar mass). These stars radiate briefly as a dim star, but gradually collapse, cool as they evolve further into Brown Dwarf stars. Eventually the Brown Dwarf will cool further and it will cease radiating at all.

The stars known as “Red Dwarf” stars have between 0.08 and 0.4 solar masses when they form. These are the most common type of stars in the observable universe and have lifetimes longer than 13 billion years. As these small, long living stars eventually cool, they die and become Black Dwarf stars.

Stars approximately the size of our Sun with 0.4 to 8 solar masses are called “Intermediate” stars and will swell into Red Giant stars as their fuel is expended. Eventually, these stars will end their lives as White Dwarf stars.

Nebulae and stars are typically composed of 74% hydrogen, 25% helium and 1% everything else in the periodic table by mass. A star’s initial mass is determined by the amount of material available within the nebula from which the star forms. Very dense nebulae can produce the most massive stars - true giants with 8 times (or greater than) our Sun’s mass. Those stars with between 8 and 25 solar masses will expand into Super Giant stars then explode as supernovae and end their lives as Neutron Stars; those stars with greater than 25 solar masses will expand into Super Giant stars, explode as supernovae and become Black Holes. It isn’t known what the upper limit is to a star’s initial mass is, but in the early 1990’s, a star nicknamed the “Pistol Star”



was discovered by the Hubble Space Telescope near the center of the Milky Way galaxy with a mass of 100 solar masses and a radius of 100 million miles, comparable to the Earth-Sun distance of 93 million miles. The Pistol Star is called a Blue Hyper Giant and is so hot that its gravity can't stabilize it and it is expected to go supernova within only 1 to 3 million years. A great deal of gas and matter is expelled during these supernovae explosions which then give rise to future generations of stars, repeating the cycle of stellar birth.

Smaller stars burn dimly, but may burn for billions and billions of years. Giant stars burn with incredible intensity, but go through their hydrogen and helium fuel in as little as millions of years, and then end their lives in dramatic supernovae explosions. I can think of a few analogous Hollywood situations...but that's for another type of "Star" article altogether.

References and image credit: NASA StarChild initiative, NASA Hubble Space Telescope, Wikipedia.

Astrophoto of The Month



Mt. Pinos Milky Way

By Darrell Bennett

Nikon D80 piggy backed on an LX-90 exposure was about 1 and one half minutes. The ISO was 1600 at f 3.5 and 18 mm

International Year of Astronomy

The Lives of Stars

Back in 1054 AD, Chinese and Arab astronomers recorded seeing a "new star" that was bright enough to be visible even during the day. 450 years later, Galileo also saw a bright "star" appear, just a few years before he made his telescope. But for both of those events, no one knew what they were seeing. We have learned now that ancient astronomers saw a special event called a supernova – the flashy end to a giant star's life. Stars spend most of their lives shining brightly without much change. But the sight of their birth and death can be spectacular.

Every star begins its life in a stellar nursery of gas and dust. As enough of this starbuilding material falls together it becomes hot and dense enough to form a star. Because the dense clouds where stars form block visible light, it is often easier to study them using infrared light which can pass right through the clouds. NASA's Spitzer Space Telescope and Hubble Space Telescope have both used infrared light to study star formation in our own galaxy and in distant ones. You can see a stellar nursery where stars are being born if you look at the December IYA Discovery Guide, which features the Orion Nebula.

At the end of their lives, very large stars will go supernova. This huge explosion blows off the outer layers of the star in a bright display. It releases oxygen, iron, and other heavier elements into the surrounding space. These contribute to making a new stellar nursery and eventually get recycled into new stars. Many of the elements that make up the Earth and even us came from many supernovae that occurred billions of years ago.



The supernova that was observed in 1054 faded after about a year. Now, when we look at the same place in the sky we see a supernova remnant called the Crab Nebula (left).

You can locate this blast of material with the Finder Chart in this guide. Giant stars also leave something else behind. In the Crab nebula, there is a neutron star that is so dense that a teaspoon would weigh as much as a train of boxcars loaded to maximum capacity that stretched all the way from Canada to Mexico! And the very biggest stars leave behind a black hole, which is even denser and more mysterious, and also invisible.

NASA is studying black holes and other high-energy x-ray and gamma-ray sources with the Suzaku and XMM-Newton Missions. The Swift and Fermi missions are orbiting Earth to study the dramatic deaths of very large stars. To learn more about the lives of these giant stars and to see what happens to stars like our Sun at the end of their lives, see the activity included in this packet.

News Headlines

32 new exoplanets found

October 19, at an international European Southern Observatory (ESO)/Center for Astrophysics, University of Porto (CAUP) exoplanet conference in Porto, Portugal, the team who built the High Accuracy Radial Velocity Planet Searcher (HARPS), the spectrograph for ESO's 3.6-meter telescope, reports on the discovery of some 32 new exoplanets.

<http://www.astronomy.com/asy/default.aspx?c=a&id=8733>

Spitzer Discovers Saturn's Largest Ring

NASA's Spitzer Space Telescope has discovered an enormous and previously unknown infrared ring around Saturn. "This is one supersized ring," says Anne Verbiscer, an astronomer at the University of Virginia, Charlottesville. "If you could see the ring in the night sky, it would span the width of two full Moons."

http://science.nasa.gov/headlines/y2009/07oct_giantring.htm

Galaxy Cluster Smashes Distance Record

The most distant galaxy cluster yet has been discovered by combining data from NASA's Chandra X-ray Observatory and optical and infrared telescopes. The cluster is located about 10.2 billion light years away, and is observed as it was when the Universe was only about a quarter of its present age.

<http://www.spaceref.com/news/viewpr.html?pid=29481>

Satellite Reveals Surprising Cosmic 'Weather' At Edge Of Solar System

The first solar system energetic particle maps show an unexpected landmark occurring at the outer edge of the solar wind bubble surrounding the solar system. Scientists published these maps, based mostly on data collected from NASA's Interstellar Boundary Explorer satellite, in the Oct. 15 issue of Science Express, the advance online version of the journal Science.

<http://www.sciencedaily.com/releases/2009/10/091016141407.htm>

Rethinking relativity: Is time out of joint?

Ever since Arthur Eddington travelled to the island of Príncipe off Africa to measure starlight bending around the sun during a 1919 eclipse, evidence for Einstein's theory of general relativity has only become stronger. Could it now be that starlight from distant galaxies is illuminating cracks in the theory's foundation?

<http://www.newscientist.com/article/mg20427314.400-rethinking-relativity-is-time-out-of-joint.html>

Is Unknown Force In Universe Acting On Dark Matter?

An international team of astronomers have found an unexpected link between mysterious 'dark matter' and the visible stars and gas in galaxies that could revolutionize our current understanding of gravity.

<http://www.sciencedaily.com/releases/2009/10/091022154644.htm>

Ares I-X rocket completes successful flight test

NASA's Ares I-X test rocket lifted off at 11:30 a.m. EDT Wednesday from NASA's Kennedy Space Center in Florida for a 2-minute powered flight. The test flight lasted about 6 minutes from its launch from the newly-modified Launch Complex 39B until splash down of the rocket's booster stage nearly 150 miles down range.

<http://www.astronomy.com/asy/default.aspx?c=a&id=8756>

November Sky Data

Best time for deep sky observing this month:
November 9 through November 21

Mercury is at “superior conjunction” (it passes directly behind the Sun) on November 5th. We’re unlikely to see this elusive little planet at all this month.

Venus is rising before sunrise, and it’s visible low in the south-eastern sky at dawn; but the separation between the Sun and Venus is steadily shrinking. Each morning Venus appears a little later and a little lower down, so the “Morning Star” is gradually getting harder to see

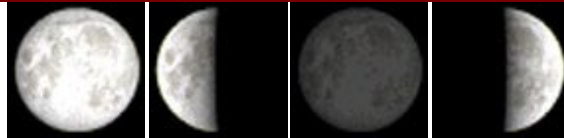
Mars is rising in the north-east around 9:30 pm, and it’s high in the southern sky before dawn. The red planet is currently in Cancer. In the telescope, the disc of Mars grows from 8 to 10 arc-seconds across this month; it may soon be possible to make out some detail. The best time to look is just before dawn.

Jupiter is due south around 6 pm, in the constellation of Capricornus, less than 20 degrees above the horizon; it sets in the south-west well before midnight. In the telescope, the disc of Jupiter shrinks this month from 41 to 38 arc-seconds in diameter, but its dark and light cloud-bands should still be visible.

Saturn is rising in the east in the early hours of the morning, and is well up in the south-eastern sky by dawn. It’s moving very slowly south-eastwards in Virgo. In a telescope, the disc of Saturn appears 17 arc-seconds across, and the famous rings form a narrow oval, 38 arc-seconds wide and only 2½ arc-second high.

The Leonid **meteor shower** is generally active between November 15th and 20th; this year it will probably peak around midday on Monday November 17th, so the best time to look would be shortly before dawn that day. Shower meteors all seem to spread out from a single radiant point; for the Leonids, this point is within the “Sickle” of Leo, to the left of Mars.

Full Nov 2 Last Qtr Nov 9 New Nov 16 First Qtr Nov 24



Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
11/1/2009	17:02	06:10	07:17	17:56
11/5/2009	19:18	09:39	06:21	16:52
11/10/2009	-----	13:13	06:26	16:48
11/15/2009	05:31	15:48	06:31	16:44
11/20/2009	10:09	20:00	06:36	16:41
11/25/2009	12:37	-----	06:41	16:39
11/30/2009	15:13	05:04	06:46	16:38

Planet Data

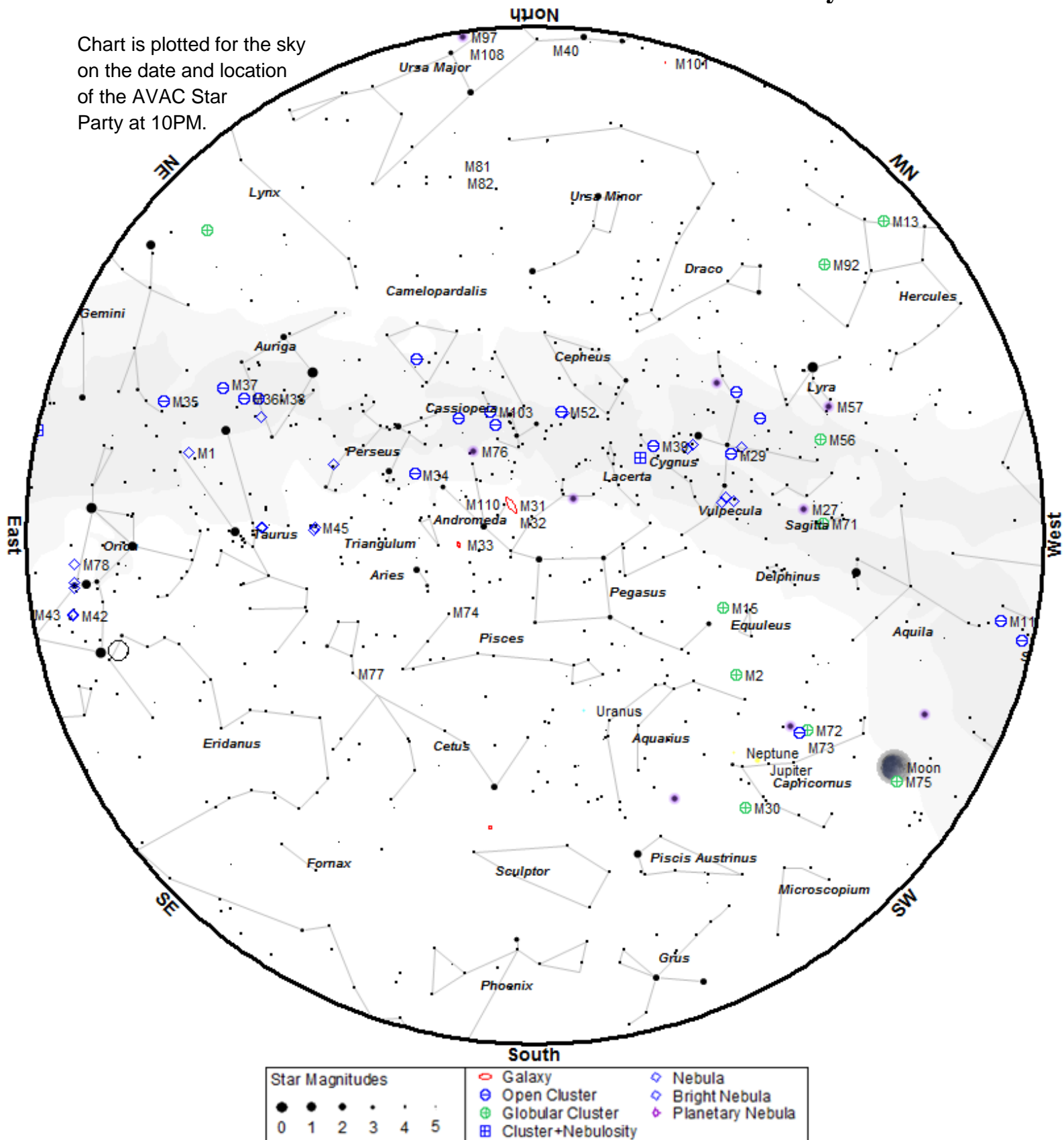
	Nov 1			
	Rise	Transit	Set	Mag
Mercury	06:04	11:31	16:56	-1.3
Venus	04:49	10:33	16:17	-3.9
Mars	22:46	05:48	12:52	0.4
Jupiter	13:12	18:29	23:47	-2.5
Saturn	03:01	09:09	15:21	1.0

	Nov 15			
	Rise	Transit	Set	Mag
Mercury	07:01	12:02	17:06	-0.8
Venus	05:18	10:45	16:11	-3.9
Mars	22:17	05:15	12:16	0.2
Jupiter	12:20	17:39	22:58	-2.4
Saturn	02:12	08:19	14:30	1.0

	Nov 30			
	Rise	Transit	Set	Mag
Mercury	05:51	11:01	16:10	-3.9
Venus	07:54	12:41	17:31	-0.5
Mars	21:38	04:34	11:30	-0.1
Jupiter	11:23	16:47	22:08	-2.3
Saturn	01:19	07:25	13:35	1.0

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 best time to observe the object. The difficulty column describes how difficult it is to observe the object from the current location on a perfect night in a 6 inch Newtonian telescope.

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Optimum	End	Difficulty
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	17:49	18:11	20:15	detectable
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	17:48	18:12	20:48	detectable
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	17:48	18:11	20:39	detectable
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	17:50	18:16	20:43	detectable
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	17:52	18:15	20:22	detectable
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	17:47	18:18	22:04	detectable
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	17:42	18:22	00:10	easy
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	17:52	18:32	21:31	difficult
NGC 7293	PNe	6.3	Aqr	22h29m38.5s	-20°50'14"	17:52	18:46	20:24	detectable
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	17:45	20:10	02:00	easy
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	18:16	20:56	23:38	challenging
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	17:53	20:58	00:48	detectable
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	17:54	20:59	00:39	detectable
NGC 253	Gal	7.9	Scl	00h47m33.1s	-25°17'20"	20:37	21:03	21:30	difficult
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	17:49	21:31	02:51	easy
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	17:48	21:41	03:18	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	17:46	21:46	03:45	easy
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	18:54	21:50	00:43	difficult
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	17:46	21:55	04:03	easy
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	17:53	21:58	02:57	detectable
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	18:59	21:58	00:57	difficult
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	17:48	22:31	04:20	obvious
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	17:50	22:34	04:24	easy
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	18:15	22:46	03:24	detectable
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	19:53	22:54	02:03	challenging
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	19:29	22:58	02:27	detectable
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	20:31	22:58	01:25	difficult
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	20:25	23:47	03:10	detectable
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	19:48	00:02	04:16	easy
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	18:28	00:05	05:24	obvious
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	18:24	00:19	05:31	obvious
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	20:13	00:31	04:49	detectable
Hyades	Open	0.8	Tau	04h26m54.0s	+15°52'00"	21:15	00:42	04:09	easy
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	22:35	01:01	03:26	difficult
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	20:52	01:06	05:15	detectable
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	22:48	01:19	03:50	difficult
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	22:28	01:44	04:58	detectable
M 42	Neb	4.0	Ori	05h35m18.0s	-05°23'00"	22:42	01:50	04:58	easy

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Optimum	End	Difficulty
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	21:34	01:52	05:24	easy
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	22:04	02:07	05:25	easy
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	21:55	02:16	05:29	easy
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	23:36	02:24	05:08	difficult
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	22:49	02:24	05:23	detectable
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	22:19	02:23	05:28	easy
NGC 2264	Open	4.1	Mon	06h40m58.0s	+09°53'42"	23:23	02:56	05:26	easy
M 41	Open	5.0	CMa	06h46m01.0s	-20°45'24"	01:22	03:01	04:39	detectable
NGC 2301	Open	6.3	Mon	06h51m45.0s	+00°27'36"	23:58	03:07	05:25	detectable
M 50	Open	7.2	Mon	07h02m42.0s	-08°23'00"	00:56	03:17	05:18	detectable
NGC 2353	Open	5.2	Mon	07h14m30.0s	-10°16'00"	00:41	03:29	05:26	easy
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	23:16	03:44	05:33	easy
NGC 2423	Open	7.0	Pup	07h37m06.0s	-13°52'18"	01:25	03:52	05:25	detectable
M 47	Open	4.3	Pup	07h36m35.0s	-14°29'00"	01:26	03:51	05:28	easy
M 46	Open	6.6	Pup	07h41m46.0s	-14°48'36"	01:50	03:56	05:21	detectable
NGC 2440	PNe	11.5	Pup	07h41m55.4s	-18°12'31"	02:27	03:56	05:14	challenging
NGC 2439	Open	7.1	Pup	07h40m45.0s	-31°41'36"	02:04	03:56	05:23	detectable
M 93	Open	6.5	Pup	07h44m30.0s	-23°51'24"	03:00	03:59	04:58	detectable
NGC 2451	Open	3.7	Pup	07h45m23.0s	-37°57'21"	02:25	03:59	05:21	detectable
NGC 2477	Open	5.7	Pup	07h52m10.0s	-38°31'48"	02:28	04:06	05:24	detectable
NGC 2571	Open	7.4	Pup	08h18m56.0s	-29°45'00"	02:38	04:34	05:25	detectable
M 44	Open	3.9	Cnc	08h40m24.0s	+19°40'00"	01:26	04:50	05:28	detectable
M 67	Open	7.4	Cnc	08h51m18.0s	+11°48'00"	03:18	04:55	05:20	challenging
IC 2395	Open	4.6	Vel	08h42m30.0s	-48°06'48"	03:47	04:56	05:28	detectable
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	01:08	05:00	05:27	detectable
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	01:31	05:00	05:25	detectable
M 106	Gal	9.1	CVn	12h18m57.6s	+47°18'13"	04:15	05:07	05:23	difficult
M 65	Gal	10.1	Leo	11h18m55.7s	+13°05'32"	04:13	05:07	05:23	difficult
M 66	Gal	9.7	Leo	11h20m14.9s	+12°59'30"	04:13	05:06	05:22	difficult
M 94	Gal	8.7	CVn	12h50m53.1s	+41°07'12"	04:07	05:08	05:24	detectable
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	04:20	05:10	05:25	detectable
M 64	Gal	9.3	Com	12h56m43.8s	+21°41'00"	04:41	05:10	05:22	detectable
M 84	Gal	10.1	Vir	12h25m03.9s	+12°53'12"	04:42	05:09	05:21	difficult
NGC 3242	PNe	8.6	Hya	10h24m46.1s	-18°38'32"	04:43	05:08	05:31	easy
M 87	Gal	9.6	Vir	12h30m49.2s	+12°23'29"	04:42	05:09	05:22	difficult
M 49	Gal	9.3	Vir	12h29m46.8s	+08°00'01"	04:48	05:10	05:20	difficult
NGC 3132	PNe	8.2	Vel	10h07m01.8s	-40°26'11"	04:26	05:14	05:30	easy
NGC 3132	PNe	8.2	Vel	10h07m01.8s	-40°26'11"	04:26	05:14	05:30	easy

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/

The Antelope Valley Astronomy Club, Inc. is a 501(c)(3) Non-Profit Corporation.

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

Board Members

President:

Don Bryden (661) 270-0627
president@avastronomyclub.org

Vice-President:

Rose Moore (661) 972-1953
vice-president@avastronomyclub.org

Secretary:

Frank Moore (661) 972-4775
secretary@avastronomyclub.org

Treasurer:

Tom Koonce (661) 943-8200
treasurer@avastronomyclub.org

Director of Community Development:

Karole Barker (661) 940-3312
community@avastronomyclub.org

Appointed Positions

Newsletter Editor:

Steve Trotta (661) 269-5428
newsletter@avastronomyclub.org

Equipment & Library:

Karol Barker (661) 940-3312
library@avastronomyclub.org

Club Historian:

Tom Koonce (661) 943-8200
history@avastronomyclub.org

Webmaster:

Steve Trotta (661) 269-5428
webmaster@avastronomyclub.org

Astronomical League Coordinator:

Steve Trotta (661) 269-5428
al@avastronomyclub.org

Our Sponsors

Thank you to our sponsors for your generous support!

Cosmos Level Sponsors



Woodland Hills Camera

5348 Topanga Canyon Blvd., Woodland Hills
888-427-8766.

www.telescopes.net

Universe Level Sponsors



Riechmann Safety Services

Galaxy Level Sponsors



Al's Vacuum and Sewing

904 West Lancaster Blvd., Lancaster
(661) 948-1521