ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 30 *Antelope Valley Astronomy Club Newsletter* **January 2010**

Up-Coming Events

January 8: Club Meeting*
January 11: Board Meeting @ Don's house
January 16: Star party @ Don's house

* 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

As I am writing this on the first day of winter, I want to wish everyone Bon Hiver! Astronomically speaking winter means Orion and the winter constellations. It also means that your stargazing can start at 5pm! In fact, just last Saturday, the few of us who braved the cold and threatening clouds to go to Red Rocks were shocked that after seemingly hours of observing it was only 7 o'clock!

How was I going to make it until midnight to see M102? Between Matt's propane heater and the moveable fire pit we had going behind the motor homes, we managed to make it until about 1:30am. There was actually a good turn out for such a remote location on a mostly cloudy day. Once Bob and a few stragglers realized that we were at Red Cliffs and not the Red Rocks Visitor's Center we ended up with about 12 folks out there. (Sorry about the directions – they seemed clear when I wrote them!)

By midnight only Matt Leone and I remained. As Draco gradually rose we started hunting for M102. Let me just say this about M102 – Messier never cataloged it and usually it's listed as a duplicate of M101. So when I finished my Messier list I had noted this. Still more and more references to an "alternate" M102 in Draco kept popping up. The most popular being a reference to be NGC 5866. And since it was on my Herschel list, why not give it a go?

On a clear dark night this would be an easy target – and Saturday ended up being very clear and crisp – the transparency and seeing at Red Rocks can be great. Still, on the horizons, low clouds lingered. Finally about 1:30 it seemed that M102 was high enough to be seen. Using Sky Atlas 2000.0 I calculated where to place my Telrad and took a look – nothing. I tried and tried but no good. Matt gave it a go and thought he had success but the long, edge-on galaxy he found didn't seem quite right. The Telrad was much further to the north and since there were a number of nice little galaxies in that area, I thought it must be one of those. After one last try, we finally found it and called it a night.

I had wanted to go to Red Rocks all year and this last star party of 2009 seemed like a good choice. Attendance turned out better than I had hoped and the sky finally cleared, though it got me thinking of 2010. Where shall we go? What can we do differently? Matt mentioned that he liked my "Lunar Observing Challenge" that I had at one of his Lunar Clubs last year so we thought that would be something to try again. In fact, I plan on doing something like that for other star parties as well. For starters, this year's

Messier Marathon (March 13th @ Poppy Reserve) will offer a Messier challenge giving prizes to the top three marathoners. Other star parties and Lunar Clubs will offer prizes for those who complete certain observing lists during the night.

It's not that we're trying to get you to rush through the night checking off targets. Rather, it always seems that observing sessions are more productive and enjoyable if you have a nice observing plan.

Other 2010 happenings: Look for an astronomer's master class hosted by Jeremy Amarant at the planetarium once a month on Thursdays (more info at the January meeting). I am planning a class on how to build a truss tube Dobsonian where we will build a scope out of an old 10" mirror on Saturdays this spring. Of course as I mentioned, there is our Messier Marathon in March, Mt. Wilson trip in August and our club picnic in August or September. And don't forget RTMC – not on Memorial weekend this year, it has moved up to the 14th-16th to coincide with the new moon. Since we hope to have a lot of folks up at RTMC we are going to move the May meeting to the 7th, the first Friday of the month. Other things in the pipeline include a joint star party with the LAAS at their permanent site near Mt. Pinos and perhaps a tour of Palomar followed by a star party.

To top it off, the year's only total lunar eclipse will occur on the evening of the 20th of December from about 10pm until the wee hours on the 21st. I'm planning on taking the 21st off from work and having an all-nighter observing party. Matt, I'll make the coffee if you'll bring the bacon...

All in all, it looks like a full year for the AVAC,
Don Bryden

Vice President

Doug Drake

Here we are starting a new year, yea!!

This year will be another good year for our club. I want to thank the past board and club members for a job well done; our club excels because of good people like you.

Rose, our past Vice President, has helped me by sending out request for speakers, thank you Rose. Any suggestions you have for new speakers would be welcome, please call me. Our speaker for this January is none other than our Planetarium Director, Jeremy Amarant; he will deliver a talk about the new astronomy classes he will be teaching this year, which are open to all of us. Now will be our chance to find more about this wonderful hobby of amateur astronomy. Astronomy is a very dynamic science with new discoveries of planet environment, solar system, galaxy, universe, and possible multi-universes.

I remember when I studied astronomy in college we only knew what could be seen through big telescopes like the 100-inch Mount Wilson and 200-inch Palomar and performing equations using our slide rule and looking at tables of computations. We now have accelerated astronomical knowledge with new tools like spacecraft exploration, CCD imaging, computer simulations, high speed mathematic computations and computer software enhancement. Wow Jeremy, show us the way, we always want to know more.

Director of Community Development

Rose Moore

Thanks to all who made our Christmas Party a great success!! And thanks to all who donated items for the silent auctions and the raffles. A great time was had by all!

The month of December ends my term as Vice President. I would like to thank all who helped me along the way especially all of the Board members this year. Many thanks to all the speakers and members who gave presentations this year. I am looking forward to working the coming year as the Director of Community Development! Please welcome Doug Drake as our new Vice President and give him your support!

2010 is here and I encourage club members to come out and become more involved with the club, even for just one event! Maybe you can attend more club meetings, or come to more community outreach events, attend one extra star party, or help a board member on a committee or project. Whatever you can do helps our club continue its successful journey!

I'm looking forward to attending more club star parties this year; I've even started buying a warmer wardrobe, so I can make it past 11pm! Come on out and enjoy the company of fellow members, lots of fun and laughs, and people willing to help you with learning and enjoying astronomy! I'm hoping to see YOU out there under some clear skies!

Rose

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

JEFF'S REPORT:

- Too Much Junk: With space debris posing a growing danger to spacecraft and satellites, DARPA says it is exploring the merits of removing man-made debris from Earth orbit. This study, known as Catcher's Mitt, will model debris, both now and projected in the future, and then, if appropriate, explore technically and economically feasible solutions for debris removal, said the agency in a release. "If justified, potential follow-on efforts might include a new DARPA-led program, or DARPA support for an effort led by another US government organization," said Wade Pulliam, a DARPA program manager. Data for the study are being gathered from three sources: a NASA-sponsored conference on debris removal held Dec. 8-10 in Chantilly, Va., a forthcoming request for information to industry for removal concepts, and utility studies by DARPA, the Air Force, and NASA that model the growing risk of debris to space operations.

- 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)!

Roswell

New Equipment Modifications by Frank Moore

As 2009 was closing out I had the privilege of participating in the design and testing of accessories for our Equatorial Mount and I got to learn firsthand about the close knit and personal nature of the "Cottage Industry" that supports our hobby.

It all started on October 20, 2009 when I wrote to Anthony Davoli, the owner of ADM Accessories, and inquired as to whether the aftermarket knob sets that he makes for the new Celestron CGEM mount would work on our Orion Atlas EQG. As both mounts are made by Synta, and look similar in many regards, I thought that might be the case.

If you aren't familiar with ADM, Anthony manufactures and sells machined aluminum accessories for telescopes and mounts. These include dovetails, saddles, ring sets, mounts for a myriad of uses, knobs for mounts and tripods, and counterweight systems. Our first experience with his fine products was when we purchased his kit that converted our Atlas from using the Vixen style saddle and dovetails to using the Losmandy D-Series saddle and dovetails.

Anthony responded that he had been considering such an accessory set for the Atlas for some time and asked if I would be interested in helping him with the design of the knob sets and testing the prototypes. I responded that I would be thrilled to have a part in such a project and asked what I could do. My role in the design process was to determine the size and pitch of the threaded shafts for the altitude/latitude and azimuth adjustment knobs, along with their length. I determined these were M10 with a 125 "standard pitch". After exchanging several emails in which I discussed the deficiencies in the original knobs that I felt needed to be addressed, on October 28, I sent the specifications to Anthony along with numerous detailed pictures of the original knobs and shafts alongside a millimeter rule.

We exchanged several more emails till, on November 9, Anthony sent me images of the knob set he had machined and advised that he would be mailing them to me. Upon looking at the images I suggested one more slight modification, the removal of 5 mm of thread from the end of the altitude/latitude knobs as was commensurate with the stock Orion knobs. Five days later, on November 14, I received the prototype knobs. 25 days after I first inquired, and I had a new, never before tested or used, product in my hand. I immediately installed the knobs on our mount and, in the warm comfort of our family room, made a cursory critique as to how they would function.

My biggest gripe, and only real issue, about the stock Atlas mount was the altitude/latitude knobs which can only be described as "paddles" and which were awkward and did not supply enough torque to make easy latitude adjustments, especially with the telescope on the mount like when making a drift alignment. The new knobs easily solved this problem and supplied more than ample torque. Due to the rather bulky nature of the new knob assembly, this allows for the additional torque while meeting the necessity of being folded down so as not to bind on the mount when slewing, Anthony had to shorten the shafts. This reduced the useful latitude range of the mount from between 9* and 72*, to between 16* and 47*. This is adequate for any place that we intend to take our telescopes, but obviously would not work for those much further South or much further North. Anthony knew this would be the case but without his own Atlas mount for testing, was not able to quantify it without our help.

At the next Star Party, November 21, Rose and I were finally able to test the new knobs on our mount. We couldn't be more pleased and found that with the new machined aluminum knobs on the mount and tripod, and our new ADM Counterweight Assembly for the front of our dovetail, the mount was the most stable it has ever been. I sent Anthony a detailed critique of this outing which he described as, "Exactly the kind of thorough evaluation I needed."

While this new knob set will work perfectly for our purposes, Anthony knows that some rethinking, reworking, and additional testing will be necessary before he offers them for sale to all. We hope to participate further in that process. Barely a month after expressing our need for such a product, we had it in the field testing it for the manufacturer. For our participation in the process....we got to keep a product that will eventually retail for $99.00. Thanks Anthony.

Wow. What neat industry. From discussing optics with Al Nagler, to buying focusers directly from William Yang of William Optics, to testing prototypes for ADM. This is a lot of fun.

Frank

Extraterrestrial Tidbits (ET) by Jeff Riechmann

Great things were planned for Virgil L. "Gus" Grissom. He started his space career as one of the original Mercury astronauts, orbiting the earth in Liberty Bell 7. This was the mission that after splashdown, the hatch of the space capsule exploded off of the craft. The craft soon filled with water and sank. Many people believe Grissom set off the explosive charges during a panic to get out of the craft while others believe there was some other sort of malfunction.

However, NASA's confidence in Gus never wavered. He was selected to command Gemini 3 with John W. Young as his pilot for three orbits. Gus had named the Gemini 3 capsule Molly Brown in reference to one of the survivors from the "unsinkable" Titanic. Gemini 3 didn't sink, but was a completely successful mission. (John Young would later walk on the moon as the commander of Apollo 16 and command the first Space Shuttle mission.)

Gus would go on to be selected to command the first Apollo mission, Apollo 1.

On January 27, 1967, Gus and his fellow astronauts Ed White and Roger Chaffee were participating in a launch rehearsal. The cabin of the capsule had been pressurized with pure oxygen. At 6:31 PM. there was a spark inside the capsule which ignited the pure oxygen resulting in the cabin bursting into an inferno. Someone screamed fire! Technicians raced to open the hatch, which normally took at least 90 seconds to open. Finally the hatch was opened, but it was too late. Gus and his two fellow astronauts had perished.

NASA had great plans for Gus. Many people speculate that had Gus not died in that fire, he would have gone on to be the first man to walk on the moon, instead of Neil Armstrong.

Gus' death was not in vain. Many lessons were learned as a result of this disaster. Things like not pressurizing the cabin with pure oxygen and using non-flammable materials in the construction of the cabin along with a plethora of other changes.

Three weeks before his death, Gus was quoted as saying, "If we die, do not mourn for us. This is a risky business we're in and we accept those risks. The space program is too valuable to this country to be halted for too long if a disaster should ever happen."

Gus Grissom, Astronaut.

Space Place

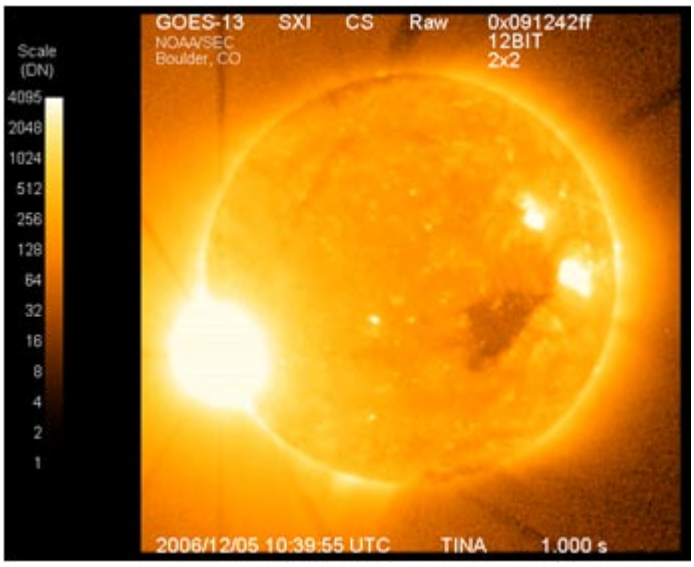
Sunglasses for a Solar Observatory
By Patrick Barry

In December 2006, an enormous solar flare erupted on the Sun's surface. The blast hurled a billion-ton cloud of gas (a coronal mass ejection, or CME) toward Earth and sparked days of intense geomagnetic activity with Northern Lights appearing across much of the United States.

While sky watchers enjoyed the show from Earth's surface, something ironic was happening in Earth orbit.

At the onset of the storm, the solar flare unleashed an intense pulse of X-rays. The flash blinded the Solar X-Ray Imager (SXI) on NOAA's GOES-13 satellite, damaging several rows of pixels. SXI was designed to monitor solar flares, but it must also be able to protect itself in extreme cases.

That's why NASA engineers gave the newest Geostationary Operational Environmental Satellite a new set of sophisticated "sunglasses." The new GOES-14 launched June 27 and reached geosynchronous orbit July 8.



X-9 class solar flare December 6, 2006, as seen by GOES-13's Solar X-ray Imager. It was one of the strongest flares in the past 30 years.

Its "sunglasses" are a new flight-software package that will enable the SXI sensor to observe even intense solar flares safely. Radiation from these largest flares can endanger military and civilian communications satellites, threaten astronauts in orbit, and even knock out cities' power grids. SXI serves as an early warning system for these flares and helps scientists better understand what causes them. "We wanted to protect the sensor from overexposure, but we didn't want to shield it so much that it couldn't gather data when a flare is occurring," says Cynthia Tanner, SXI instrument systems manager for the GOES-NOP series at NASA's Goddard Space Flight Center in Greenbelt, Maryland. (GOES-14 was called GOES-O before achieving orbit). Shielding the sensor from X-rays also reduces the amount of data it can gather about the flare. It's like stargazing with dark sunglasses on. So NASA engineers must strike a balance between protecting the sensor and gathering useful data. When a dangerous flare occurs, the new SXI sensor can protect itself with five levels of gradually "darker" sunglasses. Each level is a combination of filters and exposure times carefully calibrated to control the sensor's exposure to harmful high-energy X-rays. As the blast of X-rays from a major solar flare swells, GOES-14 can step up the protection for SXI through these five levels. The damaged sensor on GOES-13 had only two levels of protection—low and high. Rather than gradually increasing the amount of protection, the older sensor would remain at the low level of protection, switching to the high level only when the X-ray dose was very high. "You can collect more science while you're going up through the levels of protection," Tanner says. "We've really fine-tuned it." Forecasters anticipate a new solar maximum in 2012-2013, with plenty of sunspots and even more solar flares. "GOES-14 is ready," says Tanner.

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

A Winter Blast of Fun! by Tom Koonce

The weather is often keeping us inside at this time of year. The only stars we get to see are those as we are dashing from the car to the house in the evenings. For a few seconds we may glance up at Orion's Belt or perhaps a bright planet through bitterly cold, but alluringly steady, clear skies. You might briefly think about going inside and grabbing your telescope and coming back out for a few minutes of observing, but then the choice between the bitter cold and the Siren's song of the warmth of the house becomes clear as you retreat inside. It's frustrating, surely, but while amateur astronomy is a hobby that teaches patience and perseverance we don't want to sit idly by all winter.

Perhaps we should treat the winter months as an "opportunity". We could use these few months to explore our creativity, get our equipment finely tuned and ready, or even expand our horizons online by conducting real science for professional astronomers. With that in mind, here are a few ideas for the winter months. Maybe you'll like to try a few. These could count as New Year's Resolutions. All count as fun!

- Clean all of your eyepieces (http://www.televue.com/engine/page.asp?ID=143)
- Clean your telescope (http://www.ehow.com/how_10336_care-telescope.html , http://sctscopes.net/SCT_Tips/Maintenance/Cleaning_Your_Optics/cleaning_your_optics.html)
- Change the batteries in your Telrad, red light flashlights and other powered accessories.
- Inventory all of your astronomy gear. Take pictures of all of it for insurance purposes.
- Organize your eyepiece case and / or make a new eyepiece case (http://www.cloudynights.com/item.php?item_id=1090)
- Image process all of those great shots that you've been meaning to get to (http://www.spacetelescope.org/projects/fits_liberator/improc.html)
- Accomplish real science on your home computer – help scientists classify galaxy types: (http://www.galaxyzoo.org/)
- Build a model of the Cassini Spacecraft (or many others!) (http://www.jpl.nasa.gov/scalemodels/)
- Establish an "astronomy fun fund" for yourself and put $5/week into it
- Write a few letters to your town in favor of lighting control (http://www.darksky.org/)
- Review the Astronomical League list of observing clubs. There are a few new ones you might like try. (http://www.astroleague.org/observing.html)
- Repaint your old telescope with a cool pattern (http://www.cloudynights.com/ubbthreads/showflat.php/Cat/0/Board/classics/Number/2294472/page/0/view/collapsed/sb/5/o/o/fpart/all)
- Update your GoTo software on-line to the latest version
- Build your own dobsonian telescope (http://www.backyardvoyager.com/dobplans.html)

- Create a list of community outreach activities that you think your club might be able to do this year.
- Sketch out what your backyard observatory will look like one day (http://obs.nineplanets.org/obs/obslist.html)

- Survey your club members about what was their best astronomy-related experience this past year. Try to have more of those this next year.
- Make a glare shield for your telescope from black foam craft sheet (http://www.atoztelescopes.com/products/dew_shield.asp)
- Listen to an astronomy related podcast on your computer (http://www.astronomycast.com/)
- Write a letter to your state congressmen and senators in favor of the space program
- Explore Google Moon and Google Mars
- Make a cover for your telescope when not in use

I hope that you find this short list inspirational on the cold, dark, days of winter and that it prepares you for the upcoming warmer weather and "Messier Marathon" in March.

Astrophoto of The Month

M13 - Tak 130 at prime focus 15 frames at 60 sec. Images plus by Clint Whitman

News Headlines

Four 'Butterflynauts' Emerge on Space Station
As of Dec. 1, four Painted Lady butterflies are living aboard the International Space Station. These "butterflynauts" are part of an educational experiment that was launched Nov. 16 on space shuttle Atlantis and transferred to the Space Station. Students of all ages have been following the tiny crew's development from larvae to butterflies.
http://www.spaceref.com/news/viewpr.html?pid=29725

Just After the Big Bang: Hubble's Deepest View of Universe Unveils Never-Before-Seen Galaxies
The new Wide Field Camera 3 aboard the NASA/ESA Hubble Space Telescope has taken the deepest image yet of the Universe in near-infrared light. The faintest and reddest objects in the image are likely the oldest galaxies ever identified, having formed between only 600-900 million years after the Big Bang.
http://www.sciencedaily.com/releases/2009/12/091208132532.htm

New Planet Discoveries Suggest Low-Mass Planets are Common Around Nearby Stars
An international team of planet hunters has discovered as many as six low-mass planets around two nearby Sun-like stars, including two "super-Earths" with masses 5 and 7.5 times the mass of Earth. The researchers, led by Steven Vogt of the University of California, Santa Cruz, and Paul Butler of the Carnegie Institution of Washington, said the two "super-Earths" are the first ones found around Sun-like stars.
http://www.spaceref.com/news/viewpr.html?pid=29812

Clearest sign yet of dark matter detected
Deep inside an abandoned iron mine in northern Minnesota, physicists may have spotted the clearest signal yet of dark matter, the mysterious stuff that is thought to make up 90 per cent of the mass of the universe. The Cryogenic Dark Matter Search (CDMS) collaboration has announced that its experiment has seen tantalising glimpses of what could be dark matter.
http://www.newscientist.com/article/dn18303-clearest-sign-yet-of-dark-matter-detected.html

NASA's Flying Telescope Passes Key Test
A NASA jumbo jet that will help scientists unlock the origins of the universe with infrared observations reached a milestone Friday when doors covering the plane's telescope were fully opened in flight. The Stratospheric Observatory for Infrared Astronomy, a modified 747 jet known as SOFIA, flew for one hour and 19 minutes, which included two minutes with the telescope's doors fully opened. It was the first time outside air has interacted with the part of the plane that carries the 98-inch infrared telescope.
http://www.skyandtelescope.com/news/wires?id=139075235&c=y

The Wide-Field Infrared Survey Explorer space telescope jettisons its cover
NASA's recently launched Wide-Field Infrared Survey Explorer ejected its protective cover and opened its eyes to the starry sky today. Engineers and scientists say the maneuver went off without a hitch, and everything is working properly. The mission's "first-light" images of the sky will be released to the public in about a month after the telescope is calibrated.
http://www.astronomy.com/asy/default.aspx?c=a&id=8932

January Sky Data

Best time for deep sky observing this month:
January 6 through January 19

Mercury passes almost directly in front of the Sun on January 4th. But on January 27th it reaches its greatest distance west of the Sun, so we have a chance to glimpse this elusive little planet in the south-east at dawn. If you can find the waning Moon at dawn on Tuesday the 12th, Mercury will be the same height above the horizon, but 18 degrees further left

Venus is at superior conjunction – almost directly behind the Sun – on January 11th, so we won't see this brilliant planet at all this month.

Mars is at opposition on January 29th – it lies opposite to the Sun in the sky – so it rises in the north-east at sunset and it shines all night. It is also at its closest to Earth this month, though this is not a particularly close opposition. Mars is moving steadily north-westwards from Leo into Cancer

The giant planet **Jupiter** is low in the south-west at dusk. At the start of January, it is disappearing below the horizon at 8 pm; by the end of the month, it sets before 7 pm, so we have only a brief chance to see it. Jupiter is moving north-eastwards out of Capricornus into Aquarius.

Saturn is rising in the east before midnight, and it's high in the southern sky at about 5 am. It's almost stationary in the constellation of Virgo. Spica, the brightest star in Virgo, is to the lower left of Saturn. In a telescope, the disc of Saturn appears 18 arc-seconds across, and the famous rings form a narrow oval, 41 arc-seconds wide and only 4 arc-seconds high.

The Quadrantid **meteor-shower** produces a good display of meteors every year during the first week of January. This year, the peak is expected on the evening of Sunday January 3rd, but it would be better to look for them in the early hours of either Sunday or Monday morning.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
1/1/2010	18:16	07:48	06:59	16:52
1/5/2010	22:59	10:14	06:59	16:55
1/10/2010	03:15	13:11	06:59	16:59
1/15/2010	07:13	17:42	06:58	17:04
1/20/2010	09:30	22:22	06:56	17:09
1/25/2010	12:27	02:29	06:54	17:14
1/31/2010	19:31	07:38	06:50	17:20

Planet Data

Jan 1

	Rise	Transit	Set	Mag
Mercury	07:09	12:25	17:32	3.2
Venus	06:50	11:48	16:45	-3.9
Mars	19:33	02:34	09:36	-0.8
Jupiter	09:32	15:04	20:32	-2.1
Saturn	23:18	05:25	11:33	0.9

Jan 15

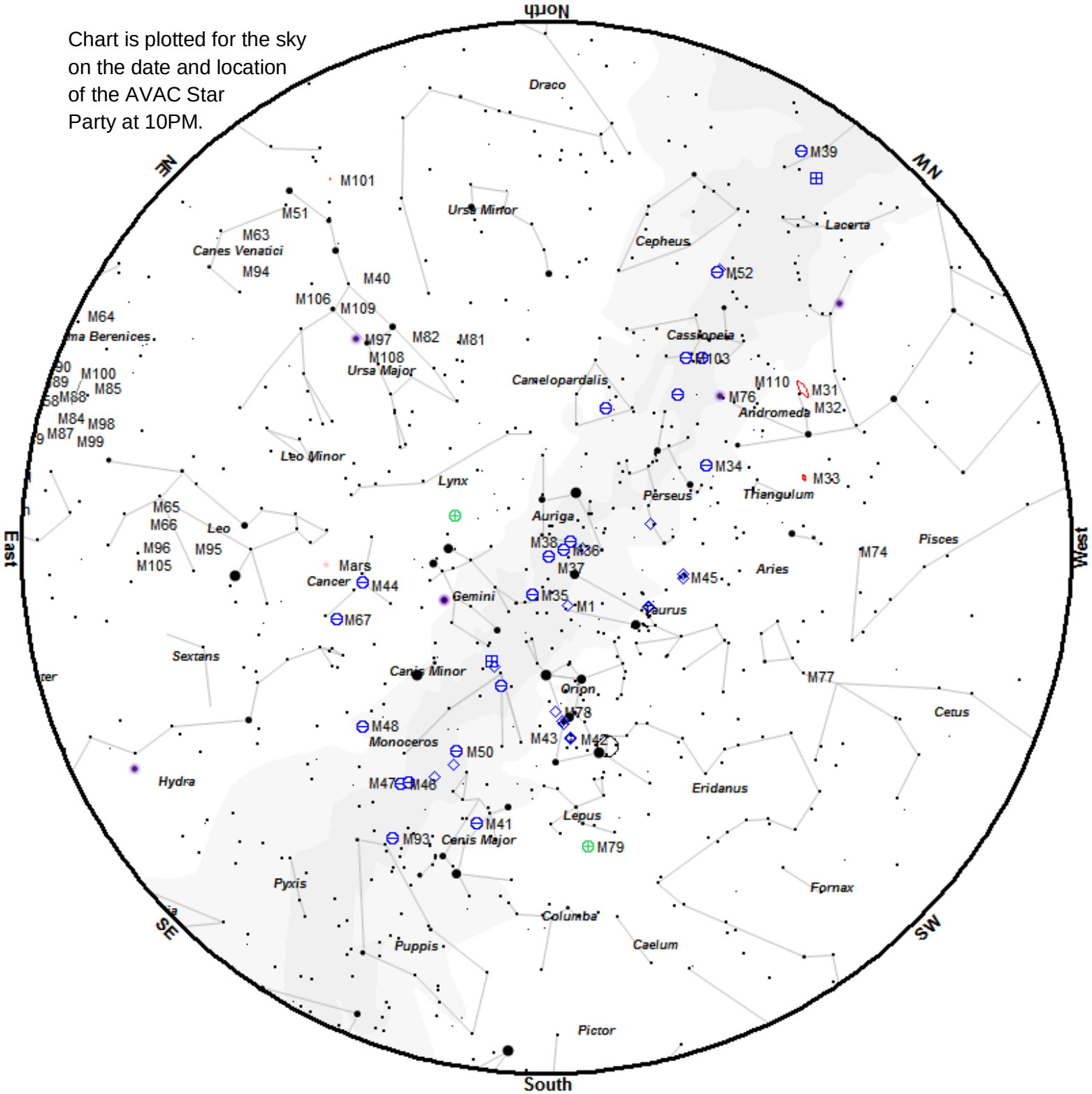
	Rise	Transit	Set	Mag
Mercury	05:25	10:33	15:44	0.4
Venus	07:04	12:07	17:12	-3.9
Mars	18:18	01:25	08:32	-1.1
Jupiter	08:45	14:20	19:52	-2.1
Saturn	22:23	04:31	10:38	0.8

Jan 31

	Rise	Transit	Set	Mag
Mercury	05:23	10:26	15:29	-0.1
Venus	07:09	12:27	17:46	-3.9
Mars	16:44	23:57	07:11	-1.3
Jupiter	07:52	13:31	19:06	-2.0
Saturn	21:19	03:27	09:35	0.7

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.



Star Magnitudes		
0 1 2 3 4 5	Galaxy	Nebula
	Open Cluster	Bright Nebula
	Globular Cluster	Planetary Nebula
	Cluster+Nebulosity	

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.

Cls	ID	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
Open	M 52	8.2	Cas	23h24m48.0s	+61°35'36"	18:17	18:39	20:32	detectable
Open	NGC 7790	7.2	Cas	23h58m24.0s	+61°12'30"	18:10	18:39	22:06	obvious
Open	NGC 7789	7.5	Cas	23h57m24.0s	+56°42'30"	18:17	18:39	20:34	detectable
Gal	M 110	8.9	And	00h40m22.3s	+41°41'09"	18:16	18:40	20:55	detectable
Gal	M 31	4.3	And	00h42m44.3s	+41°16'07"	18:14	18:40	21:40	easy
Gal	M 32	8.9	And	00h42m41.8s	+40°51'58"	18:14	18:40	21:37	easy
Open	NGC 457	5.1	Cas	01h19m35.0s	+58°17'12"	18:11	18:42	23:19	obvious
Gal	M 33	6.4	Tri	01h33m50.9s	+30°39'36"	18:14	18:41	21:39	detectable
Open	NGC 559	7.4	Cas	01h29m31.0s	+63°18'24"	18:11	18:43	23:42	easy
Open	M 103	6.9	Cas	01h33m23.0s	+60°39'00"	18:09	18:43	23:39	obvious
PNe	M 76	10.1	Per	01h42m19.9s	+51°34'31"	18:16	18:43	22:07	detectable
Open	NGC 637	7.3	Cas	01h43m04.0s	+64°02'24"	18:08	18:44	23:58	obvious
Open	NGC 752	6.6	And	01h57m41.0s	+37°47'06"	18:21	18:44	20:39	challenging
Open	NGC 869	4.3	Per	02h19m00.0s	+57°07'42"	18:09	18:48	00:15	obvious
Open	NGC 884	4.4	Per	02h22m18.0s	+57°08'12"	18:09	18:49	00:20	obvious
Open	NGC 957	7.2	Per	02h33m21.0s	+57°33'36"	18:12	18:51	00:08	easy
Gal	M 77	9.7	Cet	02h42m40.8s	-00°00'48"	18:16	18:54	21:55	detectable
Open	M 34	5.8	Per	02h42m05.0s	+42°45'42"	18:13	18:56	23:15	easy
Open	NGC 1027	7.4	Cas	02h42m40.0s	+61°35'42"	18:16	19:36	23:25	detectable
Open	NGC 1342	7.2	Per	03h31m38.0s	+37°22'36"	18:13	19:40	23:54	easy
Open	M 45	1.5	Tau	03h47m00.0s	+24°07'00"	18:09	19:55	00:31	obvious
Open	NGC 1444	6.4	Per	03h49m25.0s	+52°39'30"	18:08	19:57	01:36	obvious
Open	NGC 1502	4.1	Cam	04h07m50.0s	+62°19'54"	18:06	20:12	02:19	obvious
Open	NGC 1528	6.4	Per	04h15m23.0s	+51°12'54"	18:13	20:23	01:32	easy
Open	NGC 1647	6.2	Tau	04h45m55.0s	+19°06'54"	18:19	20:54	00:18	detectable
Open	NGC 1664	7.2	Aur	04h51m06.0s	+43°40'30"	18:13	20:59	01:54	easy
Open	NGC 1746	6.1	Tau	05h03m50.0s	+23°46'12"	18:20	21:12	00:43	detectable
Glob	NGC 1851	7.1	Col	05h14m06.0s	-40°02'48"	20:12	21:22	22:32	detectable
Open	M 38	6.8	Aur	05h28m40.0s	+35°50'54"	18:19	21:36	01:45	detectable
Neb	M 1	8.4	Tau	05h34m30.0s	+22°01'00"	19:39	21:42	23:45	challenging
Open	M 36	6.5	Aur	05h36m18.0s	+34°08'24"	18:13	21:44	02:35	easy
Neb	M 42	4.0	Ori	05h35m18.0s	-05°23'00"	18:35	21:43	00:51	easy
Open	M 37	6.2	Aur	05h52m18.0s	+32°33'12"	18:16	22:00	02:40	easy
Open	NGC 2129	7.0	Gem	06h01m07.0s	+23°19'20"	18:13	22:08	02:43	obvious
Open	M 35	5.6	Gem	06h09m00.0s	+24°21'00"	18:21	22:16	02:32	easy
Open	NGC 2169	7.0	Ori	06h08m24.0s	+13°57'54"	18:17	22:16	02:26	obvious
Open	NGC 2175	6.8	Ori	06h09m39.0s	+20°29'12"	18:39	22:17	01:56	detectable
Open	NGC 2264	4.1	Mon	06h40m58.0s	+09°53'42"	18:47	22:48	02:49	obvious

Cls	ID	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
Open	M 41	5.0	CMa	06h46m01.0s	-20°45'24"	21:17	22:54	00:28	easy
Open	NGC 2301	6.3	Mon	06h51m45.0s	+00°27'36"	19:28	22:59	02:30	easy
Open	M 50	7.2	Mon	07h02m42.0s	-08°23'00"	20:15	23:10	02:05	detectable
Open	NGC 2353	5.2	Mon	07h14m30.0s	-10°16'00"	20:34	23:22	02:09	easy
Open	NGC 2355	9.7	Gem	07h16m59.0s	+13°45'00"	20:40	23:24	02:08	difficult
PNe	NGC 2392	8.6	Gem	07h29m10.8s	+20°54'42"	19:08	23:37	04:06	obvious
Open	M 47	4.3	Pup	07h36m35.0s	-14°29'00"	21:20	23:44	02:07	obvious
Open	NGC 2439	7.1	Pup	07h40m45.0s	-31°41'36"	21:39	23:48	01:56	easy
Open	M 46	6.6	Pup	07h41m46.0s	-14°48'36"	21:27	23:49	02:11	detectable
PNe	NGC 2440	11.5	Pup	07h41m55.4s	-18°12'31"	21:52	23:49	01:46	detectable
Open	NGC 2451	3.7	Pup	07h45m23.0s	-37°57'21"	22:02	23:52	01:42	easy
Open	M 93	6.5	Pup	07h44m30.0s	-23°51'24"	22:59	23:52	00:46	easy
Open	NGC 2477	5.7	Pup	07h52m10.0s	-38°31'48"	22:12	00:00	01:47	easy
Open	NGC 2506	8.9	Mon	08h00m01.0s	-10°46'12"	22:08	00:07	02:05	difficult
Open	NGC 2571	7.4	Pup	08h18m56.0s	-29°45'00"	22:12	00:26	02:40	easy
Open	M 44	3.9	Cnc	08h40m24.0s	+19°40'00"	20:43	00:47	04:52	easy
Open	M 67	7.4	Cnc	08h51m18.0s	+11°48'00"	22:05	00:58	03:52	detectable
Gal	M 82	9.0	UMa	09h55m52.4s	+69°40'47"	20:00	01:59	05:50	easy
Gal	M 81	7.8	UMa	09h55m33.1s	+69°03'56"	20:15	01:59	05:50	detectable
PNe	NGC 3132	8.2	Vel	10h07m01.8s	-40°26'11"	00:25	02:13	04:03	easy
Gal	NGC 3227	11.5	Leo	10h23m30.6s	+19°51'54"	23:30	02:31	05:30	difficult
PNe	NGC 3242	8.6	Hya	10h24m46.1s	-18°38'32"	00:37	02:32	04:25	obvious
PNe	M 97	11.0	UMa	11h14m47.7s	+55°01'09"	00:41	03:18	05:37	challenging
Gal	M 65	10.1	Leo	11h18m55.7s	+13°05'32"	00:05	03:25	05:49	detectable
Gal	M 66	9.7	Leo	11h20m14.9s	+12°59'30"	00:03	03:27	05:48	detectable
Gal	M 106	9.1	CVn	12h18m57.6s	+47°18'13"	00:23	04:25	05:51	detectable
Gal	M 86	9.8	Vir	12h26m12.2s	+12°56'44"	01:32	04:33	05:49	detectable
Gal	M 84	10.1	Vir	12h25m03.9s	+12°53'12"	01:16	04:32	05:49	detectable
Gal	M 49	9.3	Vir	12h29m46.8s	+08°00'01"	01:20	04:36	05:50	detectable
Gal	M 87	9.6	Vir	12h30m49.2s	+12°23'29"	01:20	04:37	05:50	detectable
Gal	NGC 4565	10.1	Com	12h36m20.8s	+25°59'15"	01:32	04:43	05:49	difficult
Gal	M 104	9.1	Vir	12h39m59.3s	-11°37'22"	02:06	04:46	05:51	detectable
Glob	M 68	7.3	Hya	12h39m28.0s	-26°44'36"	02:43	04:45	05:48	detectable
Gal	M 94	8.7	CVn	12h50m53.1s	+41°07'12"	00:32	04:57	05:52	easy
Gal	M 64	9.3	Com	12h56m43.8s	+21°41'00"	01:20	05:02	05:52	detectable
Gal	NGC 5195	10.5	CVn	13h29m59.6s	+47°15'58"	01:36	05:18	05:51	detectable
Gal	M 51	8.7	CVn	13h29m52.3s	+47°11'40"	00:54	05:18	05:52	easy
Gal	M 101	8.4	UMa	14h03m12.4s	+54°20'53"	02:05	05:21	05:50	detectable
Glob	M 3	6.3	CVn	13h42m11.0s	+28°22'42"	01:43	05:21	05:52	easy
Gal	M 83	7.8	Hya	13h37m00.8s	-29°51'56"	03:37	05:24	05:52	detectable
Glob	NGC 5139	3.9	Cen	13h26m46.0s	-47°28'36"	04:41	05:27	05:48	detectable
Glob	M 13	5.8	Her	16h41m41.0s	+36°27'36"	03:44	05:30	05:51	easy
Glob	M 5	5.7	Ser	15h18m34.0s	+02°05'00"	03:49	05:29	05:51	easy
Glob	M 92	6.5	Her	17h17m07.0s	+43°08'12"	04:06	05:31	05:51	easy
PNe	NGC 6543	8.3	Dra	17h58m33.4s	+66°37'59"	03:48	05:32	06:01	obvious

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.
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Membership entitles you to…

- Desert Sky Observer–monthly newsletter.
- The Reflector – the publication of the Astronomical League.
- The A.V.A.C. Membership Manual.
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