ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 29 *Antelope Valley Astronomy Club Newsletter* **October 2009**

Up-Coming Events

October 9: LCROSS Lunar Impact viewing @ the Sage Planetarium*
October 9: Club meeting @ the Sage Planetarium*
October 10: Moonwalk with Jeremy @ Prime Desert Woodlands
October 12: Executive Board Meeting @ Don's house
October 17: Dark Sky Star Party @ Devils Punchbowl

* 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

Well our October business meeting is nearly upon us. You should be getting a letter inviting you to the meeting and informing you of all agenda items. Mainly, we will be electing a new board for 2010. So far the following members have been nominated:

- President: Don Bryden
- Vice President: Doug Drake
- Treasurer: Doug Drake, Frank Moore
- Secretary: Frank Moore
- Dir. Of Community Development: Rose Moore

You may have noticed a pattern, here. The same people, with few exceptions, are heading up the list again. Karole and Tom are stepping down after years of serving the club but then again, not really. Tom will be heading the Long Range Planning Committee as well as being heavily involved with YEA. And Karole will be as involved with the library and star parties as ever. Even Doug, who may be a new name to a few of you, is well known to most as a past president among other board positions.

So what does this mean to you? We'll have a capable board and the real heart of the club, our committee chairs, will be working behind the scenes as hard as ever. People like Steve Trotta who single-handedly put out this newsletter and provides us a wonderful internet presence. Or Jeff Reichmann & Dick Hague who chair the Aerospace and Night Sky Network committees as well as providing fantastic community outreach in the name of the club. And there are so many others who are always there. People that host star parties or run committees or organize public events.

So when you, the members, want to check out some club equipment, or take a mirror making class, or see a speaker or one of Jeremy's great shows at the SAGE, these folks are all here for you and our club. There's no better time than now to think of stepping up and nominating yourself for a board position, or heading or joining a committee. Become a piece of the heart of the club and you will be rewarded many times over!

Vice President

Rose Moore

Fall is here and there are upcoming events for our club! Check out our website for details!

Please attend our annual business meeting on Friday, October 9th and take part in our club elections and business meeting! We need you to attend to vote on whom you would like in our club executive board positions for 2010. Come and make your voice heard and your vote count!

November's club meeting, November 13th, is our last scheduled club meeting for 2009. Matt Leone and Jeremy Amarant are planning a presentation on Messier objects, with a planetarium show. Come on out to the meeting and enjoy!

There is no club meeting for December, but we do have our annual Christmas Party on Saturday, December 12th for club members. The event will start at 6:00 pm at the Antelope Valley Inn, 44055 N. Sierra Hwy., in Lancaster. At the next 2 meetings, please make sure you sign up so that we can have an accurate head count for the party. If you are unable to attend a club meeting, please email or call me or another board member so we can add you to the list. If you have an item(s) you would like to donate for the raffle or auction, please contact one of the board members.

We had several club members attend our last club star party at Mt. Pinos for 2009 and a great time was had by all. We had clear skies and chilly nighttime weather! Many thanks to Yvonne and Leon Waller for the wonderful dinner they brought for us on Saturday evening!! Tom Koonce came by with his Boy Scouts and they were able to look through all the scopes, and an added bonus for some of us club members was to listen in on Tom's astronomy lessons to the Scouts. We were also visited by Lauren Hollen, a Tehachapi High School Physics teacher, and Dale Hawkins, a retired engineer and avid astronomer from Tehachapi. Dale used to write the 'Sky Watch' column in the Tehachapi News. They were invited to come up to see what we do at Mt. Pinos by Frank Moore, who is in the Tehachapi Choir with Lauren. A wonderful time was had, and we're all looking forward to making a trip up to Mt. Pinos next spring as soon as the weather is warmer!

Here's to clear fall skies and chilly weather!

Director of Community Development

Karole Barker

The turnout for Prime Desert Woodlands on 8/26/2009 was 53 people and 5 club members and they were still able to view the Moon even though there was smoke from the station fire that weekend. On 9/12/2009 we had 140 people show up for the event, in addition to 13 club members. The last two Prime Desert Woodlands for 2009 will be held on October 10th @ 7:00 p.m., and 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.

The Lunar club will be meeting on Saturday September 26th @ 7:00 p.m. with Matt Leone.

Since our 1/2 night at Mt. Wilson on Saturday September 19th was canceled due to the Station Fire, we are going to reschedule for 2010. For those club members that had paid in advance for Mt. Wilson you will be receiving a refund. If you have any questions, please give me a call or e-mail me.

Another big event in September will be PATS @ the Pasadena Convention Center on September 26th & 27th.

On November 7th, Saturday 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

My trip to the September Star Party on Mount Pinos began uneventful enough. I spent the days preceding the trip doing my usual "preflight" of the motor home and stocking it up with provisions. By the time I left on the morning of Friday September 18 I was, as usual, already exhausted.

I made the drive from Tehachapi and arrived in front of Duane Lewis' house at around 9:00 AM. As usual, Duane was standing on the curb, all of his supplies and observing gear piled around him, and beaming with anticipation. His enthusiasm served to temper my fatigue.

We hit the road and started the long drive down Ave D/Highway 138 having our usual "conversation" with Duane expounding on some sort of theoretical physics (I think) while I made exaggerated enunciations of my words to assist him with his lip reading.

Then, we saw it, the "Notice of Public Hearing" sign posted on the site of the proposed Fairmont Butte Motorsports Park. I explained to Duane that this was the site of the site of the racetrack project and pointed out the edges of the Poppy Reserve to the south. I found it striking that while the project developers claim the site is not visible from Poppy Reserve property, I could clearly see the remains of the old windmill, which is on a hill near the Park Headquarters, perched on the top of the butte. This revelation only served to further fuel the rancor in mine and Duane's conversation. We eventually calmed down and things became quiet for a time.

Then, as we passed Neenach, I realized we were again in the vicinity of another proposed development, this one the Centennial Project. If you aren't aware, the Centennial Project is a proposed development encompassing approximately 12,000 acres located in northwestern portion of the Antelope Valley. The eastern edge of this project site starts just to the west of Neenach and the western edge of the site is approximately 1 mile east of Interstate 5 (I-5). It's just south of the Kern County line, immediately adjacent both north and south to State Route 138 in the vicinity of Quail Lake. The terrain is open rolling hills with some areas replete with Oak Groves, wildflowers, and wildlife. Most of the property is currently used for cattle grazing. As proposed, the project would have a maximum of 23,000 dwelling units, 14 million total square feet of non-residential commercial development and retail centers, to be built out over approximately 20 years. Two tracts would have around 6,000 single-family residential units between them while another provides for 5,651 lots which would have both single and multi-family residential units.

After questions from members during the last AVAC meeting, I did some research and found that the Centennial Project has been proposed by Tejon Ranch Corporation and is basically the southern (LA County) extension of the Tejon Mountain Village Project for which the draft EIR has already been approved by the Kern County Planning Commission. While Tejon Mountain Village, at 26,000 acres, is considerably larger than Centennial in area, its proposed residential density is much smaller. These projects are basically contiguous and, between the two, would encompass over 38,000 acres. Of course, mention of these projects prompted another animated discussion with Duane.

"But wait, that's not all." A bit further down the road and we passed "Gorman Post Road". This reminded me of yet another development, this one known as "Gorman Post Ranch" which will basically fill in any remaining open space between Centennial and Lebec.

While Centennial and Gorman Post Ranch are still many years down the road as Draft EIRs have not even been completed, and Tejon Mountain Village has strict lighting regulations and mitigation measures in an attempt to preserve dark skies, the cumulative effect of these projects (if all are completed) will still have a profound and unavoidable effect on the viewing conditions from Mount Pinos and the rural areas on the western side of the Antelope Valley.

At 3:30 AM on Sunday morning, in the good company of Don Bryden, I viewed The Great Orion Nebula through Rose's C-11 and couldn't help but wonder how much longer viewing conditions from the top of Mount Pinos will provide for such stunning views.

But, for that moment, as this former "telescope mount mechanic", and now awestruck novice astronomer, viewed Orion for the first time through any telescope, I was lost in the wonder of it all and my mind drifted to the lyrics of the old C. W. McCall song Aurora Borealis, "I realized that life is just a collection of memories. And memories are like starlight: they go on forever."

Dark Skies.

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

Vandenberg Launch Schedule: As of 2009 September 16

Date	Launch Time/Window (PST/PDT)	Vehicle	Pad/Silo
OCT 6	11:38-11:53	Delta II	SLC-2W
Payload is the WorldView-2 commercial reconnaissance satellite.			
OCT 13	09:12	Atlas V	SLC-3
Payload is the DMSP F18 military weather satellite.			
OCT 22	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.			

Extraterrestrial Tidbits by Jeff Riechmann

Remember the movie Armageddon? That's the movie in which Bruce Willis and a bunch of oilfield roughnecks land on an asteroid which is on a collision course with earth, in an attempt to destroy the asteroid before it hits good ol' mother earth. As farfetched as Armageddon may seem, November 19 marks the fourth anniversary of the Japanese probe Hayabusa landing on and collecting samples from the near earth asteroid 25143 Itokawa.

There was also a device on the probe that was designed to blast a hole into the surface of the asteroid and then collect samples from the dust cloud. Although unsuccessful in blasting a hole into the asteroid, it is still hoped that some dust samples were collected. Hayabusa, which was launched in May of 2003, is expected to return to earth in June of 2010. I wonder if they consulted with Mr. Willis and his roughnecks.

Astrophoto of The Month

M31 – The Andromeda Galaxy

By Dave Allen

Dave is a past member of the AVAC and an excellent astro-photographer. The only details on this photo are on the scope, a Vixen 90mm Flourite Refractor @ 5.6

To see more of Dave's photos and those of other current and past members, visit the AVAC photo gallery.

Your Telescope – Your Own Time Machine by Tom Koonce

Look up in the sky this evening at the Moon. In the time it takes to read

"The Moon light took a second and a half to reach my eyes, "

- It did! The light from our Sun takes about eight minutes to reach us. Farther out in space, Jupiter is high in the evening sky during October. Its light takes approximately forty to fifty minutes to travel the distance to Earth. Can you remember what you were doing five hours ago? Perhaps you were at school or at work. Light that left distant Pluto at that moment five hours ago and is just arriving here. This means that when we look at Pluto, we are seeing it as it looked five hours earlier. In the meantime, an asteroid could be crashing into it right now, erupting into a great plume, but we'd have no way of knowing this yet until the light arrives showing us the scene.

All of the light reflected from objects within our Solar System arrives at Earth in a matter of hours. At the speed of light, this demonstrates the vast distance involved between the solar system objects. When we look up into the night sky and see the stars of our own Milky Way Galaxy, the light has traveled between years and thousands of years to get to our eyes. Some of the light you see started its journey the day you were born and has been on its way ever since - every second of your life the light has been moving 186,000 miles closer. The night sky has objects whose light left them when the Declaration of Independence was signed, the fall of Rome, or when the capstone was set in place at the top of the Great Pyramid.

Andromeda Galaxy – Approx 2.54 million ly away

With our telescopes pointed outside of the Milky Way Galaxy, we can see the light of much more distant objects in the Universe. The light that we see from the Andromeda galaxy shows it as it was about two and a half million years ago, long before modern humans walked our planet. Some common amateur astronomy 'deep-sky' objects are so distant that the light has been on its way to us since the time of the dinosaurs.

When you think about it, the telescope is a type of time machine, showing us objects as they looked, not as they are at this instant in time, but as they looked at the moment the light left them.

Before your next public star party, it could be a lot of fun to make up a table of objects' distances in units of light years (ly). Then you can ask a young stargazer to tell you their age and show them the object whose light left it in the year of their birth. Timothy Ferris created a table of "Birthday Stars" in 1997. You can use this list or create your own. *(editor's note: If you create your own, please send a copy to the webmaster to be included on the club website)*

Print out a sheet of paper with the distance/age table on it, along with your club's contact and membership info and a calendar of your club's events and you'll have a great handout that people will enjoy!

Space Place

The Spitzer Space Telescope is getting a second chance at life.

The liquid helium "lifeblood" that flows through the telescope has finally run out, bringing Spitzer's primary mission to an end. But a new phase of this infrared telescope's exploration of the universe is just beginning.

Even without liquid helium, which cooled the telescope to about 2 degrees above absolute zero (-271°C), Spitzer will continue to do important research—some of which couldn't easily be done during its primary mission. For example, scientists will use Spitzer's "second life" to explore the rate of expansion of the universe, study variable stars, and search for near-Earth asteroids that could pose a threat to our planet.

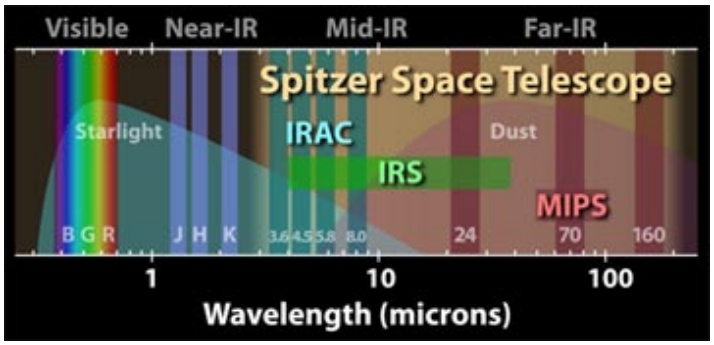
"We always knew that a 'warm phase' of the mission was a possibility, but it became ever more exciting scientifically as we started to plan for it seriously," says JPL's Michael Werner, Project Scientist for Spitzer. "Spitzer is just going on and on like the Energizer bunny."

Launched in August 2003 as the last of NASA's four Great Observatories, Spitzer specializes in observing infrared light, which is invisible to normal, optical telescopes.

That gives Spitzer the power to see relatively dark, cool objects such as planet-forming discs or nearby asteroids. These objects are too cold to emit light at visible wavelengths, but they're still warm enough to emit infrared light.

In fact, all warm objects "glow" with infrared light—even telescopes. That's why Spitzer had to be cooled with liquid helium to such a low temperature. Otherwise, it would be blinded by its own infrared glow.

As the helium expires, Spitzer will warm to about 30 degrees above absolute zero (–243°C). At that temperature, the telescope will begin emitting long-wavelength infrared light, but two of its short-wavelength sensors will still work perfectly.



The "warm mission" of the Spitzer Space Telescope will still be able to use two sensors in its Infrared Array Camera (IRAC) to continue its observations of the infrared universe.

And with more telescope time available for the remaining sensors, mission managers can more easily schedule new research proposals designed for those sensors. For example, scientists have recently realized how to use infrared observations to improve our measurements of the rate of expansion of the universe. And interest in tracking near-Earth objects has grown in recent years—a task for which Spitzer is well suited.

"Science has progressed, and people always have new ideas," Werner says. In its second life, Spitzer will help turn those ideas into new discoveries.

For kids, The Space Place Web site has a fun typing game using Spitzer and infrared astronomy words. Check it out at spaceplace.nasa.gov/en/kids/spitzer/signs.

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

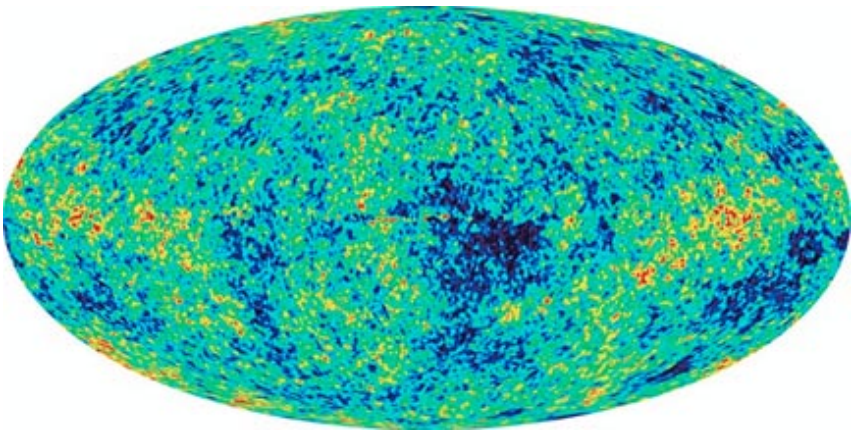
International Year of Astronomy - What is the Fate of the Universe

Where do we come from and where are we going? Humans have been asking these questions since before recorded history. Over the past 400 years, science has used observations and experiments to attempt to answer them. Cosmologists study the nature of the whole universe as they look for the answers to these big questions.

Most astronomers today accept the abundant evidence that the universe began about 14 billion years ago. But because we cannot see into the future, the fate of the universe has been somewhat more perplexing. In 1929, Edwin Hubble discovered that the universe is expanding. Then in 1990 NASA's COBE satellite showed that the universe was originally extremely hot and dense. So the universe started small and hot and is getting bigger and cooler. Based on what was known for most of the past century, scientists saw two different options for the fate of the universe, depending on how much mass it contained. Since mass creates gravity, the more mass there is, the more gravity will pull things together. Thus the two possible outcomes are:

1) Either there isn't enough mass to stop the expansion and the universe will just keep expanding forever, or
2) There is enough mass and gravity to pull the universe back together, and there will be some kind of "Big Crunch" in our future.

In both of these models, the rate of expansion was expected to slow over time. Well, new discoveries sometimes mean that scientists have to change their models. That was the case in 1998, when two separate groups came to a shocking conclusion. Using observations with the Hubble Space Telescope and ground-based telescopes, the researchers found that not only is the universe expanding, it is also accelerating! It appears that there is some unknown force "pushing" the universe faster and faster apart. This acceleration has changed our understanding of the fate of the universe and created even more questions. NASA and the Department of Energy have jointly asked scientists to design a mission, to be launched in the next decade that will explore the nature of the so-called “Dark Energy” that is causing the universe to expand ever faster.



A map of the cosmic microwave background made by NASA's WMAP satellite shows density fluctuations in the early universe - regions of higher density were slightly warmer than voids. (NASA/WMAP Science Team)

The fate of the universe is all very far in the future. But in the not so distant future, about four billion years from now, the Milky Way Galaxy will collide with the Andromeda Galaxy. Amazingly, stars in galaxies are so far apart that few, if any, of them will actually collide. But the dust and gas will slam together, and if humans still inhabit the Earth, our distant ancestors should have quite a show as bright new stars are born in the night sky. You can see the Andromeda Galaxy now, while it is still over 2 million light years away. Use the finder chart in this guide to locate it.

News Headlines

Stellar Mystery Solved, Einstein Safe
For more than 30 years, Villanova University astronomer Ed Guinan has been plagued, puzzled, and perplexed by DI Herculis. On the surface, this binary star seems pretty much like any other binary star, with two stars going 'round and 'round each other in a predictable, orderly fashion. But there remained a nagging problem that as much as Guinan wanted, he couldn't just sweep under the rug: DI Her was not behaving in accordance with Einstein's general theory of relativity.
http://www.skyandtelescope.com/community/skyblog/newsblog/59467082.html

First rocky planet found outside solar system
Scientists have discovered the first confirmed Earthlike planet outside our solar system, they announced Wednesday. "This is the first confirmed rocky planet in another system," astronomer Artie Hatzes told CNN, contrasting the solid planet with gaseous ones like Jupiter and Saturn. But "Earthlike" is a relative term.
http://www.cnn.com/2009/TECH/space/09/16/new.rocky.planet/index.html?eref=igoogle_cnn

Planck Snaps Its First Images Of Ancient Cosmic Light
Planck started surveying the sky regularly from its vantage point at the second Lagrange point of the Sun-Earth system, L2, on 13 August. The instruments were fine-tuned for optimum performance in the period preceding this date. ESA's Planck microwave observatory is the first European mission designed to study the Cosmic Microwave Background – the relic radiation from the Big Bang.
http://www.sciencedaily.com/releases/2009/09/090917111503.htm

Invading Black Holes Explain Cosmic Flashes
Black holes are invading stars, providing a radical explanation to bright flashes in the universe that are one of the biggest mysteries in astronomy today. The flashes, known as gamma ray bursts, are beams of high energy radiation – similar to the radiation emitted by explosions of nuclear weapons – produced by jets of plasma from massive dying stars.
http://www.sciencedaily.com/releases/2009/09/090918100015.htm

High School Student Discovers Strange Pulsar-Like Object
A high-school student from West Virginia has discovered a new astronomical object, a strange type of neutron star called a rotating radio transient. Lucas Bolyard, a sophomore at South Harrison High School in Clarksburg, WV, made the discovery while participating in a project in which students are trained to search through data from the Robert C. Byrd Green Bank Telescope (GBT). Bolyard made the discovery in March, after he already had studied more than 2,000 data plots from the GBT and found nothing.
http://www.universetoday.com/2009/09/22/high-school-student-discovers-strange-pulsar-like-object/

Cassini reveals new ring quirks, shadows during Saturn equinox
NASA scientists are marveling over the extent of ruffles and dust clouds revealed in the rings of Saturn during the planet's equinox last month. Scientists once thought the rings were almost flat, but new images reveal the heights of some newly discovered bumps in the rings are as high as the Rocky Mountains.
http://www.astronomy.com/asy/default.aspx?c=a&id=8647

October Sky Data

Best time for deep sky observing this month:
October 12 through October 23

Mercury is at its greatest elongation west of the Sun on October 6th, and we have an unusually good chance to see this elusive little planet in the eastern sky before sunrise. Between October 6th and 11th, try looking around 6:30 AM. Mercury will be below and a little to the left of Venus, low in the east, about 6 degrees away.

Venus is rising a couple of hours before sunrise, and it's visible in the eastern sky at dawn; but each morning it rises a little later, and appears a little lower down. However, Venus is so intensely bright that it can be seen even in a brightening sky, and even at low altitude.

Mars is rising in the north-east well before midnight, and by dawn it's climbing high into the southern sky. Relative to the stars, Mars is moving steadily eastwards out of Gemini, crossing into Cancer on the 12th. It will be exactly in line with the "Twin" stars of Gemini, Castor and Pollux, on the morning of Wednesday 14th.

Jupiter is due south in the middle of the evening, though at best it's less than 20 degrees above the horizon. It sets in the south-west around midnight. Relative to the stars, Jupiter is almost stationary in the constellation of Capricornus; but the giant planet appears significantly brighter than any of the stars.

Saturn is very slowly emerging from behind the Sun into the dawn sky; it still won't be easy to see. On the morning of Thursday 8th, if you look to the lower left of Venus and manage to find Mercury, Saturn will be very close to the left of Mercury (only 18 arc-minutes away). But Saturn is considerably dimmer than Mercury, and will almost certainly require at least a pair of binoculars to see.

The **Orionid meteor shower** will probably peak around Tuesday October 20th, but activity stays high for a week or more. The radiant is in the northern part of Orion, to the upper left of Betelgeuse, so a few Orionid meteors may be seen even in the late evening; but the best rates will be in the early hours of the morning. This year there will be no interference from moonlight.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
10/1/2009	17:09	04:18	06:46	18:35
10/5/2009	19:06	08:20	06:49	18:29
10/10/2009	23:37	13:33	06:53	18:22
10/15/2009	04:14	16:38	06:57	18:16
10/20/2009	09:44	19:39	07:01	18:10
10/25/2009	13:43	------	07:06	18:04
10/31/2009	16:31	05:02	07:11	17:58

Planet Data

Oct 1

	Rise	Transit	Set	Mag
Mercury	05:23	11:40	17:59	0.2
Venus	04:45	11:13	17:41	-3.9
Mars	00:31	07:46	15:02	0.8
Jupiter	16:11	21:30	02:49	-2.7
Saturn	05:43	12:02	18:17	1.1

Oct 15

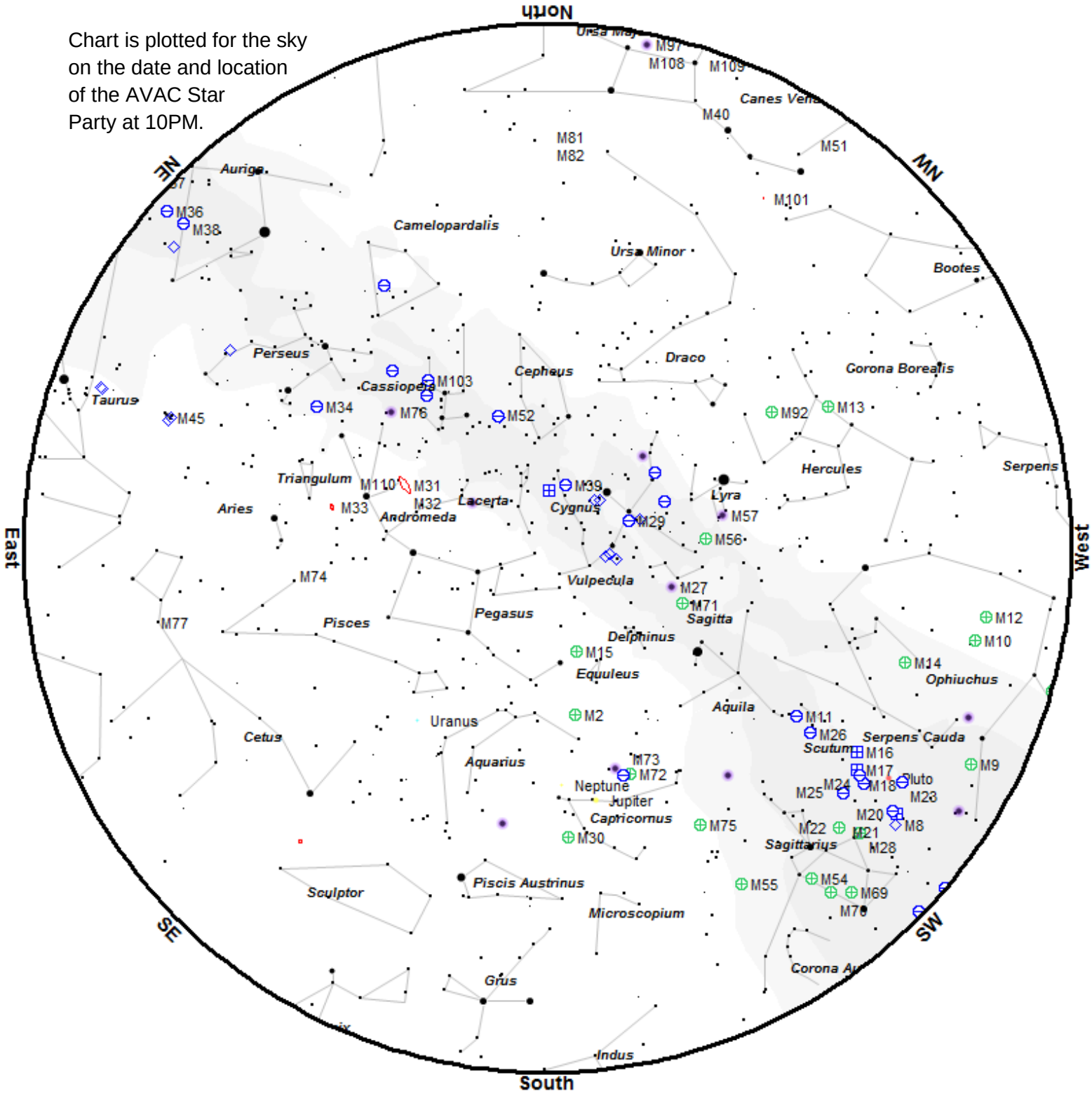
	Rise	Transit	Set	Mag
Mercury	05:50	11:52	17:53	-1.0
Venus	05:13	11:22	17:32	-3.9
Mars	00:11	07:22	14:34	0.6
Jupiter	15:15	20:34	01:53	-2.6
Saturn	04:56	11:09	17:26	1.1

Oct 31

	Rise	Transit	Set	Mag
Mercury	06:58	12:27	17:58	-1.3
Venus	05:45	11:33	17:21	-3.9
Mars	23:44	06:50	13:58	0.4
Jupiter	14:13	19:33	00:53	-2.5
Saturn	04:02	10:13	16:28	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	Best	End	Difficulty
NGC 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	19:08	19:37	21:10	obvious
M 55	Glob	6.3	Sgr	19h40m00.0s	-30°57'42"	19:21	19:39	20:45	detectable
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	19:18	19:40	21:24	easy
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	19:10	19:41	23:22	obvious
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	19:20	19:41	21:39	easy
M 11	Open	6.1	Sct	18h51m05.0s	-06°16'12"	19:22	19:41	21:03	detectable
NGC 6818	PNe	10.0	Sgr	19h43m57.8s	-14°09'12"	19:12	19:42	21:16	easy
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	19:16	19:43	22:52	easy
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	19:21	19:45	22:03	detectable
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	19:18	19:47	23:11	easy
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	19:18	19:47	23:01	easy
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	19:18	19:49	23:35	easy
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	19:19	19:51	00:00	easy
NGC 7009	PNe	8.3	Aqr	21h04m10.9s	-11°21'48"	19:11	20:12	22:52	obvious
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	19:19	20:37	00:11	easy
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	19:17	20:38	01:41	easy
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	19:20	20:40	23:48	detectable
M 30	Glob	6.9	Cap	21h40m22.0s	-23°10'42"	19:41	20:47	21:54	detectable
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	19:13	20:56	03:04	obvious
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	19:22	21:21	01:30	detectable
NGC 7293	PNe	6.3	Aqr	22h29m38.5s	-20°50'14"	20:02	21:36	23:11	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	19:26	22:27	02:39	detectable
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	19:17	23:01	05:03	obvious
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	19:33	23:00	02:53	detectable
NGC 55	Gal	8.5	Scl	00h15m08.4s	-39°13'13"	22:21	23:22	00:22	difficult
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	20:00	23:46	03:34	detectable
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	19:31	23:48	04:19	easy
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	19:29	23:49	04:24	easy
NGC 253	Gal	7.9	Scl	00h47m33.1s	-25°17'20"	21:43	23:53	02:04	detectable
NGC 288	Glob	8.1	Scl	00h52m45.0s	-26°35'00"	22:33	23:58	01:26	difficult
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	19:21	00:22	05:53	obvious
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	19:22	00:32	05:54	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	19:20	00:36	05:57	obvious
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	20:50	00:40	04:29	detectable
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	19:18	00:46	06:00	obvious
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	19:27	00:49	05:54	easy
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	20:38	00:49	04:59	detectable
NGC 752	Open	6.6	And	01h57m41.0s	+37°47'06"	22:35	01:04	03:33	challenging

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	19:37	01:21	05:59	obvious
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	19:40	01:24	05:59	obvious
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	20:16	01:36	05:55	easy
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	21:19	01:45	05:48	detectable
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	21:26	01:48	05:49	easy
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	22:46	01:49	04:51	detectable
NGC 1245	Open	7.7	Per	03h14m42.0s	+47°14'12"	23:57	02:21	04:44	challenging
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	22:25	02:38	05:53	easy
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	22:16	02:53	06:01	obvious
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	21:17	02:55	06:04	obvious
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	21:11	03:10	06:05	obvious
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	22:15	03:21	05:58	easy
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	00:30	03:52	05:55	detectable
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	23:03	03:57	05:59	easy
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	00:40	04:09	05:55	detectable
NGC 1851	Glob	7.1	Col	05h14m06.0s	-40°02'48"	03:09	04:20	05:28	detectable
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	00:28	04:34	05:58	detectable
M 1	Neb	8.4	Tau	05h34m30.0s	+22°01'00"	02:37	04:40	05:48	challenging
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	23:54	04:42	06:01	easy
M 42	Neb	4.0	Ori	05h35m18.0s	-05°23'00"	01:32	04:41	06:00	easy
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	00:19	04:58	06:00	easy
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	00:33	05:06	06:03	obvious
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	01:00	05:12	06:00	easy
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	01:38	05:13	05:57	detectable
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	01:02	05:13	06:02	obvious
NGC 2264	Open	4.1	Mon	06h40m58.0s	+09°53'42"	01:46	05:26	05:59	obvious
NGC 2301	Open	6.3	Mon	06h51m45.0s	+00°27'36"	02:26	05:29	06:00	easy
NGC 2355	Open	9.7	Gem	07h16m59.0s	+13°45'00"	03:32	05:31	05:52	difficult
M 41	Open	5.0	CMa	06h46m01.0s	-20°45'24"	04:16	05:30	05:57	easy
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	02:05	05:32	06:03	obvious
M 50	Open	7.2	Mon	07h02m42.0s	-08°23'00"	03:12	05:31	05:57	detectable
NGC 2353	Open	5.2	Mon	07h14m30.0s	-10°16'00"	03:32	05:33	06:00	easy
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	02:34	05:35	05:58	easy
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	02:35	05:34	05:56	detectable
M 44	Open	3.9	Cnc	08h40m24.0s	+19°40'00"	03:24	05:35	05:56	easy
NGC 2423	Open	7.0	Pup	07h37m06.0s	-13°52'18"	04:15	05:35	05:58	easy
M 47	Open	4.3	Pup	07h36m35.0s	-14°29'00"	04:17	05:35	06:00	obvious
M 67	Open	7.4	Cnc	08h51m18.0s	+11°48'00"	04:28	05:36	05:52	detectable
NGC 2506	Open	8.9	Mon	08h00m01.0s	-10°46'12"	04:42	05:36	05:52	difficult
M 46	Open	6.6	Pup	07h41m46.0s	-14°48'36"	04:25	05:35	05:57	detectable
NGC 2440	PNe	11.5	Pup	07h41m55.4s	-18°12'31"	04:49	05:36	05:54	detectable
M 93	Open	6.5	Pup	07h44m30.0s	-23°51'24"	03:57	05:38	05:59	easy
NGC 2439	Open	7.1	Pup	07h40m45.0s	-31°41'36"	04:27	05:40	05:59	easy
NGC 2451	Open	3.7	Pup	07h45m23.0s	-37°57'21"	04:47	05:42	06:00	easy
NGC 2477	Open	5.7	Pup	07h52m10.0s	-38°31'48"	04:54	05:44	06:00	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.
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Membership entitles you to…

- Desert Sky Observer–monthly newsletter.
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- The A.V.A.C. Membership Manual.
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