



# Desert Sky Observer

Volume 32

Antelope Valley Astronomy Club Newsletter

September 2012

## Up-Coming Events

- September 8: Dark Sky Star Party @ [Lee's Flat](#)  
September 14: Club Meeting\*  
September 15: [Mt. Wilson](#)  
September 22-23: Pacific Astronomy and Telescope Show @ [Pasadena Convention Center](#)  
September 22: Star Party @ [Unity Church in Palmdale](#)  
September 26: Acton Library Astronomy Lecture @ [Acton Library](#)  
September 29: Prime Desert Woodlands Moon Walk @ [Prime Desert Woodlands](#)

\* 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 20<sup>th</sup> Street East. Meetings start at 7 p.m. and are open to the public. *Please note that food and drink are not allowed in the planetarium*



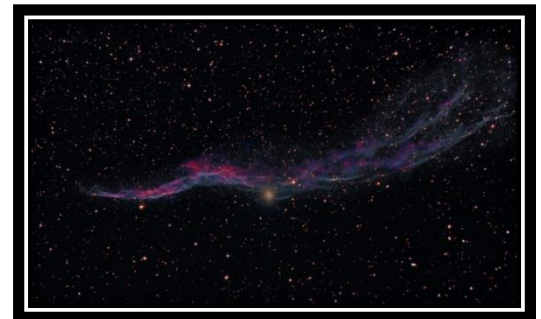
## President Don Bryden

There's a nice conjunction tonight, Mars and the moon along with Saturn and Spica in a nice tight group. It made me think of the great events we've had this summer. We started off with an annular eclipse in May quickly followed by nice weather and dark skies at RTMC. Then a rare transit of Venus in June. July gave us a great club picnic up at Brite Lake and first light for Matt's 24" LooneyScope (you just have to take a look through this nice piece of glass if you get the chance!).

While not exactly an AVAC event a number of us stayed up to "watch" Curiosity touch down on Mars and NASA/JPL celebrate. Then another nice daytime event when the waning crescent moon occulted Venus. Last weekend a few of us from the AVAC (and about 100 other folks) gathered at Mt. Pinos for three great nights of observing. The skies were so steady and dark, if you didn't make it up there you missed a great show!

If you did then don't worry! There are lots more opportunities coming up. First, join us at our September meeting for a screening of the PBS documentary "The City Dark". We'll be watching the full version not shown on TV. Next, come up to Mt. Wilson! There may still be slots available so contact Rose or get to the next meeting and sign up. We'll have a great personalized tour of the 100" Hooker telescope then settle down for a night of observing on the 60" scope. While Mt. Wilson no longer has the darkest skies around they are some of the steadiest and the tour of the 100" is worth the trip anyway!

And of course the end of the month brings us PATS down in Pasadena. We'll have our little booth but the real attraction will be all the vendors and guest speakers for an astronomy-filled weekend. And this is not to mention a Prime Desert and other outreach events – so there's no excuse not to get out among the stars!



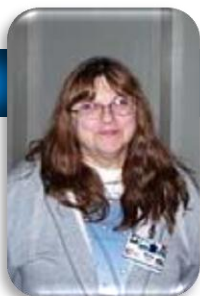
The Witch's Broom (Western Veil) nebula



## Vice President

### Doug Drake

This coming meeting (September 14, Friday) we will have a special presentation, "The City Dark." This is a new presentation the club purchased for the Planetarium and this will be the premier showing. The City Dark is a feature documentary about light pollution and the disappearing night sky. It has won several [awards](#) including best score/music and best documentary. The question is: Do we need the dark sky? Will we have a generation of kids without a glimpse of the universe above? Turtles hatching along the Florida coast? Increased breast cancer rates from exposure to light at night? Come and see for yourself, you will be glad you did.



## Director of Community Development

### Rose Moore

First I would like to thank all those that came out for the Lockheed Martin 'A Night To Explore' the end of July! We were set up in the parking lot with telescopes and had a booth inside. AVAC members were still showing night sky objects even as LM was tearing down inside after 9pm! Quite a few people stopped at our inside booth, watched astronomy videos, and were given handouts. The event was held at a different facility this year, but there was still a good turnout!

There is to be a dark sky party on Saturday, Sept. 8th. Further info to be announced, watch for emails and/or check the website!

Coming up on our calendar for September is our Mt. Wilson trip for Saturday, the 15th. There will be emails sent out in a week or so with attachments and information as to where and when we are meeting, carpooling info, and other information. There will also be handouts with the information at our next club meeting, Sept. 14th, which is the day before Mt. Wilson. If you have any questions concerning the trip, please call one of the board members prior to the trip.

Sept. 22 & 23, Saturday and Sunday, is the Pacific Astronomy and Telescope Show in Pasadena. Come on out to help at the club's booth. Tickets are \$20 at the door. There will be vendors, speakers, door prizes, and lots more!

Also on Saturday, Sept. 22nd, is the Star Party for the Unity Church in Palmdale. Check the website for info, or call Don Bryden for more information.

On Wednesday, Sept. 26th is the Acton Library Astronomy Lecture Series with Jeremy. Further info on the topic will be available on the website soon, or available from Jeremy.

And on Saturday, Sept. 29th at 7pm will be a Prime Desert Woodlands Moon Walk with Jeremy. Come on out and take the walk, or set up your telescope for public viewing!

October is coming and that means we will be having our annual business meeting and executive board elections! Please plan on attending to participate and nominate members for board positions! It's also a good time to bring up any questions or concerns about running the AVAC! Be there!!



## Secretary

### Frank Moore

In keeping with the theme of our September meeting, wherein we will be showing Ian Cheney's excellent production of "The City Dark", I have several questions for my fellow Antelope Valley Astronomy Club members.

How many stars can each of you see from your residence on a dark, moonless night? Have you ever taken the time to count them? How many of you can really see any vestige of the Milky Way from your residence? What's your perception, have you seen a discernible decline in the number of stars you can see and is it your belief that the view of the night sky, from your neighborhood, has declined appreciably in the last few years? Have you ever, honestly, looked around your own property, and at your own outdoor lights, with an eye toward limiting light pollution and light trespass?

I ask these questions because I most certainly have seen deterioration of the night skies even from our house in Tehachapi. I've lived in Tehachapi since 1986 and, even though I didn't have more than a casual interest in astronomy back then the skies from my former residence in Bear Valley Springs were stunning. Due to continued expansion of the state prison, and over 25 years of unchecked growth in Bakersfield, this is no longer true.

When Rose and I moved into our current residence in 2001 we had a naked-eye limiting magnitude that I used to estimate to be approximately 6.2. As my knowledge of astronomy and dark sky principals has expanded I've come to believe it was probably closer to a 6.6 or better. This would be approximately a 3, or "Rural Sky", on the Bortle Dark-Sky Scale. Though there was some light pollution evident at the horizon and clouds, when present, would be illuminated by sky-glow near the western horizon, it was dark overhead. The Milky Way appeared complex and [M15](#), [M4](#), [M5](#), and other brighter objects were distinctly apparent to the naked-eye with [M31](#) easily visible sometimes with, sometimes without, [averted vision](#). The zodiacal light was also apparent especially in the spring and autumn.

Today, the night sky at our residence has deteriorated into what I would call a 4, or "Rural-Suburban Transition" on the Bortle Scale. There are now light pollution domes visible from several directions, including from the city of Tehachapi proper. The zodiacal light is still visible on a clear moonless night, but it doesn't extend even halfway to the [zenith](#) at dusk or dawn. The Milky Way, overhead and away from the horizon is still impressive, but it lacks most of the finer details. Except on the darkest, clearest nights, M31 is an averted vision object.

I have even seen the night sky, as seen from Mt. Pinos, deteriorate in the five or so years since Rose and I started going up there on a regular basis. Though I'm not going to go into a long dissertation on why I think it's gone from a 1, to a 2 on the Bortle Scale. I will note this. I can remember when everyone would walk into the awning arms on our various motorhomes unless we illuminated them with red glow sticks. We even used to pad ours with towels to protect against the inevitable midnight collisions. This is no longer necessary and I can clearly see them in the "dark" now.

What can be done to prevent, or limit, further loss of our night sky? It will take involvement from each and every one of us. Every one of us will have to be concerned about development in our area. Though you can't stop all development, every one of us will have to insist that our elected officials and government planners make developers mitigate light pollution as much as possible. It will start at home, with every one

of us holding ourselves accountable and ensuring that we aren't contributing to the problem and starting a dialogue with our neighbors about proper lighting as well.

Excellent resources can be found here: <http://www.darksky.org/losingthedark>

Information on good lighting at home and how to start a dialogue with your neighbors can be found here. <http://docs.darksky.org/PG/PG3-residential-lighting.pdf>

Though I know the availability of dark sky friendly outdoor fixtures is limited at most local and big-box hardware stores, they do stock a few and others can be modified (as I have done) to make them dark sky friendly. Also, a large selection of dark sky friendly fixtures can be found online like here: [http://www.lampsplus.com/products/s\\_dark-sky/](http://www.lampsplus.com/products/s_dark-sky/). Remember, dark sky friendly fixtures are usually the most energy efficient as well.

You just have to be willing to start.

## Space Place

### A Brand New Age: Queue Observing at Mt. Paranal

By Dr. Marc J. Kuchner

First a caravan of white observatory cars arrives, winding up the narrow road to the 2600-m- (~8500-foot-) high summit. Then the shutters around the domes open, and rays from the setting sun alight on colossal mirrors and metal struts. It's the beginning of another busy night at Mt. Paranal, Chile, where I am learning about new, more efficient ways of managing a modern observatory.



[European Southern Observatory at Mt. Paranal, Chile](#)

I stepped into the observatory's control room to soak up some of the new, unfamiliar culture. Here, under florescent lights and drop ceilings are banks of computer screens, one bank to control each of the four big telescopes on the mountaintop and a few others too. At each bank sits two people, a telescope operator and an astronomer.

The layout of this workspace was not unfamiliar to me. But the way these Mt. Paranal astronomers work certainly was. When I was cutting my teeth at Mt. Palomar observatory in California, I would only go to the telescope to take my own data. In stark contrast, everyone observing at Mt Paranal tonight is taking data for someone else.

The Mt. Paranal astronomers each spend 105 nights a year here on the mountain performing various duties, including taking data for other astronomers. The latter, they call "executing the queue." Headquarters in Germany decides what parts of the sky will have priority on any given night (the queue). Then the Mt. Paranal astronomers march up the mountain and carry out this program, choosing calibrators, filling the log books, and adapting to changing conditions. They send the data back to headquarters, and from there it makes its way out to the wider astronomical community for study.

This new way of working allows the Mt. Paranal astronomers to specialize in just one or two telescope instruments each. Surely this plan is more efficient than the old-fashioned way, where each of us had to learn every instrument we used from scratch—sifting through manuals at 3:00 AM when the filter wheel got

stuck or the cryogen ran out, watching precious observing time tick away. Here at Mt. Paranal, much of the work is done in a big room full of people, not off by yourself, reducing some dangers of the process. Also, queue observing cuts down on plane travel, an important step for cutting carbon emissions.

It's a brand new age, I thought as I watched the giant domes spin in the silent, cold Chilean night. And maybe with queue observing, some of the romance is gone. Still, my colleagues and I couldn't help saying as we stared out across the moonlit mountains: I can't believe how lucky we are to be here.

*Dr. Marc J. Kuchner is an astrophysicist at the Exoplanets and Stellar Astrophysics Laboratory at NASA's Goddard Space Flight Center. NASA's Astrophysics Division works on big questions about the origin and evolution of the universe, galaxies, and planetary systems. Explore more at <http://www.science.nasa.gov/astrophysics/>. Kids can explore these topics at <http://spaceplace.nasa.gov/space>.*

## Astrophoto of The Month



### **M27 by Don Bryden**

60 minutes of luminance and 20 minutes each of RGB taken with an SBIG ST10-XME camera through a Mewlon 250s corrected Dall-Kirkham telescope. Guiding was with an Orion StarShoot autoguider through a Stellarvue SV-105 refractor all on a Losmandy DSBS plate on a Mountain Instruments MI-250 mount. Software was PHD Guiding and MaxiMDL for guiding and image acquisition. Processing was done with CCDStack, FITS Liberator and Photoshop.

## Most Days Really Aren't 24 Hours by Paul Derrick

When we speak of short winter days and long summer days, we're referring to changes in the hours of daylight during the year. But, of course, we know that even though the amount of sunlight varies with the seasons, every day really lasts 24 hours--the time it takes Earth to make one rotation on its axis relative to the Sun.

Right? Wrong! In reality, the lengths of days really do change, but we're scarcely aware of it. While the average length of a day is 24 hours, actually only four days each year are exactly 24 hours. All the others are either more or less than 24 hours, deviating by as little as a second up to a half a minute or so.

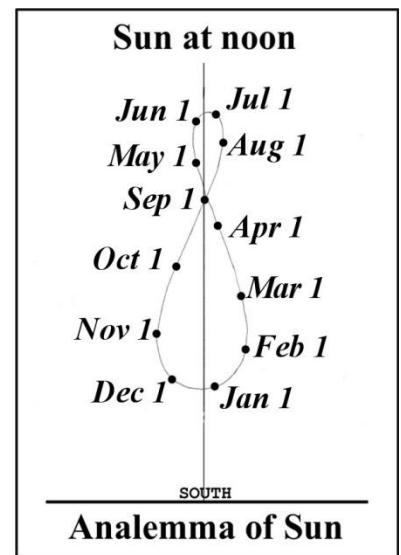
This variation is caused by a combination of two factors. The Earth's tilt on its axis, which also causes seasons, is partly to blame. But the main culprit is the fact that Earth's orbit around the Sun is a slightly oblong circle called an ellipse.

Because of its elliptical orbit, Earth in early January comes nearest the Sun (called perigee) and in early July swings farthest from the Sun (called apogee). When nearer the Sun it travels a little faster than when it's further away.

So Earth's speed around the Sun isn't constant, but its rotation on its axis is--producing differing day lengths. In theory, the Sun would be exactly due south every day at noon (ignoring one's location within a time zone and daylight time). But when Earth is traveling slower around the Sun seconds are shaved off the days, and conversely when traveling faster seconds are added.

The accompanying diagram, called an analemma, displays the Sun's noontime position throughout the year. In addition to showing that the noonday Sun is lowest in the winter and highest in the summer, it also shows that usually the Sun is either early or late in reaching due south. At the extremes, it reaches south 16 minutes after noon in early November and 14 minutes before noon in early February.

Yes, we got a bit technical this time, but I hope you stayed with me. When trying to make sense of the analemma, keep in mind that the pattern is produced by the interaction of two effects--Earth's tilt and its elliptical orbit.



*Copyright by Paul Derrick. Permission is granted for free electronic distribution as long as this paragraph is included. For permission to publish in any other form, please contact the author at [paulderrickwaco@aol.com](mailto:paulderrickwaco@aol.com)*

## News Headlines

### **Neil Armstrong, First Man on the Moon, Dies at 82**

Neil Armstrong, who made the “giant leap for mankind” as the first human to set foot on the moon, died on Saturday. He was 82. His family said in a statement that the cause was “complications resulting from cardiovascular procedures.” He had undergone heart bypass surgery this month in Cincinnati.

<http://www.nytimes.com/2012/08/26/science/space/neil-armstrong-dies-first-man-on-moon.html?pagewanted=all>

### **NASA Mars rover Curiosity begins trek to new destination**

The Mars rover Curiosity is hitting the road. It headed east Tuesday, driving 52 feet toward a spot where it will use its robotic arm for the first time to drill into bedrock. It'll take weeks for the six-wheel NASA rover to reach the site called Glenelg about a quarter mile away.

[http://www.pasadenastarnews.com/news/ci\\_21428560/nasa-mars-rover-curiosity-begins-trek-new-destination](http://www.pasadenastarnews.com/news/ci_21428560/nasa-mars-rover-curiosity-begins-trek-new-destination)

### **Hubble Watches Star Clusters on a Collision Course**

Astronomers using data from NASA's Hubble Space Telescope have caught two clusters full of massive stars that may be in the early stages of merging. The clusters are 170,000 light-years away in the Large Magellanic Cloud, a small satellite galaxy to our Milky Way. What at first was thought to be only one cluster in the core of the massive star-forming region 30 Doradus (also known as the Tarantula Nebula) has been found to be a composite of two clusters that differ in age by about one million years.

<http://hubblesite.org/newscenter/archive/releases/2012/35/full/>

### **NASA STEREO Observes One of the Fastest CMEs On Record**

On July 23, 2012, a massive cloud of solar material erupted off the sun's right side, zooming out into space, passing one of NASA's Solar TERrestrial RELations Observatory (STEREO) spacecraft along the way. Using the STEREO data, scientists at NASA's Goddard Space Flight Center in Greenbelt, Md. clocked this giant cloud, known as a coronal mass ejection, or CME, as traveling between 1,800 and 2,200 miles per second as it left the sun.

[http://www.nasa.gov/mission\\_pages/sterEO/news/fast-cme.html](http://www.nasa.gov/mission_pages/sterEO/news/fast-cme.html)

### **Endeavour Heads for L.A.**

Los Angeles Mayor Antonio Villaraigosa, Inglewood Mayor James Butts and California Science Center President Jeffrey Rudolph today announced details of Mission 26: The Big Endeavour, Endeavour's journey from Kennedy Space Center to its new home at the Science Center. Endeavour, which will be transported on top of NASA's Boeing 747 Shuttle Carrier Aircraft (SCA), is expected to arrive at LAX mid-day of September 20.

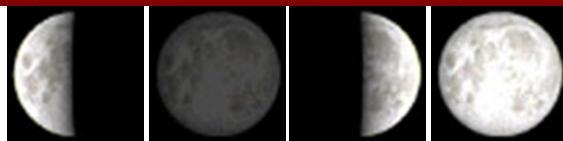
<http://spaceref.com/space-shuttle-1/endeavour-heads-for-la.html>

### **A First: Star Caught in the Act of Devouring a Planet**

How's this for a depressing look into Earth's potential future: astronomers have witnessed the first evidence of a planet's destruction by its aging star as it expands into a red giant. “A similar fate may await the inner planets in our solar system, when the Sun becomes a red giant and expands all the way out to Earth's orbit some five-billion years from now,” said Alex Wolszczan, from Penn State, University, who led a team which found evidence of a missing planet having been devoured by its parent star. Wolszczan also is the discoverer of the first planet ever found outside our solar system.

<http://www.universetoday.com/96927/a-first-star-caught-in-the-act-of-devouring-a-planet/>

## September Sky Data

Last Qtr  
Sept 8New  
Sept 15First Qtr  
Sept 22Full  
Sept 29

**Best time for deep sky observing this month:  
September 8 through September 19**

**Mercury** is at superior conjunction (almost directly behind the Sun) on September 10th. We are unlikely to see this elusive little planet at all this month.

**Venus** is rising in the north-east in the early hours of the morning, and by dawn the brilliant “Morning Star” will be well up in the eastern sky. It outshines every other star-like object in the sky – even the giant planet Jupiter, which is further up and right. Relative to the stars, Venus is moving rapidly eastwards out of Gemini, across Cancer and into Leo. It is heading apparently straight for the bright star Regulus, in Leo.

**Mars** is still very low in the western sky at dusk; throughout September the “Red Planet” continues to set just over an hour after the Sun sets. The planet Saturn is about the same height in the sky, but further right and a bit brighter - and neither planet will be easy to see in the twilight.

The giant planet **Jupiter** is rising in the north-east about 11 pm, and it’s high in the south-eastern sky at dawn. Only the brilliant planet Venus, far to its lower left, outshines Jupiter. Relative to the stars, Jupiter is moving very slowly eastwards in Taurus, to the left of the bright star Aldebaran (though Jupiter is much brighter, and shines with a steadier light).

**Saturn** is low in the western sky at sunset, and sets only about an hour after the Sun. To the eye, the ringed planet resembles a reasonably-bright star, but we’re unlikely to be able to see it in the bright twilight sky. Saturn will disappear completely behind the Sun next month.

There are no major **meteor-showers** in September, though there are various minor showers producing a few meteors an hour from radiants in Cassiopeia, Auriga, Aquarius and Pisces. But this is generally a good time of the year for seeing sporadic meteors, which may appear at any time, in any part of the sky.

## Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
9/1/2012	19:43	07:32	06:24	19:17
9/5/2012	22:00	11:21	06:27	19:12
9/10/2012	01:07	15:28	06:31	19:04
9/15/2012	06:10	18:32	06:34	18:57
9/20/2012	11:48	22:11	06:38	18:50
9/25/2012	16:02	02:18	06:42	18:43
9/30/2012	18:47	07:18	06:46	18:36

## Planet Data

	Sept 1			
	Rise	Transit	Set	Mag
<b>Mercury</b>	05:42	12:23	19:07	-1.5
<b>Venus</b>	02:47	09:53	16:58	-4.2
<b>Mars</b>	10:53	16:20	21:47	1.2
<b>Jupiter</b>	23:44	06:58	14:15	-2.4
<b>Saturn</b>	10:00	15:47	21:31	0.8

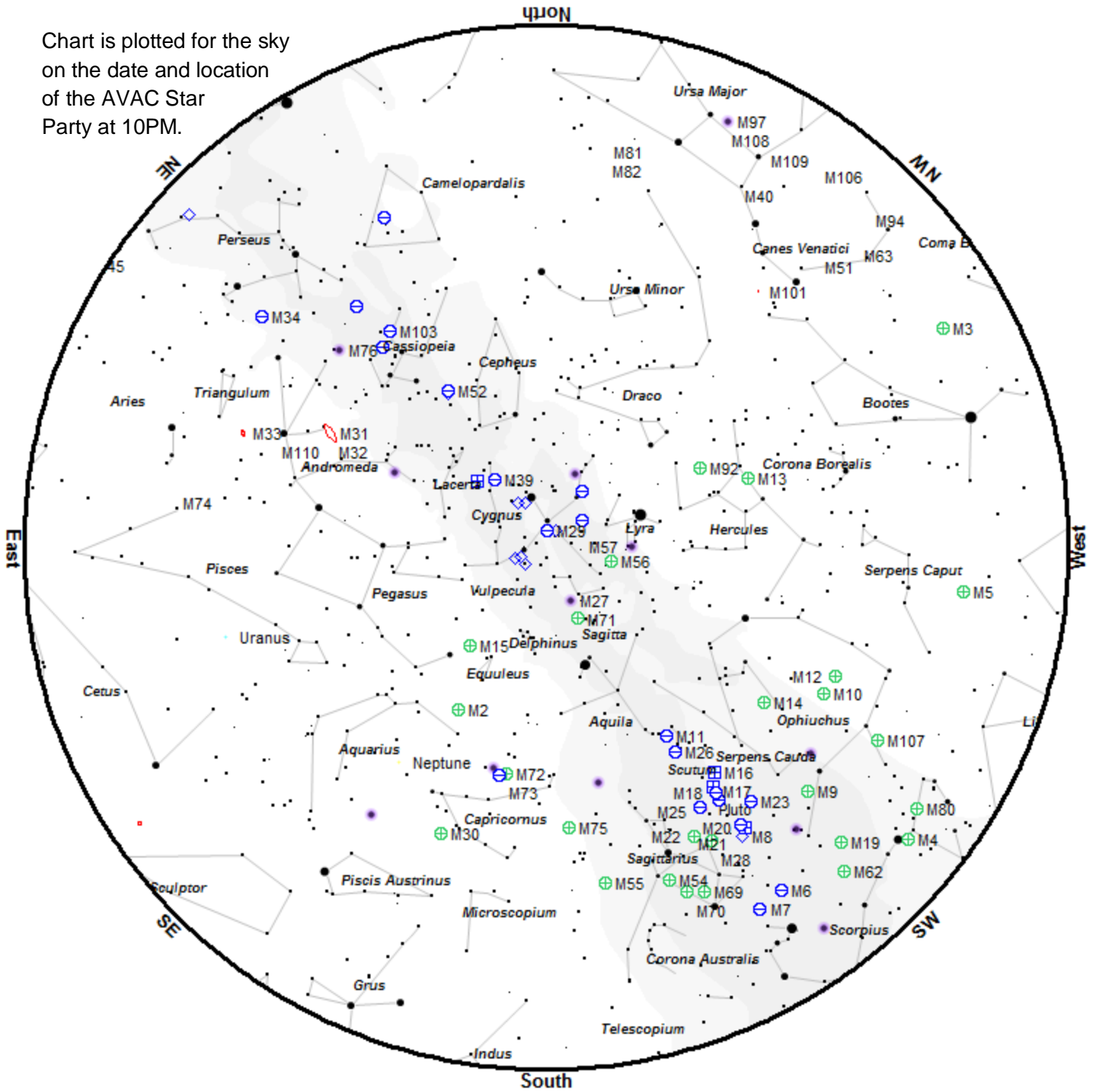
	Sept 15			
	Rise	Transit	Set	Mag
<b>Mercury</b>	06:56	13:06	19:19	-1.3
<b>Venus</b>	03:03	10:01	16:58	-4.1
<b>Mars</b>	10:43	16:01	21:19	1.2
<b>Jupiter</b>	22:54	06:07	13:25	-2.5
<b>Saturn</b>	09:12	14:57	20:40	0.8

	Sept 30			
	Rise	Transit	Set	Mag
<b>Mercury</b>	07:59	13:37	19:18	-0.4
<b>Venus</b>	03:26	10:10	16:54	-4.1
<b>Mars</b>	10:35	15:44	20:52	1.2
<b>Jupiter</b>	21:57	05:11	12:28	-2.6
<b>Saturn</b>	08:21	14:05	19:45	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.



<b>Star Magnitudes</b>	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: black; border-radius: 50%;"></span> 0</li> <li><span style="display: inline-block; width: 8px; height: 8px; background-color: black; border-radius: 50%;"></span> 1</li> <li><span style="display: inline-block; width: 6px; height: 6px; background-color: black; border-radius: 50%;"></span> 2</li> <li><span style="display: inline-block; width: 4px; height: 4px; background-color: black; border-radius: 50%;"></span> 3</li> <li><span style="display: inline-block; width: 3px; height: 3px; background-color: black; border-radius: 50%;"></span> 4</li> <li><span style="display: inline-block; width: 2px; height: 2px; background-color: black; border-radius: 50%;"></span> 5</li> </ul>	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; border: 1px solid red; border-radius: 5px;"></span> Galaxy</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid blue; border-radius: 50%;"></span> Open Cluster</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid green; border-radius: 50%;"></span> Globular Cluster</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid blue; border: 1px dashed blue; border-radius: 50%;"></span> Cluster+Nebulosity</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid blue; border-radius: 50%;"></span> Nebula</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid blue; border-radius: 50%;"></span> Bright Nebula</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid purple; border-radius: 50%;"></span> Planetary Nebula</li> </ul>
------------------------	--	--

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 6178	Open	7.2	Sco	16h35m47.0s	-45°38'36"	20:03	20:10	20:18	detectable
NGC 6388	Glob	6.8	Sco	17h36m17.0s	-44°44'06"	20:12	20:20	20:36	challenging
NGC 6322	Open	6.5	Sco	17h18m25.0s	-42°56'00"	20:05	20:21	20:54	easy
NGC 6541	Glob	6.3	CrA	18h08m02.0s	-43°42'54"	20:11	20:25	20:54	challenging
M 80	Glob	7.3	Sco	16h17m02.0s	-22°58'30"	20:12	20:26	20:59	detectable
M 62	Glob	6.4	Oph	17h01m13.0s	-30°06'48"	20:11	20:27	21:09	detectable
M 19	Glob	6.8	Oph	17h02m38.0s	-26°16'06"	20:14	20:28	21:08	detectable
NGC 6383	Open	5.4	Sco	17h34m48.0s	-32°34'00"	20:09	20:29	21:35	easy
M 5	Glob	5.7	Ser	15h18m34.0s	+02°05'00"	20:13	20:29	20:34	easy
M 6	Open	4.6	Sco	17h40m20.0s	-32°15'12"	20:08	20:29	21:51	easy
M 7	Open	3.3	Sco	17h53m51.0s	-34°47'36"	20:10	20:29	21:38	detectable
NGC 5195	Gal	10.5	CVn	13h29m59.6s	+47°15'58"	20:18	20:30	20:33	detectable
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	20:15	20:31	20:33	easy
M 9	Glob	7.8	Oph	17h19m12.0s	-18°31'00"	20:15	20:31	20:53	difficult
M 10	Glob	6.6	Oph	16h57m09.0s	-04°06'00"	20:14	20:32	21:50	detectable
M 12	Glob	6.1	Oph	16h47m14.0s	-01°56'48"	20:11	20:33	21:47	easy
M 101	Gal	8.4	UMa	14h03m12.4s	+54°20'53"	20:17	20:33	21:23	detectable
M 20	Open	5.2	Sgr	18h02m42.0s	-22°58'18"	20:10	20:33	20:51	easy
M 23	Open	5.9	Sgr	17h57m04.0s	-18°59'06"	20:12	20:34	21:27	detectable
M 8	Neb	5.0	Sgr	18h04m02.0s	-24°23'14"	20:08	20:34	22:27	easy
M 14	Glob	7.6	Oph	17h37m36.0s	-03°14'48"	20:13	20:34	22:17	detectable
M 21	Open	7.2	Sgr	18h04m13.0s	-22°29'24"	20:13	20:34	21:00	detectable
M 13	Glob	5.8	Her	16h41m41.0s	+36°27'36"	20:12	20:36	23:05	easy
NGC 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	19:58	20:36	23:41	obvious
M 28	Glob	6.9	Sgr	18h24m33.0s	-24°52'12"	20:12	20:36	22:12	detectable
IC 4665	Open	5.3	Oph	17h46m18.0s	+05°43'00"	20:15	20:37	22:30	detectable
M 16	Open	6.5	Ser	18h18m48.0s	-13°48'24"	20:08	20:37	22:25	obvious
M 17	Open	7.3	Sgr	18h20m47.0s	-16°10'18"	20:15	20:37	22:04	difficult
M 18	Open	7.5	Sgr	18h19m58.0s	-17°06'06"	20:07	20:36	22:05	easy
M 70	Glob	7.8	Sgr	18h43m13.0s	-32°17'30"	20:12	20:37	22:04	difficult
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	20:10	20:38	23:40	easy
M 25	Open	6.2	Sgr	18h31m47.0s	-19°07'00"	20:12	20:38	22:01	detectable
M 22	Glob	5.2	Sgr	18h36m24.0s	-23°54'12"	20:12	20:38	21:09	detectable
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	20:09	20:40	23:56	easy
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	20:02	20:41	01:51	obvious
IC 4756	Open	5.4	Ser	18h39m00.0s	+05°27'00"	20:12	20:41	23:39	detectable
M 54	Glob	7.7	Sgr	18h55m03.0s	-30°28'42"	20:16	20:41	22:05	difficult
NGC 6723	Glob	6.8	Sgr	18h59m33.0s	-36°37'54"	20:13	20:42	22:05	difficult

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 6716	Open	7.5	Sgr	18h54m34.0s	-19°54'06"	20:12	20:43	22:17	detectable
M 11	Open	6.1	Sct	18h51m05.0s	-06°16'12"	20:12	20:43	23:20	detectable
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	20:08	20:46	00:15	easy
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	20:14	20:56	00:16	detectable
M 55	Glob	6.3	Sgr	19h40m00.0s	-30°57'42"	20:15	21:18	23:06	detectable
NGC 6818	PNe	10.0	Sgr	19h43m57.8s	-14°09'12"	20:05	21:21	23:48	easy
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	20:10	21:32	00:16	easy
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	20:10	21:37	00:16	easy
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	20:11	21:44	00:17	easy
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	20:11	22:00	00:22	easy
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	20:11	22:01	00:15	easy
NGC 7009	PNe	8.3	Aqr	21h04m10.9s	-11°21'48"	20:04	22:42	01:24	obvious
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	20:16	23:07	00:16	detectable
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	20:11	23:09	02:38	easy
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	20:19	23:10	00:15	detectable
IC 1396	Neb		Cep	21h39m06.0s	+57°30'00"	20:11	23:16	03:01	challenging
M 30	Glob	6.9	Cap	21h40m22.0s	-23°10'42"	22:09	23:17	00:16	detectable
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	20:08	23:30	05:14	obvious
Cocoon	Neb	10.0	Cyg	21h53m24.0s	+47°16'00"	20:12	23:30	02:59	challenging
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	20:21	23:52	00:15	detectable
NGC 7293	PNe	6.3	Aqr	22h29m38.5s	-20°50'14"	22:30	00:07	00:15	detectable
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	22:12	00:15	00:16	detectable
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	22:49	00:15	05:18	detectable
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	21:13	00:15	05:30	obvious
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	21:01	00:15	05:26	easy
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	20:56	00:15	00:16	detectable
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	22:43	00:15	00:16	detectable
Heart	Neb	6.5	Cas	02h33m52.0s	+61°26'50"	22:11	00:15	05:28	challenging
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	21:24	00:15	05:26	easy
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	20:15	00:15	05:24	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	21:13	00:15	05:30	obvious
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	21:05	00:15	05:28	easy
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	22:20	00:15	05:28	easy
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	22:11	00:15	05:31	obvious
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	22:07	00:15	05:31	obvious
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	21:41	00:15	00:16	difficult
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	22:31	00:15	05:18	detectable
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	23:03	00:16	05:26	detectable
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	21:32	00:16	05:17	easy
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	21:33	00:16	05:17	easy
NGC 752	Open	6.6	And	01h57m41.0s	+37°47'06"	22:28	00:16	05:26	challenging
NGC 55	Gal	8.5	Scl	00h15m08.4s	-39°13'13"	23:37	02:00	03:50	challenging
NGC 253	Gal	7.9	Scl	00h47m33.1s	-25°17'20"	02:09	02:38	02:41	detectable
NGC 288	Glob	8.1	Scl	00h52m45.0s	-26°35'00"	23:28	02:42	05:07	challenging
M 77	Gal	9.7	Cet	02h42m40.8s	-00°00'48"	01:36	04:28	05:27	detectable

ID	Cls	Mag	Con	RA 2000	Dec 2000	Begin	Best	End	Difficulty
NGC 1245	Open	7.7	Per	03h14m42.0s	+47°14'12"	23:27	04:52	05:29	challenging
NGC 1342	Open	7.2	Per	03h31m38.0s	+37°22'36"	01:13	04:57	05:28	detectable
NGC 1444	Open	6.4	Per	03h49m25.0s	+52°39'30"	23:49	04:58	05:34	obvious
NGC 1502	Open	4.1	Cam	04h07m50.0s	+62°19'54"	23:43	04:59	05:35	obvious
NGC 1528	Open	6.4	Per	04h15m23.0s	+51°12'54"	00:57	05:00	05:29	easy
M 45	Open	1.5	Tau	03h47m00.0s	+24°07'00"	00:48	05:00	05:33	obvious
NGC 1664	Open	7.2	Aur	04h51m06.0s	+43°40'30"	01:38	05:04	05:31	easy
Hyades	Open	0.8	Tau	04h26m54.0s	+15°52'00"	02:07	05:04	05:31	easy
NGC 1647	Open	6.2	Tau	04h45m55.0s	+19°06'54"	03:37	05:06	05:26	detectable
M 38	Open	6.8	Aur	05h28m40.0s	+35°50'54"	03:07	05:06	05:28	detectable
M 36	Open	6.5	Aur	05h36m18.0s	+34°08'24"	02:21	05:07	05:32	easy
NGC 1746	Open	6.1	Tau	05h03m50.0s	+23°46'12"	03:45	05:07	05:27	detectable
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	05:06	05:07	05:25	detectable
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	03:46	05:07	05:25	detectable
M 37	Open	6.2	Aur	05h52m18.0s	+32°33'12"	02:46	05:08	05:31	easy
M 42	Neb	4.0	Ori	05h35m18.0s	-05°23'00"	04:02	05:09	05:30	easy
M 35	Open	5.6	Gem	06h09m00.0s	+24°21'00"	03:24	05:10	05:32	easy
NGC 2175	Open	6.8	Ori	06h09m39.0s	+20°29'12"	04:07	05:10	05:28	detectable
NGC 2129	Open	7.0	Gem	06h01m07.0s	+23°19'20"	03:03	05:11	05:38	obvious
NGC 2392	PNe	8.6	Gem	07h29m10.8s	+20°54'42"	04:36	05:11	05:33	obvious
NGC 2169	Open	7.0	Ori	06h08m24.0s	+13°57'54"	03:33	05:11	05:34	obvious
NGC 2264	Open	4.1	Mon	06h40m58.0s	+09°53'42"	04:16	05:11	05:31	easy
NGC 2355	Open	9.7	Gem	07h16m59.0s	+13°45'00"	04:42	05:11	05:31	difficult
NGC 2301	Open	6.3	Mon	06h51m45.0s	+00°27'36"	04:56	05:12	05:28	easy
M 50	Open	7.2	Mon	07h02m42.0s	-08°23'00"	04:47	05:14	05:26	detectable
NGC 2353	Open	5.2	Mon	07h14m30.0s	-10°16'00"	04:39	05:16	05:30	easy
M 41	Open	5.0	CMa	06h46m01.0s	-20°45'24"	04:51	05:17	05:29	easy
NGC 1851	Glob	7.1	Col	05h14m06.0s	-40°02'48"	04:33	05:17	05:35	difficult

## A.V.A.C. Information

Membership in the Antelope Valley Astronomy Club is open to any individual or family.

The Club has three categories of membership.

- Family membership at \$30.00 per year.
- Individual membership at \$25.00 per year.
- Junior membership at \$15.00 per year.

Membership entitles you to...

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

### AVAC

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

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

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](mailto:president@avastronomyclub.org)

### Vice-President:

Doug Drake (661) 433-0672  
[vice-president@avastronomyclub.org](mailto:vice-president@avastronomyclub.org)

### Secretary:

Frank Moore (661) 972-4775  
[secretary@avastronomyclub.org](mailto:secretary@avastronomyclub.org)

### Treasurer:

Virginia Reed (661) 824-3932  
[treasurer@avastronomyclub.org](mailto:treasurer@avastronomyclub.org)

### Director of Community Development:

Rose Moore (661) 972-1953  
[community@avastronomyclub.org](mailto:community@avastronomyclub.org)

## Appointed Positions

### Newsletter Editor:

Steve Trotta (661) 269-5428  
[newsletter@avastronomyclub.org](mailto:newsletter@avastronomyclub.org)

### Equipment & Library:

Bill Grove  
[library@avastronomyclub.org](mailto:library@avastronomyclub.org)

### Club Historian:

Tom Koonce (661) 943-8200  
[history@avastronomyclub.org](mailto:history@avastronomyclub.org)

### Webmaster:

Steve Trotta (661) 269-5428  
[webmaster@avastronomyclub.org](mailto:webmaster@avastronomyclub.org)

### Astronomical League Coordinator:

Don Bryden (661) 270-0627  
[al@avastronomyclub.org](mailto: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](http://www.telescopes.net)

### Galaxy Level Sponsors



### *Al's Vacuum and Sewing*

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