



# Desert Sky Observer

Volume 31

Antelope Valley Astronomy Club Newsletter

June 2011

## Up-Coming Events

- June 1: Star Party-Amargosa Creek Middle School
- June 4: Annual Summer Picnic
- June 10: Club Meeting\*
- June 11: [Prime Desert Woodland Moon Walk](#)
- June 13: Board meeting @ [Don's house](#)
- June 14: Acton Library Astronomy Lecture and Star Party @ [Acton Library](#)
- June 25: Dark Sky Star Party @ [Mt. Pinos](#)

\* 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

Well we've survived RTMC 2011 (Frank suggested we print tee shirts). Of the four nights, only Thursday was descent for observing. In fact the winds got so bad Saturday night that it felt like the RV was going to tip over! The next morning, all the vendor tents were blown away as was the information booth. Telescope parts were blowing around like tumbleweeds and what few vendors there were in attendance didn't bother setting up for sales on Sunday. Not that they could, since all the tents were in the trees!

Sounds like a miserable time but somehow it didn't matter. Rose tried her hand at star hopping on the new 13" Coultter dob. Karole bagged her last Messier object and once again Shane was unable to sell his binocular chair. That's OK, since Karole won the WHC&T raffle on Saturday for a new pair of binoculars. However that was it for prizes as we were "out front" but no one had a single winning ticket. Though the person sitting next to Robert had the grand prize winner, just one number higher than his. I didn't have the heart to tell him that if Mimi had come to the raffle instead of staying back in the RV watching movies that ticket would have been his! Oh well, there's always next year...

I'm sure that for one of these star parties the weather will cooperate. Maybe up at Mt. Pinos at the end of June. Maybe even for the picnic next week or for one of the Prime Desert Moonwalks. Anyway, it doesn't matter if the wind is blowing or the clouds are gathering or the temperatures are falling. We always have a great time out under the stars (or inside the RV watching a movie...), so put on your warm clothes (in Duane's case it was a snowsuit with thermal underwear and two jackets!) and join us! Maybe we'll keep warm with an "I survived RTMC 2011" tee shirt...



## Vice President

### Rose Moore

The next couple of months are busy ones for the AVAC! By the time you all read this, those that attended RTMC Memorial Weekend will be at home and have lots of things to talk about! And maybe some goodies they've purchased!

June 1st, Wednesday, starts with a Star Party for the 8th graders at Amargosa Creek Middle School in Lancaster. Set up time is 6:30pm, and the event starts at 7:30pm. We need members with telescopes, and also any other astronomy items of interest (i.e. meteorites), to show the kids. We will be doing a bit of solar observing first, and then some dark sky observing. Information on where to set up and where to enter the school grounds will be posted sometime next week as the information becomes available. Check our website. Please contact me if you will be able to attend!

Our summer picnic, Star-B-Que, will be Saturday June 4th at 3:00pm at Steve and Kate Trotta's home in Acton. If you have not signed up for the potluck and will be attending, please contact me asap by email or call. We still need several items. Also, if you have any items to donate for the raffle or silent auction, please contact one of the board members. There will be observing that evening, but please remember that there is no parking for RV's at their home!

Our meeting on Friday June 10th will have Dr. Daniel Barth speaking on 'Supernovae, Standard Candles and Dark Energy!' Please come out and enjoy the meeting, speak to fellow members, and show support for your club! Remember if you would like to make a donation for the speaker, to please see our Treasurer Virginia before the meeting, or at the break. Thanks for Robert Lynch for finding our speaker for this month!

Saturday, June 11th, we will have another Prime Desert Woodlands Moonwalk with Jeremy. Time for the event is 8:30pm. Come on out with your telescopes to show the public the night sky! Or if you have something else astronomy related, come out and share with the public!

On Tuesday, June 14th, we have the Acton Library Astronomy Lecture and Star Party with Jeremy. The event is at the Acton Library at 7:30 pm. We need members with telescopes to help with showing some objects in the night sky after Jeremy's lecture. Jeremy will be speaking on 'The Total Energy of the Universe Is Zero'.

The Mt. Wilson trip is scheduled for Saturday, July 2nd. Information regarding time and place to meet for carpooling will be coming sometime in mid June. I have received some information 'handouts' from our Session Director Shelley, and will be emailing them in mid June to those attending the event. You may want to print them out and keep them handy. There will be a phone number to call that day, to check on the weather and conditions at Mt. Wilson to make sure we are still okay for observing that evening. Remember there will be a tour of the rest of the Mt. Wilson facilities prior to observing with the 60 inch scope.

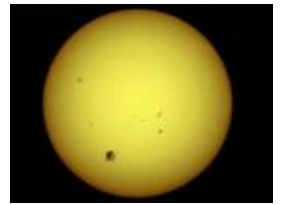
## Take the Next Step by Tom Koonce

The moderate summer evenings are finally here and the best time of year to observe the sky has arrived. I have written at length in the past about how to get started in amateur astronomy, but this month we'll step it up a few notches with a discussion of what I think a beginner needs to take observing to the next level. I have no business association with any of the companies mentioned in this article, but have extensive experience to back up each of my recommendations below. I'm calling it as I see it. Your actual mileage may vary.

First, get a *Telrad* for your telescope. This "1X spotting scope" is the most useful accessory you'll get and many star guides, maps and books are written that use its illuminated 0.5, 1.0 and 2.0 degree centering circles. I also recommend installing a "blink" kit on the Telrad to cycle the red illumination on and off to help your night vision when locating very dim deep-sky objects. There are other 1 X finders on the market that you can use, but I think the Telrad holds up the best over time.

Next, you're going to be considering getting eyepiece filters and maybe even a new eyepiece. Here's what I think are the essentials and I list them in priority order.

Get a *Thousand Oaks Solar Filter* for your telescope. By doing so, you will have instantly doubled the utility of your scope because you'll also be able to observe during the day with your telescope. The Sun is our nearest star and a high quality glass solar filter will last you many years.



Make sure that you have *decent quality eyepieces* that will yield magnifications of approximately 50X through 200X. I recommend TeleVue, Meade or Celestron Super Plossls. It's essential that you have great eyepieces to match the great telescope that you are using. Go to a Star Party with your telescope and set up next to someone who can lend you several different eyepieces for you to try out. Find ones that you really like and buy ones just like them. Don't buy any eyepiece that you haven't had a chance to use. On the question of whether or not to buy 1 1/4" or 2" eyepieces, I'll say that if you really enjoy amateur astronomy, you will eventually be buying 2" eyepieces, but they are expensive and you need to have a good idea of the kind of observing you will be doing most of the time. Eyepieces hold their value very well, so hold off on buying the 2" eyepieces for now and get the best 1 1/4" eyepiece that you can afford. If you've been reading my articles over the years, you'll know that I recommend that buying eyepieces that are in excellent shape from amateur astronomy-based websites like [Astromart.com](http://Astromart.com) and build up your collection, but you should also consider companies which offer great prices for brand new eyepieces such as Woodland Hills Telescope and Oceanside Pacific Telescope.

Get a high quality *O-III* (pronounced "Oh-three") *narrow band-pass filter* that screws into the base of your eyepieces. This is the most useful deep sky filter. If you enjoy observing deep-sky objects like the Ring Nebula, Swan Nebula, or would like to observe the Veil Nebula, then get the O-III before you buy a light pollution filter, a set of color filters, or a moon filter.

If you have a Schmidt-Cassegrain telescope, get a "Skylight" filter to seal the back of the telescope tube. Then get a high quality, 2" diagonal with a 1 1/4" adapter. I like the 2" TeleVue diagonal.



If you have a Newtonian telescope, get a quality *barlowed laser collimation tool*. 90% of all of the newtonians / dobsonians people have me look through at star parties are incorrectly collimated and are thus performing at far less than their optical potential. The collimation tool will help you attain new levels of focus with your Newtonian. I use the Howie Glatter barlowed laser collimator and am extremely pleased with it.

Get an *adjustable red light flashlight*. Make sure that the brightness can be dialed down very close to the off position so that minimum light is illuminated. Now that you're taking the next step in amateur astronomy, you're going to have to pay more attention to your night vision. After your eyes become dark adapted, most of the single switch red flashlights are too bright and are useful only to upset other observers around you. Begin to pay more attention to observing etiquette. You shouldn't walk up to other observers with your red flashlight on its cord around your neck, turned up to high, thus affecting other's night vision. It is encouraged for you to park with your car headlights pointed away from the general observing area and to turn your car's interior dome lights off at the beginning of the evening.

Get a *polarizing moon filter*. This is made up of two polarizing filters that can rotate about each other so that you can "dial" the brightness of the moon up or down to counter the brightness when directly observing the moon. You'll find this much handier than a single neutral density filter for changing brightness of the phases.

Get a good *night sky atlas*. If you have an eight inch or larger telescope, I prefer the large "Sky Atlas 2000.0 Deluxe Laminated" atlas, with black stars on a white background. For smaller scopes, you can take a look at Sky & Telescope's "Pocket Sky Atlas". This is the right time to re-read the great book "Night Watch – A Practical Guide to Viewing the Universe".

Get a *portable table* to take with you observing. A sturdy folding card table works well. You'll need a place to put your maps and eyepieces.

*Begin working on your Messier Pin*. This is an observing challenge sponsored by the Astronomical League. By completing the observation of all of the Messier objects, you will truly know the night sky.

Dedicate an *old blanket, carpet, or artificial turf* to put beneath your telescope when observing. It will keep dirt and dust off of your scope, and when you drop that new eyepiece or little retaining screw out of your diagonal at 2:00 am, it will help spare those around you from hearing a staccato of four letter words punctuating the night. Not that \*I've\* ever done such a thing myself...

This will get you started. I didn't mention other items such as an observing stool to sit on, color filters, a warm jumpsuit, or large camp chair for taking a break. You can add these as you go forward. Advancing in amateur astronomy is not about the *equipment*, but about *honing your observing skills*. Each item I've mentioned will either enable or simplify the technical portion of observing so that you can concentrate more on the sky and less on whether or not you have the necessary resources at hand.

Clear Skies, Tom



## Space Place

### Milky Way Safari

by Dauna Coulter and Dr. Tony Phillips

Safari, anyone? Citizen scientists are invited to join a hunt through the galaxy. As a volunteer for Zooniverse's Milky Way Project, you'll track down exotic creatures like mysterious gas bubbles, twisted green knots of dust and gas, and the notorious "red fuzzies."

"The project began about four months ago," says astrophysicist Robert Simpson of Oxford University. "Already, more than 18,000 people are scouting the Milky Way for these quarry."

The volunteers have been scrutinizing infrared images of the Milky Way's inner regions gathered by NASA's Spitzer Space Telescope. Spitzer's high resolution in infrared helps it pierce the cloaking haze of interstellar gas and dust, revealing strange and beautiful structures invisible to conventional telescopes. The Milky Way Project is helping astronomers catalogue these intriguing features, map our galaxy, and plan future research.

"Participants use drawing tools to flag the objects," explains Simpson. "So far they've made over a million drawings and classified over 300,000 images."

Scientists are especially interested in bubble-like objects believed to represent areas of active star formation. "Every bubble signifies hundreds to thousands of young, hot stars. Our volunteers have circled almost 300,000 bubble candidates, and counting," he says.

Humans are better at this than computers. Computer searches turn up only the objects precisely defined in a program, missing the ones that don't fit a specified mold. A computer would, for example, overlook partial bubbles and those that are skewed into unusual shapes.

"People are more flexible. They tend to pick out patterns computers don't pick up and find things that just look interesting. They're less precise, but very complementary to computer searches, making it less likely we'll miss structures that deserve a closer look. And just the sheer numbers of eyes on the prize mean more comprehensive coverage."

Along the way the project scientists distill the volunteers' data to eliminate repetitive finds (such as different people spotting the same bubbles) and other distortions.

The project's main site (<http://www.milkywayproject.org>) includes links to a blog and a site called Milky Way Talk. Here "hunters" can post comments, chat about images they've found, tag the ones they consider especially intriguing, vote for their favorite images (see the winners at <http://talk.milkywayproject.org/collections/CMWS00002u>), and more.

Zooniverse invites public participation in science missions both to garner interest in science and to help scientists achieve their goals. More than 400,000 volunteers are involved in their projects at the moment. If you want to help with the Milky Way Project, visit the site, take the tutorial, and ... happy hunting!

You can get a preview some of the bubbles at Spitzer's own web site, <http://www.spitzer.caltech.edu/>. Kids will enjoy looking for bubbles in space pictures while playing the Spitzer concentration game at <http://spaceplace.nasa.gov/spitzer-concentration/>.

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



*Volunteers study infrared images of our galaxy from the Spitzer Space Telescope, identifying interesting features using the special tools of the Milky Way Project*

## News Headlines

### **The Milky Way's New Arm**

This might come as a surprise, but every portrayal ever made of how the Milky Way galaxy looks from afar is more imagined than factual. That's because we sit squarely inside our galaxy's turgid disk, which together with its bloated central bulge make it impossible to see most of what lies on the side opposite the Sun. We're only getting half the picture.

<http://www.skyandtelescope.com/community/skyblog/newsblog/122615774.html>

### **NASA's Spirit Rover Completes Mission on Mars**

NASA has ended operational planning activities for the Mars rover Spirit and transitioned the Mars Exploration Rover Project to a single-rover operation focused on Spirit's still-active twin, Opportunity. This marks the completion of one of the most successful missions of interplanetary exploration ever launched.

[http://www.nasa.gov/mission\\_pages/mer/news/mer20110525.html](http://www.nasa.gov/mission_pages/mer/news/mer20110525.html)

### **Gliese 581d: First Discovered Terrestrial-mass Exoplanet in the Habitable Zone**

The planetary system around the red dwarf Gliese 581, one of the closest stars to the Sun in the galaxy, has been the subject of several studies aiming to detect the first potentially habitable exoplanet. Two candidates have already been discarded, but a third planet, Gliese 581d, can be considered the first confirmed exoplanet that could support Earth-like life.

<http://www.spaceref.com/news/viewpr.html?pid=33617>

### **UC Berkeley SETI survey focuses on Kepler's top Earth-like planets**

Now that NASA's Kepler space telescope has identified 1,235 possible planets around stars in our galaxy, astronomers at the University of California, Berkeley, are aiming a radio telescope at the most Earth-like of these worlds to see if they can detect signals from an advanced civilization.

<http://newscenter.berkeley.edu/2011/05/13/uc-berkeley-seti-survey-focuses-on-kepler%E2%80%99s-top-earth-like-planets/>

### **NASA Satellites Find High-Energy Surprises in 'Constant' Crab Nebula**

The combined data from several NASA satellites has astonished astronomers by revealing unexpected changes in X-ray emission from the Crab Nebula, once thought to be the steadiest high-energy source in the sky. "For 40 years, most astronomers regarded the Crab as a standard candle," said Colleen Wilson-Hodge, an astrophysicist at NASA's Marshall Space Flight Center in Huntsville, Ala., who presented the findings today at the American Astronomical Society meeting in Seattle. "Now, for the first time, we're clearly seeing how much our candle flickers."

[http://www.nasa.gov/mission\\_pages/GLAST/news/crab-nebula-surprise.html](http://www.nasa.gov/mission_pages/GLAST/news/crab-nebula-surprise.html)

### **NASA's Hubble Finds Rare Blue Straggler Stars in the Milky Way's Hub**

Probing the star-filled, ancient hub of our Milky Way, NASA's Hubble Space Telescope has found a rare class of oddball stars called blue stragglers, the first time such objects have been detected within our galaxy's bulge.

<http://hubblesite.org/newscenter/archive/releases/2011/16/full/>

# June Sky Data

New Jun 1      First Qtr Jun 8      Full Jun 15      Last Qtr Jun 23

**Best time for deep sky observing this month:  
June 1 thru June 4 and June 25 thru June 30**



**Mercury** is at superior conjunction (almost directly behind the Sun) on June 12th. We are unlikely to see this elusive little planet this month.

**Venus** is rising less than an hour before sunrise, so the “Morning Star”, brilliant though it is, will be virtually impossible to see.

**Mars** is slowly emerging from behind the Sun, into the pre-dawn sky. By the end of June it is rising in the north-east about 2:30 am. But the “Red Planet” is on the far side of its orbit, and quite faint, so it will be difficult to see in the twilight sky.

The giant planet **Jupiter** has also now emerged into the morning sky. At dawn it’s much further right and higher up than Mars is, and it’s also much brighter – it outshines all the night-time stars, and should be easy to find. Jupiter starts June in the constellation of Pisces, and travels slowly northeastwards, moving into Aries on June 7th. In the early morning of Sunday June 26th, the waning Moon will be well up in the eastern sky, and Jupiter will appear directly below it.

**Saturn** is in the south-western sky at dusk, and doesn’t set till after midnight. Relative to the stars, it is almost stationary in the constellation of Virgo, less than a degree to the lower left of the star  $\gamma$  (gamma) Virginis. Saturn looks like a much brighter star, and it shines with a steadier light. In the late evening of Thursday June 9th, our own half-lit Moon will be to the lower right of Saturn; the following night, the Moon will appear below and left of the planet.

There are no significant **meteor-showers** in June.

June is the best time of the year to see **Noctilucent (“Night-Shining”) Clouds**. These are beautiful, high-altitude clouds that form only occasionally, and usually only for a few weeks around midsummer. They are usually seen low in the northern sky. In June, the best time to look for them is around 1 am

## Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
6/1/2011	05:28	20:16	05:45	20:05
6/5/2011	09:23	23:21	05:44	20:07
6/10/2011	14:54	01:37	05:43	20:10
6/15/2011	20:23	05:28	05:43	20:12
6/20/2011	23:35	10:36	05:44	20:13
6/25/2011	23:35	10:36	05:44	20:13
6/30/2011	23:35	10:36	05:44	20:13

## Planet Data

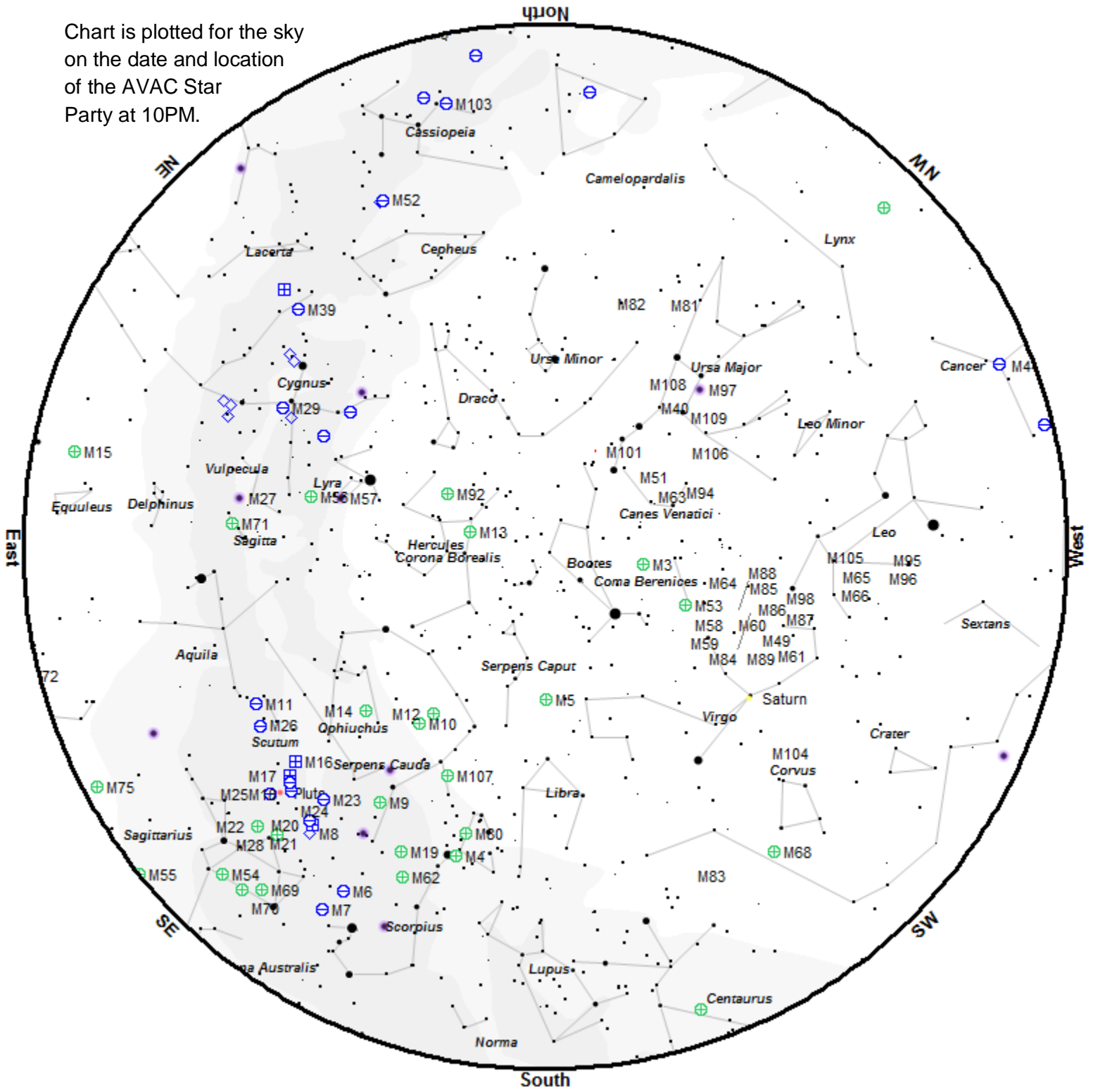
	Jun 1			
	Rise	Transit	Set	Mag
<b>Mercury</b>	03:54	11:00	18:01	-1.1
<b>Venus</b>	03:29	10:27	17:24	-3.9
<b>Mars</b>	03:10	10:06	17:03	1.3
<b>Jupiter</b>	02:24	09:00	15:40	-2.2
<b>Saturn</b>	13:52	19:54	01:55	0.7

	Jun 15			
	Rise	Transit	Set	Mag
<b>Mercury</b>	04:46	12:08	19:35	-1.9
<b>Venus</b>	03:30	10:42	17:52	-3.9
<b>Mars</b>	02:47	09:52	16:58	1.4
<b>Jupiter</b>	01:37	08:16	14:58	-2.2
<b>Saturn</b>	12:57	18:58	01:00	0.8

	Jun 31			
	Rise	Transit	Set	Mag
<b>Mercury</b>	06:05	13:18	20:35	-0.4
<b>Venus</b>	03:41	11:01	18:20	-3.9
<b>Mars</b>	02:24	09:37	16:51	1.4
<b>Jupiter</b>	00:45	07:27	14:12	-2.3
<b>Saturn</b>	11:55	18:00	00:01	0.9

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
M 83	Gal	7.8	Hya	13h37m00.8s	-29°51'56"	21:27	21:49	22:42	detectable
M 104	Gal	9.1	Vir	12h39m59.3s	-11°37'22"	21:30	21:50	22:45	detectable
M 65	Gal	10.1	Leo	11h18m55.7s	+13°05'32"	21:33	21:51	22:31	detectable
M 66	Gal	9.7	Leo	11h20m14.9s	+12°59'30"	21:33	21:51	21:52	detectable
M 86	Gal	9.8	Vir	12h26m12.2s	+12°56'44"	21:34	21:54	22:53	detectable
M 84	Gal	10.1	Vir	12h25m03.9s	+12°53'12"	21:33	21:54	22:55	detectable
M 49	Gal	9.3	Vir	12h29m46.8s	+08°00'01"	21:32	21:54	22:46	detectable
M 87	Gal	9.6	Vir	12h30m49.2s	+12°23'29"	21:33	21:55	22:59	detectable
NGC 4565	Gal	10.1	Com	12h36m20.8s	+25°59'15"	21:35	21:57	23:07	difficult
M 64	Gal	9.3	Com	12h56m43.8s	+21°41'00"	21:32	21:57	23:43	detectable
M 106	Gal	9.1	CVn	12h18m57.6s	+47°18'13"	21:35	22:00	23:46	detectable
M 94	Gal	8.7	CVn	12h50m53.1s	+41°07'12"	21:31	22:00	00:22	easy
M 3	Glob	6.3	CVn	13h42m11.0s	+28°22'42"	21:29	22:00	00:35	easy
M 82	Gal	9.0	UMa	09h55m52.4s	+69°40'47"	21:33	22:01	22:47	easy
M 81	Gal	7.8	UMa	09h55m33.1s	+69°03'56"	21:35	22:01	22:43	detectable
NGC 5195	Gal	10.5	CVn	13h29m59.6s	+47°15'58"	21:33	22:02	00:28	detectable
M 51	Gal	8.7	CVn	13h29m52.3s	+47°11'40"	21:29	22:02	01:05	easy
NGC 5897	Glob	8.4	Lib	15h17m24.0s	-21°00'36"	21:37	22:04	23:10	difficult
M 101	Gal	8.4	UMa	14h03m12.4s	+54°20'53"	21:35	22:06	00:53	detectable
M 5	Glob	5.7	Ser	15h18m34.0s	+02°05'00"	21:29	22:07	01:16	easy
NGC 5986	Glob	7.6	Lup	15h46m03.0s	-37°47'12"	21:33	22:11	23:40	detectable
M 80	Glob	7.3	Sco	16h17m02.0s	-22°58'30"	21:32	22:39	23:45	detectable
NGC 6124	Open	6.3	Sco	16h25m20.0s	-40°39'12"	21:54	22:47	23:42	difficult
NGC 6167	Open	6.6	Nor	16h34m34.0s	-49°46'18"	21:53	22:56	23:59	easy
NGC 6178	Open	7.2	Sco	16h35m47.0s	-45°38'36"	21:36	22:57	00:24	easy
NGC 6193	Open	5.4	Ara	16h41m20.0s	-48°45'48"	21:58	23:03	00:07	easy
M 13	Glob	5.8	Her	16h41m41.0s	+36°27'36"	21:29	23:04	03:44	easy
M 12	Glob	6.1	Oph	16h47m14.0s	-01°56'48"	21:29	23:09	02:31	easy
M 10	Glob	6.6	Oph	16h57m09.0s	-04°06'00"	21:32	23:18	02:21	detectable
M 62	Glob	6.4	Oph	17h01m13.0s	-30°06'48"	21:35	23:23	01:37	detectable
M 19	Glob	6.8	Oph	17h02m38.0s	-26°16'06"	21:38	23:24	01:34	detectable
M 92	Glob	6.5	Her	17h17m07.0s	+43°08'12"	21:30	23:39	04:15	easy
NGC 6322	Open	6.5	Sco	17h18m25.0s	-42°56'00"	21:47	23:40	01:34	easy
M 9	Glob	7.8	Oph	17h19m12.0s	-18°31'00"	21:45	23:41	01:36	detectable
NGC 6383	Open	5.4	Sco	17h34m48.0s	-32°34'00"	21:39	23:56	02:22	easy
NGC 6388	Glob	6.8	Sco	17h36m17.0s	-44°44'06"	22:46	23:58	01:10	detectable
M 14	Glob	7.6	Oph	17h37m36.0s	-03°14'48"	21:35	23:59	03:02	detectable
M 6	Open	4.6	Sco	17h40m20.0s	-32°15'12"	21:35	00:02	02:40	easy
IC 4665	Open	5.3	Oph	17h46m18.0s	+05°43'00"	21:39	00:08	03:16	detectable
M 7	Open	3.3	Sco	17h53m51.0s	-34°47'36"	22:04	00:15	02:27	easy

<b>ID</b>	<b>Cls</b>	<b>Mag</b>	<b>Con</b>	<b>RA 2000</b>	<b>Dec 2000</b>	<b>Begin</b>	<b>Best</b>	<b>End</b>	<b>Difficulty</b>
NGC 6543	PNe	8.3	Dra	17h58m33.4s	+66°37'59"	21:20	00:19	04:40	obvious
M 23	Open	5.9	Sgr	17h57m04.0s	-18°59'06"	22:27	00:19	02:10	detectable
M 20	Open	5.2	Sgr	18h02m42.0s	-22°58'18"	23:17	00:24	01:32	easy
M 8	Neb	5.0	Sgr	18h04m02.0s	-24°23'14"	23:45	00:25	01:06	easy
M 21	Open	7.2	Sgr	18h04m13.0s	-22°29'24"	23:12	00:26	01:40	detectable
NGC 6541	Glob	6.3	CrA	18h08m02.0s	-43°42'54"	23:12	00:30	01:46	detectable
NGC 6572	PNe	8.0	Oph	18h12m06.4s	+06°51'12"	21:16	00:33	04:25	obvious
M 16	Open	6.5	Ser	18h18m48.0s	-13°48'24"	22:11	00:41	03:08	obvious
M 18	Open	7.5	Sgr	18h19m58.0s	-17°06'06"	22:35	00:41	02:48	easy
M 17	Open	7.3	Sgr	18h20m47.0s	-16°10'18"	22:30	00:42	02:54	detectable
M 28	Glob	6.9	Sgr	18h24m33.0s	-24°52'12"	00:21	00:46	01:11	detectable
NGC 6633	Open	5.6	Oph	18h27m15.0s	+06°30'30"	21:32	00:48	04:25	easy
M 25	Open	6.2	Sgr	18h31m47.0s	-19°07'00"	23:03	00:53	02:44	detectable
M 22	Glob	5.2	Sgr	18h36m24.0s	-23°54'12"	00:06	00:57	01:49	detectable
IC 4756	Open	5.4	Ser	18h39m00.0s	+05°27'00"	21:42	01:00	04:19	easy
M 70	Glob	7.8	Sgr	18h43m13.0s	-32°17'30"	23:05	01:05	03:04	detectable
M 11	Open	6.1	Sct	18h51m05.0s	-06°16'12"	22:08	01:12	04:11	detectable
M 57	PNe	9.4	Lyr	18h53m35.1s	+33°01'45"	21:31	01:15	04:32	easy
NGC 6716	Open	7.5	Sgr	18h54m34.0s	-19°54'06"	23:32	01:16	03:00	detectable
M 54	Glob	7.7	Sgr	18h55m03.0s	-30°28'42"	23:30	01:16	03:04	detectable
NGC 6723	Glob	6.8	Sgr	18h59m33.0s	-36°37'54"	23:35	01:21	03:07	detectable
M 56	Glob	8.4	Lyr	19h16m36.0s	+30°11'06"	21:59	01:37	04:23	detectable
M 55	Glob	6.3	Sgr	19h40m00.0s	-30°57'42"	23:57	02:01	04:04	detectable
NGC 6818	PNe	10.0	Sgr	19h43m57.8s	-14°09'12"	23:40	02:05	04:30	easy
M 71	Glob	8.4	Sge	19h53m46.0s	+18°46'42"	22:03	02:15	04:31	easy
M 27	PNe	7.3	Vul	19h59m36.3s	+22°43'16"	22:05	02:21	04:31	easy
NGC 6871	Open	5.8	Cyg	20h05m59.0s	+35°46'36"	21:55	02:26	04:31	easy
M 29	Open	7.5	Cyg	20h23m57.0s	+38°30'30"	22:02	02:44	04:32	easy
NGC 6910	Open	7.3	Cyg	20h23m12.0s	+40°46'42"	21:53	02:44	04:32	easy
NGC 7009	PNe	8.3	Aqr	21h04m10.9s	-11°21'48"	00:43	03:25	04:45	obvious
M 39	Open	5.3	Cyg	21h31m48.0s	+48°26'00"	22:31	03:41	04:33	easy
M 15	Glob	6.3	Peg	21h29m58.0s	+12°10'00"	00:03	03:43	04:33	easy
NGC 7160	Open	6.4	Cep	21h53m40.0s	+62°36'12"	22:11	03:46	04:37	obvious
M 2	Glob	6.6	Aqr	21h33m27.0s	-00°49'24"	00:34	03:46	04:32	detectable
NGC 7243	Open	6.7	Lac	22h15m08.0s	+49°53'54"	00:07	03:51	04:30	detectable
M 30	Glob	6.9	Cap	21h40m22.0s	-23°10'42"	02:56	03:51	04:32	detectable
M 52	Open	8.2	Cas	23h24m48.0s	+61°35'36"	01:02	03:55	04:24	detectable
NGC 7790	Open	7.2	Cas	23h58m24.0s	+61°12'30"	00:18	03:57	04:33	obvious
NGC 7789	Open	7.5	Cas	23h57m24.0s	+56°42'30"	01:44	03:58	04:25	detectable
NGC 559	Open	7.4	Cas	01h29m31.0s	+63°18'24"	01:45	03:59	04:32	easy
NGC 637	Open	7.3	Cas	01h43m04.0s	+64°02'24"	01:55	04:00	04:35	obvious
NGC 663	Open	6.4	Cas	01h46m09.0s	+61°14'06"	02:07	04:00	04:29	easy
M 103	Open	6.9	Cas	01h33m23.0s	+60°39'00"	01:55	04:00	04:33	obvious
NGC 457	Open	5.1	Cas	01h19m35.0s	+58°17'12"	01:48	04:00	04:33	obvious
NGC 1027	Open	7.4	Cas	02h42m40.0s	+61°35'42"	03:02	04:01	04:23	detectable
M 110	Gal	8.9	And	00h40m22.3s	+41°41'09"	02:17	04:01	04:27	detectable
M 32	Gal	8.9	And	00h42m41.8s	+40°51'58"	01:51	04:02	04:31	easy

<b>ID</b>	<b>Cls</b>	<b>Mag</b>	<b>Con</b>	<b>RA 2000</b>	<b>Dec 2000</b>	<b>Begin</b>	<b>Best</b>	<b>End</b>	<b>Difficulty</b>
NGC 7293	PNe	6.3	Aqr	22h29m38.5s	-20°50'14"	03:16	04:02	04:33	detectable
NGC 957	Open	7.2	Per	02h33m21.0s	+57°33'36"	03:03	04:02	04:29	easy
NGC 884	Open	4.4	Per	02h22m18.0s	+57°08'12"	02:54	04:02	04:33	obvious
NGC 869	Open	4.3	Per	02h19m00.0s	+57°07'42"	02:50	04:02	04:33	obvious
M 76	PNe	10.1	Per	01h42m19.9s	+51°34'31"	02:28	04:02	04:26	detectable
M 31	Gal	4.3	And	00h42m44.3s	+41°16'07"	01:50	04:02	04:29	easy
M 33	Gal	6.4	Tri	01h33m50.9s	+30°39'36"	03:04	04:05	04:26	detectable
M 34	Open	5.8	Per	02h42m05.0s	+42°45'42"	03:46	04:06	04:27	easy.

## A.V.A.C. Information

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

The Club has three categories of membership.

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

Membership entitles you to...

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

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