ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 35 *Antelope Valley Astronomy Club Newsletter* **October 2015**

Up-Coming Events

October 7: Quarterly Board Meeting
October 9: Club Meeting*
October 10: AVAC trip to Mt. Wilson
October 17: Prime Desert Moon Walk

* Monthly meetings are held at the S.A.G.E. Planetarium 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

Frank Moore

Hello friends. Is it really October already? What happened to September? It was here, then it was gone. For the AVAC, it was eventful as well.

We started the month with our September 11 meeting at the SAGE Planetarium where Nancy Vandermey from JPL, who has worked as a systems engineer at Edwards AFB and now works at NASA/JPL on the Cassini mission, gave us a talk on what's entailed with the logistics and execution of complex unmanned missions like Cassini. The planning, the details, the minutiae that goes into these things is mind-boggling. As Nancy explained, from launch to end of mission, every detail has to be planned and precisely executed. Every resource from communication time to fuel and electrical power, has to be managed according to a precise timeline. It was a great talk.

On Saturday September 12 some of us headed up to the Chuchupate observing site near Frazier Park. It didn't go quite as planned. I was the first to arrive and, upon arrival, was greeted by a sign across the entrance to the parking lot that said, "Lot Closed – Helibase". The fact that the lot was closed to public use was kind of obvious since there was a GIANT, Sikorsky S-64 Sky Crane helicopter, sitting right where we'd set up our scopes. This thing was so big that the rotor blades reached from one edge of the parking lot to the other. There was also a fuel truck, a maintenance truck, and a bunch of other US Forest Service vehicles on site. Rangers told us the helicopters were staged there in anticipation of thunderstorms and more lightning caused fires.

I drove back to the intersection of Lockwood Valley Road and Frazier Mountain Park Road, so I could get a cellphone signal, and called Rose at home so she could attempt contact with anyone who might be coming up. While there, Don Bryden and Darrell Bennett showed up and we ate pizza that Don had ordered from the nearby pizza place, and pondered what to do. The fact that it was partially cloudy also complicated the decision. Don ended up heading back home while Darrell and I went on up the road to Mt. Pinos where we were later joined by Matt Leone. We observed various targets that Matt and Darrell got through the "sucker holes" in the clouds while I waited, and waited, and waited for Polaris to pop through the clouds so I could get a polar alignment. It finally popped out at about 11:00 PM and got aligned and a beautiful model for my go-to which was spot on. Darrell eventually packed up and headed for the barn

while Matt and I spent the night in my motor home. I observed till about 1:30 AM with my last object of course being my favorite, the Veil Nebula. The trip didn't go as planned but we had a good time anyhow.

On Saturday, September 19, Rose and I, Bill Schebeck, Tom Hames, and Robert Lynch had telescopes setup at the monthly Moon Walk at Prime Desert Woodland Preserve. The sky really looked hazy on the way there, and as we setup, but it ended up being a decent night for observing and we share the night sky with 100 members of the public.

Finally, we had our "Total, Super, Blood, Harvest moon" lunar eclipse event at the Palmdale Learning Plaza on Saturday September 27. As I'm sure most of you are aware, the weather did not cooperate. The moon was visible, low on the horizon, as it rose already eclipsed, but it then went into the clouds. It then came and went from view, in and out, sometimes visible through thin clouds, sometimes not visible through thick. It finally cleared the clouds, mostly, at about 7:50 our time...just after the mid- point of totality. We had well over 200 people show up for the event plus a couple of dozen club members. Those who stayed till the end, when the still red moon finally popped into the clear, got a treat and, as we said, a lesson in astronomy. Patience!! A big THANK YOU to all of the club members who came out to support this event.

Coming up on Friday, October 9, we have our Annual Business Meeting and Board Election at the SAGE Planetarium. I can't stress this enough. We need YOU, members of this club, to come and participate in our business meeting and election. We need people who will be willing to serve as officers on the Executive Board. We need your nominations for board positions (nominate yourself) and your participation in the governance of this club. Please come to the meeting and consider serving on the board.

The night after the meeting, Saturday October 10, is the trip to the Mt. Wilson Observatory for observing on the 100" telescope. Rose had handouts at the last meeting and has sent emails. If you questions about the details call or email Rose.

A new item, that hadn't yet been on the calendar as I just receive notification, is the College of the Canyons Fall Star Party, which will be held on the Canyon Country Campus on Friday October 16 from 7:00 – 9:30 PM. These are always fun events with a huge turnout from the public. Consider going to represent the club. Details will be announced at the meeting and sent out in a separate email.

Finally, on Saturday October 17 at 7:00 PM, we have the monthly Moon Walk at Prime Desert Woodland Preserve. This is preceded by the annual "Scary Science" event at 4:00 PM in the interpretive center/museum at PDW. Per the City of Lancaster, "At Scary Science, "Mad Scientist" and Director of the SAGE Planetarium, Jeremy Amarant, will send chills down your spine with this vibrant and informative presentation of science and astronomy". Scary Science always prompts a big turnout for the Moon Walk to follow so we need a lot of members to support this event

Vice President

Don Bryden

I hope everyone had a chance to see the lunar eclipse. It took a little resolve as the clouds stayed until about mid-eclipse but finally we were rewarded with a nice reddish-orange moon! We had a lot of folks out at the Palmdale Learning Plaza to view the eclipse so we had to hunt around for interesting objects to view while waiting for the moon to come out. Saturn looked nice as well as M8, M22 and some of the brighter gem.

There will be no speaker this month as it will be our annual business meeting and executive board elections. Of course Jeremy will have a nice dome show to entertain us and frank will be raffling off several goodies. So please come out and support your club!

Secretary

Rose Moore

For those going on the Mt. Wilson trip, I have heard from our coordinator for that night, and I will be sending out another email with additional information. Please be on the lookout for this information. Info on where and when to meet up to car pool will be in the email. You will be required to call the number Mt. Wilson has provided to check on the weather at a specific time.

Thanks to all who have been coming to our outreach events! And thanks to Jeremy for the Krispy Kreme donuts at our last PDW!

Our Christmas Party will be coming up the beginning of December! Sign up sheets will be starting at October's meeting, so that we will have a 'head count' by mid November to present to Julianni's Restaurant. If you cannot attend the meeting, please email or leave a voice message for either Don Bryden or myself. Also if you have any items you would like to donate for the silent auction or raffle, you may contact one of the board members, or just bring them to the party.

This month's meeting will be our Annual Business Meeting. Please attend so that we may elect an executive board for our club! I will not be running for any position, nor will I accept a nomination.

Astrophoto of The Month

9/27 lunar eclipse
by Don Bryden

Taken at the Palmdale Learning Plaza with a Nikon D300 at prime focus on a Stellarvue SV-105 APO

Space Place

Measure the moon's size and distance during the lunar eclipse

By Ethan Siegel

The moon represents perhaps the first great paradox of the night sky in all of human history. While its angular size is easy to measure with the unaided eye from any location on Earth, ranging from 29.38 arc-minutes (0.4897°) to 33.53 arc-minutes (0.5588°) as it orbits our world in an ellipse, that doesn't tell us its physical size. From its angular size alone, the moon could just as easily be close and small as it could be distant and enormous.

But we know a few other things, even relying only on naked-eye observations. We know its phases are caused by its geometric configuration with the sun and Earth. We know that the sun must be farther away (and hence, larger) than the moon from the phenomenon of solar eclipses, where the moon passes in front of the sun, blocking its disk as seen from Earth. And we know it undergoes lunar eclipses, where the sun's light is blocked from the moon by Earth.

Lunar eclipses provided the first evidence that Earth was round; the shape of the portion of the shadow that falls on the moon during its partial phase is an arc of a circle. In fact, once we measured the radius of Earth (first accomplished in the 3rd century B.C.E.), now known to be 6,371 km, all it takes is one assumption—that the physical size of Earth's shadow as it falls on the moon is approximately the physical size of Earth—and we can use lunar eclipses to measure both the size of and the distance to the moon!

Simply by knowing Earth's physical size and measuring the ratios of the angular size of its shadow and the angular size of the moon, we can determine the moon's physical size relative to Earth. During a lunar eclipse, Earth's shadow is about 3.5 times larger than the moon, with some slight variations dependent on the moon's point in its orbit. Simply divide Earth's radius by your measurement to figure out the moon's radius!

Even with this primitive method, it's straightforward to get a measurement for the moon's radius that's accurate to within 15% of the actual value: 1,738 km. Now that you've determined its physical size and its angular size, geometry alone enables you to determine how far away it is from Earth.

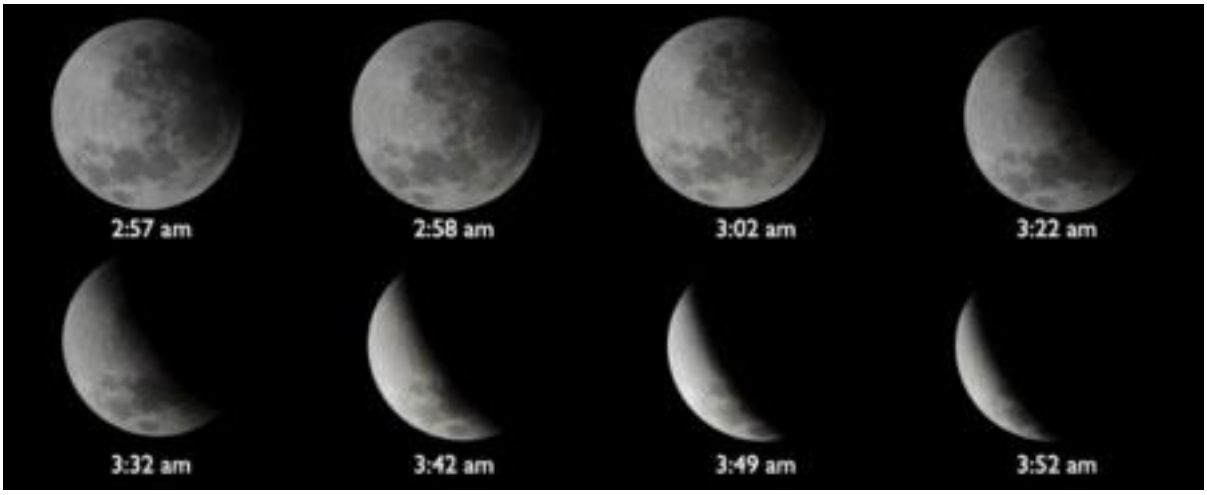


Image credit: Daniel Munizaga (NOAO South/CTIO EPO), using the Cerro Tololo Inter-American Observatory, of an eight-image sequence of the partial phase of a total lunar eclipse.

News Headlines

The BIG NEWS: NASA Confirms Evidence That Liquid Water Flows on Today's Mars
New findings from NASA's Mars Reconnaissance Orbiter (MRO) provide the strongest evidence yet that liquid water flows intermittently on present-day Mars.
Using an imaging spectrometer on MRO, researchers detected signatures of hydrated minerals on slopes where mysterious streaks are seen on the Red Planet. These darkish streaks appear to ebb and flow over time. They darken and appear to flow down steep slopes during warm seasons, and then fade in cooler seasons. They appear in several locations on Mars when temperatures are above minus 10 degrees Fahrenheit (minus 23 Celsius), and disappear at colder times.
http://www.jpl.nasa.gov/news/news.php?feature=4722&utm_source=iContact&utm_medium=email&utm_campaign=NASAJPL&utm_content=daily20150928-1

Dawn Team Shares New Maps and Insights about Ceres
A new color-coded topographic map shows more than a dozen recently approved names for features on Ceres, all eponymous for agricultural spirits, deities and festivals from cultures around the world. These include Jaja, after the Abkhazian harvest goddess, and Ernutet, after the cobra-headed Egyptian harvest goddess. A 12-mile (20-kilometer) diameter mountain near Ceres' north pole is now called Ysolo Mons, for an Albanian festival that marks the first day of the eggplant harvest.
http://www.jpl.nasa.gov/news/news.php?feature=4725

Physicists observe weird quantum fluctuations of empty space—maybe
Empty space is anything but, according to quantum mechanics: Instead, it roils with quantum particles flitting in and out of existence. Now, a team of physicists claims it has measured those fluctuations directly, without disturbing or amplifying them. However, others say it's unclear exactly what the new experiment measures—which may be fitting for a phenomenon that originates in quantum mechanics' famous uncertainty principle.
http://news.sciencemag.org/physics/2015/10/physicists-observe-weird-quantum-fluctuations-empty-space-maybe

Astronomy magazine joins in partnership with SciStarter to promote citizen science projects
Astronomy enthusiasts can join forces with researchers through a partnership between Astronomy magazine and SciStarter. A “citizen science” movement is sweeping the country. Now, astronomy enthusiasts who want to collaborate with leading scientists can visit Astronomy.com to join cutting-edge research projects.
http://cs.astronomy.com/asy/b/daves-universe/archive/2015/10/02/press-release-astronomy-magazine-joins-in-partnership-with-scistarter-to-promote-citizen-science-projects.aspx

10,000th Free Image Published in the ESO Image Archive
The number of public images on the European Southern Observatory (ESO) website has reached a new milestone, with 10,000 images now free for public use. The collection features an impressive array of cosmic phenomena — including galaxies, nebulae and star clusters. In addition there are also many spectacular views of the Atacama Large Millimeter/submillimeter Array (ALMA) and the APEX telescope, high in the Andes, as well as of the Paranal and La Silla Observatories in the barren landscapes of northern Chile.
http://www.eso.org/public/announcements/ann15076/
The ESO image archive can be found here:
http://www.eso.org/public/images/

October Sky Data

Best time for deep sky observing this month:
October 3 through October 17

Mercury is a pre-dawn object this month becoming visible about the 11th close to a thin crescent Moon - but just 8 degrees above the horizon some 40 minutes before sunrise. Mercury reaches greatest elongation west on the 16th.

Venus will dominate the pre-dawn sky this month. On the 26th of the month it reaches greatest elongation west, some 46 degrees away in angular distance from the Sun. It's apparent diameter shrinks from 33 to 23 arc second during the month but at the same time its phase increases from 35% to 53

Mars starts the month almost halfway between Venus (above) and Jupiter (below) shining at magnitude +1.8 some 23 degrees above the eastern horizon an hour before sunrise. With Mar's disk still just 4 arc seconds across no details will be seen on its salmon-pink surface.

Shining at magnitude -1.7 **Jupiter** starts the month just 12 degrees above the eastern horizon as dawn breaks. It rises earlier as the month progresses. The size of Jupiter's disk increases slightly from 31.4 to 33 arc seconds so early risers should be able to easily observe the equatorial bands.

At the start of October, **Saturn**, shining at magnitude +0.6, can be seen low in the southwest about 45 minutes after sunset. It starts the month in eastern Libra setting around 2 hours after the Sun but passes into Scorpius on the 16th. By month's end it sets one hour after the Sun.

This year presents a fine year for watching the Orionid **meteor shower**. The best viewing for the Orionids will probably be before dawn on October 22. Try the days before and after that, too, sticking to the midnight-to-dawn hours. The waxing gibbous moon will be out the during the evening hours, but it'll set before the prime time viewing hours. These fast-moving meteors occasionally leave persistent trains. They sometimes produce bright fireballs too, so watch for them to flame in the sky.

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
10/1/2015	22:39	11:44	07:46	19:35
10/5/2015	01:17	15:22	07:49	19:30
10/10/2015	05:49	18:21	07:53	19:23
10/15/2015	10:17	21:12	07:57	19:17
10/20/2015	14:35	------	08:01	19:11
10/25/2015	17:08	04:53	07:05	18:05
10/31/2015	22:07	11:26	07:11	17:59

Planet Data

Oct 1

	Rise	Transit	Set	Mag
Mercury	06:25	12:28	18:23	4.8
Venus	03:16	09:53	16:31	-4.5
Mars	03:56	10:35	17:16	1.8
Jupiter	04:29	10:59	17:32	-1.8
Saturn	10:50	16:07	21:21	0.6

Oct 15

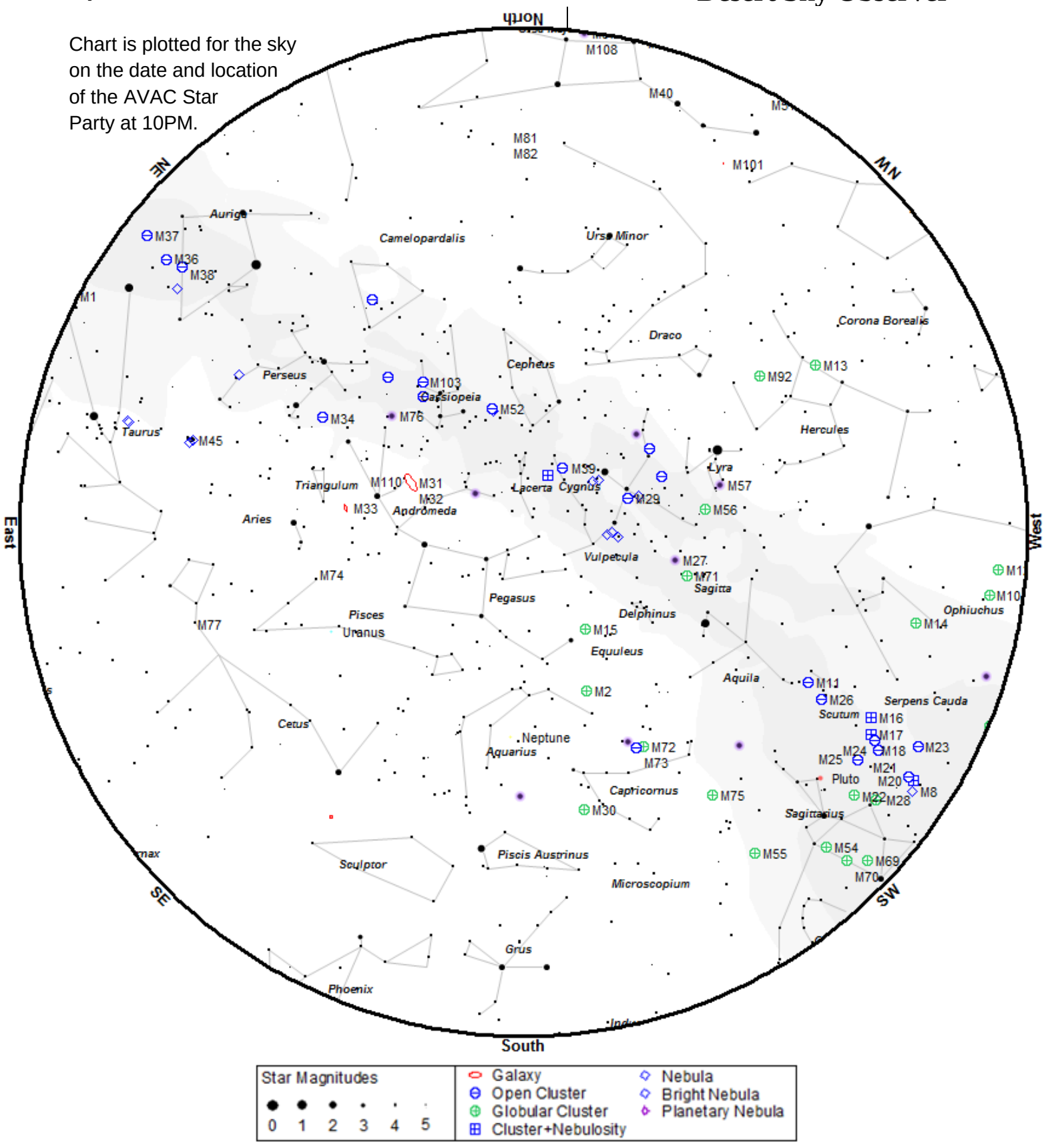
	Rise	Transit	Set	Mag
Mercury	05:26	11:33	17:40	-0.5
Venus	03:14	09:45	16:16	-4.4
Mars	03:43	10:13	16:44	1.8
Jupiter	03:47	10:14	16:45	-1.8
Saturn	10:01	15:17	20:30	0.6

Oct 31

	Rise	Transit	Set	Mag
Mercury	06:17	11:59	17:39	-1.0
Venus	03:25	09:43	16:01	-4.3
Mars	03:27	09:46	16:07	1.7
Jupiter	02:58	09:22	15:49	-1.9
Saturn	09:06	14:22	19:33	0.5

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	Con	RA 2000	Dec 2000	Mag	Begin	Best	End	Difficulty
NGC 6541	Glob	CrA	18h08m02.0s	-43°42'54"	6.3	19:23	19:37	19:59	challenging
M 62	Glob	Oph	17h01m13.0s	-30°06'48"	6.4	19:32	19:41	19:53	detectable
M 19	Glob	Oph	17h02m38.0s	-26°16'06"	6.8	19:34	19:42	19:56	detectable
NGC 6383	Open	Sco	17h34m48.0s	-32°34'00"	5.4	19:30	19:42	20:07	easy
M 6	Open	Sco	17h40m20.0s	-32°15'12"	4.6	19:29	19:43	20:18	easy
M 7	Open	Sco	17h53m51.0s	-34°47'36"	3.3	19:29	19:43	20:12	detectable
M 9	Glob	Oph	17h19m12.0s	-18°31'00"	7.8	19:34	19:47	20:10	difficult
NGC 6723	Glob	Sgr	18h59m33.0s	-36°37'54"	6.8	19:32	19:46	20:29	detectable
M 8	Neb	Sgr	18h04m02.0s	-24°23'14"	5.0	19:31	19:47	20:41	easy
M 21	Open	Sgr	18h04m13.0s	-22°29'24"	7.2	19:32	19:48	20:37	detectable
M 20	Open	Sgr	18h02m42.0s	-22°58'18"	5.2	19:32	19:48	20:47	easy
M 70	Glob	Sgr	18h43m13.0s	-32°17'30"	7.8	19:32	19:48	20:30	detectable
M 23	Open	Sgr	17h57m04.0s	-18°59'06"	5.9	19:32	19:48	20:44	detectable
M 28	Glob	Sgr	18h24m33.0s	-24°52'12"	6.9	19:32	19:48	20:40	detectable
M 12	Glob	Oph	16h47m14.0s	-01°56'48"	6.1	19:33	19:49	20:39	easy
M 10	Glob	Oph	16h57m09.0s	-04°06'00"	6.6	19:35	19:49	20:27	detectable
M 54	Glob	Sgr	18h55m03.0s	-30°28'42"	7.7	19:35	19:49	20:29	difficult
M 14	Glob	Oph	17h37m36.0s	-03°14'48"	7.6	19:34	19:50	20:30	detectable
M 17	Open	Sgr	18h20m47.0s	-16°10'18"	7.3	19:36	19:50	20:10	difficult
M 18	Open	Sgr	18h19m58.0s	-17°06'06"	7.5	19:28	19:50	20:04	easy
M 22	Glob	Sgr	18h36m24.0s	-23°54'12"	5.2	19:32	19:50	20:57	detectable
M 16	Open	Ser	18h18m48.0s	-13°48'24"	6.5	19:28	19:51	20:24	obvious
M 25	Open	Sgr	18h31m47.0s	-19°07'00"	6.2	19:33	19:51	20:00	detectable
NGC 6716	Open	Sgr	18h54m34.0s	-19°54'06"	7.5	19:30	19:52	20:15	detectable
M 13	Glob	Her	16h41m41.0s	+36°27'36"	5.8	19:33	19:52	21:19	easy
NGC 6572	PNe	Oph	18h12m06.4s	+06°51'12"	8.0	19:21	19:52	21:40	obvious
M 92	Glob	Her	17h17m07.0s	+43°08'12"	6.5	19:32	19:53	22:07	easy
NGC 6633	Open	Oph	18h27m15.0s	+06°30'30"	5.6	19:30	19:53	21:54	easy
M 11	Open	Sct	18h51m05.0s	-06°16'12"	6.1	19:32	19:54	21:32	detectable
M 55	Glob	Sgr	19h40m00.0s	-30°57'42"	6.3	19:34	19:53	21:15	detectable
IC 4756	Open	Ser	18h39m00.0s	+05°27'00"	5.4	19:31	19:54	21:57	easy
NGC 6543	PNe	Dra	17h58m33.4s	+66°37'59"	8.3	19:23	19:56	23:49	obvious
M 57	PNe	Lyr	18h53m35.1s	+33°01'45"	9.4	19:28	19:56	23:23	easy
NGC 6818	PNe	Sgr	19h43m57.8s	-14°09'12"	10.0	19:25	19:56	21:47	easy
M 56	Glob	Lyr	19h16m36.0s	+30°11'06"	8.4	19:34	19:57	22:28	detectable
M 71	Glob	Sge	19h53m46.0s	+18°46'42"	8.4	19:29	20:00	23:34	easy
M 27	PNe	Vul	19h59m36.3s	+22°43'16"	7.3	19:30	20:01	23:43	easy
NGC 6871	Open	Cyg	20h05m59.0s	+35°46'36"	5.8	19:29	20:03	00:12	easy

ID	Cls	Con	RA 2000	Dec 2000	Mag	Begin	Best	End	Difficulty
NGC 6910	Open	Cyg	20h23m12.0s	+40°46'42"	7.3	19:29	20:08	00:44	easy
M 29	Open	Cyg	20h23m57.0s	+38°30'30"	7.5	19:29	20:08	00:33	easy
NGC 7009	PNe	Aqr	21h04m10.9s	-11°21'48"	8.3	19:23	20:39	23:23	obvious
M 15	Glob	Peg	21h29m58.0s	+12°10'00"	6.3	19:30	21:05	00:47	easy
M 39	Open	Cyg	21h31m48.0s	+48°26'00"	5.3	19:29	21:06	02:20	easy
M 2	Glob	Aqr	21h33m27.0s	-00°49'24"	6.6	19:31	21:08	00:24	detectable
IC 1396	Neb	Cep	21h39m06.0s	+57°30'00"		19:31	21:13	02:33	challenging
M 30	Glob	Cap	21h40m22.0s	-23°10'42"	6.9	20:05	21:15	22:26	detectable
NGC 7160	Open	Cep	21h53m40.0s	+62°36'12"	6.4	19:25	21:28	03:30	obvious
IC 5146	Neb	Cyg	21h53m24.0s	+47°16'00"	10.0	19:29	21:28	02:30	challenging
NGC 7243	Open	Lac	22h15m08.0s	+49°53'54"	6.7	19:33	21:49	02:09	detectable
NGC 7293	PNe	Aqr	22h29m38.5s	-20°50'14"	6.3	20:27	22:03	23:42	detectable
M 52	Open	Cas	23h24m48.0s	+61°35'36"	8.2	19:39	22:59	03:07	detectable
NGC 7789	Open	Cas	23h57m24.0s	+56°42'30"	7.5	19:45	23:31	03:30	detectable
NGC 7790	Open	Cas	23h58m24.0s	+61°12'30"	7.2	19:29	23:32	05:31	easy
NGC 55	Gal	Scl	00h15m08.4s	-39°13'13"	8.5	22:44	23:49	00:54	challenging
M 110	Gal	And	00h40m22.3s	+41°41'09"	8.9	20:25	00:15	04:04	detectable
M 31	Gal	And	00h42m44.3s	+41°16'07"	4.3	19:46	00:17	04:51	easy
M 32	Gal	And	00h42m41.8s	+40°51'58"	8.9	19:44	00:17	04:55	easy
NGC 253	Gal	Scl	00h47m33.1s	-25°17'20"	7.9	23:58	00:21	00:45	detectable
NGC 288	Glob	Scl	00h52m45.0s	-26°35'00"	8.1	22:58	00:27	01:56	challenging
NGC 457	Open	Cas	01h19m35.0s	+58°17'12"	5.1	19:34	00:53	05:45	obvious
NGC 559	Open	Cas	01h29m31.0s	+63°18'24"	7.4	19:34	01:03	05:46	easy
M 103	Open	Cas	01h33m23.0s	+60°39'00"	6.9	19:33	01:07	05:48	obvious
M 33	Gal	Tri	01h33m50.9s	+30°39'36"	6.4	21:18	01:08	04:58	detectable
M 76	PNe	Per	01h42m19.9s	+51°34'31"	10.1	20:56	01:16	05:30	detectable
NGC 637	Open	Cas	01h43m04.0s	+64°02'24"	7.3	19:31	01:17	05:49	obvious
NGC 663	Open	Cas	01h46m09.0s	+61°14'06"	6.4	19:42	01:20	05:43	easy
NGC 752	Open	And	01h57m41.0s	+37°47'06"	6.6	23:10	01:32	03:53	challenging
NGC 869	Open	Per	02h19m00.0s	+57°07'42"	4.3	20:04	01:53	05:49	obvious
NGC 884	Open	Per	02h22m18.0s	+57°08'12"	4.4	20:07	01:57	05:50	obvious
NGC 957	Open	Per	02h33m21.0s	+57°33'36"	7.2	20:35	02:07	05:46	easy
Heart Neb	Neb	Cas	02h33m52.0s	+61°26'50"	6.5	23:10	02:08	05:05	challenging
M 34	Open	Per	02h42m05.0s	+42°45'42"	5.8	21:52	02:15	05:41	easy
M 77	Gal	Cet	02h42m40.8s	-00°00'48"	9.7	23:07	02:16	05:24	detectable
NGC 1027	Open	Cas	02h42m40.0s	+61°35'42"	7.4	21:36	02:17	05:40	detectable
NGC 1245	Open	Per	03h14m42.0s	+47°14'12"	7.7	00:31	02:49	05:06	challenging
NGC 1342	Open	Per	03h31m38.0s	+37°22'36"	7.2	22:50	03:06	05:44	detectable
M 45	Open	Tau	03h47m00.0s	+24°07'00"	1.5	22:44	03:20	05:49	obvious
NGC 1444	Open	Per	03h49m25.0s	+52°39'30"	6.4	21:45	03:23	05:52	obvious
NGC 1502	Open	Cam	04h07m50.0s	+62°19'54"	4.1	21:39	03:42	05:53	obvious
NGC 1528	Open	Per	04h15m23.0s	+51°12'54"	6.4	22:37	03:49	05:48	easy
Hyades	Open	Tau	04h26m54.0s	+15°52'00"	0.8	23:47	04:01	05:49	obvious
NGC 1647	Open	Tau	04h45m55.0s	+19°06'54"	6.2	00:58	04:19	05:43	detectable
NGC 1664	Open	Aur	04h51m06.0s	+43°40'30"	7.2	23:23	04:24	05:48	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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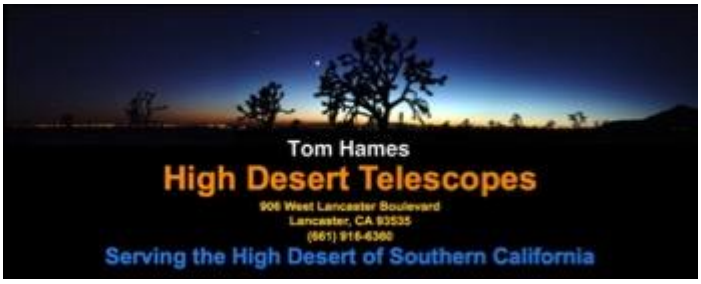

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