ANTELOPE VALLEY ASTRONOMY CLUB, INC.

Desert Sky Observer

Volume 38 *Antelope Valley Astronomy Club Newsletter* **June 2018**

Up-Coming Events

June 8: Club Meeting*
June 10: Mt. Wilson Trip
June 16: DSSP/Lunar Club

* 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

"It was a very blustery day!"

"…. the blustery day turned into a blustery night. To Pooh , it was an anxious sort of night, filled with anxious sorts of noises. And one of the noises was a sound that had never been heard before."

- A. A. Milne

Fortunately, none of those "noises", which went "bump" in the blustery night turned out to be telescopes, or anything else of importance, blowing over.

The AVAC's weekend at Red Rock Canyon began when I arrived at about 0900 on Friday May 25 followed shortly by Michael Leone in Matt and Sue's motor home. After we got the Leone's motorcycles unloaded and their trailer parked in Campsite #4, I returned to the main AVAC camp where I unloaded and got the 60mm Coronado solar scope setup. The wind wasn't too bad at first but it continued to build throughout the afternoon till dying down a little after dark. Still, we managed to share views of the sun with camping public when they ventured over to our camp. I also took our display board, updated for the event, down to the Visitor's Center

Jim Pendleton arrived around 5:30 and setup his motor home in Camp #3 before returning to Tehachapi so he could open his shop on Saturday morning and returning to Red Rock Canyon on Saturday night.

As darkness approached, I replaced the Coronado solar scope on our Orion Atlas mount with our Celestron C6-R refractor and set up the C-11 on the Losmandy G-11 mount. Matt and Michael Leone set up their C6-R on a Celestron Advanced VX Mount and well as their big Oberwerk binoculars. This was more than adequate for sharing views of the 88% illuminated waxing gibbous moon as well as Venus, Jupiter and few of the brightest of deep space objects with the public. We were able to share Saturn for a short time but, with the wind kicking up shortly after it cleared the horizon, we finally had to cover up at about 11:30 pm to protect the telescopes from the wind and blowing sand. Thus, we hunkered down for a blustery night of blowing wind which occasionally rocked the motor home and which produced "scary noises" none of which, fortunately, turned out to be anything of value blowing over.

Saturday followed much the same pattern with varying degrees of wind throughout the day before dying down slightly at dusk and then picking up again around midnight. More members with telescopes showed up throughout the afternoon on Saturday till we finally had a telescope roster which included:

Frank and Rose Moore: C-11/Losmandy G-11, C6-R/Orion Atlas, 60mm Coronado solar.
Darrell Bennett: 12" Meade LX90
Rodney Girard: 9.25" Celestron Edge HD/CPC with Mallincam and monitor.
Matt and Michael Leone: C6-R/Advanced VX, Oberwerk Binoculars
Bob Ayres: 10" Meade LX200 OTA /Orion Atlas mount
John VanEvera (and sons): Celestron Nexstar 6 SCT
Jim Pendleton: 10" Zhumell classic dobsonian

In addition to our members, there were around 20 people in our camp observing in our camp while I was doing my presentation in the amphitheater which was attended by 37. By the time Lou Figueroa and I packed up the audio/video gear and returned to our camp, those people had joined the others and our camp was a hive of activity where members could be heard describing celestial sites to the public who responded with exclamations of delight and wonder. More campers wandered in and out of our camp, taking delight in the views through our telescopes, throughout the night.

Ann Coleal helped Rose with the literature and snacks and, as she always does, actively promoted our activity by flagging the public down and directing them to the views through the telescopes. In spite of the near full moon, 88% on Friday and 94% on Saturday, we all managed to share some views of deep space objects including M13/Hercules Cluster, M57/Ring Nebula, M92/Cluster, M104/Sombrero Galaxy, as well as the Moon, Venus, Jupiter, Saturn, and the late rising Mars. Rod Girard managed to pull out impressive views of a few other deep sky objects, including M51/Whirlpool Galaxy, using his electronically assisted observation system. By about 1:00 am the increasing wind velocity finally drove us inside again and we either covered the telescopes or took them down.

I want to thank every one of YOU who participated in this event!!

Earlier in the month, on Saturday May 5, we had a Prime Desert Woodland Moonwalk which was well attended by both members of the public as well AVAC members sharing views through their telescopes. On Friday May 11, at our monthly meeting, we had Chris Butler speaking on how much, and how rapidly, our understanding of the solar system and universe has changed in his presentation "9 Planets to 9 Billion Worlds". I've seen Chris make this presentation before but it is always fresh, and new, as he adds the latest discoveries to his previous presentation. Thank you to everyone who showed up in support.

Also, on Saturday May 19, we had a Lunar Observing night at Judy Fuentes' house in Antelope Acres. With a waxing crescent moon, we were able to pick out wonderful detail along the terminator including one bright peak, sticking up out of the darkness, that Matt and Rose spent a great deal of time trying to identify on our big moon maps. We had a great turnout and, most importantly, Rose and I didn't have to take any donuts home.

Coming up in June, a meeting on Friday June 8, the Mount Wilson trip (full) on June 10, and a Dark Sky Star Party at Chuchupate on Saturday June 16. Note that a crescent moon will be up for part of the night on Saturday June 16 making it also a lunar observing night. Watch your email for details.

Secretary

Rose Moore

Many thanks to all our club members who came out to our event at Red Rock Canyon on Memorial Day Weekend! This was a Night Sky Network event. Despite the almost Full Moon, and 30 + mph winds, members at the telescopes viewed the Moon, and were able to find some dark sky objects for the public.

Also thank you to all the club members who came out to listen to our speaker last month, Chris Butler!! Thank you for support!!

We have a club meeting on Friday June 8th, and at this time we don't have a speaker. I'll keep you all posted.

On Sunday June 10th, we have our member's trip to Mt. Wilson. 1) Please read over all the directions and information that was sent out on May 10th. If any questions, please email me asap. 2) Make sure you have my phone number and Frank's phone number handy for the trip. 3) We will be having 25 members attending and will be carpooling up to the Observatory. So we appreciate any members who are willing to drive. 4) We will be meeting at 4pm at the Pearblossom Park and Ride, and leaving to the Observatory promptly at 4:30pm. 5) Dress appropriately. It may be chilly during the night. Also, you must wear closed toe shoes, NO open toe shoes per Mt. Wilson!

On Saturday June 16th, we will have a dark sky star party and lunar viewing. The Moon will be up until approximately 11pm. Further info to follow. Weather pending. Frank and I will not be able to attend as we have concert tickets.

Our summer picnic is coming up on July 14th at Brite Lake. I will be starting up a signup sheet for the picnic at the June's meeting! You may bring a side dish, but it is not necessary. The sign up is because we need a head count, as the club will be supplying burgers, hotdogs, buns, drinks. If you cannot make June's meeting to sign up, please email me! Further info and directions to Brite Lake will be sent the week before the picnic.

Save Our Dark Skies!!

Space Place

What Is the Asteroid Belt?

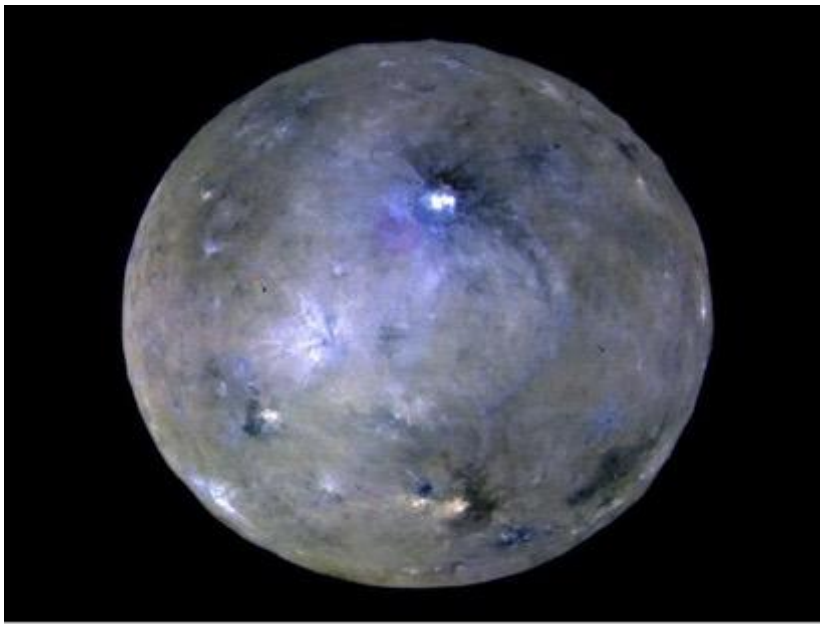
By Linda Hermans-Killiam

There are millions of pieces of rocky material left over from the formation of our solar system. These rocky chunks are called asteroids, and they can be found orbiting our Sun. Most asteroids are found between the orbits of Mars and Jupiter. They orbit the Sun in a doughnut-shaped region of space called the asteroid belt.

Asteroids come in many different sizes—from tiny rocks to giant boulders. Some can even be hundreds of miles across! Asteroids are mostly rocky, but some also have metals inside, such as iron and nickel. Almost all asteroids have irregular shapes. However, very large asteroids can have a rounder shape.

The asteroid belt is about as wide as the distance between Earth and the Sun. It's a big space, so the objects in the asteroid belt aren't very close together. That means there is plenty of room for spacecraft to safely pass through the belt. In fact, NASA has already sent several spacecraft through the asteroid belt!

The total mass of objects in the asteroid belt is only about 4 percent the mass of our Moon. Half of this mass is from the four largest objects in the belt. These objects are named Ceres, Vesta, Pallas and Hygiea.



This image captured by the Dawn spacecraft is an enhanced color view of Ceres, the largest object in the asteroid belt.
Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA

The dwarf planet Ceres is the largest object in the asteroid belt. However, Ceres is still pretty small. It is only about 587 miles across—only a quarter the diameter of Earth's moon. In 2015, NASA's Dawn mission mapped the surface of Ceres. From Dawn, we learned that the outermost layer of Ceres—called the crust—is made up of a mixture of rock and ice.

The Dawn spacecraft also visited the asteroid Vesta. Vesta is the second largest object in the asteroid belt. It is 329 miles across, and it is the brightest asteroid in the sky. Vesta is covered with light and dark patches, and lava once flowed on its surface.

The asteroid belt is filled with objects from the dawn of our solar system. Asteroids represent the building blocks of planets and moons, and studying them helps us learn about the early solar system.

For more information about asteroids, visit: https://spaceplace.nasa.gov/asteroid

This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit https://spaceplace.nasa.gov/ to explore space and Earth science!

News Headlines

NASA ScienceCast: Two Sides of the Same Star
If you've ever heard of the phrase two sides of the same coin, you know it means two things that at first appear to be unrelated are actually parts of the same thing. Now, a fundamental example can be found in the deep recesses of space in the form of a neutron star.
https://science.nasa.gov/science-news/news-articles/two-sides-of-the-same-star

Science Launching to Space Station Looks Forward and Back
The Cold Atom Lab (CAL) is a new facility that will create a spot ten billion times colder than the vacuum of space, and could help us answer some big questions in modern physics.
https://go.nasa.gov/2J8YkDC

Old Data Reveal New Evidence of Europa Plumes
Scientists re-examining data from an old mission bring new insights to the tantalizing question of whether Jupiter's moon Europa has the ingredients to support life. The data provide independent evidence that the moon's subsurface liquid water reservoir may be venting plumes of water vapor above its icy shell.
https://go.nasa.gov/2GjuM00

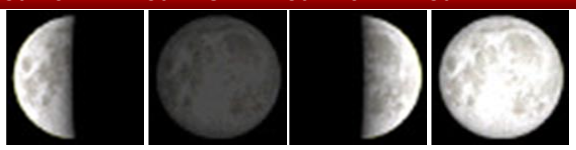
SOFIA to Study Southern Skies in New Zealand
NASA's Stratospheric Observatory for Infrared Astronomy, SOFIA, is heading to Christchurch, New Zealand, to study celestial objects best viewed from the Southern Hemisphere. Observations will include targets that are too low to observe or not visible at all from the Northern Hemisphere — including our neighboring galaxy the Large Magellanic Cloud, the center of our own Milky Way galaxy, and
Saturn's moon Titan.
https://www.nasa.gov/feature/sofia-to-study-southern-skies-in-new-zealand

NASA to request proposals for first Gateway element later this summer
NASA now expects to release a draft request for proposals for the first element of the proposed Lunar Orbital Platform-Gateway this summer, several months later that previously planned.
http://spacenews.com/nasa-to-request-proposals-for-first-gateway-element-later-this-summer/

'Surprising' methane dunes found on Pluto
Pluto is covered with surprising dunes made of methane ice, which have formed relatively recently despite the frigid dwarf planet's very thin atmosphere, international researchers said Thursday. Pluto's atmosphere has a surface pressure 100,000 times lower than Earth's, which researchers suspected might be too little to allow tiny grains of solid methane to mobilize and become airborne. Yet mild winds blowing across Pluto's surface at speeds of some 19-25 miles (30-40 kilometers) per hour have forged these ripples at the border of an ice plain and mountain range, said the report in the journal Science.
http://www.spacedaily.com/reports/Surprising_methane_dunes_found_on_Pluto_999.html

Taming the multiverse: Stephen Hawking's final theory about the big bang
Professor Stephen Hawking's final theory on the origin of the universe, which he worked on in collaboration with Professor Thomas Hertog from KU Leuven, has been published today in the Journal of High Energy Physics.
https://www.sciencedaily.com/releases/2018/05/180502094641.htm

June Sky Data



Planet Summary

Mercury passes behind the Sun (superior conjunction) on the 5th/6th June but will become visible low in the west after sunset by mid-month. By month's end its magnitude will have dropped to -0.2 and it will set some one and a half hours after the Sun when it will have an angular diameter of 6.5 arc seconds.

Venus dominates the western sky after sunset, shining brightly at magnitude -3.4 (increasing to -3.6 during month) with an angular size of 13 arc seconds increasing to 15 arc seconds as the month progresses. Venus rises a little higher in the sky during June, initially setting around two and a half hours after the Sun but a little less by month's end.

Mars beings its retrograde motion westwards on the 28th June as it moves towards its closest approach to Earth since 2003 in two months time. It rises at around midnight at the start of the month and around 10:15 pm by month's end. During the month its magnitude increases from -1.1 to -2.0 and has an angular size of 15.3 increasing to 20.7 arc seconds so, with a small telescope, it will be possible to spot details, such as Syrtis Major, on its salmon-pink surface.

Jupiter reached opposition on May 8th, so will be visible during the evening after darkness has fallen. It shines at magnitude -2.0 during the month and has a disk some 44 arc seconds across. Sadly, moving slowly westwards in Libra during the month, Jupiter is heading towards the southern part of the ecliptic and will only have an elevation of ~20 degrees when crossing the meridian.

Saturn, comes into opposition on the 27th of June and so will be visible during all the hours of darkness. Its disk has an angular size of 18.2 arc seconds increasing to 18.4 during the month. Its brightness increases from 1.2 to 1.1 as the month progresses. The rings were at their widest some months ago and are still, at 25.7 degrees to the line of sight, well open and spanning ~2.5 times the size of Saturn's globe.

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

Sun and Moon Rise and Set

Date	Moonrise	Moonset	Sunrise	Sunset
6/1/2018	22:42	08:16	05:44	19:57
6/5/2018	00:42	11:50	05:43	19:59
6/10/2018	03:29	16:46	05:42	20:02
6/15/2018	07:44	22:14	05:42	20:04
6/20/2018	13:14	01:08	05:43	20:05
6/25/2018	18:05	04:03	05:44	20:06
6/30/2018	22:05	07:53	05:46	20:06

Planet Data

Jun 1

	Rise	Transit	Set	Mag
Mercury	05:27	12:31	19:35	-1.6
Venus	08:09	15:24	22:38	-3.4
Mars	23:49	04:49	09:50	-1.1
Jupiter	17:47	23:08	04:28	-2.0
Saturn	21:49	02:47	07:46	1.2

Jun 15

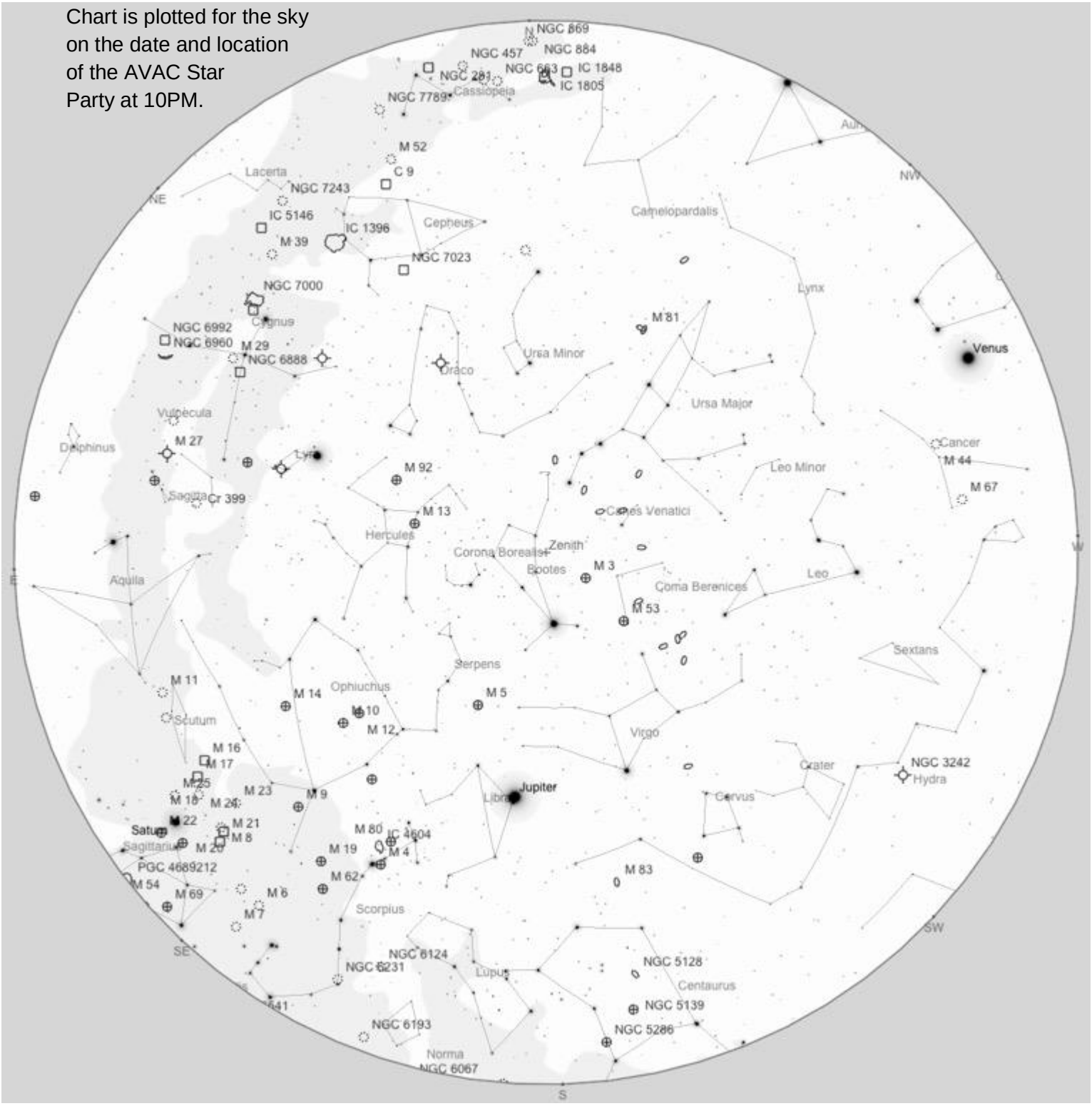
	Rise	Transit	Set	Mag
Mercury	06:29	13:46	21:04	-1.1
Venus	08:34	15:39	22:44	-3.5
Mars	23:07	04:07	09:07	-1.5
Jupiter	16:46	22:08	03:29	-2.0
Saturn	20:50	01:48	06:46	1.2

Jun 31

	Rise	Transit	Set	Mag
Mercury	07:37	14:40	21:43	0.1
Venus	09:00	15:50	22:40	-3.6
Mars	22:15	03:12	08:09	-2.0
Jupiter	15:44	21:05	02:27	-1.9
Saturn	19:46	00:44	05:42	1.1

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 transit time of the object.

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC5033	Gal	CVn	13h 13m 28s	+36°35'38"	10.1	13:16	21:21	05:25
M63	Gal	CVn	13h 15m 49s	+42°01'46"	9.3	12:48	21:23	05:58
NGC5049	Gal	Vir	13h 15m 59s	-16°23'50"	12.9	16:06	21:23	02:40
NGC5068	Gal	Vir	13h 18m 55s	-21°02'20"	11.0	16:24	21:26	02:29
NGC5079	Gal	Vir	13h 19m 38s	-12°41'58"	12.0	15:59	21:27	02:55
NGC5087	Gal	Vir	13h 20m 25s	-20°36'39"	11.0	16:24	21:28	02:32
NGC5102	Gal	Cen	13h 21m 58s	-36°37'51"	9.7	17:26	21:29	01:33
NGC5129	Gal	Vir	13h 24m 10s	+13°58'34"	13.0	14:50	21:32	04:13
NGC5128	Gal	Cen	13h 25m 28s	-43°01'08"	7.0	18:04	21:33	01:01
NGC5139	Glob	Cen	13h 26m 47s	-47°28'53"	3.7	18:38	21:34	00:30
NGC5204	Gal	UMa	13h 29m 36s	+58°25'09"	11.3	Circum	21:37	Circum
M83	Gal	Hya	13h 37m 00s	-29°51'51"	8.0	17:12	21:44	02:16
NGC5248	Gal	Boo	13h 37m 32s	+08°53'08"	10.2	15:18	21:45	04:12
NGC5247	Gal	Vir	13h 38m 03s	-17°53'04"	10.5	16:33	21:45	02:58
M3	Glob	CVn	13h 42m 11s	+28°22'35"	7.0	14:21	21:50	05:19
NGC5286	Glob	Cen	13h 46m 27s	-51°22'30"	7.6	19:37	21:54	00:11
NGC5307	P Neb	Cen	13h 51m 03s	-51°12'20"	12.0	19:39	21:58	00:17
NGC5371	Gal	CVn	13h 55m 40s	+40°27'42"	10.8	13:38	22:03	06:28
NGC5363	Gal	Vir	13h 56m 07s	+05°15'16"	10.2	15:46	22:03	04:20
NGC5364	Gal	Vir	13h 56m 12s	+05°00'55"	10.4	15:47	22:04	04:20
NGC5367	Neb	Cen	13h 57m 43s	-39°58'42"		18:19	22:05	01:51
NGC5384	Gal	Vir	13h 58m 13s	+06°31'05"	14.0	15:45	22:06	04:26
NGC5427	Gal	Vir	14h 03m 26s	-06°01'52"	11.4	16:24	22:11	03:57
NGC5460	Open	Cen	14h 07m 27s	-48°20'36"	5.6	19:26	22:15	01:03
NGC5515	Gal	Boo	14h 12m 38s	+39°18'34"	13.0	14:01	22:20	06:39
NGC5557	Gal	Boo	14h 18m 26s	+36°29'37"	11.1	14:22	22:26	06:30
NGC5585	Gal	UMa	14h 19m 48s	+56°43'45"	10.9	Circum	22:27	Circum
NGC5566	Gal	Vir	14h 20m 20s	+03°56'00"	10.5	16:14	22:28	04:41
NGC5576	Gal	Vir	14h 21m 04s	+03°16'15"	10.9	16:17	22:28	04:40
NGC5592	Gal	Hya	14h 23m 55s	-28°41'17"	13.0	17:55	22:31	03:08
NGC5638	Gal	Vir	14h 29m 40s	+03°14'00"	11.3	16:26	22:37	04:49
NGC5676	Gal	Boo	14h 32m 47s	+49°27'28"	10.9	13:04	22:40	08:16
NGC5719	Gal	Vir	14h 40m 56s	-00°19'05"	14.0	16:46	22:48	04:50
NGC5734	Gal	Lib	14h 45m 09s	-20°52'15"	14.0	17:49	22:53	03:56
NGC5750	Gal	Vir	14h 46m 11s	-00°13'23"	11.6	16:51	22:54	04:56
NGC5756	Gal	Lib	14h 47m 34s	-14°51'12"	13.0	17:33	22:55	04:16
NGC5775	Gal	Vir	14h 53m 57s	+03°32'39"	11.4	16:49	23:01	05:14
NGC5820	Gal	Boo	14h 58m 40s	+53°53'09"	11.9	12:21	23:06	09:51
NGC5806	Gal	Vir	15h 00m 00s	+01°53'28"	11.6	17:00	23:07	05:15

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC5827	Gal	Boo	15h 01m 54s	+25°57'50"	14.0	15:49	23:09	06:29
NGC5824	Glob	Lup	15h 03m 59s	-33°04'07"	9.0	18:52	23:11	03:31
NGC5831	Gal	Vir	15h 04m 07s	+01°13'12"	11.5	17:05	23:11	05:18
NGC5838	Gal	Vir	15h 05m 26s	+02°05'57"	10.8	17:04	23:13	05:21
NGC5846	Gal	Vir	15h 06m 29s	+01°36'20"	10.2	17:07	23:14	05:21
M102	Gal	Dra	15h 06m 30s	+55°45'47"	10.8	Circum	23:14	Circum
NGC5850	Gal	Vir	15h 07m 08s	+01°32'39"	11.0	17:08	23:14	05:21
NGC5873	P Neb	Lup	15h 12m 51s	-38°07'30"	13.0	19:24	23:20	03:16
NGC5892	Gal	Lib	15h 13m 48s	-15°27'51"	13.0	18:01	23:21	04:41
NGC5908	Gal	Dra	15h 16m 43s	+55°24'35"	11.9	Circum	23:24	Circum
NGC5882	P Neb	Lup	15h 16m 50s	-45°38'56"	11.0	20:14	23:24	02:35
NGC5898	Gal	Lib	15h 18m 14s	-24°05'51"	11.5	18:33	23:26	04:18
M5	Glob	Ser	15h 18m 33s	+02°04'57"	7.0	17:18	23:26	05:34
NGC5921	Gal	Ser	15h 21m 56s	+05°04'12"	10.8	17:13	23:29	05:46
NGC5925	Open	Nor	15h 27m 26s	-54°31'42"	8.0	22:07	23:35	01:02
NGC5951	Gal	Ser	15h 33m 43s	+15°00'26"	13.0	16:56	23:41	06:26
NGC5970	Gal	Ser	15h 38m 30s	+12°11'11"	11.4	17:09	23:46	06:22
NGC5985	Gal	Dra	15h 39m 37s	+59°19'54"	11.0	Circum	23:47	Circum
NGC5986	Glob	Lup	15h 46m 04s	-37°47'08"	7.1	19:56	23:53	03:51
NGC5995	Gal	Lib	15h 48m 25s	-13°45'28"	14.0	18:31	23:56	05:21
NGC6058	P Neb	Her	16h 04m 27s	+40°40'59"	13.0	15:45	00:12	08:38
NGC6085	Gal	CrB	16h 12m 35s	+29°21'53"	14.0	16:47	00:20	07:53
NGC6072	P Neb	Sco	16h 12m 58s	-36°13'47"	14.0	20:15	00:20	04:25
NGC6080	Gal	Ser	16h 12m 59s	+02°10'38"	14.0	18:12	00:20	06:29
NGC6067	Open	Nor	16h 13m 11s	-54°13'06"	5.6	22:47	00:21	01:54
M4	Glob	Sco	16h 23m 35s	-26°31'35"	7.5	19:47	00:31	05:15
NGC6124	Open	Sco	16h 25m 20s	-40°39'12"	5.8	20:50	00:33	04:15
NGC6155	Gal	Her	16h 26m 08s	+48°22'00"	13.0	15:09	00:34	09:58
NGC6139	Glob	Sco	16h 27m 40s	-38°50'57"	9.2	20:43	00:35	04:27
NGC6134	Open	Nor	16h 27m 46s	-49°09'06"	7.2	21:54	00:35	03:16
NGC6153	P Neb	Sco	16h 31m 31s	-40°15'13"	12.0	20:54	00:39	04:24
M107	Glob	Oph	16h 32m 32s	-13°03'11"	10.0	19:13	00:40	06:07
NGC6169	Open	Nor	16h 34m 04s	-44°02'42"	7.0	21:20	00:41	04:03
NGC6167	Open	Nor	16h 34m 34s	-49°46'18"	6.7	22:07	00:42	03:17
NGC6188	Neb	Ara	16h 40m 05s	-48°39'42"		22:02	00:47	03:33
NGC6193	Open	Ara	16h 41m 20s	-48°45'48"	5.2	22:04	00:49	03:33
M13	Glob	Her	16h 41m 41s	+36°27'35"	7.0	16:45	00:49	08:53
NGC6210	P Neb	Her	16h 44m 30s	+23°47'59"	9.0	17:39	00:52	08:04
NGC6204	Open	Ara	16h 46m 09s	-47°01'00"	8.2	21:54	00:54	03:53
NGC6229	Glob	Her	16h 46m 59s	+47°31'39"	9.4	15:38	00:54	10:11
NGC6208	Open	Ara	16h 49m 28s	-53°43'42"	7.2	23:14	00:57	02:40
NGC6231	Open	Sco	16h 54m 10s	-41°49'30"	2.6	21:26	01:02	04:37
NGC6242	Open	Sco	16h 55m 33s	-39°27'42"	6.4	21:14	01:03	04:52
M10	Glob	Oph	16h 57m 09s	-04°05'56"	7.5	19:13	01:05	06:56
NGC6249	Open	Sco	16h 57m 41s	-44°48'42"	8.2	21:49	01:05	04:21

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6250	Open	Ara	16h 57m 56s	-45°56'12"	5.9	21:57	01:05	04:14
NGC6269	Gal	Her	16h 57m 58s	+27°51'17"	14.0	17:38	01:05	08:32
NGC6284	Glob	Oph	17h 04m 29s	-24°45'51"	9.0	20:21	01:12	06:02
NGC6281	Open	Sco	17h 04m 41s	-37°59'06"	5.4	21:15	01:12	05:09
NGC6287	Glob	Oph	17h 05m 09s	-22°42'25"	9.2	20:15	01:13	06:10
NGC6293	Glob	Oph	17h 10m 10s	-26°34'56"	8.2	20:33	01:18	06:02
NGC6340	Gal	Dra	17h 10m 25s	+72°18'17"	11.0	Circum	01:18	Circum
NGC6302	P Neb	Sco	17h 13m 44s	-37°06'12"	13.0	21:20	01:21	05:22
NGC6309	P Neb	Oph	17h 14m 04s	-12°54'38"	11.0	19:54	01:21	06:49
M92	Glob	Her	17h 17m 07s	+43°08'11"	7.5	16:42	01:24	10:07
NGC6326	P Neb	Ara	17h 20m 46s	-51°45'17"	12.0	23:16	01:28	03:40
NGC6334	Neb	Sco	17h 20m 49s	-36°06'12"		21:22	01:28	05:34
NGC6357	Neb	Sco	17h 24m 43s	-34°12'06"		21:18	01:32	05:46
NGC6390	Gal	Dra	17h 28m 28s	+60°05'39"	14.0	Circum	01:36	Circum
NGC6412	Gal	Dra	17h 29m 37s	+75°42'14"	11.8	Circum	01:37	Circum
NGC6384	Gal	Oph	17h 32m 24s	+07°03'37"	10.6	19:18	01:40	08:02
NGC6388	Glob	Sco	17h 36m 17s	-44°44'08"	6.9	22:27	01:44	05:01
NGC6396	Open	Sco	17h 37m 36s	-35°01'36"	8.5	21:34	01:45	05:56
M14	Glob	Oph	17h 37m 36s	-03°14'43"	9.5	19:51	01:45	07:39
M6	Open	Sco	17h 40m 20s	-32°15'12"	4.5	21:25	01:48	06:10
NGC6397	Glob	Ara	17h 40m 42s	-53°40'26"	5.7	00:04	01:48	03:32
NGC6416	Open	Sco	17h 44m 19s	-32°21'42"	5.7	21:30	01:52	06:14
NGC6426	Glob	Oph	17h 44m 55s	+03°10'11"	11.2	19:41	01:52	08:04
NGC6425	Open	Sco	17h 47m 01s	-31°31'48"	7.2	21:29	01:54	06:20
NGC6439	P Neb	Sgr	17h 48m 20s	-16°28'44"	14.0	20:39	01:56	07:12
NGC6478	Gal	Dra	17h 48m 38s	+51°09'24"	14.0	15:59	01:56	11:53
NGC6445	P Neb	Sgr	17h 49m 15s	-20°00'36"	13.0	20:51	01:57	07:03
NGC6503	Gal	Dra	17h 49m 27s	+70°08'40"	10.2	Circum	01:57	Circum
NGC6460	Gal	Her	17h 49m 30s	+20°45'48"	14.0	18:54	01:57	08:59
NGC6441	Glob	Sco	17h 50m 13s	-37°03'03"	7.4	21:56	01:58	05:59
NGC6451	Open	Sco	17h 50m 41s	-30°12'36"	8.0	21:27	01:58	06:29
NGC6469	Open	Sgr	17h 53m 12s	-22°16'30"	8.0	21:02	02:01	06:59
M7	Open	Sco	17h 53m 51s	-34°47'36"	3.5	21:49	02:01	06:13
M23	Open	Sgr	17h 57m 04s	-18°59'06"	6.0	20:55	02:04	07:14
NGC6515	Gal	Dra	17h 57m 25s	+50°43'39"	14.0	16:14	02:05	11:56
NGC6543	P Neb	Dra	17h 58m 33s	+66°37'59"	9.0	Circum	02:06	Circum
NGC6496	Glob	Sco	17h 59m 04s	-44°16'00"	9.2	22:46	02:06	05:27
NGC6507	Open	Sgr	17h 59m 50s	-17°27'00"	10.0	20:53	02:07	07:21
M20	Open	Sgr	18h 02m 42s	-22°58'18"	5.0	21:14	02:10	07:07
NGC6520	Open	Sgr	18h 03m 24s	-27°53'18"	8.0	21:31	02:11	06:50
NGC6522	Glob	Sgr	18h 03m 35s	-30°02'06"	8.6	21:40	02:11	06:42
M8	Open	Sgr	18h 03m 41s	-24°22'48"	5.0	21:19	02:11	07:03
NGC6535	Glob	Ser	18h 03m 51s	-00°17'51"	10.6	20:09	02:11	08:13
NGC6526	Neb	Sgr	18h 04m 06s	-24°26'30"		21:20	02:11	07:03
NGC6530	Open	Sgr	18h 04m 31s	-24°21'30"	4.6	21:20	02:12	07:04

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6537	P Neb	Sgr	18h 05m 13s	-19°50'35"	13.0	21:06	02:13	07:19
NGC6544	Glob	Sgr	18h 07m 20s	-24°59'53"	8.3	21:25	02:15	07:04
NGC6541	Glob	CrA	18h 08m 02s	-43°42'57"	6.6	22:52	02:15	05:39
NGC6559	Neb	Sgr	18h 09m 57s	-24°06'23"		21:25	02:17	07:10
NGC6565	P Neb	Sgr	18h 11m 53s	-28°10'41"	13.0	21:41	02:19	06:58
NGC6572	P Neb	Oph	18h 12m 06s	+06°51'13"	9.0	19:58	02:19	08:41
NGC6568	Open	Sgr	18h 12m 44s	-21°36'18"	9.0	21:19	02:20	07:21
NGC6567	P Neb	Sgr	18h 13m 45s	-19°04'34"	12.0	21:12	02:21	07:30
NGC6583	Open	Sgr	18h 15m 49s	-22°08'12"	10.0	21:24	02:23	07:22
NGC6578	P Neb	Sgr	18h 16m 16s	-20°27'03"	13.0	21:19	02:24	07:28
NGC6605	Open	Ser	18h 16m 24s	-15°00'00"	6.0	21:03	02:24	07:45
NGC6595	Open	Sgr	18h 17m 05s	-19°51'57"	7.0	21:18	02:24	07:31
NGC6604	Open	Ser	18h 18m 03s	-12°14'35"	6.5	20:56	02:25	07:55
M24	Open	Sgr	18h 18m 26s	-18°24'24"	4.5	21:15	02:26	07:37
NGC6584	Glob	Tel	18h 18m 38s	-52°12'57"	9.2	00:20	02:26	04:32
M16	Open	Ser	18h 18m 48s	-13°48'24"	6.5	21:02	02:26	07:51
NGC6643	Gal	Dra	18h 19m 46s	+74°34'08"	11.1	Circum	02:27	Circum
M18	Open	Sgr	18h 19m 58s	-17°06'07"	8.0	21:12	02:27	07:42
M17	Open	Sgr	18h 20m 47s	-16°10'18"	7.0	21:10	02:28	07:46
NGC6636	Gal	Dra	18h 22m 05s	+66°37'20"	14.0	Circum	02:29	Circum
NGC6625	Open	Sct	18h 23m 01s	-12°01'24"	9.0	21:01	02:30	08:00
NGC6624	Glob	Sgr	18h 23m 41s	-30°21'40"	8.3	22:01	02:31	07:01
M28	Glob	Sgr	18h 24m 33s	-24°52'07"	8.5	21:42	02:32	07:22
NGC6629	P Neb	Sgr	18h 25m 42s	-23°12'10"	12.0	21:37	02:33	07:29
NGC6633	Open	Oph	18h 27m 15s	+06°30'30"	4.6	20:14	02:35	08:55
NGC6638	Glob	Sgr	18h 30m 56s	-25°29'56"	9.2	21:50	02:38	07:26
NGC6642	Glob	Sgr	18h 31m 54s	-23°28'35"	8.8	21:44	02:39	07:34
NGC6644	P Neb	Sgr	18h 32m 35s	-25°07'44"	12.0	21:51	02:40	07:29
NGC6645	Open	Sgr	18h 32m 37s	-16°53'00"	9.0	21:24	02:40	07:56
NGC6661	Gal	Her	18h 34m 37s	+22°54'36"	11.9	19:32	02:42	09:51
NGC6652	Glob	Sgr	18h 35m 46s	-32°59'28"	8.9	22:24	02:43	07:03
M22	Glob	Sgr	18h 36m 24s	-23°54'17"	6.5	21:50	02:44	07:37
NGC6675	Gal	Lyr	18h 37m 26s	+40°03'27"	13.0	18:22	02:45	11:08
M26	Open	Sct	18h 45m 18s	-09°23'00"	9.5	21:16	02:53	08:30
NGC6703	Gal	Lyr	18h 47m 19s	+45°33'02"	11.4	17:55	02:55	11:54
NGC6704	Open	Sct	18h 50m 45s	-05°12'18"	9.2	21:09	02:58	08:47
NGC6709	Open	Aql	18h 51m 18s	+10°19'06"	6.7	20:28	02:59	09:30
NGC6712	Glob	Sct	18h 53m 04s	-08°42'19"	8.2	21:21	03:00	08:39
M57	P Neb	Lyr	18h 53m 35s	+33°01'44"	9.5	19:13	03:01	10:49
NGC6716	Open	Sgr	18h 54m 34s	-19°54'06"	6.9	21:56	03:02	08:08
NGC6723	Glob	Sgr	18h 59m 33s	-36°37'54"	7.3	23:04	03:07	07:10
NGC6738	Open	Aql	19h 01m 21s	+11°36'54"	8.0	20:34	03:09	09:43
NGC6726	Neb	CrA	19h 01m 39s	-36°53'30"		23:07	03:09	07:11
NGC6729	Neb	CrA	19h 01m 55s	-36°57'30"		23:08	03:09	07:11
NGC6741	P Neb	Aql	19h 02m 37s	-00°26'57"	11.0	21:08	03:10	09:12

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC6749	Glob	Aql	19h 05m 15s	+01°54'02"	11.1	21:05	03:13	09:20
NGC6751	P Neb	Aql	19h 05m 56s	-05°59'31"	13.0	21:27	03:13	09:00
NGC6755	Open	Aql	19h 07m 49s	+04°16'00"	7.5	21:01	03:15	09:29
NGC6772	P Neb	Aql	19h 14m 36s	-02°42'24"	14.0	21:27	03:22	09:17
NGC6781	P Neb	Aql	19h 18m 28s	+06°32'20"	12.0	21:05	03:26	09:46
NGC6791	Open	Lyr	19h 20m 53s	+37°46'18"	9.5	19:18	03:28	11:39
NGC6790	P Neb	Aql	19h 22m 57s	+01°30'48"	10.0	21:23	03:30	09:37
NGC6802	Open	Vul	19h 30m 35s	+20°15'42"	8.8	20:37	03:38	10:39
NGC6803	P Neb	Aql	19h 31m 16s	+10°03'23"	11.0	21:08	03:39	10:09
NGC6804	P Neb	Aql	19h 31m 35s	+09°13'31"	12.0	21:11	03:39	10:07
NGC6807	P Neb	Aql	19h 34m 34s	+05°41'03"	14.0	21:24	03:42	10:00
NGC6811	Open	Cyg	19h 37m 17s	+46°23'18"	6.8	18:38	03:45	12:51
M55	Glob	Sgr	19h 40m 00s	-30°57'44"	7.0	23:20	03:47	08:15
NGC6813	Neb	Vul	19h 40m 22s	+27°18'34"		20:23	03:48	11:13
NGC6820	Neb	Vul	19h 42m 28s	+23°05'17"		20:40	03:50	11:00
NGC6823	Open	Vul	19h 43m 09s	+23°18'00"	7.1	20:40	03:51	11:01
NGC6818	P Neb	Sgr	19h 43m 58s	-14°09'10"	10.0	22:28	03:51	09:15
NGC6826	P Neb	Cyg	19h 44m 48s	+50°31'30"	10.0	18:04	03:52	13:40
NGC6833	P Neb	Cyg	19h 49m 47s	+48°57'40"	14.0	18:27	03:57	13:28
NGC6830	Open	Vul	19h 50m 59s	+23°06'00"	7.9	20:48	03:58	11:08
NGC6834	Open	Cyg	19h 52m 12s	+29°24'30"	7.8	20:27	04:00	11:33
NGC6842	P Neb	Vul	19h 55m 02s	+29°17'20"	14.0	20:30	04:02	11:35
M27	P Neb	Vul	19h 59m 36s	+22°43'15"	7.5	20:58	04:07	11:16
NGC6866	Open	Cyg	20h 03m 55s	+44°09'30"	7.6	19:22	04:11	13:00
NGC6871	Open	Cyg	20h 05m 59s	+35°46'38"	5.2	20:13	04:13	12:14
M75	Glob	Sgr	20h 06m 05s	-21°55'19"	9.5	23:14	04:13	09:13
NGC6881	P Neb	Cyg	20h 10m 52s	+37°24'42"	14.0	20:10	04:18	12:27
NGC6882	Open	Vul	20h 11m 58s	+26°29'00"	8.1	20:57	04:19	11:41
NGC6888	Neb	Cyg	20h 12m 06s	+38°21'17"		20:06	04:19	12:33
NGC6886	P Neb	Sge	20h 12m 43s	+19°59'22"	12.0	21:20	04:20	11:20
NGC6891	P Neb	Del	20h 15m 09s	+12°42'16"	12.0	21:45	04:23	11:00
NGC6894	P Neb	Cyg	20h 16m 24s	+30°33'55"	14.0	20:46	04:24	12:01
NGC6893	Gal	Tel	20h 20m 50s	-48°14'22"	13.0	01:39	04:28	07:18
NGC6905	P Neb	Del	20h 22m 23s	+20°06'16"	12.0	21:29	04:30	11:30
NGC6910	Open	Cyg	20h 23m 12s	+40°46'42"	7.4	20:03	04:31	12:58
NGC6914	Neb	Cyg	20h 24m 43s	+42°28'57"		19:54	04:32	13:10
NGC6907	Gal	Cap	20h 25m 07s	-24°48'32"	11.3	23:42	04:32	09:23
NGC6939	Open	Cep	20h 31m 30s	+60°39'42"	7.8	Circum	04:39	Circum
NGC6940	Open	Vul	20h 34m 26s	+28°17'00"	6.3	21:13	04:42	12:10
NGC6946	Gal	Cyg	20h 34m 52s	+60°09'14"	8.9	Circum	04:42	Circum
NGC6960	Neb	Cyg	20h 45m 58s	+30°35'42"		21:16	04:53	12:31
NGC6992	Neb	Cyg	20h 56m 19s	+31°44'36"		21:21	05:04	12:46
NGC6997	Open	Cyg	20h 56m 39s	+44°37'54"	10.0	20:11	05:04	13:57
NGC6995	Neb	Cyg	20h 57m 10s	+31°14'06"		21:24	05:05	12:45
M73	Open	Aqr	20h 58m 56s	-12°38'07"	9.0	23:38	05:06	10:34

ID	Type	Const	RA	Dec	Mag	Rise	Transit	Set
NGC7000	Neb	Cyg	20h 59m 18s	+44°31'00"		20:15	05:07	13:58
NGC7008	P Neb	Cyg	21h 00m 33s	+54°32'35"	13.0	18:05	05:08	16:11
NGC7006	Glob	Del	21h 01m 29s	+16°11'15"	10.6	22:21	05:09	11:57
NGC7023	Open	Cep	21h 01m 36s	+68°10'10"	7.0	Circum	05:09	Circum
NGC7009	P Neb	Aqr	21h 04m 11s	-11°21'50"	8.0	23:40	05:12	10:43
NGC7026	P Neb	Cyg	21h 06m 19s	+47°51'08"	13.0	19:54	05:14	14:33
NGC7027	P Neb	Cyg	21h 07m 02s	+42°14'10"	10.0	20:38	05:14	13:51
NGC7031	Open	Cyg	21h 07m 12s	+50°52'30"	9.1	19:22	05:15	15:07
NGC7039	Open	Cyg	21h 10m 48s	+45°37'00"	7.6	20:18	05:18	14:18
NGC7048	P Neb	Cyg	21h 14m 15s	+46°17'18"	11.0	20:16	05:22	14:27
NGC7041	Gal	Ind	21h 16m 32s	-48°21'49"	11.1	02:36	05:24	08:12
NGC7052	Gal	Vul	21h 18m 33s	+26°26'49"	14.0	22:04	05:26	12:48
NGC7049	Gal	Ind	21h 19m 00s	-48°33'46"	10.7	02:40	05:26	08:13

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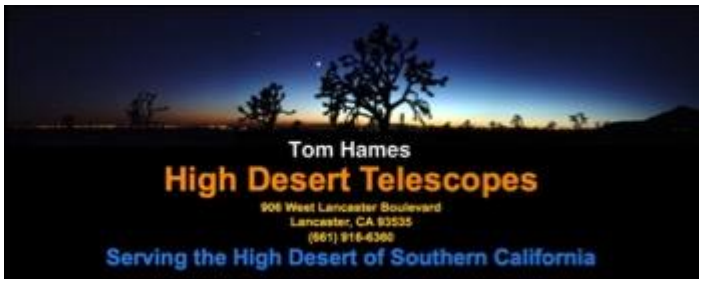

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