ANTELOPE VALLEY ASTRONOMY CLUB, INC.

# Desert Sky Observer

**Volume 32** *Antelope Valley Astronomy Club Newsletter* **July 2012**

## *Up-Coming Events*

**July 13:** Club Meeting*
**July 14:** Messier Club @ Two Goats Observatory
**July 21:** Annual Summer Picnic @ Brite Lake
**July 25:** Acton Library Astronomy Lecture Series @ Acton Library

* Monthly meetings are held at the S.A.G.E. Planetarium on the Cactus School campus in Palmdale, the second Friday of each month. The meeting location is at the northeast corner of Avenue R and 20th Street East. Meetings start at 7 p.m. and are open to the public. *Please note that food and drink are not allowed in the planetarium*

## President

### Don Bryden

Happy Summer! What's your favorite summertime observing target? Do you like the summer 'cause it's warmer or hate it 'cause you have to stay up so late for it to get dark? What's your favorite summertime destination?

For me it has to be worth the trip since my driveway is nice and dark - and convenient! In fact, once I set up the imaging scope, I can just go use the dob and forget about it or even go sit on the couch in the living room and control the camera, scope and guider from there. Now, with astrophotography you don't slew from target to target. In fact you can spend all night on just one. Often I'll set up for my last shot around midnight or so and let the camera run all night.

Sometimes you get a few frames at the end of the sequence that look quite odd – the side of the garage, or big star trails as your mount hits its R.A. tracking limit but most integrations are perfect. In fact, one of the things I like the most is to grab the computer the next morning and flip through all the captures and see what I "caught" – sort of like checking a fishing net or something.

Other times you have to attend to the rig full time. Usually to get special frames or sequences you still need – sky flats, extra dark frames, maybe a sequence through another narrowband filter. In the end you get enough data to work with until the next new moon!

That's why last star party at Mt. Pinos, I only brought my dob and a pair of binos. I came armed with a bunch of charts printed from the Astronomical League's Caldwell Club list through Sky Tools. The Caldwell list is a group of 109 bright (mag. 13 or brighter) objects that didn't make the Messier list. And there are many favorite destinations like the Cats eye, Eskimo, Blue Snowball and Blinking planetary nebulae. There are surprisingly bright galaxies and Ha/OIII regions, too, like the Whale and Sculptor galaxies and the North American and Veil nebulae.

The Caldwell list includes quite a few Southern sky sights too, unlike the Messier list which is Northern latitudes only. As a result one only need find 70 of the full 109 to get your pin (though there's a special pin for globe-trotters who get all 109!). By the way, the Caldwell list is so named because Sir Patrick Moore

created it but figured if he used his last initial for the designation it might be a bit confusing with Messier list observers. His proper name is Patrick Caldwell-Moore so he chose the "C" designation

So I suppose my favorite Summer destination is Mt. Pinos. My favorite object? That's tougher. For the Summer, it could be the Veil, M13, The Ring, the Dumbell or just about anything in and around Sagittarius, but I guess I'd choose NGC 6826 (C15), the Blinking Planetary nebula. Now of course most planetaries blink in and out as you use your averted vision but this is about the finest example of the effect and a great way to explain averted vision to a newcomer. In fact, it's so pronounced that it can be tricky to see. As you scan the field of view when trying to locate it suddenly it catches your eye. So you quickly slew or look in that direction – and it disappears! Soon you get the desired effect as the blueish halo ejected from the one-time red giant pops into view. Then you look right at it and are rewarded with a vanishing halo and one of the brightest white-dwarf remnants around – you would swear it's a different object!

Come and join me this month at the picnic out at Brite Lake in Tehachapi and we'll check it out or come up to Mt. Pinos in August and work on your own Caldwell list!

## Vice President

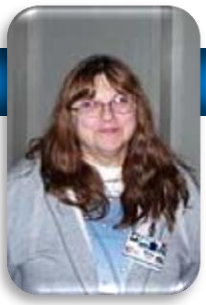
### Doug Drake

Hi everyone, well it looks like JPL does not have a speaker for our July meeting, but never fail we shall have an event anyway. This event is my alternate, or plan B, always have a plan B! You probably are thinking, "Okay what's the plan B?" I'm not going to tell you plan B until we are at the meeting, July 13. Yes that Friday the 13th! Come and get to the club meeting so you can find out; as an old saying, "be there or be square."

I hope you saw last month's Venus transit (crossing) the Sun on June 5th. This apparition will not happen again until 2117! Virginia and I did get to see the Venus crossing, but almost missed it. We had flown up to Seattle and were there June 5, the crossing date. Seattle, being Seattle, it was overcast and not a hint of the Sun! Now we had an Orion Short Tube 80mm refractor in the airplane and ready to observe Venus, but the sky was overcast! Well never mind, we went to Ivar's Acres of Clams on the shores of Puget Sound and had an acre of clams with some clam chowder for lunch. After lunch we went to the airport, loaded our airplane and took off for Red Bluff California where it was clear skies. We flew over the clouds at 15,000 feet (we were sucking oxygen) and landed at Red Bluff about 4:30pm. Virginia looked though solar glasses to see Venus crossing the Sun when we were at 15,000 feet, but Venus was small using the solar glasses. We landed at Red Bluff and refueled the airplane; we taxied just off from the fuel pumps, cut the engine, got out and unloaded the Short Tube. We put the eyepiece up to our eye and there was Venus partway crossing the Sun, wow what an event! At sunset we took off and two and half hours later we were home at Fox Field Lancaster. By-the-way, Red Bluff is just south of Redding and Mt. Shasta.

Come to the meeting and see what plan B is.

Doug



## Director of Community Development

### Rose Moore

We have several events coming up the months of July and August! We need members participation to help out to ensure that these will be a success!

First is out annual club picnic, our Star-B-Que! This year it will be held at Brite Lake in Tehachapi, starting at 4pm. We will have our BBQ, followed by our raffle and silent auction. Then settle in for a night of observing! The star party will be open to the public starting at approximately 7:30pm. We need help with potluck items for the picnic. If you can bring a side dish, or other items, please let me know asap! We also need items for donation for the raffle and silent auction, so if you can donate anything please let one of the board members know and bring it to the picnic. Further emails will be sent out soon.

On Wednesday, July 25th, at 6:30-8:30pm, will be the Acton Library Lecture series with Jeremy. This month's lecture topic to be announced. Please come out to support Jeremy and this event!

Friday, July 27th in the evening will be the annual 'A Night To Explore' event hosted by Lockheed Martin. This year's event will be at the Palmdale Boys and Girls Club, exact location and time to be announced. We will need members with telescopes and other astronomy items of interest to show the LM families. This is always a well-attended event and we need your support!

And on August 11th, Saturday, at 8:00 pm will be a Prime Desert Moonwalk with Jeremy at the Woodland Preserve. Come on out with your telescopes and show the public the night sky! Attendance in these events has been well received, and we had over 230 public attendees at our last event at PDW!

Please remember that when we have a speaker come to our meetings, that they often travel a great distance, late on a Friday, to come to speak to the club. If you would like to make a speaker donation, any amount, please see our club treasurer, Virginia, before the meeting or at the first break to make the donation.

Money for the Mt. Wilson trip will be due approximately the beginning of August, so that a Board member will have time to make a check and get it in the mail. The last few years the cost was $36/per person. Information regarding the amount and final date due will be announced soon.

The Pacific Astronomy and Telescope Show, PATS, is the weekend of September 22nd and 23rd. I have a few tickets available for $5.00 each if anyone is interested. Ticket price will be $20 at the door the day of the event. We have had several members volunteer, and could use a few more to help at our booth. If interested, please see me at the next meeting, on July 13th!

Thanks and 'see you there'!

Rose

## Space Place

# How Many Discoveries Can You Make in a Month?

By Dr. Tony Phillips

This year NASA has announced the discovery of 11 planetary systems hosting 26 planets; a gigantic cluster of galaxies known as "El Gordo;" a star exploding 9 billion light years away; alien matter stealing into the solar system; massive bullets of plasma racing out of the galactic center; and hundreds of unknown objects emitting high-energy photons at the edge of the electromagnetic spectrum.

That was just January.

Within NASA's Science Mission Directorate, the Astrophysics Division produces such a list nearly every month. Indeed, at this very moment, data is pouring in from dozens of spacecraft and orbiting observatories.

"The Hubble, Spitzer, Chandra, and Fermi space telescopes continue to make groundbreaking discoveries on an almost daily basis," says NASA Administrator Charlie Bolden.

NASA astrophysicists and their colleagues conduct an ambitious research program stretching from the edge of the solar system to the edge of the observable Universe. Their work is guided in large part by the National Research Council's Decadal Survey of Astronomy and Astrophysics, which identified the following priorities:

Finding new planets—and possibly new life—around other stars.

Discovering the nature of dark energy and dark matter.

Understanding how stars and galaxies have evolved since the Big Bang.

Studying exotic physics in extreme places like black holes.

Observing time on Hubble and the other "Great Observatories" is allocated accordingly.

*Artist's concepts such as this one are based on infrared spectrometer data from NASA's Spitzer Space Telescope. This rendering depicts a quadruple-star system called HD 98800. The system is approximately 10 million years old and is located 150 light-years away in the constellation Crater. Credit: NASA/JPL-Caltech/T. Pyle (SSC)*

Smaller missions are important, too: The Kepler spacecraft, which is only "medium-sized" by NASA standards, has single-handedly identified more than 2300 planet candidates. Recent finds include planets with double suns, massive "super-Earths" and "hot Jupiters," and a miniature solar system. It seems to be only a matter of time before Kepler locates an Earth-sized world in the Goldilocks zone of its parent star, just right for life.

A future astrophysics mission, the James Webb Space Telescope, will be able to study the atmospheres of many of the worlds Kepler is discovering now. The telescope's spectrometers can reveal the chemistry of distant exoplanets, offering clues to their climate, cloud cover, and possibilities for life.

That's not the telescope's prime mission, though. With a primary mirror almost 3 times as wide as Hubble's, and a special sensitivity to penetrating infrared radiation, Webb is designed to look into the most distant recesses of the universe to see how the first stars and galaxies formed after the Big Bang. It is, in short, a Genesis Machine.

Says Bolden, "We're on track in the construction of the James Webb Space Telescope, the most sophisticated science telescope ever constructed to help us reveal the mysteries of the cosmos in ways never before possible." Liftoff is currently scheduled for 2018.

How long will the list of discoveries be in January of that year? Stay tuned for Astrophysics.

For more on NASA's astrophysics missions, check out http://science.nasa.gov/astrophysics/. Kids can get some of their mind-boggling astrophysics questions answered by resident Space Place astrophysicist "Dr. Marc" at http://spaceplace.nasa.gov/dr-marc-space.

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

## Stargazing in the Summer by Paul Derrick

Like many avocations, stargazing can be a year-round activity as any clear night offers interesting things to see. Regardless of the season, there will always be stars and constellations, and often the Moon and one or more planets.

Yet the seasons do affect stargazing, and notably summer verses winter. A most obvious difference relates to the objects available for viewing since the winter and summer night skies feature different constellation shows.

But first, let's consider some other seasonal differences.. Being a cold weather wimp, I confess to preferring summer stargazing. No matter how lovely the winter might be, I can't enjoy viewing it if I'm shivering and my feet and hands are aching cold - so I much prefer warmer weather.

There are, however, some disadvantages to summer stargazing, like summer's later sunsets and earlier sunrises which make for shorter nights. While winter nights offer upwards of 14 hours of darkness (at our latitudes), summer nights can be as short as 10 hours. And there's the inconvenience of darkness coming so late in the summer. With daylight saving time, summer star parties can't get going good before 10 p.m., and that's kind of late for kids and old codgers like me.

And then there are the critters - especially mosquitoes which seem more active in the summer. You'll want to have bug spray available, but be careful how you use it at star parties. Never apply spray around telescopes or binoculars as the chemicals can damage the optics.

Snakes and other animals are more active in the summer, so if you're stargazing in a grassy area, be aware. I've never encountered a snake while observing, and hope I never do, but one of my stargazing buddies, Willie Strickland, had a startling encounter at our astronomy club's observatory.

As he was about to unlock the observatory door in the dark, he dimly saw something that made him step back. With his flashlight, he saw a long snake climbing up the door casing on its way to devouring some bird eggs. In our desire to live compatibly with nature, we had left undisturbed a bird nest in the entrance way, not being aware of its attractiveness to chicken and rat snakes. Fortunately, Willie wasn't bitten, but he was certainly rattled by the experience.

Another time we saw a tarantula spider ambling across the viewing field, but he was just as anxious to get away from us as we were to have him leave. We've also encountered skunks and other critters, but they didn't seem concerned about us since we didn't make threatening gestures toward them.

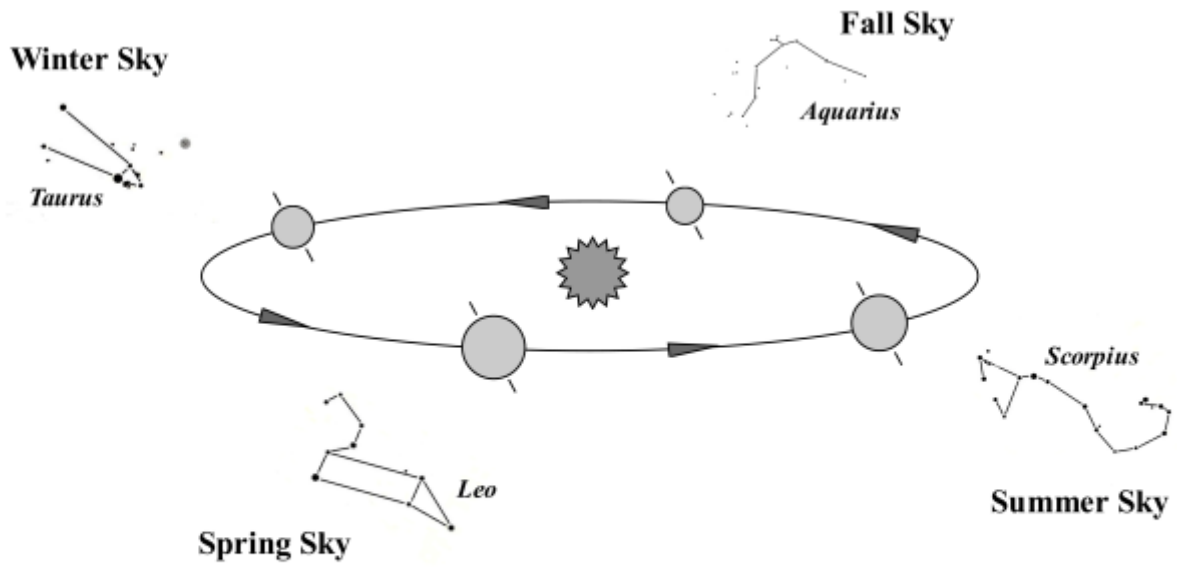
In far west Texas, the Davis Mountains and Big Bend National Park are famous for dark skies, making them popular destinations for stargazers, but there are certainly potentially hazardous inhabitants out there. Black bears and mountain lions come to mind immediately, but fortunately they are generally people-shy and rarely seen. Since my first trip to the area in 1970, I've been back 30 or more times, and I've never seen a bear or mountain lion.

*Collared peccaries, also known as javelinas, are common night critters in far west Texas (Credit: Brian Gratwicke posted on Wikimedia Commons)*

But I've seen many peccaries, also known as javelinas. (Peccaries are often erroneously called javelina hogs, and while they bear some resemblance to hogs, they are not in the pig family.) Although not particularly aggressive, they have sharp teeth and can be dangerous if one gets between them and food. They wander around in small bands, especially at night, and often come right through campsites searching for food. I've never been accosted by them, but I've seen the ruins of their determination to get at food in tents and coolers, and they've been known to kill pet dogs left out on a leash. So, again, it's good to be aware of one's surroundings while stargazing.

But enough of these earthly matters - let's look at the summer night sky. As Earth orbits the Sun throughout the year, the night sky changes with the seasons as different parts are visible at different times of the year - the key words here being "night sky." Every day of the year, all the stars ever visible from any given location come into the sky - some are up at night and can be seen, while the rest are up during day but hidden by sunlight. So when we speak of the summer sky, we mean that part of the sky that's up during the early evenings of summer.

The Milky Way, the galaxy of which we are a part, stretches all the way around the night sky, so part of it is up every night of the year - but the summer sky gets the brightest part. Galaxies are huge disc-shaped clusterings of billions of stars swirling around a central bulge where stars are far more concentrated.




**The Night Sky Changes with the Seasons**
(not drawn to scale)

The Milky Way's center happens to be in the heart of the summer sky, in the direction of Sagittarius and Scorpius, the signature constellations of summer. Although intervening cosmic dust and gases prevent our actually seeing into the heart of the galaxy, it is still the brightest and most star-rich area of the Milky Way. Hundreds of globular clusters, special type of star clusters akin to mini-galaxies, swarm around the Milky Way's central bulge, thus most of them are also seen in the summer sky.

But while the summer sky has the better Milky Way, the winter sky has a somewhat greater concentration of the brightest stars, called 1st magnitude stars. Sagittarius and Scorpius have but one 1st magnitude star between them, and the entire summer sky has just seven scattered across the sky. The winter sky has nine 1st magnitude stars, seven of which are bunched within the Great Winter Arc Region. The winter sky also contains Sirius and Canopus, the night sky's two brightest stars.

There are other seasonal differences, but it should be pretty clear that the seasons are not the same when it comes to the night sky and stargazing. In upcoming Stargazer columns we'll be highlighting the major constellations of summer.

## News Headlines

**Asteroid 2012 LZ1 Just Got Supersized**
On Sunday, June 10, a potentially hazardous asteroid thought to have been 500 meters (0.31 miles) wide was discovered by Siding Spring Observatory in New South Wales, Australia. Fortunately for us, asteroid 2012 LZ1 drifted safely by, coming within 14 lunar distances from Earth on Thursday, June 14. Phew. But as it turns out, this particular space rock was a civilization-killing asteroid in disguise.
http://news.discovery.com/space/asteroid-2012-lz1-just-got-supersized-120622.html

**Orbiter Out of Precautionary 'Safe Mode'**
NASA's Mars Odyssey orbiter has been taken out of a protective status called safe mode. Remaining steps toward resuming all normal spacecraft activities will probably be completed by next week. Odyssey resumed pointing downward toward Mars on Saturday, June 16, leaving the Earth-pointed "safe mode" status that was triggered when one of its three primary reaction wheels stuck for a few minutes on June 8.
http://mars.jpl.nasa.gov/odyssey/news/whatsnew/index.cfm?FuseAction=ShowNews&NewsID=1239

**Giant Black Hole Kicked Out of Home Galaxy**
Astronomers have found strong evidence that a massive black hole is being ejected from its host galaxy at a speed of several million miles per hour. New observations from NASA's Chandra X-ray Observatory suggest that the black hole collided and merged with another black hole and received a powerful recoil kick from gravitational wave radiation.
http://www.nasa.gov/home/hqnews/2012/jun/HQ_12-182_Chandra_Black_Hole_Ejected.html

**WISE Finds Few Brown Dwarfs Close to Earth**
Astronomers are getting to know the neighbors better. Our Sun resides within a spiral arm of our Milky Way galaxy about two-thirds of the way out from the center. It lives in a fairly calm, suburb-like area with an average number of stellar residents. Recently, NASA's Wide-field Infrared Survey Explorer, or WISE, has been turning up a new crowd of stars close to home: the coldest of the brown dwarf family of "failed" stars.
http://spaceref.com/astronomy/brown-dwarfs/wise-finds-few-brown-dwarfs-close-to-earth.html

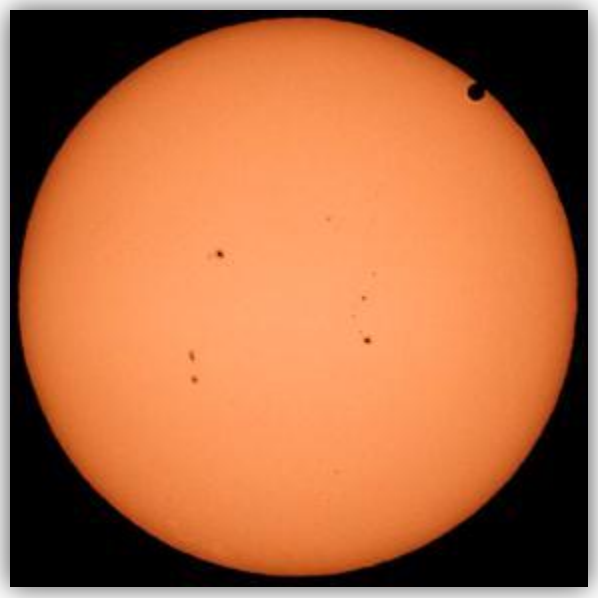
**ESO To Build World's Biggest Eye On The Sky**
ESO's governing body, the Council, met today, at the ESO Headquarters in Garching, Germany. The main topic on the agenda was the start of the European Extremely Large Telescope (E-ELT) Programme — the world's biggest eye on the sky. The E-ELT will be a 39.3-metre segmented-mirror telescope sited on Cerro Armazones in northern Chile, close to ESO's Paranal Observatory.
http://www.eso.org/public/news/eso1225/

**Data From NASA's Voyager 1 Point to Interstellar Future**
Data from NASA's Voyager 1 spacecraft indicate that the venerable deep-space explorer has encountered a region in space where the intensity of charged particles from beyond our solar system has markedly increased. Voyager scientists looking at this rapid rise draw closer to an inevitable but historic conclusion - that humanity's first emissary to interstellar space is on the edge of our solar system.
http://www.jpl.nasa.gov/news/news.cfm?release=2012-177

## Astrophoto of The Month

Transit of Venus taken by Dr. Mahadevan with a Nikon 4500 camera through an 8" Mead SCT

Transit of Venus taken by Steve Trotta through a Stellarvue AT1010, fitted with Baader Planetarium solar film, and a Televue 19mm Panoptic eyepiece. The camera was a Nikon Coolpix. Exposure was 1/400 sec.



Interior contact during the Transit of Venus by Don Bryden.

# July Sky Data


**Best time for deep sky observing this month:**
**July 13 through July 21**

**Mercury** is at its greatest distance east of the Sun on July 1st, but then quickly moves in towards the Sun again: it's at inferior conjunction (almost directly in front of the Sun) on July 28th. We're unlikely to see this elusive little planet this month.

At the start of July, **Venus** is rising an hour and a half before sunrise; by the end of the month, it's rising more than three hours before the Sun, and it should be clearly visible in the eastern sky at dawn. The bright planet Jupiter will be in the same part of the sky, further right and higher up, but Venus, the "Morning Star", will appear even brighter.

**Mars** is very low in the western sky at dusk; it sets only a couple of hours after the Sun sets. The planet Saturn is in the same part of the sky, and it will be easier to find; the bright star Spica is almost directly below Saturn, and somewhat fainter; Mars is to the right of Spica, and a little fainter again. So Mars won't be easy to see.

The giant planet **Jupiter** is rising in the early hours of the morning: look for it low in the eastern sky just before sunrise. The brilliant planet Venus will be in the same part of the sky; Jupiter is less bright than Venus, but brighter than any of the stars.

**Saturn** is low in the western sky at dusk, and sets in the late evening. Relative to the stars, it is moving very slowly south-eastwards in the constellation of Virgo, just above the bright star Spica. Saturn is a little brighter than Spica, and shows up better in the twilight. The planet Mars, to the right of Spica, is fainter still.

There are various minor **meteor-showers** which are active in July, mainly with radiants in the Capricorn-Aquarius area. Towards the end of the month, we may also start to see the first of the Perseids, which peak in August.

## Sun and Moon Rise and Set

| Date | Moonrise | Moonset | Sunrise | Sunset |
|---|---|---|---|---|
| 7/1/2012 | 18:17 | 03:32 | 05:42 | 20:08 |
| 7/5/2012 | 21:35 | 07:55 | 05:44 | 20:08 |
| 7/10/2012 | ------ | 12:56 | 05:47 | 20:06 |
| 7/15/2012 | 02:50 | 17:25 | 05:50 | 20:04 |
| 7/20/2012 | 07:29 | 20:52 | 05:53 | 20:02 |
| 7/25/2012 | 12:45 | 23:49 | 05:57 | 19:59 |
| 7/31/2012 | 18:46 | 04:28 | 06:01 | 19:54 |

## Planet Data

**Jul 1**

| | Rise | Transit | Set | Mag |
|---|---|---|---|---|
| Mercury | 07:41 | 14:45 | 21:48 | 0.6 |
| Venus | 03:36 | 10:35 | 17:37 | -4.5 |
| Mars | 11:57 | 18:08 | 00:17 | 0.9 |
| Jupiter | 03:10 | 10:19 | 17:30 | -2.1 |
| Saturn | 13:50 | 19:38 | 01:26 | 0.7 |

**Jul 15**

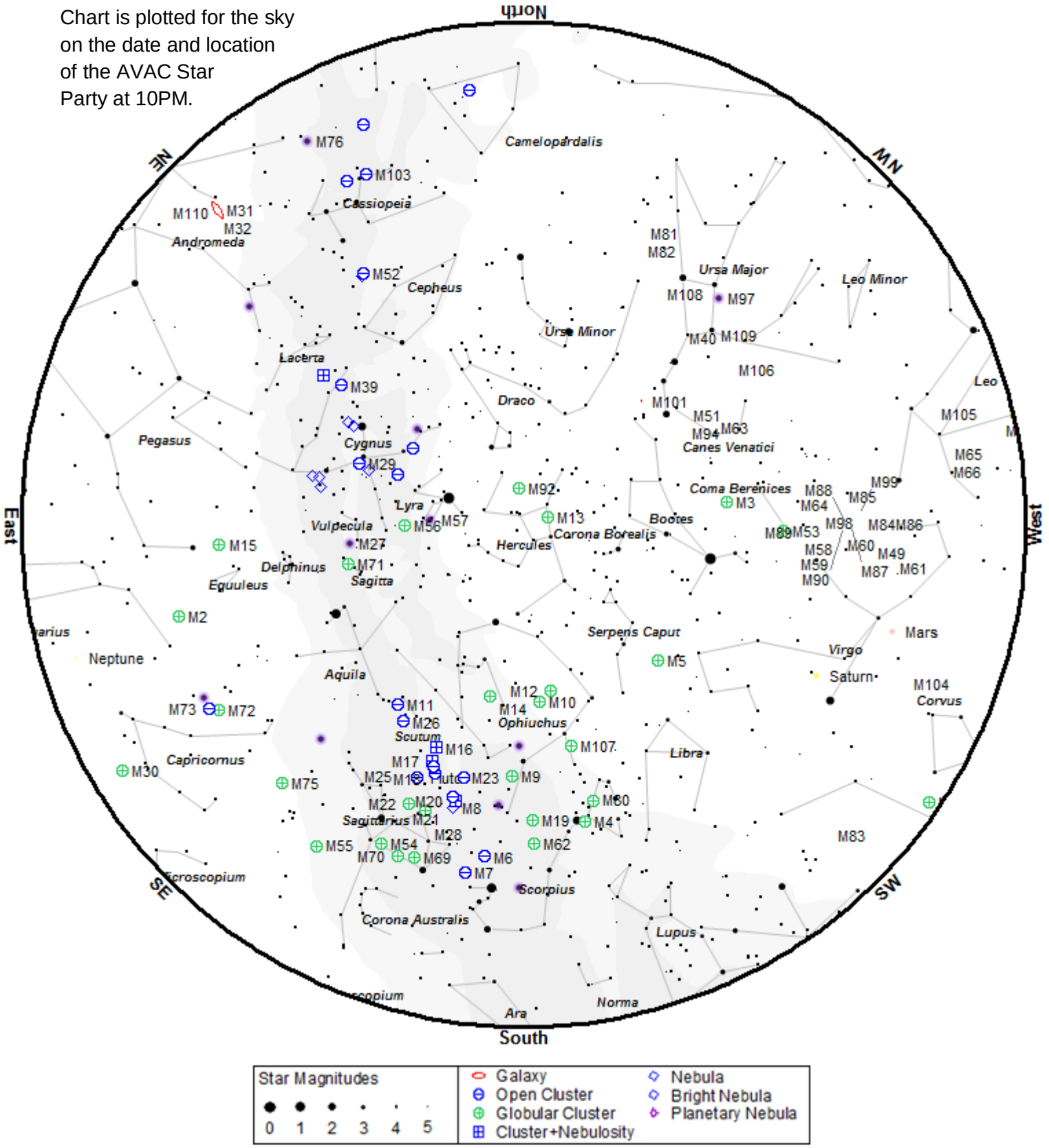
| | Rise | Transit | Set | Mag |
|---|---|---|---|---|
| Mercury | 07:20 | 14:12 | 20:59 | 2.0 |
| Venus | 03:03 | 10:03 | 17:05 | -4.5 |
| Mars | 11:39 | 17:40 | 23:40 | 1.0 |
| Jupiter | 02:26 | 09:36 | 16:49 | -2.1 |
| Saturn | 12:56 | 18:44 | 00:32 | 0.7 |

**Jul 31**

| | Rise | Transit | Set | Mag |
|---|---|---|---|---|
| Mercury | 05:38 | 12:34 | 19:23 | 4.2 |
| Venus | 02:42 | 09:48 | 16:54 | -4.4 |
| Mars | 11:21 | 17:11 | 22:59 | 1.1 |
| Jupiter | 01:33 | 08:45 | 16:00 | -2.2 |
| Saturn | 11:53 | 17:44 | 23:30 | 0.8 |

Planet, Sun, and Moon data calculated for local time at Lancaster, CA

Chart is plotted for the sky on the date and location of the AVAC Star Party at 10PM.




To use the chart, go outside within an hour or so of the time listed and hold it up to the sky. Turn the chart so the direction you are looking is at the bottom of the chart. If you are looking to the south then have 'South horizon' at the lower edge.

## Suggested Observing List

The list below contains objects that will be visible on the night of the AVAC Star Party. The list is sorted by the best time to observe the object. The difficulty column describes how difficult it is to observe the object from the current location on a perfect night in a 6 inch Newtonian telescope.

| ID | Cls | Mag | Con | RA 2000 | Dec 2000 | Begin | Best | End | Difficulty |
|---|---|---|---|---|---|---|---|---|---|
| NGC 6167 | Open | 6.6 | Nor | 16h34m34.0s | -49°46'18" | 21:06 | 21:33 | 22:29 | challenging |
| NGC 5986 | Glob | 7.6 | Lup | 15h46m03.0s | -37°47'12" | 21:20 | 21:34 | 22:03 | challenging |
| NGC 6193 | Open | 5.4 | Ara | 16h41m20.0s | -48°45'48" | 21:19 | 21:37 | 22:06 | challenging |
| NGC 6178 | Open | 7.2 | Sco | 16h35m47.0s | -45°38'36" | 21:15 | 21:38 | 22:26 | detectable |
| NGC 5897 | Glob | 8.4 | Lib | 15h17m24.0s | -21°00'36" | 21:25 | 21:39 | 22:12 | challenging |
| NGC 6124 | Open | 6.3 | Sco | 16h25m20.0s | -40°39'12" | 21:12 | 21:39 | 22:57 | challenging |
| Col 256 | Open | 2.9 | Com | 12h25m06.0s | +26°06'00" | 21:20 | 21:40 | 21:58 | easy |
| NGC 4565 | Gal | 10.1 | Com | 12h36m20.8s | +25°59'15" | 21:26 | 21:40 | 22:07 | difficult |
| M 64 | Gal | 9.3 | Com | 12h56m43.8s | +21°41'00" | 21:22 | 21:40 | 22:18 | detectable |
| M 97 | PNe | 9.7 | UMa | 11h14m47.7s | +55°01'09" | 21:26 | 21:42 | 21:53 | detectable |
| M 106 | Gal | 9.1 | CVn | 12h18m57.6s | +47°18'13" | 21:26 | 21:43 | 22:39 | detectable |
| M 94 | Gal | 8.7 | CVn | 12h50m53.1s | +41°07'12" | 21:22 | 21:43 | 22:57 | detectable |
| M 3 | Glob | 6.3 | CVn | 13h42m11.0s | +28°22'42" | 21:20 | 21:43 | 23:12 | detectable |
| M 5 | Glob | 5.7 | Ser | 15h18m34.0s | +02°05'00" | 21:17 | 21:44 | 23:40 | easy |
| NGC 5195 | Gal | 10.5 | CVn | 13h29m59.6s | +47°15'58" | 21:24 | 21:46 | 23:09 | detectable |
| M 51 | Gal | 8.7 | CVn | 13h29m52.3s | +47°11'40" | 21:20 | 21:46 | 23:39 | easy |
| M 80 | Glob | 7.3 | Sco | 16h17m02.0s | -22°58'30" | 21:18 | 21:45 | 22:07 | detectable |
| M 101 | Gal | 8.4 | UMa | 14h03m12.4s | +54°20'53" | 21:25 | 21:48 | 23:30 | detectable |
| M 12 | Glob | 6.1 | Oph | 16h47m14.0s | -01°56'48" | 21:17 | 21:56 | 00:53 | easy |
| M 62 | Glob | 6.4 | Oph | 17h01m13.0s | -30°06'48" | 21:18 | 21:57 | 23:45 | detectable |
| M 13 | Glob | 5.8 | Her | 16h41m41.0s | +36°27'36" | 21:18 | 21:58 | 01:55 | easy |
| M 19 | Glob | 6.8 | Oph | 17h02m38.0s | -26°16'06" | 21:22 | 21:59 | 23:43 | detectable |
| M 10 | Glob | 6.6 | Oph | 16h57m09.0s | -04°06'00" | 21:21 | 21:59 | 00:32 | detectable |
| NGC 6302 | PNe | 12.8 | Sco | 17h13m44.2s | -37°06'16" | 21:12 | 22:06 | 00:01 | not visible |
| NGC 6322 | Open | 6.5 | Sco | 17h18m25.0s | -42°56'00" | 21:15 | 22:10 | 23:36 | easy |
| M 92 | Glob | 6.5 | Her | 17h17m07.0s | +43°08'12" | 21:18 | 22:12 | 02:39 | easy |
| M 9 | Glob | 7.8 | Oph | 17h19m12.0s | -18°31'00" | 21:24 | 22:12 | 00:01 | difficult |
| NGC 6383 | Open | 5.4 | Sco | 17h34m48.0s | -32°34'00" | 21:18 | 22:26 | 00:27 | easy |
| NGC 6388 | Glob | 6.8 | Sco | 17h36m17.0s | -44°44'06" | 21:48 | 22:28 | 23:09 | challenging |
| M 14 | Glob | 7.6 | Oph | 17h37m36.0s | -03°14'48" | 21:21 | 22:29 | 01:13 | detectable |
| M 6 | Open | 4.6 | Sco | 17h40m20.0s | -32°15'12" | 21:15 | 22:31 | 00:47 | easy |
| IC 4665 | Open | 5.3 | Oph | 17h46m18.0s | +05°43'00" | 21:22 | 22:38 | 01:29 | detectable |
| M 7 | Open | 3.3 | Sco | 17h53m51.0s | -34°47'36" | 21:22 | 22:45 | 00:33 | detectable |
| M 23 | Open | 5.9 | Sgr | 17h57m04.0s | -18°59'06" | 21:21 | 22:48 | 00:36 | detectable |
| NGC 6543 | PNe | 8.3 | Dra | 17h58m33.4s | +66°37'59" | 21:09 | 22:49 | 04:44 | obvious |
| M 20 | Open | 5.2 | Sgr | 18h02m42.0s | -22°58'18" | 21:55 | 22:54 | 23:53 | easy |
| M 21 | Open | 7.2 | Sgr | 18h04m13.0s | -22°29'24" | 21:48 | 22:55 | 00:02 | detectable |
| M 8 | Neb | 5.0 | Sgr | 18h04m02.0s | -24°23'14" | 22:33 | 22:55 | 23:18 | easy |

| ID | Cls | Mag | Con | RA 2000 | Dec 2000 | Begin | Best | End | Difficulty |
|---|---|---|---|---|---|---|---|---|---|
| NGC 6541 | Glob | 6.3 | CrA | 18h08m02.0s | -43°42'54" | 22:15 | 22:59 | 23:43 | challenging |
| NGC 6572 | PNe | 8.0 | Oph | 18h12m06.4s | +06°51'12" | 21:03 | 23:04 | 02:53 | obvious |
| M 16 | Open | 6.5 | Ser | 18h18m48.0s | -13°48'24" | 21:14 | 23:10 | 01:35 | obvious |
| M 18 | Open | 7.5 | Sgr | 18h19m58.0s | -17°06'06" | 21:16 | 23:11 | 01:14 | easy |
| M 17 | Open | 7.3 | Sgr | 18h20m47.0s | -16°10'18" | 21:32 | 23:12 | 01:06 | difficult |
| M 28 | Glob | 6.9 | Sgr | 18h24m33.0s | -24°52'12" | 21:28 | 23:16 | 01:17 | detectable |
| NGC 6633 | Open | 5.6 | Oph | 18h27m15.0s | +06°30'30" | 21:16 | 23:19 | 03:03 | easy |
| M 25 | Open | 6.2 | Sgr | 18h31m47.0s | -19°07'00" | 21:37 | 23:23 | 01:08 | detectable |
| M 22 | Glob | 5.2 | Sgr | 18h36m24.0s | -23°54'12" | 22:47 | 23:27 | 00:08 | detectable |
| IC 4756 | Open | 5.4 | Ser | 18h39m00.0s | +05°27'00" | 21:22 | 23:30 | 02:48 | detectable |
| M 70 | Glob | 7.8 | Sgr | 18h43m13.0s | -32°17'30" | 22:01 | 23:34 | 01:07 | difficult |
| M 11 | Open | 6.1 | Sct | 18h51m05.0s | -06°16'12" | 21:26 | 23:42 | 02:28 | detectable |
| M 57 | PNe | 9.4 | Lyr | 18h53m35.1s | +33°01'45" | 21:17 | 23:44 | 04:17 | easy |
| M 54 | Glob | 7.7 | Sgr | 18h55m03.0s | -30°28'42" | 22:23 | 23:46 | 01:10 | challenging |
| NGC 6716 | Open | 7.5 | Sgr | 18h54m34.0s | -19°54'06" | 22:07 | 23:46 | 01:24 | detectable |
| NGC 6723 | Glob | 6.8 | Sgr | 18h59m33.0s | -36°37'54" | 22:31 | 23:51 | 01:11 | difficult |
| M 56 | Glob | 8.4 | Lyr | 19h16m36.0s | +30°11'06" | 21:28 | 00:07 | 03:28 | detectable |
| M 55 | Glob | 6.3 | Sgr | 19h40m00.0s | -30°57'42" | 22:51 | 00:31 | 02:11 | detectable |
| NGC 6818 | PNe | 10.0 | Sgr | 19h43m57.8s | -14°09'12" | 22:11 | 00:35 | 02:58 | easy |
| M 71 | Glob | 8.4 | Sge | 19h53m46.0s | +18°46'42" | 21:25 | 00:45 | 04:25 | easy |
| M 27 | PNe | 7.3 | Vul | 19h59m36.3s | +22°43'16" | 21:25 | 00:50 | 04:29 | easy |
| NGC 6871 | Open | 5.8 | Cyg | 20h05m59.0s | +35°46'36" | 21:26 | 00:57 | 04:32 | easy |
| NGC 6910 | Open | 7.3 | Cyg | 20h23m12.0s | +40°46'42" | 21:25 | 01:14 | 04:36 | easy |
| M 29 | Open | 7.5 | Cyg | 20h23m57.0s | +38°30'30" | 21:27 | 01:15 | 04:35 | easy |
| NGC 7009 | PNe | 8.3 | Aqr | 21h04m10.9s | -11°21'48" | 23:16 | 01:55 | 04:33 | obvious |
| M 15 | Glob | 6.3 | Peg | 21h29m58.0s | +12°10'00" | 22:52 | 02:21 | 04:37 | detectable |
| M 39 | Open | 5.3 | Cyg | 21h31m48.0s | +48°26'00" | 21:35 | 02:22 | 04:38 | easy |
| M 2 | Glob | 6.6 | Aqr | 21h33m27.0s | -00°49'24" | 23:23 | 02:24 | 04:34 | detectable |
| IC 1396 | Neb |  | Cep | 21h39m06.0s | +57°30'00" | 21:30 | 02:29 | 04:39 | challenging |
| M 30 | Glob | 6.9 | Cap | 21h40m22.0s | -23°10'42" | 01:35 | 02:30 | 03:28 | detectable |
| NGC 7160 | Open | 6.4 | Cep | 21h53m40.0s | +62°36'12" | 21:20 | 02:43 | 04:44 | obvious |
| Cocoon | Neb | 10.0 | Cyg | 21h53m24.0s | +47°16'00" | 21:50 | 02:44 | 04:39 | challenging |
| NGC 7243 | Open | 6.7 | Lac | 22h15m08.0s | +49°53'54" | 23:03 | 03:06 | 04:35 | detectable |
| NGC 7293 | PNe | 6.3 | Aqr | 22h29m38.5s | -20°50'14" | 01:51 | 03:20 | 04:38 | detectable |
| M 52 | Open | 8.2 | Cas | 23h24m48.0s | +61°35'36" | 00:17 | 03:53 | 04:32 | detectable |
| NGC 7790 | Open | 7.2 | Cas | 23h58m24.0s | +61°12'30" | 22:44 | 04:00 | 04:42 | easy |
| NGC 7789 | Open | 7.5 | Cas | 23h57m24.0s | +56°42'30" | 01:03 | 04:00 | 04:33 | difficult |
| NGC 559 | Open | 7.4 | Cas | 01h29m31.0s | +63°18'24" | 00:10 | 04:06 | 04:40 | easy |
| NGC 637 | Open | 7.3 | Cas | 01h43m04.0s | +64°02'24" | 00:21 | 04:07 | 04:43 | obvious |
| NGC 663 | Open | 6.4 | Cas | 01h46m09.0s | +61°14'06" | 00:34 | 04:07 | 04:39 | easy |
| M 103 | Open | 6.9 | Cas | 01h33m23.0s | +60°39'00" | 00:21 | 04:07 | 04:41 | obvious |
| NGC 457 | Open | 5.1 | Cas | 01h19m35.0s | +58°17'12" | 00:15 | 04:07 | 04:41 | easy |
| M 110 | Gal | 8.9 | And | 00h40m22.3s | +41°41'09" | 01:40 | 04:07 | 04:36 | detectable |
| M 31 | Gal | 4.3 | And | 00h42m44.3s | +41°16'07" | 00:54 | 04:06 | 04:39 | easy |
| M 32 | Gal | 8.9 | And | 00h42m41.8s | +40°51'58" | 00:58 | 04:07 | 04:40 | easy |

| ID | Cls | Mag | Con | RA 2000 | Dec 2000 | Begin | Best | End | Difficulty |
|---|---|---|---|---|---|---|---|---|---|
| NGC 1027 | Open | 7.4 | Cas | 02h42m40.0s | +61°35'42" | 02:17 | 04:09 | 04:32 | detectable |
| Heart | Neb | 6.5 | Cas | 02h33m52.0s | +61°26'50" | 01:19 | 04:09 | 04:38 | challenging |
| NGC 884 | Open | 4.4 | Per | 02h22m18.0s | +57°08'12" | 01:19 | 04:09 | 04:42 | obvious |
| NGC 869 | Open | 4.3 | Per | 02h19m00.0s | +57°07'42" | 01:17 | 04:09 | 04:42 | obvious |
| M 76 | PNe | 10.1 | Per | 01h42m19.9s | +51°34'31" | 02:01 | 04:09 | 04:34 | detectable |
| NGC 957 | Open | 7.2 | Per | 02h33m21.0s | +57°33'36" | 01:30 | 04:10 | 04:37 | easy |
| NGC 752 | Open | 6.6 | And | 01h57m41.0s | +37°47'06" | 03:32 | 04:10 | 04:26 | challenging |
| M 33 | Gal | 6.4 | Tri | 01h33m50.9s | +30°39'36" | 02:18 | 04:11 | 04:36 | detectable |
| NGC 1502 | Open | 4.1 | Cam | 04h07m50.0s | +62°19'54" | 02:52 | 04:11 | 04:44 | obvious |
| M 34 | Open | 5.8 | Per | 02h42m05.0s | +42°45'42" | 02:29 | 04:12 | 04:37 | detectable |
| NGC 1245 | Open | 7.7 | Per | 03h14m42.0s | +47°14'12" | 02:36 | 04:12 | 04:38 | challenging |
| NGC 1444 | Open | 6.4 | Per | 03h49m25.0s | +52°39'30" | 02:59 | 04:13 | 04:42 | obvious |
| NGC 1528 | Open | 6.4 | Per | 04h15m23.0s | +51°12'54" | 03:28 | 04:14 | 04:36 | easy |
| NGC 1342 | Open | 7.2 | Per | 03h31m38.0s | +37°22'36" | 03:14 | 04:15 | 04:35 | detectable |
| NGC 1664 | Open | 7.2 | Aur | 04h51m06.0s | +43°40'30" | 03:21 | 04:17 | 04:36 | easy |
| M 45 | Open | 1.5 | Tau | 03h47m00.0s | +24°07'00" | 04:00 | 04:18 | 04:41 | obvious |
| NGC 253 | Gal | 7.9 | Scl | 00h47m33.1s | -25°17'20" | 03:18 | 04:19 | 04:38 | detectable |
| M 77 | Gal | 9.7 | Cet | 02h42m40.8s | -00°00'48" | 04:04 | 04:20 | 04:38 | detectable |
| NGC 288 | Glob | 8.1 | Scl | 00h52m45.0s | -26°35'00" | 03:54 | 04:20 | 04:32 | challenging |
| NGC 55 | Gal | 8.5 | Scl | 00h15m08.4s | -39°13'13" | 03:12 | 04:22 | 04:47 | challenging |

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