Volume 27 Issue 9

June 2013

The Observer

East Valley Astronomy Club

ISS Expedition 36 crew members take a break from training at NASA's Johnson Space Center to pose for a crew portrait. Pictured on the front row are Russian cosmonauts Pavel Vinogradov (left), commander; and Fyodor Yurchikhin, flight engineer. Pictured from the left (back row) are Russian cosmonaut Alexander Misurkin, NASA astronaut Chris Cassidy, European Space Agency astronaut Luca Parmitano and NASA astronaut Karen Nyberg, all flight engineers. Photo credit: NASA

Upcoming Events:

Local Star Party - June 1

Deep Sky Observing Night - June 8

Public Star Party - June 14

General Meeting - June 21

Local Star Party - June 29

Check out all of the upcoming club events in the Calendars on page 8

Inside this Issue:

The Backyard Astronomer
A Binocular Primer (Part Two)
by Bill Dellinges

The prisms should be BAK-4 and not the inferior BK-7 glass which passes less light. Being tripod adaptable is a must. A medium sized binocular will weigh between 25 and 33 ounces. Anything over about 30 ounces is considered somewhat heavy when handheld.

A 7x50 usually renders a "real field of view" around 6 degrees; 7 degrees is better. This is the linear amount of sky you see; for reference, the moon is ½ degree in diameter. Real field is usually shown stamped on the back right side barrel and the "7x50" on the left barrel of the binocular. Some binoculars make you work to figure out the real field by indicating "314' at 1000 yards." In this case, divide the 314' by 52.4 to get the real field in degrees. If it reads 115m at 1000m, divide by 17.5). "Apparent field of view" (AFV) is similar to the angle of view in telescope eyepieces. For example, the Plossl, Panoptic, and Nagler eyepieces have 50, 68, and 82 degree

Continued on page 2

The Backyard Astronomer

Continued from page 1 AFV's respectively. AFV is determined by multiplying power by real field of view. For instance, a 7x50 with a 6 degree real field has an AFV of 42 degrees (7x6 = 42).

Why be concerned about this? Same thing for wanting wide angle eyepieces. When you look into a binocular, it's nice to have some space to look around in. I had a binocular once that had an AFV of 42 degrees. It was a good binocular but I felt I was looking through two straws. One can get used to that, but I find AFV's of 50 degrees much more enjoyable.

A 7x50 produces a 7mm exit pupil, the cone of light exiting the eyepieces. At night a young person's pupil opens to that size. Some purists point out it's more like 5mm for older adults and thus some light is wasted for them. Technically that's true. Exit pupil is calculated by dividing aperture by power: 50mm/7x = 7.14mm. So should old eyes seek a smaller exit pupil from say a 7x42, the typical birding glass (42mm/8x = 5.25mm)? There is an apocryphal theory that an exit pupil larger than one's pupil aids in sighting through binoculars on a rocking ship (or shaking hands!). I still advise going with a 7x50. But if this issue bothers you that much, go with a 10x50 (50mm/10x = 5mm).

Mechanical considerations to watch for are the smoothness of the focuser and diopter adjustment. Does the interpupilary adjustment move smoothly as well (opening and closing the two barrels to match your eye)? Twist-up eyepiece cups are popular now over rubber fold down ones and especially desirable for eyeglass wearers. The most important factor in choosing a binocular is, of course, its optical performance. This why there are $100 binoculars and $1000 binoculars.

You pay for optical (and also mechanical) performance. The biggest flaw in low end optics is edge performance (and collimation of the two barrels). How far from the center of the field do stars remain sharp? Low end binoculars get you 50% towards the field edge. Mid-level ones about 75%, high end perhaps 90%. A fairly decent binocular will cost $100-$200. Very good ones can be had in the $200 - $500 range. Excellent ones go up from there. You get what you pay for in binoculars. That's why one may be priced at $59 and another at $1200.What you are paying for in the expensive model is quality and durability. Avoid cheap models, spend a little more - a good one will last a lifetime. You'll be on the right road if you stick with established name brands such as Leica, Zeiss, Nikon, Swarovski, Fujinon, Pentax, Carton-Adlerblick, Celestron, or Orion, to name a few. If possible, avoid Chinese imports (currently difficult, I know). A binocular made in Japan will be far superior to one made in China.

If possible, examine in person a binocular you are considering purchasing. If that's not possible, buy from a vender that has a generous return policy. Check how comfortable they feel in your hands, the mechanical functions noted earlier and optical quality. Assuming the diopter on the right eyepiece is set properly, is there any strain on your eyes? If so, reject them. Objects should stay sharp to at least 75% from center of field to the edge of field. If you observe with eye glasses, you'll need at least 19mm of eye relief to see the full field (eye relief can be found on the binocular specification sheet). Spend a little more and get a binocular that will last as long as you will.

The writer uses a 7x50 Vixen Forester, 8x50 Swarovski, 10x70 Fujinon FMT-SX, and 20x100 Miyauchi, all of which I highly recommend.

For further reading see:

Touring the Universe with Binoculars, Phil Harrington, p. 263 (1990).
Star Ware, Phil Harrington, Chap.4 (4th ed. 2007).
The Backyard Astronomer, Terence Dickinson, p. 20 (2nd ed. 2002).

Bright Explosion on the Moon

by Dr. Tony Phillips

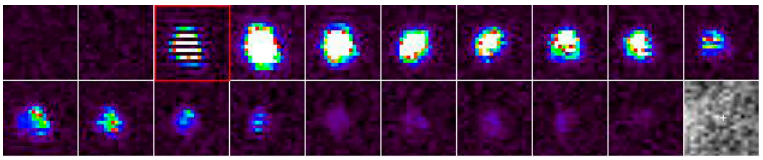
For the past 8 years, NASA astronomers have been monitoring the Moon for signs of explosions caused by meteoroids hitting the lunar surface. "Lunar meteor showers" have turned out to be more common than anyone expected, with hundreds of detectable impacts occurring every year. They've just seen the biggest explosion in the history of the program.

"On March 17, 2013, an object about the size of a small boulder hit the lunar surface in Mare Imbrium," says Bill Cooke of NASA's Meteoroid Environment Office. "It exploded in a flash nearly 10 times as bright as anything we've ever seen before."

Anyone looking at the Moon at the moment of impact could have seen the explosion--no telescope required. For about one second, the impact site was glowing like a 4th magnitude star.

Ron Suggs, an analyst at the Marshall Space Flight Center, was the first to notice the impact in a digital video recorded by one of the monitoring program's 14-inch telescopes. "It jumped right out at me, it was so bright," he recalls.

The 40 kg meteoroid measuring 0.3 to 0.4 meters wide hit the Moon traveling 56,000 mph. The resulting explosion1 packed as much punch as 5 tons of TNT.



These false-color frames extracted from the original black and white video show the explosion in progress. At its peak, the flash was as bright as a 4th magnitude star.

Cooke believes the lunar impact might have been part of a much larger event.

"On the night of March 17, NASA and University of Western Ontario all-sky cameras picked up an unusual number of deep-penetrating meteors right here on Earth," he says. "These fireballs were traveling along nearly identical orbits between Earth and the asteroid belt."

This means Earth and the Moon were pelted by meteoroids at about the same time.

"My working hypothesis is that the two events are related, and that this constitutes a short duration cluster of material encountered by the Earth-Moon system," saysCooke.

One of the goals of the lunar monitoring program is to identify new streams of space debris that pose a potential threat to the Earth-Moon system. The March 17th event seems to be a good candidate.

Controllers of NASA's Lunar Reconnaissance Orbiter have been notified of the strike. The crater could be as wide as 20 meters, which would make it an easy target for LRO the next time the spacecraft passes over the impact site. Comparing the size of the crater to the brightness of the flash would give researchers a valuable "ground truth" measurement to validate lunar impact models.

Unlike Earth, which has an atmosphere to protect it, the Moon is airless and exposed. "Lunar meteors" crash into the ground with fair frequency. Since the monitoring program began in 2005, NASA's lunar impact team has detected more than 300 strikes, most orders of magnitude fainter than the March 17th event. Statistically speaking, more than half of all lunar meteors come from known meteoroid streams such as the Perseids and Leonids. The rest are sporadic meteors--random bits of comet and asteroid debris of unknown parentage.

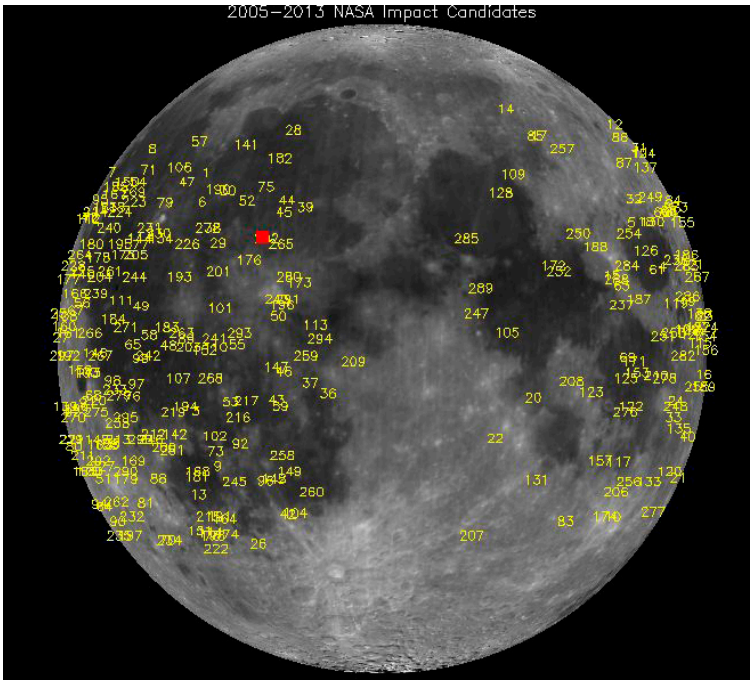
U.S. Space Exploration Policy eventually calls for extended astronaut stays on the lunar surface. Identifying the sources of lunar meteors and measuring their impact rates gives future lunar explorers an idea of what to expect. Is it safe to go on a moonwalk, or not? The middle of March might be a good time to stay inside.

"We'll be keeping an eye out for signs of a repeat performance next year when the Earth-Moon system passes through the same region of space," says Cooke. "Meanwhile, our analysis of the March 17th event continues."

For updates stay tuned to science.nasa.gov.

The Moon has no oxygen atmosphere, so how can something explode? Lunar meteors don't require oxygen or combustion to make themselves visible. They hit the ground with so much kinetic energy that even a pebble can make a crater several feet wide. The flash of light comes not from combustion but rather from the thermal glow of molten rock and hot vapors at the impact site.

Science@NASA



NASA's lunar monitoring program has detected hundreds of meteoroid impacts. The brightest, detected on March 17, 2013, in Mare Imbrium, is marked by the red square.

Collision Course? A Comet Heads for Mars

by Dr. Tony Phillips

Over the years, the spacefaring nations of Earth have sent dozens of probes and rovers to explore Mars. Today there are three active satellites circling the red planet while two rovers, Opportunity and Curiosity, wheel across the red sands below.

Mars is dry, barren, and apparently lifeless.

Soon, those assets could find themselves exploring a very different kind of world.

"There is a small but non-negligible chance that Comet 2013 A1 will strike Mars next year in October of 2014," says Don Yeomans of NASA's Near-Earth Object Program at JPL. "Current solutions put the odds of impact at 1 in 2000." The nucleus of the comet is probably 1 to 3 km in diameter, and it is coming in fast, around 56 km/s (125,000 mph). "It if does hit Mars, it would deliver as much energy as 35 million megatons of TNT," estimates Yeomans.

For comparison, the asteroid strike that ended the dinosaurs on Earth 65 million years ago was about three times as powerful, 100 million megatons. Another point of comparison is the meteor that exploded over Chelyabinsk, Russia, in February of 2013, damaging buildings and knocking people down. The Mars comet is packing 80 million times more energy than that relatively puny asteroid.

An impact wouldn't necessarily mean the end of NASA's Mars program. But it would transform the program-- along with Mars itself.

"I think of it as a giant climate experiment," says Michael Meyer, lead scientist for the Mars Exploration Program at NASA headquarters. "An impact would loft a lot of stuff into the Martian atmosphere--dust, sand, water and other debris. The result could be a warmer, wetter Mars than we're accustomed to today."

Meyer worries that solar-powered Opportunity might have a hard time surviving if the atmosphere became opaque. Nuclear-powered Curiosity, though, would carry on just fine. He also notes that Mars orbiters might have trouble seeing the surface, for a while at least, until the debris begins to clear.

A direct impact remains unlikely. Paul Chodas of NASA's Near-Earth Object Program stresses that a 1 in 2000 chance of impact means there's a 1999 in 2000 chance of no impact. "A near-miss is far more likely," he points out.

Even a near miss is a potentially big event. The latest orbit solutions put the comet somewhere within 300,000 km of the red planet at closest approach. That means Mars could find itself inside the comet's gassy, dusty atmosphere or "coma." Visually, the comet would reach 0th magnitude, that is, a few times brighter than a 1st magnitude star, as seen from the Red Planet.

"Cameras on ALL of NASA's spacecraft currently operating at Mars should be able to take photographs of Comet 2013 A1," says Jim Bell, a planetary scientist and Mars imaging specialist at Arizona State University. "The issue with Mars Odyssey and the Mars Reconnaissance Orbiter will be the ability to point them in the right direction; they are used to looking down, not up. Mission designers will have to figure out if that is possible."

"The issue with the Opportunity and Curiosity rovers will be power for imaging at night," he continues. "Opportunity is solar powered and so would need to dip into reserve battery power to operate the cameras at night. Whether or not we will be able to do this will depend on how much power the rover is getting from dusty solar panels in the daytime. On the other hand, Curiosity is nuclear powered, so it could have better odds at night-time imaging."

Researchers will be keenly interested to see how the comet's atmosphere interacts with the atmosphere of Mars. For one thing, there could be a meteor shower. "Analyzing the spectrum of disintegrating meteors could tell us something interesting about the chemistry of the upper atmosphere," notes Meyer.

Another possibility is Martian auroras. Unlike Earth, which has a global magnetic field that wraps around our entire planet, Mars is only magnetized in patches. Here and there, magnetic umbrellas sprout out of the ground, creating a crazy-quilt of magnetic poles concentrated mainly in the southern hemisphere. Ionized gases hitting the top of the Martian atmosphere could spark auroras in the canopies of the magnetic umbrellas.

Even before the comet flyby was known, NASA had already decided to send a spacecraft to Mars to study the dynamics of the Martian atmosphere. If the probe, named MAVEN (short for "Mars Atmosphere and Volatile Evolution"), is launched on time in November 2013, it would reach Mars just a few weeks before the comet in 2014.

However, notes MAVEN's principal investigator Bruce Jakosky of the University of Colorado, the spacecraft won't be ready to observe the comet when it reaches Mars. "It takes a while to get into our science mapping orbit, deploy the booms, turn on and test the science instruments--and so on," he explains. "MAVEN won't be fully operational until perhaps two weeks after the comet passes. There are some effects that I would expect to linger for a relatively long period--especially if the comet hits Mars--and we will be able to observe those changes."

Astronomers around the world are monitoring 2013 A1. Every day, new data arrive to refine the comet's orbit. As the error bars shrink, Yeomans expects a direct hit to be ruled out. "The odds favor a flyby, not a collision," he says. Either way, this is going to be good. Stay tuned for updates as the comet approaches.

Credit: Science@NASA

Looking for that perfect weekend activity?

Why not resolve to getting involved?

Contact Dave Coshow to join the staff at GRCO

Email: grco@evaconline.org

18" Classic Obsession Telescope for Sale

Purchased new in 1997 with Galaxy optics. Selling to move to a different scope. Originally the mirror tested with a Strehl ratio of 0.955 (Fringe Centers) / 0.961 (Uniform Grid) and a RMS value of 0.034. It was refigured in 2000 by Swayze Optical to remove some zones. The mirror star-tests very well. All mirrors were recoated in the last 9 months by OMI (IBAD-96 Coating process). The woodwork does show cosmetic finish issues. There are numerous upgrades to the scope.
Asking $3,200 or best offer.

Contact me at 602.291.3508 or e-mail me if you want details. James.t.waters@cox.net

◑ Last Quarter Moon on May 31 at 12:00

○ New Moon on June 8 at 08:58

◑ First Quarter Moon on June 16 at 10:24

● Full Moon on June 23 at 04:33

◑ Last Quarter Moon on June 29 at 21:54

Upcoming Meetings

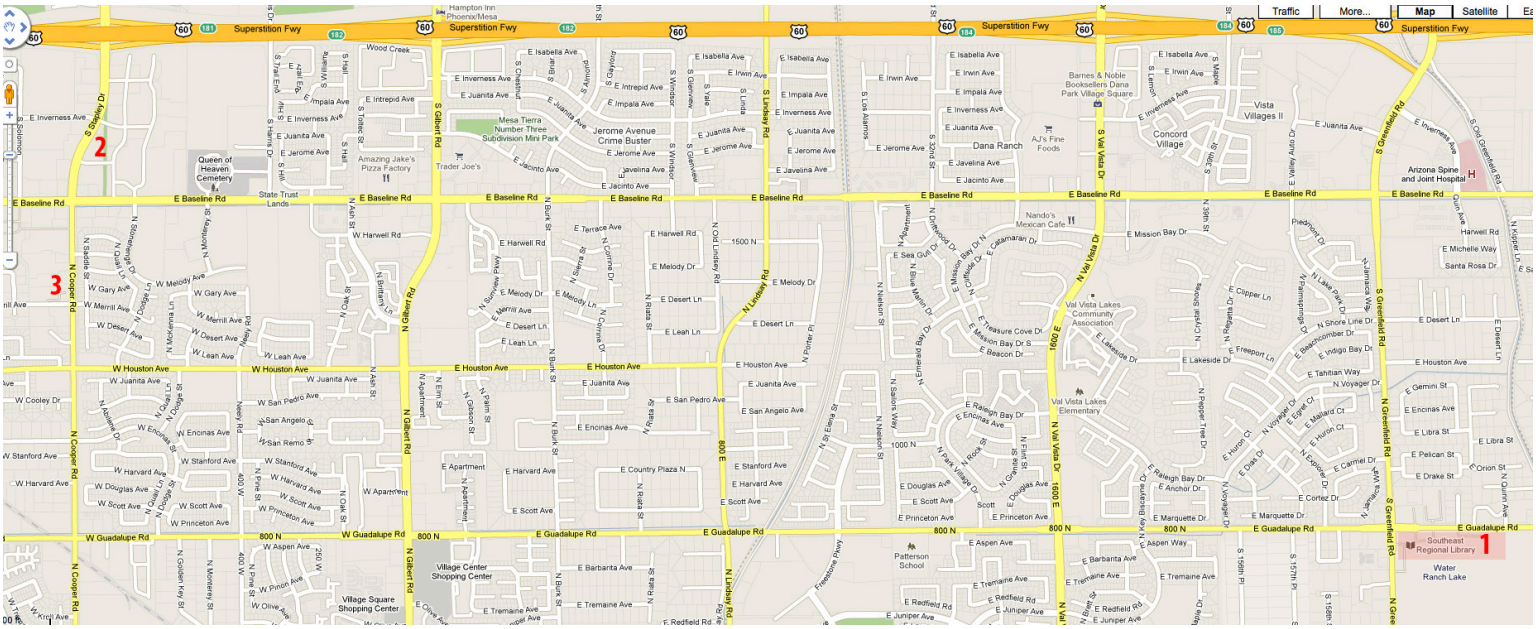
June 21
July 19
August 16
September 20
October 18
November 15

The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

Our meetings are held on the third Friday of each month at the Southeast Regional Library in Gilbert. The library is located at 775 N. Greenfield Road; on the southeast corner of Greenfield and Guadalupe Roads. Meetings begin at 7:30 pm.

All are welcome to attend the pre-meeting dinner at 5:30 pm. We meet at Old Country Buffet, located at 1855 S. Stapley Drive in Mesa. The restaurant is in the plaza on the northeast corner of Stapley and Baseline Roads, just south of US60.

Visitors are always welcome!



2 **Old Country Buffet**
1855 S. Stapley Drive
Mesa, Az. 85204

1 **Southeast Regional Library**
775 N. Greenfield Road
Gilbert, Az. 85234

June 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

June 1 - Local Star Party

June 8 - Deep Sky Observing Night

June 14 - Public Star Party & SkyWatch

June 21 - General Meeting at SE Library

June 29 - Local Star Party

July 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

July 6 - Deep Sky Observing Night

July 12 - Public Star Party & SkyWatch at Riparian Preserve

July 19 - General Meeting at SE Library

July 27 - Local Star Party

East Valley Astronomy Club -- 2013 Membership Form

Please complete this form and return it to the club Treasurer at the next meeting or mail it to EVAC, PO Box 2202, Mesa, Az, 85214-2202. Please include a check or money order made payable to EVAC for the appropriate amount.

IMPORTANT: All memberships expire on December 31 of each year.

Select one of the following:

☐ New Member ☐ Renewal ☐ Change of Address

New Member Dues (dues are prorated, select according to the month you are joining the club):

☐ **$30.00 Individual** January through March

☐ **$35.00 Family** January through March

☐ **$22.50 Individual** April through June

☐ **$26.25 Family** April through June

☐ **$15.00 Individual** July through September

☐ **$17.50 Family** July through September

☐ **$37.50 Individual** October through December

☐ **$43.75 Family** October through December

Includes dues for the following year

Renewal (current members only):

☐ **$30.00 Individual** ☐ **$35.00 Family**

Name Badges:

☐ **$10.00** Each (including postage) Quantity: _____

Name to imprint: _____

Total amount enclosed: ☐

Please make check or money order payable to EVAC

☐ Payment was remitted separately using PayPal ☐ Payment was remitted separately using my financial institution's online bill payment feature

Name: ☐ Phone: ☐

Address: ☐ Email: ☐

☐ Publish email address on website

City, State, Zip: ☐ URL: ☐

How would you like to receive your monthly newsletter? (choose one option):

☐ Electronic delivery (PDF) *Included with membership* ☐ US Mail **Please add $10 to the total payment**

Areas of Interest (check all that apply):

☐ General Observing ☐ Cosmology

☐ Lunar Observing ☐ Telescope Making

☐ Planetary Observing ☐ Astrophotography

☐ Deep Sky Observing ☐ Other

Please describe your astronomy equipment:

Would you be interested in attending a beginner's workshop? ☐ Yes ☐ No

How did you discover East Valley Astronomy Club? ☐

PO Box 2202
Mesa, AZ 85214-2202
www.evaconline.org

All members are required to have a liability release form (waiver) on file. Please complete one and forward to the Treasurer with your membership application or renewal.

Liability Release Form

In consideration of attending any publicized Star Party hosted by the East Valley Astronomy Club (hereinafter referred to as "EVAC") I hereby affirm that I and my family agree to hold EVAC harmless from any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), which may directly or indirectly be connected to EVAC and/or my presence on the premises of any EVAC Star Party and related areas.

I further agree to indemnify any party indicated above should such party suffer any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), caused directly or indirectly by my negligent or intentional acts, or failure to act, or if such acts or failures to act are directly or indirectly caused by any person in my family or associates while participating in an EVAC Star Party.

My signature upon this form also indicates agreement and acceptance on behalf of all minor children (under 18 years of age) under my care in attendance.

EVAC only recognizes those who are members or invitees and who also have a signed Liability Release Form on file as participants at an EVAC Star Party.

Please print name here ***Date***

Please sign name here

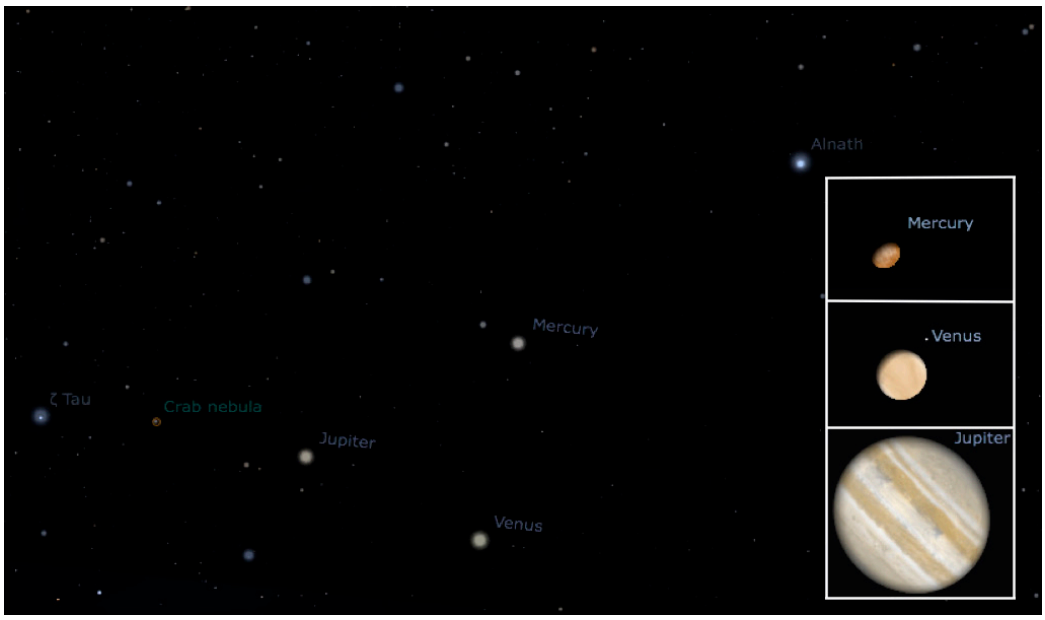
PO Box 2202
Mesa, AZ 85214-2202
www.eastvalleyastronomy.org

Triple Treat

by Dr. Ethan Siegel

The solar system is a busy place, with five wandering planets visible to the naked eye alone. When any two pass close by each other from our point of view, we see an astronomical conjunction, but on very rare occasions, three planets will find themselves grouped together: a triple conjunction. Towards the end of May, Mercury, Venus and Jupiter will treat us to the best triple conjunction in years.

On May 25th, Mercury will pass within 1.4° of Venus, then two days later Mercury comes within 2.4° of Jupiter, and finally on the 28th, Jupiter and Venus approach within 1° of one another. If it weren't for the slight orbital tilt of our solar system's planetary orbits, these conjunctions would all be occultations instead. During the nights of May 26th-27th, all three planets are visible immediately after sunset within the same 3° field of view, with the triple conjunction peaking in a triangular shape on the 26th. (For scale, the full Moon subtends about 1/2°.) The three planets appear close together for a few days more, making a line in the sky on the 30th/31st.



The image shows the configuration of Mercury, Venus, and Jupiter in the western sky just after sunset on May 26, 2013. Insets show the relative size appearance of the planets on that date.

How does this happen? Mercury and Venus race around the Sun far faster than Earth, with Mercury completing more than four revolutions around the Sun for each one that Earth makes. At the same time, Jupiter is far slower, taking 12 years to orbit just once around the Sun. Jupiter's been high in the sky during the early parts of the night, but steadily lowers throughout May as Earth continues to move away from it, approaching its maximum distance from Earth. Mercury and Venus, meanwhile, begin to move out from behind the Sun during May: Venus at the beginning of the month and Mercury in the middle.

Thus, during this triple conjunction, all three planets will be on the far side of the Sun, something that happens just 25% of the time in triple conjunctions involving Mercury and Venus! If you telescopically resolve these planets into disks, you'll see our inner worlds in a nearly-full gibbous phase. Jupiter will appear largest in terms of angular diameter, followed by Venus and lastly by Mercury. Just a year ago, during its now-famous transit, Venus took up more than a full arc-minute in the sky; during this conjunction, it will just one-sixth that angular size and less than a third the apparent diameter of Jupiter. Nevertheless, Venus will still be more than six times as bright as Jupiter during this time, outshining all night-sky objects other than the Moon. Closer conjunctions of two naked-eye planets are frequent, but getting three or more like this happens just once or twice per decade, so don't miss your chance to see it.

And speaking of occultations, The Space Place has a great kid-friendly explanation of the Venus transit and solar eclipses of 2012 at spaceplace.nasa.gov/venus-transit.

Dr. Ethan Siegel, a theoretical astrophysicist, is a professor at the University of Portland (OR) and Lewis & Clark College.

If It's Clear...

by Fulton Wright, Jr.
Prescott Astronomy Club

Celestial events (from Sky & Telescope magazine, Astronomy magazine, and anywhere else I can find information) customized for Prescott, Arizona. Remember, the Moon is 1/2 degree or 30 arc minutes in diameter. All times are Mountain Standard Time.

Sky & Telescope magazine, June 2013, p. 52, points out that Pluto is getting harder to see because it is moving further south each year till 2030 and further away from us till 2112. So, if you would like to hunt it down, sooner is better than later. It will be magnitude 14.0 at this opposition, July 1, 2013, and magnitude 16.0 in 2112. Get out there with your large telescope (12 inch) and the finder chart from the S & T article and bag it at the end of June or the beginning of July.

On Saturday, June 8, it is new Moon and you have all night to hunt for faint fuzzies.

On Sunday, June 16, the Moon is at first quarter phase and sets at 12:41 AM (Monday).

On Tuesday, June 18, about 8:30 PM, Venus (magnitude -4) and Mercury (magnitude +1) are both about 8 degrees above the west-northwest horizon. They are both about the same size (10 arc-seconds) but Venus is almost full phase and Mercury is a 1/4 illuminated crescent. This is the best time to see Mercury in the evening sky this year. If you would like to see the two of them in the daylight, Sky & Telescope magazine has an article on how to do it in the June 2013 issue on page 51.

On Wednesday, June 19, during the morning, Jupiter (magnitude -2) is occulted by the Sun (magnitude -27). This event is completely unobservable. (Why does he keep telling us about these things no one can see? Because it's there.)

On Friday, June 21, the Sun is at the summer solstice. That means short but warm nights.

On Saturday, June 22, at 7:07 PM (39 minutes before sunset), the full Moon rises, spoiling any chance of seeing faint fuzzies for the night.

On Saturday, June 29, the Moon is at last quarter phase and rises at 12:09 AM (Sunday).

Let's Party - June

by Fulton Wright, Jr. ~~~ Prescott Astronomy Club

Flashy, deep-sky objects, visible in the middle of the month, at the end of astronomical twilight (when it really gets dark, about 9:30 PM this month). This list is customized for Prescott, Arizona, should work well anywhere in the state, and be usable anywhere in the old 48 states.

Double Stars:

Algieba (Gamma Leonis), magnitudes 2.2 & 3.4, separation 4.6 arc-seconds, distance 130 light-years. 10h20m+19d50', 30 degrees up, to the West, in Leo.

Mizar (Zeta Ursae Majoris), magnitudes 2.2 & 3.9, separation 14 arc-seconds, distance 86 light-years. 13h24m+54d56', 65 degrees up, to the Northwest, in Ursa Major.

Double-Double (Epsilon Lyrae); Epsilon 1, magnitudes 5.0 & 6.1, separation 2.1 arc-seconds; Epsilon 2, magnitudes 5.3 & 5.4, separation 2.4 arc-seconds; separation of 1&2 210 arc-seconds, distance 162 light-years. 18h44m+39d40', 40 degrees up, to the Northeast, in Lyra.

Albirio (Beta Cygni), magnitudes 3.4 (yellow) & 4.7 (blue), separation 35 arc-seconds, distance 430 light-years. 19h31m+27d58', 30 degrees up, to the East, in Cygnus.

Open Clusters:

Wild Duck (M 11), magnitude 5.8, size 32 arc-minutes, distance 6.1 thousand light-years. 18h51m-06d16', 20 degrees up, to the East, in Scutum.

M 39, magnitude 4.6, size 29 arc-minutes, distance 1.1 thousand light-years. 21h32m+48d26', 15 degrees up, to the Northeast, in Cygnus.

Globular Clusters:

M 5, magnitude 5.6, size 3.5 arc-minutes, distance 24 thousand light-years. 15h19m+02d05', 55 degrees up, to the South, in Serpens.

Hercules (M 13), magnitude 5.8, size 3.4 arc-minutes, distance 23 thousand light-years. 16h42m+36d28', 65 degrees up, to the East, in Hercules.

M 4, magnitude 5.6, size 8.7 arc-minutes, distance 7.2 thousand light-years. 16h24m-26d32', 25 degrees up, to the Southeast, in Scorpius.

Galaxies:

M 83, magnitude 7.5, size 13x12 arc-minutes, distance 16 million light-years. 13h37m-29d52', 25 degrees up, to the South, in Hydra.

Sombrero (M 104), magnitude 8.0, size 9x4 arc-minutes, distance 29 million light-years. 12h40m-11d37', 35 degrees up, to the Southwest, in Virgo.

M 81 & M 82, magnitude 6.9 & 8.4, size 25x12 & 11x4 arc-minutes, 37 arc-minutes apart, distance 12 million light-years. 09h56m+69d04', 40 degrees up, to the Northwest, in Ursa Major.

Whirlpool (M 51), magnitude 8.4, size 11x7 arc-minutes, distance 27 million light-years. 13h30m+47d12', 70 degrees up, to the Northwest, in Canes Venatici.

Bright Nebulae:

Omega (M 17), magnitude 6.0, size 46x37 arc-minutes, distance 4.2 thousand light-years. 18h21m-16d11', 15 degrees up, to the Southeast, in Sagitarius.

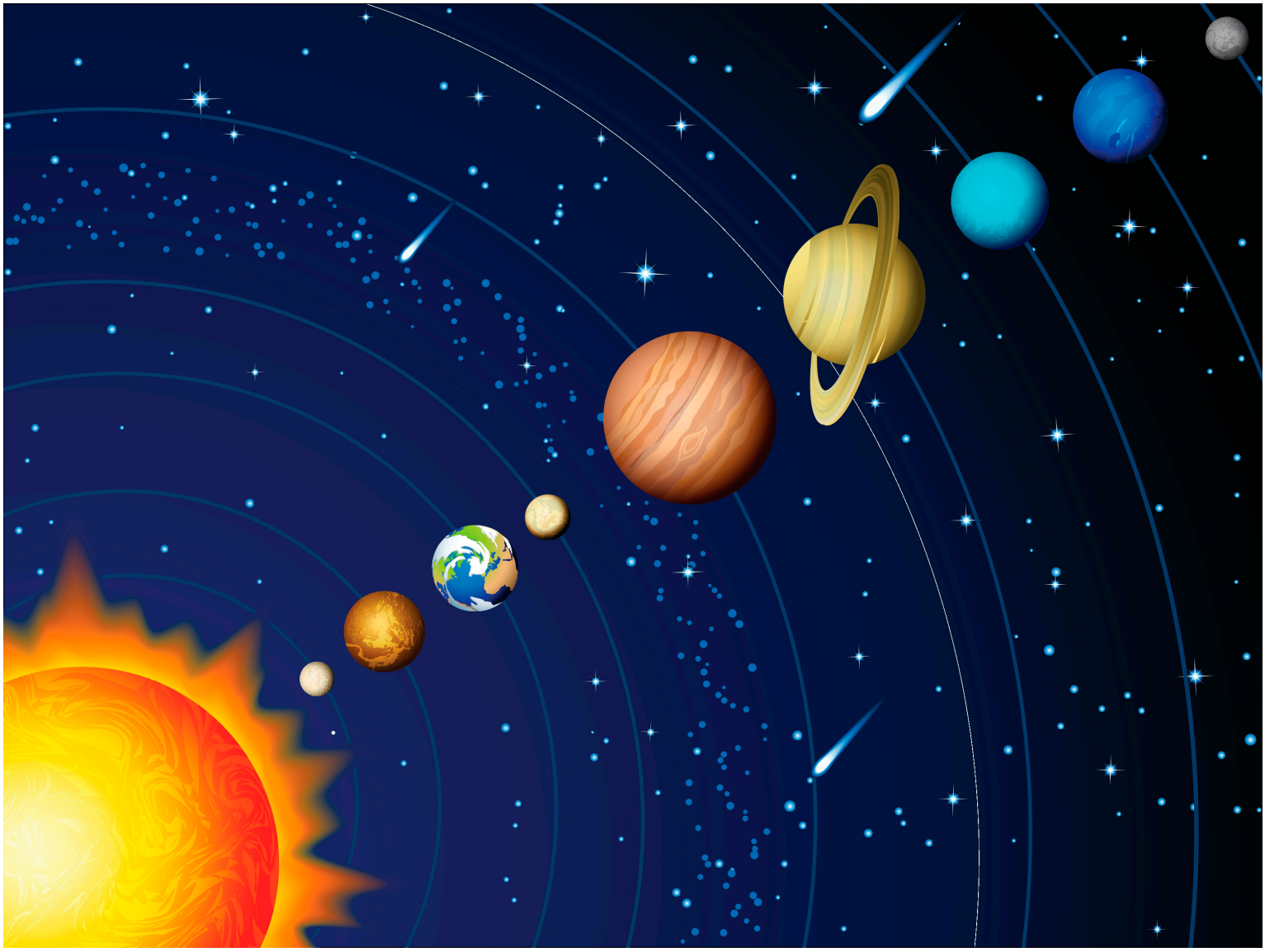
Planetary Nebulae:

Cat's Eye (NGC 6543), magnitude 8.1, size 0.4x0.3 arc-minutes, distance 3.2 thousand light-years. 17h59m+66d38', 45 degrees up, to the Northeast, in Draco.

Blinking (NGC 6826), magnitude 8.9, size 2.1 arc-minutes, distance 4.2 thousand light-years. 19h45m+50d31', 35 degrees up, to the Northeast, in Cygnus.

Ring (M 57), magnitude 8.8, size 1.4x1.1 arc-minutes, distance 1.4 thousand light-years. 18h54m+33d02', 40 degrees up, to the East, in Lyra.

Dumbbell (M 27), magnitude 7.1, size 8x6 arc-minutes, distance 1.7 thousand light-years. 20h00m+22d43', 20 degrees up, to the East, in Vulpecula.



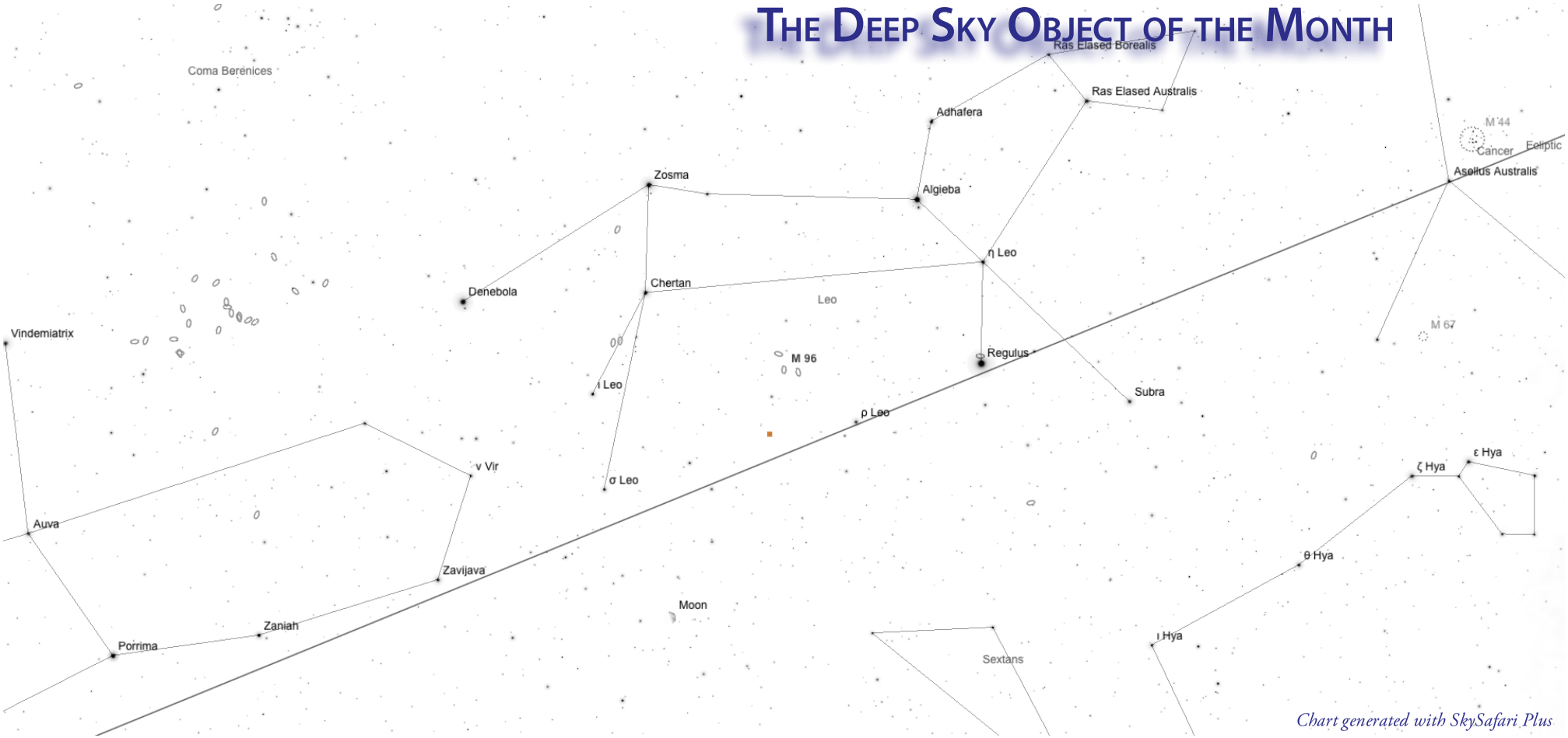
All good things must one day end, and so it is with my tenure as Newsletter Editor for East Valley Astronomy Club.

I have served the club as Board Member, Vice President, President, and as Editor for the past seven years. It is time for someone new to take the reins. Please contact one of the primary officers to volunteer for this fun and rewarding position.

I hope you have enjoyed the newsletter!

Feel free to contact me with any questions you may have at:
news@evaconline.org

The Deep Sky Object of the Month



Messier 96 (NGC 3368) is a conspicuous spiral galaxy in Leo, and forms a pair with M 95 near the middle of the constellation. M 96 is the eastern member of this fine 40′-wide pair.

M 96 was discovered, along with M 95, by Pierre Mechain in 1781, and catalogued by Charles Messier that same year. It was among the first 14 "spiral nebulae" listed by Lord Rosse in 1850.

M 95, 96, 65, and 66 are all members of the same Leo I group of galaxies. M 96 appears to be the brightest, with a visual magnitude of 9.2. It is a bright oval, 6′ x 4′ across, containing a brilliant core with a non-stellar nucleus. Its periphery is irregular both in brightness and in shape, and bulges toward the southeast. It has a prominent dust lane which extends through the nucleus.

One bright supernova, SN 1998bu, has been observed in M 96.

The bright inner disk of M 96 is composed of an older, yellow stellar population, which ends slightly beyond a ring of blue knots. These knots are probably clusters of hot, young stars. This galaxy contains a significant amount of dust, which appears more concentrated on its near side. M 96 is inclined by 35° to our line of sight, and rotates with its spiral arms trailing.

M96 (NGC 3368) Spiral Galaxy in Leo

RA: 10h 47m 29.02s Dec: +11° 44′ 49.1″ Size: 7.8′ x 5.2′ Magnitude: 9.30

As one of the many benefits to becoming an East Valley Astronomy Club member, we have the following telescopes available for monthly check-out to current EVAC members:

8 inch Orion manual Dobsonian
8 inch Orion Intelliscope Dobsonian
60mm Tasco Alt-Azimuth Refractor

For more information, or to check out one of these scopes, please talk to:

David Hatch
EVAC Properties Director
480.433.4217

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Please send your contributions, tips, suggestions and comments to the Editor at: news@evaconline.org Contributions may be edited. The views and opinions expressed in this newsletter do not necessarily represent those of the East Valley Astronomy Club, the publisher or editor.

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