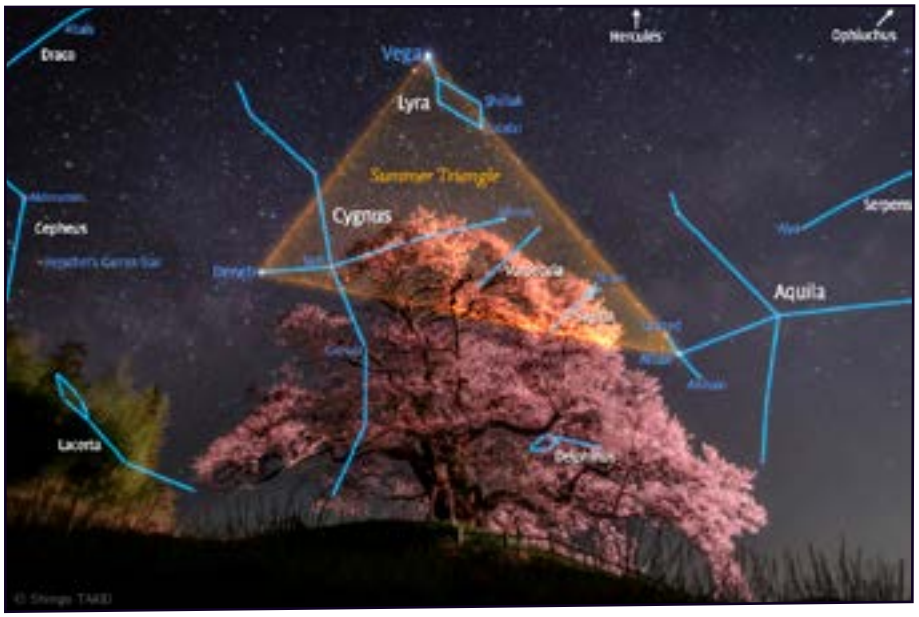
Volume 32 Issue 8

August 2018

The Observer



Summer Triangle Over Japan - APOD May 6, 2015
Credit Shingo Takie (TWAN)

Upcoming Events:

EVAC Star Party - August 4

Public Star Party - August 10

EVAC Star Party - August 11

EVAC Monthly Meeting - August 17

Check out all of the upcoming club events in the Calendars on page 13.

From the Desk of the President

by Tom Mozdzen

Our Club membership is in good health as our total has reached the 120 level. Facebook participation is also good at 90+ members as well. To keep abreast of the latest club announcements or Arizona astronomy related topics, subscribe to evac-announce and az-observing. Az-observing is a two-way mail system meaning that subscribers can post and read messages. Evac-announce is a one-way system meaning that members get messages but do not send messages.

Now is a good time to see most of the bright planets: Venus, Jupiter, Saturn, Mars, and Earth. Uranus and Neptune can also be spotted with a little bit of effort, a star map, and a telescope. Mars is relatively close to the earth this month, but the current dust storm is hiding most surface details, however the polar caps of Mars seem to be identifiable. Perhaps the storm will abate while Mars is still relatively close.

GRCO can still use more help. Please contact Claude if you think you could spare a weekend evening helping out in any capacity.

More organizers for the Christmas party (or other club social events) would be quite welcome. Please

Inside this Issue:

From the Desk of the President

Continued from page 1

contact me if you'd like to assist. It is also a good way to meet other club members.

Ted Blank gave a wonderful talk last meeting, and it was quite inspiring to learn about the assistance amateur astronomers gave to NASA to help determine the precise location of New Horizons' next Kuiper Belt target, MU69.

The August featured talk will be given by EVAC club members who have constructed their own observatories. They will give us information about how they built them, the equipment inside, and how they use their observatories.

Until next month,

Tom Mozdzen

EVAC General Meeting Notes for July 2018

by Martin Pieczonka

Tom Mozdzen started the meeting by inviting visitors to stand. We had several visitors and very good membership turnout for this meeting. Lana Young, our Treasurer reported that we now have 103 paid members and 23 Astromical League members. Our income for June exceeded our expenses by $269.

Our featured speaker was Ted Blank. Ted's presentation covered many of the aspects of the New Horizons mission to Pluto. The highlights of the presentation were: The New Horizons interplanetary probe achieved the fastest speed of any spacecraft thus far. New Horizons flew past the orbit of our moon in only 9 hours, and traveled more than 3 billion miles to rendezvous with Pluto in just nine years. New Horizons also buzzed by Pluto at a distance of just 8,000 miles, taking photos and gathering scientific data as quickly as possible, then slowly sent the data back to Earth over the next year. Pluto also turned out to be full of surprises - an active surface, an atmosphere with multiple layers, and a giant heart-shaped "iceberg" made of frozen nitrogen.

As an encore to the discoveries at Pluto, New Horizons will have traveled another one billion miles by the end of this year for its New Year's day rendezvous with Kuiper Belt object (KBO) 2014 MU69. That flyby will be the most distant in the history of space exploration. Ted also shared his experience as part of the small group deployed by the New Horizons team to Africa and a remote part of Patagonia to be in just the right place at just the right time to catch 2014 MU69 occult a distant star so as to capture important data to help mission flyby planners better determine the spacecraft trajectory and understand the size, shape, orbit and environment around MU69.

The next EVAC meeting is on Friday, August 17th. We look forward to seeing everyone!

The Backyard Astronomer

by Bill Dellinges (August 2018)

Summer Triangle Stars' Intrinsic Brightness

When you look at the three stars comprising the asterism known as the Summer Triangle, you can easily tell how they rate in brightness. Vega (25 light years away (LY)) in Lyra is obviously the brightest at apparent magnitude (m) +0.03. Next is Altair (16 LY) in Aquila at magnitude +0.77. The faintest star of the trio is Deneb (~1500 LY) in Cygnus, magnitude +1.25. But these apparent magnitudes don't really tell us how big or bright they really are because a small dim star would appear bright if close to Earth and conversely a bright star would appear dim if very distant. Here's where we can use the absolute magnitude (M) system to level the playing field. It works like this – imagine putting all the stars at the same distance from Earth, say 10 parsecs* (32.6 light years, LY). Then you'd be able to better assess the intrinsic brightness of each. It uses parsecs for distance, as professional astronomers prefer that distance unit over light years. I like to imagine a circle around Earth with a radius of 32.6 light years to allow enough stars to be placed shoulder to shoulder along that perimeter. That's just the way my mind thinks.

To get used to this scale, lets use our Sun as an example. The Sun's apparent magnitude is -27.72. That's REALLY bright, right? Now let's move it out to that 32.6 light year circle. Its apparent magnitude is now only +4.8! So, our glorious Sol, which we wouldn't normally look at without a solar filter, would be difficult to see from a modestly light polluted night sky. I love this scale! It's fun and interesting to learn how some of our favorite stars rank. On this scale, Sirius (-1.4), our brightest night sky star, is now a magnitude +1.4 star because it was pushed back from 8.6 LY to 32.6 LY. Remember, in astronomy, the bigger a positive number, the dimmer it is. The bigger a negative number, the brighter the star is.

Now back to the Summer Triangle. Recall that the order of brightness of its stars were (bright to dim) Vega, Altair, then Deneb. If we want to determine their relative intrinsic brightness, we need to place them next to one another at the same distance – let us choose 10 parsecs (32.6 LY). The distance doesn't matter if all the stars are at that same distance. Now we see them in their true "light." In the absolute magnitude system, Deneb is now a magnitude -7.2 star, Vega +0.6, and Altair +2.3.

You can see that Deneb must be an extremely luminous star – a real blowtorch. Deneb is a spectral class A2Ia blue-white supergiant. It puts out as much energy in one second as the sun does in 24 hours. It's 200 times the diameter of our Sun, twenty times the mass and over 50,000 times as luminous. Earth would need to be 400 Astronomical Units away from Deneb for humans to survive.

If you would like to play around with this concept, one form of the distance modulus equation is M = m+5-5 log r where M is absolute magnitude, m is apparent magnitude and r is distance in parsecs. I also found online this neat magnitude calculator: http://www.mesacc.edu/~kev2077220/flash/magcalc.html

So, don't feel sorry for Deneb, the Summer Triangle's dimmest star. It would fry your fanny off once you got within ten times the Sun – Pluto distance from it.

*A parsec is the distance a star would be if it exhibited a parallax of one arc second. Astronomers use parsecs to determine the distance to stars via trigonometric means (observing the angle of background stars relative to the target star from two points in Earth's orbit around the Sun). As it turns out, no star is near enough to exhibit a parallax of one arc second. The nearest star, Proxima Centauri, shows a parallax of 0.78" arc seconds which equal about 4.16 LY (1/0.78" = 1.277 parsecs x 3.26 LY = 4.16 LY). By convention, astronomers chose the distance of 10 parsecs for the absolute magnitude system.

Let's Party for July

Astronomical objects for public (and private) star parties, arranged by type.

by Fulton Wright, Jr. Prescott Astronomy Club

Flashy, deep-sky objects, visible in the middle of the month, at the end of astronomical twilight, 8:50 PM this month, (when it really gets dark). This list customized for Prescott, Arizona, should work well anywhere in the state, and be usable anywhere in the old 48 states.

Double Stars (2 or 3 stars, close together)

*name: Beta Cygni
--alt name: Albireo, SAO 87301
--magnitudes 3.4 (yellow) & 4.7 (blue)
--separation: 35 arc-seconds
--R.A.: 19hr 31min
--dec.: +27deg 58'

*name: Zeta Ursae Majoris
--alt name: Mizar, SAO 28738
--magnitudes: 2.2 & 3.9
--separation: 14 arc-seconds
--R.A.: 13hr 24min
--dec.: +54deg 56'

*name: Epsilon Lyrae
--alt name: Double-Double, SAO 67310 & 67315
--magnitudes: 5.0 & 6.1, 5.3 & 5.4
--separation: 2 arc-seconds, 2.5 arc-seconds
--R.A.: 18hr 44min
--dec.: +39deg 40'

*name: 70 Ophiuchus
--alt name: SAO 123107
--magnitudes: 4.0, 6.0
--separation: 7 arc-seconds
--R.A.: 18hrs 06min
--Dec.: +02deg 30'

Open Clusters (about 50 bright stars)

*name: Collinder 399
--alt name: Coat-hanger
--magnitude: 3.6
--size: 90 arc-minutes
--R.A.: 19hr 25min
--dec.: +20deg 11'

*name: IC 4665
--alt name: ---
--magnitude: 4.2
--size: 70 arc-minutes
--R.A.: 17hr 46min
--dec.: +05deg 43'

*name: NGC 6633 (use wide field)
--alt name: ---
--magnitude: 4.6
--size: 30 arc-minutes
--R.A.: 18hr 27min
--dec.: +06deg 30'

*name: M 7
--alt name: NGC 6475
--magnitude: 3.3
--size: 80 arc-minutes
--R.A.: 17hr 55min
--dec.: -34deg 47'

Globular Clusters (about 200,000 dim stars)

*name: M 22
--alt name: NGC 6656
--magnitude: 5.1
--size: 32 arc-minutes
--R.A.: 18hr 38min
--dec.: -23deg 53'

*name: M 5
--alt name: NGC 5904
--magnitude: 5.6
--size: 3.5 arc-minutes
--R.A.: 15hr 19mmin
--dec.: +02deg 05'

*name: M 13
--alt name: Hercules Cluster, NGC 6205
--magnitude: 5.8
--size: 20 arc-minutes
--R.A.: 16hrs 42min
--Dec.: +36deg 28'

Let's Party for July

Continued from page 4

*name: M 4
--alt name: NGC 6121
--magnitude: 5.6
--size: 8.7 arc-minutes
--R.A.: 16hr 24mmin
--dec.: -26deg 32'

Galaxies (about 200,000,000 very dim and distant stars)

*name: M 82 and M 81
--alt name: Bode's nebula, NGC 3031 and NGC 3034
--magnitudes: 6.8 and 8.1
--size: 21 x 11, 11 x 5 arc-minutes, 37 arc-minutes apart
--R.A.: 9hrs 55min
--Dec.: +69deg 23'

*name: M 51
--alt name: Whirlpool Galaxy, NGC 5194
--magnitude: 8.0
--size: 14 x 12 arc-minutes
--R.A.: 13hr 30min
--Dec.: +47deg 12'

*name: M 106
--alt name: NGC 4258
--magnitude: 8.3
--size: 17 x 7 arc-minutes
--R.A.: 12hr 20min
--dec.: +47deg 12'

*name: M 104
--alt name: NGC 4594
--magnitude: 8.2
--size: 8 arc-minutes
--R.A.: 12hrs 40min
--Dec.: -11deg 37'

*Bright Nebulae:

*name: M 17
--alt name: Omega Nebula, Swan Nebula, NGC 6618
--magnitude: 6.0
--size: 46 x 37 arc-minutes
--R.A.: 18hr 22min
--dec.: -16deg 10'

*name: M 8
--alt name: Lagoon Nebula, NGC 6523
--magnitude: 6.0
--size: 90 x 40 arc-minutes
--R.A.: 18hr 05min
--dec.: -24deg 23'

*name: M 20
--alt name: Trifid Nebula, NGC 6514
--magnitude: 6.3
--size: 29 x 27 arc-minutes
--R.A.: 18hr 04min
--dec.: -23deg 02'

***Planetary Nebulae:

*name: M 57
--alt name: NGC 6720, Ring Nebula
--magnitude: 8.8
--size 1.4 x 1.1 arc-minutes
--R.A.: 18hr 54min
--dec.: +33deg 02'

*name: NGC 6543
--alt name: Cat's Eye Nebula, Caldwell 6
--magnitude: 8.1
--size: 0.4 arc-minutes
--R.A.: 17hrs 59min
--Dec.: +66deg 38'

*name: NGC 6826
--alt name: Caldwell 15, Blinking Planetary Nebula
--magnitude: 8.9
--size: 2.1 arc-minutes
--R.A.: 19hr 45min
--dec.: +50deg 31'

The Moon as an Optical Test

by Don Wrigley

The Moon as an Optical Test

One generally thinks in terms of double stars when attempting to assess the optical quality of a particular telescope. The guidebooks are rife with such comments as "mu Microscopii is an excellent test for a two inch refractor", or some such thing; but the only problem is the star pair I wish to test my optics on always seems to be located in some obscure constellation that I can't even locate on the star chart, let alone the sky. My solution to the problem is to test my telescope on the one object that I never have much trouble finding, and that object is - you guessed it - the Moon!

Actually, I find the moon to be an excellent testing ground for any telescope, as long as you bear in mind the fact that any time you point your telescope through the atmosphere you are testing the seeing conditions as well as the telescope. The Moon seems ideally suited to do both jobs: it has an almost unlimited number of progressively smaller details to be resolved, and it provides us with objects that are consistantly viewable form month to month, so that we can have an objective means to determine seeing conditions.

It is interesting to note that the amount of detail visible on any given night is a product of several factors, of which aperture can play a somewhat contradictory role. Greater aperture is associated with increased resolution, but it can also accentuate the problem of turbulence, which will diminish the clarity of the image. Sometimes, it seems, smaller is better. The only way to really tell which aperture is optimal on a given night is to develop a feel for the amount of detail that one can expect to see with any given aperture. With this in mind, let's look at a short list of objects that are good tests for a variety of telescopes.

TRIESNECKEER: This is a relatively small crater (14 miles across) that is conspicuous by its location near the center of the lunar disc. It is generally visible near the terminator at first quarter, and is noted for a fine system of rilles emanating near its eastern wall and crisscrossing along the surrounding plain. A good 3 inch refractor will show the main structure, but good seeing and a somewhat larger aperture are needed to see the more intricate details. This is a good test for smaller telescopes.

PLATO AND ARCHIMEDES: These two large craters (70 and 52 miles across) lie along the northern and southern borders, respectively, of the Mare Imbrium, and possess smooth lava filled bottoms, each containing several small craters that are a real challenge for the small to medium telescope. I have not been able to detect any of them in my 3 inch refractor, but my 8 inch reflector reveals four of them in Plato and three in Archimedes. The small size of these craters represents a challenge for any amateur telescope.

THE HADLEY RILLE: Located near the base of Mount Hadley, due east of the crater Achimedes, this meandering rille is only about one kilometer wide and can be difficult to spot. See if you can tell where it turns sharply northwest, at the base of the Hadley Delta. This is the exact position of the Apollo 15 landing site, and the easiest Apollo site to pinpoint so accurately.

RIMA BIRT: This challenging little formation is relatively easy to find, but can be somewhat difficult to see in smaller instruments. It can be found near the prominent feature known as the straight wall, a 70 mile long cleft located in the Moon's southern hemisphere, which becomes visible a day or two after the first quarter. West of the straight wall is the crater Birt, a small bowl shaped crater whose smaller companion, Birt A, just touches its east rim, facing the straight wall. Just west of Birt is a narrow rille, which runs northerly, and is about half the length of the straight wall. Its unique feature is the way it connects two very small craters, Birt E and Birt F. I find this feature quite easily in my 8 inch reflector, but have only rarely seen it in my 3 inch refractor. I'd be interested to hear how others see it in their scopes.

HESIODUS A: One night or two after viewing the straight wall, look just south and west of the wall and find the large, old, flooded crater Pitatus, whose interior is marked by several small rilles. West of Pitatus, and attached to its western wall is a considerably smaller, but similarly formed crater called Hesiodus. On the southwest rim of Hesiodus is another much smaller crater called Hesiodus A. The unique feature of Hesiodus A is the ringlike inner crater exactly centered in the crater, giving it a double walled effect. You might have to wait until the terminator has moved considerably beyond this area before the inner ring becomes visible in its entirety.

The Moon as an Optical Test

by Don Wrigley

Continued from page 6

I have seen it barely in my 3 inch refractor, and considerably better in an 80mm refractor, though it has been quite elusive in larger reflectors. I suspect that the greater contrast afforded by refractors is critical for this object.

LUNAR DOMES NEAR HORTENSIUS: Just due west of the great crater Copernicus, and visible one or two nights after Copernicus becomes visible, there are a number of lunar domes which can be seen in small refractors, but which can present a challenge to even larger telescopes. Most prominent are a series of domes near the crater Hortensius, which show perfect little craterlets at their summits. I have seen these craterlets clearly in my 3 inch refractor, but have had difficulty spotting them in my 8 inch reflector. They require good seeing, and nearly perfect placement of the terminator in order to be seen at their best. Catching them in the right light may require careful searching over a period of several lunations, but the sight of them is well worth the effort, for they serve as gentle reminders that the race is not always to the swift, and he who tries with the most aperture does not always win.

Last Quarter Moon on August 4 at 14:18

New Moon on August 11 at 05:58

First Quarter Moon on August 18 at 03:48

Full Moon on August 26 at 07:56

Find Out What's Happening – Join EVAC-Announce List

If you would like to receive email announcements about EVAC meetings and activities please join the EVAC–Announce mailing list. Click on the link below to subscribe. Enter your full email address in the box titled User Options and press OK. You will receive a confirmation email. Your privacy is respected by EVAC and we will never sell your email address, or use it for non-club relevant solicitations. This mailing list is designed for communication from EVAC, and does not enable users to respond to the message. If you wish to contact club officers, please use the list on the Contact-Us tab. To subscribe to the EVAC–Announce mail group click: http://www.freelists.org/list/evac-announce. To unsubscribe use the same link, enter your email address and select Unsubscribe from the "Choose An Action" list. Another list that may be of interest is AZ-Observering. To subcribe click http://www.freelists.org/list/az-observing.

EVAC also has a Facebook Group where members may share ideas, photos, and Astronomy related information. To join: EVAC Facebook Group.

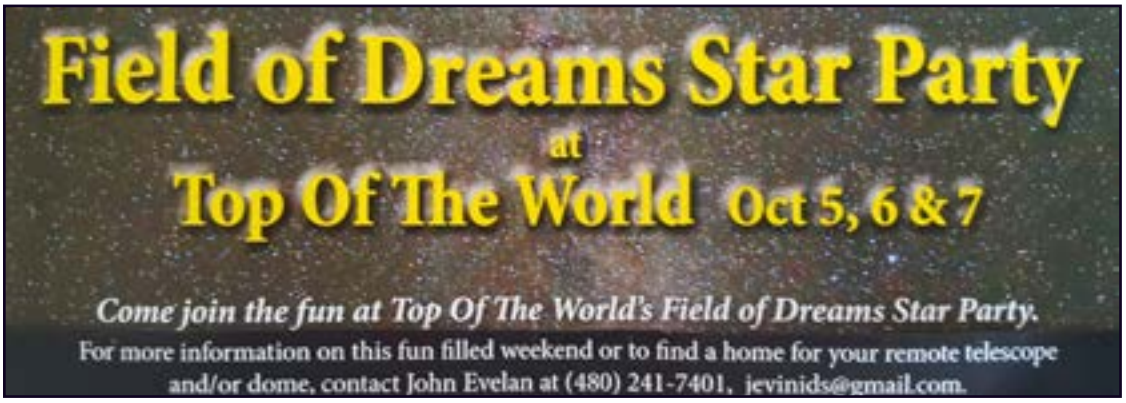
Looking for that perfect weekend activity?

Why not resolve to getting involved?

Contact Claude Haynes to join the staff at GRCO

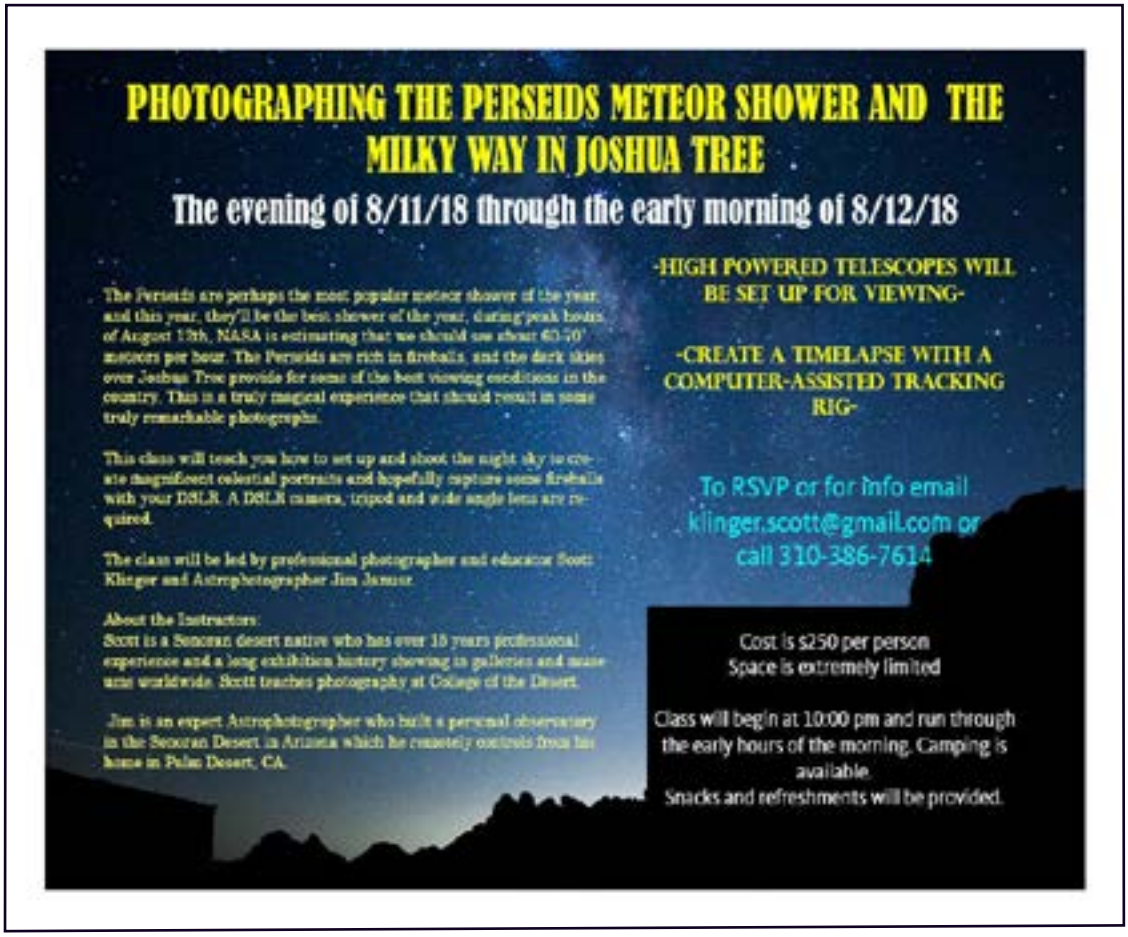
Email: grco@evaconline.org

Classified Ads



SkyPi Observatory has the darkest, most pristine, sky in the continental U.S. ! At the site: Bathroom facilities, running water, 5 pads w110v, wifi, acres of grassy camp sites. From the site: Very Large Array 42mi east, The Astronomical Lyceum 55mi east. MRO Observatory 80mi east.

Contact John Evelan: 480-241-7401.
Email: jevinids@gmail.com



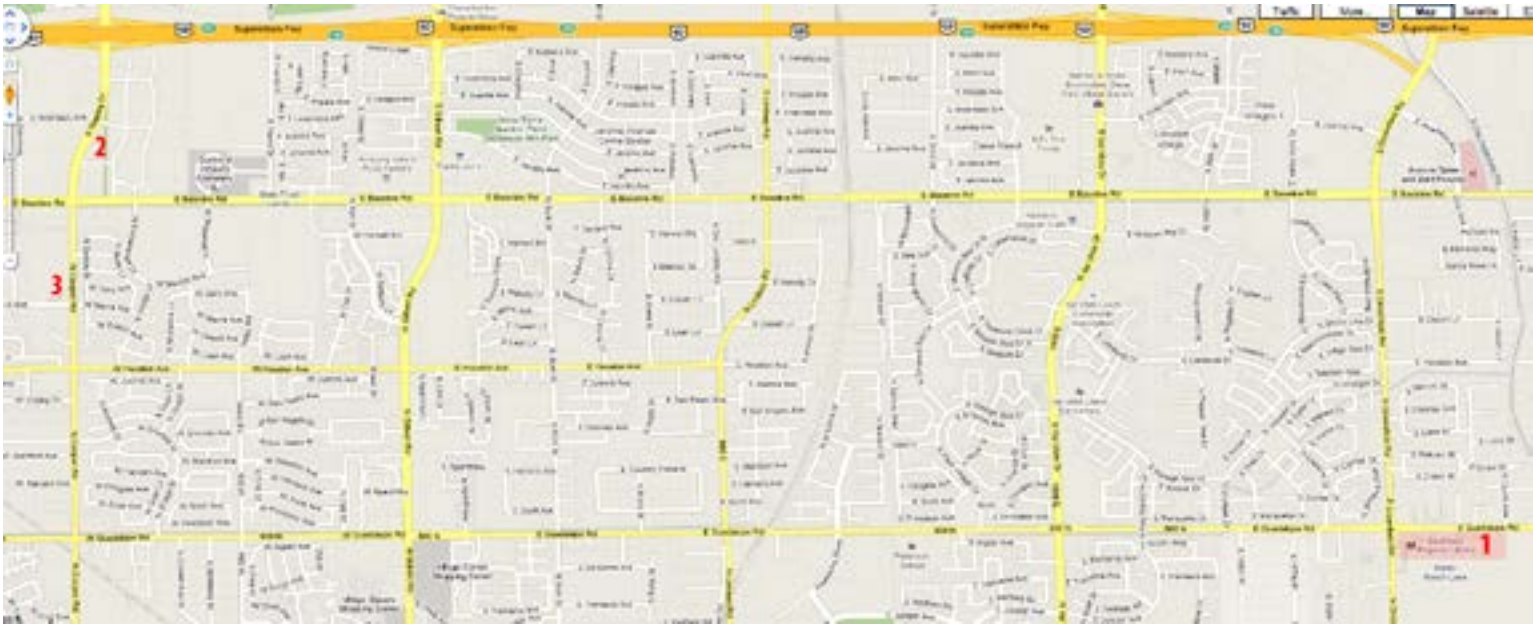
Upcoming Meeting

August 17
September 21
October 19
November 16
December 21
January 18
February 15
March 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.

Visitors are always welcome!



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

August 2018

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	

August 4- EVAC Star Party

August 10- Public Star Party

August 11 - EVAC Star Party

August 17 - EVAC Monthly Meeting

September 2018

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

September 1 - EVAC Star Party

September 8 - EVAC Star Party

September 14 - Public Star Party

September 21 - EVAC Monthly Meeting

East Valley Astronomy Club -- 2018 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

☐ **$15.00 Individual** July through September

☐ **$17.50 Family** July through September

☐ **$22.50 Individual** April through June

☐ **$26.25 Family** April through June

☐ **$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

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Name: ☐ Phone: ☐

Address: ☐ Email: ☐

☐ Publish email address on website

City, State, Zip: ☐ URL: ☐

The Observer is the official publication of the East Valley Astronomy Club. It is published monthly and made available electronically as an Adobe PDF document the first week of the month.

☐ General Observing ☐ Cosmology

☐ Lunar Observing ☐ Telescope Making

☐ Planetary Observing ☐ Astrophotography

☐ Deep Sky Observing ☐ Other

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.

The Observer is the official publication of the East Valley Astronomy Club. It is published monthly and made available electronically as an Adobe PDF document the first week of the month. 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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www.evaconline.org

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