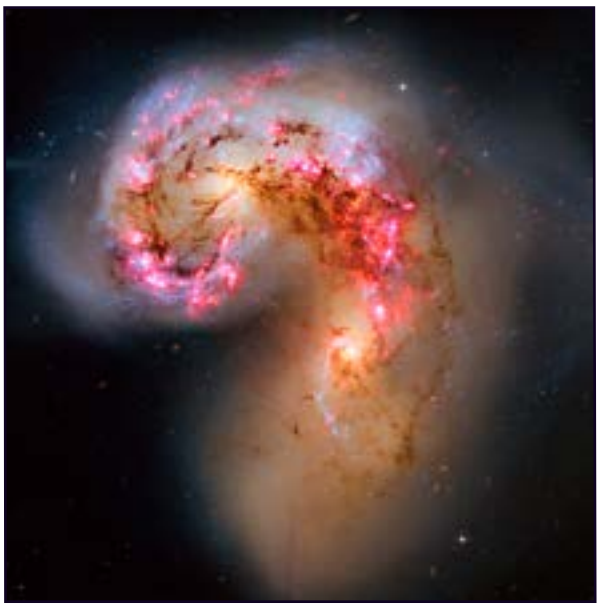
Volume 35 Issue 3

March 2021

The Observer



The Antennae Galaxies in Collision
Image Credit: Hubble Legacy Archive, NASA, ESA

Upcoming Events:

All meetings will be held online.

EVAC Meeting via Zoom - March 19th

Nevedita Mahesh - Arizona State University " A Farside Array for Radio Science Investigations of the Dark Ages and Exoplanets".

Inside this Issue:

From the Desk of the President
by Gordon Rosner

Greetings from your President.

As always, I sure hope everyone is still doing well and keeping healthy. And again, please remain vigilant as we all have hopes that things will get much better later this year and allow us to get back to in-person events. That sure is our hope. But, remember that all EVAC in-person group activities still remain cancelled. As always, check our club website for the latest information.

As a final reminder, 2021 club dues are due. You are the most important part of our club. By renewing your membership or joining as a new member, you become part of a premier astronomy club and keeping it strong. Go to our club website on the JOIN page and renew or join online or by mail.

You'll notice that this newsletter now contains a new feature, a member article. This is an example of a one page or so article on any astronomy related topic from our membership. As I mentioned in last month's newsletter, tell us about your equipment, how you got started in astronomy, your road to astrophotography, outreach programs you have done, any observatories you have visited or any other

From the Desk of the President

by Gordon Rosner

Continued from page 1

astronomy related subject. Remember this is YOUR club. If it was interesting to you, it will be interesting to all of us. So, become a published astronomer and submit a member article to me via the 'Contact President' link on our website. Fun!

Our Facebook page continues to be our vehicle to get together without being together. Visit it to see the latest astrophotography successes and descriptions on how they got there. It also includes general astronomy news and help with equipment. And you just might find that scope for sale there that you were thinking about.

During our January and February online General Meetings I mentioned a five part series of online presentations available to us titled "Introduction to Amateur Astronomy". This series is presented by the Kalamazoo Astronomical Society in Michigan and uses the online Zoom format just as our club meetings do. The first presentation was on 23 January titled "Our Place Among the Infinities". The second was two weeks later on 6 February titled "Discovering the Night Sky". And the third was again two weeks later titled "Binocular Basics" on 20 February. I watched all three and was very impressed by those two-hour presentations. Very well done with excellent graphics and a very knowledgeable live presenter. I highly recommend that you watch this series. The next one is titled "Telescope Tutorial" on 6 March and the last one will be on 20 March titled "The Art of Astrophotography". I get quite a lot of questions about which telescope to buy and how to get started in astrophotography. These presentations are sure to address your questions and get you ready to make your own decisions. This series runs on Saturday morning 11:00AM to 1:00PM AZ time. If you haven't already, you must register for these by going to their website at kasonline.org and can also get more information there. Once registered, they will then send you the link to each online Zoom presentation a few days before.

Lowell Observatory did an online presentation series 13-18 February titled "I Heart Pluto Festival 2021" celebrating Pluto's discovery 91 years ago. If you missed these, you can watch them on YouTube. One presentation standing out was by Dr. Allen Stern titled "Why Pluto IS a Planet". This was a very thought provoking topic that described the International Astronomical Union's definition of a planet and their controversial demotion of Pluto. Dr. Stern discussed the subsequent counter definition by planetary scientists called the Geophysical Planet Definition that simplified planet definition to 1) Hydrostatic equilibrium (round) and 2) But not enough mass to support nuclear fusion in its interior. And provides an interesting "Star Trek" test that will certainly get you thinking. Since every astronomy enthusiast has been asked about Pluto's demotion, this presentation will further fill your "Pluto Tool Bag".

An upcoming event we will be hearing more about is the "International Dark Sky Week". Spanning 5-12 April, this event is sponsored by the International Dark Sky Association. Watch out for more information on this event or by visiting the website at idsw.darksky.org.

Everyone should remember that live member presentations are always a fun and valuable part of our monthly online Zoom meetings. These are about ten minutes long regarding any astronomy related subject you would like to share with the club. I encourage you to do one of these. Just let me know you would like to do one by using the 'Contact President' link near the bottom of the main page of our EVAC website. I'll then get back with you and we can discuss. If needed, we can also do a dry run sometime before the actual meeting.

Our next online Monthly General Meeting will be on Friday, 19 March starting at 7:30PM. The main presentation will be by Nivedita Mahesh of Arizona State University titled "A Farside Array for Radio Science Investigations of the Dark Ages and Exoplanets". By "Farside Array", Nivedita means the far side of the Moon and not a presentation of classic Gary Larson Far Side cartoons! Although that would be fun also.

As always, a reminder that there are three ways to receive a notification link via an email to register for the next online monthly General Meeting. You only need to do one of the following and only once to continue to receive the email on how to register for the upcoming meetings:

1. Send a one-time email request to vp@evaconline.org.
2. Sign up for the evac-announce@freelists.org mailing list.
3. Sign up for the AZ-observing@groups.io mailing list.

Another way to get notifications of any special online events and how to register, is to join the EVAC Facebook

From the Desk of the President
by Gordon Rosner

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page and occasionally check for special event announcements. These will also be announced during our monthly General Meetings. I'll 'see you' at our 19 March meeting.

"Keep your feet on the ground and keep reaching for the stars."

Your President, Gordon Rosner

EVAC Zoom Meeting Notes for 2021 February 19th, at 07:30 P.M. AZ Time
by Wayne Thomas

Meeting Minutes.

President Gordon Rosner welcomed those in the "audience" to the virtual meeting at 7:33 p.m. His first slide presented the meeting agenda:

- Welcome
- Introductions
- Dues are Due
- Club News
- Member presentation: Bruce Barron: "Simple Orbital Simulations"
- Featured Speaker: Dr. Gerard van Belle, Lowell Observatory: "Present Research Capabilities & Future Plans"

After his welcome, Gordon introduced the leadership team in charge of keeping EVAC running.

Club dues are due. Individual membership is $30, and family membership is $35. You may renew either online at "evaconline.org" or by mail. The mailing address is on our website with the membership form.

Under club news, he reminded us that all club sponsored events with personal contact are still cancelled. Member presentations are always welcome. A presentation can be made on any aspect of astronomy the member is interested in. Send Gordon a note if you are interested in making one. If you would like to write an article for the Observer, our newsletter editor, Marty, would appreciate one. Submit a draft to the president for review before submitting to Marty. Our monthly meetings on Zoom are being recorded and each can be viewed from its link on the EVAC website.

Sponsored by the International Dark Sky Association, "Discover the Night" will be the week of April 5th.

The Kalamazoo Astronomical Society is offering a class "Introduction to Amateur Astronomy." It meets online every other Saturday from 1:00 p.m. to 3:00 p.m. EST (11:00 a.m. to 1:00 p.m. MST). To attend register at www.kasonline.org.

Our next regular club meeting will be at 7:30 p.m. Friday March 19 via Zoom. Nivedita Mahesh of Arizona State University will speak on "A Farside Array for Radio Science Investigations of the Dark Ages and Exoplanets." Register for the meeting in the usual way by the link in the invitation email.

Gordon introduced Bruce Barron who presented Simple Orbital Simulations. He used the program Matlab. His simulations demonstrated how speeding up a satellite in orbit around the Earth causes its orbital period to increase thus slowing it down. He explained the Gemini 4 problem of speeding up to catch up to the intended target for docking actually caused the space craft to get further behind. He then demonstrated how slowing down the spacecraft would allow it to overtake the target.

Tom Mozdzen then introduced the featured speaker, Dr. Gerard van Belle, from Lowell Observatory and the Naval Precision Optical Interferometer (NPOI).

Gerard began by describing the Naval Precision Optical Interferometer (NPOI). It has 3 arms in a Y configuration which can have siderostats located from 10 meters apart up to 232 meters apart. This provides capability to resolve bright objects (to 6th magnitude) to a few milliarcseconds. The apertures are 12 centimeters and the configuration can accommodate up to 6 of the siderostats. Recently NPOI has acquired 1 meter telescopes which will be sensitive down to 9th magnitude.

The next generation for the NPOI will include fiber optics, electron multiplying CCD and adaptive optics. With speckle imaging, a resolution of about 40 milliarcseconds should be achievable.

EVAC Zoom Meeting Notes for 2021 February 19, at 07:30 P.M. AZ Time

by Wayne Thomas

Continued from page 3

Another project is to develop a satellite based interferometer. This would include a 3-D printer creating the booms of the interferometer in space after the satellite is in orbit.

The Lowell Observatory has recently created the Giovale Open Deck Observatory on Mars Hill. This directly supports Lowell's public outreach programs. On the horizon is the Astronomy Discovery Center with its Universe Theater and a rooftop open sky planetarium. This facility was started with a grant from the Marley Foundation.

Q&A:

Was NPOI able to image Betelgeuse when it was faint? No, the NPOI was offline.

How long are the arms of Optimast planned to be in space? Each arm would be about 10 meters accurate to 0.25 microns each. Such a satellite should be relatively inexpensive of the order of $70 million.

How faint could the Discovery Channel Telescope see using Speckle? It should get to 15.5 magnitude. This would allow investigating M-dwarf stars.

Could adaptive optics improve planetary imaging in addition to the video technique currently in use? AO works well with large apertures greater than 10 to 20 cm. For smaller instruments, a tip/tilt mirror should be adequate. Also, CMOS cameras will provide higher frame rates.

Will the beam splitter reduce resolution or intensity at the other frequency? For broad band light, the intensity is greatest when the path lengths are equal.

Are there Adaptive Optics packages, or must AO be tuned for each telescope? There are many good vendors. Expect to spend 60K to 75K per installation.

Where is the new public observatory located? The Giovale Open Deck Observatory (GODO) is located where the water tanks used to be, on a high spot on Mars Hill.

Where did you obtain your optical benches? A 1 meter Optical Bench can be obtained from Vere or Base Lab Tools. However, the question is how soon do you want it or do you want the highest quality?

Where would you want an orbiting interferometer to be located in space? The best location for observing Near Earth Asteroids would be from L1, the stable position between the Sun and the Earth. L2 would be good too except for the eclipses which occur. L2 is on the opposite side of the Earth from the Sun. Observing NEAs from space would provide size and possibly mass if they are double. This in turn would infer composition.

How does the resolution of NPOI compare to that of the Giant Magellan Telescope? NPOI has the capability of positioning its mirrors up to 400 meters apart. However, its current limiting magnitude is in single digits. Large telescopes are good for faint, fuzzy and far away objects, but they cannot look at bright objects. Altair was seen by NPOI to be a squashed sphere when observed by NPOI.

Are there plans to place an interferometer on the Moon? Yes, but. The Moon would be a stable platform compared to a satellite in orbit.

Can current technology be used to observe a distribution of stars such as a globular cluster? Compared to an individual star or a star with planets, observing a collection of stars is much more difficult. That is likely a future capability.

Are there plans to add auto guiding to the telescopes of the GODO? The Plane Wave telescopes have such good tracking that auto guiding is not required. The subject of providing imaging service has been discussed. However, with the Covid pandemic, that is on hold.

What is the value of the atmosphere coherence time? 5 to 10 milliseconds.

Would speckle imaging be used in space? Speckle is not part of the space interferometer proposal. Space imaging can be less rigid than ground-based telescopes. In-space manufacturing may become a gateway to more interest in orbiting large telescopes in space.

Gordon adjourned the meeting at 9:26 p.m. Attendance maximum was 83.

Wayne Thomas
Secretary EVAC

The Backyard Astronomer

by Bill Dellinges (Reprint: November 2001)

How Many Scopes Do You Need?

I knew a guy in a California club who, for all the years I knew him, had one scope, an Optical Craftsmen 8" Newtonian reflector which he took to every event-I'm sure it was the only scope he owned. And he was quite content with his one and only scope (which, by the way, was one hell of a performer). We all know someone in our hobby of astronomy who owns many telescopes and we might ask ourselves why they need so many. Thus, my question: How many scopes do you really need? Certainly one good one is enough. But there ARE people out there who own an "armada" of scopes. One is in our club, I won't mention his name, but his initials are Don Wrigley. Now, some folks just like to collect telescopes. But let's discuss here what I feel is the minimum number based on practical requirements. Yes, one is fine-have a ball! But indulge me, if you will.

Scope #1: OK, first, you need a portable-quick setup scope. Something you can quickly and easily bring outside for quick looks. It will also be your "travel scope" for eclipses, solar observation, camping, etc. May I suggest a C-90, C-5, Questar, Orion/Celestron Short tube 80, or Takahashi Sky 90 (Orion's new Starmax 90-127mm Maksutov line looks interesting, pending reviews).

Scope #2: You need your main telescope, the one you will be using most often. It needs to have at least 8" of aperture and be somewhat manageable (otherwise you'll never use it). There are many possibilities here as the current market is loaded with interesting choices. I might suggest a Meade or Celestron 8" Schmidt-Cassegrain telescope, an equatorial Newtonian or one of the many Dobsonians out there in the 8-12" range (Orion, Meade, Celestron, Obsession, Discovery, Starsplitter).

Scope #3: A refractor! Any Refractor of at least 4" aperture. You haven't lived till you've looked through one. They make you very aware of the shortcomings of reflectors in the resolution and contrast department. Recently, some low end 4-6" refractors have appeared on the scene. But high end models from Astro-Physics, TMB, and Takahashi are pricey (now there's an understatement).

Scope #4: You need a "light bucket" for those times when just raw light gathering ability is called for. This instrument would be utilized at a dark site every now and then when you'd like to really see things at their best; after all, there is no substitute for aperture. Personal experience: as nice as the C-5, C-8, and C-14 are, I found the 8" imaging far superior to the 5" and the 14" far superior to the 8". Each larger scope made the smaller one seem like a toy. Views in 17-20" Dobs render my C-14 a toy. Here, consider a Dobsonian over 12", C-14, Meade LX-200 12", 16".

Scope #5: A wide field instrument. Getting upset because you can never get as much field in as you like? Try an Astroscan, Tele-Vue 101, any F4 ratio scope.

Scope #6: A "giant" binocular for super wide views of stars or objects with the added beauty of being able to use BOTH EYES! After many years of one-eyed peering, I discovered the refreshing and relaxing world of stargazing with tripod mounted binoculars. Consider Orion's 9x or 12x63, 11x70,15x80, 25x100, 20x125, Celestron's 20x80 Deluxe, Fujinon 10x or 16x70, 25x150, Lunt 16x70, Miyauchi 20x77, 20x100.

There you have it folks. YOU NEED SIX TELESCOPES, MINUMUM! Do I practice what I preach? Well, let's see. Hmmm. I have a T/V 70mm Ranger, Questar 3 ½ (travel scopes), Astroscan (wide field), 5" refractor (fills refractor requirement), C-8 (main scope), C-14 (light bucket), and 10x70 and 20x100 binos (fills the 2 eyed wide field requirement). Ok, that's 8 because I have 2 instruments in two categories-so shoot me.

Addendum:
2016 – The 1974 C-8 has been replaced by an Evolution 8". The C-14 has been replaced by a CPC-11. New additions are: Lunt 80mm H-Alpha solar scope, Sky Watcher 5" Maksutov, APM 27x100 binocular, Lunt 16x70 binocular. Total now 12. Yikes!

Inside a Schmidt Cassegrain Telescope

by Bruce Baron

Years ago, I worked on a lidar system (light detection and ranging) to warn helicopter pilots of power lines in their projected flight path. For the concept testing I used the optical tube assembly from a 5" Celestron Schmidt Cassegrain telescope. See the Optical bench below, installed on a UH-1 "Huey" helicopter.

The initial flight testing had some problems due to the "mirror flop" (vibration causing the mirror to move inside the telescope tube).

I disassembled the telescope to see if there was a good way to stop the movement.

In the picture above you can see the major parts. From left to right: Scope tube, back structure with light shield, primary mirror with shield rider and focus screw, front corrector plate with secondary mirror, misc hardware, front dust cover, front assembly ring.

In the picture above, the primary mirror is shown assembled on to the back structure.

Basic observations:

Primary mirror was thinner than expected. The shield rider rides along the central shield as the focus is changed. Shield rider was held to the mirror with silicon RTV. Focus screw is attached to the shield rider and is the only thing holding the mirror. To stop mirror movement, we had to reduce the play between the shield rider and the shield. We tried thin tape but that interfered with focusing. Thick grease helped reduce the high frequency vibration but was a bit messy cleaning up after the tests. The secondary mirror was very cheap looking and very thin. It may have been plastic. And NO, I have not disassembled any of the telescopes I use for imaging!

Optics testing:

After reassembly we did some basic optical testing and collimation. We also did some testing in the infrared region. Our lidar was designed to operate in the 830-860 nm region. We found that the reflectivity of the mirrors fell off rapidly once you got outside of the visible range as did the AR (antireflection) coating on the front corrector plate. We actually found that refracting telescope type optics worked better. It was easier to prevent optics movement. While refractive telescopes usually have significant issues focusing over a wide IR range, a laser is very narrow band so it is not an issue focusing at the one required wavelength.

Outcome:

We were a small business at the time and with the 9 month delay in government funding after 9-11 and anthrax issues, work was terminated and never recovered.

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 in the Contact-Us area on the Home page of our EVAC website. 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 to consder is AZ-Observing@groups.io, simply click on this link https://groups.io/g/AZ-Observing and follow the instructions on the page. EVAC also has a Facebook Group where members may share ideas, photos, and Astronomy related information. To join: EVAC Facebook Group.

The Gilbert Rotary Centennial Observatory (GRCO) also has a Facebook Group where members may share ideas, photos, and Astronomy related information. To visit, please click on Gilbert Rotary Centennial Observatory - GRCO.

EVAC Outreach Events

by Gordon Rosner

Again, unfortunately another very short column this month. All outreach events remain can-celled due to supporting the public health concerns. For more information, see the President's column at the beginning of this newsletter or at the top of the EVAC website.

As always, still looking very forward to our outreach program getting back and to hearing all those "OH WOW's" we so love to hear.

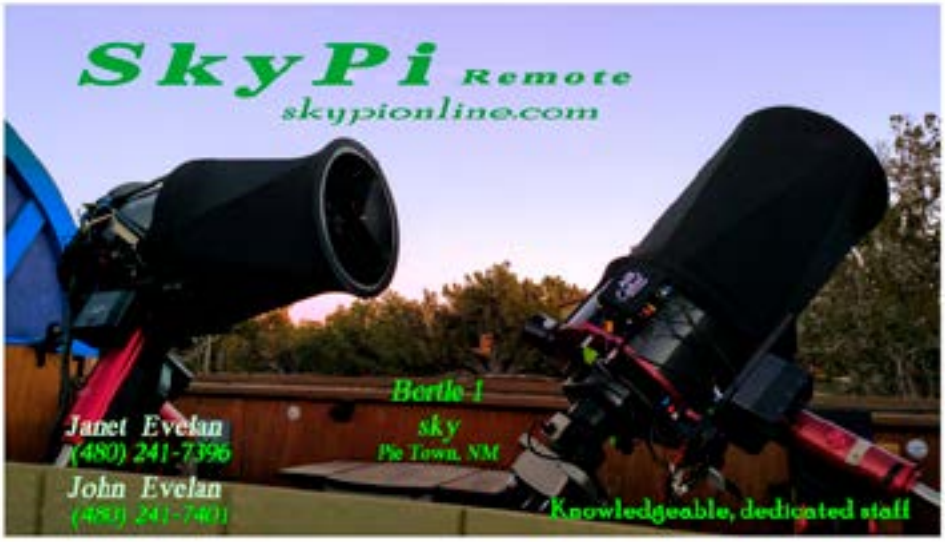
Gordon Rosner
EVAC Outreach Events Coordinator

Last Quarter Moon on March 5 at 18:30

New Moon on March 13 at 03:21

First Quarter Moon on March 21 at 07:40

Full Moon on March 28 at 11:48



SkyPi Remote Observatory

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 E, The Astronomical Lyceum 55mi E, MRO Observatory 80mi E

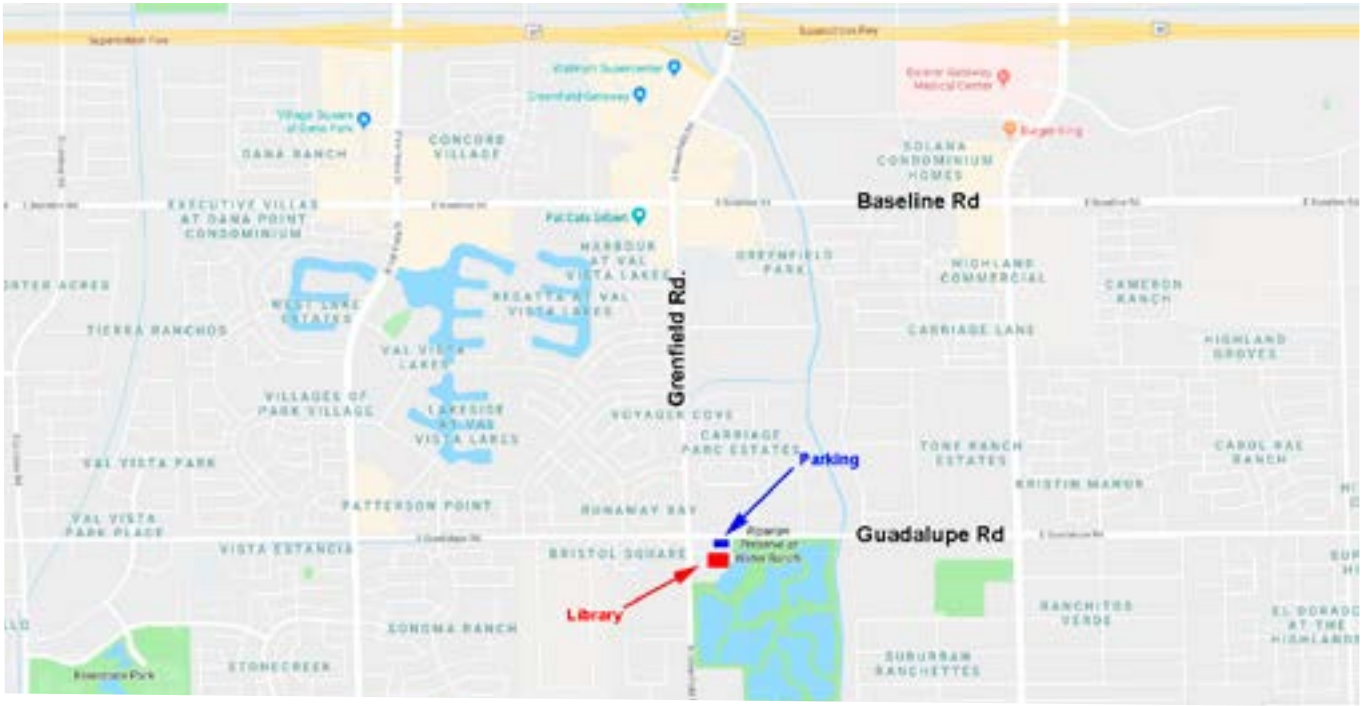
Monthly Meetings will be presented live online using Zoom. See the EVAC Website for updates. All other events are on hold until health concerns are resolved.

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 normal in-person monthly meetings have temporarily been cancelled. and are replaced with an online Zoom meeting.

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!



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

March 2021

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			

March 19 - EVAC Monthly Meeting Live Online via Zoom.

The EVAC Monthly Meeting will be held live online via Zoom. All other meetings and events have been cancelled until further notice.

April 2021

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	

April 16 - EVAC Monthly Meeting Live Online via Zoom.

The EVAC Monthly Meeting will be held live online via Zoom. All other meetings and events have been cancelled until further notice.

East Valley Astronomy Club -- 2021 Membership Form.

IMPORTANT: All memberships expire on December 31 of each year

New Member Dues (select according to the month you are joining the club)

	Individual	Family	
January, Feburary & March	**$30.00**	**$35.00**	
April, May & June	**$22.50**	**$26.25**	
July, August & September	**$15.00**	**$17.50**	
October, November & December	**$37.50**	**$43.75**	(*Includes following year)*

Renewal (current members only):
☐ **$30.00 Individual** ☐ **$35.00 Family**

☐ **Astronomical League:** $7.50 Annually (per person)

Name Badges: Quantity: _____
☐ **$10.00** Each
Name to imprint: _____

Total amount enclosed:

Please make check or money order payable to EVAC
Payment will be made using PayPal ☐

Name: | Phone:

Address: | Email:

City
State
Zip | URL
For website

Would you be interested in our outreach program? ☐ Yes ☐ No

How did you discover East Valley Astronomy Club?

Liability Release Form

In consideration of attending any publicized Star Party hosted by the East Valley Astronomy Club (hereinafter referred to as "EVAC"), the receipt and sufficiency of which is hereby acknowledged, I hereby affirm that I and any related entities, predecessors, successors, affiliates, attorneys, guarantors, insurers, transferees, assigns, parents, spouses, children, subsidiaries, accountants, officers, directors, employees, agents, shareholders, members, and trustees, past and present, hereby forever release, acquit and discharge to hold EVAC and its related entities, predecessors, successors, affiliates, attorneys, guarantors, insurers, transferees, assigns, parents, spouses, subsidiaries, accountants, officers, directors, employees, agents, shareholders, members, and trustees, past and present, from any and all causes of action, claims, losses, damages, liabilities, expenses (including attorneys' fees) and demands of any nature whatsoever, known or unknown, that in any way relate to, arise out of, or concern EVAC and/or my presence on the premises of any EVAC Star Party and related areas, whether or not those causes of action, claims, damages, liabilities, and demands are part of the specific subject matter of EVAC or any EVAC Star Party. This release is intended to and does cover all injuries and damages, and the consequences thereof, whether known or unknown at the time of the execution of this release, which have occurred or may hereafter occur or which may hereafter be discovered, and which may have been caused or may be claimed to have been caused by the said incident, and specifically includes, but is not limited to, bodily injuries, mental and emotional injury, pain and suffering, medical treatments, and loss of earnings or income.

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.

Signature _____ Date _____

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The East Valley Astronomy Club is a 501(c)(3) nonprofit charitable organization.

www.evaconline.org

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