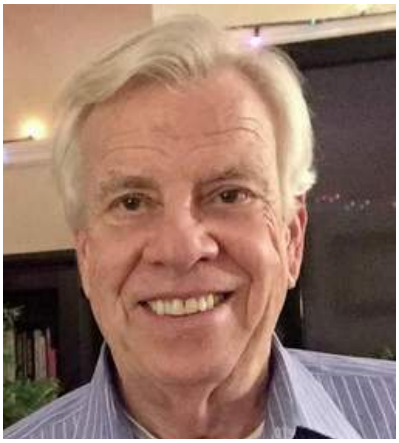
May, 2024 Volume 75, Issue 8

PAStimes

A Publication of the Phoenix Astronomical Society

Stu's Views • Stu Brackney, President PAS



Hi everyone. Oh, my it's been a busy time of year for all who love looking into our cosmos. We did have a few weather cancellations for our outdoor events, but it was still a busy month. Although we did not experience a total solar eclipse here in Arizona, some of our members made the trip to the "Path of Totality" in other locations. Keep an eye out for their images in our PAStimes and our website.

In years past after the May election, PAS took a break from its monthly lectures and other events. Your board has decided to continue with all our activities during these summer months. As usual you can review our event schedule at our website.

Richard Sauerbrun, our treasurer was our guest speaker this month of May, which is a reminder to all of us. We know there are others in our membership that have information to share. If that is you, contact **vicepresident@pasaz.org** to offer your lecture topic ideas.

Still looking for two people: A member to be our Secretary; and an appointed position the Event Manager. Interested, contact **president@pasaz.org**

Tip of the month: Don't purchase scores of eye pieces (lenses) for your telescope. Buy a "Barlow lens" it will double your viewing pleasure for half the cost. A Barlow lens can increase the magnification and allow the short focal length telescope to achieve its maximum useable power. Perhaps the biggest benefit of a Barlow is that it doubles the number of magnifications available to you, effectively doubling the number of telescope eyepieces in your repertoire.

In This Issue

May Upcoming Events

May 2nd – Monthly Lecture Series - "The Recent Renaissance in Astronomy Equipment"
May 16th – Telescope Workshop 101 – What to Buy
May 16th – Telescope Workshop 201 – Operating Your Telescope
May 18th – International Astronomy Day – Apache Wash trailhead

For more information and to register for these events, go to the PAS Event Calendar and Registration Site
It is important to register for all events. In case of an event change or cancellation, you will be notified via email.

May Lecture Series

by Paul Facuna

The May 2, 2024 speaker is Richard Sauerbun. The title of his presentation is:

"The recent renaissance in astronomy equipment"

The points he will cover are: The History of Looking Up, The History of "Telescopes, Visual vs Imaging, The, Recent Renaissance, Broadening the Hobby's Appeal, Making Everything Easier, Expanding the Horizons, Newly Available Equipment.

Richard has been fascinated with the field of astronomy for several years and became an active member of the Phoenix Astronomical Society in 2019. After owning several different small telescopes, Richard decided to invest in a scope that would provide significantly better views of the cosmos. With his newly acquired Celestron 8" Schmidt-Cassegrain he attended one of PAS's telescope workshops to learn how to set up and properly operate his new telescope.

Combining his professional background in technology with his astronomy hobby, he entered the field of Electronically Assisted Astronomy (EAA) in 2021. This approach, combining a quality telescope with a dedicated astronomy camera, provides views of various deep space objects not visible with the human eye.

Richard's second telescope purchase was a RedCat 51mm wide-field refractor which enabled him to capture images of the largest deep space objects like the Orion Nebula (M42) and the Andromeda Galaxy (M31). Shortly after joining the Star Tours group, Richard acquired his third telescope … an Askar 103mm APO refractor. It is this scope, combined with an assortment of astronomy cameras and various automation technologies, that he uses to present views of the night sky at the various Star Tours private events.

On cloudy nights, or on days when the weather is not conducive to quality observing or imaging, Richard enjoys delivering various multi-media presentations involving astronomy topics. These may be presented to groups either outdoors or indoors.

Shortly after joining PAS as a member, he volunteered to help with the organization's financial accounting and was elected to the Board of Directors as treasurer.

While still considered an amateur astronomer, Richard is a person who delights in learning and is constantly improving both his telescope operating skills as well as his knowledge of the cosmos.

For more details and to register for the meeting and presentation go to the PAS Event Calendar and Registration Site: PAS Event Calendar and Registration Site

Mr. James Renn Vatican Observatory April 2024 Lecture

By Paul Facuna

The April 4, 2024, meeting speaker was Mr. James Renn, Board member of the Vatican Observatory Foundation since 2018 and currently a member of the Vatican Observatory Outreach Committee. The title of his presentation was:

"Searching for Life in Creation"

Mr. James Renn gave a very interesting presentation. Most people are not aware that the Vatican has been involved in astronomical research since 1582 when it had the first Vatican astronomical observatory built. The Vatican astronomers have been priests of various orders educated in astronomy, physics, mathematics, theology, and philosophy. Current and some prior Vatican astronomers have been from the Jesuit order. Vatican astronomers like other astronomers are also searching for evidence of life in the universe. He presented information on the Vatican telescope. The 1.8 meter telescope mirror was made, shaped, and polished at the University of Arizona mirror lab in Tucson, Arizona. The current Vatican Observatory is located on Mt. Graham in Arizona. He gave an overview of the search for life and intelligent life in the universe. Some of the topics he covered were: is the universe tuned for life; anthropic principle; planetary habitable zone for life as we know it; transit method for finding exoplanets using the Kepler telescope; techno- and bio-signatures as indicators of past or present life; the techno-signature example of earth generating radio signals starting in 1920 and having traveled 95 light years so far; and the ingredients for life. He also covered the different ways intelligent alien life forms and humans might interact: aliens attacking Earth, humans attacking aliens, and both attempting to communicate with each other peacefully.

He covered the Vatican astronomers' views on meeting intelligent extraterrestrials. Theologically humans are considered brothers and sisters. If extraterrestrial intelligent life is found it could theologically also be considered brothers and sisters. He also indicated that someone once asked the Pope if he were introduced to an intelligent alien would he ask it if it were Christian or if it wanted to be baptized. The Pope supposedly replied to the latter question, only if it asked me to.

His presentation focused on the relationship of faith and science and how they provide complementary, not contradictory, explanations for physical reality.

The website for the Mount Graham International Observatory where the Vatican Telescope is located is:
Home | Mount Graham International Observatory (arizona.edu)

The Vatican Astronomical Observatory in Italy offers a summer class and observatory museum tours:
https://www.vaticanobservatory.va/en/

To see this very interesting presentation and other presentations, go to the recorded Lecture Series Videos found on the PAS website **pasaz.org**

April Outreach Events

The PAS outreach program had a few events canceled in April due to scheduling conflicts and uncooperative weather conditions, but we held a very successful training program for members.

Star Tours – Heros Regional Park Library

The Star Tours outreach program held an event for 60 students and adults at the Sonoran Trails Middle School on the 22nd. Mark Johnston entertained a large crowd of interested library patrons with his EAA setup.

Star Tours – Foothills Fine Arts Academy

The Star Tours outreach program held an event for over 300 students and adults at Foothills Elementary's Science Night. Richard Sauerbrun ran his EAA setup, Stu Brackney operated his visual telescope, and Pete Turner shared his meteorite collection.

Star Tours – Pinnacle Peak Preparatory

The Star Tours outreach program participated in the STEM Night event for students and adults at the school. Stu Brackney and Andrew Stone operated their visual telescopes and Roger Anzini showed off his meteorite collection.

Telescope Workshop 101 – What to Buy

April's 101 workshop on the 18th at PVCC was canceled as 3 students who had signed up failed to attend.

Telescope Workshop 201 – How to Operate My Telescope

April's 201 workshop on the 18th at PVCC was canceled as cloud cover and very poor seeing conditions prevented any observing.

Mark Johnston did an outreach event with Jenny Hall's astronomy class at PVCC. Showed the Sun's photosphere and chromosphere to the students with the Lunt 100MT telescope.

Night Sky Training Session

This spring's member-only Night Sky training Session at the Apache Wash Trailhead was a big success. 14 PAS members attended and participated in the following topic sessions:

- Stu Brackney – Getting Started
- Stu Brackney - Using Internet applications to plan for a night of viewing
- Chris Mahar – Review of major kinds of scopes and their best use
- Jud Knittle – Using a basic Dobsonian telescope
- Chris Mahar - A general review and explanation of various eyepieces and filters
- Vince Marzella- How to identify constellations and asterisms?
- Vince Marzella - Using the star hopping method to learn the night sky
- Vince Marzella - Binoculars, what are the best for night viewing?
- Vince Marzella - Astronomical mythology, the stories behind naming night sky objects
- Mark Savan – The very basics of astrophotography – Using your DSLR and more

My Total Eclipse Experience
By Leah Sapir

I flew to Texas to see the total eclipse of April 8, 2024. I chose Texas because it is closest to Arizona, and because in general the weather in the southwest is sunnier than in the midwest or northeast. And I chose Dallas because it was easiest to get to. I made my flight and hotel reservations way ahead of time, in August 2023, knowing that the prices would go up as we got closer to the event.

During the weeks before the eclipse, I started to track the weather, but it was not looking good – cloudy weather was being predicted for Dallas and most of Texas. (Ironically, the northeast was supposed to be better). The general conversation in the social media eclipse groups was: (1) be ready to move elsewhere if it's cloudy, and (2) don't expect to be able to move elsewhere because all the roads will be traffic-jammed with people who are all trying to do the same thing that you are.(As in: "Ha! Did you think you were the only one following weather reports online?")

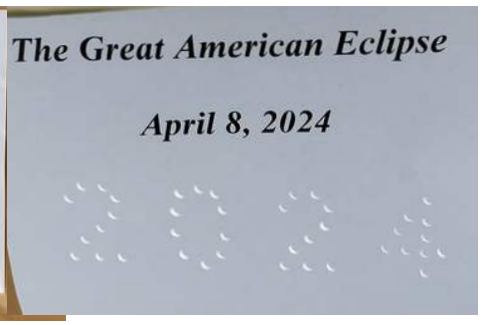
But I wouldn't have been able to go anywhere else anyway, because I wouldn't have a car; so all I could do was hope and pray. I packed my suitcase on the Thursday before the eclipse and hoped for the best.

I couldn't pack my telescope, of course – too big – but I packed all the equipment I could: 12x50 binoculars, an adjustable digital camera (Canon Powershot A620), a tripod, solar filters for the binoculars and camera, eclipse glasses (thanks Terri! 😊), and a device called a "solarscope", which uses a small refracting telescope (40 mm – about 1.5 inches) and a mirror to project an image of the sun on the inside of a box. I also used two storage-box lids to make a pinhole projector. I tested all the equipment during the week before the eclipse and practiced using it.

I arrived at my hotel on Sunday evening. And when I got up early the next morning, the sky was clear – but only an hour later it was overcast. Panic! But over the next few hours, the clouds started to clear – not completely, but enough to be able to see the sun, sometimes through the clouds and sometimes between them.

I set up all my equipment on a lawn in front of the hotel, and was soon joined by a few other people who came to observe the eclipse. (One of them, with a lot of photographic equipment, had come all the way from Portugal!)

At 12:25, we could see that a little "bite" was missing from the sun. We watched through our eclipse glasses – and took pictures – as the sun became a smaller and smaller crescent. I took a few pictures with my camera, but I found it was easiest to take pictures of the partial phases using the "solarscope" and my cellphone. Interestingly, a large sunspot was visible. I also viewed through my binoculars (with solar filters, of course) and shared them with the other people nearby. From time to time I took pictures of the sun's progress using my pinhole projector, and a few pictures under trees, where the spaces between the leaves acted like little pinhole projectors. And all this time, the sun was playing hide-and-seek with the clouds – sometimes behind, sometimes between.
The sun grew smaller and smaller, and suddenly the sky darkened. Someone said – "Oh no, is it the clouds?" I pointed to the sun – only a small bright bit remained – and said, "No!It's the eclipse! It's what we've been waiting for!"



A moment later the sun moved into a space with only a few thin clouds just as totality started – a perfect time to do so!

The corona glow around the sun was entrancing – we couldn't take our eyes off it! I even made a video with my phone. At the bottom of the sun was a pink dot that I afterwards learned was a solar prominence.

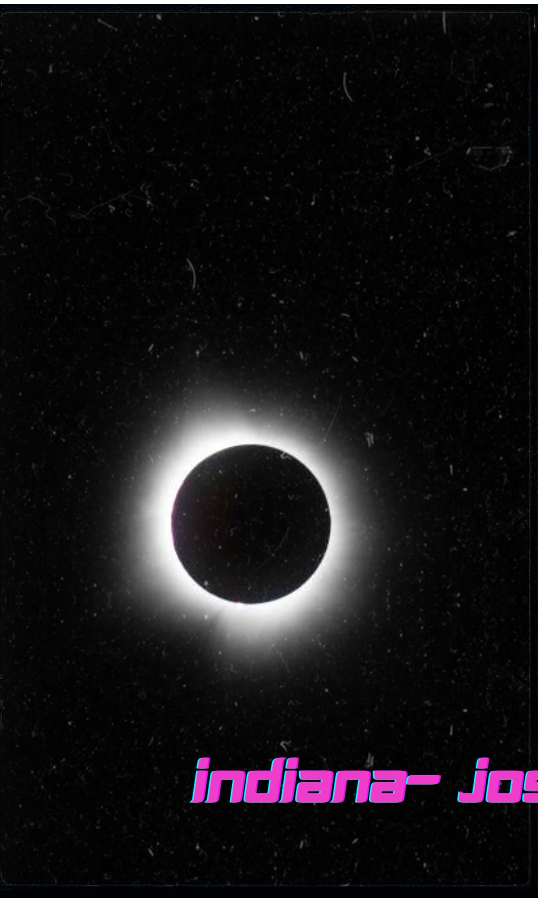
The sky was still cloudy all around, so we weren't able to see other sky objects like stars or planets.(We'll just look for them at night.)

Three and a half minutes of totality passed quickly, and soon we needed to put our eclipse glasses back on as a bright bit of the sun reappeared. We continued watching the partial phases till the end, at around 3 pm.

It was a perfect day.

total solar eclipse april 8, 2024

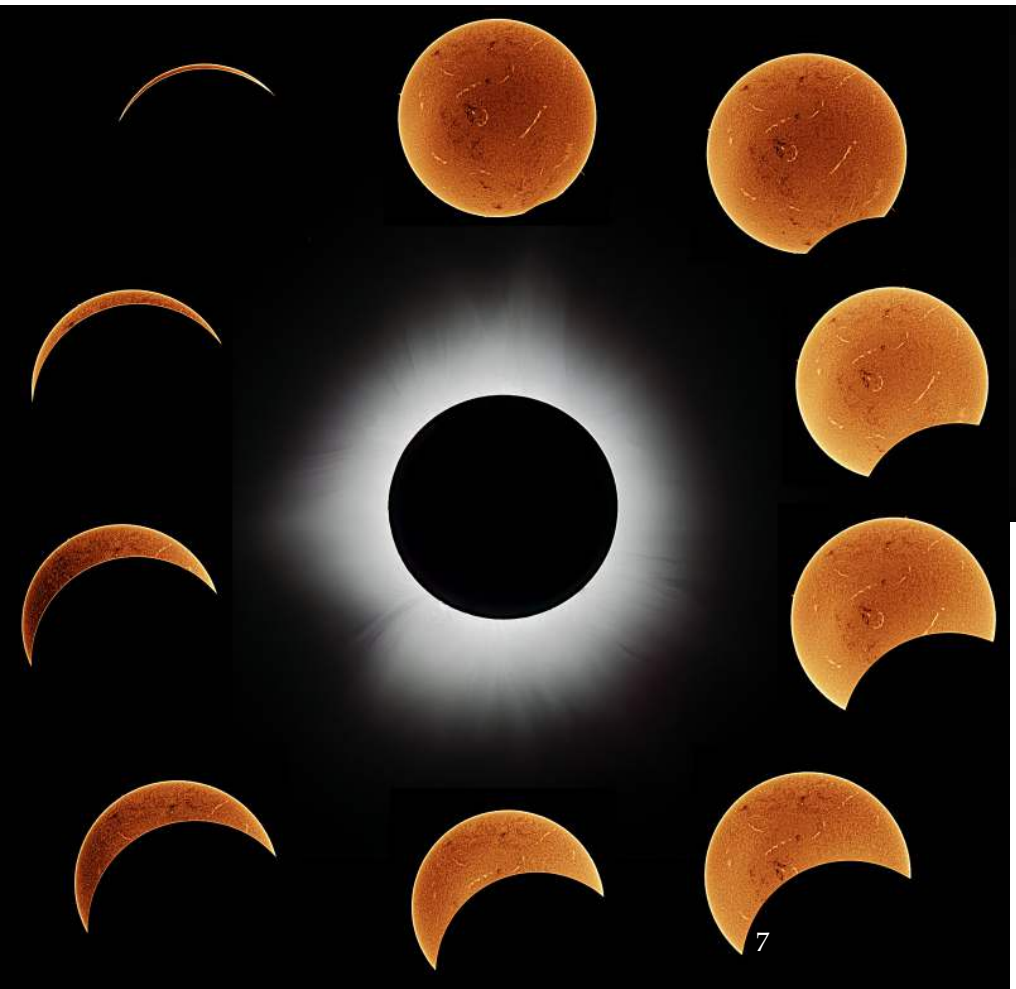
Member Astro Images

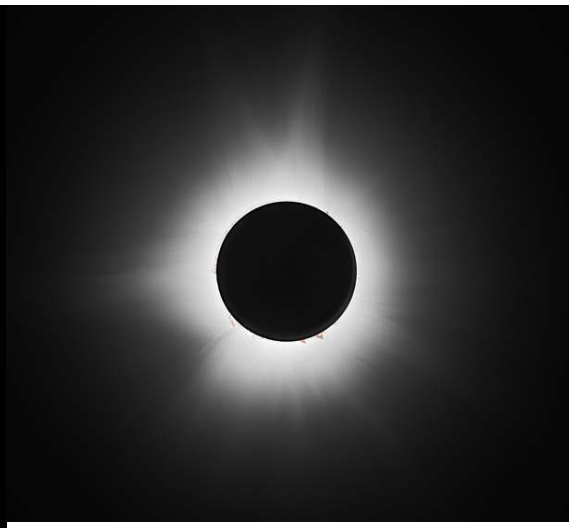


indiana- joseph sandy

phoenix- stuart brackney

total solar eclipse april 8, 2024





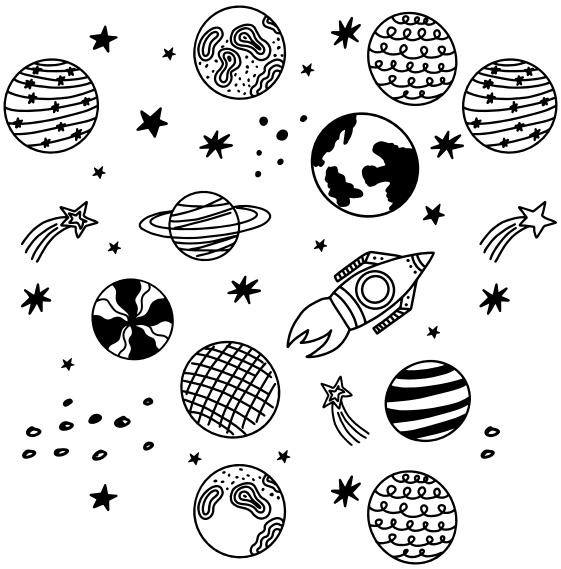
arkansas- mark johnston

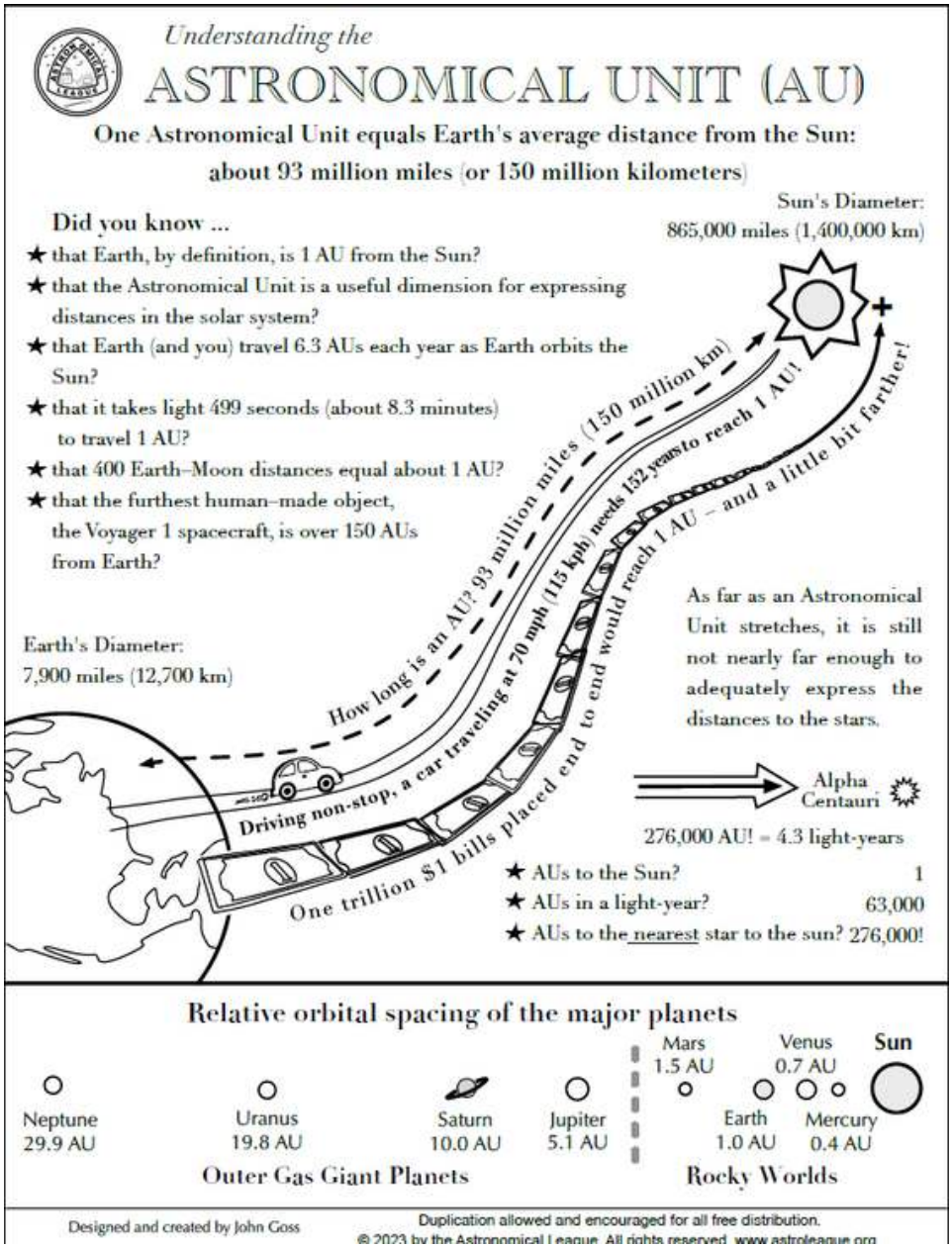
7 Telescope Targets for May

Each month we feature 7 good targets for small telescopes that should be visible in the evening

1. M51 The Whirlpool Galaxy Possibly the finest example of a face-on spiral galaxy
2. Cor Caroli The brightest star in Canes Venatici is also an Orange/Blue double star
3. NGC 5139 Omega Centauri By far the most spectacular globular cluster in the night sky, it barely scrapes above the horizon in Arizona in the south. But it's worth looking for, I have even seen it from Cave Creek looking south through the Phoenix sky glow with a 5" telescope.
4. 24 Com Yellow/blue binary star in Coma Berenices
5. NGC4565 Largest edgewise galaxy visible from Earth
6. M104 the Sombrero Galaxy Third brightest galaxy visible from Earth. Look for the dust lane bisecting the galaxy
7. Stargate cluster Fascinating asterism featuring a triangle of stars inside a triangle of stars in the constellation Corvus

Cosmic Classroom (CC)





ZWO Seestar S50 Smart Telescope (Part 2 of 3)

Phil Hoppes

Lunar-The Seestar takes wonderful pictures of the moon. The focal length and camera are paired very will to image the moon. Pointing and taking images of the moon are identical to pointing and imaging the sun. Like the solar mode, stills will be copied to your portable device picture database while timelapse and videos will need to be downloaded. I will cover downloading your data later.

Figure 15 & 16 – A 4x closeup of the moon and a 1x image of the entire object.

Planetary – Planetary mode is probably the class of objects the Seestar is least suited to observe. As all experience visual or photography amateur astronomers know, you need a lot more focal length to get the magnification necessary to show details on planets, especially Jupiter, Saturn and Mars. I have a planet-killer in my backyard that is a C14 Edge HD with just under 4000mm of focal length and for great pictures you use a 2x barlow so now I'm at 8000mm of focal length. You just cannot expect a 50mm objective with a 250mm focal length to give the same performance. You can get some reasonable images of Jupiter and Saturn and you can absolutely get Jupiter and it's main 4 moons. Planetary mode is like solar and lunar modes for pointing and imaging. Manual pointing however is much more of a challenge but my limited experience so far with just imaging Jupiter, the Seestar found it with no issues.

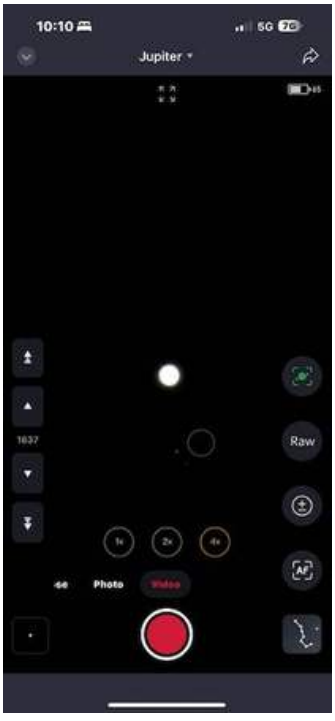


Figure 17 – Jupiter imaging session. Exposure was high to see the moons. Autofocus has not been done yet.

Scenery – Scenery mode is both quite useful and fun. Pointing is completely manual but autofocus will work and you can guide your focus for DOF effects should you choose. Like solar and lunar mode, you can take stills, time-lapse and video. I was curious myself to see what kind of daytime magnification you get with the Seestar. I took a picture with my iPhone to show both the Seestar and the object being imaged by the Seestar. Then I took the actual picture with the Seestar. You can see below the magnification is quite impressive. A side note on this is one of the initial uses I'd hoped to do was take pictures of hummingbirds at my place in northern Arizona. That quickly dissipated. I see now I must change my approach as I need to place the Seestar much f urther away than I had initially thought to accomplish this task since the magnification is so high.

Figure 18 & 19 – Scenery mode. The saguaro cactus on the top of the hill is the target. The next image is that cactus.

A typical astrophotography mount for consumers is an equatorial (EQ) mount. This type of mount has one axis, right ascension, that is always pointed at the celestial pole, either north or south, depending upon your location. The other axis, declination, points the telescope to the object's angular separation from the celestial equator. The ZWO Seestar is an automated telescope that rides on an Alt/Az mount. If you are not familiar with this type of mount, like an equatorial mount, it has movement on two axes, altitude (height above the observer's horizon) and azimuth (the compass heading going around a circle). An equatorial mount must be initially aligned to the pole with tight accuracy to allow the telescope to track the movement of the night sky. For an EQ mount precise leveling is not required. The advantage to an equatorial mount is the objects FOV will remain steady for the entire imaging session. An Alt/Az mount does not require polar alignment, but the mount must be accurately leveled. The largest issue with an Alt/Az mount is that the FOV will rotate for the entire imaging session. The ability to image using an Alt/Az mount has only been a modern invention as it requires sophisticated real time computer calculations to offset the rotation of the FOV over an imaging session. The amount of rotation depends upon both the object's location in the night sky and the observer's location. The rate of rotation changes significantly over the course of an evening and it is a very complicated set of equations to visually represent these movements. I don't have a graph but there are many excellent explanations of field rotations on the web. Here is one that I like.

https://shrtm.nu/sWt

The way modern research telescopes image with Alt/Az mounts is by having a camera rotation system that is constantly modifying the rate of rotation regardless of the object position in the sky or the observatory's location on the globe. The Seestar has no rotation system on the camera. Because of this, images taken with the Seestar will rotate. This rotation effects imaging on DSO objects (nebula, galaxies, comets, clusters and stars). Images of the sun, planets and moon are not affected since those objects are bright and stills or video frames are very fast exposures although very long videos (minutes) may show some frame rotations. Stacking will fix this issue in post processing. Scenery images are not affected.

You start your DSO imaging session by first picking an object. Due to the rotation, there are some things that you need to keep in mind when you pick targets, and you take DSO images. In general, if I am not taking long (> 30 minutes) exposures I try to pick objects that will stay below 60 degrees in altitude but stay above 30 degrees for my entire imaging session. Looking at the graphs on the link above you will see that the rate of rotation is significantly less at these lower altitudes. Staying above 30 degrees is necessary since imaging any lower the Seestar is looking between 2x and 3x the density of the atmosphere which adds a significant amount of noise to your images. Objects close to the zenith are not photographed well as Seestar and Alt/Az mounts in general, have difficulty in tracking in this area of the sky. If you stay within these guides your DSO images right out of the Seestar will look very nice and not require additional processing.

Once you pick a target the Seestar will first slew to the object, and you will see this on the framing screen I showed at the beginning of this article. The Seestar will use plate solving to assure the object is properly centered. You can see this as the target will have a red rectangle around it and the Seestar's FOV will be a blue rectangle. The blue rectangle will move and slowly center over the top of the red rectangle. Once complete the screen view will switch to the image screen. On your first image of the evening the Seestar will do two things. First it will want to rotate around to verify the exact horizontal position of the Seestar. This is done only once and at the beginning of a session. The Seestar will then follow with what it calls image enhancement. What the Seestar is doing is taking dark frames which will be used to create a master dark for the evening. Like the horizontal positioning the enhancement is also only done once at the beginning of an imaging session. The Seestar will then start to take your first picture. I let the Seestar finish the first image just to see if it is pointed correctly. I then stop the session at one picture, and I use the autofocus to ensure my entire session is in focus. The autofocus routine built into the Seestar works quite well but it can have difficulty on faint areas of the sky or when there are thin clouds.

One trick I have found that works well is if I cannot obtain a good focus on my desired object, I use a planetarium program such as Stellarium and find a cluster or grouping of stars that are close to my desired object. This requires you move off your target to another brighter target but having your best focus is critical to producing a good final image. Pointing by the Seestar may not always frame your desired object the way you would like. You can reframe your object. This can be done either in the frame screen by using your finger to slide the red rectangle and center your desired FOV to your liking. The Seestar will then plate solve to your new FOV and start imaging. The other way is in the image screen you use the move circle of the Seestar to shift your FOV to your desired location. Personally, I've had mixed success with moving with the frame screen. At times it behaves like your selection worked only to see in the image screen, the Seestar is clearly not guiding so you get star trails across your image. When this happens, I stop the session and try again. When I use the image screen with the move circle it is more difficult to see your framing but when I finish with my manual placement, the Seestar almost always starts guiding and imaging correctly.

As you image you will see a countdown timer around the start image button on the bottom of the screen. In the top right corner of your image, you will see an accumulation of your images that were stacked to create the composite image you see on your portable device. You will notice very quickly using the Seestar that the accumulated time of images stacked do not equal the amount of actual time that has passed. This is because as you image, not all the images taken by the Seestar were accepted by the software. Internal to the Seestar every image taken is graded. If it does not pass the grading criteria that image is rejected, deleted and not used to stack your displayed image. I have found that on short sessions (30 minutes of actual time), I get between 60% to 70% of the images taken are used. On long sessions (> 1 hour) that number falls to 50% or even less. This means that if you want to get 30 actual minutes of image on a galaxy, you should plan on needing 45 minutes to an hour of actual time to accomplish your picture. I keep a spreadsheet of my Seestar image sessions as I am trying to see what the correlation between the different parameters that affect the rotation and image rejection. The graph of rejection vs number of subs taken which is below. This graph was a bit of a surprise in that it does not exactly correlate my comments above. The disconnect I believe lies in that for the graph to be more meaningful I need to pick and graph targets that have like environmental conditions meaning the same range of altitude, the same seeing conditions, same temperature, etc. At the start I was just gathering data on a spreadsheet and made a graph. I can see now that I need more data and the data needs to be sifted better for equal conditions. I still think the graph is important as it shows the rejection rate of the Seestar across a wide spectrum of imaging sessions. The reader should not infer anything more than this from the graph.

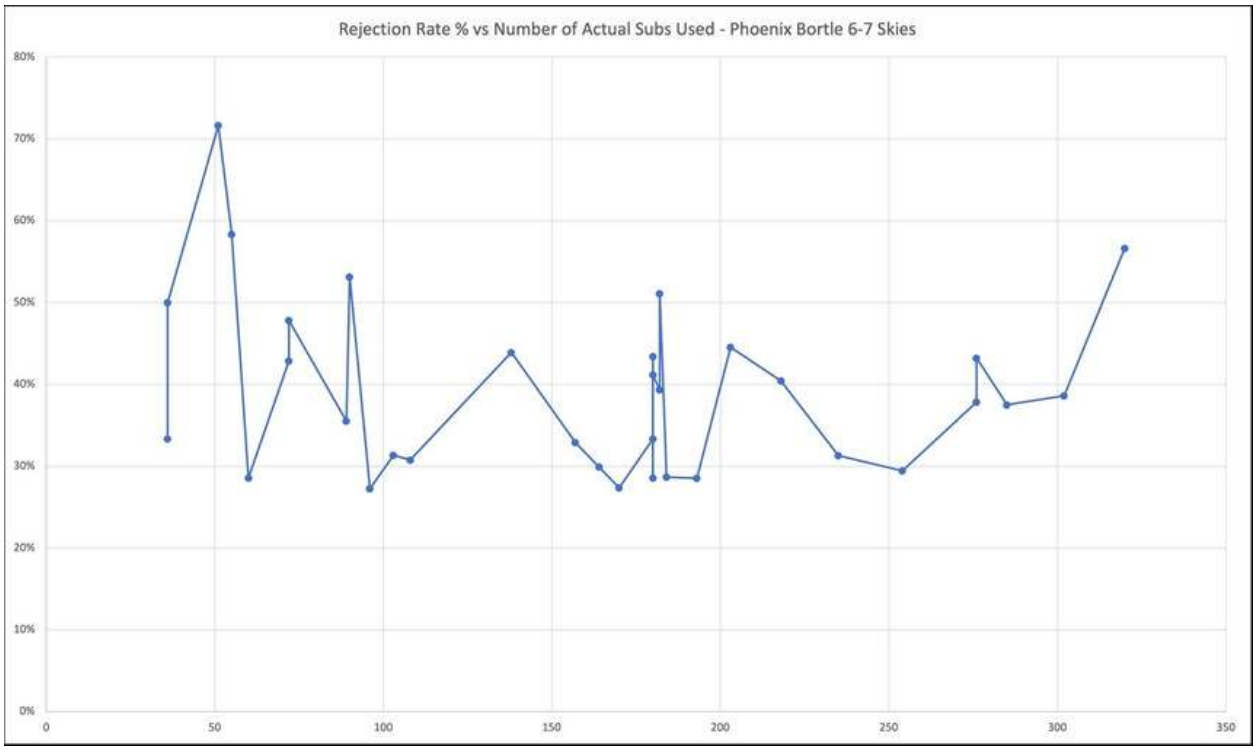


Figure 20 - Seestar image rejection rate vs number of subs in session.

Filters - The Seestar is equipped with two imaging filters for DSO imaging. There is a standard IR/UVCut filter which basically cuts the tails off the visible spectrum but leaves everything pass in between those ends. The second is a light pollution filter called LP. ZWO does not give much information on this filter but having imaged quite a bit with OSC (one shot color) cameras that are using dual narrow band filters I believe the LP filter is very similar to many of the commercial city or light pollution filters that are available on the market today. You can enable the LP filter on the imaging screen with the small button on the lower right-side stack of icons. If the filter button is green, you will be using the LP filter in your image session. If the filter button is white, you are using the IR/UVCut filter. My guidance on using these filters is if you are imaging clusters or galaxies with little to no nebulosity, you should use the IR/UVCut filter or the no filter setting on the image screen. If you are imaging comets or nebulas, you should use the LP filter. The IR/UVCut filter will let in the higher number of photons for brighter images but you will suffer in color discrimination. The LP filter will greatly enhance colors at the expense of brilliance so you will need a lot more subs to achieve the illumination you would get with the IR/UVCut filter. An example of this can be seen below. I imaged Leo's Triplet which includes M65, M66 and NGC3628. Both were imaged for identical amounts of time and then post processed as identical as possible.

Figure 21 & 22 - Leo Triplet with different Seestar filters

The IR/UVCut filter image is brighter while the LP filter image has more color. I know post processing can bias this and the raw master light images show the same perspective, but the raw images are both quite dim and I was concerned that published jpgs simply would not show the differences as well as the post images demonstrate.

Stacking - Stacking is a post processing technique used to significantly increase the signal to noise ratio of an image. A Seestar image can be significantly enhanced using stacking techniques. The internal software on the Seestar is stacking your image when it builds it so it can be viewed on a portable device. In general, the internal stacking does an adequate job given the constraints of the system, but a user can make a higher quality image with the stacking and post processing tools that are currently available. One of the issues with the internal system is the reference frame used for stacking is always the first image taken. As you take more images your object is rotating. That rotation can be seen by how the stacking is affecting the image. Below is an excellent example of the stacking issues the internal Seestar stacking suffers.

Figure 23 - Example of the skew in an image caused by Seestar stacking.

Looking at the top left and bottom right corners of Figure 23 you can see a diagonal band where there are stars and color and the blackness. This is a 61-minute image which means Seestar accumulated 366x10" subs to create this image. The reference frame was the first frame and all subsequent images with the associated rotation were registered to this first image. When I download the image set from the Seestar and stack them myself I have control over what sub will be used as the reference. I use Stellarium to give me the initial altitude and final altitude of a session. I also look at the number of frames and the time the files were saved between the first and last image. Usually, the middle frame based on save times is a good sub to pick as the reference frame. When a mid-sub is used you tend to get an equal spread about the middle, so the distortion is less on each edge and is far less noticeable in the final image. I used PixInsight on an imaging session to demonstrate the distribution of stacked frames and their alignment to center. PixInsight will supply a low rejection and high rejection image along with a final stacked image. The low rejection image clearly shows the alignment of a stack relative to what sub was picked at a reference frame. The image below shows how the Seestar stacked an image and the rotational bias is clearly seen in the far right image.

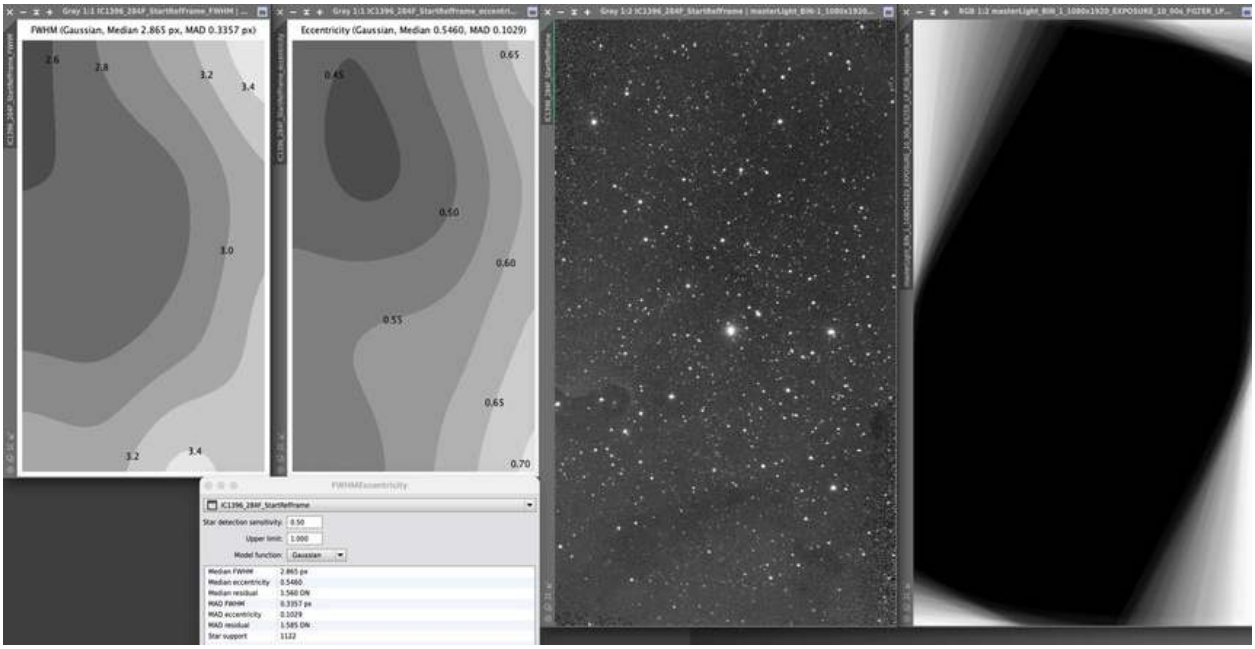


Figure 24 - Seestar stacking bias based on reference frame selection.

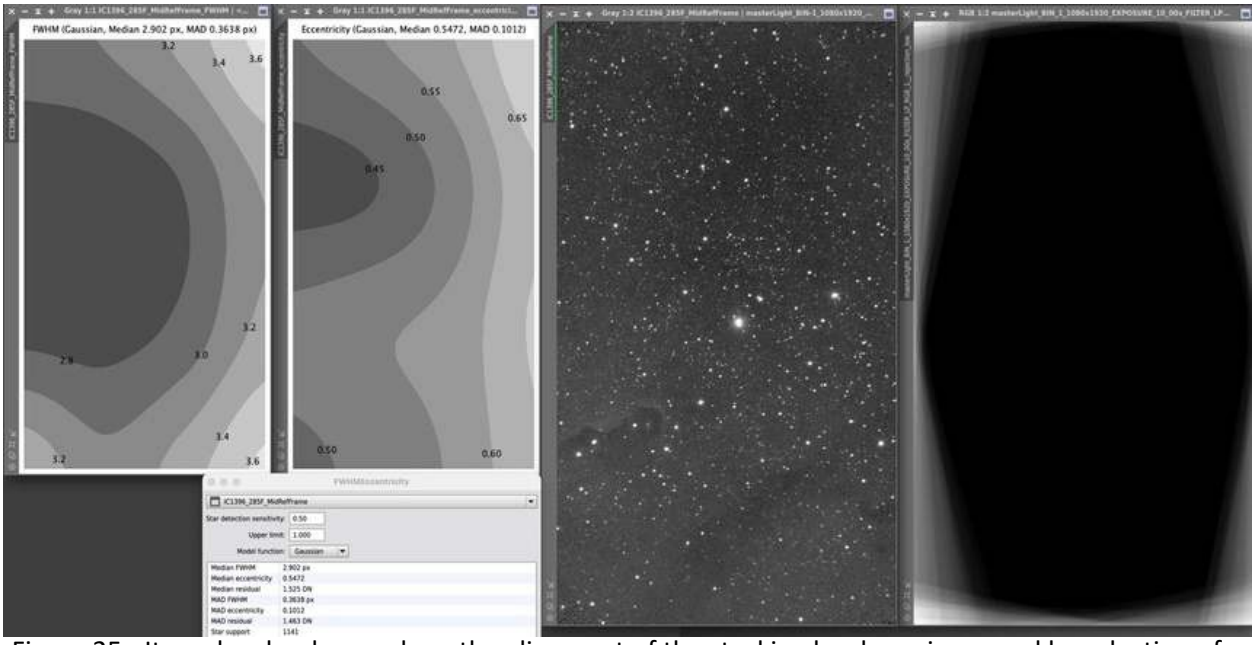


Figure 25 - It can be clearly seen how the alignment of the stacking has been improved by selection of a central reference frame.

On both images I also captured the FWHM and Eccentricity mapping of the image as graded by PixInsight.

Another reason to do your own post processing is for removal of satellites and airplanes from your Seestar picture. Below is a great example of this issue.

The satellite trail above can be fixed using tools in Photoshop or like software, but it is quite time consuming and/or sometimes difficult to remove without shadows. The latest versions of Photoshop and some other software can now remove this a lot easier but at the expense of possibly removing stars and nebulosity that you would like to keep in your image. Stacking software like PixInsight or even free software, Siril can remove this from the image that contains the streak, so it is completely removed, and the rest of the image is preserved.

Noise reduction - Most astrophotography processing tools today have deconvolution tools that excel at enhancing details and removing noise. As this is not a image processing tutorial I won't review all the steps I used to generate the final image below but I used PixInsight along with some additional plugins from RC-Astro and Photoshop to clean up the image. To the left is the original Seestar image of M81 and to the right is my reprocessed image.

Figure 26 - Nice image of M104 ruined by a satellite trail.

End Part 2 of 3

Helpful Astronomy Websites

by Mark Johnston

The following websites are great free resources to help you plan and enjoy your astronomy adventures

Astromart **astromart.com/** This is one of the top two sites for buying and selling used astronomy gear, product reviews, and forums where you can discuss any aspect of astronomy with other enthusiasts. A small fee is required.

Astrometry.net **https://nova.astrometry.net/** This site will take any astronomy image you send it (galaxy, starfield, nebula, etc) and then tell you what it is and where it is in the sky.

Astronomy Tools **astronomy.tools/calculators/field_of_view/** This site has a lot of capabilities but I use it primarily to figure out how a target (e.g. the Helix nebula) will look in my eyepiece or astronomy camera. You pick your scope, camera, eyepiece and target and the site does the rest.

Astrospheric **www.astrospheric.com/** Probably the best short term astronomy weather forecasting tool, providing predictions of clouds, transparency and seeing.

Clear Sky Charts **www.cleardarksky.com/** Excellent source of astronomy seeing conditions forecast. Also a great tool for finding observing sites with lower light pollution.

Cloudynights **www.cloudynights.com/** This is one of the top two sites for buying and selling used astronomy gear, product reviews, and forums where you can discuss any aspect of astronomy with other enthusiasts. Free.

Dark site finder **darksitefinder.com/map/** Great website for finding a dark observing location.

Heavens above **heavens-above.com/**Top site for predicting naked eye observations of satellites. See when the ISS is visible in your neighborhood!

Jupiter transits **shallowsky.com/jupiter/** For anyone with a small telescope, this is a great site. You can find out when the Great Red Spot and Jupiter's satellite transits are visible.

Solar Dynamic Observatory (SDO) **https://sdo.gsfc.nasa.gov/data/** Find out how the Sun looks right now, at various wavelengths. If you own a solar telescope, this site coupled with Astrospheric is all you need to plan fabulous solar observing!

Telescopius **telescopius.com/** This site is very helpful in planning an observing evening. It will tell you when any particular target is rising and setting and when is the best time to observe it. This allows you to sequence your observing in a planned manner.

Additional Information

April 8, 2024 The International Dark Sky Discovery Center in Fountain Hills ground is broken

Over 1,000 people gathered in Fountain Hills, Arizona, for a solar eclipse-watching party and groundbreaking ceremony for the International Dark Sky Discovery Center. The center, to be built by McCarthy Building Companies, will span 23,000 square feet and include a planetarium, observatory, exhibit hall, and more. Fountain Hills is the 17th International Dark Sky Community worldwide. The center seeks further donations and offers naming opportunities. For more information or to support the project, visit www.darkskycenter.org.

Attended by Scott Adams:

We broke ground today for the International Dark Sky Discovery Center, a developing project in Fountain Hills.

- My "colorful" cellphone shot of the large TV monitor that we had for showing what a telescope was viewing.*
- My Photoshopped version of the TV monitor image more closely resembles what we saw through solar sunglasses.

*With the sun behind fairly thick clouds, we set the camera's gain and exposure to produce the usual orangish image of the sun. After the clouds parted, we were stuck with those settings because we didn't have time to mess with them before the event started.

2024 Official Board of Directors Election Results

President-Stuart Brackney
Vice President-Mark Johnston
Secretary-Open
Treasurer-Richard Sauerbrun
Newsletter Editor-Richard Meyers
Member- at-large-Pete Turner
Member- at-large-Hector Bocanegra