



# SPACE

St. Petersburg Astronomy Club **Examiner**

April 2023

Editor – Guy Earle

The St. Petersburg Astronomy Club has been the center of family astronomy in the Tampa Bay Area since 1927. Our 414 adult members are dedicated to promoting and sharing the wonders and science of astronomy. We host a dark-sky star party each New Moon at Withlacoochee River Park, along with local star parties, telescope-making workshops, science lectures, astronomy lectures, educational outreach sessions and much more.

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## Astronomy Image of the Month

M51, PlaneWave CDk14, Astro-Physics 1600GT, ASI 2600MC, 60x120s **by Howard Ritter**



## May Preview

In next month's *Examiner*, there will be an article showcasing a long-time SPAC member's **homebuilt Dobsonian reflector**, originally constructed by David Rodda in the 1990's, which is in process of an extensive renovation. Also, please make sure to check out another rebuild in this month's Mirror Lab article below, which has Mike Davis starting a renovation for next year's OBS raffle scope.

Also in next month's edition, Mike Partain will be doing a review of a classic eyepiece, the **Edmund Optics RKE 28mm Precision Eyepiece**. With its super thin edge, the RKE provides bright, crisp images in a binoviewer or as a single monocular view.



## April General Meeting

This month's general meeting is on Thursday, April 27<sup>th</sup> at **7:30 PM**. The meeting will be *in person* at St. Petersburg College, Gibbs Campus, 6405 5<sup>th</sup> Avenue North, Natural Science Building, Classroom 236, 2nd floor, and **also virtual**. This month's presentation is **Topics on Astronomy** by SPAC President Brad Perryman and **An OBS Review** by Kelly Anderson



To attend virtually with **Zoom**, join from your computer, tablet or smartphone by clicking [here](#). You can also dial in using your phone.  
United States: +1 (301) 715-8592  
Meeting ID: 993-399-331  
Passcode: 999123

The club's **New Moon observing weekend** will be April 21<sup>st</sup>-22<sup>nd</sup> at [Withlacoochee River Park](#) east of Dade City.



## New SPAC Members

We would like to welcome Josh & Crystal Barber, Casey & Chris Vaughan, London & Leslie Crosby, Matt Potak & Amanda Akin, Kathy Blackett, Bruce Sobut, George Francis & Loretta McGrath, Craig & Hunter Drake, Sherron Brooks & Pete Kling, Jim & Robin Sumner, Michael Brennan, Dave Lorenz, Brenda Lorenz, Brett Williams, and Ashley Chochrek to our family of members.

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## An Extraordinary Night



*GUY EARLE*

As the New Moon weekend approached last month, I noticed that unfortunately the skies for that Saturday the 18<sup>th</sup> looked someone grim, however, a cold front looked to blast its way through a week before. It looked to be a really strong front and seemed to be the best prospect of the entire season to get a very clear and transparent sky. Clear and cold doesn't mean much if there's moisture in the air, knocking down the transparency. This looked to be different, so Mike Partain, Tim Harris, Pete Haviland, and myself set out for Chiefland mid-week as the cold front had just passed through. Chiefland is due west of Gainesville near the coast and is, besides Kissimmee Prairie State Park, one of two dark locations left in Florida. I wanted to throw my 16" Dob on some galaxies for a change, as I tend to love globular clusters more with my binoviewer and equatorial platform, and getting as dark a sky as possible was draw. It takes about 2-1/2 hours to get up to the Chiefland

Astronomy Village from my home in Riverview, and thankfully Mike gave me a bunk in his RV to crash for the two days. I've been going to Chiefland nearly as long as I've been in SPAC, but I haven't made many trips in the last decade, whereas in the mid-90's to mid-2000's I was up there at least twice a year. The CAV has gone through a recent revival lately, which is exciting news.

That Wednesday night was to be the better of the two nights we were there, and I excused myself from our SPAC board meeting via Zoom early because I just HAD to get outside. It was killing me. So, while Mike, who was also on the Zoom call, was finishing up, I grabbed my red flashlight, pulled my jacket tight and stepped outside. Coming around the RV I was struck dumbfounded, staring up at the southern sky and the winter constellations. They were blazing, and the Milky Way was not just visible, it was obvious. I felt a thrill of a dark sky I hadn't felt in a long, long time. I was practically giddy and I was once again I was in my early 20's under a dark, Chiefland sky.

I switched on my Tom O. equatorial platform, grabbed my binoviewer and started with, of course, Orion. My eyes widened. Color! It had been a long time since I'd seen anything but shades of blue, but here was a distinct green hue. Mike finished up and the four of us went from object to object for the next six hours. I brought my camera and its 14mm Rokinon f/2.8 lens, which I had purchased for a vacation in September. A quick 20 second shot produced what you see above. Galaxies like M82 showed tremendous mottling, globs like M3 and M5 were broken down to nearly the core, and best of all was hunting down stuff in the southern sky in constellations like Puppis. Normally, Puppis is in the light dome of Tampa or a tree line. There are a lot of open clusters down in Puppis, such as NGC 2477 that have a density almost globular in nature.

The enthusiasm kept me going even when the body and sore knees and back said otherwise. The cold crept in, but we had to see Omega Centauri before calling it a night. So, around 2:30 we swung low and, to paraphrase Spock in Star Trek IV, a bunch of colorful metaphors echoed across the observing field. Omega wasn't just a large mass, or only somewhat distinct from the background as it normally would be, instead it was thousands of individual pinpoints that went all the way down to the center. It was magnificent, and it was as good an ending to a fantastic night's observing as I could home. As we were enjoying Chiefland, fellow SPAC member Mike Davis was experiencing something similar at our observing site at Withlacoochee River Park.

Here is his account of that same night: Back in mid-March we had a couple of amazingly clear nights at Withlacoochee River Park. It was the middle of the week before New Moon weekend. The weekend was forecast to be rainy, but the middle of the week looked like it was going to be amazing. I decided on the spur of the moment to head up to WRP for a couple of nights. A lot of people took advantage of the great weather to head for Chiefland, but I think they would have been almost as happy with the conditions closer to home the two nights I imaged at WRP. I set up next to SPAC's own Intrepid Field Reporter Kelly Anderson. We were joined by Phillip Roey and Joe Canz. We three astronomers had the huge field and amazing sky all to ourselves.



I took my astrophotography setup on this occasion, instead of the big DOB, since the conditions were forecast to be so good. I set up the Losmandy G11 mount and 5 inch Explore Scientific refractor and got down to some serious astrophotography. During the two super clear nights I got photos of M81 & M82, M101, the Trio in Leo, M108 & the Owl Nebula (and caught the supernova in M108 as a bonus). I also imaged Omega Centauri skimming over the treetops at the south end of the field.



I have never seen the skies that good from WRP before. It was an epic couple of nights. I stayed a third night, but clouds rolled in just after sunset and I spent the night reprocessing images from the previous two nights.





## Cats in Space II



Back in November 2022, a group of SPAC members volunteered their time and telescopes to a wonderful cause, a joint astronomy/cat adoption event put on by the wonderful team at **First Ladies Farm and Cat Sanctuary** that we called **Cats in Space**. It was an exceedingly popular event, giving the attendees the opportunity to look through telescopes while also enjoying some wonderful food, drink, and—of course—beautiful cats of all types who are up for adoption. Cats in Space was so popular that we've been requested to do it again, so **Saturday, April 29<sup>th</sup>** will be **Cats in Space II**! Once again, we'll have a telescope to raffle off, with the benefits going to the Farm and all their amazing work. You can purchase tickets

through their website or Facebook page, as well as tickets for the raffle telescope, an Orion 10" Dobsonian with digital setting circles. Scan the QR code to go their Facebook page; you can also visit their website for more information (<https://firstladiesfarm.com/>).



## The Dwarf II

### The DWARF II - Mutation, Disease and Cure(s)



The Mayo Clinic defines “Dwarfism” as the “Shortness in height that results from a genetic or medical condition”. When I first funded the Kickstarter project in December 2021, the prospect of a tiny, “take it everywhere” EAA tool to curb the worst withdrawal symptoms that occur when leaving home without heavy astronomy gear sounded appealing.



*CHRISTIAN  
RUBACH*

#### What is it?

It took about 20 minutes during OBS to coin the nickname “VHS tape” among SPAC members which is a pretty accurate given the compact size and light weight (1 kg) of this EAA instrument. It has telephoto lens using a periscope design inside an alt-azimuth mount and includes an internal battery, arm-based computer and microSD card. It also provides a separate wide-angle camera; the software supports tracking, go-to capabilities, plate-solving, darks, live stacking and downloads. For those club members that are occasionally active when the sun is up, daytime modes allow photos, automated panoramas and video recording (including automated object tracking and motion detection). The deluxe version includes two neutral density filters allowing solar imaging and an ultra-high contrast filter for deep sky imaging.

#### The Good

The DWARF is surprisingly light, compact and easy to transport and set up. Calibration is a breeze and usually works if you have a clear view of about 60 degrees of the night sky somewhere between the horizon and 10 degrees from the zenith; Polaris does not need to be visible.

The quick start guides and help on the DwarfLabs website (including 4 astrophotography topics) are a decent start, but there are already dozens of YouTube videos and a growing DWARF II Smart Telescope User Community on Facebook with further information.



For about \$400 (or \$490 including an additional battery and filters), about the price of your average non-cooled planetary camera, the DWARF provides decent, “entry-level” imaging capabilities.

Beyond real-time preview and stacking, you can download raw images (2k, 12 bit) and download them for local processing. For a “version 1” of a new product, the software is surprisingly capable. Even though you will certainly now achieve images of the quality of a much more expensive telescope and dedicated astronomy camera, you quickly get “recognizable” images of various objects and can even coax “acceptable images” of a few large, bright DSOs out of the VHS tape if you resort to external post-processing, e.g. using PixInsight.



Uncropped, live stacked 20 x 3.5s w/ included UHC filter  
vs. PixInsight processed, cropped 450 x 10 s raw images w/Optolong L-Enhance



Sun w/included ND filters, Rosette 100 x 10s, post-processed in Google Photos only

## The Bad

- **Limited Exposure Times**

The maximum exposure time allowed is 15 seconds. However, “out of the box” you will see blurring and star trails at much short exposure times, sometimes above 3.5 seconds. This is due to the field rotation; the Dwarf respects field rotation between images when stacking, but (expectedly) cannot account for trailing within a single exposure and does not use the wide-field camera for guiding.

**TIP:** You can minimize field rotation by roughly polar aligning using a tilt head; just rotate

the “tube” so the lens points up, put your DWARD into preview mode and center Polaris in the preview image. Auto-calibration works when aligned with Polaris, enabling you to take 10-15 second exposures with reduced rotation; see “The Ugly” section for risks.

- **Image adjustment**

Even though both live stacking and the preview offer the ability to manipulate the histogram and allow “unlinked” RGB curves, adjusting the curves is somewhat hard on a touchscreen.

**TIP:** Err on the side of taking longer/higher gain exposures to separate your data from “low-level noise”; the resulting black point is usually too high and can be adjusted by inserting a “minimum cut off” point in the lower left corner first and carefully dragging it right to visually adjust your black point before adding other curve adjustment points.

- **Filters**

The UHC filter included in the first batch of shipments eliminated h-Alpha wavelengths and DwarfIabs replaces it for free; this has been remedied in more recent shipments.



**TIP:** You can use 1.25" filters or buy and attach 1.25"à49mmà48mm adapters to use any 2" filters. Make sure to go through the calibration before attaching a larger filter to prevent the adapter from hitting the case during initial calibration.

- **Noise**

Astrophotography is about the art of separating signal from noise. The Dwarf II uses an all-purpose passively cooled camera, so image noise is a noticeable problem. For faint targets, you will also notice a form of “walking noise” mostly stemming from black level errors and “hot”/“cold” pixels, presenting in a circular pattern due to the field de-rotation during stacking.

**TIP:** Even though the help text recommends taking astrophotography darks inside the bag, I recommend attaching a blackout filter instead (or putting a piece of black film under the magnetic filter holder) and taking a “fresh” set of darks after dark around the time when you are imaging. As the sensor is not cooled, noise and “dark levels” for individual pixels depend

on the ambient temperature; taking dark calibration frames under similar conditions helps reduce artifacts in the processed image.

**TIP:** At the time of this writing, the software does not support dithering; however, if you plan on post-processing manually, you may want to consider recording multiple sets of exposures and manually changing the image center slightly between sets.

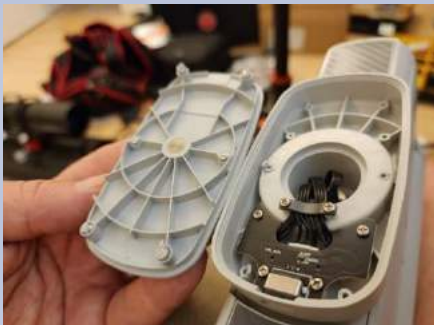
- **Downloads**

The download process for images takes a bit to get used to, involving a download from the device to the phone and, depending on intended use, downloading or sharing the image again.

**TIP:** If you plan on post-processing images on a Windows computer, connect your Dwarf via a USB cable connected to the USB-C port in the base. On your phone, connect to the Dwarf, go to Settings/Camera Settings and turn on “MTP Mode”. The Dwarf will show in your Windows Explorer, showing the device and the file folders (lights and darks) under “sdcard”.

### The Ugly

- The base plate of the Dwarf is secured to the device using very small screws. If you decide to polar align your device, there is significant stress, caused by the tilt and the lever resulting from most of the weight being further away from the base plate. This can cause the base plate to break / separate from the device. Dwarf has reinforced the base plate in more recent shipments; the recommendation for earlier Dwarfs is to reattach the base plate using 3M Scotch-Weld PR100 glue.



**TIP:** Secure the base plate by tightly wrapping a single layer of fiber tape all the way around the base on both sides of the center, with ends meeting up at the bottom of the base plate. This takes strain off the screws and pegs inside.

**TIP:** Email Dwarfllabs; in my case, they offered to ship a free replacement device.

### Worthy?

The Dwarf II is in a new category of compact, entry-level EAA instruments and it's fun to be an early adopter. For a first-generation device, the Dwarf is surprisingly capable, and we can hope to see improvements through firmware updates.

However, just like the original VHS tapes, expect your latest purchase to soon be replaced by the DVDs, Blu-Rays and streaming services of EAA; you will likely see many more entries in this field. ZWO recently introduced the Seestar S50 for pre-order at NEAF for a similar price, but as a specialized astrophotography offering, larger and with the same aperture and sensor as Vaionis' \$2,500 entry-level Vespera.

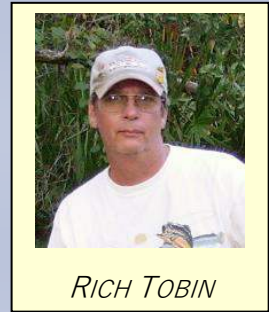
Product	Price	Focal Length (/ Wide)	Full fr. equiv. (/ Wide)	f-Ratio (/ Wide)	Aperture	Optics	Resolution	Sensor QE / AD Bits	Battery Life	Weight	Dimensions
<b>Dwarflabs</b> Dwarf II	<b>\$395</b> (\$485 filters, 2nd batt)	100mm / 8mm	≈ 675mm / 48mm	4.2 / 2.4	24 mm	Not specified	3864x2192 (8MP) Astro Bin 2: 2MP	IMX415 ≈ 90% / 12	3-4 hrs	1 kg	130x62x204mm
<b>ZWO</b> Seestar S50	<b>\$399</b> (pre-order, NEAF)	248mm (?)	≈ 785mm	4.9	50 mm	Triplet Achrom	1920x1080 (2MP)	IMX462 ≈ 90% / 12	6 hrs	3 kg	142x129x257mm
<b>Unistellar</b> eQuinox2	<b>\$2,499</b>	450mm		4.0	114 mm	Reflector	2688x1520 (6.2MP)	IMX347 ≈ 85% / 12	11 hrs	9 kg	740x270x310mm (in Backpack)
<b>Vaionis</b> Vespera VE50	<b>\$2,499</b>	200mm	≈ 635mm	4.0	50 mm	Quadruplet Apo	1920x1080 (2MP)	IMX462 ≈ 90% / 12	8 hrs	5 kg	400x200x90mm

Compact, entry-level EAA devices make both great “gateway drugs” as well as “instant gratification toys” for occasional use and are surely here to stay.



## Flats and Darks

This is the first of a monthly contribution to the Examiner by a group of SPAC imagers, who will be providing input on equipment, techniques, and all things imaging, in a new section called “Flats and Darks.” This contribution is made by Rich Tobin.



This is my current setup (may change soon I ordered a zwo 2600 camera) ZWO AM5 mount, William Optics Redcat 71, William Optics guide scope, ZWO ASiAir plus, ZWO ASI 294mc Pro, 2" filter drawer using a optolong L Extreme filter. This makes a very light setup that I can move quickly around the house to get the best position for what I'm trying to image for the night, also very quick setup when you want to travel to a different site.

As a Nebula guy using my Redcat 71 the choice of Nebulas is starting to get scarce now but if you get out early you can still capture the Crab Nebula M1 in Taurus but sets about 12:30, Orion M42 great Nebula for beginnings again sets about 11:30, Rosette NGC 2237 very large Nebula easy to locate sets about 12:50. The Cone Nebula NGC 2264 (Christmas Tree) another large Nebula will be a good target until it sets about 1:15. Nebula

season is winding down now quickly but still time to get four hours or so in on capturing some of these nice Nebulas but be ready and setup early and be ready to start imaging as soon as it's dark enough to begin.

Two pics, IC 443 is a super nova remnant not very large but a bright target located in Gemini. I captured it at WRP the 2023 star party using my Redcat 71 with a Optolong L Extreme filter shot at gain 200 and 2 minute exposure time about two hours of exposure



time total stacked in Deepsky stacker and post processing in Pixinsight.



Photo number two the Rosette Nebula NGC2237 (C49) very large Nebula in the constellation Monoceros. A wide field telescope or a focal reducer is the only way to capture the entire Nebula, Captured with my Redcat 71 using the Optolong L Extreme filter at gain of 200 and two minute exposure time about two hours of exposure time. Stacked with DeepSky stacker and processed using Pixinsight.

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In contrast to the super clear skies of mid-week, March's official **New Moon Weekend** was...



## SPAC Outreach

There are several aspects to **Outreach**, all having to do with introducing people to astronomy and telescopes in particular. Most of the events are at elementary schools plus a few libraries and scout troops. Generally, star parties are from Halloween the early March. The time change gives us an “extra” hour of darkness which is important for elementary students.

We like to have rookies look through a scope for the first time and remind veterans of the beautiful objects we can see. In the Fall, it is nice to point out to parents/grandparents that scopes make great gifts.

There is another type of Outreach – **Sidewalk Astronomy**. Whereas school events are planned and guests expect to look through a scope, viewers at Sidewalk evenings are entirely random. You sometimes have to be like a carny barker and hook them in. It is a serendipitous happening. Scopes are set up in high traffic areas, with dark skies not being a concern. Only bright objects are viewed in the city lights, primarily the moon and planets. First quarter moon is the best time of the month for all public viewing. I have had parents go home and bring back a kid “who loves astronomy”.

A third area is in **school presentation**, such as the Great American Teach-In. An in-class presentation usually covers the solar system. I always bring a scope to explain how they work and numerous display items, thanks to NASA and a meteorite.

I have found it very rewarding to hear the “Wows” from rookies. Truth be known, I have probably signed up less than five new members in thirty years but hopefully I have gotten a few scopes as gifts into children’s hands.

If you plan to join us in the Outreach program, first contact me to put you on the mailing list for events. I try to get data such as head count to determine the number of scopes, physically where do we enter the campus, park and set up. I tell them we want to park close. Occasionally a school brings out dollies to help us move gear from parking to viewing locations.

There are a few things to remember. Bring everything you need - batteries – no cords in the dark, charts to show viewers, chairs, tables and display item plus SPAC brochures. I don’t recommend big scopes, that avoids kids up on ladders. There will be very young viewers held by parents. Even though you have told them not to touch the scope (particularly Dobs), they will. I don’t want to “scare” kids away from scientific instruments but use it as a teaching moment to explain how scopes move easily and what happens – no harm, just nothing to see.





## ASI AIR – Evil Genius - Tamed?



Imagine you got yourself into an obscure hobby that allows you to peek deep into the universe, a time long ago, places unimaginably far away. Once you get sucked in, you want more; you want to see things that no human can see with the naked eye. Your lofty aspirations are followed by the realization that the fact that the quote “All

good things are difficult to achieve, and bad things are very easy to get.” is attributed to Confucius must surely have been based his astrophotography ventures.



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For those of us that have partaken in this potentially rewarding, but pain-inflicting hobby, the thought that “there must be a simpler way” surely came across our mind after marveling at the error “CheckDotNetExceptions ASCOM.myFocuser2ASCOM1.Focuser Position Get System.Threading.AbandonedMutexException: The wait completed due to an abandoned mutex” that persisted even after the second reboot and spending a few hours of clear sky time reinstalling drivers to fix the issue just before clouds roll in.

ZWO released the first dedicated “Astrophotography Wireless Controller”, named the “ASI Air” in 2018, quickly followed by a more polished “Pro” version the following year and the improved “Plus” in 2021; a cheaper, smaller, feature-reduced “Mini” version was introduced last year. ASI describes the device as the “promised land”, i.e. a “smart WiFi device that allows you to control all ASI USB 3.0 cameras, ASI Mini series cameras, and an equatorial mount to do plate solving and imaging with your phone or tablet/iPad when connected via WiFi”.

At its core, the ASI AIR is a Raspberry Pi 4 with specialized software; the idea of leveraging this cheap and readily available hardware is far from new and several open-source solutions exist. [INDI](#) and [INDIGO](#) provide a framework for drivers (i.e. “ASCOM on Linux”) to control astronomical equipment. [Open Astro](#) and [AstroBerry](#) are Raspbian Linux builds with INDI support while [Indigo Sky](#) offers images with built-in INDIGO support. The INDI-based [Ekos](#) is a full automation and control suite. [Stellarmate](#) offers commercial cross-platform solutions, including software you can run on a Raspberry PI 4 (or an ASI AIR) as well as “all-in one hardware”, even promising an ASI AIR-like device with 4 12V ports, 2 controlled dew heater outputs, built-in GPS to be released in June



## Evil

ZWO uses a Debian Linux build and leverages INDI drivers, PHD2 etc. under the hood, but took a page out of Apple's playbook and, removes support for any kind of hardware for which it offers an alternative, i.e. your ASIAIR will not work with dedicated astronomy cameras, focusers or filter wheels that are not manufactured by ZWO. Luckily it does support most Canon, Nikon, and Sony DSLR & mirrorless cameras and most mounts.

One of the benefits of the ASIAIR is that you can easily control it via your Android or iOS phone or tablet. However, the absence of native Windows and MacOS apps makes transferring and post-processing a possibly "disjointed" experience requiring multiple devices.

## Genius

ASI did not *just* take a Raspberry PI with its standard USB hub and microSD card slot, but also added 4 12V switchable power outputs, a DSLR "snap" control port, a USB-C host port and an external antenna promising a range of about 60 feet.

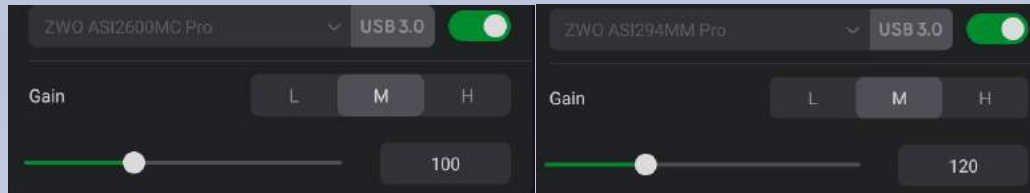
## Tamed

ZWO maintains fairly detailed [documentation](https://www.yuque.com/zwopkb/asiair) (<https://www.yuque.com/zwopkb/asiair>) for the various models. Even though there are a few questionable translations and diagrams and a few outdated screen shots involved, the manual does appear to be updated, e.g. showing an accurate list of supported hardware (which now includes Sony mirrorless cameras and additional Canon mirrorless cameras as of February). Instead of "rehashing documentation", I will attempt to focus on a few, hopefully useful tips

### Camera Settings

- o Gain

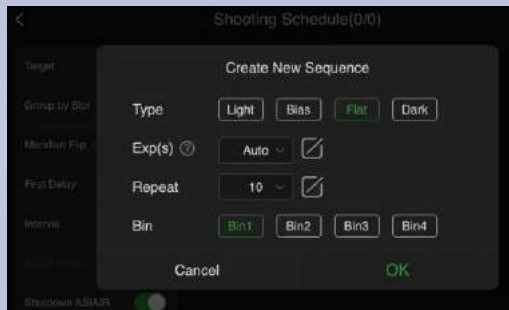
During OBS, I noticed several club members using the gain sliders in the camera settings to adjust between gains suitable for imaging vs preview for framing. The ASIAIR defaults "L" to the minimum gain (0), "M" to the gain where either the HCG kicks in or unity gain and "H" to maximum usable gain; for optimal signal-to noise ratios when imaging DSOs, choose "M" or "L" presets. You can see below that the values vary depending on the camera model.



ASI presets the offset value for all cameras.

## Calibration Frames

You can use Autorun to record Bias, Flat and Dark sequences; the ASIAIR will store the corresponding calibration frame(s) on your currently active storage device; the frames can be downloaded, used for live stacking or referenced in post-capture stacking that was added in recent software releases.



## Storage

While live stacking is handy, you will likely also configure your ASIAIR to capture raw images you download for later processing, so removable or expanded storage is useful.

- The built-in microSD card slot accepts SD cards up to 1TB in size as long as they are formatted using an exFAT, FAT32 or NTFS file system. A 256GB card (e.g. Samsung Pro Plus) is a healthy compromise and leaves sufficient room for RAW images from a few sessions before transferring them. A speed class of 10 / U-1 / V10 or above is sufficient.
- You can use a USB drive/stick, connected either to the ASIAIR or a hub, i.e. in one of the cameras or indirectly connected. However, the ASIAIR software only uses one storage device at a time; this includes e.g. flats / calibration frames and negates some of the “convenience” of having a removable drive as it translates to the necessity to “move around” darks used for live stacking between removable devices.
- Avoid using external SSDs and hard drives due to the higher power consumption, particularly if you have other USB-powered devices (e.g. focusers).

## WiFi

- Changing the WiFi band on your ASIAIR from 2.4 to 5 Ghz significantly speeds up your transfers (and live preview), usually by a factor of about 2 as long you stay close to the device. For long distances, the 2.4 GHz signal usually reaches farther as the ASIAIR only has a single antenna and has no “beamforming” capabilities found in modern 802.11ac or Wi-Fi 6 routers.
- When imaging at home or with multiple devices in the field, you can put your ASIAIR into “Station Mode” to connect it to a router and then connect other devices to the same router. This comes in handy while at home as you can roam your house, connecting to the ASIAIR as long as both devices “see” the router. The connection is usually faster than a WiFi direct connection over larger distances (see comment above).

## USB Ports

- Only 2 of the 4 USB ports on an ASIAIR plus are capable of USB 3.0 speeds. Without doubt, you want to connect your cooled main camera to one of these ports, but most monochrome guide cameras, focuser, mount and filter wheel are not significantly affected by USB 2.0 speeds.
- Avoid connecting devices with high power draw to the ASIAIR. The maximum total power draw between all ports (per chip manufacturer spec) is 1.2 Amps, i.e. 6 Watts. Connecting hard drives or USB dew heaters causes issues when the power draw fluctuates during operation (e.g. USB powered focuser motor rotation). If necessary, connect a powered USB hub.

## Image Transfer

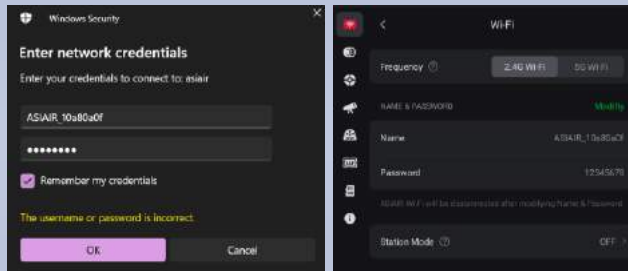
- Using WiFi

Beyond downloading images to your mobile device, you can also connect to the ASIAIR from your Windows laptop in “Station” mode or when connected directly to the device WiFi.

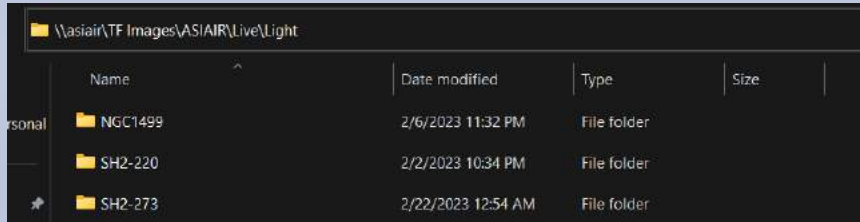
- Connect and open [\\asiair](#) e.g. in the Windows File Explorer.

If the name does not resolve when connected directly, open a command window, type “ipconfig” and look at Default Gateway...: <addr>, then open [\\<addr>](#).

- You will be prompted for network credentials (left); use the “Name” and “Password” (“12345678” by default) configured in the ASI AIR Wi-Fi setup:



- Once connected, navigate to the respective device and folder to access the files



- USB-C**

You can also transfer files to a PC, Mac or tablet directly using the USB-C port; depending on the type of host device port, you may have to use a Type A to Type C cable with a Type C to Type A host adapter on the other end to make it work (e.g. when connecting to some tablet).

- Ethernet**

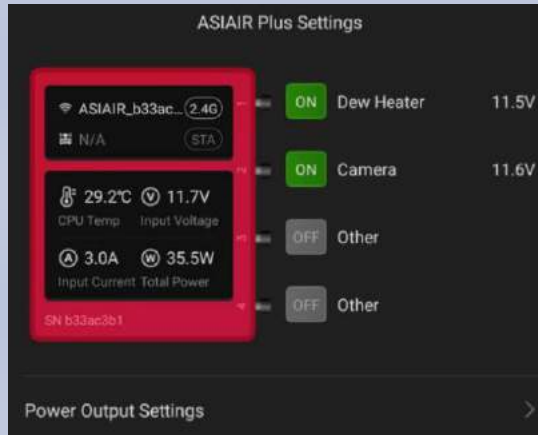
You can directly connect the Gigabit Ethernet port to your home router and use the same options as shown under “WiFi” above. Alternatively, use the WSA application connection shown below.

### 12V ports

- The ASI AIR has controlled and monitored power ports; each port is limited to 3A and the power draw for all ports including the ASI AIR is 10A. Even though that accommodates most cameras and dew heaters (e.g. the Celestron RASA 11 dew heater ring uses 30 Watts max, i.e. below 3 amps), it does not support embedded



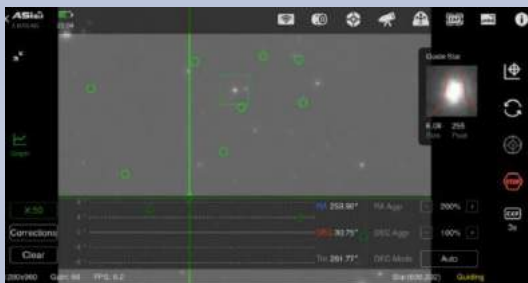
temperature sensors found in those devices.



- Settings for the ports (e.g. on/off state, whether it is a dew heater and the level) are retained by the ASI air and automatically restored during the boot process.

### Autoguiding

- We know to reduce flexure when using a guide scope and reduce cable drag where possible. However, the ASI AIR does not show a “preview” of the guide camera image by default. This makes it hard to notice issues that your guide scope has dew or is out of focus. Make sure to expand guiding details to check for issues



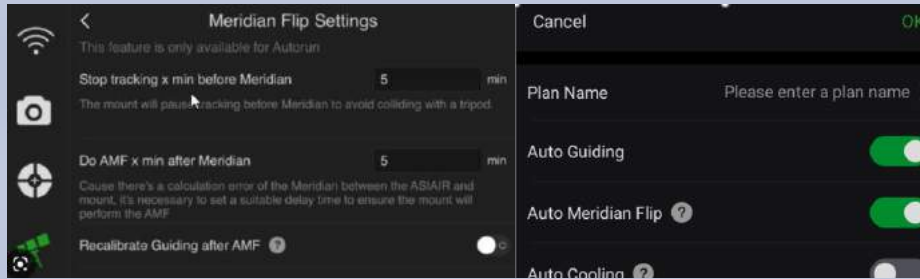
### Preview

- Low refresh rates in preview can make e.g. manual focus adjustment on your guide scope cumbersome. If you need to make any manual adjustments and find the refresh rate too low, temporarily use binning (to reduce resolution) or switch to video mode with high gain.

### Meridian Flips

- The crux with meridian flips is that mounts, drivers and the controlling software (initiating a slew to target coordinates past the meridian) can cause a flip. Furthermore, some mounts allow tracking past the meridian while others do not. Some telescope configurations limit motion further as experienced by at least one club member during OBS.
- At least until release 2.0, the ASI AIR software did *not* perform automatic meridian flips via forced slew commands during live stacking, but will in autorun / plan mode.
- You can control mount/driver level meridian flip under “Mount Settings” or “Telescope Settings” (depending on the version you use) under “Meridian Flip Settings”.

You can enable “Auto Meridian Flip” on the plan level.



- If your mount does not let you track past the meridian or your telescope would e.g. hit your tripod legs, make sure to adjust the “Stop tracking x min” and “Do AMF x min after Meridian” accordingly. The ASI AIR often cannot “tell” that your mount is stuck or stopped tracking; it can only derive the information based on whether guiding is operational. Based on what I could find, it appears that the ASI AIR attempts to (re-)start the guiding up to 30 times; if that fails, the plan is stopped.
- For AM5 mounts, ASI has default settings that initially worked; however, ASI has recently released firmware updates for the mount that affect tracking past the meridian. Make sure to update your mount firmware if you have an AM5 mount when you update your ASI AIR to a more recent version.

### Desktop Use

- ZWO offers a native ASI AIR application for M1/M2 chipset Macs on the AppStore
- On Windows 11, you can leverage WSA (Windows Subsystem for Android) to run the ASI AIR app on your computer to connect to the ASI AIR
  - Follow the instructions [here](#) ; you basically install “Amazon AppStore” from the Windows store and enable developer mode
  - Download “WSA Sideload” from the Windows store
  - Go to <https://www.zwoastro.com/downloads/asi-air>, download the Android APK file and install it with the side-loader.
  - You can now run the ASI AIR app on your PC. Sharing in WSA integrates with your Windows applications, so you can even directly “share” e.g. a .FIT file from within

the ASIAIR app to open it with PixInsight.



- On Intel Macs and Windows 7 through 10 PCs, you should be able to run the ASIAIR application via BlueStacks.

The ASIAIR provides tremendous value for very little money; if you are so inclined and everything seems too easy after you start using it (or you want or need hardware not supported by ZWO), you can even install several of the aforementioned open source builds on your ASIAIR. Just prepare yourself to see even more amazing error messages.

## OBS Tribute Video

Field Reporter extraordinaire **Kelly Anderson** will be presenting this video at this month's General Meeting, going over each day's activities and highlights of our 30<sup>th</sup> annual Orange Blossom Special star party. I had experimented with a



new DJI mini 3 Pro drone and composing daily videos, but as I started to get sick on Friday, it wasn't until much later that I completed the final two days. These videos have been combined with additional photos and videos taken by Kelly into one singular tribute video. Scan the QR code to the left with your phone's camera to be taken directly to watch the video. Enjoy!



## Space Exploration News



Dust devils have returned to Jezero Crater on Mars with the purely coincidental arrival of spring on both Earth and Mars. With the increased solar radiation falling on that region of the planet, [dust devils](#) have again become routine sightings since the first since last fall was sighted April 4 just after noon.

On Mars, dust devils have mostly been good for our solar powered spacecraft, cleaning off solar cells and extending their lives. Perceverance doesn't have solar panels, so it can't benefit. In fact, a recent dust devil actually damaged some wires attached to a wind speed sensor on Perceverance's observation mast.

James Webb Space Telescope, using multiple instruments on board, has taken the most detailed spectroscopy of an exoplanet in history, of [VHS 1256b](#), a planet about 40 light-years away orbiting a pair of M dwarf stars. With masses of only about 64 Jupiter masses, they are so faint that they weren't discovered until 2015. VHS 1256b, 10 to 20 Jupiter masses itself, orbits both stars in a large orbit about 150 AU in diameter, four times further than Pluto's average distance from the Sun. Because of this, astronomers don't need an occulting disk to block light from the star, they don't have to take spectra of a star with a planet in front of it and another with none and mathematically





subtract one from the other, they can directly point JWST at the planet, just as we would to take a spectrograph of Saturn. Among the astounding results are that VHS 1256b has silicates in its atmosphere.

ULA had something of an anomaly while testing the latest version of its Centaur hydrogen powered second stage rocket on March 29. After a couple of weeks of severe information management, ULA chief executive, finally posted some [close up video of the explosion](#). This revealed a pressure burst, followed by an ignition and intense fireball. It's still unknown if this test article was being tested to destruction, or what the parameters of the test were. It is known that the test article was not the present generation of Centaur, but a prototype of the next. Although the news media is predicting this will delay the first launch of ULA's new Vulcan-Centaur rocket, experts, like Scott Manley, doubt it will have any impact.

Friday afternoon, April 14, 2023, SpaceX received official FAA license to launch the fully stacked Super Heavy/Starship for the first time. [Launch is expected](#) early next week as SpaceX has road closings, temporary flight restrictions and notices to mariners for Monday, April 17. Speculation is that obtaining the license on Friday leaves no time for the Sierra Club to obtain injunctions from the court system to stop a launch on Monday. Apparently this first launch will not be orbital, but a long range suborbital flight with an apogee of ~235 km and a duration of about 90 minutes. Neither the Super Heavy booster nor the Starship will be recovered on this first mission.

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## May Lunar Calendar

May 3, Spica will be  $3.3^\circ$  south of the Moon

May 4, the Moon will cross the celestial equator going south at the Descending Node

### **Full Moon May 5, the Full Flower Moon**

May 5, the Eta Aquarid Meteor shower will yield a ZHR of about 50, severely hampered by the full moon

May 7, Antares will be  $1.5^\circ$  south of the Moon

May 8 Mars will be  $3.2^\circ$  south of the Pollux

May 10, the Moon will be at Perigee: 369,345 km from Earth

### **Third Quarter May 12**

May 13, Saturn will be  $3.3^\circ$  north of the Moon

May 17, Jupiter occulted by the Moon beginning at 07:17 EST ending at 08:22

May 17, the Moon will cross the celestial equator going northward at the Ascending Node

May 17, Mercury will be  $3.6^\circ$  south of the Moon

### New Moon May 19

May 23, Venus will be  $2.2^\circ$  south of the Moon

May 23, Pollux will be  $1.6^\circ$  north of the Moon

May 24, Mars will be  $3.8^\circ$  south of the Moon

May 25, the Moon will be at Apogee: 404,510 km from Earth




























### First Quarter May 27

May 29, Mercury will be at Greatest Elongation:  $24.9^\circ$  west of the Sunday

May 29, Venus will be  $3.9^\circ$  south of Pollux

May 30, Mars will be at Aphelion, 1.66594 AU from the Sun

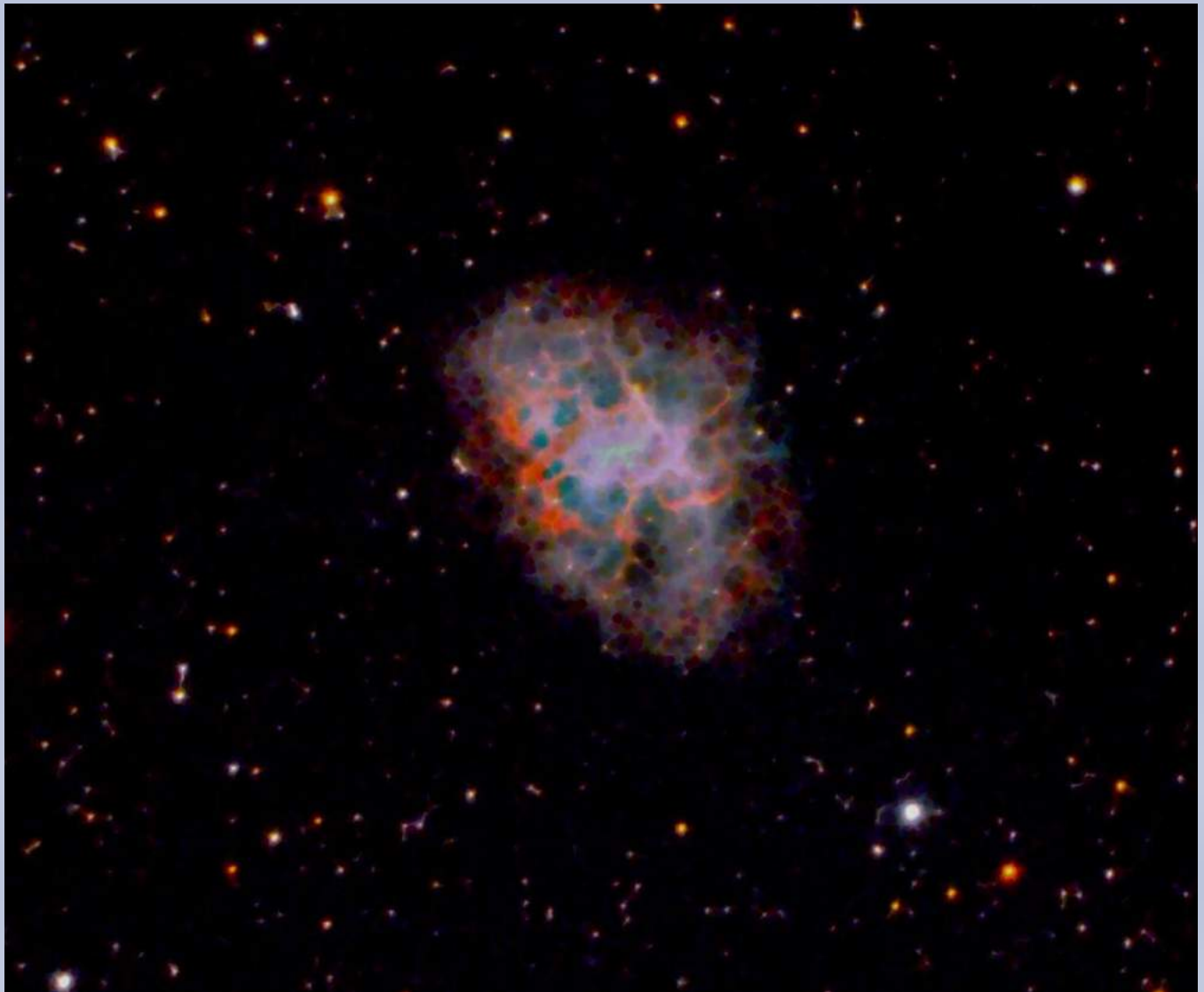
May 31, Spica will be  $3.3^\circ$  south of Moon

May 2023						
««	Sun	Mon	Tue	Wed	Thu	Fri
»»	Sat					
		1	2	3	4	5
						
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			
						

## SPAC Image Gallery



Here are some excellent astrophotography highlights from our fellow SPAC members. Anyone who would like to share his or her work, I encourage you to [email the editor](#) to submit for future newsletters or share them on our [SPAC Facebook page](#).

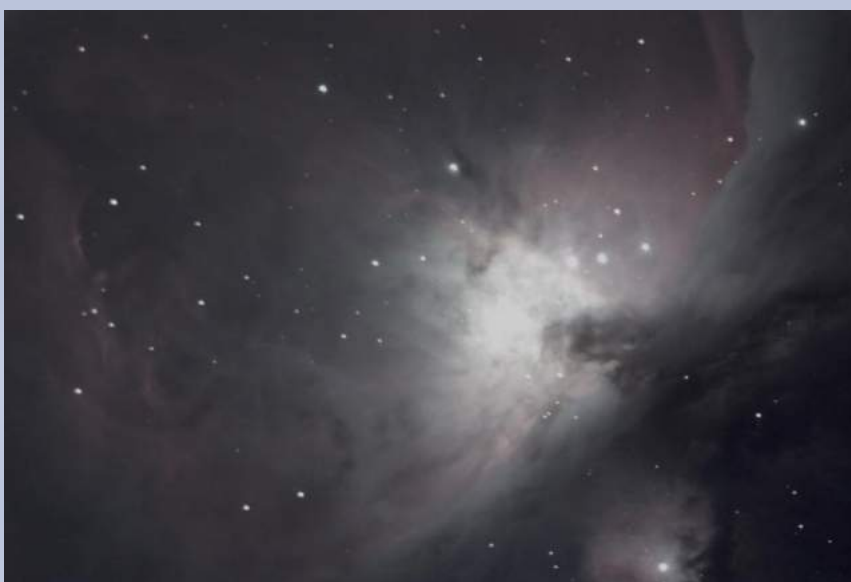


**M1** integration time 1.5 hours, scope celestron 6 inch, mount EQ6 R, Camera 2600MC  
Filter OTL-L Pro, Located in Zephyrhills using Pixinsight **by Johnny White**



Above: **M51** by **Phillip Roey**  
and

Right: M42 with Sharpcap  
livestack on my 10" Meade  
Schmidt Newtonian with a  
ZWO ASI178MC camera by  
**Peter McLean**

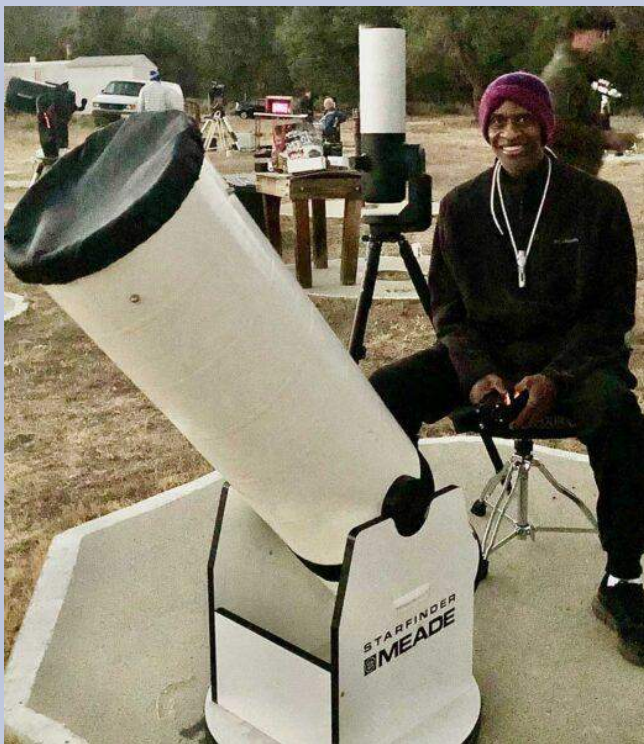


## To Boldly Go...

I started in this hobby long before my first trip up to the old Hickory Hill observing site back in 1993, having grown up watching all manner of sci-fi shows and movies. Ah, the early 80's! It was such a golden era of memorable movies such as Star Trek II: Wrath of Khan (the good one). Then came along The Next Generation in 1987 and I was hooked. After high school, I took a few astronomy classes which led me to SPAC, and here we are 30 years later. If you have Paramount + then perhaps you too have been watching Season 3 of Picard. I'm not a fan of Picard's executive producer Alex Kurtzman and his style of "Trek," but season 3 changed hands and the difference can't be understated. It's a trip down memory lane with the crew of the Enterprise D at their best.

While watching an episode of Wil Wheaton's "Ready Room" on Youtube, that'd be the actor who played Wesley Crusher on STNG, he was talking to actor Tim Russ. He played the Vulcan Tuvok on Star Trek Voyager from 1995-2001, and I was shocked to learn he was also an amateur astronomer. I don't know why it surprised me, I guess because I'd never heard of a Trek actor actually being interested in the night sky. A quick internet search and I found a Sky & Tel article with him back in 2022. He's a member of Los Angeles Astronomical Society and routinely brings his 10"

Starfinder Dob up to the Griffith Observatory for public viewings. Hearing him talk to Wil Wheaton about setting up his gear and using his scope made me smile. Live long and clear skies, Mr. Russ.





## SPAC Mirror Lab



Hi All,



*MICHAEL DAVIS*

Well, it's time to start working on next year's OBS raffle scope. Actually, work started on it at the end of the last OBS, when I was presented with an old wreck of a scope and told it was going to be the next raffle scope. Oh, and by the way, I was going to be the lead person on rebuilding this one. I can't really blame some of the other Mirror Lab guys. They have really worked hard on the last few raffle scopes, and they needed a break. Anyway, I loaded it up and brought it home with me from OBS. Then I set it up and began cataloging its shortcomings and formulating a plan to fix it.

I'm sure this scope was someone's pride and joy when they built it, but I took a good hard look at it after getting it home and cringed. It had so many issues. It's an older, home-built DOB with an all wood tube. It's insanely heavy, awkward to handle and difficult to transport. The primary mirror was glued into an inadequate cell with no ventilation. The altitude



bearings were horribly undersized. The balance point must have been too far to the rear, because huge blocks of heavy wood were used to mount the accessories at the front. The ground board has four feet and tends to rock. On the plus side, the woodwork was pretty good, it had decent optics and some reusable parts like a decent focuser, spider and Telrad.

I pondered what to do. The temptation to just strip the reusable parts off of it and start over from scratch was strong. But I didn't think I had time to build an entirely new scope before the next OBS given that I am going to be out of town for several months between now and then. Eventually I formulated a plan to modify the scope to make it much lighter and easier to transport and use. Plus make it perform better optically, without having to do a complete rebuild.

I decided the best and easiest thing to do would be to cut over three feet out of the middle of the long wooden tube and turn it into a Serrurier truss design, with light-weight aluminum rods bridging the gap between the upper and lower sections of the tube. This would make each section

of tubing much shorter, lighter and easier to handle. In a bold move, I decided the truss connecting hardware will be made from 3D printed parts (an idea we have been kicking around at the Mirror Lab for a while now). I also planned on rebuilding the mirror cell, adding ventilation and much larger altitude bearings. I also decided the rocker box will need to be shortened and modified to accept the larger diameter altitude bearings. The ground board will also be modified or replaced.



I ran my ideas past the other Mirror Lab members at our regular Saturday lunches, and got their helpful feedback. I also arm-twisted promises of help out of a few of them. Allen Maroney will be handling 3D printing all the interconnection hardware based on my prototype design. Allen has also

donated some Ebony Star Formica for the new altitude bearings. Ralph Craig has offered to help with the new altitude bearings.

One area where other club members could help out with this project is to donate any unused or unwanted eyepieces. It's always nice to include a few eyepieces with a raffle scope so the winner has everything they need to start using their scope immediately. Contact myself, Mike Partain, or any club officer or Mirror Lab member to make a donation.

I also decided to make videos of the entire renovation process and post them to YouTube. I am doing them in the theme of This Old House, under the title This Old Telescope. The first two videos are already out, and I am deep into making the third as I write this. Here are the links to the first two videos:

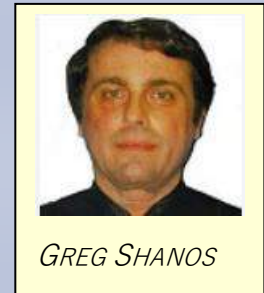
#1 <https://youtu.be/OSAfPXtjZ78>

#2 <https://youtu.be/OSAfPXtjZ78>

The scope is coming along, and I am enjoying the project. I think it will be a great scope for someone once it's done. I will likely buy some raffle tickets myself.

That's all for this month. Please feel free to submit your own article ideas. If you know of a mirror making or telescope making story that you think should be showcased here, email me at [astronomermike@gmail.com](mailto:astronomermike@gmail.com). Put "Mirror Lab Submission" in the title so it will stand out in my email torrent. You can follow everything happening at The Mirror Lab at <http://telescopelab.com/>. You can follow what I am doing on my blog at <http://www.mdpub.com>.

Venus in a Different Light  
by Gregory T.  
Shanos  
NASA/JPL Solar System Ambassador



The planet Venus is currently well placed in the western sky right after sunset. The best time to observe Venus is while it is still daylight since it will be higher in the sky which will lessen the atmospheric turbulence. Use a GOTO telescope to find Venus an hour before sunset and just before sunrise. For many amateur astronomers, Venus appears rather featureless and not very interesting except for its phase. Therefore there is no reason to image Venus on a regular basis. Nothing can be further from the truth; we need to see the planet in a different light- namely the ultraviolet and infrared. These wavelengths are invisible to our eyes, however, today's CMOS planetary imaging cameras are rather sensitive to these wavelengths.

At ultraviolet wavelengths, Venus exhibits high altitude clouds of sulfur dioxide, sulfuric acid and other unknown absorbers. To image these cloud features an ultraviolet filter is required. An inexpensive specialized planetary imaging filter set is available from Astromania for only \$77.99. The filter set includes an ultraviolet 350nm narrowband filter, infrared 685 longpass filter and methane 890nm narrowband filter. Our eyes are fine tuned to see the electromagnetic spectrum between 400nm to 700nm. Today's CMOS chips are sensitive between 300nm to 400nm in the near-ultraviolet. A barlow lens and diagonal prism cannot be used when imaging Venus in the ultraviolet since these additional lenses and mirrors can potentially absorb precious ultraviolet photons. Simply screw the UV filter onto the nosepiece of the monochrome ZWO, QHY or Player One camera then attach it to the telescope at prime focus. *A Schmidt-Cassegrain at least 8-inches (200mm) or larger in aperture is ideal for planetary imaging.* The telescope must be tracking, however, autoguiding is not necessary and can even be mounted alt-azimuth. *Focusing can be challenging especially in the ultraviolet. My technique is to reduce the screen size of the planet to 50% then focus until the circumference of the planet is as sharp as possible. When you hit record, the video is taken at 100% size and resolution.* Typically, a 60 second video is taken with the free software Firecapture or SharpCap. The reason a 60 second video is taken is because most planets show significant rotation if taken for longer periods of time. The surface details on Mars, Jupiter and Saturn will appear blurry and smeared if videos are taken longer than one minute. This is not true for Venus. Venus exhibits two central meridians, CMI is for the surface rotation and CMII is for atmospheric rotation. For Venus, I take a 300 second (5 minute) AVI video. The planet barely rotated during the five-minute

exposure with the surface central meridian exhibiting no rotation whereas the atmospheric clouds only rotated 0.3 degrees. Firecapture has an autoguide and cut feature which will keep the planet centered and reduce the region of interest resulting in a smaller file size. File sizes for planetary videos are typically in the gigabyte range. *Once you have the video, import it into the free program Autostakkert for aligning and stacking then export the image into Registax for sharpening.* Stack only 15% to 25% of the highest quality video frames. Further sharpening with Astralimage and Photoshop Elements are recommended. *I typically do a quick Autostakkert and Registax processing in the field to see the quality of my video processed image. The time it takes to capture, align, stack and sharpen an image is only 10 minutes (five minutes was to capture the video). If the image is of poorer quality, simply take another video. I typically take three to five videos then choose the best processed image. Import this image into Astralimage.*

I use a Lucy-Richardson deconvolution which further enhances the clouds. The clouds appear dark against a white planet. Once you deconvoluted in Astralimage, import the image into Photoshop or Photoshop elements. The high pass filter option further brings out details in the cloud structure. Increase the image size by 1.25x to 1.5x depending on the quality of the image. Save the file as a TIFF, PNG or JPG and you are finished.

Once you become proficient in imaging Venus in the ultraviolet, you will want to upgrade your ultraviolet filter. *The best UV filters on the market are the Chroma UBessel and Astrodon UVenus which both give a 98% bandpass from 320nm to 380nm whereas the Astromania only gives 80% bandpass at 350nm with some infrared leakage.* The Chroma filter does not come cheap at \$295 and is available from the manufacturer. Astrodon UVenus costs slightly less at \$253. I now use the Chroma U Bessel filter exclusively and the difference is astounding. The dark clouds of Venus appear with much higher contrast and resolution. You get what you pay for.

The mid-latitude clouds of Venus become visible in infrared wavelengths. Monochrome planetary cameras such as the ZWO, QHY and Player One are sensitive to the near-infrared from 700nm to 1000nm. The 685nm longpass filter from the Astromania filter set is therefore required. However, one needs to be deeper in the infrared to have better contrast with the mid-latitude clouds. The ZWO 850nm IR longpass filter costs only \$22 and is strongly recommended. Follow the same procedures as for the ultraviolet. Take a 300 second (five minute) video using the 850nm IR longpass filter then process the video using Autostakkert, Registax, Astralimage, and Photoshop. The infrared camera gives more video frames therefore one can stack 25% to 33% of the highest quality frames.

There is a hidden treasure for deep-sky and planetary imaging unknown to most amateur astronomers- AstroSurface. Astrosurface is a free software that aligns, stacks, sharpens, deconvolutes all in the same program. Tutorials are available on YouTube. Fortunately, the learning curve for this program is not very steep. I typically process UV and IR images of Venus using both Autostakkert/Registax and Astrosurface. The images turn out essentially equivalent in quality.



Today's planetary images taken by amateur astronomers rival photographs from professional observatories fifty years ago. Therefore, planetary images are of great scientific value. The Association of Lunar and Planetary Observers (ALPO) archives your images for amateur-professional collaboration. See [www.alpo-astronomy.org](http://www.alpo-astronomy.org) Send images to [venus@alpo-astronomy.org](mailto:venus@alpo-astronomy.org). The Venus Section director is Julius Benton PhD. The Planetary Virtual Observatory and Laboratory (PVOL) is a European database. Send images to [pvol@ehu.eus](mailto:pvol@ehu.eus). The [hstjupiter@groups.io](mailto:hstjupiter@groups.io) is another database for all the planets not only Jupiter. There is also ALPO-Japan email: [alpo-obs@alpo-j.sakura.ne.jp](mailto:alpo-obs@alpo-j.sakura.ne.jp) I send my planetary images to all these databases.

The Akatsuki spacecraft launched by the Japanese Aerospace Exploration Agency entered orbit around Venus on Dec 7, 2015 and has since been continuously studying the atmosphere of Venus using several cameras in the visible, ultraviolet and infrared wavelengths. *The Akatsuki Science Data archive has photos of the clouds of Venus in the ultraviolet and infrared that can complement amateur astronomer ground based images.*

*NASA has two missions in the works to study Venus. The DAVINCI mission is planned to launch in 2029 and will study the Venetian clouds. VERITAS is scheduled to launch in 2031 and will map the surface at higher resolution. The European Space Agency (ESA) plans to launch the EnVISION spacecraft in 2032 which is designed to study the atmospheric composition of Venus.*

*A private mission from Rocket Labs will launch a spacecraft called the Venus Life Finder (VLF) within the next year or so to study the clouds of Venus and attempt to confirm the presence of phosphine and other organic molecules. Phosphine has been in the news as a possible molecule from living organisms in the clouds of Venus.*

*In conclusion, Venus when imaged in the infrared and ultraviolet portion of the electromagnetic spectrum exhibits dynamic cloud features that are visible in a small telescope by amateur astronomers. Unlike deep-sky, planetary imaging is more reasonably priced and affordable. A ZWO, QHY, or Player One camera costs \$299, the price of an average eyepiece. The Astromania filter set is only \$78 and the ZWO 850nm IR filter is \$22. Therefore for about \$400 you can start imaging the planets "in a different light".*

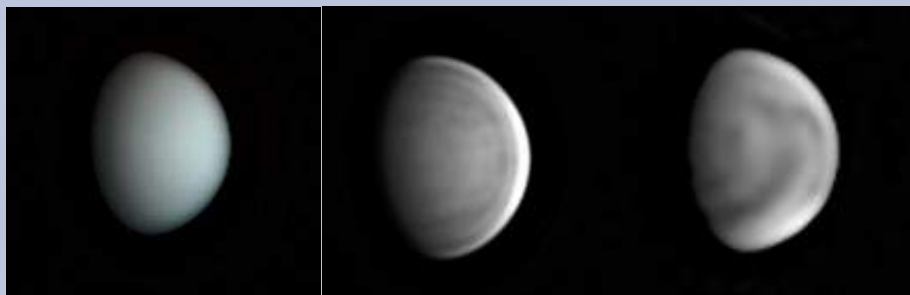




Figure 1: Venus taken on March 22, 2023 in the visible, infrared and ultraviolet by the author. The left image was taken at 22h 09.3m UT (6:09pm local time) CMI 18.2° CM2: 192.7° with the ZWO ASI 462MC one-shot color camera and Baader CMOS optimized UV/IR cut filter to simulate what the eye would see. The middle image was taken at 23h 14.1m UT (7:14pm local time) CMI 18.4° CMII 196.6° with the ZWO ASI 462MM monochrome (high infrared sensitivity) and a ZWO 850nm IR longpass filter while the image on the right taken at 22h 47.3m UT (6:47pm local time) CMI 18.3° CMII 195.0° with the ZWO ASI 178MM monochrome (high ultraviolet sensitivity) and the Chroma U Bessel filter. Venus was at Magnitude -4.0, Diameter 13.4" and 80% phase. North is up. Note how Venus has a very slow rotation rate as evidenced by the central meridian values. It is important to use the camera with the highest sensitivity for the spectral region you would like to image. Venus was 54° above the horizon when the color image was taken and 40° when the infrared image was taken.



Figure 2: I imaged a strange white spot that appeared on Venus in the ultraviolet on Feb 6, 2023 (far right). This caught the attention of three planetary scientists in Europe namely Antonio Cidadao MD PhD, Agustin Sanchez PhD and Javier Peralta PhD. Dr. Cidadao from Portugal also imaged this white spot on Feb 1<sup>st</sup> and 2<sup>nd</sup> 2023 and created this composite which includes my image. The origin of the white spot remains a mystery however current hypotheses include volcanic activity, turbulence in the atmosphere or charged particles from the sun. Scientific papers have been written on this phenomenon and the 2023 occurrence will surely be published.

Figure 3: The Venus Cloud Discontinuity is a rare phenomenon believed to be a type of gravity wave that changes the atmospheric density occurring in the mid-latitude clouds at infrared wavelengths (use an 850nm filter). The wave appears as a vertical “bruise” or “zipper” like structure. I am constantly monitoring for this phenomenon when I image Venus and hope to one day observe and image it. From the ALPO website under the Venus section.



Figure 4: The author with his 10-inch Meade LX200GPS Schmidt-Cassegrain telescope, ZWO cameras, assortment of filters and MSI GF65 six core 12 thread upgraded to 40GB RAM gaming computer. *I recommend a high-end gaming laptop since these computers are designed with high-end graphic cards, processors and RAM which greatly reduces video processing time.* A fenced in area also helps with unexpected wind gusts. Also pictured is the Ambient Weather WS8480 weather station.

## International Dark Sky Association



LEEANN  
MUSZYNSKI

### **Celebrate the Night! April 15-22, 2023**

Join the International Dark-Sky Association and the dark sky movement!

International Dark-Sky Week was created to raise awareness of light pollution, and provide free education, resources, and solutions to the public to encourage the protection of and enjoyment of dark skies and responsible outdoor lighting.

Learn more at <https://idsw.darksky.org/>

Many local municipalities have issued proclamations for International Dark-Sky Week this year. Dade City (home of Withlacoochee River Park), Gainesville and Alachua County, Florida all recognized the special event. The proclamations were presented at the city/county commissioner's meetings to Leeann Muszynski.



Mayor James Shive and the Commissioners of Dade City.

## For Sale

Premium 2" **Explore Scientific Eyepieces**. 100° afov.

PM me if interested @ [stargeezer812@gmail.com](mailto:stargeezer812@gmail.com)

40 mm 82° afov

20 mm 100° afov

9 MM 100° afov

5.5 mm ° 100 afov

All fully multi-coated and  
sealed with argon inside





## SPAC Business Meeting

Our next business meeting is **Wed., May 10th, at 8:00 PM** via conference call; details upon request.

All interested members are invited to attend. All club business decisions are made at the business meeting so as not to encumber the general meeting.

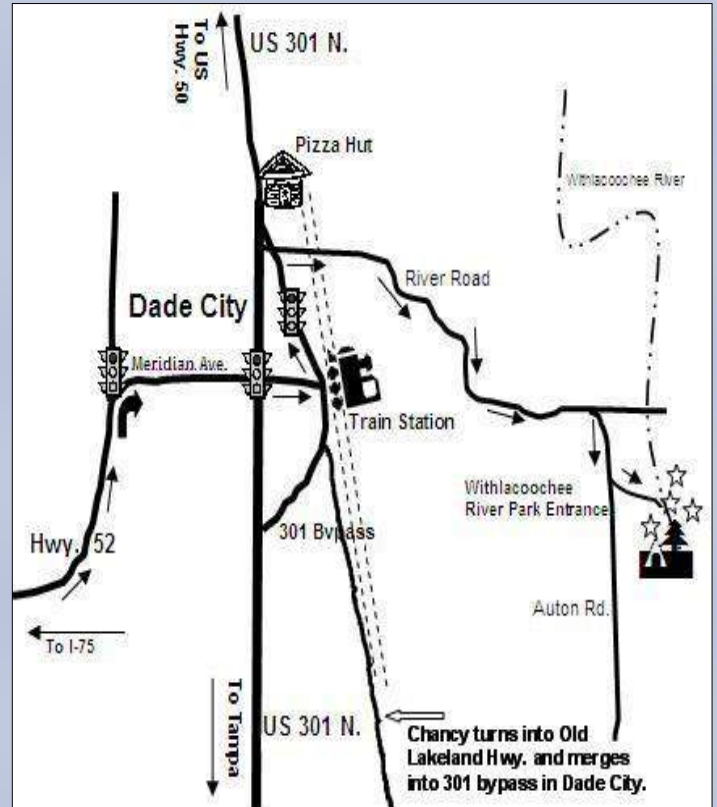
## Officers & Directors

President	<a href="#">Brad Perryman</a>	727 420-1957
Vice Pres.	<a href="#">Paul Krahmer</a>	727 535-5827
Secretary	<a href="#">Shirley Vuille</a>	727 864-2624
Treasurer	<a href="#">Jim Hunter</a>	813 507-8415
Dir.-at-Large	<a href="#">Kyle Brinkman</a>	727 455-6931
Dir.-at-Large	<a href="#">Steven Gaber</a>	727 215-0464
Dir.-at-Large	<a href="#">Jack Fritz</a>	727 692-9831
SPACE Editor	<a href="#">Guy Earle</a>	813 785-1972
Public Relations	<a href="#">John O'Neill</a>	727 637-5945
Membership Chair	<a href="#">Shirley Vuille</a>	727 864-2624
Mirror Lab Chair	<a href="#">Paul McNabb</a>	727-345-5713
Outreach Chair	<a href="#">Jim Hunter</a>	813 507-8415
Star Party Chair	<a href="#">Mike Partain</a>	850 339-0828
Librarian	<a href="#">Ralph Craig</a>	727 384-2086
Club Webmaster	<a href="#">Jack Fritz</a>	813 508-5680
Dark Sky Chair	<a href="#">Leeann Muszynski</a>	813-601-0986

*Click on the name to send email*

### Withlacoochee New Moon Weekends

There's no need for reservations. However, the park closes at sundown, so you will need to arrive before then. The park rangers will give you the gate-code once you're inside the park. Please do not call for the gate code as they are not allowed to give it out over the phone.



### Withlacoochee River Park – Dade City, FL

Detailed directions can be found at:

[www.StPeteAstronomyClub.org](http://www.StPeteAstronomyClub.org)

Reservations are not necessary. Please print and display our [Friends-Of-The-Park Pass](#) on your dashboard.

Please join us! All astronomy enthusiasts are welcome. You do not need to be a club member to attend. Please refer to our [Club Calendar](#) for details and scheduled dates.





## St. Petersburg Astronomy Club

### Recognition of Patrons & Benefactors

Clifford B. Benham	Benefactor	Steven Balke	Patron
Lakeisha & Stephen Black	Benefactor	Christopher Bankston	Patron
David Brewer	Benefactor	Lori Bartels-Tobin &	
Walter Brinkman	Benefactor	Espen Holmen	Patron
Dave & Deborah Catalano	Benefactor	Sean Bloch & Emiliy Kulokas	Patron
Kimberly Dean	Benefactor	Kyle Brinkman	Patron
& Caroline Sherman		Michael Callahan	Patron
Jack & Roni Fritz	Benefactor	Ralph & Christine Craig	Patron
Michael Haworth & Melanie Otte	Benefactor	Garrison Crenshaw	Patron
Valerie Hyman	Benefactor	& Diane Doolittle	
Sai & Maggie Kakumanu	Benefactor	London & Leslie Crosby	Patron
Jamie Kenas	Benefactor	Dan Denney	Patron
David Knowlton	Benefactor	Peter & Jaclynn Dimmit	Patron
Laura & Roy Lanier	Benefactor	Daniel Doyle & Suzanne Ford	Patron
Greg Legas	Benefactor	Guy & Kelly Earle	Patron
Brenda Lorenz	Benefactor	Joseph & Pamela Faubion	Patron
Dave Lorenz	Benefactor	Darla & Peter Flynn	Patron
Tod Markin	Benefactor	Steve & Cindy Fredlund	Patron
Kelly McGrew	Benefactor	Steve Gaber & Karen Sell	Patron
Kevin & Karen Mulford	Benefactor	Richard & Mary Garner	Patron
Will & Jenni Nelson	Benefactor	Les & Janet Gatechair	Patron
David & Tara Pearson	Benefactor	Steve Gross & Julia Winston	Patron
Rath, Damon & Jean Futch	Benefactor	Ben Groves & Veronica Bynum	Patron
Howard Ritter	Benefactor	Timothy & Mary Ann Harris	Patron
Doug & Teri Sliman	Benefactor	Sharon Herman	Patron
Jill & Robin Sumner	Benefactor	& Melissa Hughes	
Bob & Michele Winslow	Benefactor	Charlie & Linda Hoffman	Patron
*****		Matt Hughes & Manuel Ordonez	Patron
Bill & Norma Amthor	Patron	Matt Labadie & Jennifer Willman	Patron
Jan Anschuetz	Patron	Bill Larsen	Patron

Joe & Shirley Litton	Patron
Barbara Lloyd	Patron
Steve & Jeri Maiaroto	Patron
Allen Maroney & Tracee Elliott	Patron
Gabriel & Reyna Martinez	Patron
Herb Monroe & Martha Stewart	Patron
Leeann Muszynski	Patron
Robert Nadeau & Ali Wuchert	Patron
Dominick Oppolo	Patron
Stephen Oros	Patron
Michael & Carli Partain	Patron
Brad & Lisa Perryman	Patron
Alan Polansky	Patron
David & Jenny Powell	Patron
Thomas & Andy Prince	Patron
John & Abbie Redmond	Patron
David & Rusty Richmond	Patron
Christian & Wendy Rubach	Patron
Gregory Satchwell	Patron
Nancy Schafer	Patron
Anthony Staiano	Patron
Jonathan Stewart	Patron
Tom & Michelle Sweet	Patron
Alexie Velez & Yanira Hernandez	Patron
Elizabeth Wood	Patron



## St. Petersburg Astronomy Club Membership Form

Membership in St. Petersburg Astronomy Club, Inc. (SPAC) is open to anyone, regardless of age, who is interested in astronomy. Benefits of membership include a monthly subscription to the SPAC Examiner newsletter, reduced camping rates and use of the club's bunkhouse at our dark sky site at Withlacoochee River Park, the ability to serve on the SPAC board and voting privileges. Dues are considered donations and are non-refundable. Membership options are available as listed below.

You are now able to choose how you wish to join or renew your membership:

- **Preferred On-line Website Option: New instructions as our website has been updated.**

Go to [https://www.stpeteastronomyclub.org/Sign\\_In.php](https://www.stpeteastronomyclub.org/Sign_In.php) on the SPAC website where you can join, view and update your membership profile, provide payment, and **print your membership card**.

- **US Mail Option: Takes more time to process manually because we are all volunteers.**

Complete the attached membership form and send it along with your payment to:

Jim Hunter  
17316 Oak Ledge Drive  
Lutz, FL 33549.  
(Checks should be made payable to SPAC, Inc.)

Adult 1: \_\_\_\_\_ Adult 2: \_\_\_\_\_

Street: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Home Phone: \_\_\_\_\_ Cell Phone: \_\_\_\_\_

Email Address: \_\_\_\_\_

Number of Children under 18: \_\_\_\_\_

### Memberships:

Single: ☐ \$ 30.00/YR. Includes one adult, minor children, the "SPACE" newsletter, and all the rights and privileges of membership.

Family: ☐ \$ 35.00/YR. Includes two adults, minor children and the above rights and privileges.

Patron: ☐ \$ 50.00/YR. A Patron member is entitled to the above rights and privileges.

Benefactor: ☐ \$100.00/YR. A Benefactor member is entitled to the above rights and privileges.

Student: ☐ FREE. SPAC offers free membership to full time high school and college students.

Expected date of graduation: \_\_\_\_\_

Total Submitted: \$ \_\_\_\_\_

**Your SPAC Membership Card is required for reduced fees at the campground.**