



Peoria Astronomical Society, Inc.

P.O. Box 10111 Peoria, IL 61612-0111
Section of Peoria Academy of Science
Affiliate of the Astronomical League
www.astronomical.org

STARLITE

Fall, 2023

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M57 JWST



NASA, ESA, CST, JWST
Processing: Zhang Kong

Officers:

President: Dan Son, sonshine1992@gmail.com

Vice-President: Brian Bill

Secretary: Phil Burroughs

Treasurer: Dave Monroe, dave.monroe@comcast.net

Directors:

Parliamentarian: Dave Monroe, dave.monroe@comcast.net

Nominating Chairman:

Legal Agent: Rodney Nordstrom

Northmoor Chairman: Dan Son, sonshine1992@gmail.com

Jubilee Chairman: Jesse Hoover

PEORIA ASTRONOMICAL SOCIETY IS NOW ON FACEBOOK:

www.facebook.com/PeoriaAstronomicalSociety

Update your address, phone or email changes

Please notify Dan Son at sonshine1992@gmail.com if you will be getting a new mailing address, email address and/or phone number. It is important that he has your personal information correct so you will continue to receive the Starlite and the Reflector.

NEW MEMBERS:

The Peoria Astronomical Society welcomes new members: Amy Ashley-Raher, Jamal Shafii and Jake Schultz.

2023 Meteor Shower Schedule:

The **Northern Taurids** Nov 11th -12th & **Southern Taurids** Nov 4th-5th produce about 5 per hour with a noticeable increase in fireballs activity. Comet 2P/Encke parent object.

The **Leonids** peak on Nov 17-18 and will be close to 1st quarter Moon. Comet Temple - Tuttle parent object.

Geminids meteor shower is Dec 13-14 on a new Moon.



Jack-o-Lantern Nebula

A carved-out cloud of gas and dust seen by NASA's Spitzer Space Telescope

Presidents Ramblings:

Well Summer days are leaving us for cooler days with color. I look forward to the Fall as the cooler days and longer nights give us more astronomy time at night. I can still see to the west those summer constellations but get excited to see long lost fall and some winter constellations. Illinois Dark Sky Star Party is October 12- 15 find more info here: <https://sas-sky.org/2023-idssp/> . We have an annual eclipse on October 14th with close to 50% obscuration for central Illinois, time is 10:37am till 1:22pm. We have our annual banquet on Sept 17th at 5pm and hope everyone can make it (more information in Starlite).

ICC star Party starts this weekend at Jubilee Sept 8,9th or 15th,16th with the 1st clear night sky the winner. Come on out with or without a scope. October is the start of our meeting and this October 4th will be a Northmoor Observatory. Start time is 7pm and if clear we will be observing. I want to thanks some new volunteers for Northmoor and at Jubilee for the this and next years. WE need volunteers to keep PAS working and just a few hours at a time makes this possible with your help.

Dan Son

Facts ...just the Facts..

The Moon is covered in craters, with estimates ranging from hundreds of thousands to millions. New craters — usually very small — are being added all the time. On average, about 100 meteoroids the size of a ping pong ball hit the Moon every day.

Submission of photos / article content for the Starlite: Dan Son

If you have a photo that you would like to submit for the Starlite, please send these to Dan Son sonshine1992@gmail.com along with a little write-up about the photo. Photos can be from star parties, club events, personal view, etc. Astrophotography is encouraged. Also, if you have educational content, tips, techniques, lessons learned or how-to articles with photos, we encourage that material for the Starlite. We can also put these on our Facebook page if you so desire.

<https://www.facebook.com/PeoriaAstronomicalSociety>

The Caterpillar Matching Gifts Program: Brian Hakes

Employees/Retirees are asked to submit matching gift forms electronically via the Caterpillar Foundation website, www.caterpillar.com/foundation. The process is easy. Once you made your gift to the PAS you can go online to the Cat Foundation website and complete the electronic form, there is no paper involved. Once the form is registered with the foundation they will notify the PAS and the treasurer will then verify the gift has been received. Because there will be no mailings, the turnaround time for the whole process will be negligible. This is especially advantageous at the end of the calendar (tax) year. This is an excellent way to support the PAS. If you can, please participate in this generous program. This is a great way to help the society and the promotion of astronomy in the greater Peoria area.

Reflector:

Reflector Magazine digital edition is available for download. You may access an archive of digital issues from the AL website by visiting:

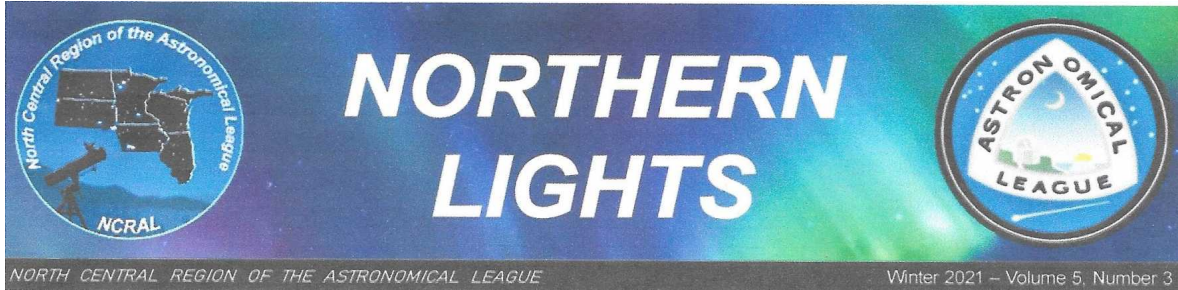
<https://www.astroleague.org/reflector>

NCRAL Newsletter:

The North-Central Region of the Astronomical League (NCRAL) is made up of member societies... the six states commonly thought of as the Upper Midwest of the USA, plus the Upper Peninsula of the state of Michigan. The PAS is a member of the NCRAL. Their Region Newsletter, also named "Northern Lights", has been resurrected and is better than ever! The latest issue's can be read on their website can be found here:

<https://ncral.wordpress.com/newsletter-archive/>

You can access the current issue and all other back issues through this link.



Add Your Email Address to NCRAL Member Database

Add your email address to the NCRAL member database now so that you can get direct mailings of NORTHERN LIGHTS and important and timely announcements about Regional conferences, star parties, and so forth. Your email address will never be shared with or sold to outside entities. Sign-up takes only about a minute. You'll need to provide your name, email address, astronomy club affiliation (including at-large), and indicate if you hold particular positions within your club. Go to the following case-sensitive URL to add your information to our database: <https://docs.google.com/forms/d/e/1FAIpQLSdGCQJiekrrqVV3SY4BGrQdow5N7Elxv3VbX2YmFPA4AJZ2iag/viewform>

Program Schedule 2023-2024 possible final draft – All speakers confirmed

Meeting Time 7:00 p.m. CST/CDT (note new time)

Meeting in the Dome Planetarium at the Peoria Riverfront Museum (speakers via Zoom)

October 4, 2023 All about Northmoor Observatory (Meet at Northmoor Observatory, Donovan Park**) Dan Son**

It will be after sunset start so be prepared and will be open if cloudy. Learn all there is to know about our historic public observatory, including the history, telescope operation and public weekend routine (especially helpful for weekend assistants). If weather is clear, we will observe Saturn.

November 1, 2023 The new generation of Smart Telescopes – with a live demonstration (outside if clear). Dr. Jim Sweitzer

December 6, 2023 The April 8, 2024 Eclipse – Planing & sharing of members plans to observe + Oct 2023 Annual Eclipse recap

January 2023 No Meeting in January

February 7, 2024 New Full Dome Show

- March 6, 2024** **Titan Dr. James Dire**
- April 3, 2024** **Astro-Jeopardy Brian Bill** (+ summary of eclipse events)
- May 1, 2024** **The April 8 Eclipse recap** – Members sharing experience

Inclement weather notice: Monitor email (e-group), local radio stations or PAS Facebook Page if a program, board meeting, viewing, or star party may be canceled due to weather. If we determine a risk in the weather, the Society will cancel the event. If we host an event and you feel the weather or road conditions are questionable, please take the safest actions and do not attend the event.

Riverfront Planetarium Museum:

The Peoria Riverfront Museum and Planetarium will be hosting a viewing party for the October 14 solar eclipse. Those who travel to the path will be able to see an annular “ring of fire” eclipse. Here in Peoria the Sun will be about 60% eclipsed. Renae and Nick from the planetarium will be hosting a viewing party on our Sun Plaza on Saturday, October 14 from 10:30 AM – 12:30 PM. We plan to have a sun spotter and telescopes set up with a projected view of the Sun. We will be selling eclipse shades in our museum store for \$4 each, and have some related activities set up. We would welcome members of the Peoria Astronomical Society to join us. Feel free to bring your own telescope if you can safely view the Sun with it, or just be around to enjoy the event and help raise awareness for the club. Please contact Renae at rkerrigan@peoriariverfrontmuseum.org if you plan to join the party.

Processing Astro Photos – Part 1

For me, my main interest in astronomy is in photography. Probably because I’ve been doing photography in some form since the early 1980s. Earlier if you count the Instamatic cameras I had when I was a kid. But I got my first SLR camera as a present in High School and I was hooked. In all the intervening years I was rarely very far away from a camera. Nowadays I shoot landscapes, macro nature photography, underwater video and now deep space objects. I joke around that I do own a couple of eyepieces and I do actually look through my telescopes from time to time, and well it is true. I do own some eyepieces and I do look through my telescopes from time to time, but most of my time up at Jubilee, I am either sitting watching my camera capturing photons on a sensor for hours on end, or if there’s anyone else around, wandering around to see what everyone else is looking at.

One part of making images of deep space objects that often gets overlooked is taking calibration frames to go with your lights. When I first started in astrophotography, I felt

there were so many other things to learn about, that taking proper calibration frames was not very important. It took a while, but I was finally convinced that I was wrong.

So what are calibration frames? Well, they're frames that are used to correct for problems in your captured images. Electronic cameras are much more convenient than trying to capture on film. But there are a couple issues that need to be addressed. Electronics produce heat, and heat translates into noise in your image. The process of simply reading the image off the sensor also produces noise. And finally, there are physical issues that we can correct for. It's very rare (unless you're using a camera with a very small sensor) not to have some vignetting in the corners of your image. And it's almost impossible to keep dust off your sensor and filters and such.

The three main types of calibration frames are darks, flats and bias. So, what are they and what do they do?

Darks are pretty much what they say they are. Frames that are captured with no light hitting the sensor. So, whether you're shooting with a DSLR or dedicated camera, that's with the cap on. Dark frames are used to calibrate out sensor noise. And part of that noise is thermal. So it's important that they are taken with the same exposure settings, that is, gain/ISO, exposure length and temperature. If you're using a DSLR, that means you need to take your darks as soon as you're done taking your lights. If you're using a dedicated cooled camera where you can control the sensor temperature, you can take your darks any time, and in fact you can build a master dark and use it over and over provided it matches your exposure values. How long can you use the same darks? I don't know, and I don't know if anyone else knows. About twice a year, I build a new darks library with all the exposure lengths (60, 120, 180 and 300 seconds) and temperatures (-10C and 0C) that I commonly use, which is probably more than needed, but considering that it is a process I can program in advance and walk away from for 10 or 12 hours it takes, I guess it doesn't matter.

Next up are bias frames. Bias frames are also taken with no light hitting the sensor, and at the same gain/ISO and temperature as the lights, but with a 0-exposure time. They're used to calibrate the read noise of your sensor. That is, the electronic noise produced by actually reading the data off your sensor at the end of your exposure. Now you can't actually have a 0 exposure, so use as short of an exposure as your camera allows. Again, if you're using a cooled camera, you can build a library of master biases for all the common settings you use. If you're using a DSLR, well, again you're probably going to have to take them with each session.

Lastly, there are the flat frames. Flats are an image taken of an evenly illuminated field, at the same temperature and gain/ISO as your lights, but the exposure will vary. You want the histogram of your flats to fall somewhere between the bottom third and top

third of the histogram. Flats are used to correct optical defects in your frames. That's the vignetting and dust motes that inevitably show up. It's a rare night that I don't have dust bunnies wander across my sensor or filters no matter how careful I am. They may not show up with a DSLR when you're taking landscape pictures, but they will certainly stand out as big ugly blotches against the black of outer space once you stretch your final stacked image. There are several methods for getting that "flat, evenly illuminated field." One way is to take what are called "sky flats" by covering the end of your telescope with a white t-shirt or other plain white fabric and pointing your telescope (away from the harsh light of the setting sun) at the evening or morning sky. Or you can use a light panel of some kind that produces a well-balanced pure white light. I use my iPad, with its color-calibrated screen, showing a plain white image. The most important thing is that the flats are taken with the optical train in the same configuration as it was when you took your lights. Same focus, same camera orientation, same filters, same everything. Any changes mean the dust bunnies will hop around and your flats won't calibrate correctly. If you have a permanently mounted telescope, this may not be a problem, but if you're like me, and not fortunate enough to live in a dark area with your own permanent observatory in your back yard, and have to set up and take apart your telescope every night, that means taking flats every night (or even multiple times a night if you're shooting multiple filters).

As you can see, taking pictures of nebulae and galaxies, actually capturing those photons that have streamed across light years to hit your camera sensor (and eyeball) is just one part of a whole process to produce a nice image. Lights are just one part of that process. Calibration frames may seem like a waste of time and not important (as a beginner, I told myself they weren't important at any rate, and my photos suffered for it until I wised up) but it can make the difference between a photo, and a really good photo.

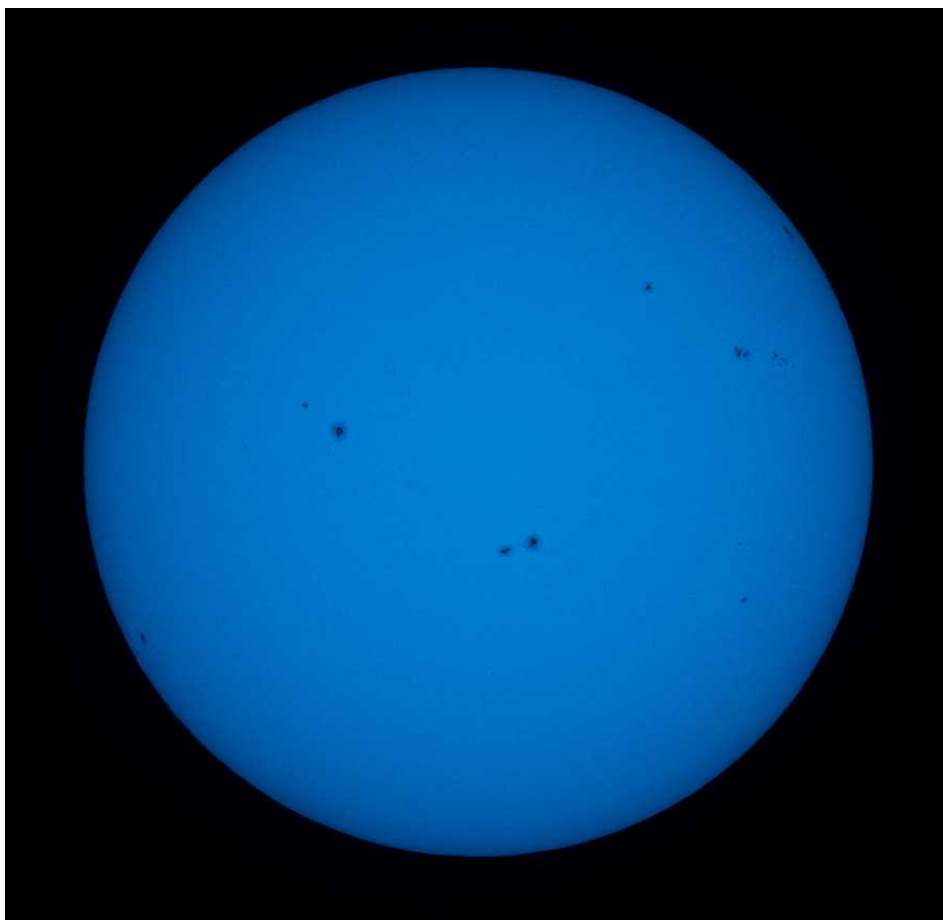
I've put together a set of sample data that you can download and use, it includes the master calibration frames that I used. In the future I'll discuss processing that sample data into a finished picture. The data is available for download here:

<https://www.dropbox.com/scl/fi/gnwii2izvp1ovhpqsvjtn/IC1396.zip?rlkey=0bjyai63q281w4u6d7ulyjxlr&dl=0>

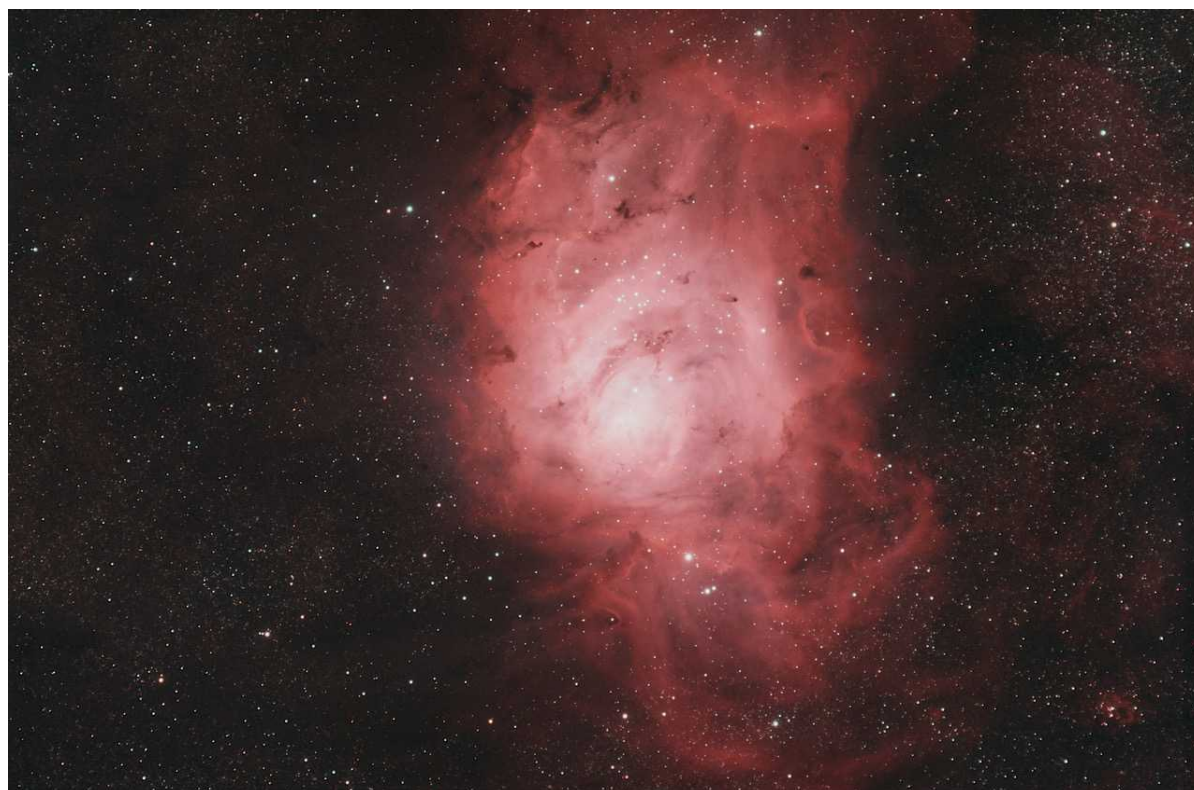
Be aware that that file is about 1.7 GB and when you open that link you may have to click on "download this file" or similar, depending on what browser you're using.

By John Nowack

**Photos from
Members:**



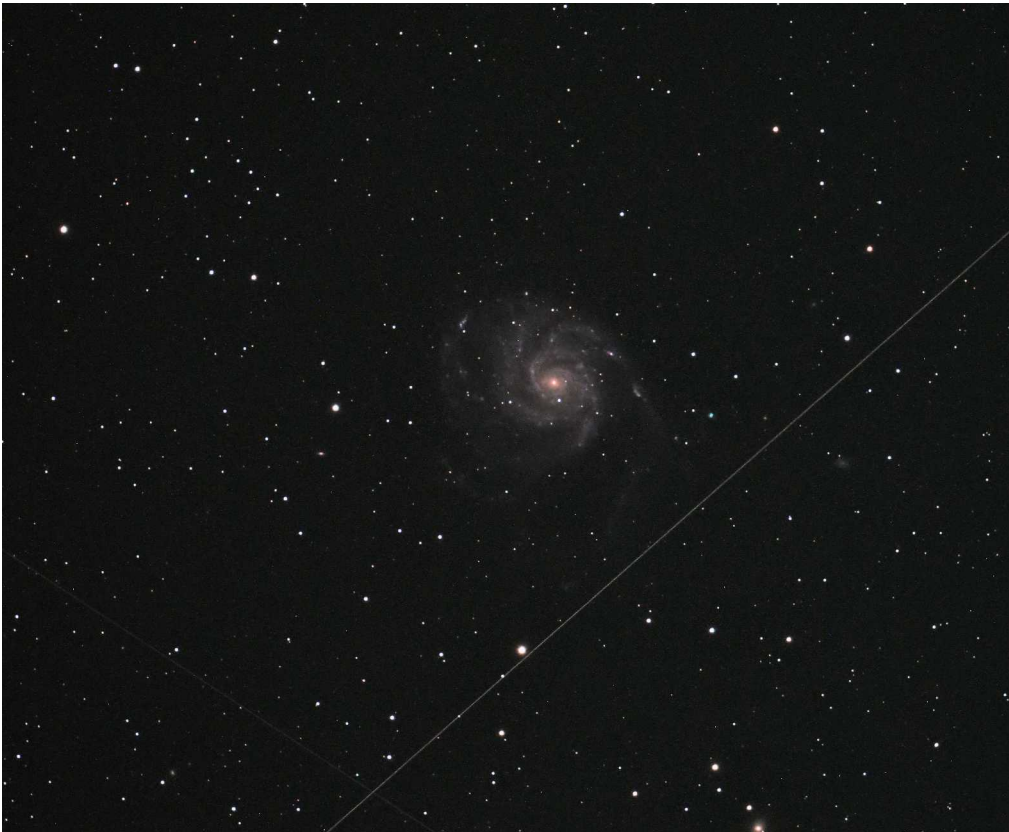
**J Dire Sun on
07/23/23 Cannon
600D on
WO Megrez 110**



M8 John Nowack5 hours from Jubilee AS107MC-PRO camera



J Carroll M3 Globular Cluster



M33 J Armstrong



The New Celestron StarSense Autoguider (SSAG) (and Auto Aligner and Polar Aligner)

FIRST IMPRESSIONS

Linda S. Groezinger | [AstroAttorney.com](https://www.AstroAttorney.com) | August 29, 2023

In The Beginning...

In this review, I will use far too many words to describe my initial experience with the new Celestron StarSense Autoguider, or as I see it, the Swiss Army Knife of astrophotography. But I feel I would be remiss by not starting this review at the beginning of my experiences over the past 4 years with Celestron products.

When I first decided to step up my astrophotography game from DSLR and star tracker to full blown scope, I chose the Celestron \$NexStar+ 6SE based on its versatility and outstanding reviews for both beginners and advanced stargazers. Sure, it was an alt-az but the price was right for my debit card.

I didn't quite understand yet that polar aligning was fundamental to good astrophotos and that required an EQ mount. Soon enough, I did and purchased a \$wedge. Struggling with figuring all of this out on my own, the Google Machine and YouTube videos, I next decided I needed the \$StarSense AutoAligner. And the \$AVX mount. And an \$OCS camera. And another \$SCT6 (there was an accident and my corrector plate shattered) and then a \$Celestron C8.

Fast forward to my 100lb. GSD AstroDog knocking over my AVX mount, my AVX then not working (with 2 error codes on the hand controller), a lot of time tearing it apart and attempting to repair it, I then purchased a replacement EQ mount- the \$Sky-Watcher EQM-35 but I refused to let go of the AVX.

Next, I stepped up to the \$\$Sky-Watcher EQ-6R Pro and sold the EQM-35. Not one to give up on Celestron, I purchased the \$StarSense for Sky-Watcher mounts. Same Starsense but comes with an interface to perform auto-alignments on most Sly-Watcher mounts.

After nearly a year of waiting for the computer boards for the AVX, they both finally arrived and I replaced them on my AVX. And it still. didn't. work. Frustrated, I got all of my Celestron hand controllers and performed updates, yet again. And voila! My AVX was suddenly working again.

AGHHH, Just Get On With The SSAG Review, will ya?!

Ok, so months ago I saw mention of a Celestron Autoguider that would also take the place of the StarSense Autoaligner coming out in the near future. And I had to have it. No offense to PHD2 but push here dummy doesn't actually work that great for real dummies. It would work or give me fits. I had been looking for other alternatives. Yes, I have an \$ASIAIR Mini. I have a Stellarmate Raspberry Pi. I even have \$Maxim DL 6 software with it's own built-in autoguiding function. But I love SharpCap so I have still never used it. SharpCap and I have spent a lot of time together under the Moon, under the stars,

frolicking in the Sun, getting to know each other, holding hands, drinking and dining together. AND IT'S CHEAP!

Now, I am no fan at all of the CPWI software that one *must* use to connect and run Celestron products but I am even less a fan of hand controllers. Plus, what would I do with the \$mini PC I purchased to remotely run everything in the winter from the comfort of my bedroom? Last month, I saw an ad online for the StarSense Autoguider (SSAG) at \$799. And it was mine. 10 in stock. \$SOLD!

Now this meant that I couldn't use it with the Sky-Watcher mount, a true powerhouse, even with the StatSense interface. Understood. But at 5'1", it does tend to get exhausting hauling that behemoth up my rural road and back every clear sky night in and out of the trunk of my car. So, back to the AVX. At least now it works!

Setting Up The CPWI Software And Devices

Ok, so if you've stuck with me this far, we're finally to the point where I explain the setup step-by-step.

1. Mount the StarSense Autoguider onto your telescope tube. Any OTA can be used that has a bracket for an autoguider or guidescope. So far, I have used it with my SCT6 & SCT8 with the large mounting bracket. When I used it with my 70-200mm Pentax lens, I used the small mounting bracket. These are the same brackets that come with the SSAA. However, with the SSAG, one doesn't need a separate StarSense hand controller, unlike the SSAA. The mount's native hand controller needs to be used after updating the firmware.

2. One can connect to the CPWI software via USB or Wi-Fi (if one has the Celestron Skyportal Wi-Fi module, that is.) As I chiefly use the HC, I connect a USB cable to the bottom of the HC and to my computer (or laptop, ASI AIR or Raspberry Pi gadget) and then power everything up.

2. Next, I level my mount, balance my telescope, line the marks up and make sure I am pointing toward Polaris. (I've gotten pretty good at locating Polaris, even during the day. My internal compass has become well-refined from this hobby.) From here on out, I will be referring to the CPWI software setup and usage with the SSAG since anyone using the SSAG will no doubt be performing astrophotography as there is really no need for an autoguider when doing visual astronomy. (Apologies to anyone using a DSLR and hand controller but the menu structure on the hand controller will use the same procedures.)

3. I connect all my devices to the Celestron mount via the ports. I have the Celestron Skysync GPS device in the HC port, the HC then plugged into the GPS device, a Celestron Focus Motor and the SSAG plugged into the AUX ports. I knew there was the capability of a Live View with the SSAG but could not get it to work the first few times I

used it. I discovered that a USC-C cable plugged into the port on the SSAG and then into the computer is required to utilize this option.

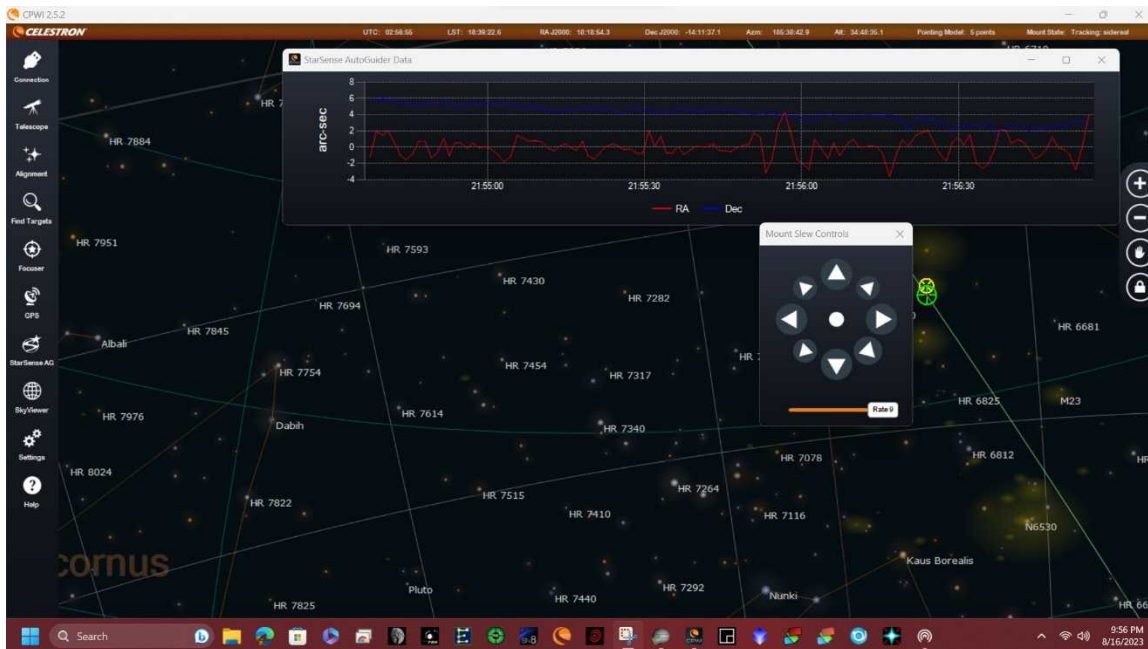
4. To use the CPWI software, you will connect to the program via USB or WiFi (using the SkyPortal app on a cellphone or tablet as an available option). Upon starting CPWI and connecting one can then see all the devices running. If one or all are not listed, there is a connection or cable cord issue that needs addressed. I have discovered the hard way that one must unplug the HC from the PC/CPWI, shut off the mount, re-plug in the devices, then start again. That is the only way to clear out the error from CPWI and the mount.



Setting Up The SSAG

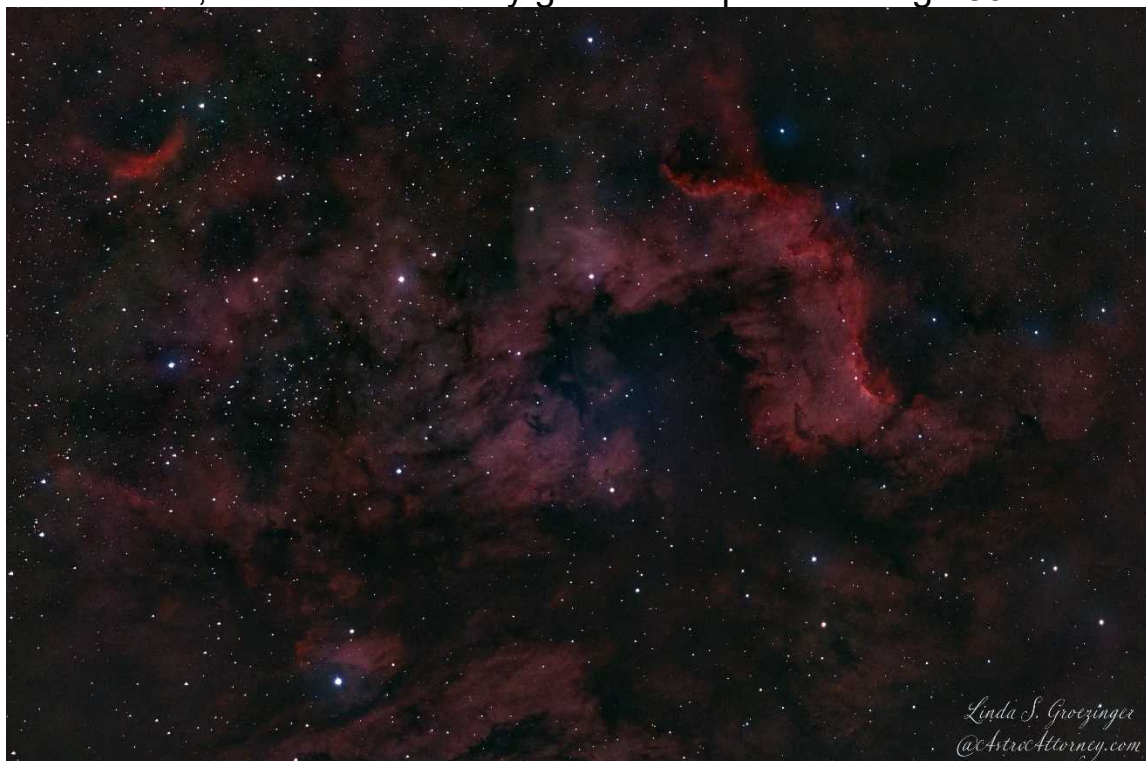
Ok, so we are finally at the nuts and bolts of the SSAG. I thank you for making it this far!

1. Once the CPWI software is running and all the connected devices are running in CPWI, the alignments screen pops up and lets you choose between Manual Alignment, StarSense Alignment, Quick Align, Last Alignment or Load Alignment. If using a GPS, your location will be auto loaded. When I have been out under open skies, I have chosen the StarSense Alignment. When I have been at home with a small hole in the trees around the zenith, I utilize the StarSense Alignment - Custom Points so that I can maneuver to my little open space above my house.
2. CPWI will then ask if you wish to center calibrate your SSAG. It's a typical calibration, choosing a bright object in the sky and then centering it in the eyepiece or imaging software.
3. Next up is Celestron's built-in Polar Alignment, new to the StarSense lineup. One must use an EQ mount as there is no way to turn RA & Dec knobs on an Alt-Az unless you have it on a wedge and have designated it at startup. Roughly polar align the mount, This is a rough polar alignment. Manually slew the telescope to an initial start position which should allow the mount to slew from West to East 50 degrees. Use a clear area of sky that provides a clear 50 degree path W-to-E. A screen pops up when it has slewed 50 degrees and guides the user to adjust azimuth knobs. Then click "Next Axis" and a screen pops up to adjust altitude. Perfect Polar Alignment is not necessary unless taking 5 minute or longer subframes.
4. We are now ready to image! Start up the SSAG by going to the SSAG menu in CPWI and choose Precise GoTo. Using CPWI's Find Targets, choose from Local Database or the 2 other options. Select an object, click on GoTo and the mount will slew to the object. SSAG will perform a platesolve and should then place the object in the center of your imaging software or eyepiece. Then select Guiding Enabled. Choose Guider Graphs and let the autoguider run for about a minute until the graph shows consistent RA & Dec lines (or just RA if using an alt-az mount). There is also an option to show a Live View through the SSAG but be sure to connect a USB cable from the SSAG to your laptop/PC. That was the only way I could get a live view on the screen.



Now you are ready to image the night away.

Am I glad I forked over \$800 for the SSAG? Absolutely! It is well worth it for me just to get rid of the pain of PHD2. While I also have an ASI AIR Mini, I have yet to use it because I just love imaging through SharpCap. It's like an old worn shoe that still keeps my feet dry. And even though I cannot polar align in my woods until the leaves come down, I have consistently gotten sharp stars using 180" subframes.



Clear Skies !

Northmoor Hosting Schedule Dates for 2023

Date:	Keyholder	Helper 1	Helper 2
Sept 09	Dan Son	John Crow	John Manney
Sept 16	Gerald Horst	Dave Grebner	Sheldon Schafer
Sept 23	Sheldon Schafer	Jesse Hoover	John Lyle
Sept 30	Dan Son	John Manney	Dave Grebner
Oct 07	John Lyle	Rodney Nordstrom	Dave Grebner
Oct 14	Nick Rae	Trent Widmer	John Crow
Oct 21	Dan Son	Shannon Wiltz	Brian Bill

Observe The Moon Night with Peoria Library is October 21st, everyone is welcome to join.

2023 Jubilee Maintenance Schedule

Sept 9 th	Brian Bill	Dan Son
Sept 16 th	Jon Crow	Steve Russell
Sept 23 rd	Jesse Hoover	Gary Bussman
Sept 30 th	Brandt Bechtold	Brian Bill

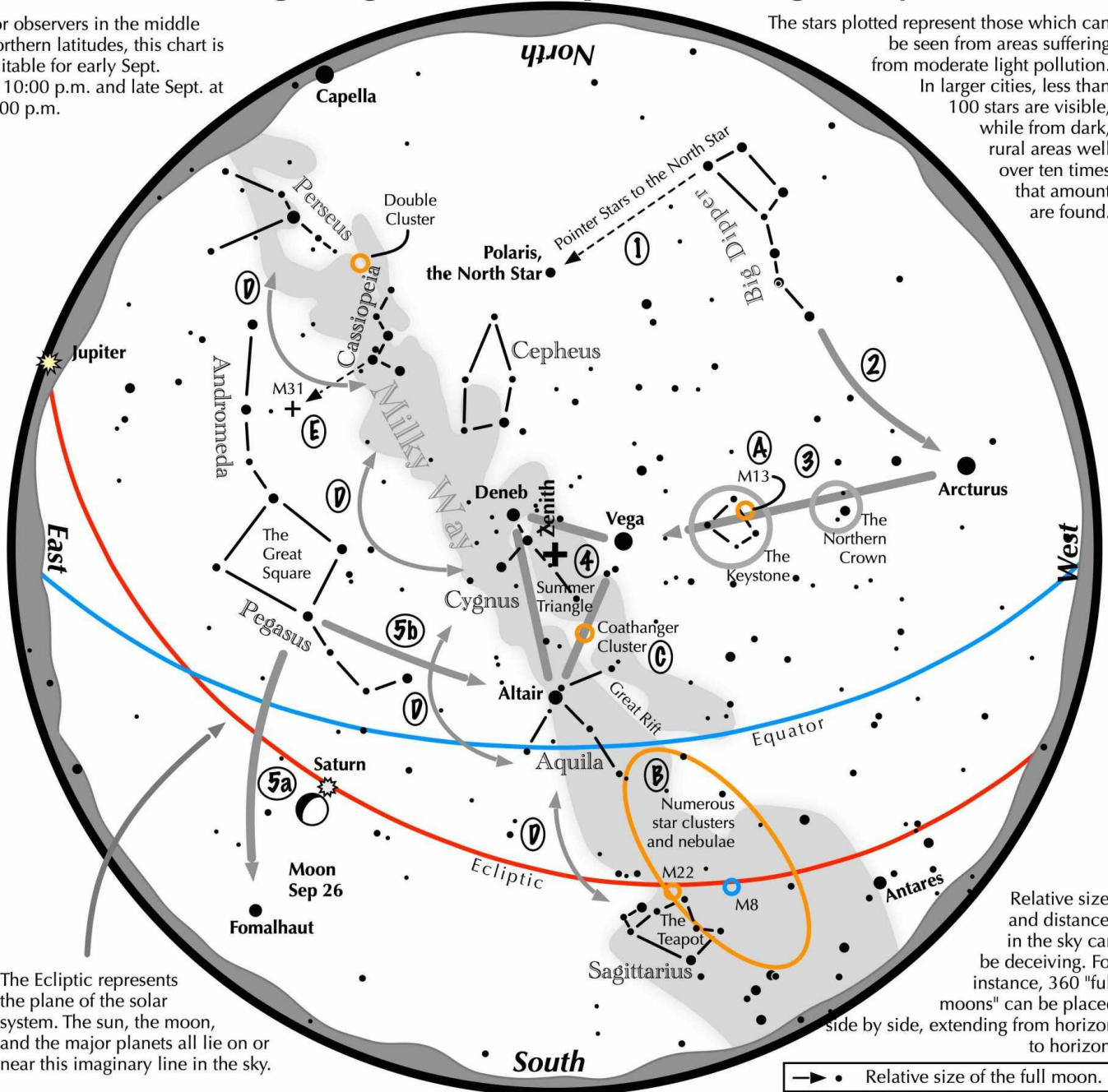


NGC 6652 hubble

Navigating the mid September Night Sky

For observers in the middle northern latitudes, this chart is suitable for early Sept. at 10:00 p.m. and late Sept. at 9:00 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

Navigating the mid September night sky: Simply start with what you know or with what you can easily find.

- 1 Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
- 2 Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the September evening sky.
- 3 Nearly overhead shines a star of similar brightness as Arcturus, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- 4 The stars of the summer triangle, Vega, Altair, and Deneb, shine overhead.
- 5 The westernmost two stars of the Great Square, which lies high in the east, point south to Fomalhaut. The southernmost two stars point west to Altair.

Binocular Highlights

- A: On the western side of the Keystone glows the Great Hercules Cluster.
- B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
- C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- D: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.
- E: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.

