

ASTRAL PROJECTIONS

SEPTEMBER 2020
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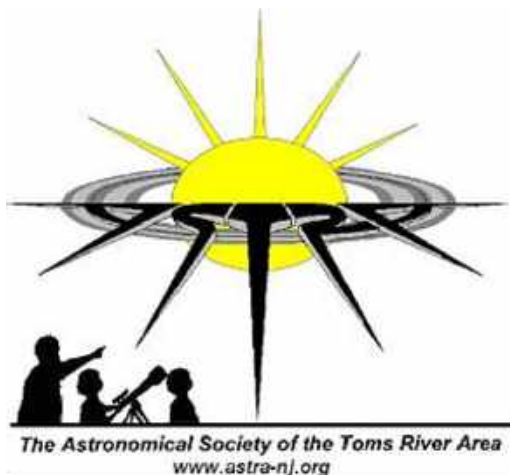
CONTENTS

What's Inside?

Page 2:	Event Calendar
Page 3-6:	Recap
Page 7-8:	Feature: Finders Keepers
Page 9-10:	Night Sky Notes
Page 11:	Observing Calendar
Page 12:	Astronomy Trivia
Page 12:	Note About Astral Projections
Page 12:	Club Benefits

Cover Photo

Orion captured over Chester, VA during 2019's Thanksgiving weekend. Canon DSLR with zoom set at 18mm, 30second exposure at ISO 1600. Image credit: Phil Zollner



EVENT CALENDAR

ASTRA'S NEXT VIRTUAL MEETING IS ON FRIDAY SEPTEMBER 11, 2020 AT 7 P.M.

PLEASE NOTE AT THIS TIME FUTURE IN-PERSON EVENTS WILL BE CANCELLED FOR THE DURATION OF THE CORONAVIRUS / COVID-19 THREAT.

PLEASE CHECK YOUR EMAILS, THE CLUB FORUM, OR CALL THE ASTRA HOTLINE FOR UPDATES.

THE DEADLINE FOR RE-UPPING MEMBERSHIP HAS BEEN POSTPONED UNTIL FURTHER NOTICE.

PLEASE NOTE ISLAND BEACH STATE PARK HOURS ARE 5AM TO 8PM WHICH PREVENTS AFTER HOURS OBSERVING. GROUPS ARE NOT ALLOWED IN THE PARK AS WELL.

A.S.T.R.A.

**Robert J. Novins Planetarium
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P.O. Box 2001
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EVENT CANCELLATIONS

Members will receive an email notification of an event cancellation, or call the ASTRA Hotline: 609-971-3331

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RECAP

August 14, 2020 Meeting

by Jim Webster

All scheduled star parties are still canceled based on COVID-19 concerns and state requirements. We discussed the current state of COVID-19 and the impact to the club with no access to our usual county and state park locations. We are all hoping things get better soon and we can get back out there again for ourselves and public star parties. We reviewed the permit type for Island Beach State Park. We will research the permit types further reaching out to fellow astronomy groups in the state.

The club picnic was also discussed that is set for August 29th at John C. Bartlett Park. Our time there will be from 1 PM until 7 PM.

Due to member's concerns about COVID-19 this event has been changed to ASTRA Day at the Park. Astra has paid for and reserved the main pavilion for us to use. Everyone will need to bring their own food and drinks. Astra will not provide any food or drinks due to COVID-19 concerns. There is a grill available but you would have to bring your own charcoal, lighter fluid, utensils and food to cook. This event is free to members and their families. There are several picnic tables available and social distancing will need to be practiced.

We then moved onto the main event for the evening. The presentation for the night was from Sam Granovsky: Heavyweight Narrow-Field Astrophotography.

Sam opened his presentation as part two of Jim Websters Lightweight Wide-field Astrophotography as Heavyweight Narrow-field Astrophotography.

Sam's presentation was divided into two parts Planetary and Solar System, followed by Deep Sky.

Overview

- Planetary & Solar System Astrophotography
 - Introduction
 - Equipment
 - Procedure
 - Post Processing
- Deep Sky Astrophotography
 - Introduction
 - Equipment
 - Procedure
 - Post Processing



RECAP

Planetary Astrophotography is the easiest type of high magnification astrophotography and much less expensive equipment is needed. Less time imaging and processing and is not affected as much from light pollution. But is very dependent on atmospheric conditions.

Laptop operated webcam cameras will yield better results than DSLR's and cooling is not required. Color cameras work well requiring less equipment and effort, but a monochrome camera with RGB filters will yield sharper results. An Atmospheric Dispersion Corrector or ADC will help compensate for atmospheric prism effects, resulting in a sharper image.

Sam's equipment with the ADC and camera in a separate picture. For planetary imaging Aperture and a long focal length is best. Reflectors typically work best.

Equipment

My Current Setup:

Telescope: Celestron 8se

Mount: Celestron CGEM II

Camera: ZWO ASI 224MC + ZWO ADC
+ Celestron Lumios 2.5x Barlow +
Baader IR Cut Filter

Laptop: Lenovo ThinkPad 11e



The basics of planetary imaging that same stepped through for the membership are listed below:

1. Record video of planet.
2. Sort video frames from most to least sharp.
3. Stack some percentage of the better frames.
4. Sharpen stacked image.
5. Adjust framing and color.

The software he uses for capturing are Firecapture and Sharpcap.

Sam's final tips in his presentation for planetary and solar system astrophotography:

- Post processing is the same for high magnification pictures of the Moon and Sun other than selecting "Surface" instead of "Planet" in Autostakkert.
- When imaging Saturn, make a normal and long exposure recording and combine them after sharpening to enhance details in the C ring and its moons.
- Avoid brightening the image too much, as this could make it harder to see detail in bright areas.

RECAP

Deep Sky Astrophotography can be more difficult than planetary photography. It requires more expensive equipment and more time imaging and processing. Deep sky imaging is heavily affected by light pollution, but less dependent on atmospheric turbulence.

For deep sky imaging a cooled webcam with large sensor works best. Color cameras provide fast imaging and processing, use a monochrome for higher imaging quality and for narrowband imaging. DSLR or mirrorless cameras with the IR cut filter removed is also an option.

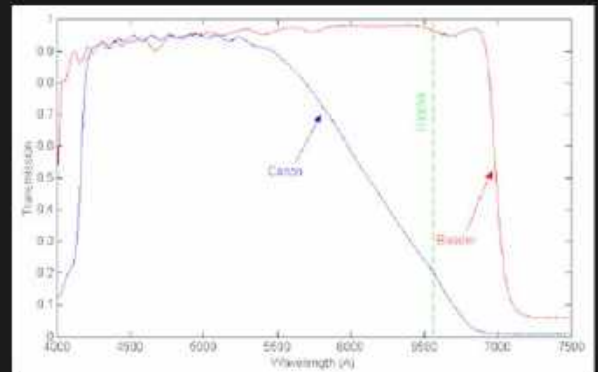
Removal of the IR filter helps in the red end of the imaging spectrum. Sam was able to perform this removal himself, but there are companies that can perform this for you and in some cases, there are vendors that sell them. The latter of course will be a higher mark up in price.

Sam then reviewed the different filters that are used for deep sky astrophotography. The three main types are Broadband, Semi-Narrowband or Multi-Band Narrowband and Narrowband. From there we moved onto Polar Alignment. Good polar alignment is essential to perfect tracking even with autoguiding. Focal Reducers and Field Flatteners help reduce either exposure time or reduce required ISO/Gain. Reduces or eliminates distortions near edges of the frame.

Equipment

Modified DSLR or Mirrorless Camera

- IR filter must be removed to increase transmission towards the red end of the spectrum
- DIY, buy modified, or made without a filter



Sam discussed the basics of deep sky imaging and setting up.

1. Take as many long shutter speed pictures of the target as possible.
2. Throw away bad frames and align/stack the rest.
3. Process the stacked image to enhance the nebulosity.

RECAP

Equipment

My Current Setup:

Telescopes: Explore Scientific ED102 FCD 100 and William Optics Redcat 51

Mount: Celestron CGEM II

Camera: CentralDS modified Cooled Canon 80D

Autoguiding + Camera Control: ZWO ASIAIR Pro

Guide Camera: ZWO ASI290MM mini

Guidescope: Orion 70mm Multi-Use Finder Scope

Filters: Hutech IDAS LPS D1 and IDAS NB1

Two bags full of tangled wires and accessories



The setup:

- Roughly polar align mount
- Connect camera, mount, and guide camera to ASIAIR/Stellarmate or laptop
- Accurately polar align mount
- Focus imaging camera (and guide camera)
- Find and frame target
- Start Autoguiding
- Set imaging sequence for imaging camera to follow and start imaging.

Sam's final tips for Deep Sky Astrophotography:

- Everyone has different preferences for how they edit, so don't feel like you should copy tutorials exactly, experiment to find what works for you.
- Practice setting up any new equipment, so you don't get lost in the dark.
- Try to organize your accessories and cables. (I know I am being hypocritical)
- If you are imaging away from home, make sure before and after you did not forget to bring something.
- Make sure every battery you may need is charged.

Clear Skies!

FEATURE

Finders Keepers

by Vic Palmieri

I read somewhere that society needs more "what if" people. NASA has always had many "what if" people. I learned the importance of asking "what if" one night when setting up my telescope for a few hours observing. What is of critical importance is doing something to resolve the "what if" of concern. My "what if" had to do with how my finderscope attaches to the telescope. My "what if" of concern was the thumb screw that retains the finder to the telescope. If it loosens then the finder crashes to the ground and this is what happened that evening. The finder's tail piece was knocked out of alignment and there was surface damage on the front edge of the finder's dew shield. I pushed the tail piece back into the tube and after some sanding and touch-up paint the finder looks and works as good as new. The finder is a lightweight 8 X 40 but "what if" it was a larger and heavier 8X50 or "what if" it was a camera?



Figure 2

I realized that some type of clip can be fashioned to retain the finder if the thumb screw loosens and this same thumbscrew can be used to attach the proposed clip to the shoe. I had on hand 1/2" and 3/4" wide 1/16" thick aluminum stock (can be purchased at any home center). The 1/2" wide aluminum was the right size for the shoe that is attached to the optical tube so I worked on that first. I cut a 1/2" wide cardboard strips from an index card to use to shape the clip. The reason for using the cardboard strip was to find the shapes that would retain the finder bracket while matching the slanted face of the shoe. Once that was worked out I transferred the shape to the aluminum then cut and bent the pieces. A hole was drilled into the clip for the thumbscrew. A

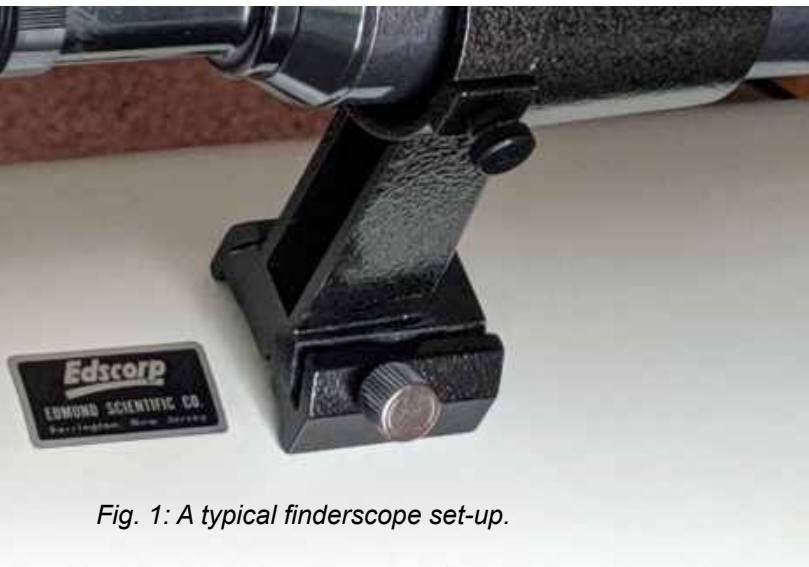


Fig. 1: A typical finderscope set-up.

The piece that holds the finderscope is called a bracket. The fitting into which the bracket slides is the shoe and is a dovetail. The bracket is held in place with a thumbscrew. The shoe shown in Figure 1 is attached to the optical tube. Figure 2 shows a shoe that was made part of the focuser.



Figure 3

FEATURE

clip needed for the shoe molded as part of the focuser required 3/4" wide strip and aluminum.



Figure 4

Once the clips were cut, filed to remove sharp edges and to round the corners, washed, and cleaned with acetone I checked the fit. Then I had them powder coated. Figure 3 shows the 1/2" clip on the type of shoe that gets attached to the optical tube. Figure 4 shows the clip attached on the focuser style shoe. Some notes: The use of these clips may require new thumbscrews for fastening the finderscope.



Figure 5: The finished clips.

I purchased the necessary thumbscrews from McMaster-Carr. One of these replacement thumbscrews can be seen in figure 4. It is

important to mention that while the thumbscrews must be tightened to secure the finder to the telescope the clip does not have to be. It can be loose and most if not all will be. However, they cannot be so loose that they can fail to retain the finderscope (or camera!) no matter how the telescope is orientated. A replacement thumbscrew only needs to be a few millimeters longer than the original. Making these clips is not as difficult as it seems. Use cardboard strips! You can paint them and avoid the extra time of the powder coat but powder coating is so nice!



In the immortal words of Futurama's Professor Hubert J. Farnsworth, "Good news, everyone!" Ardent viewers of Futurama always know the news is never good, and ClickOnDetroit, among other news outlets, shares the good and the bad surrounding this breaking story.

In short, an asteroid is on a possible collision course with the planet Earth.

2018 VP1, according to NASA's ephemerides, could very well impact our favorite ball of mud before Election Day in November. The good news? It's impact could wipe out humanity and end the pain and suffering and lack of toilet paper. On the other side of the coin, the bad news is 2018 VP1 is barely two meters in diameter. We'll be lucky to get sprinkled by its remains after it burns up in our thick atmosphere.

Still this glimmer of grim hope will hopefully light up our skies on November 2nd, inciting wonderment about the grand cosmos all around us.

NIGHT SKY NOTES

Summer Triangle Corner: Altair

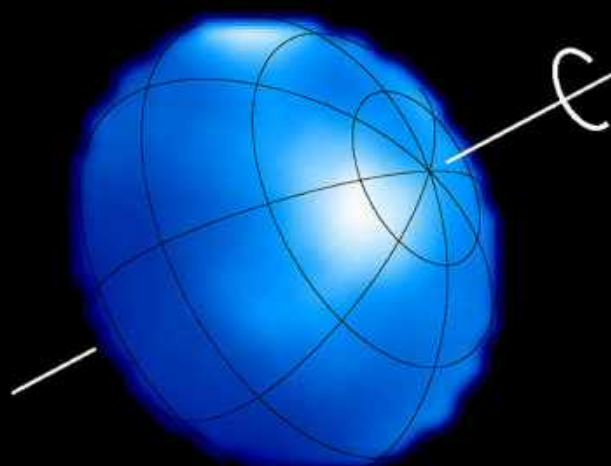
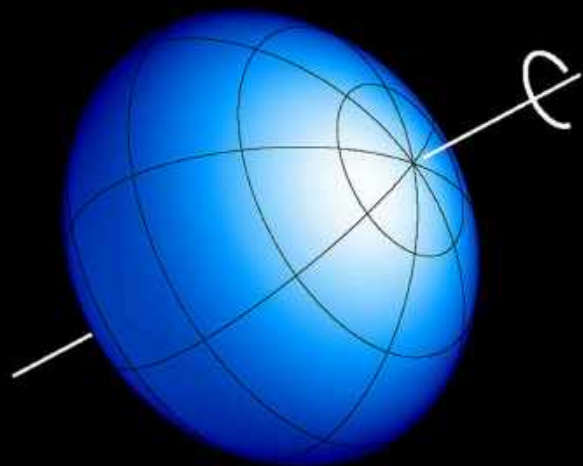
by David Prosper

Altair is the final stop on our trip around the Summer Triangle! The last star in the asterism to rise for Northern Hemisphere observers before summer begins, brilliant Altair is high overhead at sunset at the end of the season in September. Altair might be the most unusual of the three stars of the Triangle, due to its great speed: this star spins so rapidly that it appears “squished.”

A very bright star, Altair has its own notable place in the mythologies of cultures around the world. As discussed in our previous edition, Altair represents the cowherd Niulang in the ancient Chinese tale of the “Cowherd and the Weaver Girl.” Altair is the brightest star in the constellation of Aquila the Eagle; while described as part of an eagle by ancient peoples around the Mediterranean, it was also seen as part of an eagle by the Koori people in Australia! They saw the star itself as representing a wedge-tailed eagle, and two nearby stars as his wives, a pair of black swans. More recently one of the first home computers was named after the star: the Altair 8800.

Altair’s rapid spinning was first detected in the 1960s. The close observations that followed tested the limits of technology available to astronomers, eventually resulting in direct images of the star’s shape and surface by using a technique called interferometry, which combines the light from two or more instruments to produce a single image. Predictions about how the surface of a rapidly spinning massive star would appear held true to the observations; models predicted a squashed, almost “pumpkin-like” shape instead of a round sphere, along with a dimming effect along the widened equator, and the observations confirmed this! This equatorial dimming is due to a phenomenon called gravity darkening. Altair is wider at the equator than it is at the poles due to centrifugal force, resulting in the star’s mass bulging outwards at the equator. This results in the denser poles of the star being hotter and brighter, and the less dense equator being cooler and therefore dimmer. This doesn’t mean that the equator of Altair or other rapidly spinning stars are actually dark, but rather that the equator is dark in comparison to the poles; this is similar in a sense to sunspots. If you were to observe a sunspot on its own, it would appear blindingly bright, but it is cooler than the surrounding plasma in the Sun and so appears dark in contrast.

Model of a fast-spinning star Actual image of Altair from the CHARA Interferometer



Equator bulges and darkens as star spins faster
2.8 revolutions/day

The image on the right was created using optical interferometry: the light from four telescopes was combined to produce this image of Altair’s surface. Image credit: Ming Zhao.

NIGHT SKY NOTES

Spot Vega and the other stars of the Summer Triangle by looking straight up after sunset in August!



Altair is up high in the early evening in September. Note Altair's two bright "companions" on either side of the star. Can you imagine them as a formation of an eagle and two swans, like the Koori?

Altair in the Summer Triangle Overhead, September Evenings

OBSERVING

September 2nd - Conjunction of the moon and Mars. The moon and Mars will make a close approach of each other passing with $0^{\circ}01'$ of each other in the constellation of Pisces. The pair will become accessible around 9:59 p.m., reaching their highest point of 56° above the southern horizon at 3:43 a.m. before becoming lost in the sunrise. Unfortunately the moon occulting Mars will not be visible from the United States of America.

September 2nd - Full moon at 1:21 a.m.

September 7th - Venus reaches its highest point in the morning sky. Shining at -4.3 magnitude Venus reaches its highest point in the morning sky of 40° above the southeastern horizon around 2:55 a.m.

September 9th - ϵ -Perseid meteor shower. A minor meteor shower emanating from the constellation of Perseus producing about 5 meteors an hour producing its best display around 1 a.m. EDT.

September 11th - Neptune at opposition. At 4:10 p.m. EDT the 8th planet of our solar system will shine at magnitude 7.8 in Aquarius. Neptune becomes accessible around 9:12 p.m. until 4:39 a.m. EDT reaching an altitude of 44° above the southern horizon.

September 14th - Conjunction of the moon and Venus. The moon and Venus will share the same right ascension, with the moon passing $4^{\circ}27'$ to the north of Venus in the constellation of Cancer. The pair become accessible around 3:00 a.m. EDT, reaching the altitude of 36° above the eastern horizon before being lost in the sunrise.

September 17th - New moon at 6:59 a.m.

September 18th - Mercury reaches its highest point in the evening sky. Shining at magnitude 0, Mercury will be 9° above the southwestern horizon around sunset.

September 22nd - Autumnal Equinox at 9:30 a.m. EDT. Considering the circumstances of 2020, blood sacrifices at certified stone circles are permitted. Please wear a mask.

September 25th - Conjunction of the moon and Jupiter. The moon and Jupiter will share the same right ascension, with the moon passing $1^{\circ}35'$ to the south of Jupiter in the constellation of Sagittarius. The pair become accessible around 7:04 p.m. EDT, reaching their highest point of 27° above the southern horizon until 11:39 p.m. when they sink below 7° above the southwestern horizon.

CLUB BENEFITS

Astronomy Trivia

- All the moons of the Solar System are named after Greek and Roman mythology, except the moons of Uranus, which are named after Shakespearean characters.
- Astronauts brought back about 800 pounds of lunar rock to Earth. Most of it has not been analyzed.
- In 1959, the Soviet space probe "Luna Two" became the first manmade object to reach the moon as it crashed onto the lunar surface.
- Jupiter's moon Ganymede is the largest moon in the Solar System, and is larger than the planets Mercury and Pluto.
- On a clear night in the Northern Hemisphere the naked eye can discern some 5000 stars.
- On February 7, 1969 a meteorite weighing over 1 ton fell in Chihuahua, Mexico.
- Olympus Mons on Mars is the largest volcano in our solar system.

Special Note from Astral Projections

Submissions may be sent to newsletter@astra-nj.org, but there's another email one can utilize to contact the newsletter:

astralprojectionsnj@gmail.com

Please note there is a virtual ASTRA meeting in September on Friday the 11th commencing at 7 p.m.

WHY JOIN?

For \$15.00 a year, you can enjoy many benefits with the Astronomical Society of the Toms River Area. Members can borrow A.S.T.R.A.'s telescopes for observations, have access to private star parties, access to Island Beach State Park permits, in addition to camaraderie with local amateur astronomers. Contact one of our club officers today to join the fun.

ISLAND BEACH STATE PARK PERMITS

Island Beach State Park permits are available but due to the current coronavirus / COVID-19 situation, the park's hours are now 5 a.m. to 8 p.m. which precludes overnight observing. The IBSP office also stated they are not allowing groups entry into the park.

ASTRA'S TELESCOPES

ASTRA has several different types of telescopes, telescope mounts, along with binoculars, eyepieces, and eyepiece filters available for members to borrow. If any member is interested, please check out ASTRA's website and contact John Endreson at telescope-loan@astra-nj.org, or 609-971-3331.

SUBMISSIONS WELCOME

Members are invited to submit articles, photos, news, or stories for inclusion with Astral Projections. Please contact Chris Savia at newsletter@astra-nj.org.