



# Morning Star

## Spring 2023

Newsletter of the Vermont Astronomical Society



### \*\*\* Club Info \*\*\*

#### Announcements

Check out our Member [Forum](#) on our website ([vtastro.org](http://vtastro.org)), under Discussions.

Several [past meeting presentations and newsletter articles](#) on imaging, observing and equipment are posted on our website, check them out.

[Past newsletters](#) are posted on our website under What We Do.

**Associate Members interested in becoming full members** make your interest known to one of the board members. To become a Full Member one has to actively participate in club functions and events and be active in some other aspects of astronomy (more details are in our by-laws).

#### Moving or Changing Email?

Please send changes to Paul Walker, 53 Valley View, Middlebury, VT 05753, [paulwaav@together.net](mailto:paulwaav@together.net) ([info@vtastro.org](mailto:info@vtastro.org) will also work)

#### Hinesburg Observing Site

We have an observing site in Hinesburg, VT. (Located on town property). A locked gate (required by the town) limits access to the site.

Associate Members can request access to the gate lock. They have to be a member for 3 months. This provides access to the Warming Hut, 115v AC power, the port-a-potty and the Teaching Dome.

Full Members can request access to the gate lock, Green Mountain Observatory (18" Obsession) and the

Chmela Observatory (5" folded optics planetary scope) locks.

Board approval is required for Associates. Some training is required in all cases. There is a training checklist and an access agreement that need to be filled out.

Contact the Secretary, Paul Walker or Jack St. Louis for more information at [info@vtastro.org](mailto:info@vtastro.org)

#### Observing List for HOS

We have an email list for members interested in getting a heads-up when someone will be at the Hinesburg Observing Site (HOS).

If interested in getting on the list contact [info@vtastro.org](mailto:info@vtastro.org)

#### Observing Certificates

Several certificates (beginner to advanced) are available to members as encouragement to get out under the stars and hone their observing skills. Follow the link on our web site.

#### Outreach

#### Acknowledgment Letter

To help record our broad community involvement with public star gazing events, projects and classes, we have developed an Outreach Acknowledgment Letter with a Sample Form. It is posted on the website and can be found under **Members, VAS Club Materials for Members, Outreach Acknowledgement Letter**.

**Direct Link:** [http://vtastro.org/wp-content/uploads/2018/03/VAS\\_Outreach\\_Ack\\_Letter\\_V3.pdf](http://vtastro.org/wp-content/uploads/2018/03/VAS_Outreach_Ack_Letter_V3.pdf)

#### Dues

Are due the first of each year.

**Associate Members \$15**

**Full Members \$25**

Send dues and any address or email updates to VAS, PO Box 782, Williston, VT 05495. Or bring to any monthly meeting or Contact Paul Walker, 802-388-4220, [paulwaav@together.net](mailto:paulwaav@together.net).

#### Connect On-line

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

[Twitter@VTAstroSociety](https://twitter.com/VTAstroSociety)

[Facebook.com/Vermont-Astronomical-Society-113053818706458/](https://www.facebook.com/Vermont-Astronomical-Society-113053818706458/)

Email: [info@vtastro.org](mailto:info@vtastro.org) (Goes to the President and Secretary)

[webmaster@vtastro.org](mailto:webmaster@vtastro.org)

(Goes to Secretary and Webmaster)

#### Board Members

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Terri Zittritsch	Treas	598-7226
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Bob Horton		238-7290
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(My apologies if I missed anyone)

## The Morning Star newsletter from Yesteryear

You may have seen something like this in magazines. When I saw that the ALPO (Association of Lunar and Planetary Observers) was doing this in their newsletter, I thought, why not do it here?

This is the oldest issue I could find in the records I inherited as secretary, it's from exactly 40 years ago. I don't plan to do the 10, 25, 40 year type of thing. Nor necessarily do them sequentially. I don't have copies of all the back issues nor was the production necessarily consistent in the early 80's.

Larry Garrett is still a member of ALPO and still makes observations of asteroids. In addition to his C8 he now has a 12.5" Dob and a 6" Dob.

Paul still has that 10" scope and mount, he now calls it his "big" 10" because 2 years later he made a large 500 lb wooden split-ring mount for it. He has used the aluminum fork one time since then, for the 2004 Venus transit which he viewed from Dennis Woo's in New Haven and needed something portable.

I know Jack has some older copies and I plan to see if he can scan some of them. I also may put out a list of some of the issues I am missing in case other members have copies that can be scanned. The next one I have is the April-May-June 1985 issue.

Most are multi-page publications so I won't be including the whole newsletter each time but do plan to include the cover page and email the complete scan as separate PDF file.

We will get to see examples of the cover artwork that Russell Chmela produced starting in the Fall of 1985.

### VERMONT ASTRONOMICAL SOCIETY THE MORNING STAR January / February / March 1983

The Vermont Astronomical Society wishes to announce that there will be a meeting February 28, 1983 at 6:30 pm. The meeting will be held in the Community Room of the Burlington Free (Fletcher) Library located at 235 College St. This meeting is open to the public. The meeting will consist of short talks by VAS members and the movie Universe. The following topics will be discussed:

Constellation of the month.  
How to build a RFT (Rich Field Telescope.)  
How to build an inexpensive telescope.

VAS wishes to thank everyone for their interest during the Space Week exhibit in November. Because the response from the show was so great, VAS wishes to apologize for the delay in sending out this information.

In order to continue and expand our scientific and educational programs in astronomy, VAS needs your talents as well as your financial support. All donations to VAS are tax deductible.

#### VAS AWARDS

Larry Garrett of Burlington, Vt received the VAS Observers Award for his research with asteroids. Larry is a member of the Association of Lunar and Planetary Observers (ALPO) and uses a Celestron 8.

Paul Walker of Panton, Vt received the VAS Telescope Building Award and Astrophotography Award. Paul won the award for his design and building of a 10" f/5.6 Newtonian on a fork mount which he uses for astrophotography.

#### UPCOMING ASTRO EVENTS

JAN	28	Full Moon.
FEB	3	Saturn 2 degrees south of Moon.
	4	Last Quarter Moon.
	6	Jupiter 1.5 degrees south of Moon.
	10	Mercury 2 degrees north of Moon.
	13	New Moon.
	15	Venus 4 degrees north of Moon, Mars 5 degrees north of Moon.
	18	Venus 0.5 degrees south of Mars, one of best conjunctions of the year.
	20	First Quarter Moon.
	27	Full Moon.
MAR	6	Jupiter 1 degree south of Moon; Last Quarter Moon.
	7	Asteroid 5 Astraea at opposition. RA 10h41m DEC 12 degrees. MAG +9.9.
	14	New Moon.
	17	Venus 5 degrees north of Moon.
	21	Vernal Equinox at 4:39 UT or MAR 20 at 11:39 pm.
	22	First Quarter Moon.

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## Stargazing and other Events

All observing events are weather permitting unless otherwise stated.

Bring extra clothes. Even a summer evening can be chilly after standing still for a couple hours in damp air. We have an email list for members interested in getting a heads-up on impromptu events at the Hinesburg Observing Site (HOS).

If interested in being on this list contact [info@vtastro.org](mailto:info@vtastro.org)

Some events are listed on our website ([vtastro.org](http://vtastro.org)) and Google Calendar- (<https://calendar.google.com/calendar?cid=Nzc5dnQ1bnZrN2ljcDA2NG9vbXFnczI1M2NAZ3JvdXAuY2FsZW5kYXluZ29vZ2xlLmNvbQ>)

### Member & Invited Guest Star Gazing at HOS & other events

Keep watch for emails announcing impromptu observing at the Hinesburg site.

**Note:** If you would like to be a host, greeter/orienteer or want some training on operating the scopes, let Paul Walker know.

#### COVID Note:

We will follow the current State COVID restrictions recommendations.

**Contact:** [info@vtastro.org](mailto:info@vtastro.org)

### Public Star Gazing at Schools, Libraries, and other groups.

If you know of a group or institution that would like to schedule a star gazing session have them contact: [info@vtastro.org](mailto:info@vtastro.org)

**COVID Note:** We will follow the current State COVID recommendations.

### Public Stargazing at Waterbury Library:

**March 24-26, 2023.** The event has been postponed a couple of times, these are the current rain dates.

## New Members

**VAS welcomes** the following members who joined us since the last newsletter:

Dave Lawrence  
Tyler Tilton  
Paige Tilton  
Scott Luria  
Dexter Mayo  
Justin Cutroni

Meetings are held the first (non-holiday) Monday of the month, at 7:30 P.M. in the Kolvoord Community Room of the Brownell Library, 6 Lincoln St., Essex Jct (2nd building north of Essex 5 corners on the left on Rt. 2A). Extra parking is available in the Bank North parking lot across from the library. For inclement weather call Jack St. Louis (802-658-0184) or Paul Walker (802-388-4220) to confirm.

## April 3

### Intro to Planetary Astrophotography and Processing.

By Terri Zittritsch

This year I've spent quite a bit more time trying to capture the planets because of the several oppositions in a row (Saturn, Jupiter and then Mars). I thought I'd share some of the things I've learned along the way for both capturing as well as processing the photos.

### Jack on the Radio

Listen to Jack's astronomy update on radio station WJOY AM (AM 1230) on Ginny McGehee's 'Breakfast Table' morning show. Aired the first Wednesday of the month at 8:40 AM.

### Gary's Astronomical Events for the Month

can be viewed via WCAX at <https://www.wcax.com/weather/astronomy>

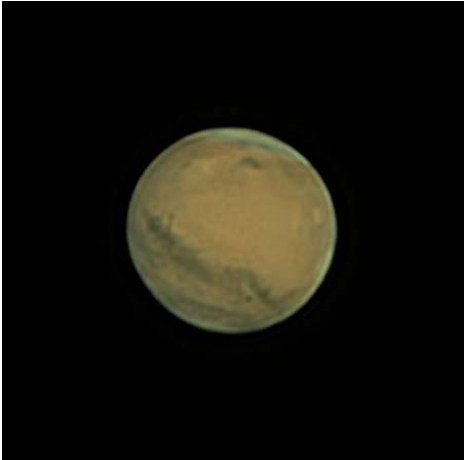
## Meetings/Presentations

**Meetings can be attended in-person or remotely. We are back to holding meetings in-person at Brownell Library. They can also be attended via Zoom. The Zoom link will be emailed to members with the meeting reminders. Non-members can request the link via [info@vtastor.org](mailto:info@vtastor.org).**



May 1

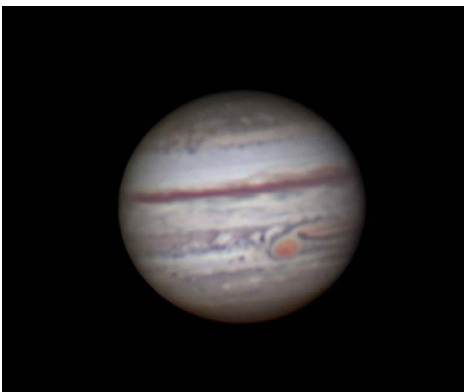
**Annual Banquet & Business Meeting**  
**Plans for Zooming as well**  
**Starts 6:00 PM**



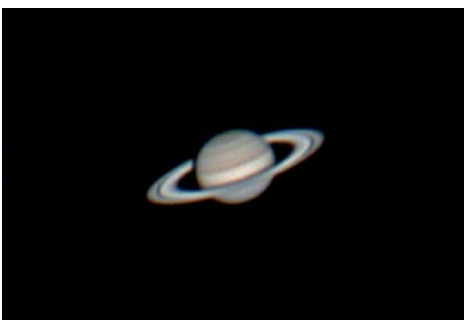
Mars 2022-12-13



Jupiter, Callisto &amp; Europa 2022-09-30



Jupiter 2022-09-09



Saturn 2022-09-03

No Presentation. Members and invited guests only. **Contact any member to get an invite. Members can invite spouses and friends.**

**Meal:** If you are having the meal, choices are Turkey with all the fixings or Pasta Primavera (veggie dish). Paul will send out RSVP's in April.

The **meal is \$25 at the door**, no charge if not eating. **An email about the meal will be sent out a couple weeks before the meeting.**

**Location:** St. John's Club, 9 Central Ave. Burlington (take Lakeside Ave from Pine St.).

**Time:** Social Hour 6-7. Dinner 7-8. Door prizes, awards, annual business meeting 8-9.

#### **Election of Officers**

Board Positions up for election/re-election this year- Secretary, Treasurer, 4 Board Members at large (1 at large position is currently unoccupied. Let Jack or Paul know if you are interested in any of these positions by emailing [info@vtastro.org](mailto:info@vtastro.org). **You must be a Full Member** (if you are an Associate, you must request to become a Full Member early enough to give us time to consider making you a Full Member first).

June 5

#### **Asteroids and Meteors** **By Steve Grimsley**

Asteroids and meteors are the leftovers of non-gaseous material from the formation of the solar system. They are found throughout the solar system but are concentrated in the main asteroid belt between the orbits of Mars and Jupiter. Much of what we know about the early history of the solar system comes from the study of these rocky remnants that made their way to Earth.

There are three main categories of meteors: stony, stony iron, and iron. These types mostly are based on where, in an internally melted and gravity segregated asteroid, they were formed.



Carbonaceous Chondrite Meteorite

Stony meteors that contain chondrules are known as chondrites. Chondrules are spherical grains of silicate minerals 1 - 3 mm in size from rapidly cooled molten droplets in the primordial solar nebula. They are composed of pyroxene, olivine, plagioclase, glass, iron nickel, and sulfate minerals that have not undergone a full melt since their formation. Their bulk composition is nearly identical to the Sun without hydrogen and helium and other light volatile elements and compounds. A special class of stony meteors are the lighter carbonaceous chondrites. These make up a higher proportion of asteroid bodies further away from the Sun. The carbonaceous meteorites represent the most unaltered non-gaseous material in the original cloud from which our solar system formed. They date to 4.55 billion years back to the earliest formation of the solar system. Ordinary stony chondrite meteors are by far the most common type.

Achondrites are stony material that has undergone a full melt cooling in a differentiated asteroid. These meteors are much like igneous rocks that form on earth. Fragments from the moon and Mars that have fallen on Earth are achondrites.



Stony iron Meteorite

Stony irons and irons are from the interiors of large asteroids whose interiors melted and gravity segregated. Me-

teors of this type have been some of the largest that have finds. Polished surfaces of these have much visual appeal.

This presentation will review these major meteor classifications with physical samples to examine and discuss in an open forum. Nine separate meteor samples, three irons, four stony irons, and four ordinary chondrites and one carbonaceous chondrite will be available. A historical chronology of the early solar system will be presented as a summary.

## Articles

### "Earth Without the Moon"

By Lou Varricchio

What would Earth be like without the Moon?

This intriguing question isn't just a fanciful "what if" exercise, but an inquiry into what makes our planet such a unique place in our solar system.

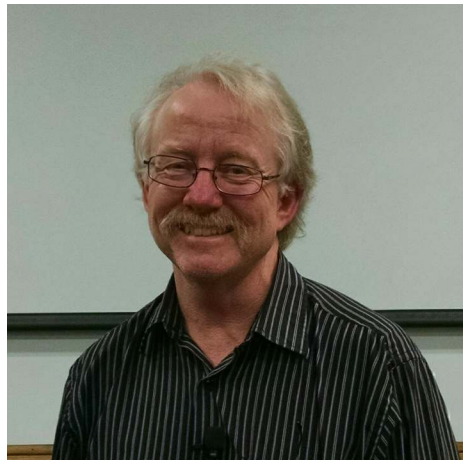
NASA astronomer Sten Odenwald—founder of the online *Astronomycafe.net*—has thought a lot about the problem of a Moonless Earth; he came up with several intriguing possibilities.

First, let's look at tides: Without Luna, Earth would still have high and low tides thanks to the Sun, but these tides would be half as high as lunar high and low tides. Spring tides (or Neap tides) would disappear since both the Sun and the Moon—on opposite sides of the Earth or on the same side—create these effects. However, large coastal breakers, familiar to residents of California and

Oregon, would still occur thanks to the effects of Earth's rotation and maritime storms.

When it comes to time-keeping, there'd be no need to keep a 12-month calendar without the Moon, said Odenwald. Also, take away the influence of Luna's gravity upon Earth and fewer volcanoes might have been created during our planet's long geological history. This problem, with reduced out-gassing from volcanoes, might have reduced the density, and perhaps the complex composition, of the terrestrial atmosphere. Such an effect might have reduced or even eliminated the chance of life arising early in the Earth's history.

NASA astronomer Sten Odenwald has thought a lot about the problem of a Moonless Earth; he came up with several intriguing possibilities.



NASA astronomer Sten Odenwald

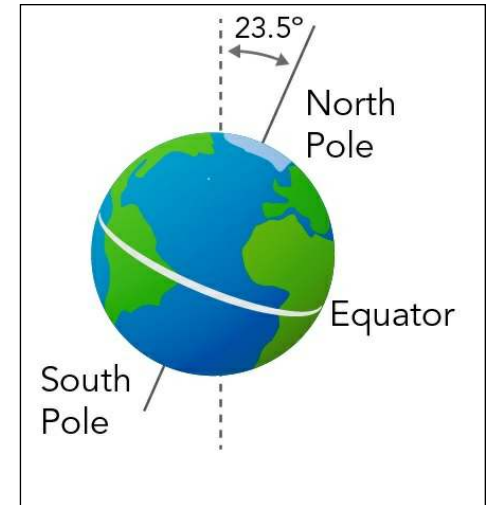
"Would the lack of the Moon near Earth... have prevented continental drift?" Odenwald asked. "Probably not," he concluded, "since convection of molten materials deep within the Earth's mantle is the result of internal forces not

lunar forces."

One intriguing effect of a Moonless planet Earth, Odenwald surmised, would be a world without seasons—or at least seasons very alien to those we're used to.

Many astronomers think the proto Moon was an "interloper", a planetary wanderer, which

came from elsewhere in space and impacted the Earth to form the Moon we know today. If true, then the Earth's rotation axis—in pre-lunar times—could have been tilted perpendicular to the "ecliptic" or plane of the solar system (rather than tilted at nearly 24 degrees as it is now).

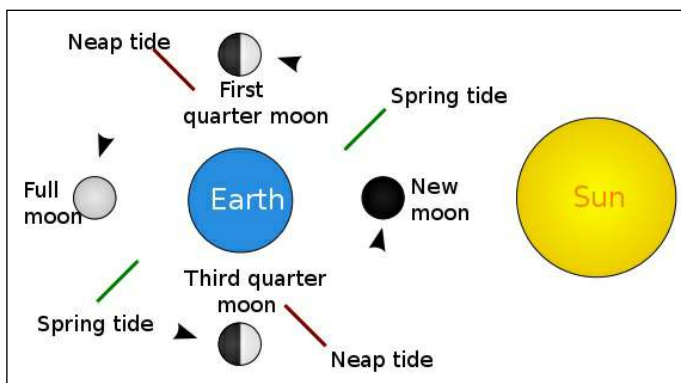


The Earth's rotation axis—during ancient pre-lunar times—could have been tilted perpendicular to the "ecliptic".

Without the Moon, sunlight would reach the Earth's surface at the same angle throughout the year. At Vermont's latitude, for example, the Sun's rays would strike the ground at 45 degrees daily. At both poles, the Sun would never rise above the horizon. Thus, at the equator, summer would continue year round; at mid-latitudes spring would reign; and at higher latitudes, winter would continue throughout the year. Such a hodgepodge of seasons would create wild, unpredictable planet-wide weather.

## Sky Lore and Stories

*Long ago, storytellers invented magical stories of the stars, the Moon, the Sun, and other mysteries of the sky. The stories helped people pay attention to our world—in the sky and right here on the Earth. Today, astronomers help us pay attention to the mysteries of the universe. By observing, measuring and predicting, they explain how things work and, like the storytellers, they help us notice and care for our world. Storytellers and astronomers are both*



Tide chart: Spring tides (or Neap tides) would disappear since both the Sun and the Moon—on opposite sides of the Earth or on the same side—create these effects.

*sky tellers. Though each tells a different kind of story, both help us to open our minds and grow.*

*In this series of articles, I will be a sky-teller of the first kind, bringing you tales from different cultures as we look at the stars through the eyes of historical imaginations.*

~Carrie Cruz

### **Canis Major and Canis Minor**

While Canis Major and Canis Minor are commonly said to be Orion's hunting dogs (as they are steadfastly by his side in the winter southern sky), there is a more involved Greek tale about these two canids.

Zeus, king of the Greek gods, was quite accustomed to getting what he wanted and WHO he wanted and it was with great desire that he decided he must have the beautiful Phoenician princess, Europa. After being initially refused by Europa, Zeus turned himself into a tame white bull and hid among her father's herd of cattle. When Europa saw the handsome beast, she climbed on his back and Zeus saw this as his chance to make a get-away with the beautiful girl. With Europa on his back, Zeus swam with her to the island of Crete. (Taurus is sometimes said to be this bull. The constellation artwork only shows the bull's upper half as his lower half is submerged as he swims to Crete.... but that is another story!) Once on Crete, Zeus revealed himself and Europa became the first queen of Crete, bearing Zeus three sons. But alas, Zeus could not stay on Crete with her, as his godly duties called him back to Mount Olympus. Zeus did not abandon Europa and their sons completely, though. He left three gifts: a man made of bronze to guard the shore, a javelin that never missed its mark, and Laelaps, the dog that caught whatever it hunted.

Meanwhile, there existed another canid, the Teumessian Fox -- a gigantic fox that could never be caught. The fox was sent by the gods (some myths say it was Dionysus, the Olympian god of madness and wild frenzy) to ravage Thebes and kill the children of the city as punishment for some horrible, though unnamed, crime. The inhabitants of Thebes tried to pacify the Teumessian Fox by sending out a child sacrifice each month, with the hope that more children

would not be taken, but the plan itself was awful -- and not working. Creon, the ruler of Thebes, had heard about Europa's dog who always caught what it hunted. He set about making a deal to use Laelaps to capture the Teumessian Fox and the chase was on. However, the fox could never be caught! Zeus, faced with an inevitable paradox, turned both the dog and the fox to stone and placed them up in the sky as Canis Major (the dog) and Canis Minor (the fox).

The paradoxical chase continued to this day, as Canis Minor, the fox, is seen rising in the sky on winter nights about an hour before Canis Major, the dog, follows in pursuit.

## **Board & Committee Meetings**

### **January Board Meeting**

We discussed the Annual Meeting, whether to have it in-person or not, whether to have it at St. John's Club or Keith's house (he offered). The preference for the board members present was to have it in-person at St. John's. We did not make a decision on this.

With the Recycled Optics Program we discussed whether to spend any money on refurbishing any of the donated telescopes. We decided it was OK to spend some money on some scopes. For example it was suggested that ~\$100 for a 4.5" Newtonian optical tube assembly (OTA) and ~\$150 for a 6" OTA to build a Dobsonian base, replace or refurb the focuser, add a unity finder and a couple eyepieces, etc. Most other types of scopes we would not put any money into.

Insurance is coming due. We need to add the new shed to the list of assets on the policy, this will increase the insurance premium a little.

Eclipse Committee update- The Eclipse Letter for sending to businesses and state entities is ready. Jack wrote an introductory letter to go with it.

### **February**

Jack sent an email to the membership to find out what people's preferences are regarding where to have the

Annual Meeting. He received 9 replies with the majority for St. John's Club.

The Public Stargazing Event sponsored by the Waterbury Library has been postponed to the end of March. The date for the Wake Robin stargazing event is flexible and will be set based on weather. We will set up outside their Community Center. We will do a stargazing event for the Shelburne Community School. Jack will do a presentation of for the Brownies.

Recycled Optics Program - Keith has been keeping his eye out for camera tripods at the reused facilities at local Transfer Stations. He plans to add binocular mounts placed on top of them- this will require a modest investment and something he will want to be reimbursed from the club. The Board has approved this.

Some of the Library Loaner Scopes are in need of some items being replaced. He is willing to do the work but asks that the club reimburse him for the cost of the parts. The Board has approved this.

Jim has sent out 8 hard copy letters to the Vermont Chamber of Commerce, Senator Sanders, VT Dept. of Safety, the Governor among others. Most of the letters will be sent via email.

### **March**

**Joe presided over the meeting.**

We mostly discussed proposals for some changes and updates to the by-laws. Terri presented several. The main one is a Non-Discrimination section, another is a list and description of club activity coordinators, such as Site Manager, Outreach coordinator, Newsletter Editor, etc.

Another area of the by-laws we are looking at is the description and requirements for Full Membership. The plan is to reduce and consolidate the requirements but add to suggestions of what member can do. The emphasis will be the expectation that they demonstrate their desire to be active in club activities and events for the benefit of other members and the general public. The current requirements encourage members to engage in research type activities as a path to Full membership. This list of activities will remain as an alternative



for members who may not be interested in outreach or other club activities.

We discussed the Annual Banquet & Business Meeting. Paul had contacted Michelle at St. John's Club. She sent their 6 buffet menus. The Board will decide which menu to use and which items from the menu. Likely will be the usual 2 options, Turkey and a veggie dish.

Over a concern by Paul that at some point, we may not receive enough votes to reach a quorum on matters requiring a vote by the Full members, we discussed the idea of removing Full member status for those who no longer actively participate in the. The consensus was that we should not consider this.

Joe is still waiting for good weather for scheduling the Wake Robin and Shelburne Community School stargazing events.

#### ACTION ITEMS:

It was suggested that a copy of the by-laws be sent to new members. Paul will add this to the current slate of items sent.

#### MOTIONS:

None

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#### VAS Membership Committee

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#### Observatory Site Committee

No meetings this quarter.

### Under the Stars & Planets

#### OBSERVER'S CORNER

##### Observing Tips

If you have tips to share whether for beginners or experienced observers send them our way at [info@vtastro.org](mailto:info@vtastro.org)

► Tip (repeat) Sketching is a good way to improve your observing skills.

##### Equipment Tips & Recommendations

If you have equipment tips and suggestions to share whether for beginners

or experienced observers send them our way at [info@vtastro.org](mailto:info@vtastro.org)

► (repeat) Tips for dealing with humidity (whether dew or frost).

One common way to address humidity problems is with a dew heater and/or fans. But here are a couple more ideas.

A common place for humidity problems is the finder scope. A dew shield helps a lot. You can buy scope-specific shields, you can buy generic shields, or you can make your own. People have used a roll of cardboard (e.g. a toilet paper roll or paper towel roll can work nicely when blackened with paint or felt pen), sheets of foam, or very thin plywood. Plastic foam sheet can be wrapped around the finder to keep it warmer longer. A rule of thumb is to make the shield 1.5 times as long as your aperture is wide. Longer is better for reducing dew but but make it too long and you will reduce the effective aperture by restricting the field of view (remember finder scopes have a field of view of about 5 degrees which means there's a cone of light coming into the objective lens on the front).

If you don't have a dew shield putting the lens cap back on (and the eyepiece cap) whenever you aren't using the finder will help. No caps? Cover the finder with a cloth or small towel.

A very effective though technically more challenging approach is to make your own dew heater with a string several electronic resistors together and attaching each end of the string to a 12v power source (a standard 9v battery also works but may only last a night or two). Make one string for the objective end and a shorter string for the eyepiece (or wrap a longer one a couple times around). The resistors or at least any bare wires will need to be inside some heat shrink tubing to prevent shorting out the power source. The drawbacks are that you need a power source and you have wires hanging off the scope. Many observers with motorized GoTo scopes have a suitable 12vdc power source and some mounts have "pass-through" power management cables allowing accessories to be plugged into auxiliary power connectors right on the mount.

You only need about 1 to 2 watts of power to provide enough heat. Here's more technical info for those who may have a soldering iron but don't know how to calculate what you need to use for resistors.  $2 \text{ watts} / 12\text{v} = 0.17 \text{ amps}$ .  $12\text{v} / 0.17 \text{ amps} = 72 \Omega$  (ohms) (value of the total resistance needed) (1 watt of power calculates to  $144 \Omega$ ). **Any amount of resistance in about the 50 to 150  $\Omega$  (ohm) range will work.** This resistance will be distributed between 5 or 6 resistors in series (daisy chained). So the reasonable range of values for the resistors is:  $50/5 = 10 \Omega$  each (this will produce more heat) to  $150/6 = 25 \Omega$  each (will produce less heat and is a better choice if using a 9v battery).

Radio Shack has a 5 pack of 33  $\Omega$  (ohm), 1/2 watt resistors. Using all 5 would add up to 165  $\Omega$  and produce 0.87 watts, using 4 of them would give you 132  $\Omega$  and 1.1 watts, using 3 would give 99  $\Omega$  and 1.5 watts.

**Note that these resistors have wattage rating of 1/2 watt.** This means each resistor is rated to dissipate up to 1/2 watts of power (in the form of heat). So you have to divide the total calculated watts by the number of resistors and get a result of no more than 0.5 watt. Otherwise they will get hot enough to burn you. They get very hot even when dissipating 1/2 watt, 1/4 watt is better.

Radio Shack has a 5 pack of 15  $\Omega$ , 1/2 watt resistors. 5 of these will produce 2 watts. Radio Shack also has a 5 pack of 10  $\Omega$ , 1/2 watt resistors (currently sold out). 5 of these will produce 2.9 watts in case you need more heat, but would get very hot and damage the resistors over time. 6 would produce 2.4 watts and handle the heat.

Amazon.com has resistors as well, only they come in large assortment packs. There is a 600 piece pack of 1/2 watt resistors for \$14 with resistor values in the proper range (10  $\Omega$  and 22  $\Omega$ ). It has 20 pcs. of each value so you could make several dew heaters. There are other sets with 33  $\Omega$  and/or 47  $\Omega$  resistors that will work as well.

Almost forgot the heat shrink tubing! Radio Shack and Amazon carry it. Mostly in kits with short pieces but you can use multiple pieces placing one at a time over part of the string of resistors,

## Member's Observations

### Comet C/ 2022 E3

#### *Lawrence Garrett --*

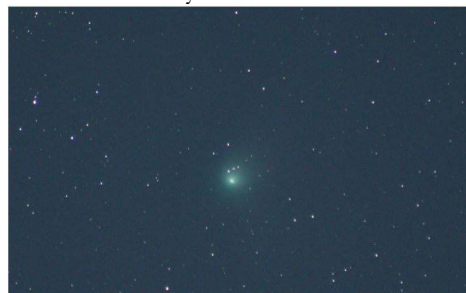
[1/29/23] Its been so long with cloud lock here I forgot what the skies looked like! But this morning I was greeted with excellent skies to spot that green comet at 4:25 AM. Despite using only 7x35mm binoculars, Comet ZTF looked good, but not green. Naked eye too. But just two hours clouded out again. Glad this did not get away, first observations of new year. Any other lucky sights?

#### *Paul Walker --*

Though there was a lot of cloud interference and a lot of waiting for the standing wave clouds to stop standing in our way, Lou Varricchio and I saw it last evening [1/28/23]. I saw it about 7 PM and Lou got a very brief glimpse through a the 20x90's just after he arrived about 7:30. Lou got another view about 9 PM before he left. Couldn't see any color in 20x90 binos nor 12.5" f/4.9 Dobsonian at 114x in binoviewers. We could make out a very short dust tail to the upper right of the coma. In the 12.5" the nucleus looked star-like at 114x but not at 188x.

Early in the evening I could not detect the comet naked eye but later about 11 PM I could (the Moon was low in the West by then). I could only detect it with "extreme" averted vision. Referencing some stars near Polaris that I use for "limiting magnitude" (sky transparency) purposes, the comet was dimmer than magnitude 4.2-4.3 but brighter than 5.3 and maybe brighter than 4.7.

I also took images. The early images only produced 3 in row without clouds. However, after 10:30 the clouds cooperated and I got 31, 45 second shots. by 11:00 there were almost no clouds in the sky.



Single unprocessed 45 sec. exp., ISO 3200, Canon Rebel T7i, 300mm, f/5.6, cropped 50%.

shrinking it, letting it cool down and placing the next piece overlapping the first piece a little. The shrink tubing requires fairly high heat, a soldering iron can be placed on it and slowly moved over the surface of the tubing or a heat gun can be used. A hair dryer does not get hot enough. Ideally the shrink tubing should fit snugly around the resistors when shrunk. Try a piece on a spare resistor to determine which size tubing to use.

Contact [info@vtastro.org](mailto:info@vtastro.org) if you need help or have questions. Paul Walker has a bunch of 9v battery clips and what seems to be a standard connector (5.5mm O.D. with 2.1mm center pins) for DC power supplies, both male and female types, if you need them.

### **On-line Resources**

► Here's a really nice, printable Star Atlas. It shows how to go about printing, laminating and binding the atlas. And, even more, with supplements!

<http://www.deepskywatch.com/deep-sky-hunter-atlas.html>

Discussion of the best star atlases-  
<https://astronomy.com/observing/get-to-know-the-night-sky/2014/04/choose-a-star-atlas-thats-right-for-you?page=1>

#### ► ALPO

<https://alpo-astronomy.org/>

No, not the dog food, the Association of Lunar and Planetary Observers. They are a good place to check out for those interested in learning more about the Moon, Sun, planets, asteroids, meteor showers and observing them or submitting your images or drawings of them.

The Moon is a good place to start as it is often visible, requires no specialized accessories and is close enough to see lots of different geological features.

The Lunar Section produces a monthly newsletter containing observations and images of the Moon.

It is a little tricky finding the link to the newsletter. From the link above, under Observing Section (top left side), select "Lunar Section". Look for "here" about halfway down the info for each month, that's the link to each newsletter.



45 sec X 31 (23 min), enhanced, cropped 50%.  
Field of view is ~1.4 x 2 degrees.

#### *Gary T. Nowak --*

My first observation was on 31 Jan 2023 at 23:30 UT. The Comet C/ 2022 E3(ZTF) had just cleared the trees in the NE. I got the 11 X 56 binoculars on it and had a very short view of it. Thin streaky clouds came in and ruined the view by covering up the comet. I waited about 15 minutes and the thin cloud mass spread out more and covered the sky, so I decided to try again later.

2nd Observation was on 1 Feb 2023 at 08:30 UT. The sky finally cleared and the Waxing Gibbous Moon (84% Illuminated, 10 Day Old Moon) was still up in the West. I wanted to see if I could see the comet with the unaided eye with the Moon up due to the fact that from 1 Feb -7 Feb, the Gibbous and Full Moon would be up all night and causing strong lunar interference. Transparency was 4.1, Seeing was 4.0. I could not see the comet with the unaided eye. Moonlight did interfere with comet observations. I did see the comet in 8 x 42, 11 x 56 and 16 X 80 binoculars (first light). I had recently purchased a pair of Orion's New Giant View® 16 X 80 ED Giant Binoculars (FOV 4.0 °) so I finally had a chance to try them out. So the first object I saw in the 16 x 80's was the comet. No matter how hard I tried, I could not see the comet with the unaided eye. Moonlight was definitely a big problem. There was no tail seen in the 16 x 80's. I did a magnitude estimate of the comet and it was about +5.5 and the size was 20'. I knew that the Moonlight was really interfering so I decided I would do another observation after the Moon set. It was clear to me that this comet would be extremely hard to find and see in the strong Moonlight for the inexperienced. The inexperienced General Public would be tasked with a rather impossible situa-



tion in trying to find and see this comet in bright Moonlight. Some of the news reports on the comet made it seem that this "Green Colored" Comet would be rather easy to find and see. This is not the case for the inexperienced General Public.

3rd Observation was on 1 Feb 2023 at 09:30 UT. The Moon had been set for at least 20 minutes so I could now see the comet in a some what darker sky. Transparency was 4.7, Seeing was 5.0. There was some light pollution around in the sky due to the lights of Taft's Corner getting a reflective boost off the snow. I tried to see the comet with the unaided eye and failed again. The Transparency, which was being influenced by the light pollution, did not help. I could easily see the comet in the 8 X 42 binoculars. I also observed Comet C/ 2022 E3 (ZTF) in the 11 x 56 and 16 x 80. The 16 x 80 gave the best view of the comet. I now was able to get some better visual data on the Comet due to the Moon free sky: Condensation 7.0, Size 32', and Magnitude +5.4 (5.0, 5.3, 5.4, 5.5, 5.7, 6.3, 6.5). I scanned the comet area with the 16 x 80 but failed to detect a tail of any type. (I had seen visual reports that the Comet's tail was faint.) I thought that since the Comet was only 1 day away from its closest approach to Earth (2 February), I should be able to detect some sort of tail with the 16 x 80. I also saw the faint greenish color of the comet in the 16 x 80. The 8 X 42 did not show the comet's color while the 11 X 56 did show a very faint trace of the comet's greenish color. It's clear to me that this comet even in a dark sky will not be an easy find for the inexperienced General Public especially without a noticeable tail. This comet is more of a binocular comet than an unaided eye comet. With this visual comet observation, I've now seen 119 comets visually. Most of those visual comet observations were made with giant binoculars. After this observation, I was feeling the cold which was getting into my face mask and I could feel the strain on my upper lungs and heart so I ended my session. In case your wondering what was the conditions in my back yard: Temperature -3 °F, Humidity 95%, Wind 2 mph SE, Barometer 29.74" and Wind Chill -10.3 °F.

It will be interesting to see how much the Comet has faded once we get free from the Lunar Interference. After 7 Feb, the Moon will be out of the evening sky for awhile and the Comet will be high up in the evening sky. I would not be surprised if at that time the Comet will have dropped a magnitude or so in brightness and would not be visible to the unaided eye. The decrease in the comet brightness will likely decrease any visibility of the greenish color. Next time I will try using my larger giant binoculars and maybe even my telescopes to see what size instrument will reveal the comet faint tail(s) visually.

#### **Joe Comeau --**

[2/5/23] Last night. 2.5 minutes  
[from Puerto Rico]



#### **Peter Gillette --**

[2/6/23] I just came in from my observatory, where I was hoping to attend the meeting while observing the comet, but I lost my connectivity out there. It mystically returned at about 9:15, as I was closing up to come back inside to thaw out, but I figured it was too late to jump in by then. Sorry I missed everyone, but the sky was really good. Best I've seen in a couple of months, I think.

I was hoping to be able to Live Feed a view of the comet, but no dice. But this is what I was seeing on my video monitor... Oh well.



#### **Paul Walker --**

[2/6/23] I couldn't see any color [in the comet] but that's no surprise, I have

never seen or noticed color in M42. I could see a short tail in the 12.5" f/4.9 @ 114x with the binoviews. I estimated the tail at ~6' based on the Moon not quite filling the same field of view. I verified that by processing one of the images I took with my 6" f/4 Newt. to closely match my visual memory and measuring it.

#### **Naked Eye Sunspot**

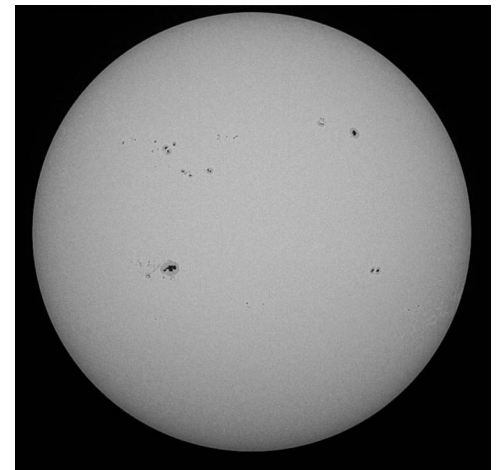
#### **Paul Walker --**

[1/17/23] I have been getting several email notifications of solar flares (small to medium ones). With the Sun showing today I decided to check the sunspot situation on spaceweather.com. There I saw that were lots of spots and a message that one was big enough to see with the naked eye. I pulled out a pair of solar viewing glasses and sure enough, I could see just see a spot in the lower left quadrant of the Sun.

After lunch I put an 8" full aperture white light solar filter on my 10" scope. Even with the Sun so low in the South it was a beautiful sight.

Putting my camera on the scope I took some prime focus shots and some using a 1.5X Barlow (provides 2X with the camera).

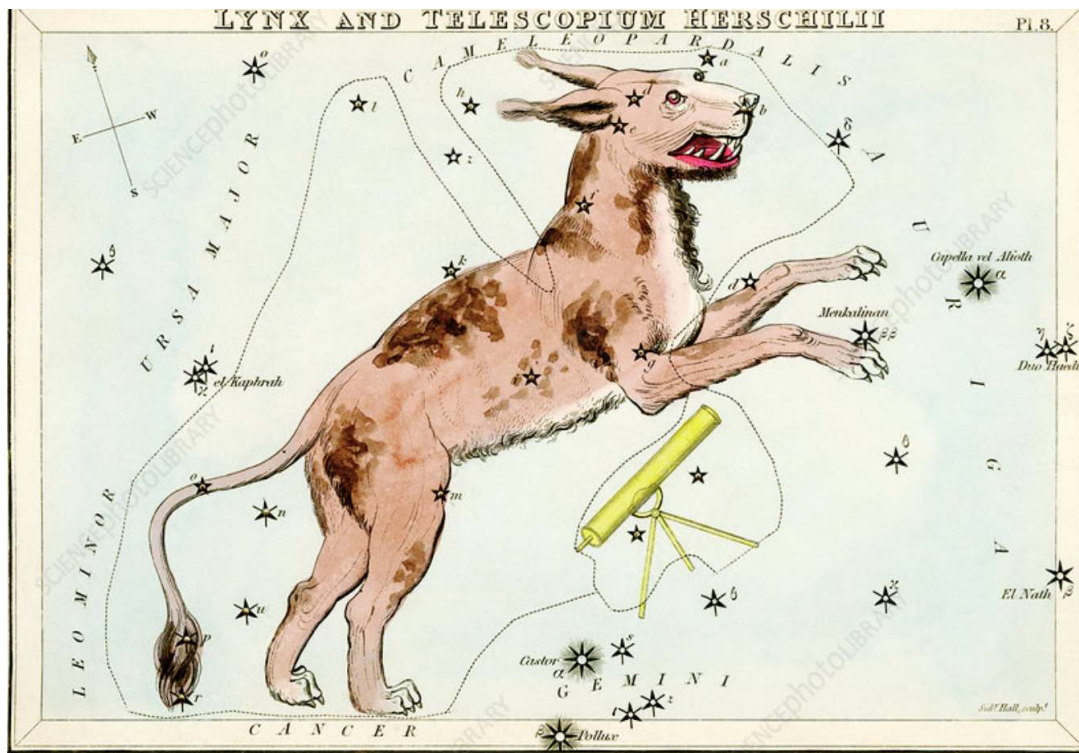
Here is the prime focus shot.



10" f/5.6 Newtonian stopped down to 8" f/6.9 with the solar filter. Canon Rebel T7i DSLR, 1/800 sec @ iso100, stack of 15 out of 33 images. With processing, this image has much more contrast than it had visually.

Always happy to include your observations. Send them to [info@vtastro.org](mailto:info@vtastro.org).

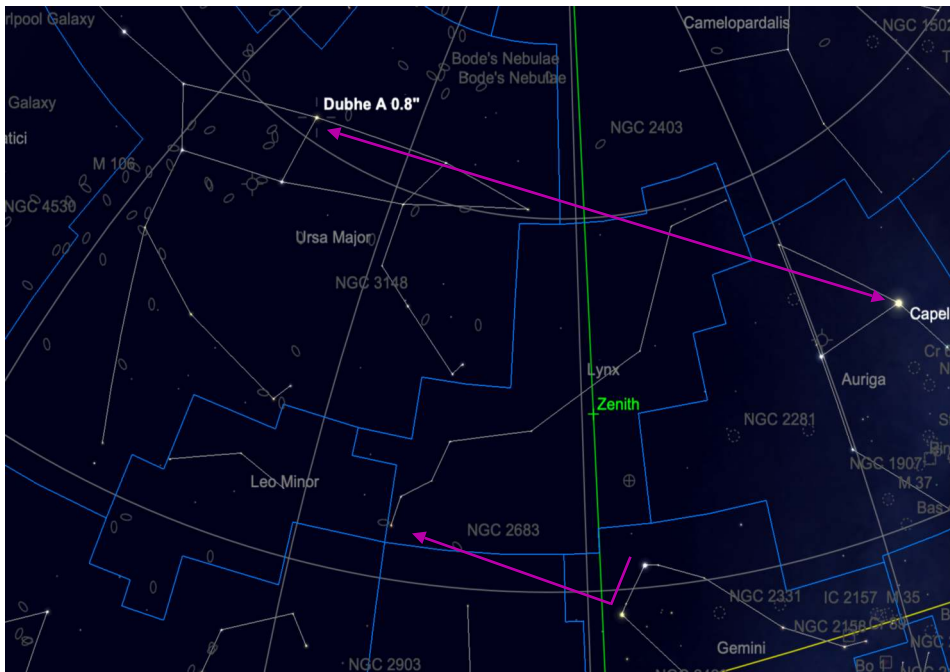
# OBJECTS TO OBSERVE



**Lynx – not for the faint of heart**  
**(Terri Zitttritsch's March Constellation of the Month Presentation)**  
 Urania's Mirror: plate 8

- Pronounced 'links'
- A Bobcat of Canadian, Eurasian or Iberian descent, its name loosely meaning reflective eyes.
- Cataloged by Johannes Helvelius in the 17th century
- Created to fill the large void between Ursa Major and Auriga, and named Lynx because it would take good eyesight to view the faint constellation. Only Alpha Lyncis is brighter than 4th mag. He wrote in his Prodrum astronomiae that only those with the sight of a lynx will be able to see it!
- Who was Johannes Helvelius?
  - ▶ A prolific observer and sketcher. In 1647 Johannes created an atlas of the moon called the Selenographia, which included 60 detailed drawings of the moon's surface and gives him the title of "founder of lunar topography". Johannes also discovered the moon's libration in longitude.
  - ▶ Johannes also defined Canes Venatici, Sextans, Leo Minor, Vulpecula as well as several now obsolete constellations.
- Lynx is a member of the Ursa Major family of constellations
- Mythology: Loosely associated with the constellation's name, Lynceus who sailed with Jason and the Argonauts





## Finding LYNX

1. As defined by Johannes Helvelius, see the area between Ursa Major and Auriga
2. Look for the head of Ursa Major which points directly at Lynx
3. Approximately  $\frac{1}{2}$  way between Dubhe and Capella
4. Alpha Lyncis is perpendicular to the line between Castor and Pollux and extending from Pollux

## Observing in Lynx

### Bright Stars

**Alpha Lyncis** – Mag 3.13, class K7 III (Orange giant that has exhausted hydrogen in its core) Alpha Lyncis, also called Elvashak, has a diameter of 55x solar radius and 677 times more luminous than our sun. The only star with a formal designation in Lynx

**38 Lyncis** – Binary of Mag 3.82 and class A3V hydrogen fusing star with a 6<sup>th</sup> mag companion at 2.6\"

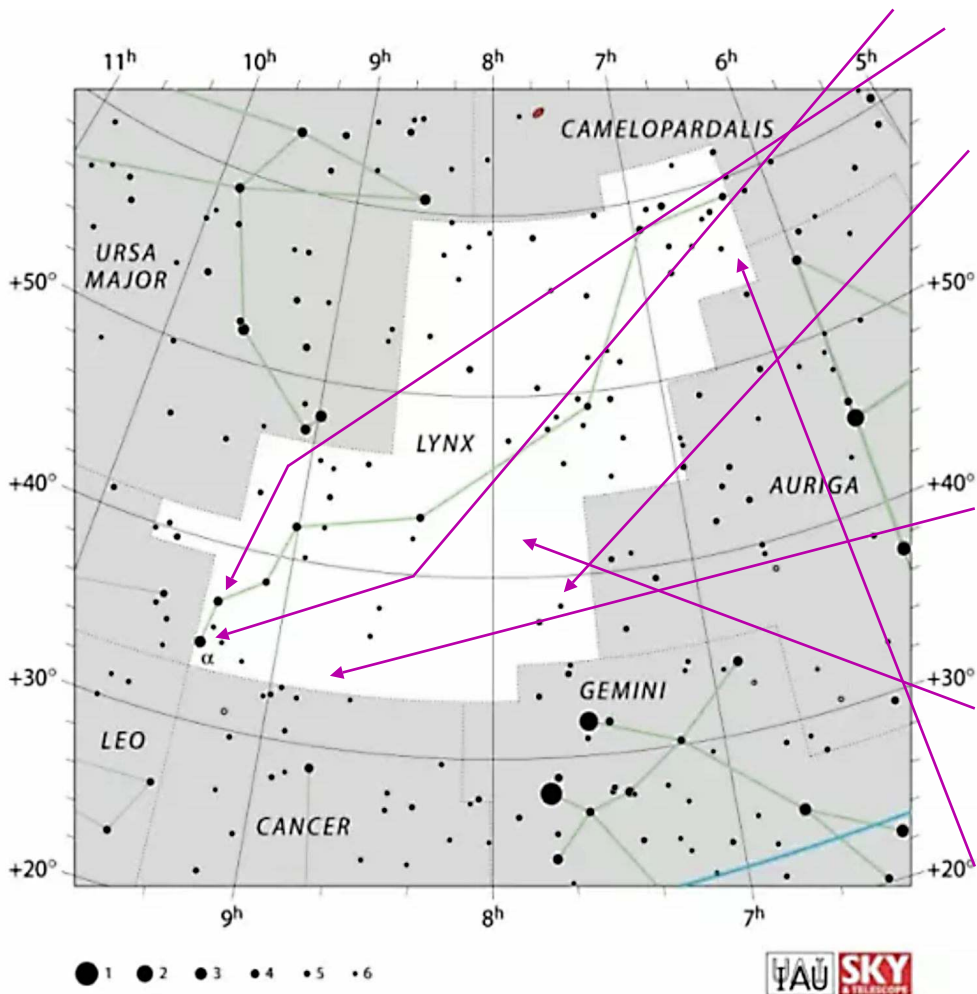
### Deep sky objects

**NGC 2419**, Intergalactic Wanderer – A globular cluster of mag 9 which is highly concentrated and classified Shapely class II. Discovered by W. Herschel on New Years eve, 1788. It's one of the most remote globulars at 300,000 ly distant. Its name comes from the fact that it is far from the majority of globulars in the MW and originally not thought to be part of our Milky Way. Can be seen in good skies with a 4\"

**NGC 2683**, UFO Galaxy, Mag 9 edge on spiral galaxy approximately 10'x3' in size. Discovered by Herschel in 1788. Because of its edge on appearance and high surface brightness it was nicknamed the UFO galaxy.

**NGC 2500**, an 11<sup>th</sup> mag spiral galaxy, also discovered by Herschel in 1788. This galaxy is still in a heavy star forming state and has been studied with the Hubble telescope.

**PuWe 1**, an 11<sup>th</sup> magnitude planetary nebula created when a red giant blew off it's outer layers. At 20' in size, one of the largest planetary nebula, but it's large size also results in a low surface brightness. Presumably discovered by two people, Pegathofer and Weinberger. It is large but faint. A challenge astrophotography target!



Lynx constellation map by IAU and Sky&Telescope magazine



## ASTRO-IMAGER'S CORNER

All things astrophotography, for the beginner to the expert.

### Imaging Tips

► (repeat) Both cell phones and point & shoot cameras can be used to image the Moon and some planets through a telescope. One can hold the phone or camera up to the eyepiece for the Moon. There are also adapters specifically for holding the phone and others specifically for cameras. These make taking pictures a lot easier.

If you have tips to share whether for beginners or experienced imagers send them our way at [info@vtastro.org](mailto:info@vtastro.org)

### Software/Online Info

► **Autostakkert3! (AS!) Stacking Software** – Lucky Imaging with an Edge for planet, the Moon and solar images. Works with still and video images.

<https://www.autostakkert.com/>

There are video tutorials on YouTube such as: Autostakkert3! How to process The Planets (Tutorial part 1) - <https://www.youtube.com/watch?v=g67DfADSWvA>

I have found it works better than Registax for stacking Moon and Sun images and as good or better for the planets. -- Paul Walker.

### *Astrophotography How-to*

<https://www.allaboutastro.com/how-to-learn-astrophotography.html>

If you have imaging software or a site with imaging info to share whether for beginners or experienced imagers send them our way at [info@vtastro.org](mailto:info@vtastro.org)

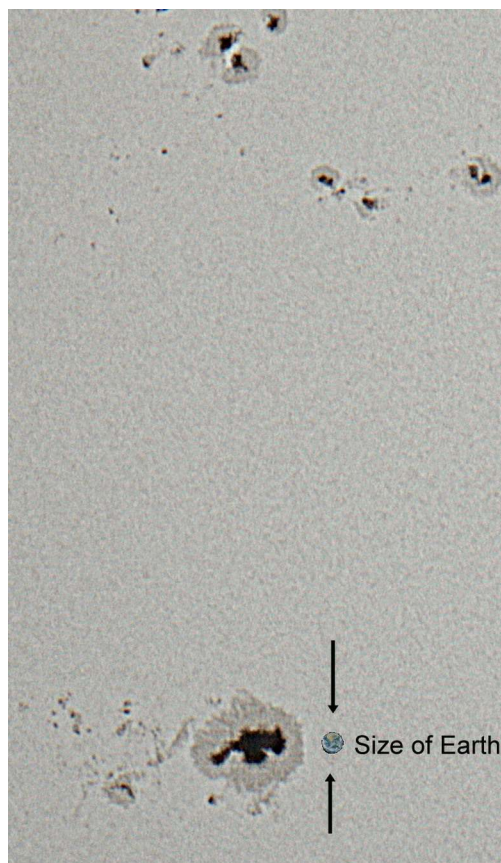
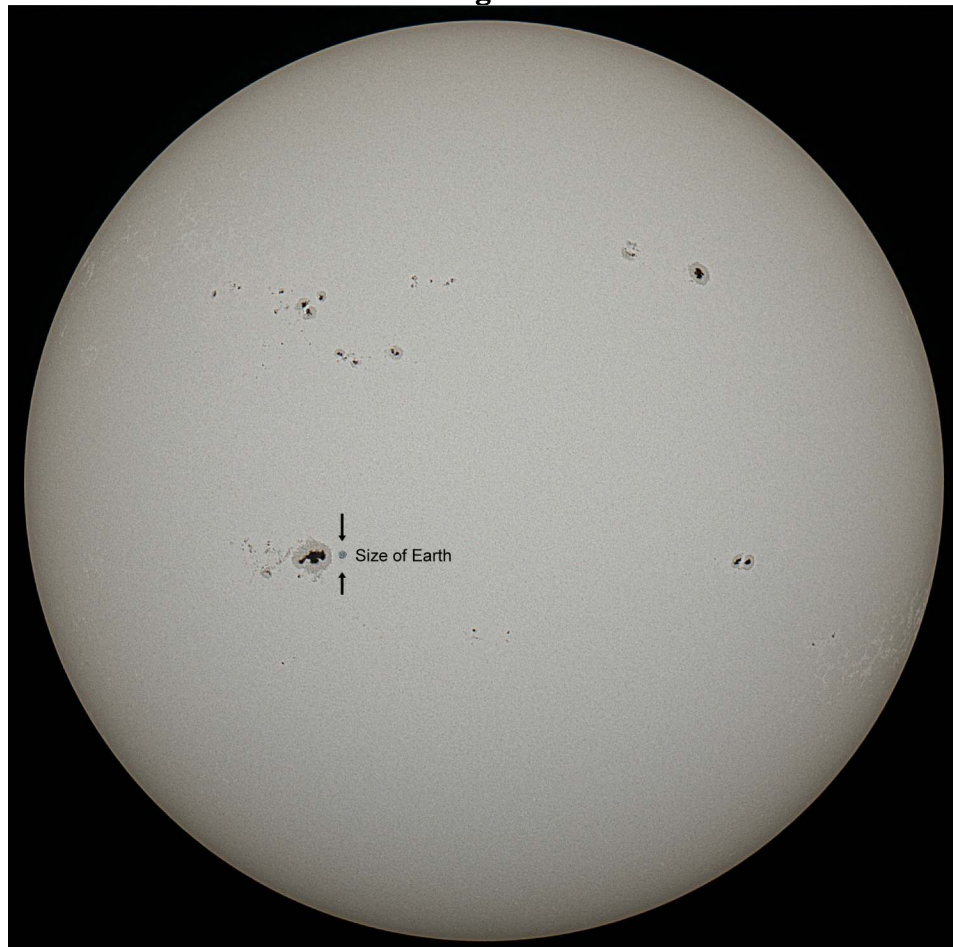
### Imaging Projects--

Making your own projects can add another dimension to your imaging experience.

If you have an imaging project you would like to share, drop us a line at [info@vtastro.org](mailto:info@vtastro.org).

## MEMBER'S IMAGES

### White-Light Solar

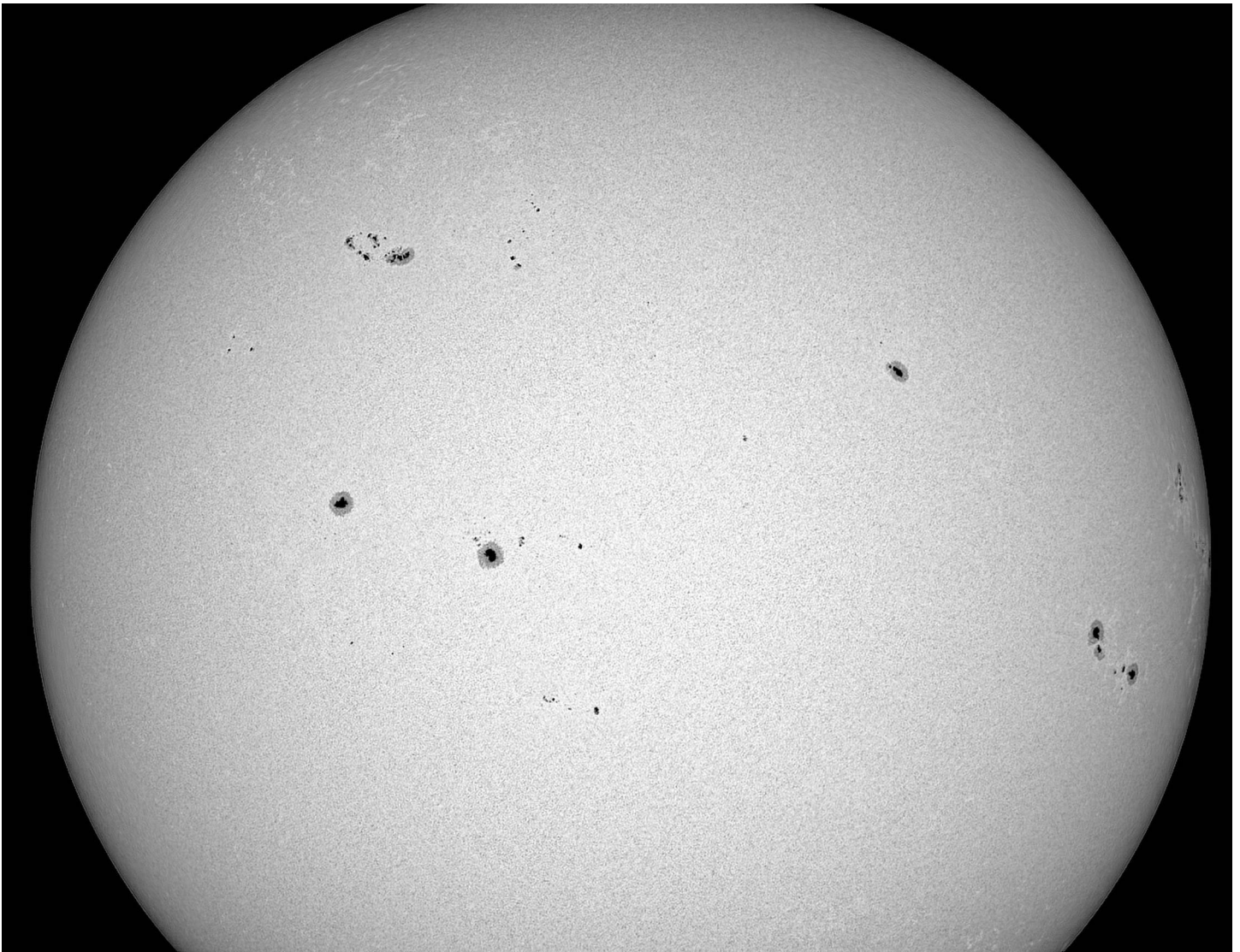


There are lots of sunspots on the Sun most days now. One can go to <https://www.spaceweather.com/> to see what there are for sunspots.

The image above was taken on 1/17/23 when there was a large Sunspot visible to the unaided eye (must use solar glasses or #13 or #14 welders glass to view it safely). I could see this spot using solar viewing glasses.

The image is a stack of 15 out of 107 images I took that day from my backyard. I superimposed a scaled image of Earth next to the large sunspot for comparison. In the cropped image on the left it is clear that even many of the smaller sunspots are much larger than the Earth especially when the lighter penumbra of the spots are included.

Image taken on 1/17/2023 at 12:54 PM EST by Paul Walker. 10" f/5.6 with 8" white light solar filter, 1/800 sec @ ISO 100, Canon Rebel T7i camera.



**Image by Greg Erianne**

I was able to capture some images (videos) of the sun today [2/14/23].

Unfortunately, I couldn't capture the entire Sun even with a reducer in place since the highest resolution I could set on my ASI2600MC was 1920 x 1080 because I was running things through an ASIAir Plus (Raspberry Pi) which, apparently, limits the resolution for video. Who knew?

Anyway, I think the image shows how numerous sunspots are these days!

**Technical Details:**

Askar 107PHQ Petzval Quadruplet telescope (native 749mm fl; F/7)  
with a 0.7x reducer (524mm fl; F/4.9)

Baader 4" ASTF Solar Filter

ASI2600MC Pro (OSC camera) -- Gain at 0; Exposures at 0.015s; Resolution 1920x1080; 13 fps

ZWO AM5 mount with guiding via ASIAir Plus

Meade 13% Moon Filter (needed with this setup to get the exposure time within the range of the camera).

Videos processed in AS!3

Image processed in ImPPG and Photoshop.





**The Sun in 3-D**  
**By Paul Walker**

Get out your red and blue 3-D glasses for these images. Because the Sun rotates it is possible to take 2 images of the Sun at 2 different times and create a 3-D image. I didn't know how much time was needed to get a good 3-D effect, so this was an experiment. Note for those with a printed version of the image, 3-D glasses won't work well.

To create these 3-D images I took 2 sets of images about 2 1/2 hours apart on 2/11/2023. By shifting the left and right images sideways I created 3 versions. One where the Sun appears inside the screen, one where it appears to be sitting on and projecting out of the screen and one where it appears to be floating in front of the screen.

**Technical info:**

10" f/5.6 Newtonian, Canon Rebel T7i, 8" Baader White-Light Solar Filter, 1/800 sec @ ISO 100.

Right image- taken at 10:53 AM EST and is a stack of 14 out of 40 images.

Left image- taken at 2:28 PM EST and is a stack of 18 out of 50 images.



**Comet C/2022  
E3 (ZTF)  
By Terri Zittrisch**

Well, I was finally able to get a few images the other night (or morning) after a very late/early break in the clouds. From 2:30 to 4:30 AM I was able to capture 50 images of 1 minute, spread across L, R, G and B in a couple of different runs. This is from one of them. I will

try combining all the data later so I double my data.

I've been reacquainting myself with the comet processing steps, which is a job in and of itself (for me). My data had a very bright background due to the moon with a comet tails that were

barely over the background, but I did get something. I still need to apply my luminance data (this is only RGB).

I did get a blue, albeit faint, ion trail which I thought pretty cool. I just could use some more data.

I shot this with the Astro-Physics Stowaway scope with a 0.8 focal reducer and ASI6200 mono camera and Chroma R, G, B filters with 60 second exposures. I tried both tracking on the comet using JPL ephemeris data but star tracking is more obvious than comet

tracking and harder to clean, so I ended up tracking on stars and letting the comet head trail a little. At this scale it's hard to see.

To the left is an update. I added the remaining data (color only) and have discarded the luminance (too much work). It is a bit noisy as I tried to extract more than what was in the data so may look a bit over-cooked.





### **Comet C/2022 E3 (ZTF)**

**By Greg Erianne**

Here's my first attempt at using PixInsight to process my C/2022 E3 (ZTF) data from 2/1/23 from about 2:30 until 3:30 AM. I was able to capture 39 images before my equipment started to freeze up.

This was my second attempt since the first attempt earlier in the evening of 1/31 was clouded out. This second attempt turned out better since the clouds broke around 2:15 AM, but I had the same problem as Terri in that the Moon was nearly full. I was also aiming north toward the South Burlington light dome so the actual signal was much less than I would have liked.

#### **Technical Details**

AT60ED (360 mm fL) telescope, ASI2600MC Pro one shot color (OSC) camera), ZWO AM5 harmonic mount with guiding (tracked on stars) via ASIAir Plus using an ASI120mm mini and a 30mm F4 guide scope. No filters used.

75s x 39 [Total Exposure about 49 minutes]; with dark, flat, and flat dark frames. Processed in PixInsight; images combined in Photoshop (since I couldn't figure out how to use Pixel Math to combine them in PixInsight!)





**Comet C/2022 E3 (ZTF) and Mars - 2/11/23**

**By Maura Kelley**

This comet is driving me nuts trying to process. I updated DeepSkyStacker and then it kept showing an error message (long story). Finally, I got it working. Then I tried downloading Starnet V2 to work on the comet separately.. that wouldn't work so I went back to Starnet ++ and the results were not good. So, this is a simple stack basically with no real processing.

This is 33 minutes of data (25 sec subs) using darks & flats from 2/11/23 when it flew by Mars.

It is very interesting the evolution of this comet over different nights.



**Jupiter and Its Moons - 11/02/22**

**By Paul Walker**

Jupiter is too close to the western horizon in the evening now but here's shot it during the prime observing season last Fall. From left to right the moons are Callisto, Io, Ganymede and Europa. The moon shadow is Ganymede's. Though one can take still images similar to this, for some reason the camera does a much better job in video mode of capturing the moons without overexposing Jupiter's disk. This is a stack of 50% of about a 1 minute video (~1500 frames out of 3600). 10" f/5.6 Newtonian on split-ring equatorial mount, Canon Rebel T7i, HD video mode (3X digital zoom) @ 30 fps, 1.5X Barlow (2X eff.), 1/320s @ ISO 800, 10:43 PM EDT.



## Lunar Observing Season is Here

Here's a lunar image from last night (3/28/22). It's a good reminder that this is the season for observing the waxing Moon. The seeing was quite good last night as evidenced by this image. The effective visual magnification is  $\sim 600\times$  in an eyepiece with a  $60^\circ$  apparent f.o.v.

Smallest craters- 1.4 mi. (2.2 km) (1.2")  
Rima Hyginus (in middle of image below) is  $\sim 1.8$  mi (3 km) (1.6") across

10" f/5.6 Newt. on equatorial mount  
2X Barlow (2.65X eff.)

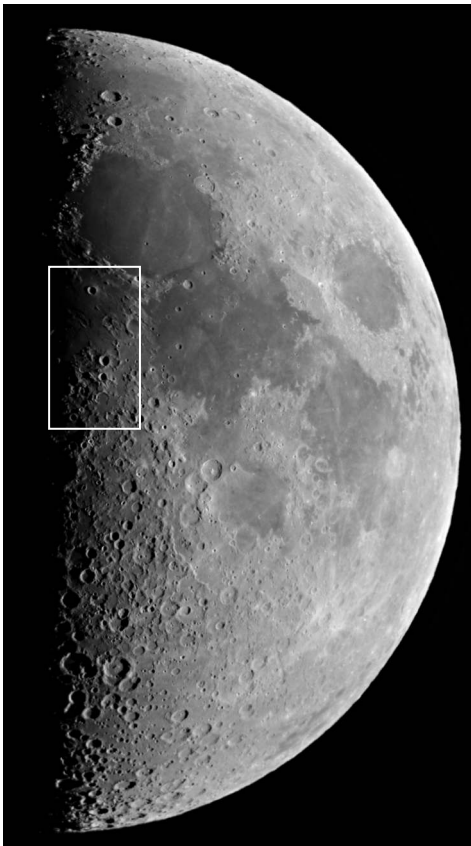
Canon T7i in HD video mode at 3X digital zoom.

1/125 sec @ ISO 3200

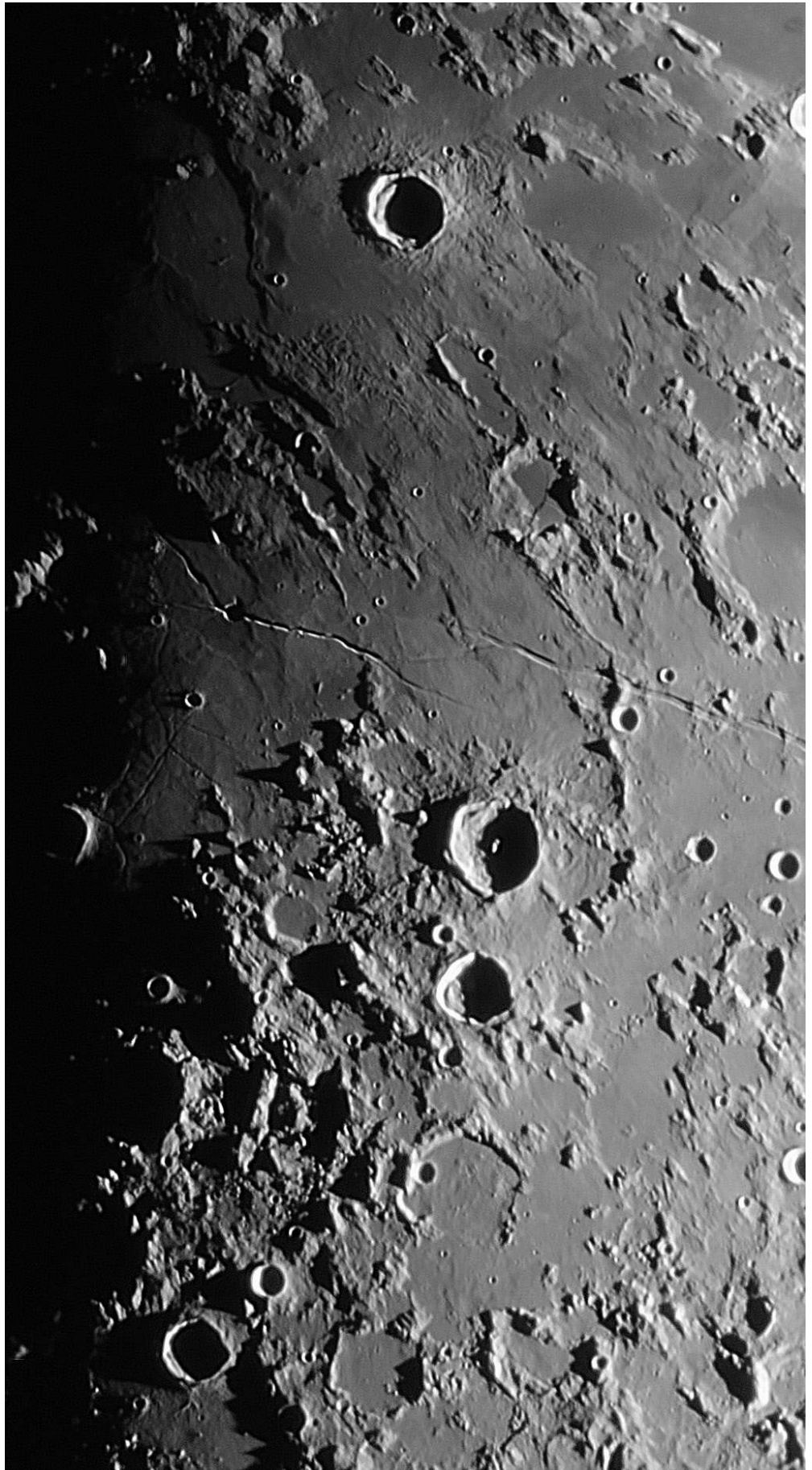
$\sim 11,200\text{mm}$  efl (1407mm X 2.65 X 3)



Approx. visual resolution



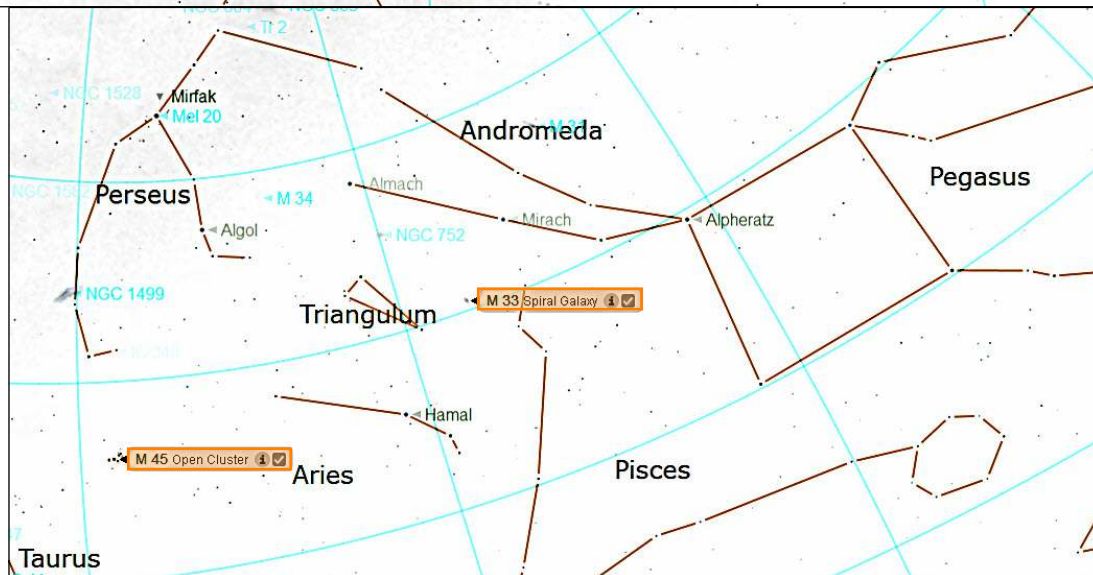
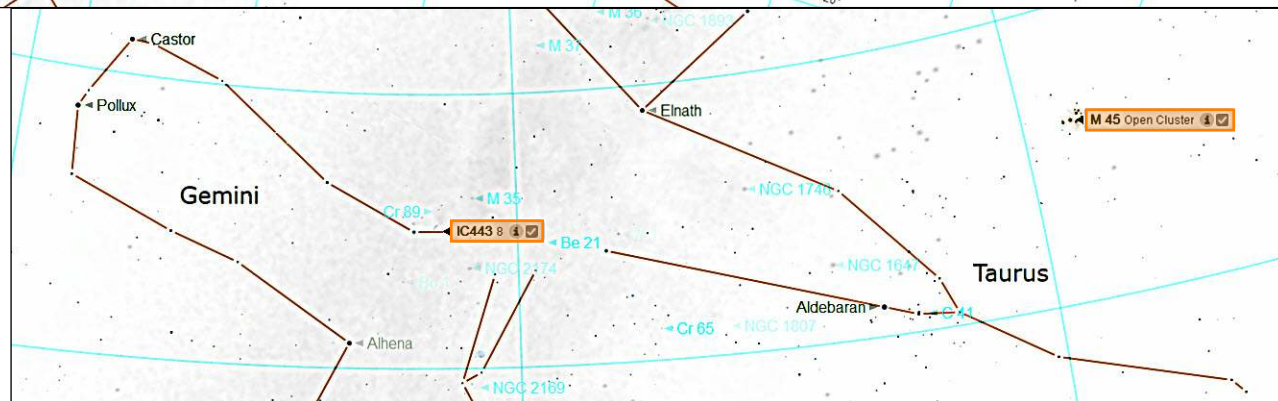
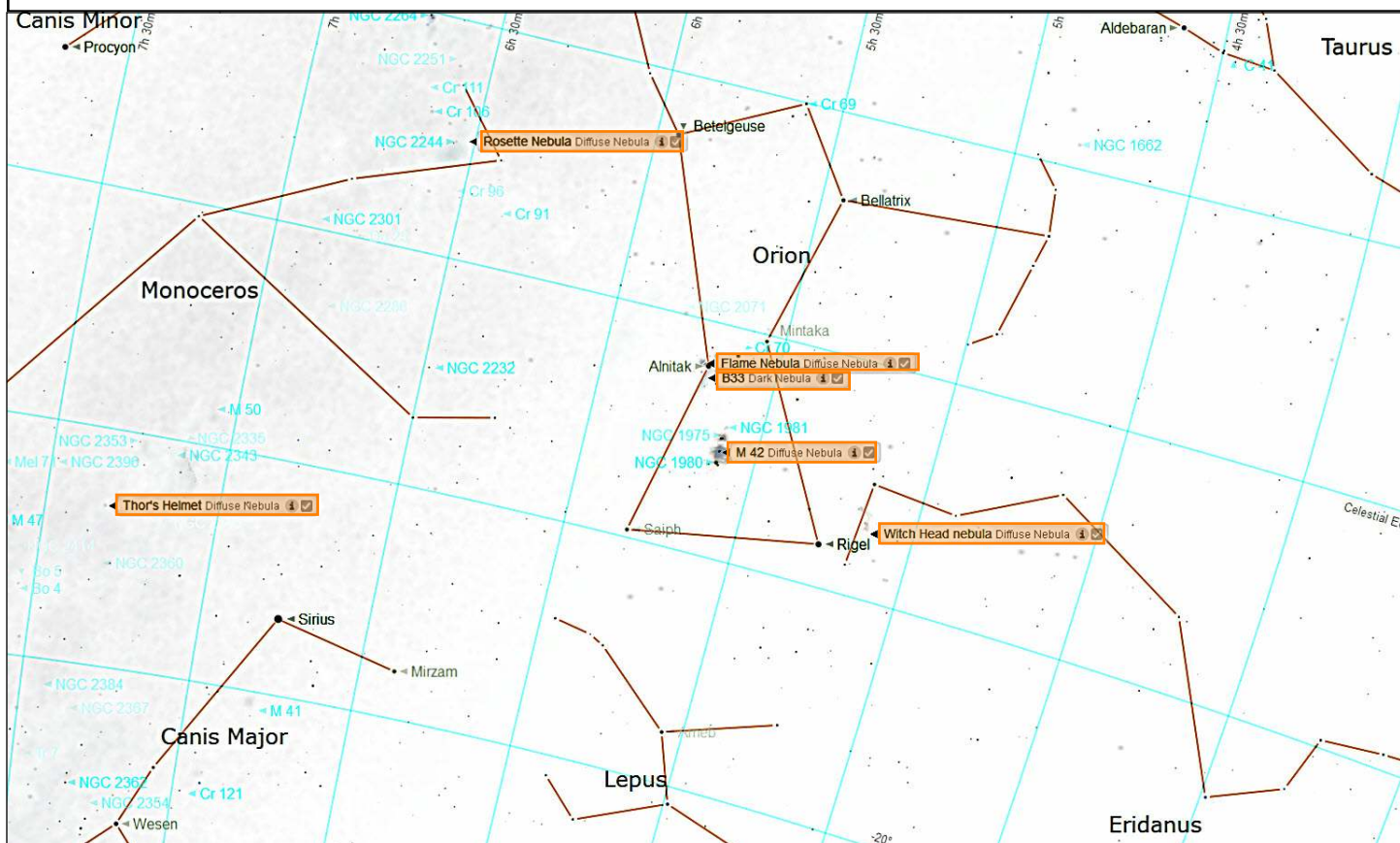
Location Map





**Location Charts for the deep sky object images in this issue.**

Created using Starry Night Pro 8 & Picture Window Pro 7.





**The Great Orion Nebula (M42)**  
**By Dave Legrow**

M42 is a large star birth region in Orion, below the 3 belt stars. Visible to the unaided eye, it is a joy to view in any size telescope or binoculars.

I originally thought this image was terrible compared to others I have seen. However, after redoing the noise reduction, I now think it has a nice ethereal quality to it.

**Technical Details:**

Shot: 3-29-22

Dec: -5.29852

RA: 84.06855

Telescope: Explore Scientific ED152CF f/8 with .7x reducer/flattener

Camera: ZWO ASI2600MC

Filter: Antlia ALP-T (I believe. I need to take better notes)

Gain:100

Exposure: 180s

Stack: Best of 42

Mount: iOptron CEM40

Cropped from original size.





**Witch Head Nebula**

**By Steve Grimsley**

First image of 2023, but actually I gathered the data on this 9 months ago, just never processed it. Skies are cloudy here and my scope down south isn't behaving so I'm glad I have a backlog. This is an HaRGB image processed in Pixinsight .

The Witch Head is a very faint reflection nebula in Orion near Rigel.

**Technical Details:**

92mm f/7scope

10 subs, 7 minutes each

Taken in central Texas October, 2022.



**The Great Orion Nebula (M42)**

**By Joe Comeau**

I know it is an easy target but for fun I photographed M42 last night using my 100 mm F/6 achromat. I took 20 frames at 0.5 sec, 63 frames at 10 seconds and 40 frames at 30 seconds and combined them as a sum in Maxim DL at 32 bits with no sigma clip to get a dynamic range covering the brightness range from the trapezium to the outer nebula. I finished the image using simple curves and levels adjustments in photoshop.





**The Jellyfish Nebula and friends ( IC443) in SHO**  
**By Richard Whitehead**

I posted a half finished image of this a few days ago and was lucky enough to get a few moonless hours to re-do the OIII and SII. I have to say I'm fairly pleased with the result which has enough data to produce a deep image and faint details that are not often imaged. This one subject has taken up my last 4 imaging nights over a month in Vermont.

The Jellyfish Nebula is a supernova remnant variously estimated to be between 3000 and 30,000 years old and lies around 5000 LY from earth.

**Technical Details:**

Location : St. George, VT  
Scope: Takahashi FSQ106 EDX4  
Mount: A-P 1100 GTOAE  
Camera: QHY600M  
SHO Image 3nm Chroma Filters  
All 20min subs, Darks, Bias, Flats  
Ha x16 OIII x15, SII x12  
Processed in PI and PS 2022





**The Pinwheel Galaxy (M33)**  
**By Richard Whitehead**

First image of 2023, but actually I gathered the data on this 9 months ago just never processed it . Skies are cloudy here and my scope down south isn't behaving so I'm glad I have a backlog . This is an HaRGB image processed in Pixinsight. 20x10 min for each of RGB then 15x15 min for the H-alpha.





**Thor's Helmet**  
By Terri Zittritsch

One of the images I captured at the Winter Star Party. This is taking with a TEC140 with field flattener at about 1036mm. I used an ASI6200MM monochrome camera and Chroma 3nm Ha and OIII filters. I blended into 3 channels but the OIII is very prominent in the data as you can see. I did unguided imaging for all of my imaging at the Winter Star Party. The Ha images were 15 minutes and OIII 10 minutes, all unguided. I first modeled the path of the object across the sky using what Astro-Physics calls a DEC arc model. It generates a model that will account for telescope and mount flexure, polar alignment inaccuracies, and sky refraction. I didn't throw any sub frames away. I do note I have some sensor tilt I need to adjust out but it doesn't show in this crop.

This version includes an update to my stars.. I noticed lots of artifacts in my original RGB stars due to using bin2 to capture them. I needed to go back and drizzle the stars to get them round again, and then recovered some star color in the middle of stars with a little processing before screening them back in. They look almost too perfect. Going to play around with a few more color variations.





**Horsehead (B33) and Flame (NGC 2024)(Sh2-277) Nebulae**  
**By Greg Erianne**

I got this replacement 107 mm f/7 scope on 1/18 and had 30 days to test it, so I had to take advantage of the clear skies last night [2/6/23] to do that. I was getting a bit nervous that I wouldn't have clear enough skies to test it before the return period. (The scope I had to send back had pinched stars when the scope cooled, so I was thrilled to see that this copy of the scope gave me round stars despite the -14 deg Celsius temperature!)

I used it to capture two nebulae. The Horsehead Nebula is the horse head shaped dark nebula, Barnard 33, which is silhouetted against the red glow of the h-alpha nebula IC 434, producing an iconic feature. The Flame Nebulae, a bright emission nebula, also has a dark nebula at its center. Both nebulae are contained in the star-forming region of the Orion Molecular Cloud Complex and are illuminated by Alnitak, a triple star at the eastern end of Orion's Belt.

The moon was smiling down at about 98% illumination for most of the 4-hour imaging session, so the dual narrowband filter was a necessity.

#### **Technical Details:**

Askar 107PHQ Petzval Quadruplet (749mm fL)

ASI2600MC Pro (OSC camera)

ZWO AM5 mount with guiding via ASIAir Plus using an ASI178mm mini and a 60mm F4 guide scope

Antlia ALP-T Ha/OIII dual narrowband filter

240s x 48 [Total Exposure 3:12]; with dark, flat, and dark-flat frames

Pre-processed in Siril and post-processed in Photoshop.





**Rosette Nebula (in HOO)**  
**By Greg Erianne**

I was very pleasantly surprised the clouds broke around 10:00 pm last night (or maybe before) so I took advantage of the time to test out a new filter (Antlia RGB Triband Ultra) as well as a 0.7x reducer for my Askar 107PHQ.

I decided to image the Rosette Nebula in Monoceros since I hadn't done this before. This Nebula is actually a complex that contains four different nebulae (NGC 2237, 2238, 2239, and 2246) as well as an open cluster of young, hot stars at the center (NGC 2244), the radiation from which creates the central opening in the nebulae.

The moon rose about 10:18 pm and was about 90% illuminated, so it was a nice test for the triband filter.

I never thought I'd get any usable images after only 35 minutes of integration (when the clouds rolled in) and didn't even plan on doing any calibration frames but between the new filter and the reducer, the seven images I had looked pretty good, so I decided to do calibration frames and process the images.

I processed in Ha/O-III and also tried my hand at processing in HOO (a Hubble-like palette).

#### **Technical Details:**

Askar 107PHQ Petzval Quadruplet telescope, native: 749mm fl @ F/7 with a 0.7x reducer  
524mm fl @ F/4.9

ASI2600MC Pro (OSC camera)

ZWO AM5 mount with guiding via ASIAir Plus using an ASI178mm mini and a 60mm F/4 guide scope

Antlia RGB Triband Ultra filter (H-alpha/N-II, O-III, and S-II)

300s x 7 [Total Exposure 0:35]; with dark, flat, and dark-flat frames

Pre- and post-processed Pixinsight.



**The Pleiades Star Cluster (M45)**  
**By Greg Erianne**

It's hard for me to resist capturing the beautiful Pleiades asterism each year. Also known as the Seven Sisters and Messier 45 (M45) among other names, it's an open cluster of hot, young stars in the constellation Taurus.

Fun fact if you didn't already know this: six of the stars in the blue reflection nebula in the center of the photograph are used for the Subaru logo, Subaru being a Japanese word meaning “unite.” (You can see the correlation more easily if you look at older Subaru logos before 1980.) So...I felt obligated to add the diffraction spikes!

As usual, the VT wx got me as the clouds moved in after only 30 min of integration. I was going to pick it up after the clouds broke, but then the wind was much stronger than forecast and it was hopeless to try to get more images.

**Technical Details:**

Askar 107PHQ Petzval Quadruplet telescope, native: 749mm fl @ F/7 with a 0.7x reducer  
524mm fl @ F/4.9

ASI2600MC Pro (OSC camera)

ZWO AM5 mount with guiding via ASIAir Plus using an ASI178mm mini and a 60mm  
F/4 guide scope

180s x 10 [Total Exposure 0:30]; with dark, flat, and dark-flat frames

Pre- and post-processed Pixinsight; Final edits in Photoshop.



## Space Science Roundup



### NASA News

--by Scott Turnbull, VAS Member and Solar System Ambassador volunteering for JPL/NASA

## Keeping Track of Webb

For this article we'll be taking a closer look at the tracking capabilities of the James Webb Space Telescope, and how it can capture stable images of distant celestial objects as well as objects as close as those in our solar system's asteroid belt.

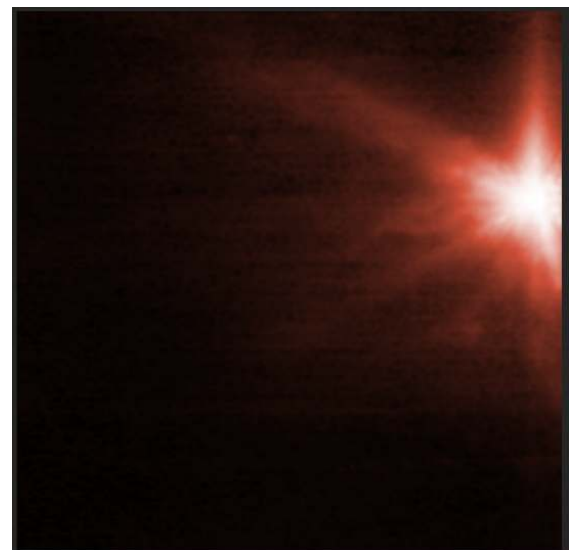
The primary mission for Webb is to observe distant objects in our galaxy and other galaxies far removed from our own. It does this by locking onto guide stars and maintaining those stars at a fixed position within the field of view while performing imaging. This effectively freezes all the elements in the field of view so that they have no motion relative to the imaging sensors.

In September, the James Webb Space Telescope observed as NASA's Double Asteroid Redirection Test (DART) intentionally smashed a spacecraft into a small asteroid, Didymos. This intentional obliteration of a spacecraft was captured in detail thanks to the newly extended ability of the Webb to track near space objects. See Figures 1 and 2. To appreciate the feat that this represents, we first must learn a little about tracking near space objects.

The challenge in capturing an image of a near space object is that the solar system objects are not in a fixed position relative to guide stars. If Webb's standard tracking mode were used, the near object would be a smeared blob in the resulting image. This is much the same as what we amateur astroimagers experience when using the wrong tracking mode when doing planetary imaging. For Webb to be able to capture near object images the field of view must be constantly adjusted by moving the guide star at the precise rate and opposite direction of the moving object in the field of view. This ensures the science target remains stationary in the field of view. This also means the background field of stars and galaxies drift in the moving target images. This was first demonstrated with the Webb images of planets within our solar system. Images of Mars and Jupiter were captured during the initial Webb calibration phase last year. Those images confirmed that planetary tracking was working as designed and simulated prior to Webb's launch. The initial maximum speed of tracking was set based on Mars and was a limit of 30 milliarcseconds per second (mas).

As is often the case, give a scientist a new instrument, and they will ask what else can be done with it. NASA set out to not only confirm that Webb could track at the pre-flight speed limit during commissioning, but also to show that the observatory is capable of much faster tracking rates. They started out slow at a rate of only 5 milliarcseconds per second (mas/s) for asteroid, 6481 Tenzing. They gradually sought out faster moving objects and tested higher rates. All of these tests were successful, and they confirmed that Webb could track moving objects at a rate of up to 67 mas/s (241"/hr).

While that increased tracking speed could be used to track many typical fast moving solar system objects, it would still not be fast enough to hold the Didymos asteroid still in the field of view. Ultimately the engineers and scientists working with Webb were able to test and confirm that Webb can track and observe targets at over 100 mas/s (360"/hr). These sorts of accelerated target tracking opportunities will remain the exception to normal Webb operation. They are currently restricted to very brief observations due to the guide stars at those rates moving out of the field of view so quickly. They would have to use multiple guide stars to support a longer observation. Changing guide stars in mid-observation introduces complexity and inefficiency. As it stands now, the new speed limit set for Webb is 75 mas/s for future observations, but special permission may be requested for rates up to 100 mas/s.



## Behind Webb's Mask

This article looks deeper into the cosmos and into the engineering of the Webb telescope that enables it to capture images of distant exoplanets.

NASA's James Webb Space Telescope has many different observing modes to study exoplanets. Directly detecting planets around other stars is challenging. The stars are so far away that their planets appear to be separated by a fraction of the width of a human hair held at arm's length. At these tiny angular scales, the planet's faint light is lost in the glare of its host star.

To meet the challenge, Webb uses the Near-Infrared Camera (NIRCam) and Mid-Infrared Instrument (MIRI) coronagraphic modes. Webb's coronagraphs block the light from a distant star, while allowing the faint planet light through to reach the sensors.

There are several important locations along the path that light takes through Webb's optics. The "image plane" is where the distant astrophysical objects are in focus. The "pupil plane" allows the surface of the primary mirror to be in focus, which is used to inspect the mirror surfaces when needed. Webb's coronagraphs physically mask out unwanted starlight in both the image and pupil planes to optimize performance. Most of Webb's image plane masks, resembling opaque spots or bars, remove starlight simply by blocking it in the image. The exception to this are MIRI's "four-quadrant phase masks," which shift the wave-tops of one part of the wave of light, so it cancels out with another part through a process called "destructive interference."

However, the image plane masks can't completely block the star. Webb makes use of additional pupil plane masks, called Lyot stops, to remove much of the remaining starlight. These pupil plane masks are different in shape from the hexagonal primary mirror. This has the effect that objects imaged with the coronagraphs do not exhibit Webb's hallmark six-spiked diffraction pattern visible in many of Webb's captured images. See Figure for a diagram of coronagraph pupil masks relative to the primary mirror.

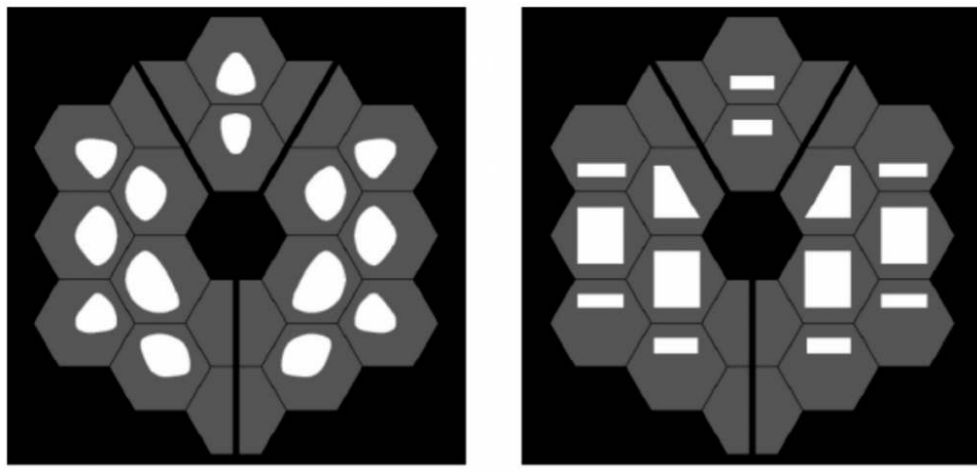


Figure 1- Illustration of NIRCam's pupil plane mask/Lyot stop for the round image plane mask (left) and the bar image plane mask (right). Transmission through the mask is limited to the white regions. Webb's telescope pupil is shown in gray for comparison.

Credit : Mao et al. 2011

Webb's NIRCam instrument has five coronagraphic masks, each of which can each be configured to observe at different wavelengths. Webb's MIRI instrument has four coronagraphic masks that operate at fixed wavelengths. The coronagraphs can observe objects as close as 0.13 arcseconds from the star, and as distant as about 30 arcseconds from the star, which roughly translates to distances ranging from a few Astronomical Units (au) to hundreds of au around nearby stars.

Despite the masks, Webb's coronagraphs don't perfectly remove a star's light. To remove the last remnants of light, Webb's astronomers use a variety of "point spread function (PSF) subtraction methods." This means measuring the pattern of the residual starlight and subtracting it from the science image. The result of the PSF processing is a noisy-looking pattern, which ultimately limits the faintest detectable exoplanet. This limit is expressed in terms of "contrast," the ratio in brightness between the faintest detectable planet and the star. During commissioning, Webb's NIRCam and MIRI coronagraphs demonstrated contrasts better than  $10^{-5}$  and  $10^{-4}$  at 1 arcsecond separation, respectively.

### Resources

Information presented in this article was provided by the NASA/JPL mission web sites.

For more information, please refer to

<https://blogs.nasa.gov/webb/2023/02/08/breaking-the-tracking-speed-limit-with-webb/>

<https://jwst-docs.stsci.edu/jwst-near-infrared-camera/nircam-instrumentation/nircam-coronagraphic-occulting-masks-and-lyot-stops>



## Services

### Planetarium Shows

There's a planetarium in Williston! The Planetarium Lady's immersive Digitarium planetarium dome is a great introduction to sky viewing. This immersive experience builds familiarity with sky objects and the stories and science that surround them.

Learn more about this experience at [www.theplanetariumlady.com](http://www.theplanetariumlady.com).

### Light-duty Machining

Custom machining of brackets / adapters and modifications to existing hardware for astronomy purposes.

Nominal fee (~\$10 - \$50 depending on size and complexity).

I have a mini milling machine and a mini lathe.

Paul Walker 802-388-4220 or [paulwaav@together.net](mailto:paulwaav@together.net)

## Wanted

## For Sale

Selling for a friend – **Celestron Nexstar Evolution 9.25" F/10 SCT Bundle** as originally purchased from Highpoint Scientific. Includes OTA, mount with wifi so it can be controlled with a smart phone or tablet, heavy duty tripod, Astrozap dew shield, red dot finder, 15 piece eyepiece and filter set. Has had very little use due to current owners health issues. This bundle currently sells for \$3100. at Highpoint. **Asking \$2300.**

Also available is a heavy duty (home-made) tripod dolly – \$175.00

Pick up near Rutland, VT

Patrick Porch 802-236-2463 or [pcwizard2600@gmail.com](mailto:pcwizard2600@gmail.com)

### VAS Surplus Items

All items stored in Bob's Hut at the Hinesburg Observing Site



**6" F/8 Newtonian Reflector**, Dobsonian mount not included, tube separates into two pieces.

**Your's for a donation of \$25.**



**6" F/8 Criterion Dynascope** Newtonian Reflector, no mount

**Your's for a donation of \$40.**



**4.5" F/8 Meade 4504** Newtonian Reflector with rings, no mount.

**Your's for a donation of \$40.**

Jack St. Louis 802-857-5049 or [jack.st.louis@comcast.net](mailto:jack.st.louis@comcast.net)

### VAS Surplus Items

All items stored in Bob's Hut at the Hinesburg Observing Site



**TraQ Model 545 F/15 Refractor** Telescope with equatorial mount  
**Your's for a donation of \$20.**



**60mm F/15 Tasco refractor**, Eyepieces: 25mm, 12.5mm, 4mm, Moon filter, star diagonal, 3x Barlow, 1.5x Erecting eyepiece, Sky X First Light program, Solar projection screen

**Your's for a donation of \$20.**



**Celestron alt-az tripod**

**Your's for a donation of \$20.**

Jack St. Louis 802-857-5049 or [jack.st.louis@comcast.net](mailto:jack.st.louis@comcast.net)

### VAS Surplus Items

All items stored in Bob's Hut at the Hinesburg Observing Site

**80mm f/11 Refractor with GO TO altazimuth mount** - Celestron Nexstar GT

Eyepieces: Celestron 25mm (fov 52 degrees), Orion 17mm (fov 55 degrees) Star diagonal, Meade 2x Barlow 120 volt AC power adapter Red dot finder, has a printed operators manual; very good Solar projector for the eclipse.

**Your's for a donation of \$75.00.**

**4 1/2" Brookstone f/8 Dobsonian**

with an adult size mount. Eyepiece height goes from 39" at the horizon to 54" at the zenith. It could be fitted with a child size mount.

Red dot finder, Eyepieces: Meade 26mm Super Plossl (fov 50 degrees), Orion Explorer 17mm (fov = 55 degrees), 10mm Super Plossl (fov = 52 degrees), Orion Explorer 6mm (fov = 55 degrees).

Comes with a red flashlight.

**Your's for a donation of \$80.00.**



**Galileo telescopes with tripods**

**Your's for a donation of \$20.00 each.**

Jack St. Louis 802-857-5049 or [jack.st.louis@comcast.net](mailto:jack.st.louis@comcast.net)

**Copies of "Mirror Mirror" - A History of the Human Love Affair with Reflection** by Mark Pendergrast of Colchester, Vt. available for **\$25.**

Mark will split the profits with VAS.

Contact Mark at [markp508@gmail.com](mailto:markp508@gmail.com) or see Jack St. Louis at any monthly meeting.

**Telescope mirrors and a couple mounting cells**

**3.5" f/10** with 3/4" diagonal.

**6", probably f/8.**

**8", probably f/8**, in nice cast aluminum cell.

**10" f/9, 1/10 wave** (measured by Bob several years ago), Beral coating that is in good condition though the edge has several chips (edge not beveled) and a note from the coater says there are a few scratches and it is not fully polished (may be saying that because of the scratches). From St. Michael's College.

Other than the 10" f/9 I cannot vouch for the figure of the mirrors.

The only one that may be Pyrex is the 8" mirror, I'd have to pull it out of the cell and look again. The rest have the slight greenish-yellow tint of plate glass.

**Make an offer on any of the items.**

Paul Walker 802-388-4220 or [paulwaav@together.net](mailto:paulwaav@together.net)

### Celestron NexGuide Autoguiders

I purchased used at the Stellafane Swap Tables as a backup to the one I am using, however, I forgot had already purchased a backup at the Swap Tables the previous year. I don't really need 2 spares.

**\$140 OBO.** (\$300 new)

It is a stand alone autoguiders, does not use a computer, connects directly to your mount's autoguiders port. Has an screen for displaying stars and menu.

**Note:** to use this you will likely need a an 80-90mm guide scope to find a star to guide on (I use a 90mm and get down to mag 7). You will also likely need a way to aim the guide scope at a suitable star. There is now a commercially available guide scope aligner, Google Lftscop.

Paul Walker 802-388-4220 or [paulwaav@together.net](mailto:paulwaav@together.net)