

Morning Star

Winter 2023

Newsletter of the Vermont Astronomical Society



*** Club Info ***

Announcements

Check out our Member [Forum](#) on our website (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 (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

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

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

Dues

Are due the first of each year.

Time to Renew

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.

Connect On-line

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 (Goes to the President and Secretary)

webmaster@vtastro.org

(Goes to Secretary and Webmaster)

Board Members

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(My apologies if I missed anyone)

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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. Airs 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>

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

Events are listed on our website (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

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

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

Waterbury Winterfest:

Friday, February 3, Rain date Saturday, February 4. The Waterbury Winterfest is back in person with lots of outdoor events this year.

New Members

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

David Selinger (missed last time)
Kevin Kelley
Andy Solomon
Tracy & Christopher Tomasi-Applin

Green Mountain Astronomers (GMA)

All events start about sunset. Check before going as some events are not cast in stone or written in the stars yet.

Contact Ron Lewis for info
802-779-5913 (cell)
802-247-5913 (home)
vtpoet@gmail.com

Stay tuned for email notices.

Jon Gazzillo
Peyton Bowden
Ata Anlazi
Katie Yantz
Marian Miller
Heidi Pius
Jay Allen

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.

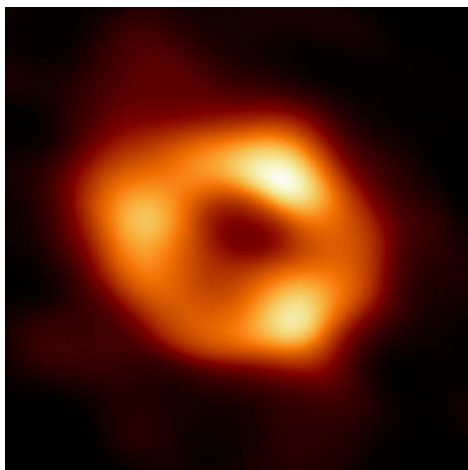
Meetings are held the first (non-holiday) Monday of the month, at 7:30 P.M. in the Kolvoord Community Room of the Brownell Library, 6 Lincoln St., Essex Jct (2nd building north of Essex 5 corners on the left on Rt. 2A). Extra parking is available in the Bank North parking lot across from the library.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

January 9

Black Holes, Worm Holes and the Star Trek Dilemma

By Al Boudreau

This talk explores the mysterious realm of black holes, showing how they form and how they consume their neighbors. We explore the problems of making and using cosmic "worm holes" for inter-stellar travel.



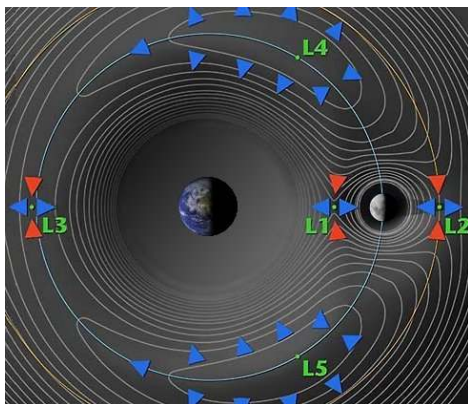
First image of the black hole at the centre of the Milky Way

This is the first image of Sagittarius A* (or Sgr A* for short), the supermassive black hole at the center of our galaxy. It's the first direct visual evidence of the presence of this black hole. It was captured by the Event Horizon Telescope (EHT), an array which linked together eight existing radio observatories across the planet to form a single "Earth-sized" virtual telescope. The telescope is named after the "event horizon", the boundary of the black hole beyond which no light can escape.

February 6

Lagrange Points of Gravitational Equilibrium

by Christopher Mauro



Lagrange Points

This presentation describes the zones of gravitational equilibrium within systems of orbiting celestial bodies otherwise known as Lagrange Points. It includes the highlights of Lagrange's career and accomplishments in the fields of mathematics and science. It describes the historical context of his life, much of his work done during the tumultuous French Revolution.

The presentation concludes with the practical use of Lagrange points in today's space exploration and the application of Lagrange Points in future missions.



Joseph Louis Lagrange - 1736 - 1813

March 6

Getting Ready For the 2 Up Coming Solar Eclipses: Annular Solar Eclipse on Oct. 14, 2023 & Total Solar Eclipse on Mon Apr 8, 2024!

By Rik Yeames & David McDonald

Dave McDonald & Rik Yeames co-founders of the NH SETAF (Solar Eclipse Task Force)-will show you how to plan, prepare, and celebrate these 2 upcoming Astronomical Events of a lifetime. Topics will include; basic Solar eclipse knowledge, eye safety, community outreach, along with networking among various government, commerce, education, non-profit, and media stakeholders.

Articles

None

Board & Committee Meetings

October

Board Meeting

The re-capping of the landfill next to the Hinesburg Observing Site is completed.

Jack has received \$500 in bids in the auction so far.

Our order for solar viewers is completed. Terri has sent them a check. The solar viewers will be stored at Jim's house. Jim has been checking out Eclipse2024.org.

The scheduled Wake Robin events with Terri and Scott are coming up.

We further discussed, the ideas of buying a lawn mower and a shed to store it. It will be more cost effective to do this than to contract out mowing the grass at the observing site. Jack made contact with one firm that was willing to mow the site every 3 weeks at \$100 each time. Starting in early May and going to the end of September or early October comes out to 8-9 mowings at \$800-\$900. A lawn mower will be ~\$600 and the shed \$3050 (\$3650 total). We would break even at 4 to 4.5 years, not counting maintenance. The mower should last 10+ years and the shed 30+ years with occasional painting. The use of the shed for storing donated equipment would be an added bonus. Addendum-Looking at our finances from 2016-2021 we had an average "surplus" of \$600. So without increasing our income, paying a contractor to mow would produce a \$200-\$300 deficit per year.

Terri updated us on the bank account.

Williston Library outreach has been canceled due to weather, twice.

ACTION ITEMS:

Jack and Paul will look into buying the lawn mower. Jack and Keith will check out the shed again.

MOTIONS:

None

November

The storage shed for a lawn mower and donated telescope is due in mid

December. The total cost for the shed is \$3142.

We discussed the need to record all donated items, either on the resource list or separately.

Paul did a presentation for the Town Hall Theater in Middlebury as part of their town-wide Space Week event.

We discussed what we need to do concerning our Recycled Optics Program. Doug Williamson, our previous treasurer, has said we need to be careful about selling items and recording these sales. Terri has started looking into the IRS guidelines.

Terri suggested we add an anti-discrimination clause to our by-laws. We agreed to devote the March meeting to this. There are other sections that we should revisit and update.

Terri did an astronomy presentation for the residents at Wake Robin. Via Zoom, she did her "Remote Imaging" talk for NJAG (New Jersey Astronomical Group). The Williston Library's star gazing event went well.

Jim has found online lists for VT state offices and Vermont chambers of commerce for the Eclipse committee to use in contacting entities about the eclipse. He will schedule a committee meeting in early December.

ACTION ITEMS:

None

MOTIONS:

None

December No Board Meeting

VAS Membership Committee

Observatory Site Committee

No meetings this quarter.

Under the Stars & Planets

OBSERVER'S CORNER

Observing Tips

► (repeat) It takes 20 minutes or more of being in the dark for your eyes to become fully sensitive to dim light (fully dark adapted).

If you have tips to share whether for beginners or experienced observers send them our way at info@vtastro.org

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

Equipment Tip:

(repeat) **Electric heating pad for your telescope mount.**

If you are one of those observers who braves the winter temperatures and use a GoTo mount, this tip is for you, or rather your mount. Because most lubricants become stiff at cold temperatures some mounts will freeze up, especially when slewing to objects or trying to star align the mount. Most annoying!

Once I used a hair dryer to warm my mount when that happened, but it took several minutes. A couple of times I literally took a blow torch to warm it up. It was faster but required a lot of care to avoid damaging wires, other plastic parts and avoid burning the paint. Another technique I have used is covering the equatorial head with a vest to slow down the rate of cooling. But on really cold nights that is not enough.

In an aha moment I realized I could use an electric heating pad to keep it warm. The kind you drape over your shoulders and around your neck works well. With the heating pad set to high and the air temperature at 13 degrees F, the mount was a relatively warm 40 degrees. I could have used a lower setting with no problem. This pad uses 55 watts at max heat so you can use the pad with a small inverter running off car battery or large lithium-ion battery for at least a few hours.

Note, you should try running it with the inverter you plan to use as most inverters produce a very "dirty" line voltage and if the heater uses electronics to control the temperature, may not work. FYI- the inverter at the Hinesburg Observing Site is a "true RMS" (has a clean sinusoidal line voltage) and 600W output so any pad will work on it. The heater pad may have a safety feature that shuts it off after 10-15 minutes, so keep an eye on the power light and turn it back on.

In most cases you can probably just drape the pad over the housing of the equatorial head without it falling off as the scope moves.

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 and planets, observing them or submitting your images or drawings of them.

The Moon is a good place to start as it is often visible and close enough to 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, look on the top left side for Lunar Section under Observing Section. The link for each issue is the underlined word "here" about halfway down the info for each month. Then click on "Click here to view PDF file".

Member's Observations**Bolide Observation**

11/27/2022 - Gary Nowak:

Hi Paul,

Did you by any chance get an image of that super bright bolide last night? ... That was the best one I've seen in many years... exceptionally bright with a extremely brilliant flash which produced shadows.

Seeing last night was terrible, the so called high pressure wasn't that strong so it effected seeing... Uranus and Mars was boiling and smeared. I was observing Mars around 1 am and despite being up very high in the sky... Capella to Mars left was twinkling and Aldebaran to Mars right was twinkling also. Sirius was scintillating so hard, it was changing color... One of these nights, I'll get a really good view of Mars.

---Gary

Nope, didn't even see it. When was it? Yes, the seeing was very bad last night. Peaked a Jupiter a few times, once early on, about 5:30 and again about 7:00. Checked again about 9:00 but but not much better. Peaked at Mars at 106x but fuzzy and doing the jig. I switched to a few star clusters in Auriga and then M42 before calling it a night.

---Paul

Hi Paul (Lawrence Garret cc'd)

Here's my data on the brilliant fireball: Date: 27 Nov 2022 (UT), Time 03:34 (UT), Magnitude: -10.0 \approx , Duration: 2.0 sec \approx ... Meteor start dim East of Alpha Cetus then curved and ended up just North of Nu Lepus. Meteor grew in brightness as it headed into Lepus. At end of flight some sparks were seen. Tear shape with a short broken train. Ended with a brilliant white flash which cast distinct dark shadows. Flash was glaring bright white color. Flash was way much brighter than Jupiter. No sonic boom heard. So this fireball was a Bolide due to its violent end. Magnitude and Duration were estimated by me; (the best that I could).

I checked the NASA All Sky Fireball Network which records fireballs

which are brighter than Venus. There is one for that date:

Date: 20221127 UT (Year, Month, Day)

Time 03:34:00 UT

Velocity: 40.2 Km/S

Orbit: Meteor came from beyond Mars (Asteroid Belt)

Couldn't find any data on brightness or duration.

Sporadic Meteor: Not associated with any meteor shower.

So my observation is backed up by NASA all sky cameras (fireball network).

So Larry that was a nice piece of work to discern that this meteor was from the Asteroid Belt. I need to be more aware of that fact that some of our meteors we see are actually (asteroids). Usually I think of meteors as just pieces of comets... because I observe comets a lot.

Usually I don't get to see meteors because I'm usually looking through an eyepiece and my giant binoculars or telescope is pointing in the wrong direction in the sky.

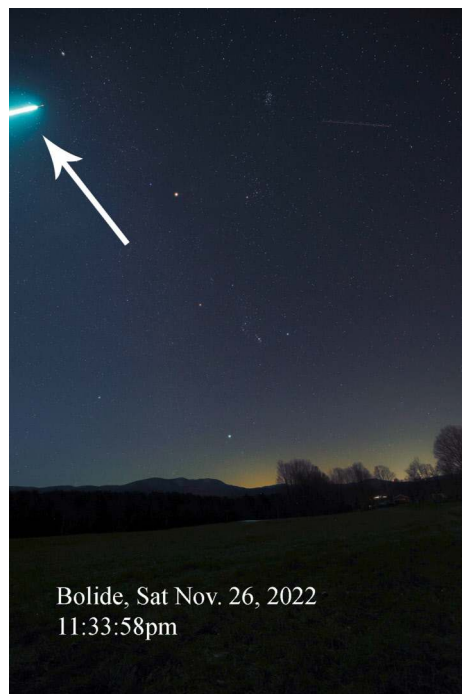
It was nice to see a brilliant bolide.

---Gary

11/28/2022 - Allon Wildgust:

Hi Paul,

As you can see I just started an exposure when the bolide passed by. So I caught only a piece of the meteor. It was spectacular. To bad the camera was



Bolide, Sat Nov. 26, 2022
11:33:58pm

point in the wrong direction. The time matches with what Gary posted.

---Allon

Mars

11/3/2022 Paul Walker:

3:33 AM EDT (7:33 UT) from Middlebury, VT. Seeing is excellent, airy disk on the stars visible. Sky Quality Meter readings- 5:09 AM EDT, @ zenith- 20.7, @ Polaris- 20.72 (mag/sq arc sec).

Equipment:

10" f/5.6 Newtonian, equatorial

8" f/6 Newtonian, Dobsonian

Denkmeier Binoview (21mm e.p.)

2", 2X Barlow

Mars was steady in the 10" @ 333x & 548x (Binoviewer + 2X Barlow).

The image was soft at both magnifications. At 548x the "floaters" in my eyes interfered with the view. At 888x looked very soft and the "floaters" interfered too much.

The view through the 8" @ 282x was sharp and provided the best view.

I also imaged Mars with the 10" f/5.6 using a DSLR and eyepiece projection.

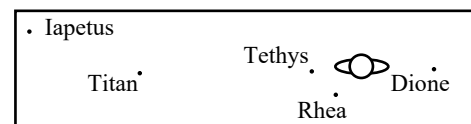
Saturn & Jupiter

11/6/22 Paul Walker:

Started at 8:53 PM EST (01:53 UT)

68 deg F, 77% RH, windy. The fine scale and medium scale seeing was fair. OK for visual only, not good imaging.

Viewed Saturn with 10" f/5.6 Newtonian and binoviewers @ 282x. Could see the moons, Tethys, Rhea, Dione, Titan and Iapetus. The equatorial belt was visible and Cassini's Division was detectable.



With Jupiter, the Great Red Spot (GRS) was visible on the west edge, going out of site around the edge. South of the SEB (South Equatorial Belt) I could see 2 additional dark belts. They appeared to deflect around the GRS. I could see the dusky region north of the NEB. The moons were visible as fuzzy disks.

Always happy to include your observations. Send them to info@vtastro.org.

Objects to Observe

Taurus

Pronounced TOR-us

Adapted from Terri Zittrich's Constellation of the Month

- Taurus is a very old 'asterism' known to many cultures including the Egyptians, Ancient Greeks and Babylonians and part of their mythologies.
- Taurus is one of the Zodiacal constellations, which ride the Ecliptic (the path of the Sun and planets).
- Taurus at one time marked the beginning of in the bronze age with the spring equinox. Currently the spring equinox is in March and changes based on the Earth's precession.
- A long with many other constellations, Ptolemy documented Taurus in the 2nd century in his Almagest.

Myths:

- The simplest myth is that Orion is fending off Taurus with his shield and club.
- The Greek myth is that Zeus changed himself into a handsome bull, sometimes depicted as white, to lure and seduce the princess Europa.
- Zeus came into the king's heard and was noticed by Europa.
- When Europa climbed onto Taurus's back the bull ran off with her to the sea and stopped on the island of Crete where he disclosed his true identity and lavished the princess with gifts.
- Zeus and Europa then had children including Minos, who became the famous king of Crete legend.
- Minos built the palace of Knossos where he sacrificed 7 boys and girls each year to the minotaur.

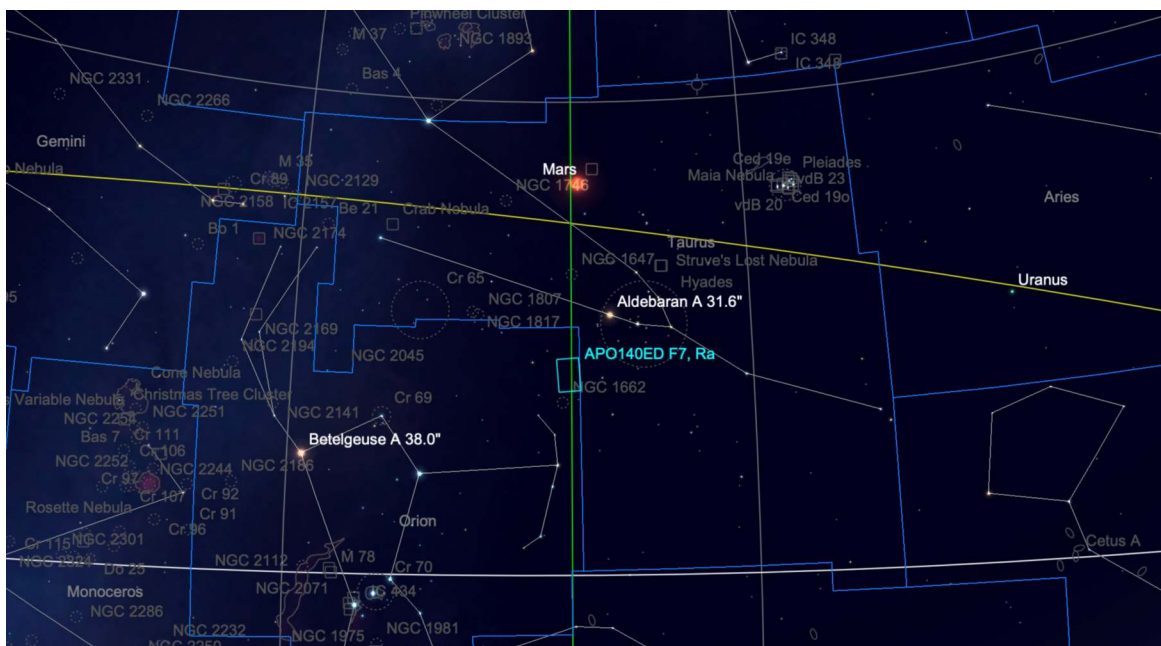


Finding Taurus is easy

- Fall and Winter constellation.
- Being on the Ecliptic it's one of 12 constellations on a path along with the planets and the moon (roughly).
- Taurus is just east of Aries and west of Gemini.
- Taurus is just north of Orion and Orion's belt conveniently points to Aldeberon, Alpha Tauri.
- Taurus is just south of Auriga.
- Where you see the Pleiades so is Taurus.

Other Notable facts:

- Taurus is the 17th largest constellations at 797 square degrees.



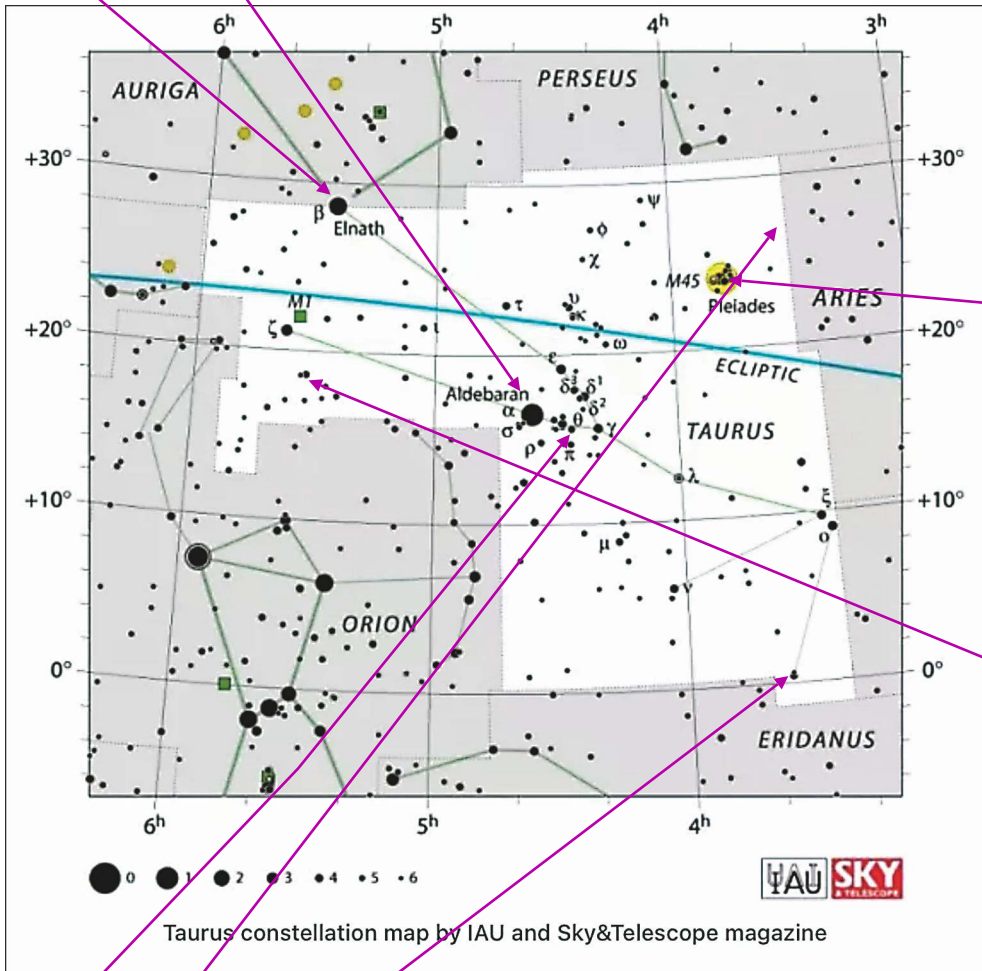
Taurus notable stars:

- α Tauri (Aldebaran)- The brightest star in Taurus its name means 'Follower' named so as it follows the Pleiades in the sky. Aldebaran marks the 'eye' of the bull. A variable binary orange giant of mag 0.75 to 0.95. It's a class K5 III (Giant) that's left the main sequence (hydrogen fusing). At a surface temp of 4000K it's 44 times the diameter of the Sun and 425 times the Sun's luminosity but only 2.5 times its mass. Aldebaran is 65ly distant from our Sun. Aldebaran is also a binary with a 13th magnitude red dwarf companion 32" away. Aldebaran's future is a not spectacular, not being large enough for a future black hole, it'll finish fusing helium into carbon and oxygen and finally discard its outer layers into a planetary nebula shell and end its life as a white dwarf. Aldebaran is also in, but not part of, the Hyades star cluster.
- β Σ Tauri (Elnath)- The 'butting one' is the 2nd brightest star in Taurus. Also known as Gamma Aurigae and one of only 2

linking stars with designations in 2 different constellations. The other is Alpheratz (Gamma Pegasi and Alpha Andromeda) Elnath is a mag 1.65 class B giant at 13,500K but near the end of its hydrogen fusing lifetime and will move over to become an orange giant. Elnath is 130 ly distant and 700 times as luminous as the Sun but only 4.5 times its mass.

- η Tauri (Alcyone) is the third brightest star in Taurus at Mag 2.87 and the brightest star in the Pleiades cluster. Like the rest of the 'sisters', Alcyone is a hot class B star at 13,000K and classified as a B7 III giant and also the brightest with an absolute luminosity of 2400 times the Sun, while just containing a mass of 6 Suns and 430ly distant. Alcyone spins very fast with a rotation period of 2.3 days.

- 119 Tauri, a 4th magnitude variable star in Taurus is also one of the largest known in the sky. Luckily it's 1792 ly from our Sun. 119 Tauri is a red supergiant of class M2LAB-lb with a surface temp of 3370K but 406 times the Sun's diameter in size while it has a luminosity 19224 times the Sun and 19 solar masses.

**Multiple Stars:**

- $\theta 1, \theta 2$ Tauri- A naked eye double star in the Hyades cluster. They are magnitude 3.8 and 3.4 respectively and separated by 337". $\theta 1$ Tauri is a hydrogen fusing orange giant of class K0III and $\theta 2$ Tauri is class A7III. Both theta 1,2 Tauri have spectrographic companions at a few tenths to a few hundredths of an arc second distant. This double can be seen just left of center in the Hyades.
- Struve 401 (Σ 401)- A 6th magnitude double star just northwest of the Pleiades. A white main sequence star of class A2V, The companion is mag 6.9 and 11.3" away.
- Struve 422 (Σ 422)- A 5th mag variable star in Taurus with a 9th magnitude companion 6.3" distant. The primary star is in the main sequence with a classification of G9V

INFORMATION SOURCES

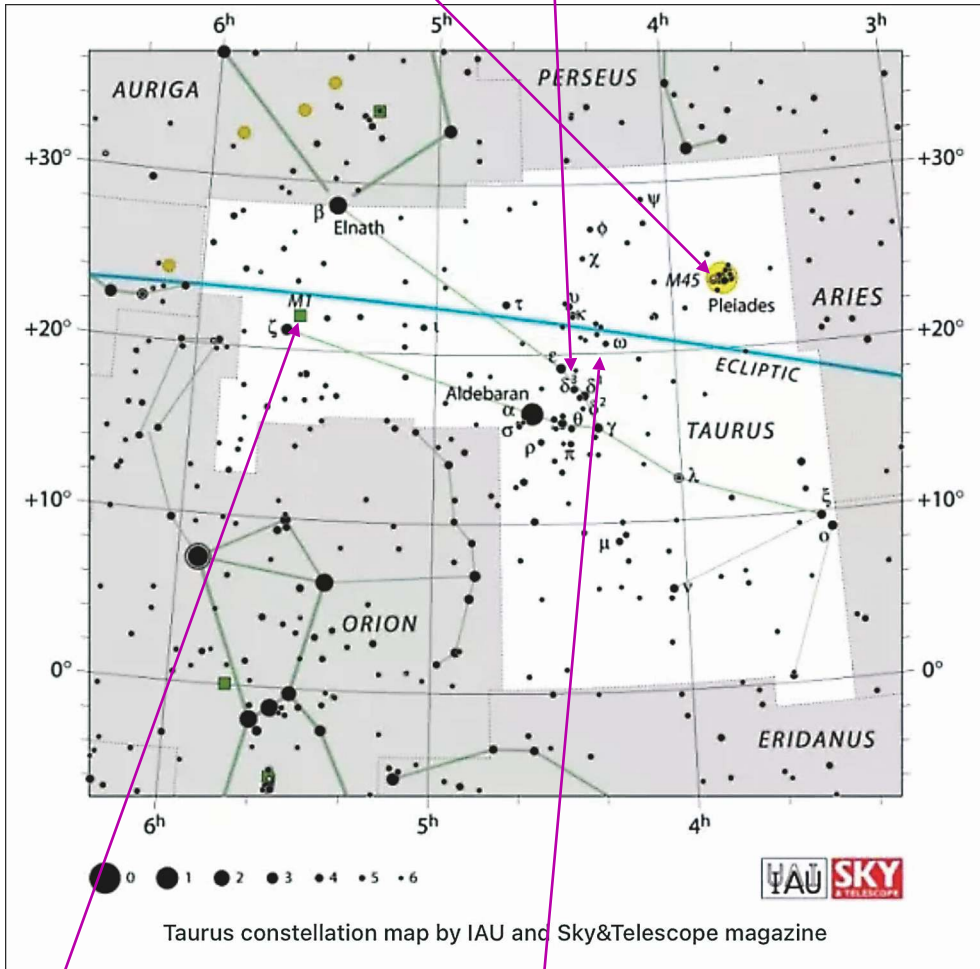
Constellation-guide.com
 Space.com
 earthsky.com
 Wikipedia.com
 Sky Safari 6.0 Pro
 On Astrobin 'Terri'

Deep sky objects:

- M45 (Pleiades or 7 Sisters) – A mag 1.5 cluster of stars known since antiquity, and by names: Matariki (Aus Aborigine), Tzab-ek (Mayans), Tianquitzli (Aztek), Kiymih (Hebrew), Kritika (Hindi), Al Thuraiya (Arabic) and Subaru (Japan). See if you can see the 6 members that form a small dipper. The group spans a full 2 degrees and also illuminates some reflection nebula unassociated with the cluster itself.

has a mass of 1.4 Suns but in an area only 30km across!!

- Hyades (Melotte 25/Caldwell 41) – A Mag 0.5 naked eye star cluster in Taurus approximately 330" in diameter and 152ly from Earth. Another object long documented in various ways and in literature from Homer to Ovid. Only 5 stars are visible with the naked eye but a total of 300-400 stars exist within the cluster. The attached image by Jerry Lodrigus (famous DSLR astrophotographer)



- M1 (Crab) – A supernova remnant of Mag 8.3 and 6'x4'. The first object in Messier's famous list of non-comet objects. The Crab is a result of a supernova from the year 1054 and recorded by Chinese of that time. From the Chinese documents its magnitude rose to -6 and was visible in the daytime for 23 days and visible for 653 days at night. The Nebulosity of M1 was first recorded in 1731 by John Bevis. M1 has a neutron star at its center creating a pulsar which is rotating 30.3 times per second and

- NGC 1555 (Hind's variable reflection nebula) – A mag 10 reflection nebula 3'x4' across just north of the Hyades illuminated by T Tauri, a variable star which is the model for T Tauri variables, a class of young stars that have just emerged from their dust and gas cocoons where light is reflecting off the dust and gas clouds it was created within. A very difficult object for visual observation.

ASTRO-IMAGER'S CORNER

All things astrophotography, for the beginner to the expert.

Imaging Tips

If you have tips to share whether for beginners or experienced imagers send them our way at info@vtastro.org

Software/Online Info

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

Imaging Projects--

'Project: Dark Nebulae'
~ by Maura Kelley

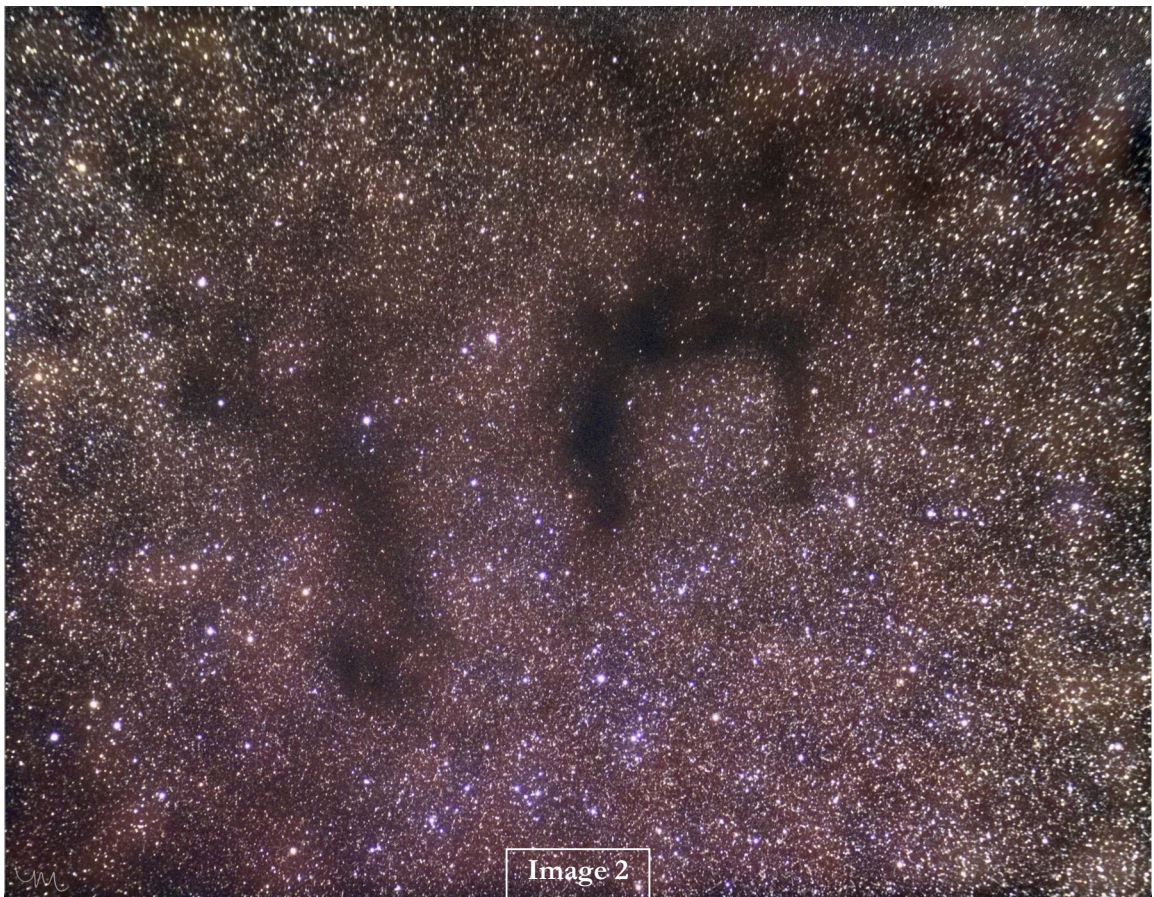
Barnard's "E" in widefield (140mm camera lens & slightly cropped, 36min.) ~ The 2 dark nebulae together are Barnard 142 and Barnard 143 that lie against the rich Milky Way in constellation Aquila (**image 1, pg 9**). The second, 1 hour image, was taken with an 80mm refractor telescope (**image 2, pg 9**).

Barnard 150 widefield (150mm camera lens, 2.20hrs.) ~ The Seahorse Nebula with The Fireworks Galaxy NGC 6946 and Open Cluster NGC 6939 seen at the bottom. These objects lie in the border area of constellations Cepheus and Cygnus (**image 3, pg 10**).

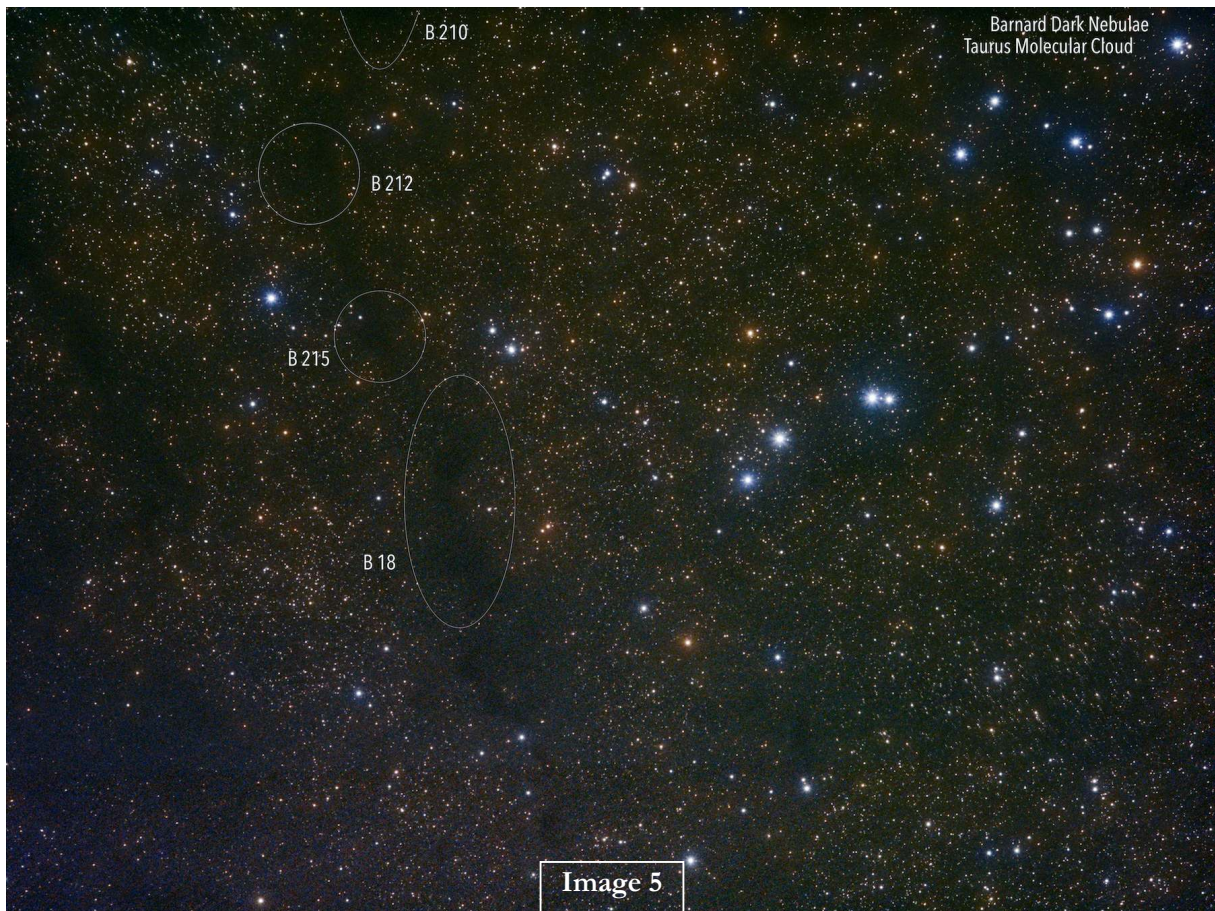
Lastly, these dark nebulae are located in The Taurus Molecular Cloud which is an area very rich with dark nebulae; this is just a very small piece (**image 4, pg 10**). These are labeled in the annotated image (**image 5, pg 11**) ~ (150mm camera lens, 1.6hrs.). My goal is more of a widefield image of this area, to come, if only our weather and much more exposure time is acquired.

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.







MEMBER'S IMAGES

Lunar Eclipse - 11/8/2022



By Paul Walker, 5:02 AM EDT, during the partial phase, 10" f/5.6 Telescope, prime focus, Canon T7i, 6 sec. @ ISO 100.

The eclipse was much better than I thought it would be. I was thinking the Moon would be too low to the horizon once it got into the shadow for a good show, I was wrong. Luckily I checked out a nearby field the day before. There I found that there was 1 tree tree that would provide good foreground when it got down real low. And I actually set up in the right place to use that tree (see bottom left image). Granted I had used a compass when I checked the in daylight but I didn't use the compass when I set up and 10 feet or so to either side would not have been as good.

I also was thinking (but hadn't checked) that I would not be able to get the earlier phase from my observatory deck. But as one can see I did (see image on page 11). I got up about 3AM so I decided, that while waiting for the eclipse, I would get some video clips of Mars, but clouds interfered with that (the seeing wasn't really quite good enough anyway). Then I switched from eyepiece projection to prime focus to shoot the Full Moon, not realizing the Moon was already in the penumbra and about to start entering the umbra. Apparently I hadn't done quite enough prep yesterday. Plus, I still had to wait for the clouds to move out of the way. Before they did, I noticed the left edge of the Moon was a little dark, indicating it had reached the umbra. But at least that meant I could get some good "close-up" shots of part of the eclipse!

--Paul



By Paul Walker, shortly before totality, 5:11 AM EDT Canon T7i, on an iOptron SkyTracker, 33% crop, 300mm lens, f/5.6, 3.2 sec @ ISO 100, brightened and sharpened.



By Paul Walker, during totality, 6:05 AM EDT Canon T7i, on an iOptron SkyTracker, Slightly cropped - 300mm lens, f/5.6, 0.6 sec @ ISO 400.

Totality

By Greg Erianne

Canon SL3 (250D) at ISO 6400, 1.3 sec exposure. I had the SL3 attached directly (prime focus) to my 60mm f/6 APO (360mm fL), untracked.



Eclipse Composite

By Maurea Kelley

Well, I was there at Overlook Park in So. Burlington certainly early enough at around 3:20 AM. I've been having trouble focusing my 300mm camera lens since it was exposed to rain. So, I had to fiddle with the settings for a while (my brain was having a hard time working at that hour) and wait as the moon was behind clouds. Then it cleared. It was cold and windy and standing there for so long I only captured the Deep Penumbra to almost 50% before my fingers were numb and I gave up before totality even began. However, I ran into another VAS member also taking photos.

I put a few images into a composite here.



Mars in 3-D - 12/20/2022

By Paul Walker

These are 2 images taken about 20 minutes apart to create a 3-D pair. This configuration is for "free veiwing", that is without red/blue glasses or other device.

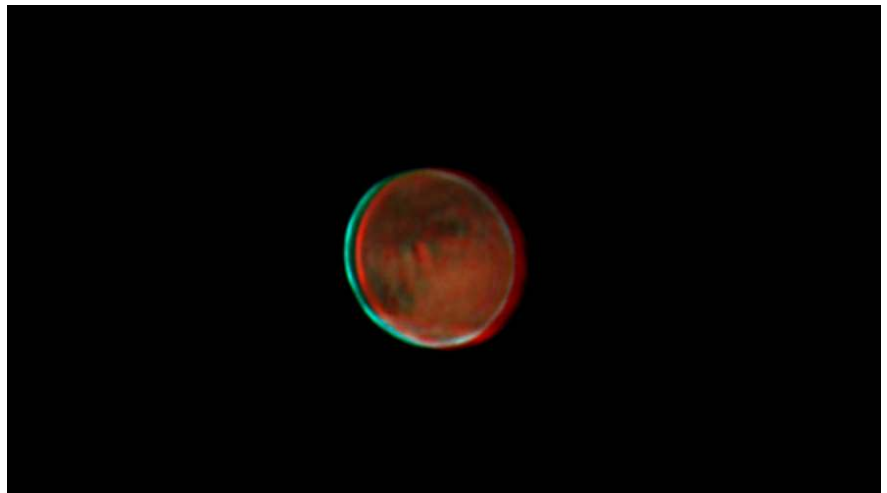
To view, it is helpful to place divider between you and the images (one end of a piece of paper or cardboard between the 2 images of Mars and the other end near you nose). They can be viewed without the divider, but it is harder and you will see 3 images, with the middle one in 3-D.



If you have red/blue 3-D glasses you will be able to view the image to the right in 3-D. It will appear to float slightly in front of your screen. The 3-D effect would be stronger if there was more detail in the image.

Right hand image was taken on 12/20/22, 8:52 PM EST (1:52 UT), the left hand at 9:11 (2:52 UT).

10" f/5.6, eyepiece projection using a 15mm eyepiece, Canon T7i camera, 3x digital zoom, 1/160s @ iso 1600, 20% of ~5500 video frames. Stacked with AstroStakkert!3, post processing in Registax 6 and Picture Window Pro 7. Images are cropped. North is down.



From Starry Night Pro

Mars, Later that Night

The seeing got better as the night progressed (until clouds came in). I wish the 3-D images had this much detail

This is the best Mars images I have gotten. Solar Lacus is obvious to the upper left of center. Part of Vallis Marineris may be there, left of center. And Olympus Mons may be detectable to the lower right, at least there is something showing at the right place.

The Mars globe graphic from Starry Night Pro planetarium software shows where Vallis Marineris, Olympus Mons and the 3 other volcanoes are located. Note that my image is rotated a bit counter clockwise relative to this graphic.

The S&T Mars profiler graphic helps in identifying the albedo (dark and light) features.

1183 (20%) out of 5917 video frames. The video was taken at 10:25 PM EST (3:25 UT).

Mars Profiler

This map depicts the Martian hemisphere facing Earth for the entered date, time, and telescope type. The red circle indicates the region of Mars pointed directly toward us.

Date: Time: UT
(mm/dd/yyyy)

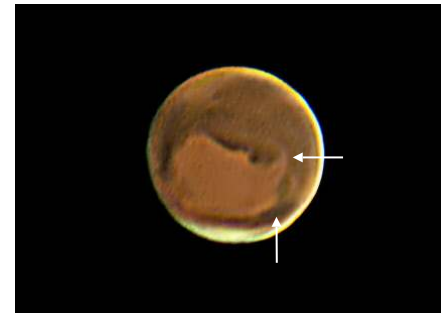
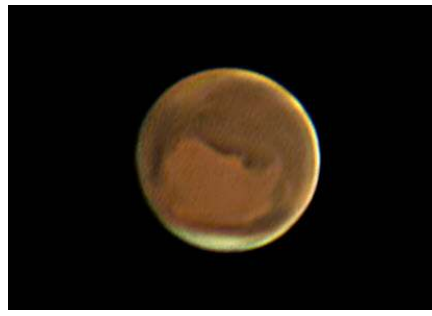
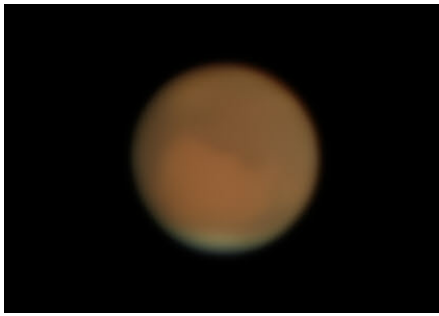
Time-zone offset from UT in hours (from your Web browser):

Telescope type: **Inverted view**

Sky & Telescope Tools:

<https://skyandtelescope.org/observing/interactive-sky-watching-tools/>

https://skyandtelescope.org/wp-content/plugins/observing-tools/mars_profiler/mars.html



11/22/2022, 9:45 PM EST (2:45 UT)

Images are cropped. The left image approximates the visual contrast and the detail that I could make out at 282x in my 10" f/5.6 scope. The other 2 have varying degrees of enhancement applied.

(Same setup as the images on the preceding pages) 10" f/5.6 Newtonian telescope, Canon T7i DSLR camera, eyepiece projection using a 15mm eyepiece, 8110mm eff. focal length @ f/32.3 (5.76 x prime), 1/200 sec @ ISO 3200. Used 3X digital zoom which yields 24,330mm efl. and a field of view of 184"x104" @ 1920x1080 pixels. Image scale is 10.4 px / arc sec (0.096 arc sec / pixel). I measured Mars to be ~170 pixels across which indicates my calculations for the image scale is off a little. It's closer to 10 px / arc sec. (0.1 arc sec/ px. The smallest features visible are ~0.5" across (see arrows in right hand image).

skyandtelescope.org/wp-content/plugins/observing-tools/mars_profiler/mars.html

SKY & TELESCOPE Mars Profiler

This map depicts the Martian hemisphere facing Earth for the entered date, time, and telescope type. The red circle indicates the region of Mars pointed directly toward us.

Date: 11/23/2022 Time: 02:41 UT
(mm/dd/yyyy)

Reset to current date & time Calculate using entered date and time

-1 Day -1 Hour +1 Hour +1 Day

Time-zone offset from UT in hours (from your Web browser): -5

Telescope type: **Inverted view**

N Direct view (Erect-image system) H Inverted view (Newtonian / Dobsonian) N Mirror reversed (SCT/Mak/refractor + diagonal)

Basic Data about Mars for telescopic observers:

Apparent visual magnitude:	-1.7	Angular diameter (arcsec):	17
Distance from Earth (a.u.):	0.55	Elongation from the Sun (°):	159
Illumination (%):	99	Central-meridian longitude (°):	338
Position angle of north pole (°):	330	Opposition 2020 countdown (days):	past

Mars

11/15/2022

By Terri Zittritsch

Well finally received the TEC 180.. it's a beauty. I was out last night taking a few images of Mars and looking around. Besides Mars, I viewed the trapezium and both E and F jumped out at me like never before. I could see them in the 8" once in a while, but it was an averted gaze thing due to the brightness of the main 4 stars in the trap. In this scope, the stars are like little jewels in the sky. E and F were resolvable at 100X and only more beautiful when I zoomed in. The Moon was a sight to behold. It was perfect for looking at Hadley Rille (see image on pg 20). I could easily see the entire rille except where it jumps into the mountain where you don't see it on any map. Fresnel Rille (also visible in image on page 20) was ridiculously easy to see. Next time I'll have to see what kind of resolution I get, but it's better than my 11" SCT so far.

Here's Mars taken at 3:37 AM EST. I used the ASI224MC color camera with a 2X Powermate and 2X Barlow stacked and then a ZWO ADC. So more than 4X magnification given the distance from the Barlow lens to the focus point above the Atmospheric Dispersion Corrector (ADC).

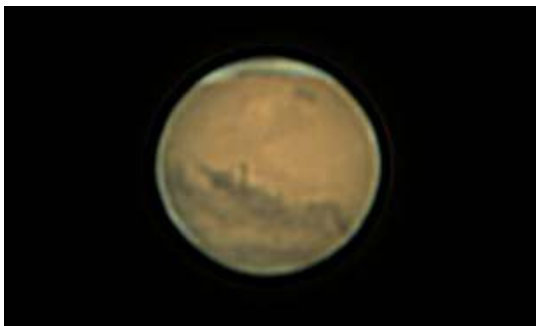




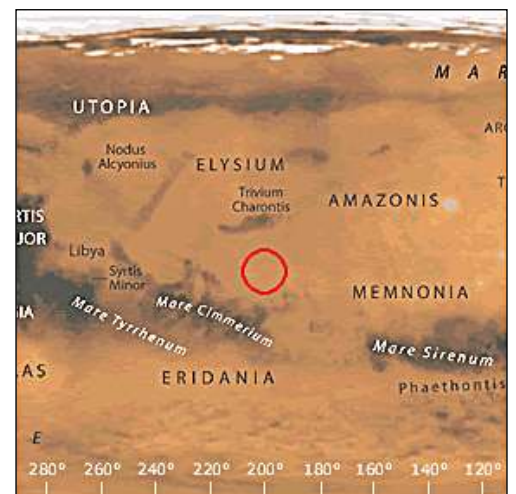
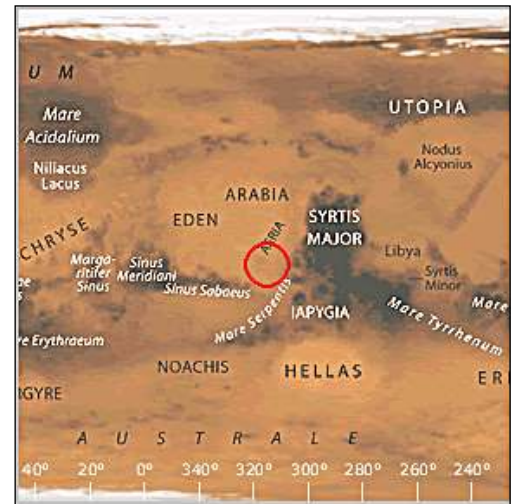
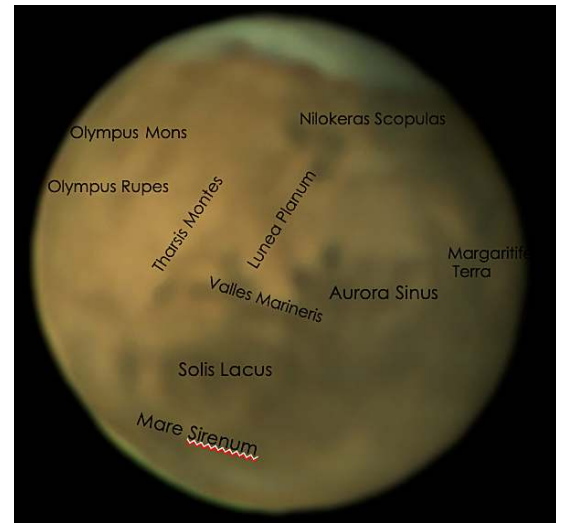
Here's another image (above, annotated version on the right) taken a few minutes later at 3:43 AM EST. Processed in a way that eliminates the typical high contrast edge artifact caused by the sharpening algorithms.

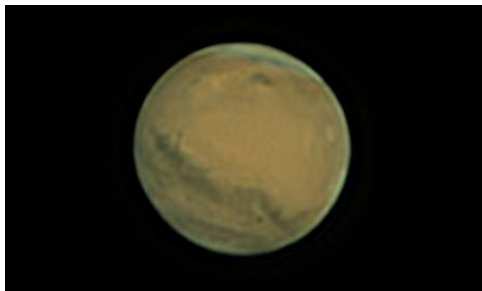


11/27/22 - It was another challenging night. I was able to take some images between 10 PM and midnight before the wind did me in. I just don't enjoy sitting in the wind and trying to keep things from blowing away. Seeing for me was maybe 4/10 at best. This image has quite a lot of detail in it if you compare to a standard and I can even see the leopard skin mottling. Even though I was disappointed in the night, I was happy with the results. I used my TEC180 with only a 2X barlow and the ADC. I didn't think it would take more magnification last night so kept f/ratio lower. I was shooting pretty fast frame rates of 5ms and less and for 4 minutes of video. I was getting >40,000 frames per video but only using 3-6% of them (max around 2K frames). I'm going to play around to see if more gives me any added detail. I used Autostakkert!3 plus Astrosurface. I take a very light hand to wavelets and sharpening.

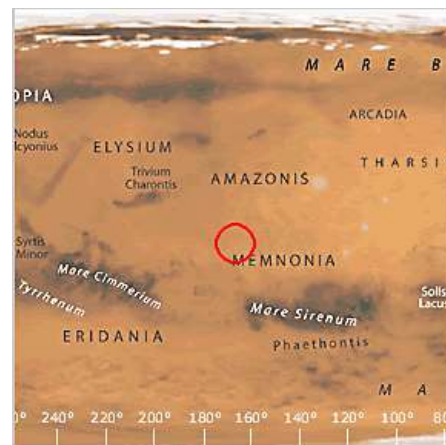


Another Mars image from December 9th/10th using the TEC180. Not my favorite view of Mars, but I did capture enough detail to make out quite a few areas and features. Surprised what a 7" scope can do on a fairly nice night.





12/13/22 - I thought I'd throw another Mars image out here. This one from last night but using an 11" Celestron Edge with a 2X powermate (no ADC). The system was around 6,000 mm e.f.l. and I used the ASI224MC camera at around 2ms exposure time. I captured 20,000 frames and processed 3,000 into this image. Finally seeing some decent results from this scope. What I'm realizing is that large aperture scopes, or maybe scopes with obstructions, need better seeing than refractors for pleasing views. The scope was able to easily break the trapezium into 6 stars with hints of more. Hadley Rille on the Moon was easily viewable.

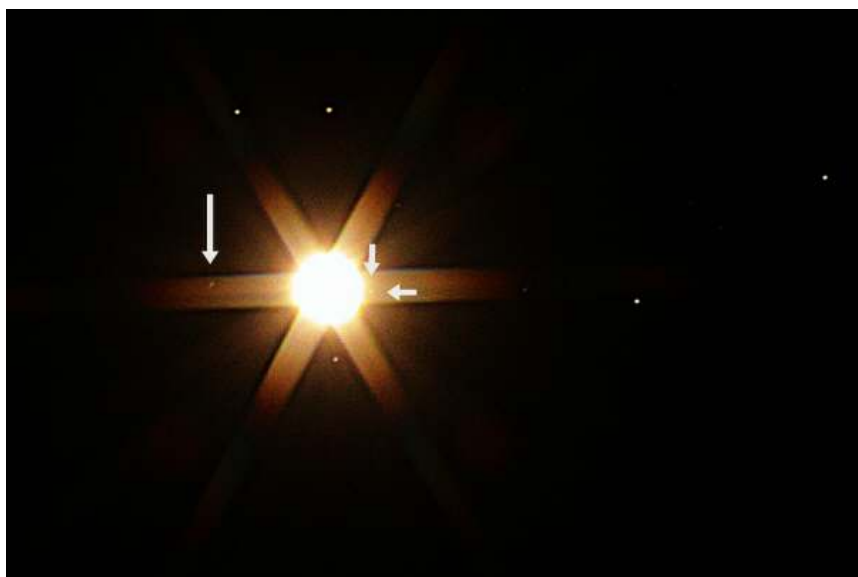


Mars' Moons Deimos and Phobos By Paul Walker

I took some longer exposures of Mars Thursday Morning, 11/3/2022 to see if I could image Mars' moons Deimos and Phobos. Earlier I had seen on my planetarium software that they would both be favorably positioned in their orbits (away from the glare of Mars). I was successful but turns out the telescope's "spider vanes" holding the secondary mirror were in just the wrong place, making it harder than it needed to be (it also has 3 vanes which creates 6 diffraction spikes). I'll have to try again after I rotating the tube assembly a little.

10" f/5.6 Newtonian, Canon T7i DSLR, used eyepiece projection using a 24 mm Konig eyepiece to get high magnification (~4866 efl @ f/19, 3.5 x prime), 20 sec @ ISO 400. On the camera's display I could just make out Deimos on the best images. I stacked the 3 best. It wasn't until later that I spotted what appears to be Phobos in the image.

The star map showing their locations was created from Starry Night Pro 7 software.



Occultation of Mars by the Moon - 12/7/22

By Paul Walker

I managed to catch a some glimpses of Mars and the Moon through heavy clouds starting moments after Mars emerged from behind the Moon.

I lucked out on 4 counts in getting these images:

1. I was thinking the reappearance was not until about 11:45. Silly me, when I rechecked early in the evening with Starry Night Pro planetarium software on the exact time for the disappearance, I did not recheck the time of the reappearance! (which was 11:22:00 to 11:23:10) I only went out early, about 11:15 to see if I could catch enough sight of the Moon to get at least a rough focus on the camera so that I wasn't scrambling later. I did manage to catch sight of the Moon dimly through weak points in the clouds and focus the camera. While waiting for a good "hole" to verify the focus and identify the right place on the limb of the Moon, I was surprised to see Mars already hovering next to the Moon.
2. I had managed to get a good focus and didn't have to fine tune it.
3. Though I would of course loved to get shots or video of Mars emerging from behind the Moon, I did catch it just

moments after it had fully emerged. The time for the first image I took was 11:24:09.

4. Last but not least, I got enough thin spots in the clouds (no actual openings) to get some still shots and video.

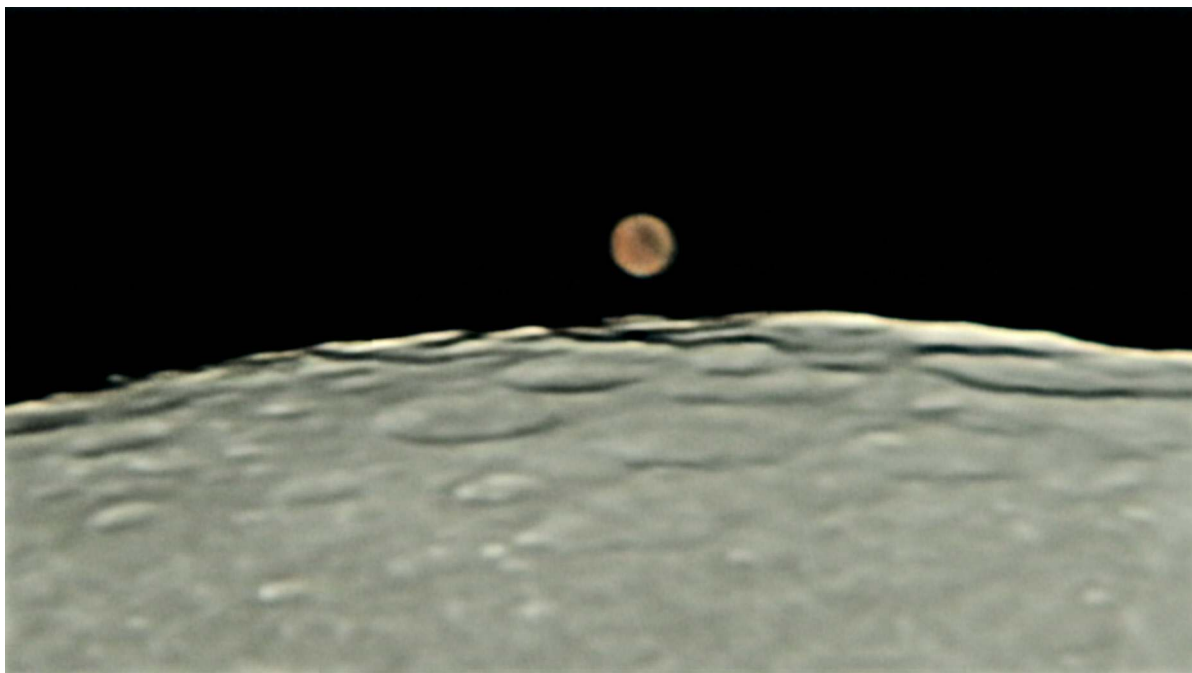
I had to keep changing the exposure time to compensate for the variability of the clouds. The images were all washed out due to the clouds but I was able to make them look as if they weren't.

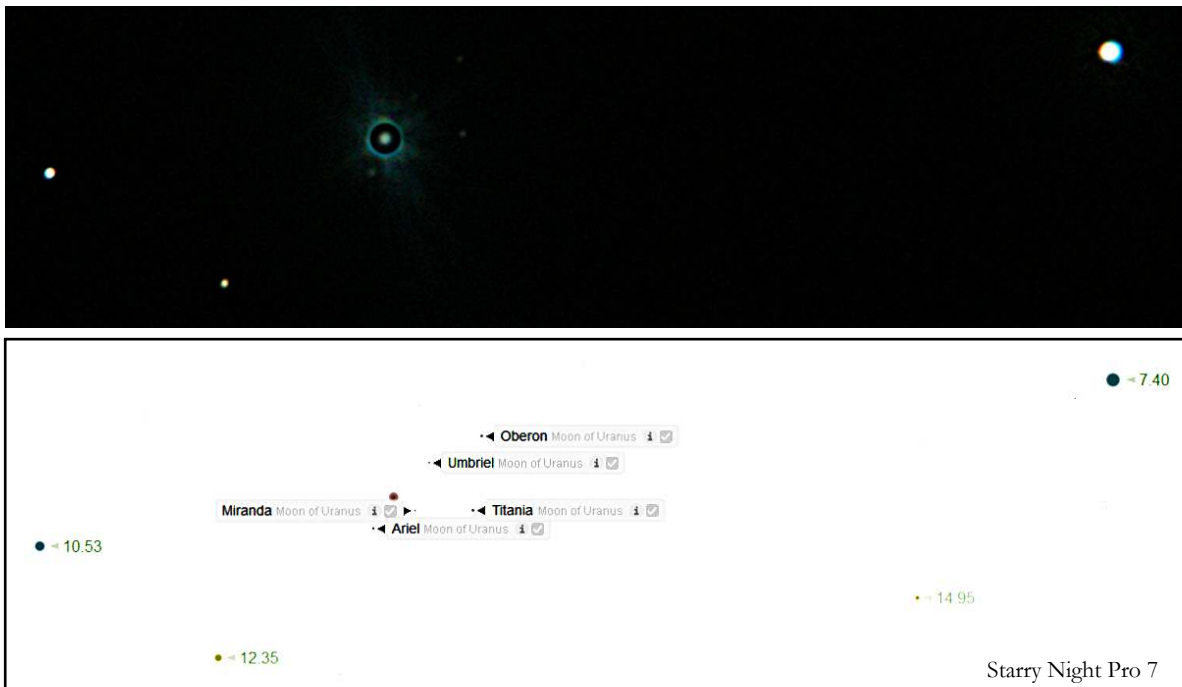
Top image:

This is from a single still image taken at 11:24 PM EST with a 10" f/5.6 Newtonian telescope on an equatorial mount, using eyepiece projection with a 24 mm eyepiece (~4870mm e.f.l.), 1/2 sec exposure @ ISO 800, Canon T7i DSLR. The 2nd image below is enhanced to compensate for the clouds. Both are down sized by 50%, the 2nd is cropped a little. Cropped top and bottom. North is down.

Bottom image:

The video for is image taken right after the top image at ~11:24:43 PM EST. Having HD video built into a DSLR is great. Used the same setup plus 3X digital zoom (~14600mm e.f.l.) It was created by stacking 160 frames (5 sec worth of video) from a longer video clip. Not cropped. North is down.





Uranus and Some of it's Moons

By Paul Walker

On 11/20/2022 I tracked down and viewed Uranus and Neptune. Neptune is 7.8 magnitude and appears ~2" across, barely bigger than Jupiter's largest moon Ganymede (1.7"). It takes high magnification to discern it as a disk. 200x is enough in good seeing, maybe less for an experienced observer, 300x or more is better, if your telescope is big enough. It has a moon, Triton, which at 13.5 magnitude is bright enough at to see in medium sized telescopes (10" or larger is best but on a good night an 8" might be big enough. Using my 10" f/5.6 with the binoviewers at 282x I was not able to detect Triton even though it was well placed away from the Neptune.

At ~4" across Uranus is much easier to discern as a disk. If the seeing had been better I might have been able to see one or more of it's moons but they are faint and never get far from their parent planet.

I did not try imaging Neptune but I did image Uranus. I may even have gotten a little bit of cloud detail but probably not (image not included here). I also took several 10 sec exposures to try to get some of the moons (see image above). We are currently looking a "down" on the north pole so the moons appear to be doing circles around Uranus.

10" f/5.6 Newtonian, Canon T7i camera, eyepiece projection using a 15mm eyepiece, stack of 11 shots, 10 sec @ ISO 6400 with a single 1/6 sec shot @ ISO 6400 cloned in to replace the overexposed image of Uranus. The faintest star is magnitude 15, barely visible in the lower right of the image.

Magnitudes of Uranus' moons:

Oberon 14.05
 Umbriel 14.95
 Titania 13.84
 Ariel 14.28
 Miranda 16.42 (not visible)



Uranus

By Terri Zittritsch

Here's Uranus from a stack of around 3000 frames taken on 11/27/22. I thought I'd detour a bit and see what I could see. Seeing was poor, but I was able to capture the blue dot. TEC180FL with 2X powermate and ADC (Atmospheric Dispersion Corrector) with ASI224MC with 3.75um pixels, exposures were quite long at 20ms and gain was really high just to get the exposure needed. So I didn't expect much detail due to the relatively long exposure time. But here she is.



Rima Fresnel and Rima Hadley

By Terri Zittritsch

Given the descent seeing last night (12/13/22) and the waning Moon, I thought I'd look for Hadley again to see how the 11" Celestron would do. I used an 1100HD Celestron scope, 2X Powermate and ASI 224MC camera. The system was at around 6000mm e.f.l. Seeing wasn't excellent but it was better than typical. Lighting wasn't perfect but it was good enough for me to finally get a shot (north is up). I also took the opportunity to pop in an eyepiece and easily spied both Rima Fresnel and Rima Hadley.



Jupiter

By Terri Zittritsch

I captured this on Monday evening (11/14/22) through some holes in the clouds. I was just too excited to try out the new scope and not take advantage of any clear skies available. The skies opened up before Jupiter got to a point close the the meridian where my seeing always goes bad (must be some ground feature causing air churn). No matter the seeing for the night, when I hit that point and farther west, seeing is terrible for planets. In any case, shot this with the TEC180, 2X powermate with 2X barlow and ADC, so 4X magnification and a ASI224MC color camera. This image was huge so guessing I was closer to 5+X but I'm not entirely sure how much added distance the ADC causes. 2 minutes of exposure for this one.



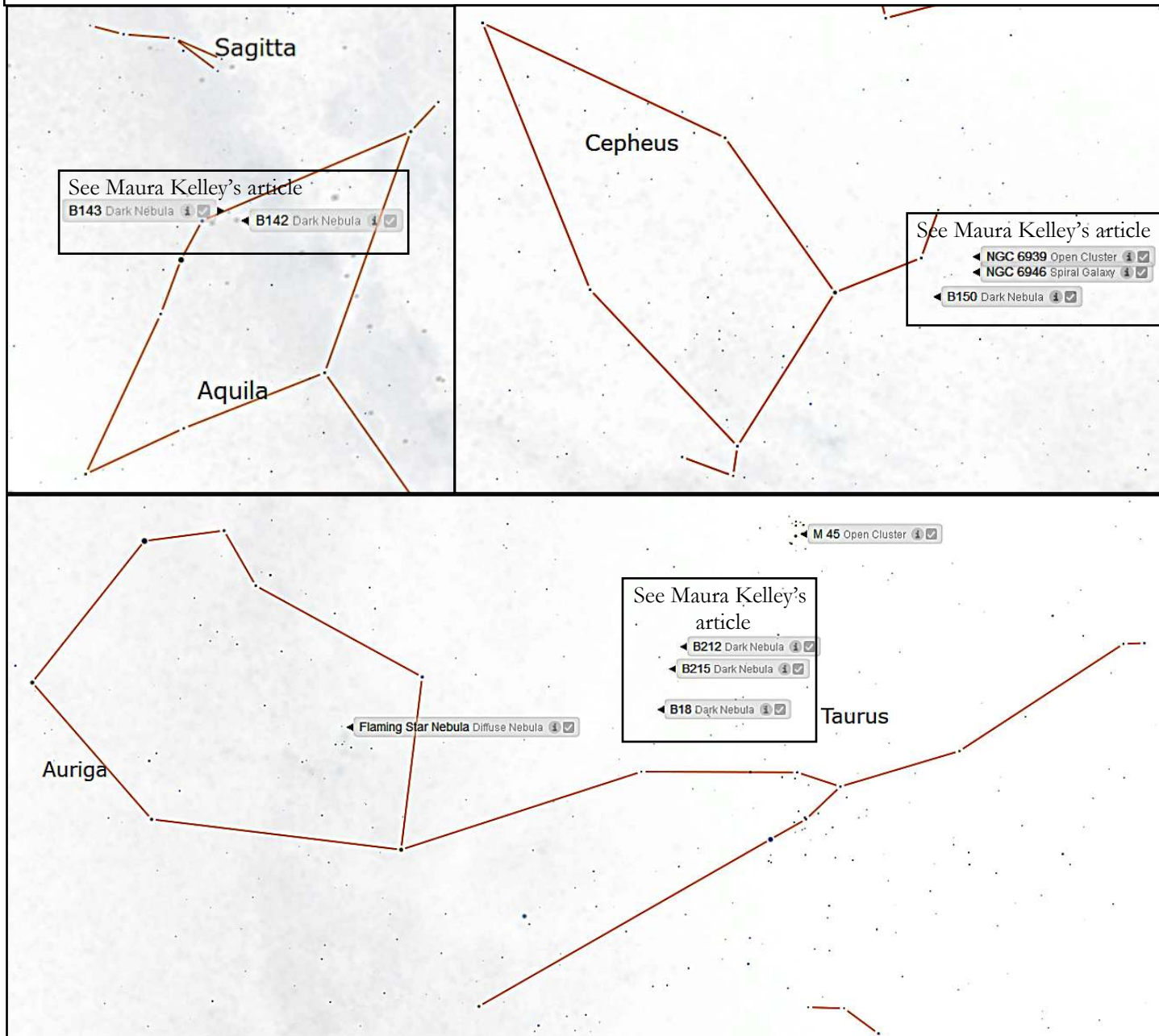
Jupiter, the Great Red Spot and

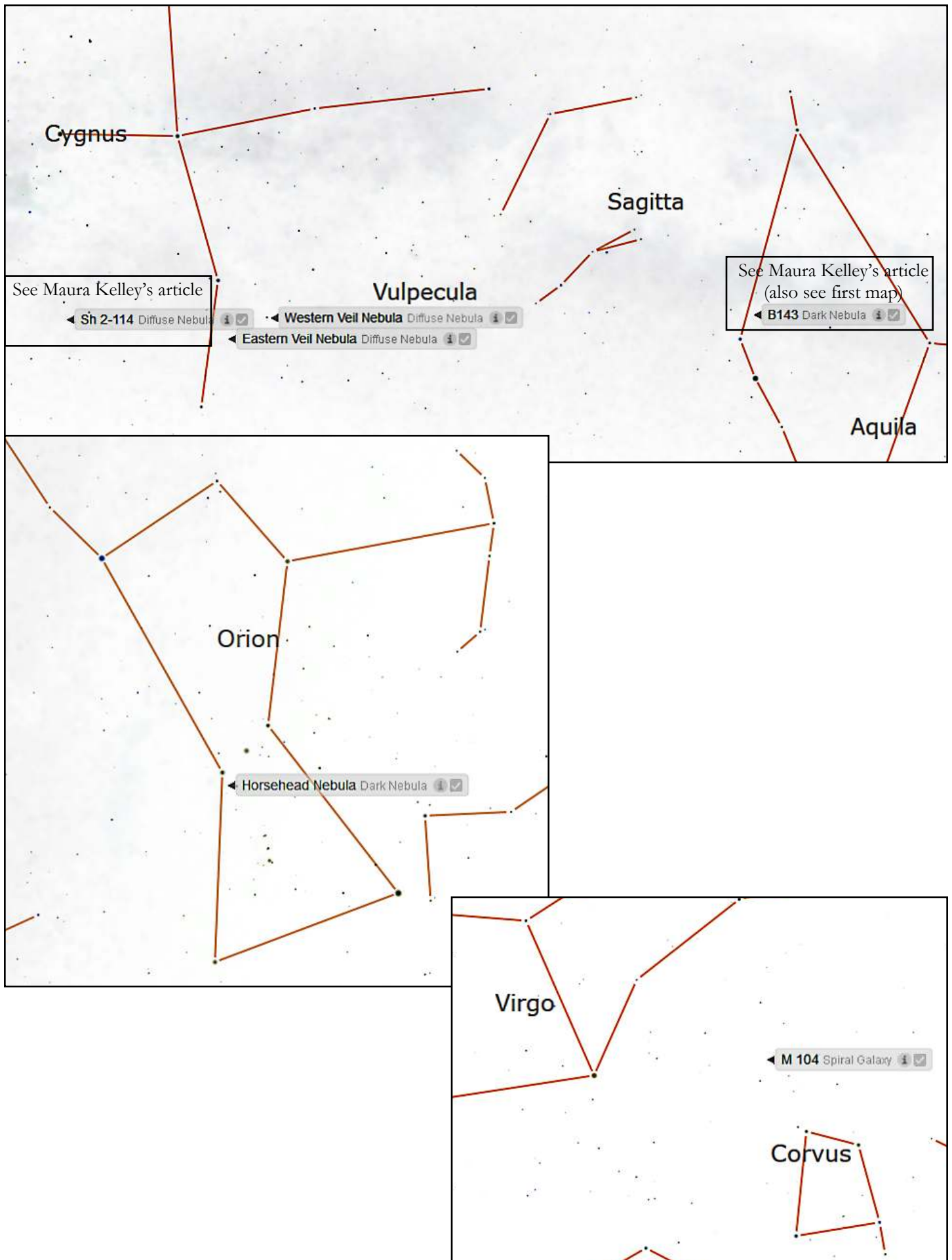
By Terri Zittritsch

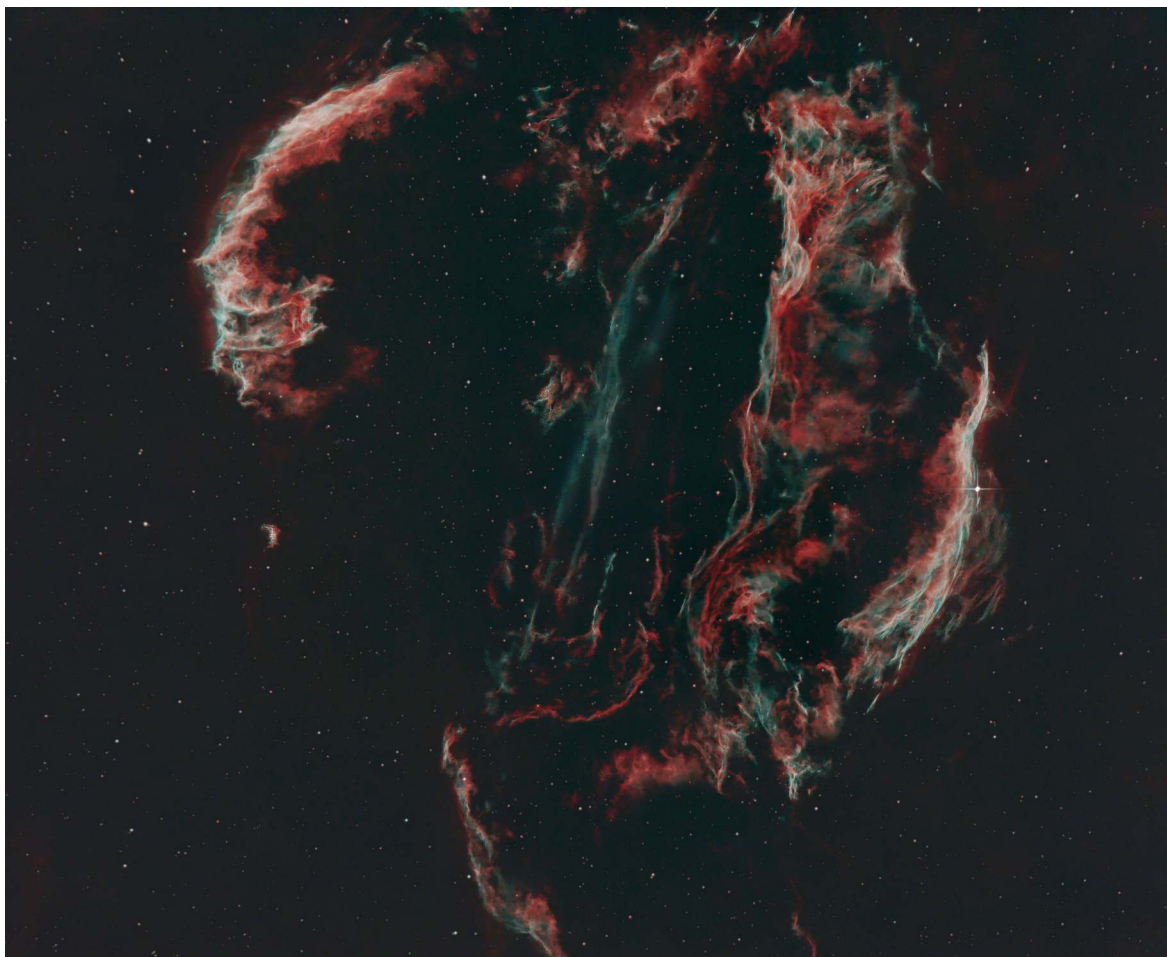
Another capture of Jupiter from the morning of December 10th. A pretty nice night of decent seeing. Taken with a 7" refractor at ~F/20. I was using a 2X Barlow with ADC just about nulled out and an ASI224MC camera. I was using 5ms exposures for this.

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

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







The Veil Nebula

By Greg Erianne

This is a wide field image of the entire Veil Nebula (the Cygnus Loop) including: The Eastern Veil (NGC 6995) at left, The Southeastern Knot at lower left, Pickering's Triangle at top right, and the Western Veil (NGC 6960; Witch's Broom; Filamentary Nebula) at middle right. There are numerous other structures present as well.

I wanted to try out a new 0.8x reducer/flattener, but I see a few oval stars at the corners, especially. I'm not sure if this was due to the reducer/flattener or if it was the wind, which was whipping around pretty good last night (10/22/22) (Guiding error was a little higher than usual as well; between 1-2"). I'll have to try it out again on a calm night.

Unfortunately, I inadvertently had 2x2 binning selected in my exposure options so the image appears a little softer than it might otherwise. I can still make out some detail, though, so not a total loss. And yet another lesson learned: check binning before imaging!

Technical Details:

AT60ED w/ 0.8x reducer/flattener (288mm fL)

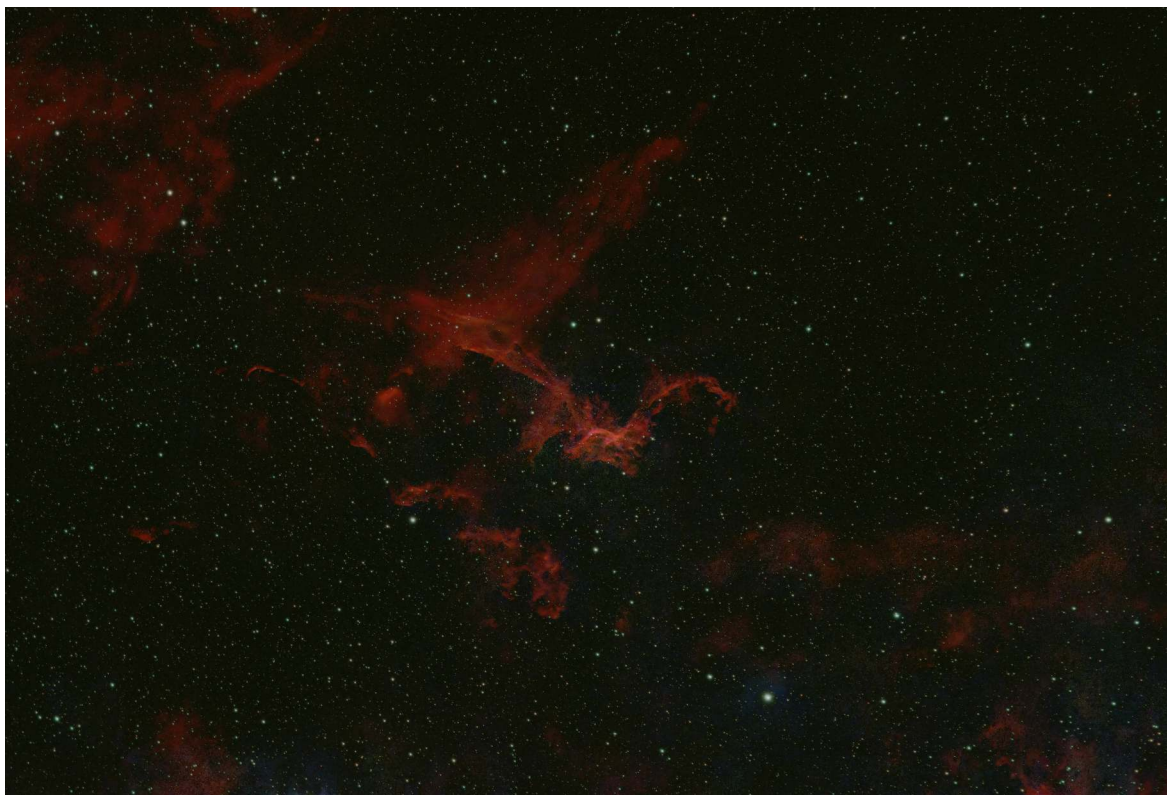
ASI2600MC Pro (OSC camera) -- 2x2 binning (not intentional!)

SkyGuider Pro with guiding via ASIAir Plus using an ASI120mm mini and a 30mm F4 guide scope

Antlia ALP-T Ha/OIII dual narrowband filter

180s x 79 [Total Exposure 3:57]; with dark, flat, and dark-flat frames

Pre-processed in PixInsight and post-processed in Photoshop



The Flying Dragon Nebula By Greg Erianne

The Flying Dragon nebula (Sh2-114) is a very faint nebula located in the constellation Cygnus. It is very filamentous, not well-studied, and has a few nearby structures such as Sh2-113 (cloud below the Dragon's right wingtip assuming it's flying toward us). However, the descriptions that I could find of surrounding structures and some of the galaxies around were very, well, nebulous! So, I won't try to identify anything else other than the obvious Sh2-114 Nebula. Apparently, its distance from us isn't even published (yet).

Since this is such a dim target, this was a challenge I set for myself with my new mount with Go-to capability (yahooooee!) and automated meridian flips! Nirvana. Amazingly, the second set of images were captured with a 79% illuminated moon, which was out all night. Gotta love those narrowband filters!

I might be able to capture some more detail with more integration time, but I'm not sure if the diminishing returns are worth the time taken away from other more interesting and colorful targets. I looked at Sara Wager's site and she had over 42 HOURS of integration time on this target! Yikes. Don't know if I want to spend that much time on one target.

Anyway, I thought the image was decent and was happy I was able to see anything!

Technical Details:

AT60ED (360 mm f.l.)

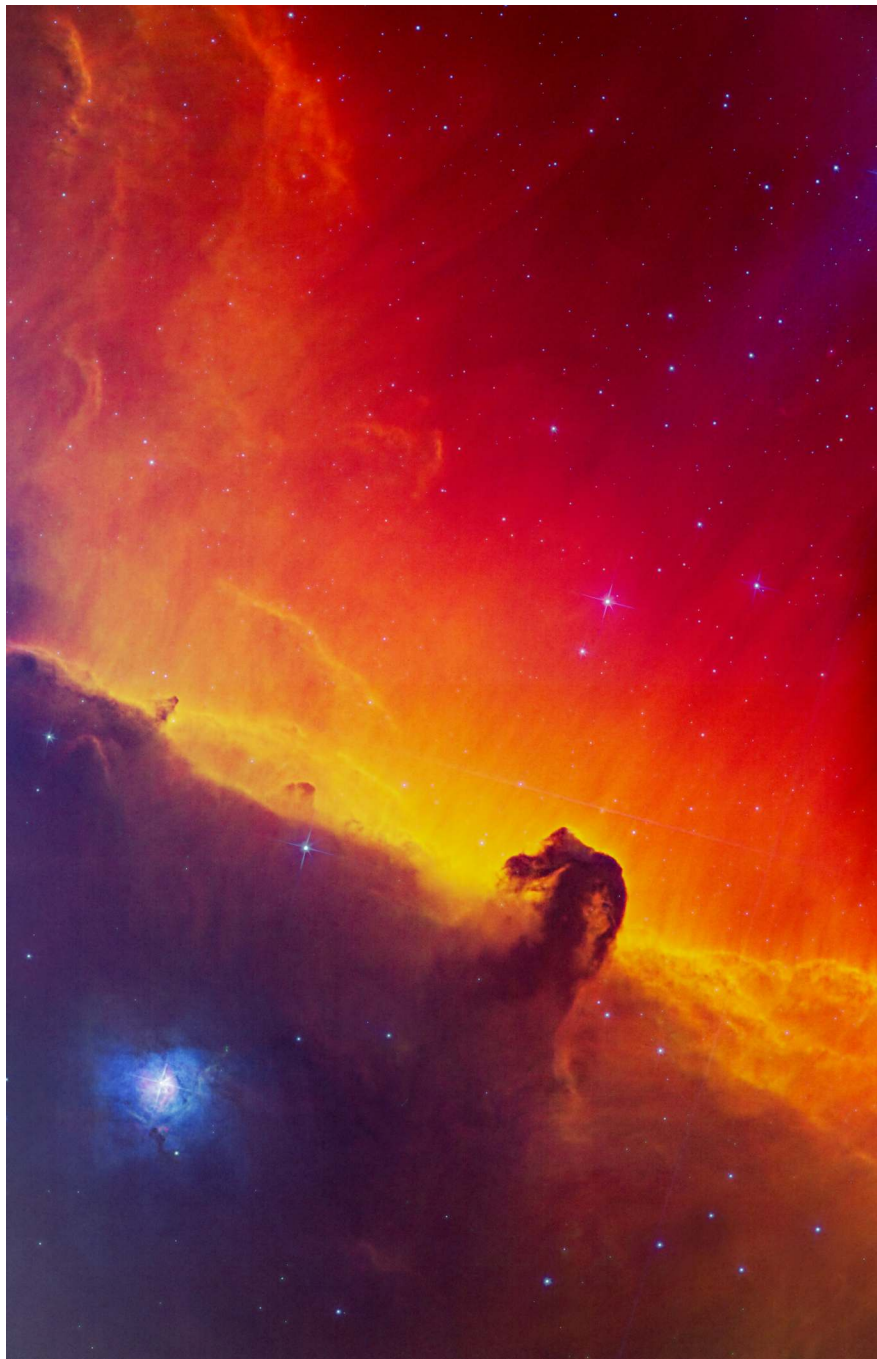
ASI2600MC Pro (OSC camera)

ZWO AM5 harmonic mount with guiding via ASIAir Plus using an ASI120mm mini and a 30mm F/4 guide scope

Antlia ALP-T Ha/OIII dual narrowband filter

300s x 80 [Total Exposure about 6 hrs 40 min over two nights]; with dark, flat, and flat dark frames

Pre-processed in PixInsight and post-processed in Photoshop



The Horsehead Nebula
By Richard Whitehead

1300 Light years away we see the very familiar shape of the Horse Head nebula, situated in Orion close to its belt, this region of dust, obscuring proto-stars rears its head. Although it's huge, it's entire contents only equates to 250 solar masses.

One of the most popular astrophotography targets, here's a slightly different take. This is a narrowband image processed in HSO palette, where Hydrogen =Red, Sulfur (shown here as mainly yellow) and blue is Oxygen. The filters have a very narrow bandwidth, only 3nm wide requiring long exposures. There is 26.5 hours of data used here, taken as 53 x 30min sub exposures.

This is my first image from my new Camera (QHY600) and no flats or darks were used (because I haven't taken them yet ??). Also interesting is that all data was gathered around the time of the Full Moon, and I found that the Hydrogen and Sulfur filters work very well, oxygen , less so with some moonlight seeping in, as well as just out of frame light from nearby stars such as Alnitak. This has caused a slight purple hue in part of the image, but WTF I kind of like it! So I've left this in , but I will certainly shoot the OIII again. The other interesting fact is that depending on frame rotation and exact framing , one can very much mitigate the troublesome effects of nearby Alnitak.

Tech Stuff

Location : Animas , NM

Scope : Planewave CDK14

Mount: Planewave L-350

Camera : QHY 600

53 x 30 min subs divided among Ha, SII, OIII Chroma 3nm Filters

Processed in PI, PS, touch of BlurXT



The Pleiades Star Cluster
By Richard Whitehead

The Pleiades or M45, take two ! I posted about a week ago a preliminary image with just 8 subs, since then I managed to capture 33 frames and used a completely different process which I think make the stars much more natural looking. I learned a lot from people all over the world about this wonderful naked eye object who made comments on my image. Its an asterism important to almost every civilization. Perhaps the one that I enjoyed most was the Maori name - Matariki.

I hope you like it !

The Pleiades, the seven sisters, Subaru, M45, whatever you want to call them, this famous asterism is a beauty, and its at the zenith in the northern hemisphere so a great time to shoot it. The nebulosity around the main stars is because they are really passing through dust clouds in our galaxy.

I've finally got my backyard rig working and this was a test shot to see how it performed. I'm going to shoot some more data when there is another clear moonless night, but I'm quite impressed with what 8 subs pulled out, I didn't even add any darks or flats.

Extra bonus points if you can spot the two tiny background galaxies in this shot.

Tech stuff

Location: Hinesburg, VT
 Scope : Takahashi FSQ 106 EDX4
 Mount : AP 1100GTOAE
 Camera : ZWO 6200 MC Pro
 33 x 10 min subs OSC
 Processed in Pixinsight and PS



The Flaming Star Nebula (IC 405)

By Ata Anzali

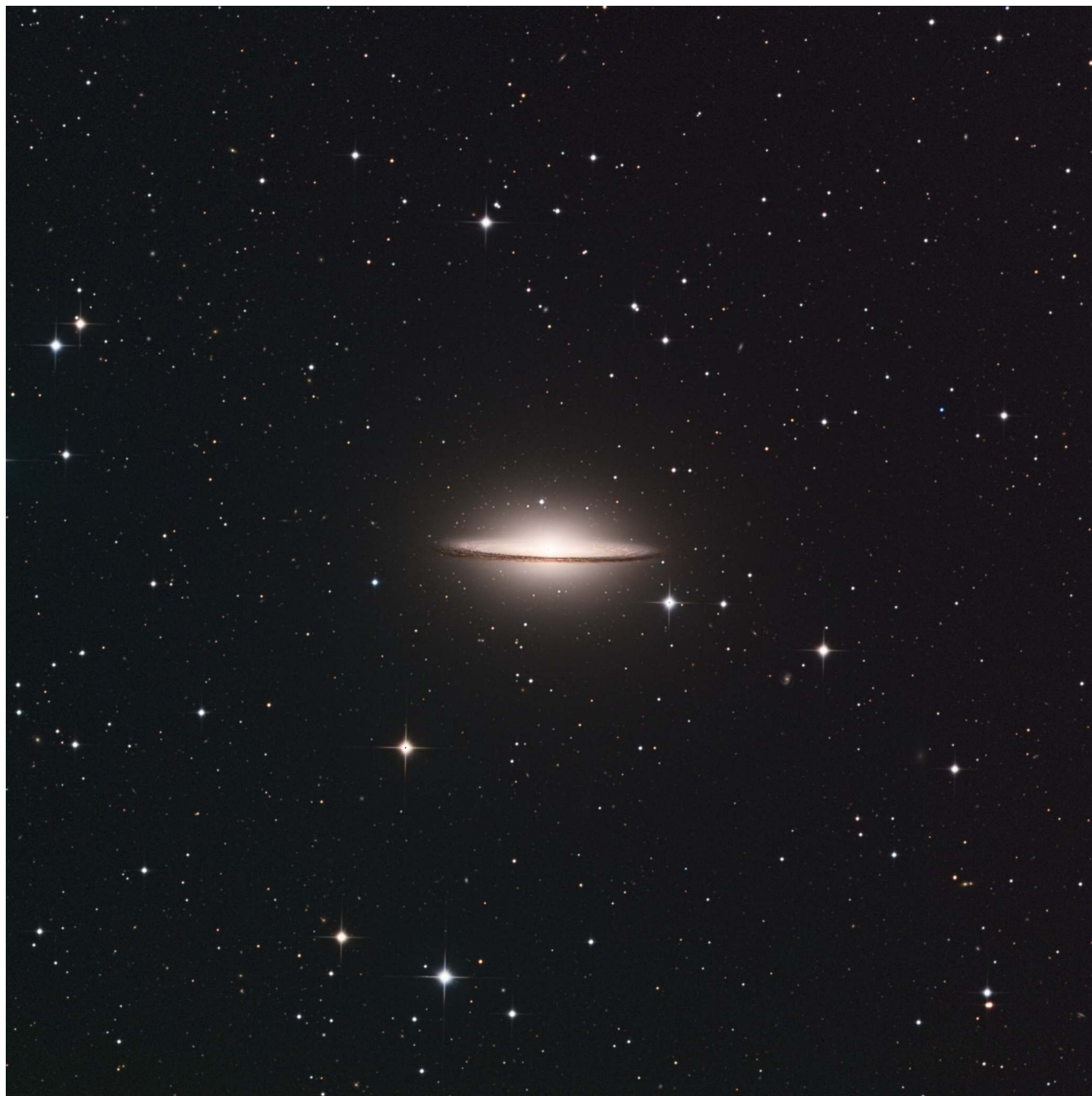
Shot over multiple nights spread over a month from my own backyard (bortle 4.5).
15+ hours of integration calibrated with dark, flat and bias frames.

Hardware:

Main scope: EON 110mm refractor
Mount: Skywatcher EQ6R-Pro
Main Camera: Canon T3i
Filter: Astronomik Clip-in CCD 12nm H-alpha
Guidescope: Astromania 60mm
Guidecamera: ZWO ASI120mm

Software:

PHD2 for guiding
AstroPhotographyTool for managing the sessions
AstroPixelProcessor for processing
PS and Lightroom for Post-processing



M104 - Sombrero Galaxy

By Terri Zittritsch

Here's one I've been sitting on for a while. This is from remote telescope data from the Telescope Live network. The data is in LRGB, processed in Pixinsight and Photoshop. I used non-calibrated data so I did all of the image calibration as well. The telescope use is a 24" Planewave CDK (corrected Dall Kirkam) telescope.

If you zoom in you can see lots of detail in the dust lane and tons of background galaxies.

Space Science Roundup

NASA News

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

InSight: Silent Night

On December 21st JPL announced that InSight mission controllers at the agency's Jet Propulsion Laboratory in Southern California were unable to contact the lander after two consecutive attempts, leading them to conclude the spacecraft's solar-powered batteries are depleted. They will continue to listen for a signal from the lander but hearing from it at this point is considered unlikely. The last time InSight communicated with Earth was Dec. 15. The lander spent just over four years studying the Martian soil and monitoring seismic events. InSight detected 1,319 marsquakes, including quakes caused by meteoroid impacts, the largest of which unearthed boulder-size chunks of ice late last year. The loss of power is attributed to the predicted and inevitable accumulation of the clingy Martian dust upon the lander's twin solar panels, see Figure 1. The original planned mission duration was for two years. InSight operated on Mars for just over twice that long.

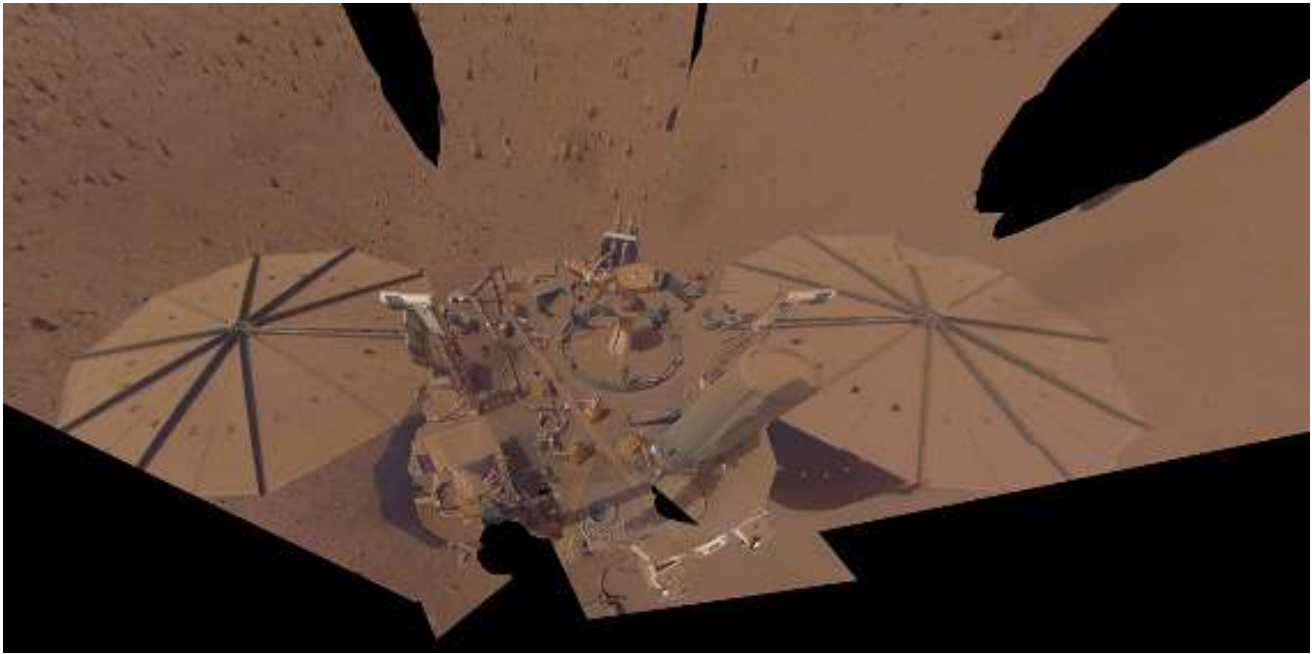


Figure 1: InSight Mars Lander Final Selfie

Webb: Ringing in the New Year

The James Webb Space Telescope continues to produce high quality imagery and spectroscopic. The mid-range infrared instrument grating wheel anomaly reported in the last newsletter has been analyzed and the telescope is back to using its full range of capabilities.

One particularly stellar observation of note is a new perspective on the binary star Wolf-Rayet 140. In Figure 2 a set of concentric rings can be seen around the pair of stars. Although they resemble rings in the image, the true geometry of those features is better described as a shell. The shells of dust are formed each time the stars reach a point in their orbit where they are closest to each other, and their stellar winds interact. The even spacing between the shells indicates that dust formation events are occurring like clockwork, once in each eight-year orbit. In this case, the 17 shells can be counted like tree rings, showing more than 130 years of dust formation.

In other Webb news, an international team of astronomers has used data from Webb to report the discovery of the earliest galaxies confirmed to date. The light from these galaxies has taken more than 13.4 billion years to reach us. That means the data collected is from a time less than 400 million years after the big bang, when the universe was only 2% of its current age.



Figure 2- Shells of cosmic dust created by the interaction of binary stars appear like tree rings around Wolf-Rayet 140. In this image, blue, green, and red were assigned to Webb's Mid-Infrared Instrument (MIRI) data at 7.7, 15, and 21 microns (F770W, F1500W, and F2100W filters, respectively). Credit: NASA, ESA, CSA, STScI, JPL-Caltech.

ARTEMIS 1: Traveling Afar

In NASA news closer to home and much more recent in time the Artemis 1 crew rated spacecraft has completed its most recent test mission to the Moon. Just short of 50 years after the last human stepped off the surface of the Moon the Artemis 1 spacecraft returned to that neighborhood in an uncrewed test of the spacecraft's ability to return humans to the Moon.

The Artemis I Orion spacecraft is currently on its way back to NASA's Kennedy Space Center in Florida. After completing a 25.5-day, 1.4-million-mile journey beyond the Moon and back, the spacecraft was recovered from the Pacific Ocean and transported to U.S. Naval Base San Diego, where engineers prepared the spacecraft for its trek by truck back to Florida. Orion is scheduled to arrive to Kennedy's Multi Payload Processing Facility by the end of the year.

The next ARTEMIS mission, scheduled for May 2024, will carry a crew and perform a Lunar flyby. This is planned to be the first crewed spacecraft to travel beyond low Earth orbit since Apollo 17 in 1972.

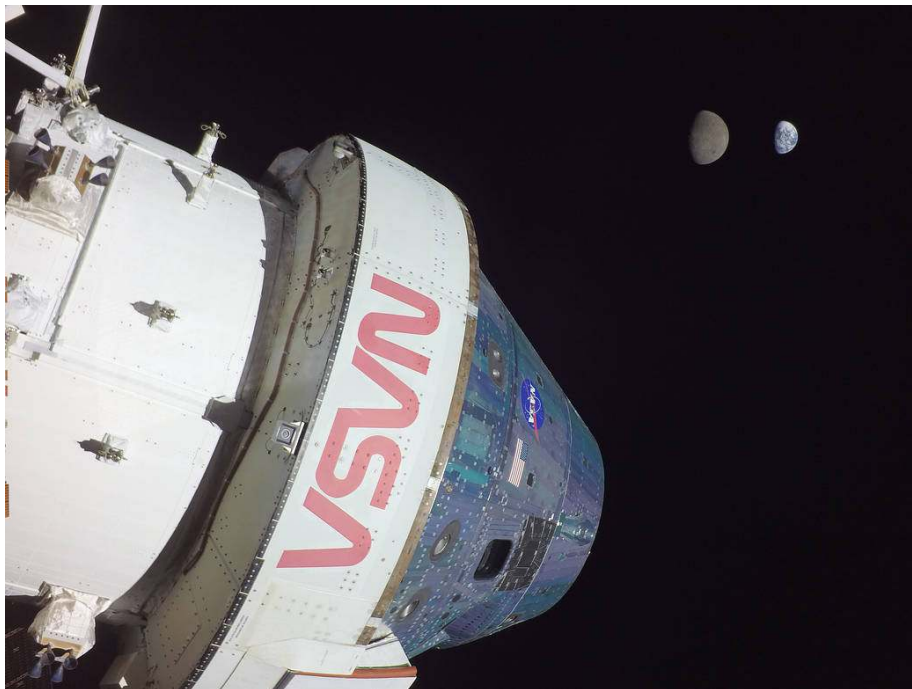


Figure 3- ARTEMIS 1 Spacecraft captures a selfie from its Lunar Orbit with the Moon and Earth aligned in the background

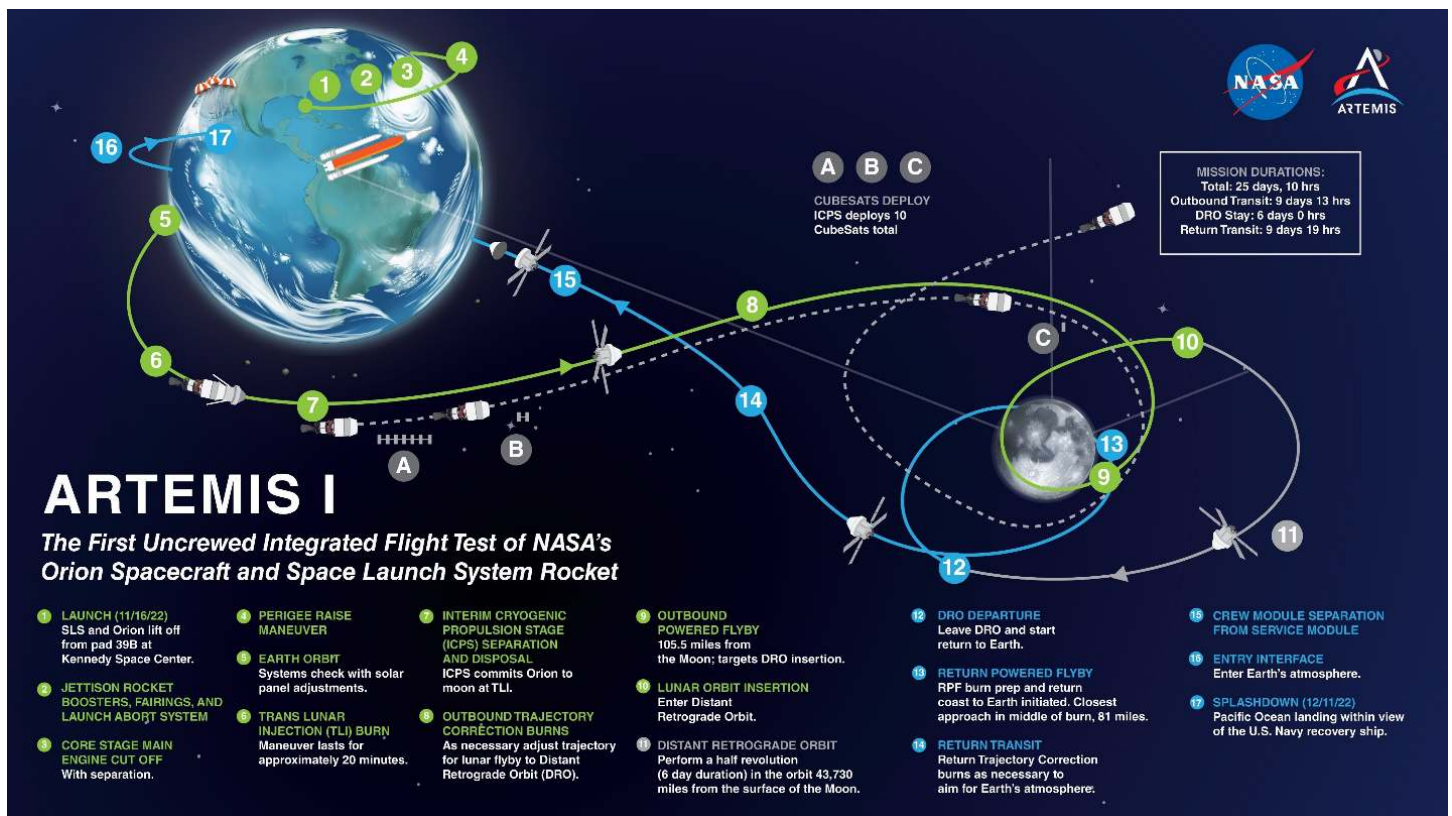


Figure 4- Diagram of the completed ARTEMIS I Mission Flight plan

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/>

<https://www.nasa.gov/artemis-1>

<https://www.nasa.gov/insight>

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.

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 have mini milling machine and a mini lathe.

Paul Walker 802-388-4220 or 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

Complete astro observatory with 8-ft Exploradome. Equipped with Meade 14-inch Advanced Coma Free SCT and accessories including heavy-duty polar-alignment wedge, heavy duty tripod, autoguider, dew shield, and other accessories. Over \$11K invested, asking \$5K.

Al Boudreau at astromanvt@gmavt.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 or see Jack St. Louis at any monthly meeting.

Celestron Evolution 9.25" complete set up for sale. Pictures are available.

The time has come for this lovely instrument to find a new home. I am increasingly imaging with my newly acquired EdghHD8 these days and this scope does not really see much use so I can't justify keeping it.

This scope is five years old. I bought it from the original owner locally three years ago in like new condition (the guy had bought the scope on a whim and did not use it more than 4-5 times). It is in very good shape. Everything functions as it is supposed to. The internal battery can support the mount as long as you want (I never found out how many hours because I never had to).

The hand-controller works and the wi-fi connection is also fully functional. There are signs of use on the tripod and some specs of dust on the corrector plate but the general condition is very good - I have taken good care of this. The scope holds collimation very well and it is a joy to look through and work with. The 3-star alignment process has always worked like a breeze. I used this scope for visual mostly with 2" eyepieces and I am **willing include my GSO 2" diagonal in the sale (\$120 value if bought new) and a dew shield that i bought later (\$55 value if bought new)**. Everything that came with the original scope will be included in the sale (with the exception of the hard copy manual but you can find the digital copy on Celestron's website).

I prefer local sale and I am willing to drive some distance to meet the buyer but I am also open to shipping (I have all the original boxes from Celestron).

If sold locally, I am happy to depart with this for \$1650. This represents 40% discount over the current new price.

Contact Ata at aanzali@middlebury.edu

Celestron NexGuide Autoguider

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 autoguider, does not use a computer, connects directly to your mount's autoguider 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



6" F/8 Newtonian, homemade by C.J. Park, won Stellafane award in 2006, gold-coated primary mirror, **alt-az & equatorial mount.**
\$200.00 minimum

For sale by the VAS.
Jack St. Lois 802-857-5049 or
jack.st.louis@comcast.net

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

Orion Parallelogram/Oberwerk Tripod/Head (for sale as a set only)

Orion parallelogram-style mount is for binoculars as large as 80mm in aperture. Constructed of aluminum, the mount features a sliding counterweight for perfect balance and an L-adapter for attaching virtually any tripod-adaptable binocular. For more details see Orion website, Telescopes.com.

Oberwerk 3000 Series tripod/head (works with above parallelogram) combo for binocular astronomy. Maximum height (78")- Tripod construction is black-anodized aluminum, the pan head is cast aluminum. Also included is a padded carrying case. For more details got to Oberwerk.com.

All in excellent, near-new condition. Purchased earlier this year and have now moved to other gear. Will meet for delivery in Chittenden or Franklin counties.

(for sale as a set only) \$200 (New Price)

Text Russ Lavigne at 802-343-7356 with "Orion/Oberwerk" as Subject."

Celestron alt-az tripod for sale by the VAS. **Make an offer.**



Jack St. Lois 802-857-5049 or
jack.st.louis@comcast.net