



Event Horizon



Volume 30, Number 4
February 2023



From The Editor

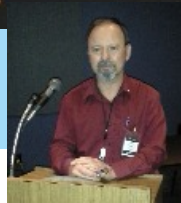
Welcome to the February 2023 Event Horizon Newsletter!

And thank you to those who contributed images and articles this month.

Clear Skies!

*Bob Christmas,
Editor*

*editor 'AT'
amateurastronomy.org*



Chair's Report by Bernie Venasse

I would like to begin this month thanking Sue McLaughlin and company for filling in as Chair at our council meeting and then again as chair at our regular meeting in January. A great thanks to John Gauvreau for stepping into the speaker position when I could not attend in person.

We still have some 2023 calendars available. They will be offered at a reduced price of \$10.00 each. Get them quickly.

Our spring Scope Clinic is scheduled to be held at the McMaster Innovation Park facility on Saturday, February 18th, 2023. Doors are open to the public and members from 2:00 to 4:00 PM. Admission is free but as always, we are happy to accept donations for the food bank. Make this event part of your Family Day Weekend!

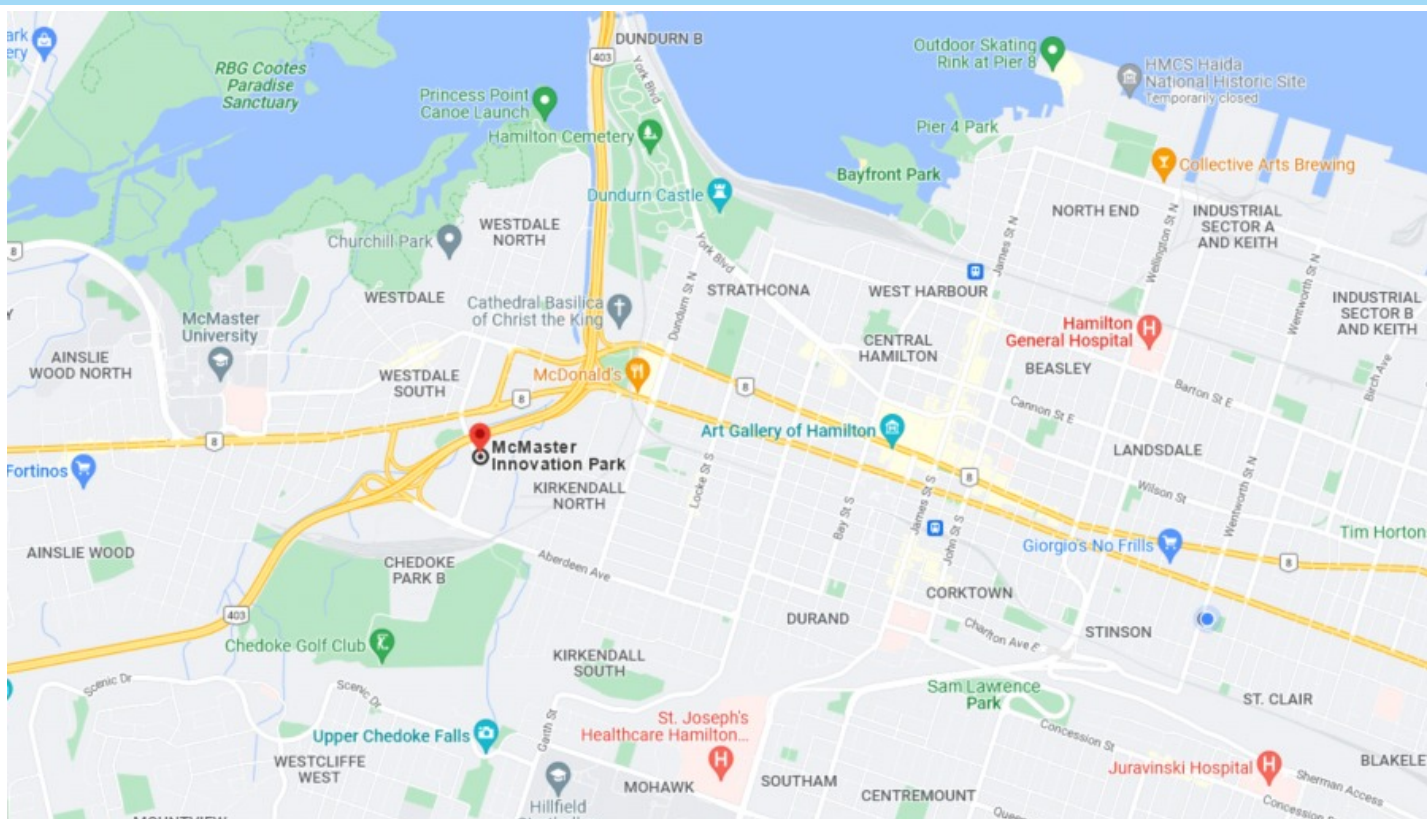
A BIG Thank You to Chris Strejch who handles the on-site media controls and to Sue MacLachlin for moderating the ZOOM aspect of our meetings. Yes, we are still working on getting the audio systems working better... please bear with us!
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Chair's Report (continued)



Our Next Meeting is scheduled for February 10th, 2023, at McMaster Innovation Park. MIP is located at 175 Longwood Rd. S. in Hamilton. This will be a hybrid meeting combining a live audience with a Zoom presence. Doors open at 7:00 and the meeting begins promptly at 7:30.

Inreach and Outreach events

Upcoming Observing Events:

Friday, March 17, 2023	Binbrook Conservation Area	Membership Observing Session
Saturday, March 25, 2023	Grimsby Welcome Centre	Outreach

Membership growth... new members list... Welcome!!

We would like to take this opportunity to welcome new/returning members (Dec 29 -Jan 28).

B. Lynn Jones, London. Individual membership. Rejoined.

Randy Crispo, Ancaster. Family membership.

Bob Zariczniak, Hamilton. Individual membership.

Cecilia Ingram, Hamilton. Individual membership

Current membership:	73 Individual memberships	= 73
	43 Family memberships (x2)	= 86
	1 Honorary membership	= 1
	117 memberships	160

<https://www.amateurastronomy.org/membership/>

Masthead Photo: *The Crab Nebula (M1)*, by Pavle Culum.

Taken through a Sky-Watcher 190MN scope on an EQ6-r mount with an ASI533MC camera. 22 x 240 seconds; 88 minutes total exposure time, with an Antlia ALP-T filter.

HAA Helps Hamilton

The H.A.A. is once again accepting and collecting donations from our members and guests for local food banks at our general meetings.

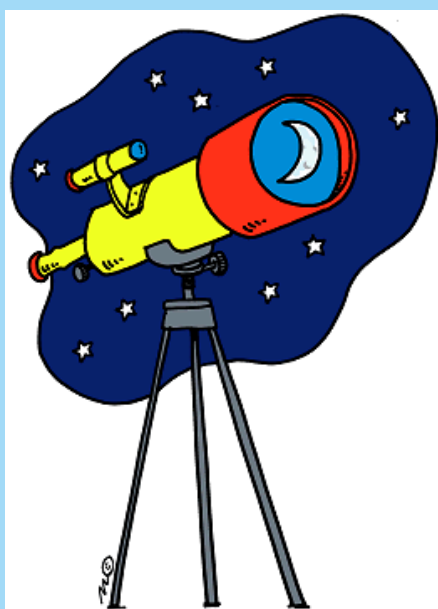


The H.A.A. has always valued its relationships with food banks in the community, particularly [Hamilton Food Share](#).

If you can't make an in-person meeting, you can make a donation directly to your local food bank.

HAA's Loaner Scope Program

We at the HAA are proud of our Loaner Scope Program. It allows members who don't own a telescope to get more up close with the night sky, and it allows members to explore different types of telescopes! Paid members are welcome to borrow a telescope for one month.



We have telescopes of varying expertise levels, a MallinCam, a spotter scope and various eyepieces.

Please visit the HAA website for more information!

If you are interested in borrowing a scope, please contact Paula Owen at loanerscope@amateurastronomy.org.

Telescopes are loaned out on a first come basis.

Astro 101

Don't know a black hole from a white dwarf? How about a planet from a planetary nebula? Wondering which end of the telescope to look through? Wondering which end is even supposed to point at the sky? Then Astro 101 is for you!

Astro 101 is a series of casual, online sessions aimed at the absolute beginner, who might be new to the club or new to the hobby.

Every year we host Astro 101 where we talk about things like how to use a telescope, what is in the sky to look at and how to find them. The sessions are interactive and casual. This means that although an experienced club member will lead each session, everyone is encouraged to participate, ask questions, offer input and just talk! And a joke is welcome (always)! This is a great way to get to know the hobby and your fellow club members.

We hope to start around the end of January or beginning of February and we get together online about once every two weeks. We will have enough sessions to get us through to late spring, and then we hope to finish with an observing session!

If this sounds like something you would like to participate in just get in touch (email astro101@mateurastronomy.org) and we will put you on the list. Then you will get emails with links to the online sessions.

Please feel free to get in touch if you have any questions or suggestions (yes, if there is a topic you want to talk about just let me know and we will do our best).

Hope to see you there.

– John Gauvreau astro101@mateurastronomy.org

HAA Outreach Presentations with Vulnerable Sectors

The HAA executive has created a policy for any HAA member who wishes to do outreach presentations to vulnerable sectors, which includes children under 18 years of age and vulnerable adults. This does not include our general club outreach activities.

Presentations include in-person or virtual sessions where parents/guardians may not be present. **As it is not always possible to anticipate caregiver attendance at outreach activities for children under the age of 18, or vulnerable adults, it is therefore a requirement for HAA member-volunteers who work with these vulnerable populations to complete a Police Vulnerable Sector Check.**

These can be obtained only in your region of residency. Costs vary from one area to another. They will be kept on file by the HAA Education Director. No details regarding the findings of the check will be made in any way public or viewed beyond the HAA Education Director.

The HAA will reimburse any member who wishes to do outreach presentations to vulnerable individuals, provided a receipt is submitted.

Please contact Jo Ann Salci if you have any questions about this policy and/or if you wish to put your name forward to help with outreach activities to young people! This policy is effective immediately.



...A column for young astronomers - and those young at heart!

Last month we explored Jupiter...this month we are going to explore Jupiter's moons! Let's go!

Jupiter's got ~~13~~ ~~79~~ 80 Moons!

Well, when I was in high school in 1977, Jupiter only had 13 known moons. And when I first began writing this article, Jupiter had 79 moons! Now it has 80! How can that be? Jupiter actually has 57 confirmed moons and 23 provisional moons as of January 26th, 2023. Provisional moons are moons that need to be confirmed by additional observations, and once confirmed they get a name and become a confirmed moon. Most of Jupiter's moons are small, leftover chunks from the beginning of the Solar System... similar to the asteroids we explored in the December 2022 HAA Explorer's article.

So even though some of Jupiter's moons are still being confirmed in 2023, there are four that have been seen since the year 1610 AD! That's when Galileo, with his new telescope first saw them! There are even some reports of people seeing these moons with their eyes 2,000 years before that. These four Galilean moons were named: Io, Europa, Ganymede and Callisto, in order of their distance from Jupiter. They can be seen with binoculars! Let's explore!

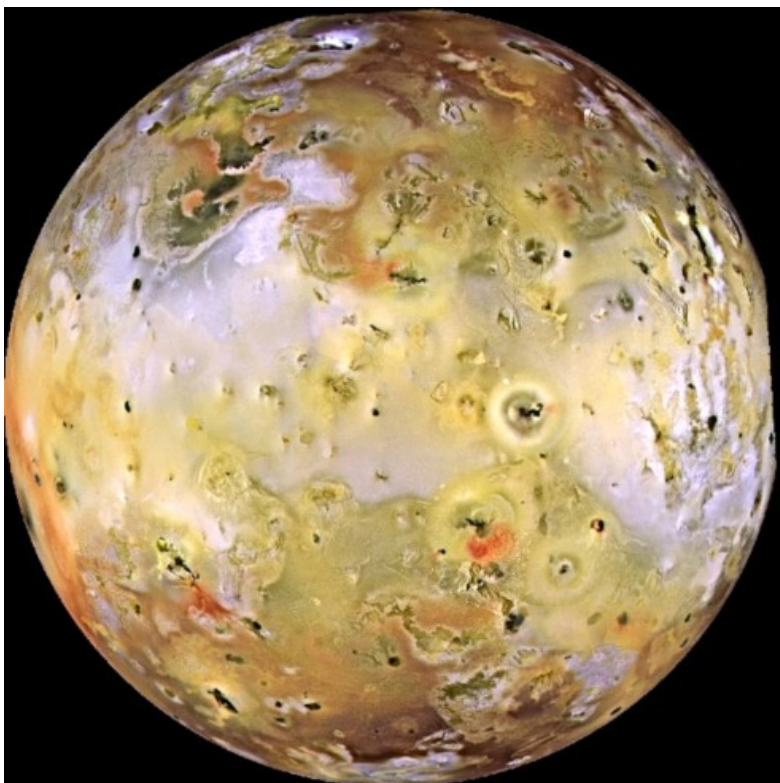


Image of Io

Image Credit: Captured by NASA's Galileo spacecraft. NASA/JPL/University of Arizona

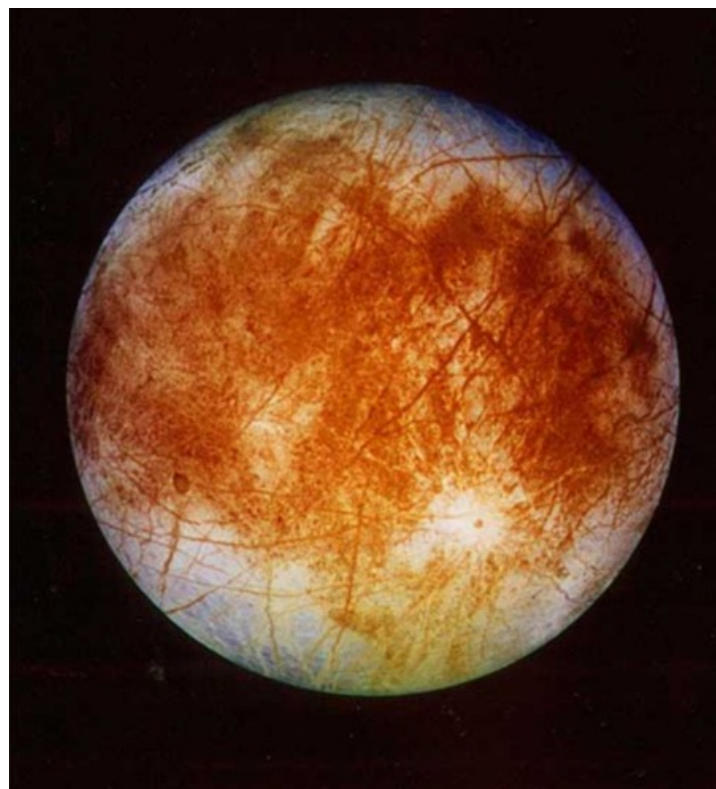


Image of Europa

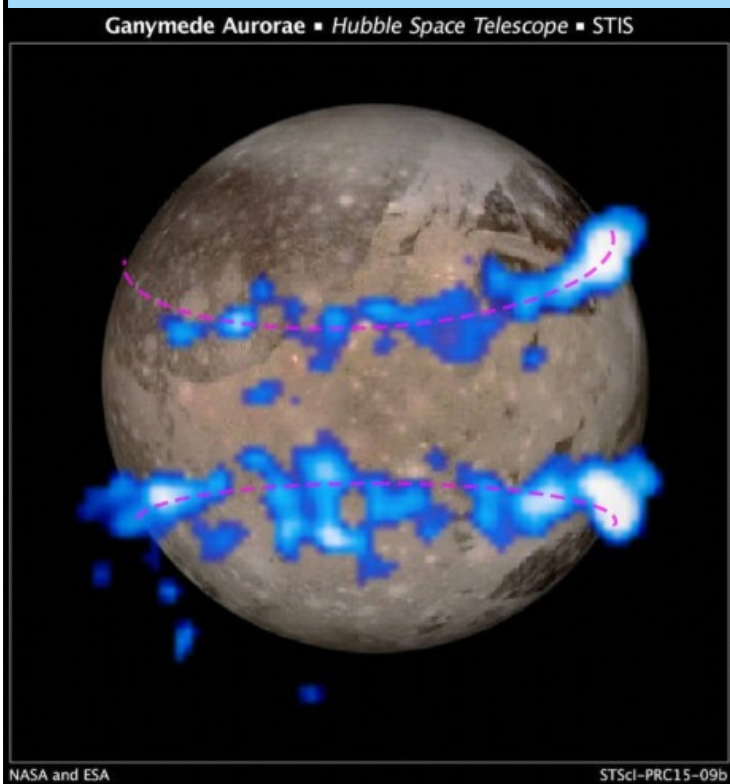
Image Credit: Taken by the Galileo Orbiter spacecraft in 1998. Credit: Galileo Project/JPL/NASA

The moon *Io* (pronounced eye-o) looks a lot like a pizza! *Io*'s closeness to Jupiter is part of the reason. Jupiter's size and gravity causes *Io*'s surface to bulge and its interior to heat up. This heat needs to escape somehow, and it does so in the form of volcanoes. *Io* has the most volcanic action in the entire solar system. It has a lot of volcanoes and lakes of molten lava. And because *Io* is small with a weak gravitational pull and no atmosphere, the volcanoes spray farther than volcanoes on Earth! The sulphur from these volcanoes gives *Io* its yellow-orange colour. Because *Io* is close to Jupiter, it only takes 1.8 days to orbit the planet.

Europa looks so different from *Io*! It looks like a scratched-up, dirty hockey rink. *Europa* is in fact covered with a thin shell of water ice, and its icy surface is streaked with lines. Under this solid icy crust is a warmer icy, slushy layer, and beneath that a liquid water ocean, with more water than Earth! Under the

(Continued on [page 6](#))

HAA Explorers (continued)



Ganymede and its Aurorae
Image Credit: NASA and ESA



Callisto
Image Credit: <https://solarsystem.nasa.gov/moons/jupiter-moons/callisto/overview/>

water is believed to be rocks and then a metallic core. Because of all this, it is a great place to look for signs of life! Of the four Galilean moons, Europa is the only one that is smaller than Earth's moon! Europa travels around Jupiter in 3.6 days.

Ganymede is Jupiter's biggest moon, and it's also the biggest moon in the solar system! It's even bigger than the planet Mercury. So why isn't it a planet then? Well, it's because it doesn't directly orbit the Sun. It's similar to Europa because it also has an icy crust over a slushy saltwater layer. It has a molten iron core, which means it has a magnetic field. So, it has aurorae!! Particles from Jupiter enter the magnetic field of Ganymede. Ganymede is another moon that is a good place to search for signs of life. It takes Ganymede about 7.2 days to orbit Jupiter.

Callisto has the most heavily cratered surface of any object in our solar system. It is home to the largest multi-ring crater in our solar system called the Valhalla crater. It, too, is made of rocks and ice.



Interesting sights can be seen when the shadow of any of these four moons cross the surface of Jupiter. I was able to capture a photo of this with my telescope in 2020 (left).

So the next time you see Jupiter, just imagine those 80 *or more* moons orbiting around it!

Shadow of Io on Jupiter; Io can be seen to the right of Jupiter

Image Credit: Jo Ann Salci;
July 31, 2020

(Continued on [page 7](#))

Moons, Moons and More Moons!

Y	V	U	A	N	J	U	P	I	T	E	R
L	M	Y	V	A	L	H	A	L	L	A	E
I	S	O	I	S	I	A	G	A	O	M	N
F	L	I	O	I	N	A	V	C	M	F	E
E	U	N	C	N	L	I	R	A	T	S	A
C	S	Y	R	I	I	A	V	S	E	L	R
A	H	G	L	E	T	O	N	O	A	Y	O
L	Y	E	D	E	M	Y	N	A	G	C	R
L	O	P	R	H	Z	A	O	A	R	R	U
I	R	S	V	P	C	H	P	I	A	U	A
S	E	O	U	L	I	O	E	R	V	S	I
T	M	V	O	Y	R	Z	Y	O	I	T	T
O	I	V	A	U	N	I	Z	N	T	S	N
C	I	T	E	N	G	A	M	A	Y	R	I

CALLISTO
MOON IO
GANYMEDE
EUROPA
GALILEO
JUPITER
AURORAE
ICY
PIZZA
VALHALLA
CRUST
MAGNETIC
CRATERS
VOLCANOES
LAVA
LIFE
GRAVITY
IRON
SLUSHY

Answers on page 9.

© TheWordSearch.com

Things to do until next time **:

** Check with your parents or caregivers before checking out websites.

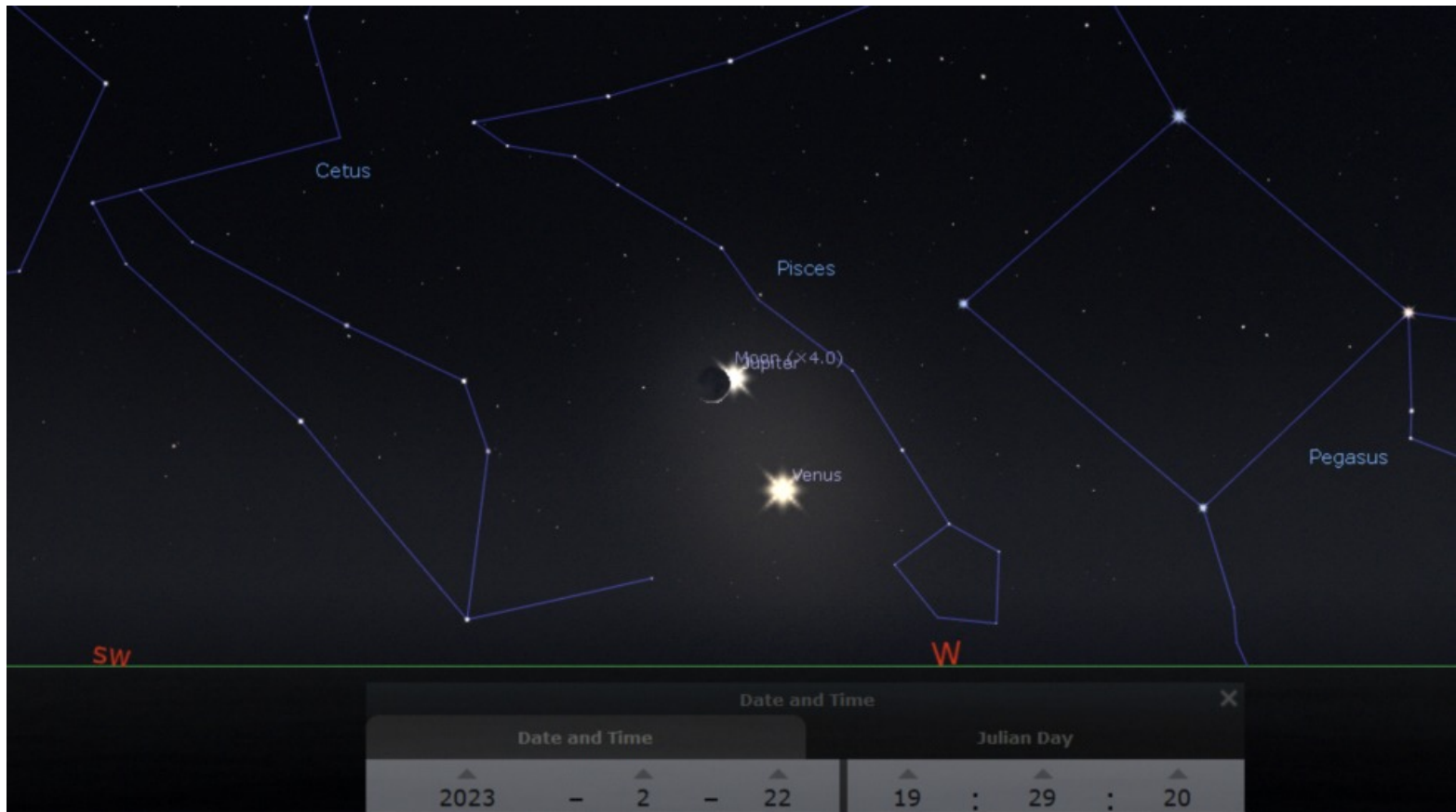
1. Visit *this website* to learn more about Io and its tides: <https://spaceplace.nasa.gov/io-tides/en/>
2. Visit *this website* to learn more about the Moons in our Solar System: <https://solarsystem.nasa.gov/moons/in-depth/>
3. Visit *this website* to learn more about Europa: <https://spaceplace.nasa.gov/europa/en/>
4. Check out this 3D model of Ganymede: <https://solarsystem.nasa.gov/resources/2385/ganymede-3d-model/>

(Continued on [page 8](#))

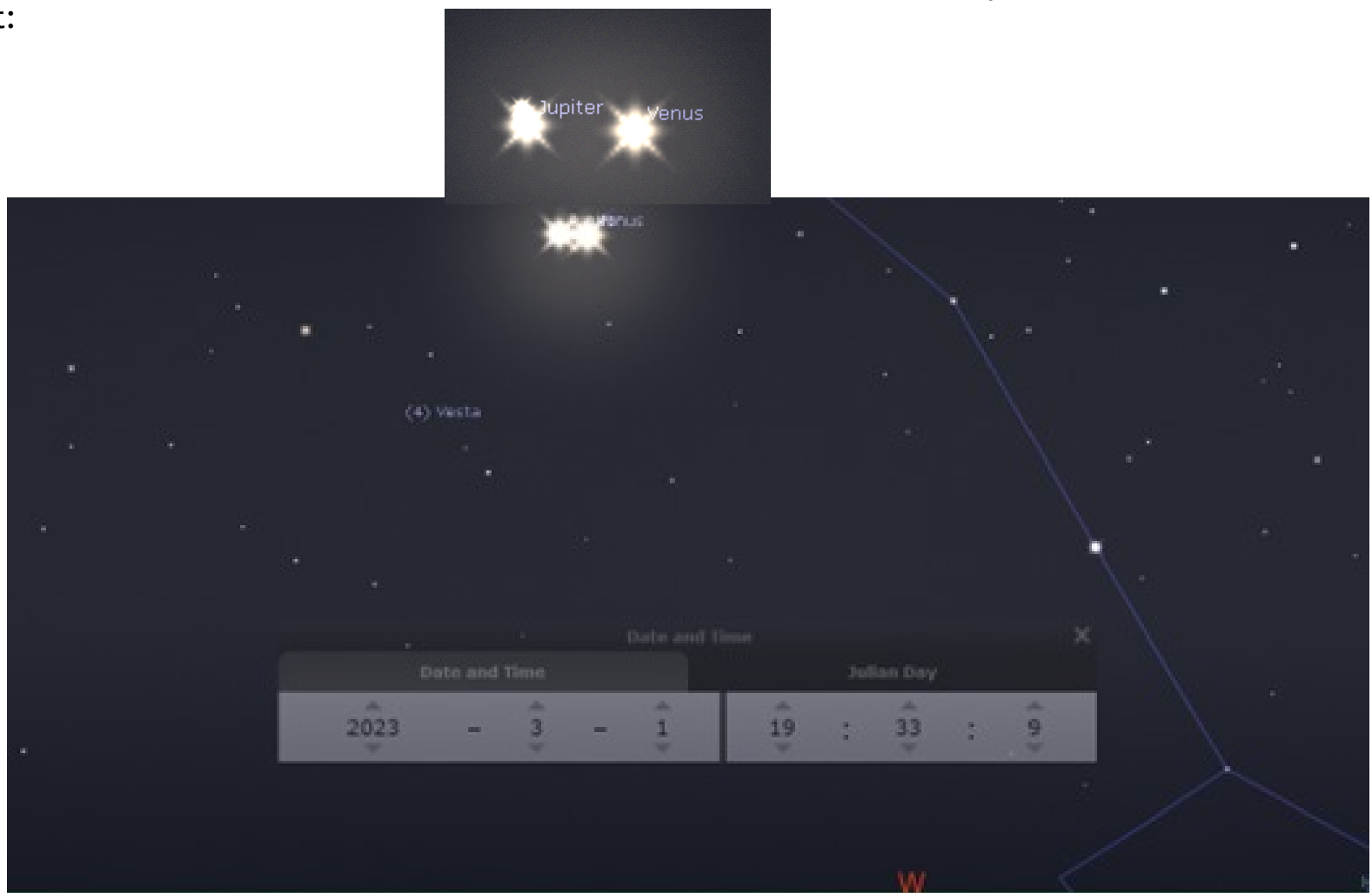
HAA Explorers (continued)

During February, check out:

1. On February 22nd around 7:30 pm, check out the thin crescent Moon near Jupiter, with Venus below in the West:



2. On March 1st around 7:30 pm, 1 week later, check out Venus and Jupiter close to each other in the West:



Images generated using Stellarium

(Continued on [page 9](#))

HAA Explorers (continued)

Finally:

What is Jupiter's favourite day of the week?

If you have a question that you would like answered in the newsletter, please send it to education@amateurastronomy.org

Answer: 😊 Moon-day

Thank you to Ro for reviewing this article! 😊

References:

The Essential Guide to Space. Paul Sutherland. 2016.

How Space Works. DK Penguin Random House. 2021.

My Book of Stars and Planets. Dr. Parshati Patel. NY: DK Penguin Random House, 2021.

National Geographic Kids: Ultimate Space Atlas, 2017.

<https://spaceplace.nasa.gov/>

Page 7 Word Search Answers:





The Sky for February 2023 by Steve Germann

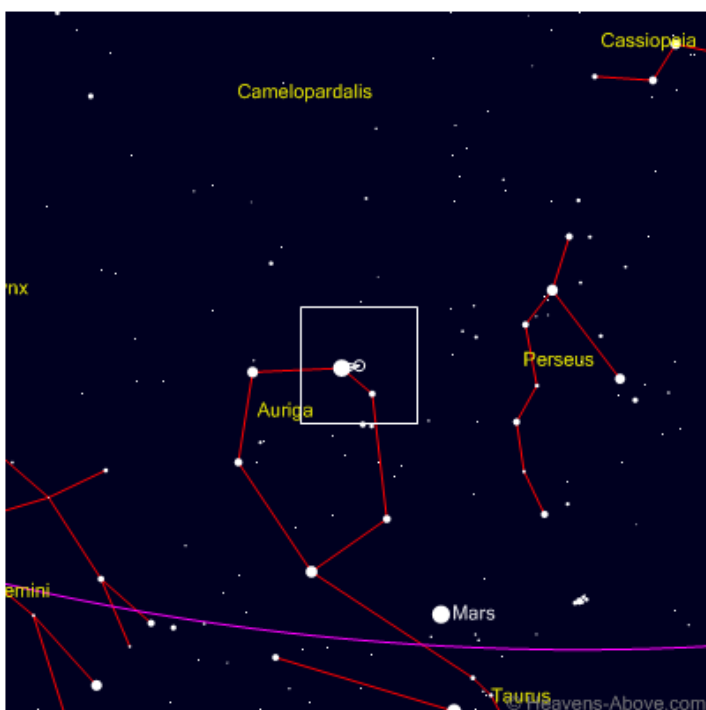
The year is now well underway, and we are seeing some of the cloudiest skies that I can remember. If you are like me, you have been thwarted by incoming clouds while looking for the great comet of January 2023. Don't give up just yet. It has only reached closest approach to Earth on February 1, and what follows is likely to be brighter than what came before, as the comet is still being warmed by the Sun.

Here is a diagram showing approximately where to look for it. If you can see the North Star and there's no clouds near, grab your binoculars for a closer look while you can! I have mine set up in the living room on a tripod to make this as quick a process as possible.

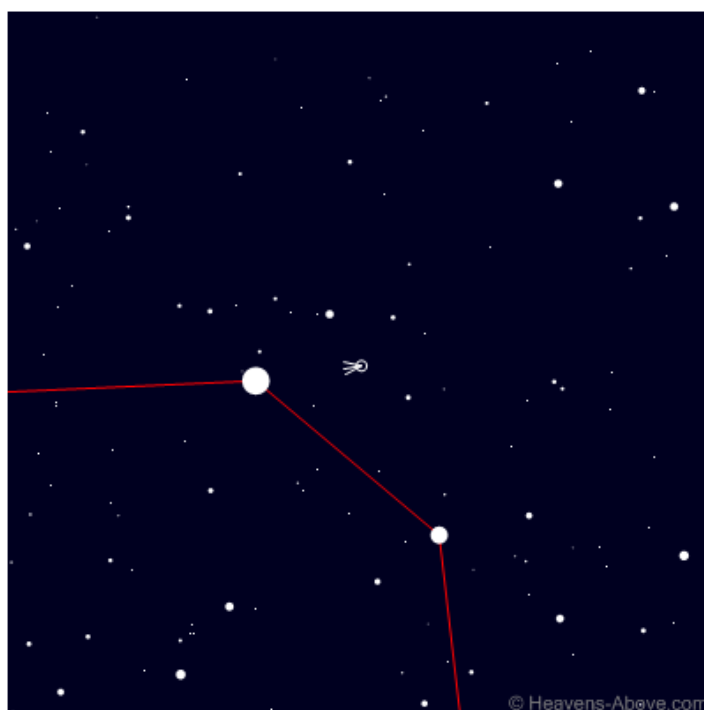
The comet will soon pass through the zenith, as it heads south. The comet is still near Polaris, but now moving a few degrees per day. By Saturday night, it will be right beside Capella in the winter hexagon (aka the winter G, more on that later).

Comet C/2022 E3 ZTF

Year Month Day Time



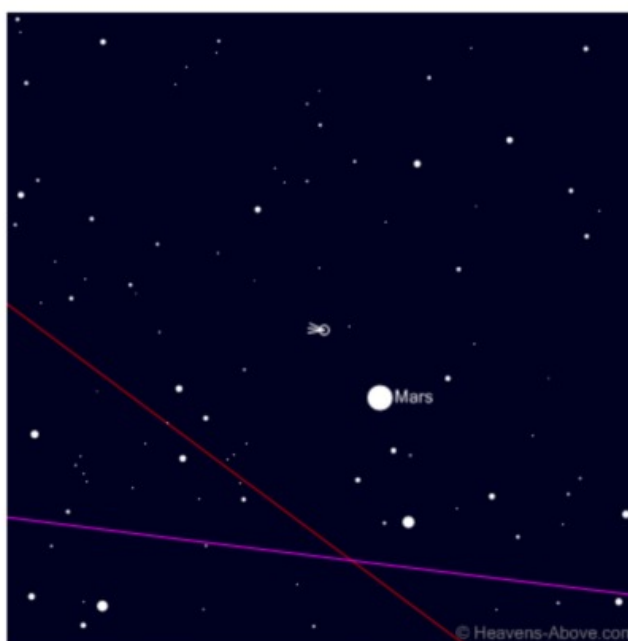
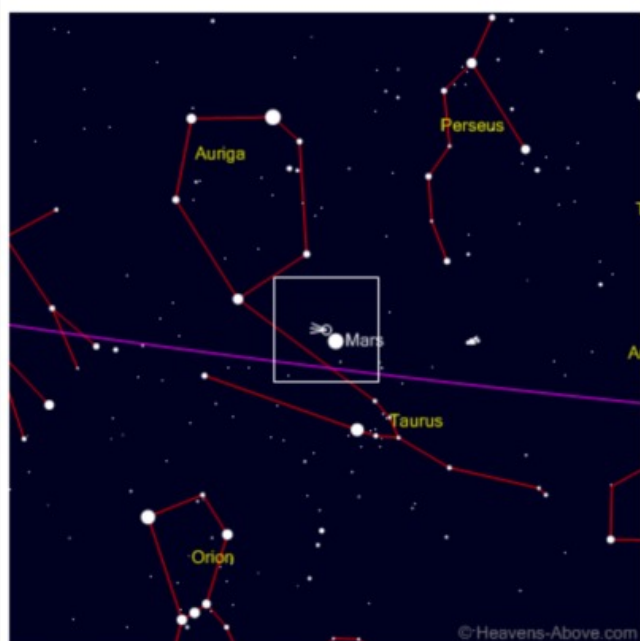
Coarse finder chart
(Field of view: 60°, Max. star mag.: 5)



Fine finder chart
(Field of view: 10°, Max. star mag.: 8)

By the time of our meeting night, on February 10th, the comet and Mars will be side by side! I will bring my binoculars on a tripod, but I recommend you try sooner.

Year Month Day Time



(Continued on [page 11](#))

The Sky for February 2023 (continued)

Please send me any sightings, and photos, which I can include at our monthly Meeting on February 10th. Those 2 I mention are great opportunities for astrophoto pairings.

The winter constellations continue to figure prominently in the evening sky.

This month, there are some notable events worth a look, and I will reveal the 'armchair astronomer' event as well.

Armchair astronomers are those who read this article then don't look up. Well, there is a cure for that, it's a combination of curiosity, fear of missing out, and eagerness to share what you have seen. For this month, our armchair event is the *Zodiacal Light*.

Did you know that the dust in the inner solar system shines with the brightness of the full moon? Fortunately for us, most of the dust is on the daytime side of Earth, or our astronomy would be in trouble.

Starting on February 7th and continuing for a full 2 weeks, (there should be at least one clear evening in that stretch...) the Zodiacal Light will be visible in the west, after evening twilight. So you will need a vantage point to the west (no tall trees) with reasonably dark skies in that direction.

First, a word about twilight.

There are a lot of ways that the Sun can light up the Earth, even when it's out of sight. The simplest is that it lights the clouds from above, and a lot of that light finds its way to Earth before being absorbed. But how about when the Sun is below the horizon? It can light up the atmosphere, which will then scatter light in all directions, and some of that will actually scatter further to the night side of the earth, and that makes twilight.

There are 3 categories of twilight. Civil, Nautical, and Astronomical Twilight, corresponding to when the top edge of the sun is 6, 12, and 18 degrees below the horizon, respectively. The math for that can be done by a computer, and the times for all locations can be easily read off from this website:

<https://www.timeanddate.com/sun/canada/hamilton>

For instance, this graphic shows a year's worth of twilight. Not on this map is moon phase which would generate a diagonal zebra stripe on the darkest parts. *(Continued on [page 12](#))*

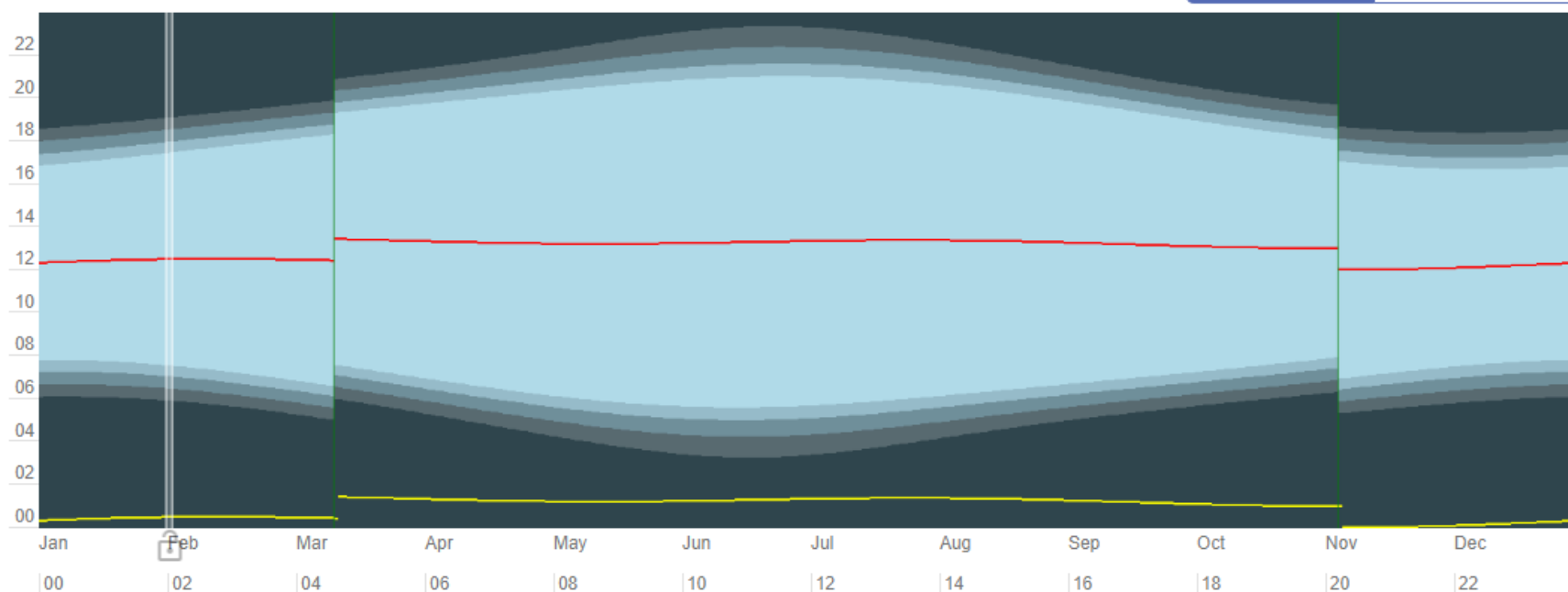


Image Credit: *timeanddate.com*

The Sky for February 2023 (continued)

In the Winter at our latitudes, the Sun sets more steeply. In the Summer, it's as if the Sun is gliding in for a landing on the horizon. That's why the sky takes so long to get dark in the Summertime. Notice how the last outer gray band gets wider in the summer months, with astronomical twilight not ending until 11 PM and starting again in the morning before 4 AM. The red line shows when the Sun is on the meridian, and the yellow line corresponds to solar midnight. Wall clock vs Solar transit time is partly affected by where in the timezone band we reside, and also affected by the Earth's elliptical orbit making progress around the Sun more slowly in the summer, and the rotation of the Earth getting ahead of the Sun.

The graphic also takes into account refraction of the Sun's rays as they enter the atmosphere.

Did I mention there's no mosquitos during winter and early spring observing sessions?

For reference, astronomical twilight ends at about 7:20 PM. By 7:30, it's not going to get any darker. It's like a silver platter with a cosmic phenomenon served up, served at a convenient time.

The Zodiacal Light is about as bright as the Milky Way, so that means, you will have to get well out of your armchair, and probably into a car, to see it.

You will need to judge for yourself whether your intended location has been able to reveal the Milky Way in the sky on past visits. That will be your guide to how much you will see. Of course, the Milky Way shows up at the Binbrook Conservation Area, our club's dark sky site.

At our club meeting, we will make arrangements to trigger an expedition to darker skies on the next clear night, but be advised, the glow is strongest in the inner solar system, so you have to be out there looking for it at 7:30 PM. Binoculars or a telescope will be useless for observing this phenomenon, so you don't need them for it. Of course, once you are out under dark skies, you will have a chance to observe other things with tools such as those. Since this will be after Full Moon, the moon will not be in the sky for early evening.

This is our best chance to see the Zodiacal Light for the year, because this month, the Sun sets sooner than in March, and in late September the glow will be visible in the morning, and I believe that all amateur astronomers, like me, are not keen to be up early in the morning.

Save yourself some sleep then, and look in the evening now.

To whet your appetite, here's a link to the Zodiacal Light article in Wikipedia:
https://en.wikipedia.org/wiki/Zodiacal_light

But more importantly, here's a photo comparing it to the Milky Way.

It is only a touch dimmer than the brightest parts of the Milky Way. It actually extends all the way across the sky, dimming as it goes, so the brightest and easiest part to see will be just after the end of astronomical twilight near where the Sun just set (or in the fall, will rise).

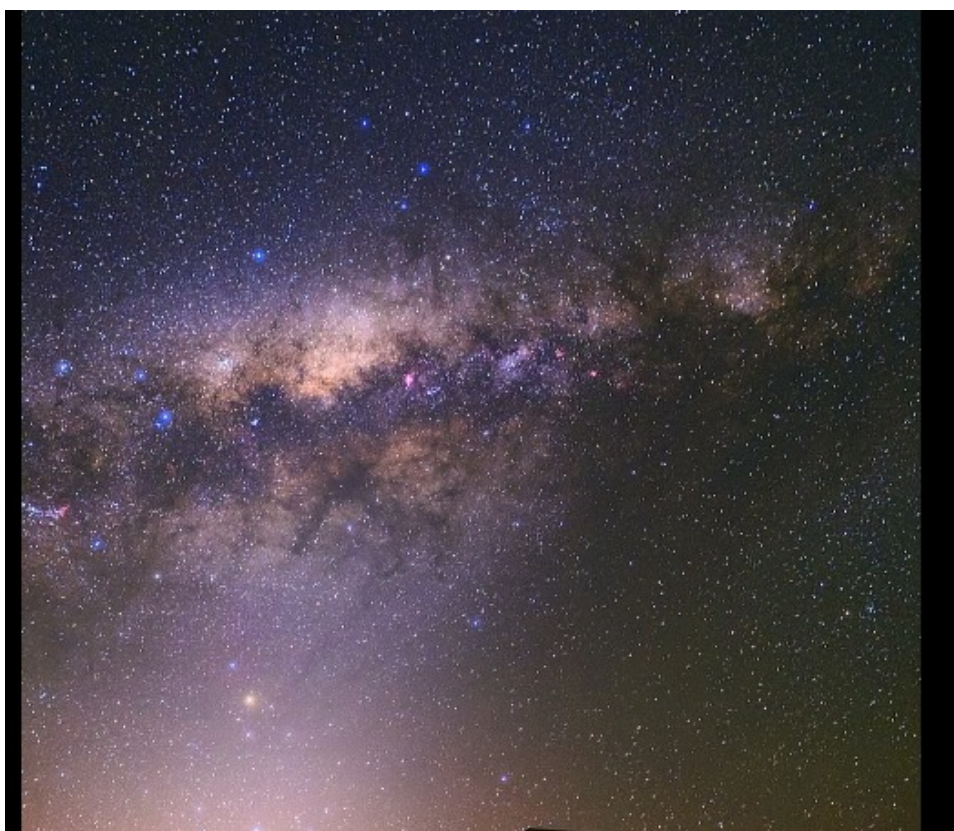


Image Credit: Babak Tafreshi

(Continued on [page 13](#))

The Sky for February 2023 (continued)

There will be another chance to see this in mid March, but it won't be as early nor as satisfying, and by then there will be a new armchair challenge.

Some day, I'll watch.... *planets* in the daytime.

It is actually easier to see planets than you think, but you have to know exactly where to look.

Venus is 25 degrees from the Sun, and can be seen in daytime if you know where to look. Alas it is almost impossible to find without some kind of reference. That's where the Moon comes in. When the Moon and a planet are in a known relation, then the planet can be found with a little careful searching.

During the day, if you are going to use binoculars or a telescope, you must set up to the east side of a building, in the shade, so that as time progresses, the shadow will only become more, and you will never be surprised by the Sun peeking out and lighting up your equipment. So we really only care about looking for evening apparitions, in the daytime, and preferably when they are near the meridian, at times like 2 PM.

This month, for telescope owners, there are two interesting cases. One is a chance to see *Neptune*, as *Venus* passes very near it. The evening of February 14th or 15th will be a good time to seek a clear western horizon, to have a good look at 8th magnitude *Neptune*. It will be visible in binoculars, still close to *Venus*, which has its closest approach early on Feb 15th, when both planets are below the horizon for us.

There will be about a 12 magnitude difference between the brightness of the 2 planets. You might have to adjust your binocular direction so that *Venus* is no longer visible, to be able to adapt your eyes to see something 15 thousand times dimmer.

This will be a good time to practice for some double star challenges I have planned in the future, since you will get one of the 2 items for free, being the brightest light in the sky at the time.

When you have found *Neptune*, note its characteristics. Can you see a disk or notice a hint of colour?

Don't go away. There's plenty more to see, no matter where you are.

Double Stars

Double stars can be observed from anywhere, and are fairly immune to light pollution, so make a good candidate list for an observing program where you can be confident that you will find what you are looking at.

There is an aspect of subjectivity, because the compared colour also depends on how dark-adapted your eyes are.

This month, some prominent double stars are found in the winter hexagon, or as we like to call it the winter G, in honour of our past chairman, John Gauvreau.

There are 7 well chosen double stars to seek, and the dimmest on the list is 10th magnitude, which is in range of big binoculars or a small telescope.

This link sums things up perfectly...

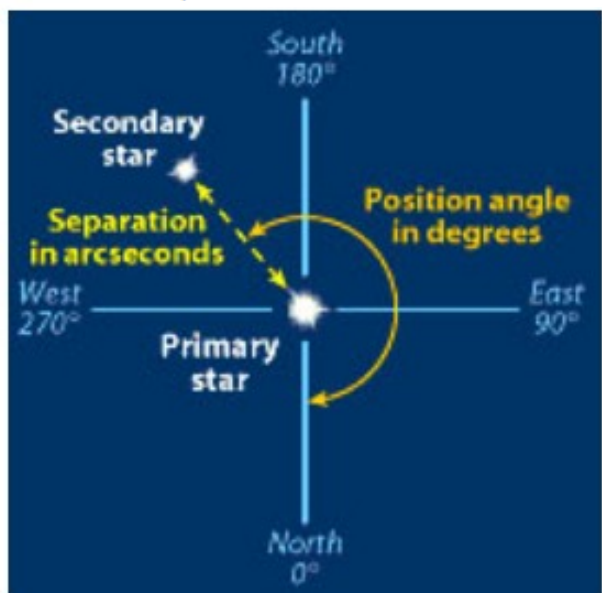
<https://skyandtelescope.org/astronomy-news/night-sky-sights/explore-the-winter-pair-a-gon/>

(Continued on [page 14](#))

The Sky for February 2023 (continued)

Star	Magnitudes	Separation	P.A. of secondary
Sirius A and B	-1.5, 8.4	11.3"	66°
Nu ¹ (ν ¹) Canis Majoris	5.8, 7.4	17"	265°
Σ1126	6.6, 7.0	0.8"	179°
Σ1182	7.5, 8.8	4.9"	75°
Castor A, B, and C	1.9, 3.0, 9.8	AB = 5.4", AC = 72"	AB = 52°, AC = 164°
Theta (θ) Aurigae	2.6, 7.2	4.1"	303°
Σ559	7.0, 7.0	3.1"	275°
Rigel	0.3, 6.8	9.2"	202°

Separations and position angles are recent and from [Stelle Doppie](#). P.A. or position angle is the angle between the secondary and primary star, with 0° for north; 90° for east; 180° for south; and 270° for west.



The two measures of a double star are separation and position angle. The directions shown here are for an inverting scope, such as a Newtonian reflector.
Sky & Telescope

Credit: Sky & Telescope

Here above is the chart they show, to give you an idea of the difficulties. They show that Sirius is easiest to separate for the next 43 years. I do believe that this year at some point, you will see Sirius B. To give you an idea how easy it is, it's just one of the items on the list. If you see one of these doubles, be sure to make a sketch and note the time and equipment.

But that is not our armchair item, because it's not going anywhere, so to speak. Be sure to take up the time-limited opportunities first.

This year is the time to try, and you will need a scope with high magnification and clear skies. Effectively, every time you take out your scope for the next couple of months, you should give it a try, until the day when the stars align, so to speak, and there's a clear sky with good seeing. See the web article for hints and strategy for it.

Castor, the more northerly star in Gemini's bright pair, is a triple star that will be barely visible in binoculars, and much more of a satisfying pair in a telescope.

Until our meeting, I wish you some clear skies, to catch our comet!



Contents:

What's up in awards? Rising Star Program: February-March
 Pathways Observing Program targets... February-March
 Messier Observing Program: February-March... Including target hints!!
 The Planets, Comets, Upcoming Meteor showers, Award Programs

What's Up in Awards?

The Hamilton Amateur Astronomers Observing Programs are designed to provide direction for amateur astronomer's observations and to reward their accomplishments. A certificate is awarded when the goals of the observing program are met. The HAA offer various certificates based upon achieving specific observing goals. There is no time limit for completing the required observing but good record keeping is required. Each observer must perform all the requirements of each Observing Program themselves. However, observers are able to receive help from (an)other observer(s) as they learn to find and identify different objects. Each observer will then need to locate and observe the object on their own to meet the goals of the program. Observing logs will be submitted to and examined by the HAA Observing Programs Project Coordinator to confirm all observations before a certificate is granted.

This column tells you which objects are visible this next month for the HAA Observing Programs and other sights of interest.

HAA Rising Star Observing Award

February

Constellations: Gemini, Canis Major
Stars: Pollux, Sirius
Double Stars: Castor, Aldura
Object Pairs: NGC 2437 / NGC 2438
Messier Objects: M35, M42

March

Constellations: Ursa Major
Stars: Regulus
Double Stars: tau Cancri
Object Pairs: M81 / M82
Messier Objects: M44, M65, M109

Pathways Observing Program

Group A

Observable in January, February, March
Winter Constellations: Find, observe, sketch: *Taurus, Orion, Gemini.*
Stars: Find, observe, sketch: *Capella, Sirius, Betelgeuse.*
Asterisms: Find, observe, sketch: *Head of the Whale, Winter Triangle, Winter Hexagon*
Planet: Any one planet that is remaining in the list.

HAA Messier Objects Observing Award

February Messier targets

- M1** The Crab nebula is a supernova remnant in Taurus. It is a hazy patch in small telescopes, large scopes can resolve some detail.
- M45** The Pleiades are a large open cluster in Taurus. Easy to resolve six stars naked eye. Binoculars provide the best view. Large telescopes can show some nebulosity.

(Continued on [page 16](#))

What's Up in Awards? February-March 2023 (continued)

M35, M37, M36, M38 A series of open clusters in the winter Milky Way. M35 is in Gemini, the others are in Auriga. All can be seen naked eye as faint fuzzy stars, low power telescopes can resolve these rich clusters.

M42, M43 M42 is the great Orion Nebula. It can be seen as small fuzzy patch naked eye and the view is superb in most any scope. M43 is a small region of nebulosity next to M42, and probably requires the use of a telescope to view. Use low to moderate powers for the best view of this pair.

M78 A small emission nebula in Orion. It is best viewed in a telescope at moderate powers.

M79 This is one of the smallest and dimmest globular clusters in the catalogue. It is best viewed in a telescope at moderate powers.

March Messier targets

M41 This cluster in Canis Major is visible as a hazy patch to the naked eye just below Sirius. M41 appears fairly loose in telescopes at low power.

M93 This is a small fuzzy patch of light in Puppis. Use low power to examine this cluster and the surrounding richness in a telescope. Medium power provides a nice view of the cluster itself.

M47 A bright cluster in Puppis, easily visible as a hazy patch to the naked eye. Telescopes show a loose cluster with stars of wide variety of magnitudes.

M46 This cluster is right next to M47 and is also visible to the naked eye. In telescopes at low powers this cluster evenly fills the eyepiece. While you are here go to medium or high power and look for the planetary nebula NGC 2438. It will appear as a faint uneven ring, with a blue/green color.

M50 An open cluster in Monoceros. Like M93, the richness of the surrounding field is the only difficulty in finding this object. This is a fairly tight cluster at low power in a telescope.

M48 Messier 48 is a large fuzzy patch in binoculars, partially resolvable. Use low to medium power in your telescope for a spectacular view.

M67 In the southeast portion of Cancer is another open cluster, barely visible as a fuzzy patch to the naked eye. Use low power to resolve this large, rich cluster in a telescope.

M44 Known as the Praesepe or Beehive Cluster, this open cluster is easily visible to the naked eye as a large, fuzzy patch bigger than the moon. Binoculars or rich field telescopes provide the best view of M44.

M81, M82 Both galaxies will fit into the same low power telescope field. M81 will appear as a large oval gray patch of light. M82 is a pencil like streak of light next to and perpendicular to the long axis of M81.

The Planets... February 2023 via (BBC) Sky at Night Magazine

Mercury: Poor morning positioning and brightness make Mercury hard to see this month.

Venus: Bright evening planet. Near Neptune on 14/15 February, closing on Jupiter at the end of February.

Mars: Well-placed and good altitude when due south. Shrinks from 10 to 8 arcseconds throughout February.

Jupiter: Bright evening planet loses altitude throughout the month. Near Venus on 28 February.

Saturn: In conjunction with the Sun on 16 February and not visible this month.

(Continued on [page 17](#))

What's Up in Awards? February-March 2023 (continued)

Uranus: Evening planet. Uranus reaches 50° altitude in darkness at the start of the month but drops rapidly thereafter.

Neptune: Poorly located in the evening sky. Close encounter with Venus on 14/15 February, just 20 arcminutes apart. But the UK will miss the closest approach of 47 arcseconds.

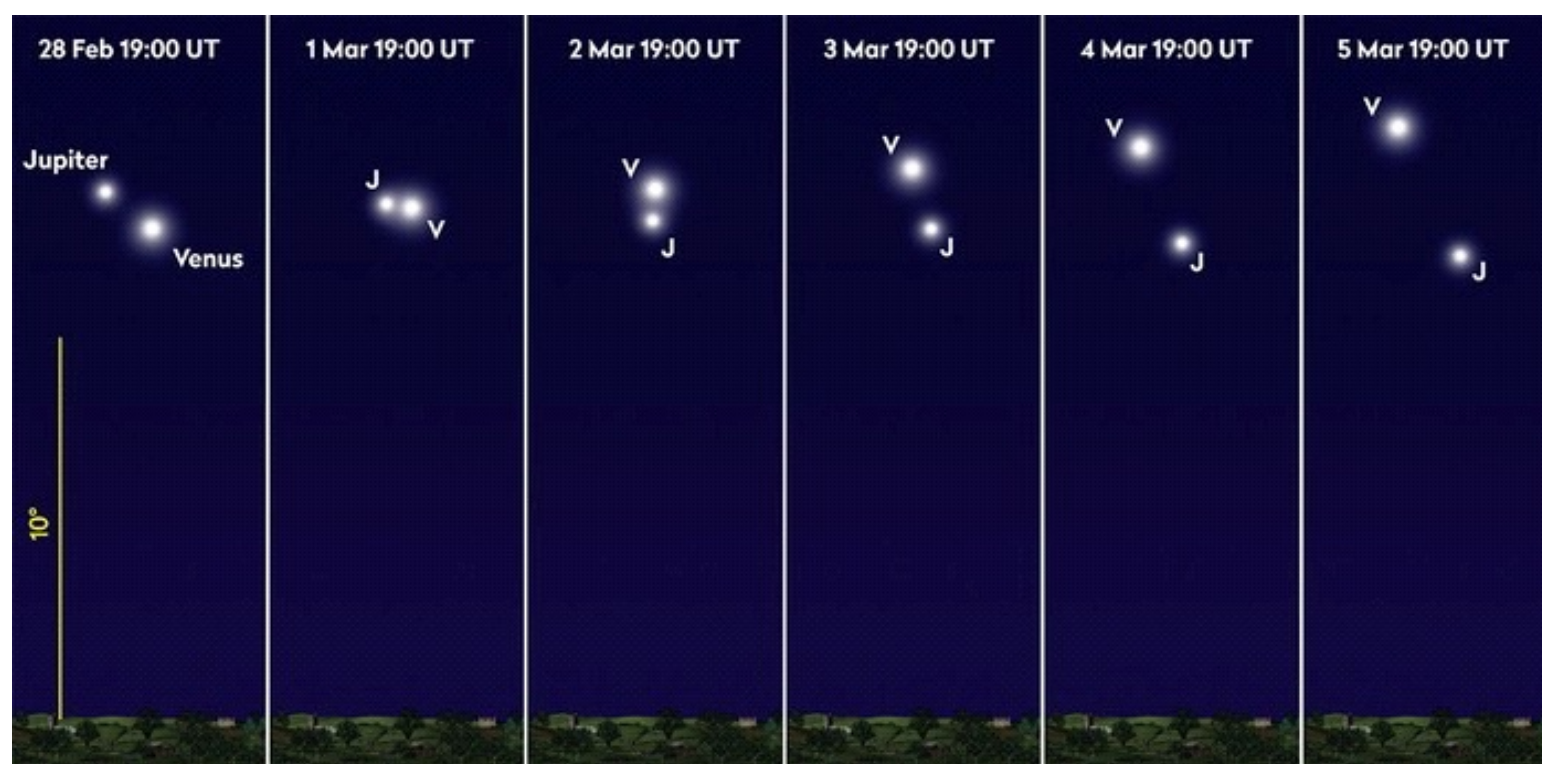
The Planets... March 2023 via (BBC) Sky at Night Magazine

Mercury: Best at the end of the month in the evening sky. Near to Jupiter on 27 March.

Venus: Lovely evening planet. Close to Jupiter in the first week. Moon close on 23 and 24 March.

Mars: Declining evening planet. Still well presented but fading and shrinking. Mars is near the open cluster M35 on 30 March.

Jupiter: Evening planet near Venus early March, but poorly placed. Moon close on 22 March. Near Mercury on 27 March.



Venus and Jupiter have a close encounter at the start of March 2023, best seen as they approach the western horizon. Credit: Pete Lawrence

Saturn: Poorly located morning planet, unlikely to be seen this month, so not worth trying to view.

Uranus: Deteriorating evening planet, losing altitude throughout the month. Uranus is near Venus on 30 March.

Neptune: Too close to the Sun to be seen this month, so not worth trying to view.

Comets February-March 2023 via Seiichi Yoshida – Click here:

<http://www.aerith.net/comet/future-n.html>

When is the Next Meteor Shower? ...via American Meteor Society

Lyrids

Status: Active from April 15th to April 29th

Peak Night: Apr 22-23 2023 (Moon 9% full.)



(Continued on [page 18](#))

What's Up in Awards? February-March 2023 (continued)

eta Aquariids

Status: Active from April 15th to May 27th
Peak Night: May 5-6 2023 (Moon 100% full.)



Observing Award Recipients

We would like to give recognition and congratulations to any member who completes an award program regardless of the sponsoring organization. Congratulations to the following:

HAA Pathfinder

A01 Anastasia Morissette

HAA Rising Star Awards

001 Jean Jefferson
002 Kevin Salwach
003 Jo Ann Salci

RASC

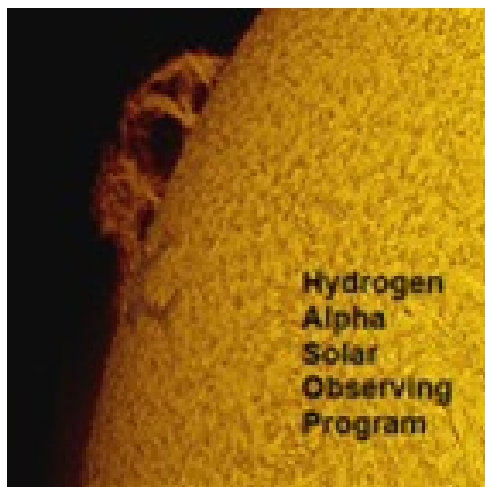
Jo Ann Salci
Exploring Exoplanets (on-line course)
Swapna Shrivastava
Explore the Moon
Explore the Universe
Bernie Venasse
Explore the Universe

Astronomical League

Bernie Venasse (2023)
Sunspotters Observing Program



Hydrogen Alpha Solar Observing Program



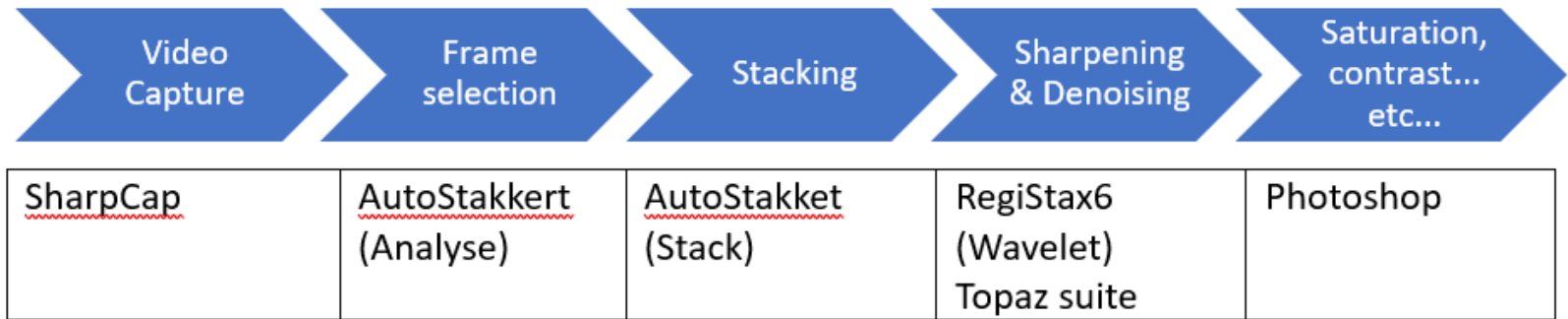
Please feel free to contact me with any questions or comments at chair@amateurastronomy.org
— Bernie



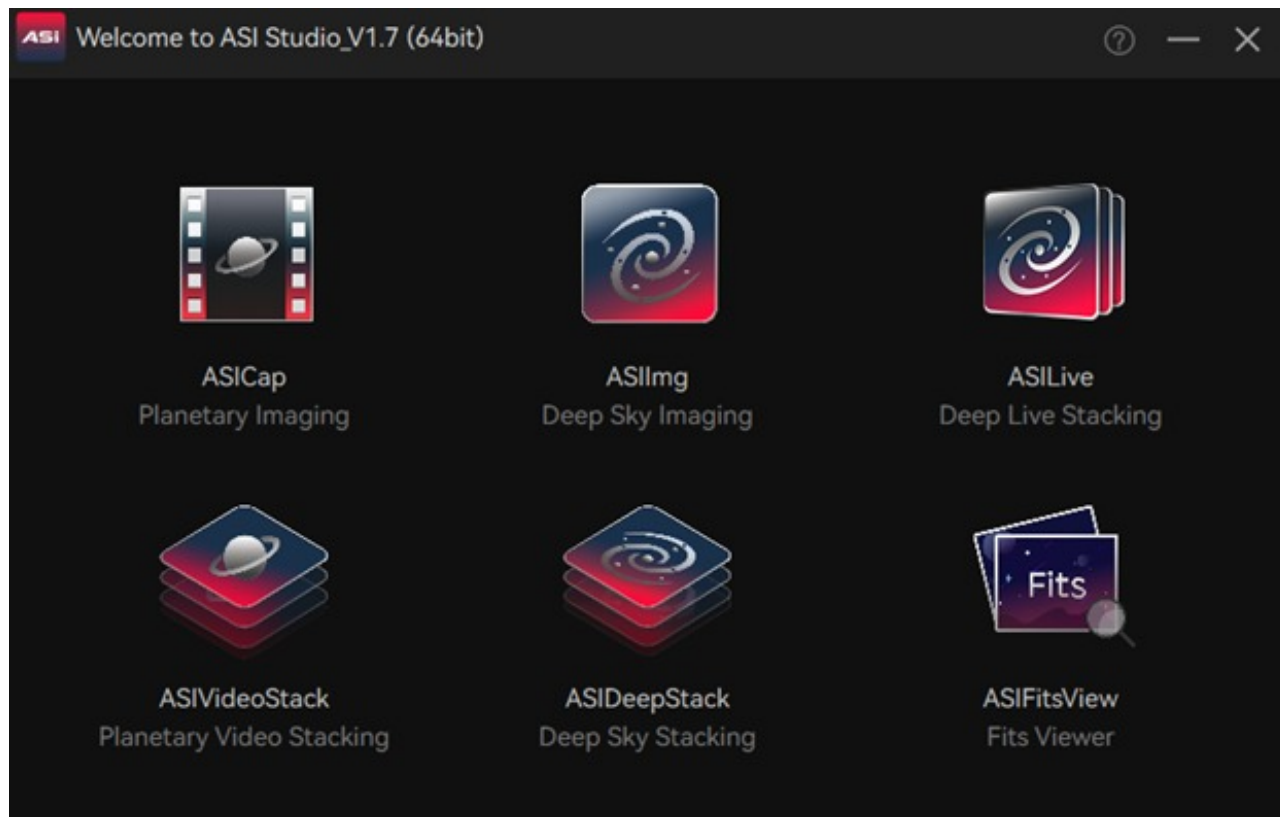
ASI Studio from ZWO by Michel Audette

Before I start, I need to be honest that I didn't want to like ZWO Software. While somewhat new to "lucky imaging" (Referencing to taking a video and getting a few good frames for stacking), there is a level of proudness to come up with a picture using complex processes of various specialized software to arrive at the final picture (which never seems to be good enough 😊). Spending hours processing and re-processing your imaging is often half the fun and frustration.

But here we are. I normally use my Mac for post processing but resigned last year to get a Windows computer to capture and process planets imaging. I learn a lot using the current workflow (not including WinJUPOS but soon):



While I was using my new windows computer, I ended up downloading the free ASI Studio from ZWO (<https://astronomy-imaging-camera.com/software-drivers>). From its description, ASI Studio is "ZWO ASI Official astronomy software, specialized in planetary imaging, DSO imaging, live stack and other useful imaging processing gadget." (also available for Mac).



I thought to myself that while I'm sure the results won't be good, it would allow me to see if I need to take more video; A bit like as a quick preview.

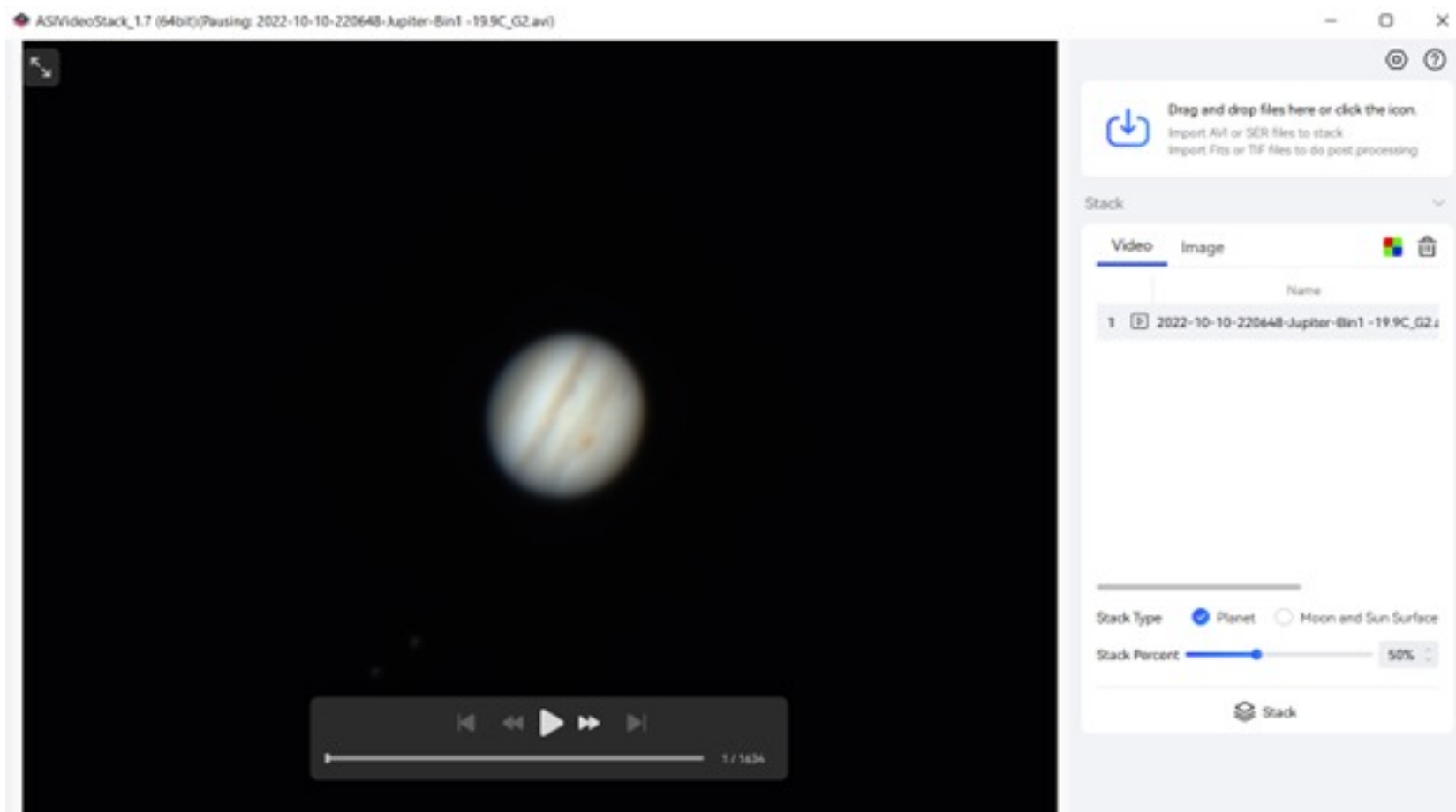
So, on October 3rd last year, I decided to forego my laptop and to use my ASIAir Plus with an ASI174MC to take videos of Jupiter on my Vixen VMC260L. Simple setup, no tracking just a good polar alignment on my Vixen SDX2.

The ASIAir Plus give you various resolution options. Easy to use. The brightness level is automated, but you really need to tune it to prevent saturation and balance each colour. In less than 3 minutes I had my AVI video and ready to process.

(Continued on [page 20](#))

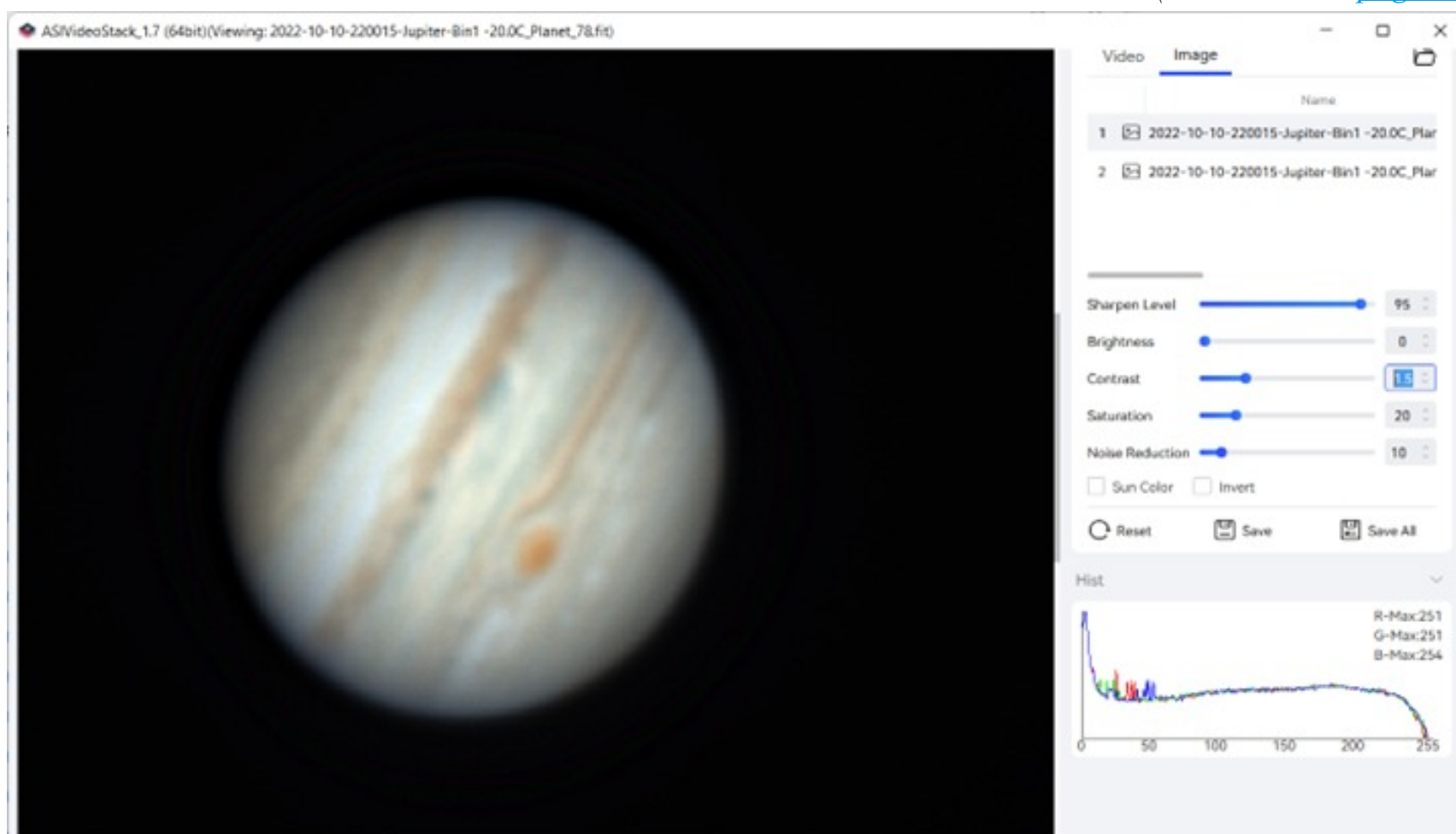
ASI Studio from ZWO (continued)

I opened the AVIVideoStack software from the ZWO suite and downloaded my video.



The interface is super simple. Once you got your video in. All you need to do is select your stack percentage (similar to AutoStakket) and to press “Stack”.

After about 2 minutes you get a “stacking completed successfully” and you get a new interface. No need to select reference points or anything else. *(Continued on [page 21](#))*



ASI Studio from ZWO (continued)

I must admit, I was dumbfounded. I just didn't expect this. No photoshop; I just increased the levels and that's it. You will notice that you can save/snapshot pictures with different settings and compare by selecting which picture you want to work with. In this case, 70% stack selection seemed the best.



ASIVideoStack



AutoStakket /Registax

I had to use my original and more complex workflow to compare of course. It took a lot longer, and while I think the results are a bit better, it is marginal. (I did adjust the exposure to match both pictures)

In summary, I'm really impressed. It's nice to see a small company driven like this to create such innovative and free! software like this one to keep our hobby fun. I'm really struggling now about what setup to choose. For now, I think I will use the ASI setup, it is quick to put together and operate (and it is cold outside!). Not sure what I would do if I had a permanent setup. As for post-processing, I think I will still do both. If anything, I can use the ASIVideoStack output as a baseline when working through my original workflow.

“HAA Presents”

Members of the public of any age in the GTHA can now request an in-person (once it is safe to do so) or virtual presentation from the HAA directly on our website.

Simply navigate to www.amateurastronomy.org and select “Contact” from the top menu bar and then click on “HAA Presents” (see image below). You will be presented with a request form and once all required fields are entered, click on the “Submit” button and you will see a confirmation message that your request has been successfully submitted.



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HAA Presents

Once received, our Public Education Director, Jo Ann Salci, will respond to your request within 5 business days to discuss next steps. If you have any questions, feel free to send an email to: haapresents@amateurastronomy.org.



This article is distributed by NASA Night Sky Network (NSN).

Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Spot the King of Planets: Observe Jupiter

David Prosper

Jupiter is our solar system's undisputed king of the planets! Jupiter is bright and easy to spot from our vantage point on Earth, helped by its massive size and banded, reflective cloud tops. Jupiter even possesses moons the size of planets: Ganymede, its largest, is bigger than the planet Mercury. What's more, you can easily observe Jupiter and its moons with a modest instrument, just like Galileo did over 400 years ago.

Jupiter's position as our solar system's largest planet is truly earned; you could fit 11 Earths along Jupiter's diameter, and in case you were looking to fill up Jupiter with some Earth-size marbles, you would need over 1300 Earths to fill it up – and that would still not be quite enough! However, despite its awesome size, Jupiter's true rule over the outer solar system comes from its enormous mass. If you took all of the planets in our solar system and put them together they would still only be half as massive as Jupiter all by itself. Jupiter's mighty mass has shaped the orbits of countless comets and asteroids. Its gravity can fling these tiny objects towards our inner solar system and also draw them into itself, as famously observed in 1994 when Comet Shoemaker-Levy 9, drawn towards Jupiter in previous orbits, smashed into the gas giant's atmosphere. Its multiple fragments slammed into Jupiter's cloud tops with such violence that the fireballs and dark impact spots were not only seen by NASA's orbiting Galileo probe, but also observers back on Earth!

Jupiter is easy to observe at night with our unaided eyes, as well-documented by the ancient astronomers who carefully recorded its slow movements from night to night. It can be one of the brightest objects in our nighttime skies, bested only by the Moon, Venus, and occasionally Mars, when the red planet is at opposition. That's impressive for a planet that, at its closest to Earth, is still over 365 million miles (587 million km) away. It's even more impressive that the giant world remains very bright to Earthbound observers at its furthest distance: 600 million miles (968 million km)! While the King of Planets has a coterie of around 75 known moons, only the four large moons that Galileo originally observed in 1610 – Io, Europa, Ganymede, and Calisto – can be easily observed by Earth-based observers with very modest equipment. These are called, appropriately enough, the Galilean moons. Most telescopes will show the moons as faint star-like objects neatly lined up close to bright Jupiter. Most binoculars will show at least one or two moons orbiting the planet. Small telescopes will show all four of the Galilean moons if they are all visible, but sometimes they can pass behind or in front of Jupiter, or even each other. Telescopes will also show details like Jupiter's cloud bands and, if powerful enough, large storms like its famous Great Red Spot, and the shadows of the Galilean moons passing between the Sun and Jupiter. Sketching the positions of Jupiter's moons during the course of an evening - and night to night – can be a rewarding project! You can download an activity guide from the Astronomical Society of the Pacific at bit.ly/drawjupitermoons.

NASA's Juno mission currently orbits Jupiter, one of just nine spacecraft to have visited this awesome world. Juno entered Jupiter's orbit in 2016 to begin its initial mission to study this giant world's mysterious
(Continued on [page 23](#))

NASA Night Sky Notes (continued)

interior. The years have proven Juno's mission a success, with data from the probe revolutionizing our understanding of this gassy world's guts. Juno's mission has since been extended to include the study of its large moons, and since 2021 the plucky probe, increasingly battered by Jupiter's powerful radiation belts, has made close flybys of the icy moons Ganymede and Europa, along with volcanic Io. In 2024 NASA will launch the Europa Clipper mission to study this world and its potential to host life inside its deep subsurface oceans in much more detail. Find the latest discoveries from Juno and NASA's missions at nasa.gov.



This stunning image of Jupiter's cloud tops was taken by NASA's Juno mission and processed by Kevin M. Gill. You too can create amazing images like this, all with publicly available data from Juno. Go to missionjuno.swri.edu/junocam to begin your image procession journey – and get creative!

Full Image Credit: NASA/JPL-Caltech/SwRI/MSSS; Processing: Kevin M. Gill, license: CC BY 2.0) <https://creativecommons.org/licenses/by/2.0/> Source: <https://apod.nasa.gov/apod/ap201123.html>

below left: Look for Jupiter as it forms one of the points of a celestial triangle, along with Venus and a very thin crescent Moon, the evening of February 22, 2023. This trio consists of the brightest objects in the sky – until the Sun rises! Binoculars may help you spot Jupiter's moons as small bright star-like objects on either side of the planet. A small telescope will show them easily, along with Jupiter's famed cloud bands. How many can you count? Keep watching Jupiter and Venus as the two planets will continue to get closer together each night until they form a close conjunction the night of March 1.



Image created with assistance from Stellarium



Comet C/2022 E3 ZTF, by Andrew Brenyo

Taken January 15, 2023 at Callander Bay, ON



left:

**Orion's Sword and
Nebula**

by Dan Copeland



above: **The Waning Gibbous Wolf Moon, by Sylvie Gionet**

Taken January 7, 2023 with her EOS Rebel T6i with an EF-S 55_250mm f/4.56 IS STM (250.0mm)

right:

The Full Moon

by Kevin Salwach

Taken October 9th, 2022,
in the Algonquin Highlands
with a Samsung S21 Ultra.





Melotte 15, Within the Heart Nebula

by **Peter Wolsley**

Thirty-one 450 second exposures taken with a QHY294C camera. Total exposure time was 3hrs 50min.
Camera Cooler setpoint was -15 Celsius
Air Temperature was 20C and Humidity was 70%
Telescope was a Celestron 8" EdgeHD (2032mm FL) with an OPTOLONG LeNhance Narrowband filter
Air Temperature was 20C and Humidity was 70%

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 - Thousand Oaks 4 channel dew controller
 - 2 separate Dew straps for 8" telescope
 - Dew strap for finder scope
 - Dew strap for 2" eyepiece
 - Dew strap for 1.25" eyepiece
- Complete Celestron 2" eyepiece kit (price for new \$540) including;
 - 2" diagonal with 1.25" adapter
 - Celestron E-lux 40mm eyepiece
 - Celestron E-lux 32mm eyepiece
 - Celestron E-lux 26mm eyepiece
 - Celestron E-lux Barlow
 - 5 piece 2" colour filter set
 - Case

Shroud to cover entire assembled telescope
Pelican case for easy transport



More pictures available or come see it in person!

Asking \$1850

Contact Jim Wamsley

289-439-6795



William J. McCallion Planetarium

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 — **Solar System**
 - **Feb 8: Know our Universe at different scales**
 - **Feb 15: Planetarium show: Lost at Sea**
- **Masks strongly encouraged for duration of all shows.**
- For more details, visit
www.physics.mcmaster.ca/planetarium

UPCOMING EVENTS

February 10, 2023 - 7:30 pm – H.A.A. Meeting at McMaster Innovation Park. Our speaker will be *Dr. Laura Parker* of McMaster University, who will talk about Galaxy Evolution in Groups & Clusters. This will be a “hybrid” meeting, with the attendance option of in-person or online via [Facebook](#) and [Zoom](#).

February 18, 2023 - 2:00 pm to 4:00 pm – Telescope Clinic at McMaster Innovation Park.

March 10, 2023 - 7:30 pm – H.A.A. Meeting at McMaster Innovation Park.

2022-2023 Council

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All active HAA members have the privilege of access to an exclusive HAA members only dark sky location.

Be on the lookout for e-mails with dark sky observing details. Space is limited.

The Harvey Garden HAA Portable Library



Contact Information

E-mail: library@amateurastronomy.org