Event Horizon

Volume 28, Number 1
November 2020

Hamilton Amateur Astronomers

From The Editor

Welcome to Issue 1 of our 28th year!

Hopefully, we will be back to some semblance of normalcy by this time next year, perhaps sooner.

Thanks to those who have contributed.

Stay safe, and Clear Skies!

Bob Christmas, Editor

editor 'AT'
amateurastronomy.org

Chair's Report by John Gauvreau

The parade of planets across the evening sky has been spectacular. Mars is still looking great even a little past opposition now, and although Jupiter and Saturn are sinking into the west they are growing closer and closer to each other, moving toward their very close encounter in late December. I have no complaints about what the sky has offered us this year and I have no complaints about the many nice clear nights we have had to enjoy the sky. Still, these last few weeks seem to have had the gloomy weather of fall move in and I have had very little observing recently. Fortunately, I was ready!

This year I realized that I was very happy with my observing equipment and didn't really need anything (okay, that's different than saying I don't want anything; there's always something on the wish list, but you know what I mean). So instead of saving and shopping for a new piece of astro-gear, I decided to stock up my astro library. I have added a couple of new books and have a couple more on the way. This has worked out great during these times when we are restricted to home and times when the clouds roll in.

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IN THIS ISSUE:

Chair's Report (continued)

Two wonderful observing guides have been added to my shelves. The first is 'An Anthology of Visual Double Stars' by Bob Argyle. A softcover book, its 450 pages are filled with info on 175 double stars; history, data, charts and what to expect to see in your scope. This is a real treasure of a book. I first heard of it during Bernie Venasse's talk on doubles last year and I'm glad I did.

The second guide I found is 'The Complete Guide to the Herschel Objects' by Mark Bratton. Over the 550 pages between the hardcovers, the author gives a brief description of about 2,500 objects! It too, is a real treasure.

Still to come is the 'Arp Atlas of Peculiar Galaxies', by Jeff Kanipe and Dennis Webb. I saw this book several years ago and admired it. Ever since then I have had my eye out for it, for even though I don't use a big Newtonian or Cassegrain telescope for scooping up faint fuzzies, this book was so intriguing that I knew I would enjoy losing myself in page after page of intriguing galaxies. I never did pick one up but one is on its way now, and apparently just in time. I just heard the sad news that Willman-Bell publishers, who produce this book and many others, have closed. A family business for many years, they have published many great astronomy books, like Uranometria 2000, The Night Sky Observer's Guide and The Messier Marathon Field Guide. I can't say enough good things about these books and I hope some other publisher will pick them up and continue to make them available.

But for now, bring on the cold and cloudy nights! I have lots of good reading material!

HAA Meetings

All our meetings will be held online through the Zoom platform for the foreseeable future. This is a very easy format to use and if you have had any hesitation about joining in please feel free to get in touch and we will help you. The meetings are fun and interesting, and as a bonus we are able to enjoy speakers from farther afield. Over the next couple of months, we will be having *Tom Field* from Seattle speak to us about spectroscopy and *Yanqin Wu* from the University of Toronto speaking to us about extrasolar planets he has been studying using Kepler satellite data. Don't miss out on these exciting presentations!

A friendly reminder that since we are holding our meetings online there is no collection for the foodbank, but don't let that stop you from contributing yourself. It doesn't matter if it comes from the club or straight from the club members; there are people in need and any donation is always welcome.

The November meeting begins at the usual time of 7:30pm on the 13th. Hope to 'see you there'!

Membership

This is the time of year when we renew our memberships. We are still the least expensive and most active club in the area and members like you are what make the club so great. You can join through our PayPal link on our website or even mail in a cheque (but doing it online is really easy!). If you have already renewed; thank you! If you are a new member who has just joined us recently, glad to have you here for the upcoming year. And if you are a member who needs to renew, I hope you will do so. I always say that it is getting to know all the good people here that make membership in the club worthwhile.

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Masthead Photo: *The Milky Way,* by *John Gauvreau.*

Taken with his with DSLR and 14mm lens from a dark site in Ontario's Bruce Peninsula.

Chair's Report (continued)

HAA 2021 Calendar

The calendar is right on schedule and will be available very soon! I have had a chance to see the finished file and it is as good as always; Doug Turner has done a great job. So many spectacular pictures! The calendars will be offered to members at cost, with the goal simply to show off the great work of some of the club's skilled and talented astrophotographers. Once they are available from the printer we will set up a date and location (okay, a couple of dates and locations) when the calendars can be picked up. We will make this as safe as possible with distancing and proper Covid protocols in place. These are a great way to show off to your family and friends just what it is you are doing out there at night!

HAA Council

The new year for council has begun, and I would like to start by offering a big thank you to all the volunteers who help keep the club going. There were no changes to the elected positions on council, and you can review them at the back of this newsletter. This has been a challenging year for all, and those who kept the club going deserve a nod of appreciation from me. I am delighted that the same hardworking crew have volunteered their efforts for another year.

There is still opportunity to join council if you are interested in joining as a councillor at large. These members have the same voting privileges as elected councillors but are free to put their efforts into whatever aspect of the club they choose. If it is a busy time for them and they don't have the ability to offer much to the club, that is fine. If they have new ideas or special projects they would like to pursue that is great. It's a tabula rasa and yet we couldn't manage without them. If this sounds appealing to you please get in touch with me and I will be happy to discuss it and answer any of your questions.

Please take care of yourselves and stay safe. Feel free to get in touch and hopefully I'll see you at the online meeting and out observing.

HAA Helps Hamilton

While during the pandemic, the H.A.A. hasn't been able to collect 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, particulary Hamilton Food Share.

In that spirit, we encourage you to continue making donations directly to your local food banks.

The Sky This Month for November 2020 by Matthew Mannering

October saw the opposition of *Mars* at mid-month. I hope that most of you got out to observe Mars at its closest approach. During October it was about 22.5 arc seconds in diameter. It's not too late to view the planet which will be 16 arc seconds in diameter at the end of November. Look for Mars in the south at about 8pm. Mars is a beautiful bright red colour at this time when viewed naked eye.

Jupiter and *Saturn* are already due south at 6:30pm as darkness falls at the beginning of November. By month's end you will need to get out at 5:30pm to see them in the SSW only 22 degrees above the horizon. The gap between the planets at that time will only be 2.25 degrees.

Remember to circle *December 21st* on your calendar to catch Jupiter and Saturn only 6 arc minutes apart low in the southwest. They haven't been this close to each other in hundreds of years. This is one of the most anticipated events of 2020. Let's hope for clear skies!

There are a couple of other events that involve Jupiter this month. The first occurs the evening of November 12th. At that time *Pluto* will be 0.7 degrees south of Jupiter. You need dark skies and a big scope to see Pluto visually. I would encourage those who can to attach a camera to their telescope to photograph/image Pluto and Jupiter. Use the included star map for that evening to identify Pluto. This may be the only way you will ever see Pluto with your gear.

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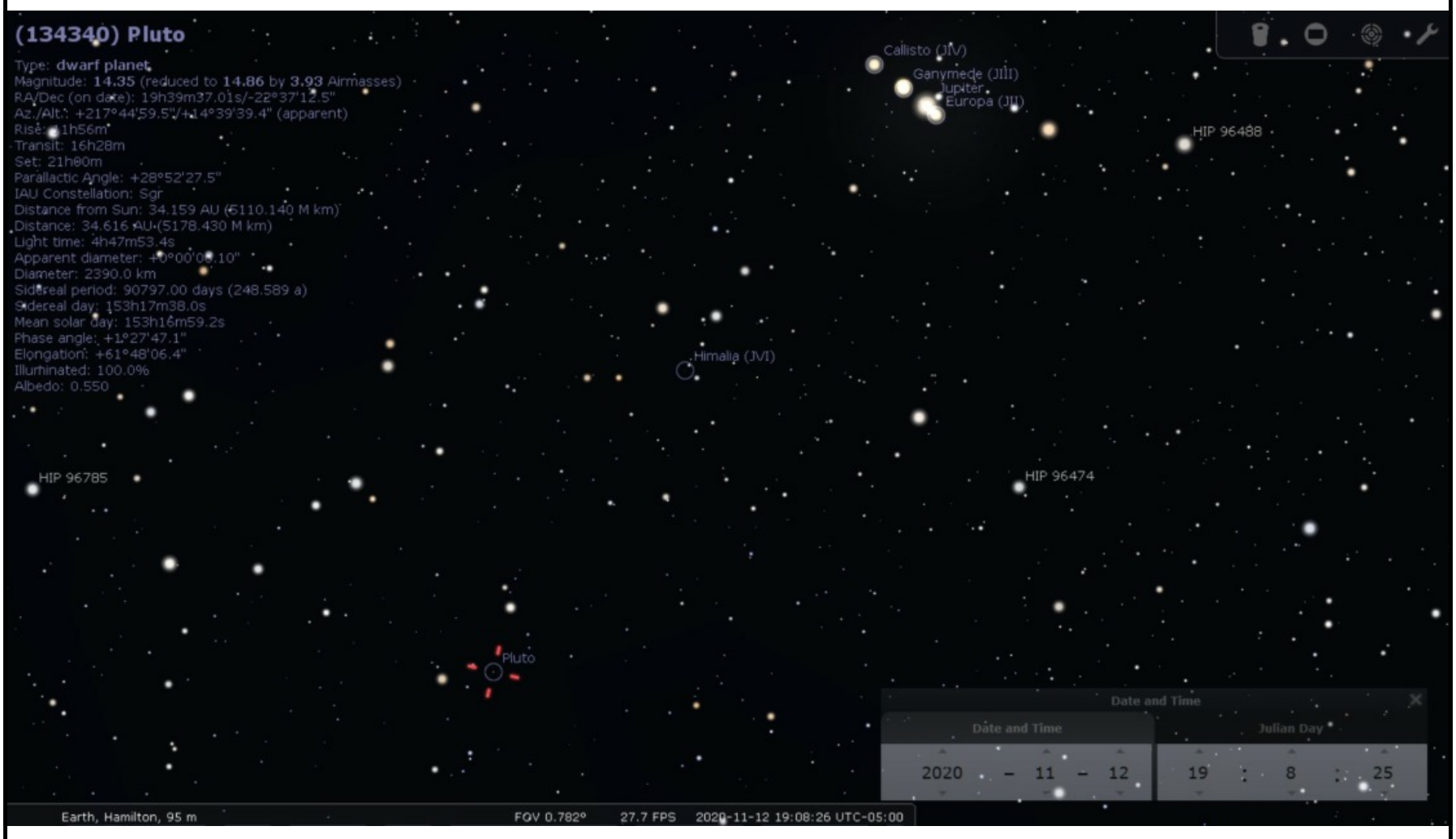
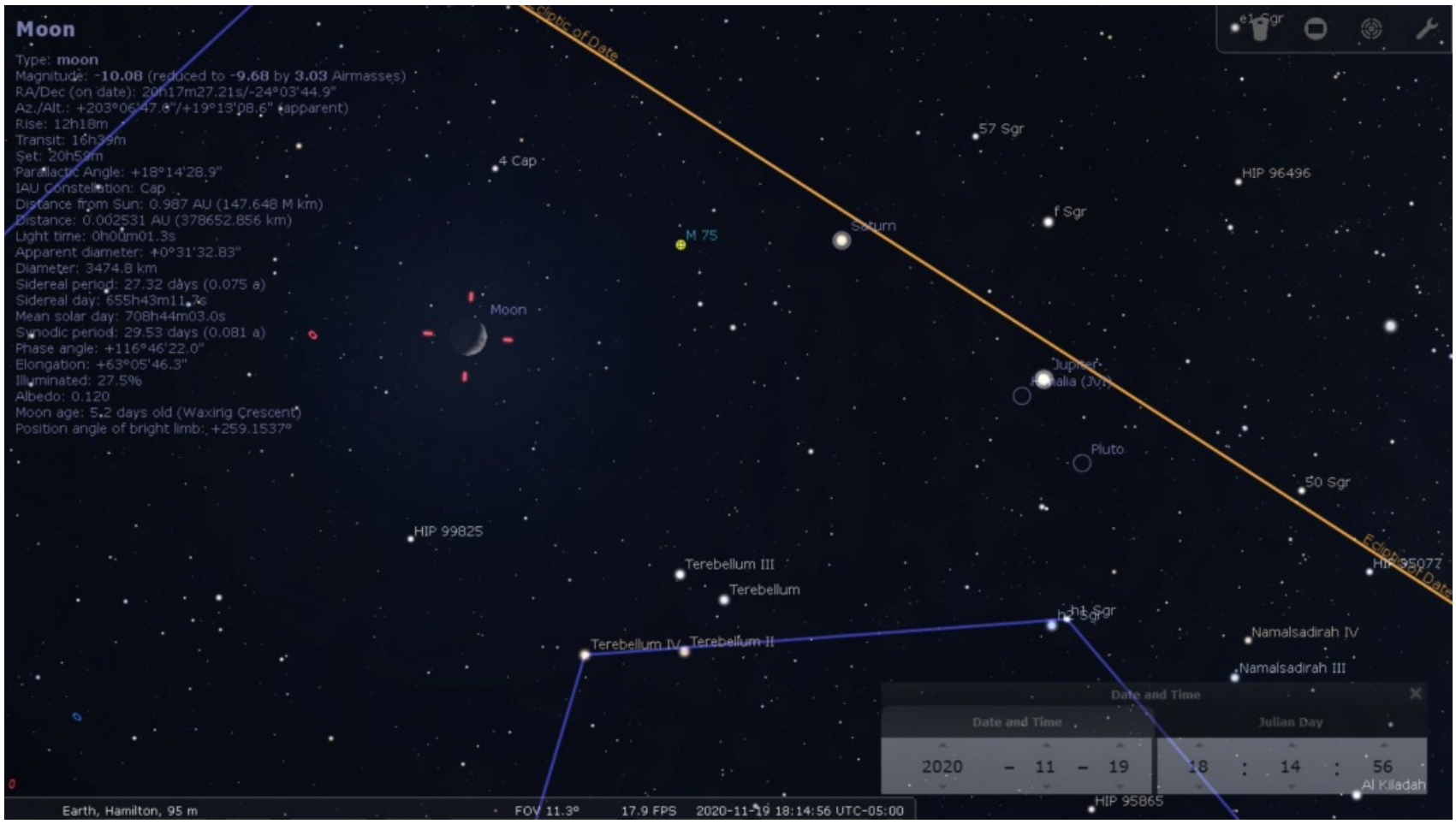


The locations of Jupiter (near top) and Pluto (in crosshairs near bottom) on November 12.

This chart and all other night-sky charts generated using Stellarium.

The Sky This Month for November 2020 (continued)

The second event involving Jupiter occurs on the evening of November 19th. The Moon, Saturn and Jupiter will form a nice grouping low in the SSW at dusk. The Moon will be a waxing crescent, which won't be so bright as to overpower the planets.



The other two evening planets are the ice giants *Uranus* and *Neptune*. Uranus spends the month about 9 degrees (two binocular fields) below the constellation Aries. Most people describe Uranus as a pale green/blue dot. This is an easy target for binoculars, and you will be able to cross it off your bucket list.

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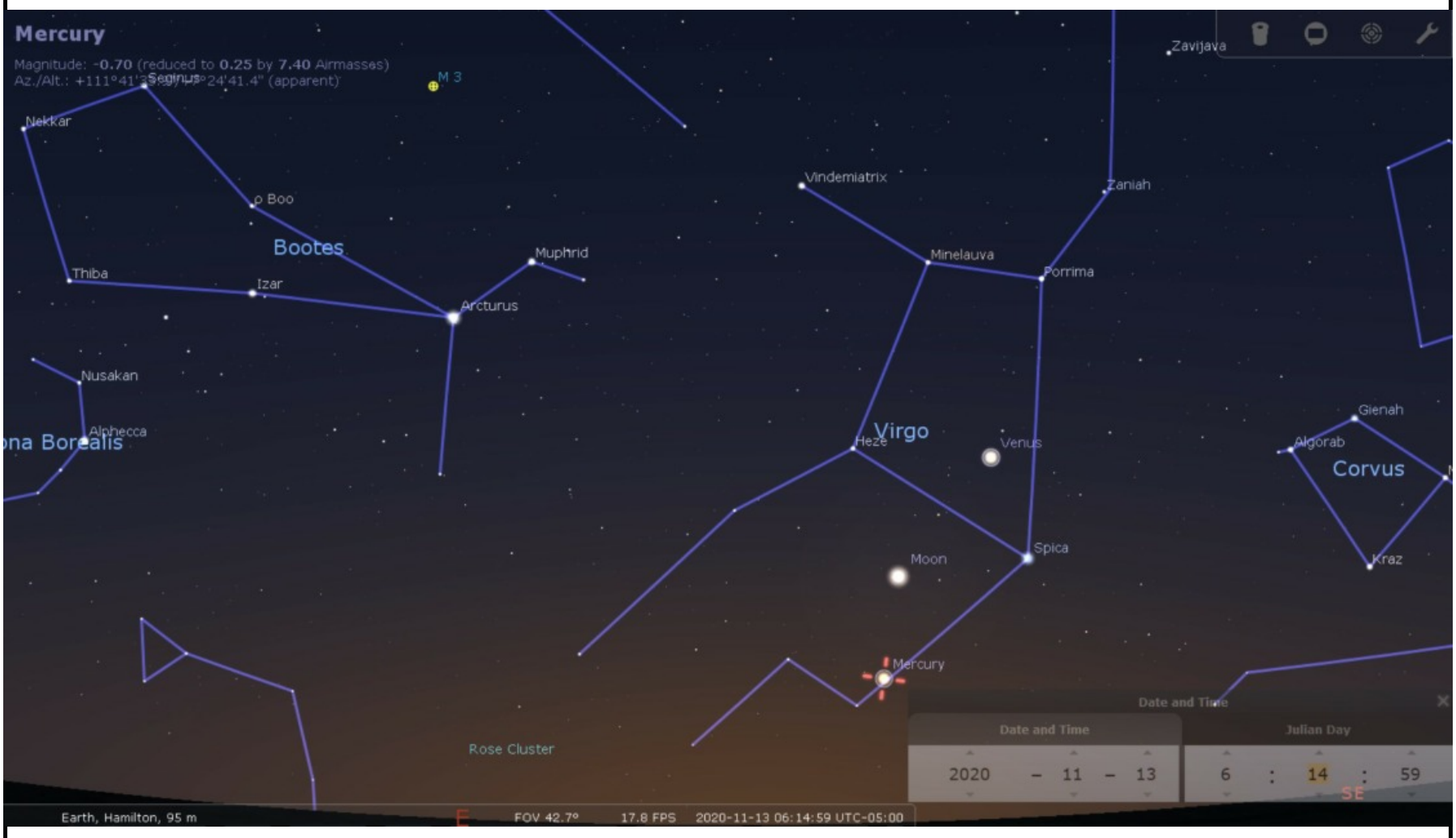
The Sky This Month for November 2020 (continued)

Neptune is still loping along in Aquarius and, like Uranus, is visible most of the night. By the end of the month Neptune will be 0.75 degrees east of Phi Aquarii. This is also a nice binocular bucket list target which will appear as a deep blue dot. If you place Phi Aquarii in the centre of the field in your binoculars, Neptune will be a little to the left of Phi. Use a star chart to nail down Neptune's position (homework for you).

We have two morning planets this month. *Venus* will appear low in the east before dawn followed by *Mercury* which will be very low in the east at dawn. Mercury will be easiest to see around the 10th of the month. At 6:15am on the 13th look for the Moon, Venus, Mercury and the star Spica low in the ESE. The Moon will only be 4.4% lit as it is only two days till New Moon.



Now is the time to start looking for the winter constellations (see the chart of the eastern sky at the top of page 7).

At mid-month *Orion* will clear the horizon by 9:30pm. Look directly above *Bellatrix* (the right shoulder of Orion) for *The Hyades* (the head of Taurus). Above the Hyades you will see the *Pleiades*. The stars *Sirius* and *Procyon* will be visible by 11pm. Above Procyon look for the constellations *Gemini* and *Auriga*.

Sirius B (the Pup) is still well placed this winter just east of Sirius (see diagram at bottom of page 7).

The Pup is a very faint star that orbits Sirius (constellation Canis Major) in a fifty-year ellipse. For the next decade or so, the Pup will be far enough from Sirius to be seen visually. Ten thousand times fainter than Sirius, the Pup can be seen in a 130mm refractor if you place Sirius just out of the field of view. It makes for a great challenge object!

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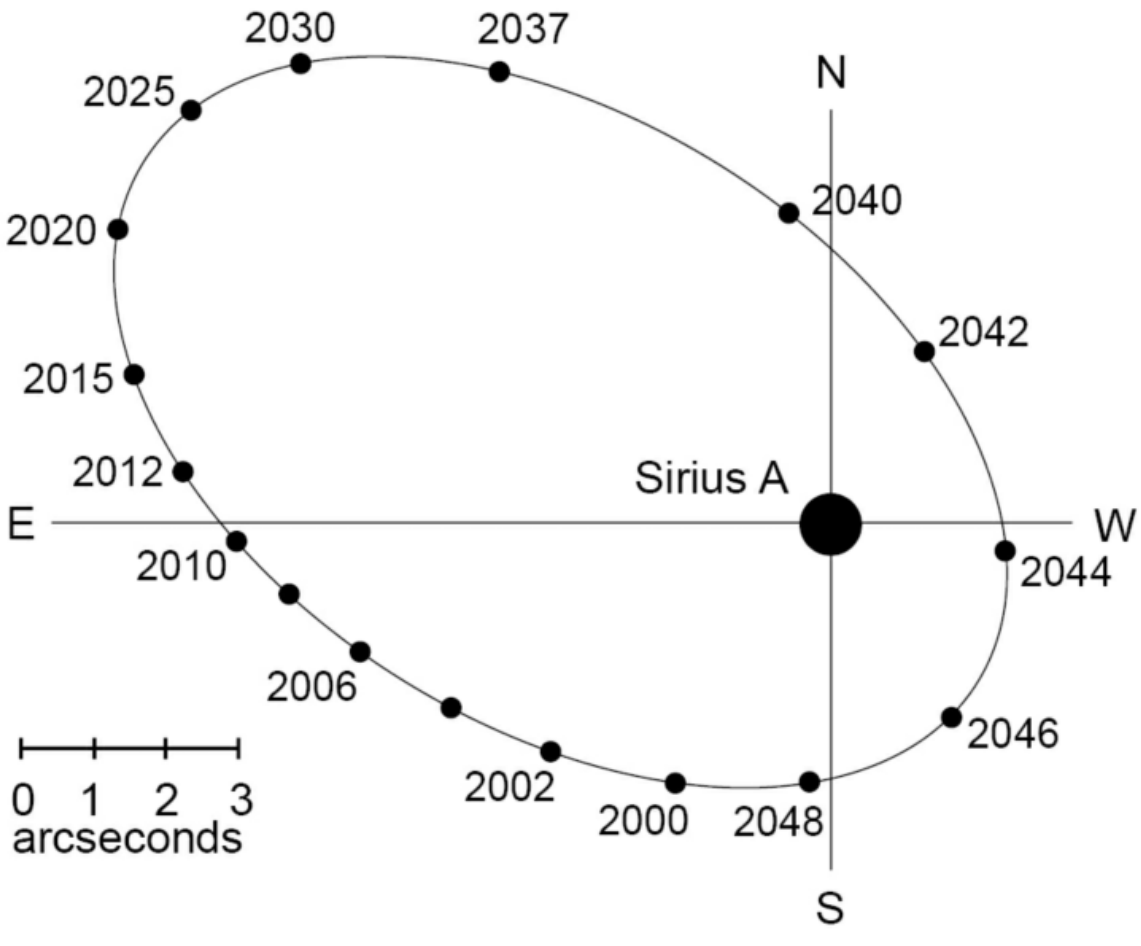
The Sky This Month for November 2020 (continued)

The Winter sky rises in the East.

Stellaium chart for November 15, 2020

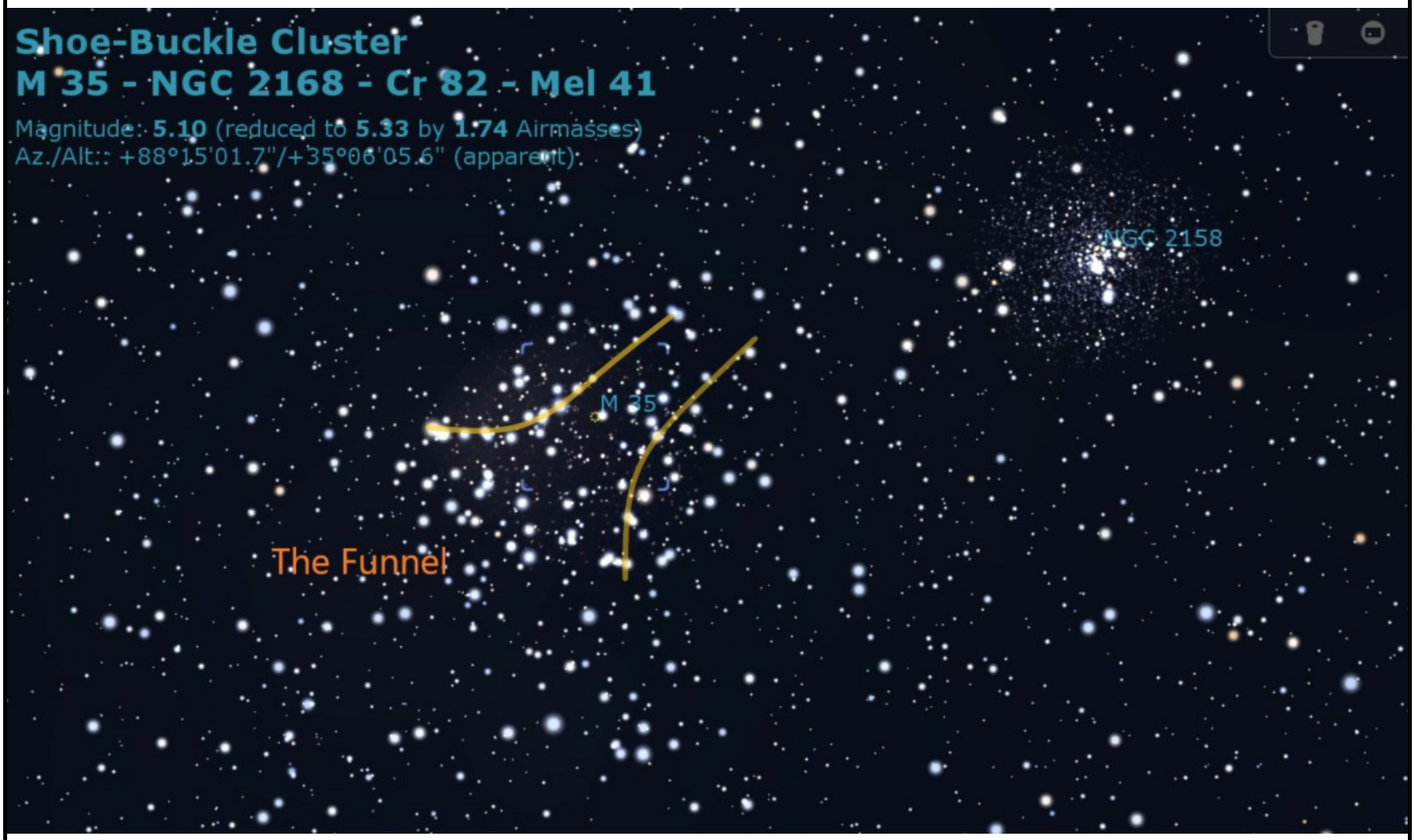


The Sirius system with orbit of Sirius B ("the Pup") around Sirius A.

(Continued on page 8)

The Sky This Month for November 2020 (continued)

On the night of November 4th look for the Moon just 0.6 degrees away from the open cluster *M35*. In a telescope, a funnel of stars is apparent in M35. The narrow end of the funnel points almost directly at a much more distant and dimmer open cluster *NGC 2158*. You will need dark transparent skies to see NGC 2158.



The star clusters M35 and NGC 2158 in Gemini.

Lastly, the month ends with a *Lunar penumbral eclipse* that reaches its maximum at 4:43am on November 30th. At that time, the Moon should be about 85% within the shadow of the penumbra. This penumbral eclipse will be dark enough that it should be apparent to the naked eye a half hour either side of maximum. However, it is by no means an Umbral eclipse where the Moon appears dark orange. So, if you can't sleep that night...

In closing, November is one of the best months to observe. The sky tends to be steady for observing and it isn't too cold. Try to get out early enough that you can watch the winter constellations rise in the east. Then track their path across the sky as winter progresses and before you know it, spring will be in the air.

What I've Been Doing During The Epidemic by Mike Jefferson

Since the Co-Vid struck back in the late winter season of 2019/2020, there have been quite a few nights that had skies, clear enough to enjoy visually. Some of my nocturnal ventures have included telescope viewing, use of binoculars and camera and spectroscope. I live in a subdivision that loves its glaring streetlamps, its cars running up and down streets at all hours and its high-intensity Liberace Candelabra driveway illumination. My solution to this unwanted nonsense is to block it out to the best of my ability. This involves hiding behind trees and other vegetation, setting up large, dark plastic garbage bags on bamboo poles to block the unwanted photons and placing deck chairs strategically. All of this is quite effective. In fact, it was not until this year that I even stooped (LOL) to using chairs, only to find out how comfortable and relaxing they are, especially for sessions lasting several hours.

With a 60 mm refractor (a Bushnell Spacemaster - from the shores of Georgian Bay) I was able to view the Galilean Jovian system – all four pinpoint moons and some detail on the atmospheric surface of the of the parent body. Saturn and its rings were visible with a selection of powers from 25X – 45X. Mars was quite visible and some surface detail was even glimpsed with a 60 mm Gregorian telescope from my driveway here at home with 30X. Even the lunar surface was fascinating.

Binocular observing involved instruments of 7X35, 10X50, 7X50, 7X42 and 8X56. Some nights at home were quite good for this light-polluted area. Sweeping the skies with these rich-field instruments yielded all kinds of different treasures from meteors to globular clusters, to open clusters, nebulae and galaxies, Venus (in the wee morning hours), Milky Way background, asterisms, open clusters and constellations. All of these were hand-held while the telescopes were tripod-mounted.

Spectroscopy reared its head in all of this, too. Using an electronic '35mm' DSLR, 55mm lens and a diffraction grating, Mars showed a solar reflection spectrum that was skewed toward the red due to the planet's orange-red colour. I captured 14 separate hand-held images of about or < than 1 second. 4 of these are very usable for calibration purposes and designing good line profiles. I have not done any of this work yet because of time constraints. What I would like to do is to compare these spectra to some of Mars that I did in 2003 when Mars and Earth were also close to each other. At that time everything was film-based. It should be interesting!

On the next page is a “colourful jpeg”. My work is in jpegs because I have not yet learned how to use FITs files. As you can see, it is VERY colourful. Done with an electronic camera, a diffraction grating and a house lamp, it was processed with spectroscopic software. No star, planet or spectral slit was employed. If you look closely at it you'll notice the brilliant colour found only in very few other locations in Nature. Spectral colour is something that you need to see at least once in your life and, hopefully, more!

At the very bottom of this image is a synthetic spectrum, made with the information of the jagged one above it and looking, for all intents and purposes, like the rectangular black-and-white spectra done years ago with film. Because it did not employ a slit for its acquisition, there is not much detail visible. The figures above it are Angstrom counts, that is the wavelengths of light that are in this spectrum. The figures on the left side show the intensity (colour temperature?) of the light at various wavelengths. It is easy to see that the blue end (left side of the spectrum) is the 'hottest'. The right red half is not as high and is, therefore 'cooler'. You are looking at the orbitals of electrons and the energy levels of photons. If you do this with a telescope or lens and spectral equipment, you are getting the highest 'resolution' possible with any astronomical equipment. This is not 'bragging rights'. It is science. It is Nature, and if it is stellar, you are looking at the fingerprints of stars.

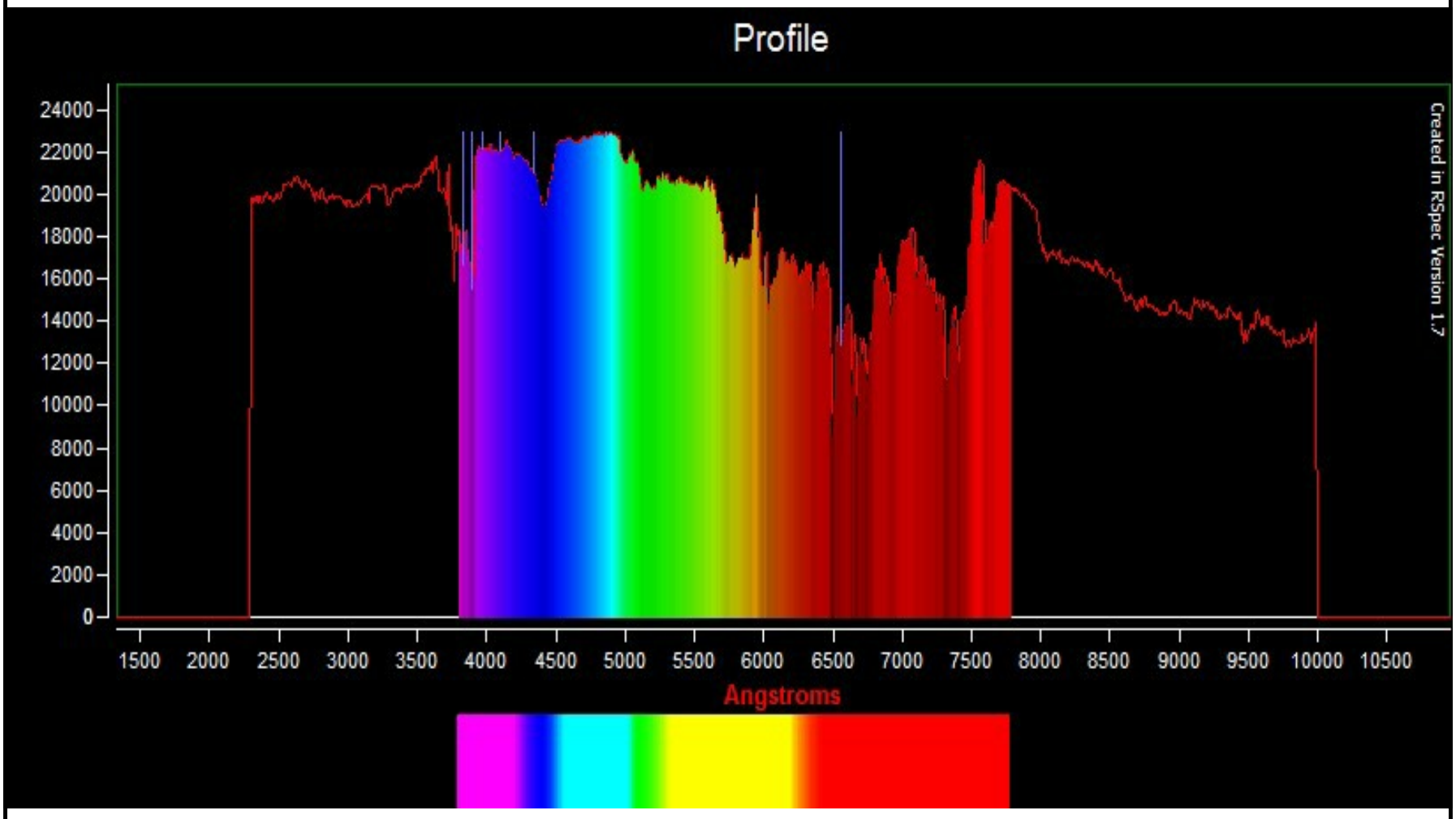
(Continued on page 10)

What I've Been Doing During The Epidemic (continued)

You will notice that the red end of the spectrum ends at about 7750 A and the blue at about 3800 A. That is because you have entered the invisible infrared and ultraviolet regions of the spectrum. Your eyes will not see these regions. It takes special equipment beyond the budgets of most amateurs, including me, to afford.

Finally, we come to the 6 artificial, vertical blue lines. These are markers of significant energy levels and were discovered by a man named Balmer: hence 'Balmer Ladder' or 'Balmer Lines'. The right hand one is Hydrogen Alpha @ about 6563 Angstroms. To its left is the orange Sodium Doublet @ about 5892 A. Hydrogen Beta is @ 4861 A. The final 4 on the left are Gamma, Delta, Epsilon and Zeta (@ 3889 A). These artificial lines can mark significant energy absorption or emission depending on what type of star or source is creating the spectral line profile. However, there is lots more absorption and emission indicated by the spikes and troughs along the top of the line profile.

To conclude, this is much of what I have been doing over the course of the Pandemic. We may not be able to work together, but we can work alone and share our experiences.



Spectrographic profile of a house lamp.

Image Credit: Mike Jefferson.

This article is distributed by NASA Night Sky Network.

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach.

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

The International Space Station: 20 Continuously Crewed Years of Operation

David Prosper

Did you know that humans have been living in the International Space Station, uninterrupted, for twenty years? Ever since the first crew members docked with the International Space Station (ISS) in November 2000, more than 240 people have visited this outpost, representing 19 countries working together. They have been busy building, upgrading, and maintaining the space station - while simultaneously engaging in cutting-edge scientific research.

The first modules that would later make up the ISS were launched into orbit in 1998: the Russian Zarya launched via a Proton-K rocket, and the US-built Unity module launched about a week and a half later by the Space Shuttle Endeavour. Subsequent missions added vital elements and modules to the Space Station before it was ready to be inhabited. And at last, on November 2, 2000, Expedition-1 brought the first three permanent crew members to the station in a Russian Soyuz capsule: NASA astronaut William M. Shepherd and Russian cosmonauts Sergei Krikalev and Yuri Gidzenk. Since then, an entire generation has been born into a world where humans continually live and work in space! The pressurized space inside this modern engineering marvel is roughly equal to the volume of a Boeing 747, and is sometimes briefly shared by up to 13 individuals, though the average number of crew members is 6. The unique microgravity environment of the ISS means that long-term studies can be performed on the space station that can't be performed anywhere on Earth in many fields including space medicine, fluid dynamics, biology, meteorology and environmental monitoring, particle physics, and astrophysics. Of course, one of the biggest and longest experiments on board is research into the effects of microgravity on the human body itself, absolutely vital knowledge for future crewed exploration into deep space.

Stargazers have also enjoyed the presence of the ISS as it graces our skies with bright passes overhead. This space station is the largest object humans have yet put into orbit at 357 feet long, almost the length of an American football field (if end zones are included). The large solar arrays – 240 feet wide - reflect quite a bit of sunlight, at times making the ISS brighter than Venus to observers on the ground! Its morning and evening passes can be a treat for stargazers and can even be observed from brightly-lit cities. People all over the world can spot the ISS, and with an orbit only 90 minutes long, sometimes you can spot the station multiple times a night. You can find the next ISS pass near you and receive alerts at sites like NASA's Spot the Station website (spotthestation.nasa.gov) and stargazing and satellite tracking apps.

(Continued on page 12)

NASA Night Sky Notes (continued)

Hundreds of astronauts from all over the world have crewed the International Space Station over the last two decades, and their work has inspired countless people to look up and ponder humanity's presence and future in space. You can find out more about the International Space Station and how living and working on board this amazing outpost has helped prepare us to return to the Moon - and beyond! - at nasa.gov.

The ISS photobombs the Sun in this amazing image taken during the eclipse of August 21, 2017 from Banner, Wyoming.

Photo credit: NASA/Joel Kowsky
More info: bit.ly/eclipseiss

A complete view of the ISS as of October 4, 2018, taken from the Soyuz capsule of the departing crew of Expedition 56 from their Soyuz capsule. This structure was built by materials launched into orbit by 37 United States Space Shuttle missions and 5 Russian Proton and Soyuz rockets, and assembled and maintained by 230 spacewalks, with more to come!

Credit: NASA/Roscosmos
More info: bit.ly/issbasics

Eye Candy the Members' Image Gallery

Mars at Opposition

top:

October 13, 2020, from Ancaster, ON.
Taken with a cell phone @ ISO 400 for a 10 second exposure.

by **Jo Ann Salci**

right:

October 11, 2020,
from near Barry's Bay, ON.
Canon 40D with 50mm lens
@ ISO 800 & f/4; exposure: 15 seconds.

by **Bob Christmas**

Eye Candy the Members' Image Gallery

The Heart and Soul nebulas, and the Perseus Double-Cluster
15 x 2 minutes; 30 minutes of total exposure time at 100mm f/2.8 and ISO 800
by **Bob Christmas**

For Sale

Telescope & Power Tank

Brand new *Meade ETX125 Observer Telescope* including *Meade Autostar Hand Controller*, and *Celestron Power Tank - 7aH - 12V Power Supply* with spot light.

New lower total price
$800.00

I joined the HAA about 3 years ago. Just before that I had given my 45+ year-old 4" Tasco to my half-brother who lives in a dark sky area NW of Huntsville, but I missed the old scope, so almost exactly a year ago on March 19, 2019, I purchased the above-noted Meade ETX 125 & the power tank from KW Telescope in Kitchener for $1151.47.

I soon realized that the new instruments exceeded my capabilities at my venerable current age, so I've decided to sell them.

Shannon Cameron (who operates KW Telescope) has informed me that the Meade ETX125 is the most popular telescope in her store. I only used this telescope once (without any of the electronics) for less than an hour to show my grandkids the Moon and Jupiter with its 4 Galilean moons. A fantastic experience for me and them!

Once you've got it up and running, I wouldn't mind a peek thru it to see what I'm missing!

Thanks!

Jim Rose - Guelph - (519) 821-4333

jmrose43 'AT' gmail.com

Product Specifications

- *Optical Tube Design:* Maksutov-Cassagrain
- *Aperture:* 127mm (5 inches)
- *Focal Length:* 1900mm f/15
- *Mount Type:* Computerized Go-To
- Focuser: Internal
- Optical Cowling: Multi-coated
- Eyepieces: Two (2) 1.25" Super Plossl 9.7mm & 25mm
- Tripod: Adjustable height stainless steel with accessory tray; built-in tilt plate for EQ alignment.
- Software: AutoStar Suite DVD
- Batteries: Requires 8 AA batteries (user supplied)

UPCOMING EVENTS

November 13, 2020 - 7:30 pm — Virtual Online H.A.A. Meeting for members. The meeting will be conducted on the platform Zoom. Be on the lookout for an invitation e-mail with a meeting link.
You may download the Zoom app for various platforms from Zoom's Download Center

Due to the COVID-19 Coronavirus pandemic, all in-person Hamilton Amateur Astronomers meetings and events are suspended until further notice.

2020-2021 Council

Chair	John Gauvreau
Second Chair	Jim Wamsley
Treasurer	Ann Tekatch
Digital Platforms Director	Christopher Strejch
Membership Director	Leslie Webb
Observing Director	Matthew Mannering
Education Director	Jo Ann Salci
Event Horizon Editor	Bob Christmas
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Secretary	Denise White
Publicity Director	Mario Carr
Councillors at Large	To be confirmed by the new council

Check out the H.A.A. **Website**
www.amateurastronomy.org

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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