# Nova Notes

The Newsletter of the Halifax Centre of the Royal Astronomical Society of Canada

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IN THIS ISSUE:



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## St. Croix Observatory

Part of your membership in the Halifax RASC includes access to our observatory, located in the community of St. Croix, NS. The site has expanded over the last few years and includes a roll-off roof observatory with electrical outlets, use of the Centre's new Go-To 400-mm Dobsonian telescope and 100-mm binoculars, a warm-room, and washroom facilities.

Enjoy dark pristine skies far away from city lights and the company of like minded observers searching out those faint "fuzzies" in the night. Observing nights (Fridays close to the New Moon or Saturday backup) are open to both members and their guests. If you are not a key holder and would like to become one, or need more information, please contact the SCO Manager, Tony McGrath.

**Upcoming Observing Nights:**
**June15 (alt 16)**
**July 13 (alt 14)**

Meetings usually begin at 8:00 p.m. at Saint Mary's University in Room 101 of the Atrium Building (AT).

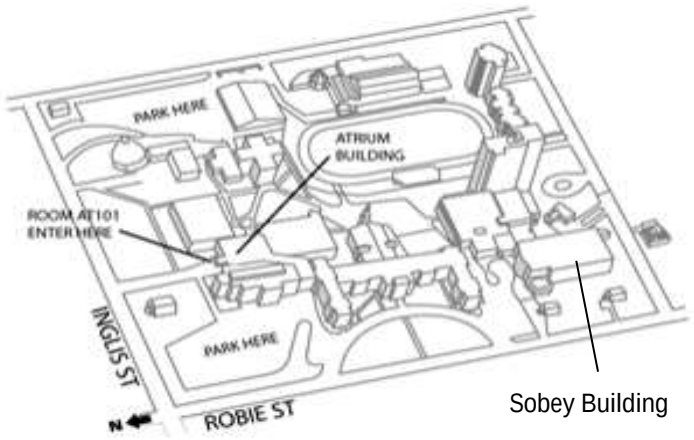
*All meeting locations and presentations subject to change*

# Meeting Dates for 2018/19

Meeting: Friday, 11 May
SCO BBQ Friday: 15 June
(Rain date scheduled 16 June)
Nova East Star Party: Aug 10-13
Keji Dark Sky Weekend: Aug 17-19

Meeting Location:
**Saint Mary's University**

Atrium Building (AT)
Room AT 101
The Atrium is located in front of the Patrick Power Library, between the Burke Building and Science Building.




**Meetings are usually held on the third Friday of the month, except for the months of July and August.**

**Executive meetings begin at 6:45 p.m., usually in room AT306, and all members are welcome.**

## Halifax RASC Board of Directors, 2018:

| | |
|---|---|
| **Honorary President : Dr. Roy Bishop** | **(Appointed)** |
| **President: Paul Gray** | **(Elected)** |
| **Vice-President: Melody Hamilton** | **(Elected)** |
| **Secretary: Judy Black** | **(Elected)** |
| **Treasurer: Gregg Dill** | **(Appointed)** |
| **National Council Rep: Patrick Kelly** | **(Elected)** |
| **Director: Sean Dzafovic** | **(Elected)** |
| **Director: Andrew Frank** | **(Elected)** |
| **Director: Paul Heath** | **(Elected)** |
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| **Director: Charles White** | **(Elected)** |
| **Librarians: Vacant** | **(Appointed)** |
| **SCO Manager: Tony McGrath** | **(Appointed)** |
| **Observing Chair: Sean Dzafovic** | **(Appointed)** |
| **Outreach Chair: Paul Heath** | **(Appointed)** |
| **Nova Notes Editor : Charles White** | **(Appointed)** |

Cover Photo By:

## Dave Chapman
## "First Light"

**A young individual takes a look through a telescope at the annual observing night hosted by Atlantic Photo Supply in Dartmouth. The event this year was well attended and well received by those who went. Thanks to Blair MacDonald and the other RASC Halifax Centre members who helped out that evening.**

# In this issue:



**From the Editor** — Poor weather conditions have been rampant this new year and seemingly much of end of 2017. When the skies are choked with cloud cover, rain, or snow; or let's face it recently, rain, snow, and whatever else Mother Nature seems to feel appropriate by times. So when the bad weather sets in and we're unable to look up, I try and task myself with other astronomy related things that help to keep those starless nights blues away.

First thing I always try and do, and again with this weather it is difficult, is observe the Sun. Myself and a friend here in the RASC Halifax Centre compare notes regularly on the number of spots, pores and faculae we see and then submit that to the American Association of Variable Star observers. Even if our closest star is quiet and has an R value of zero. Getting out and observing the Sun is a good way to spend a couple minutes on my lunch. It's two birds with one stone, doing good citizen science and it helps scratch that astronomy itch too.

Another method I use to try and keep those astronomy blues away, is to go through my RASC Observing program guide and do some preparation. I look at what I require, cross reference that with my star maps and get my astronomy log papers ready to go. This gets me ready for a couple nights of observing in advance so that when the clouds do break all that I have to do is grab my scope and my clip board and maximize my time outside looking up.

If all else fails, there is always a great read in the *Observers Handbook*.

Clear skies!
- Charles White

Above: Sun spots on solar disk. Spots were counted and submitted to AAVSO. (Photo: Charles White)

## Congratulations to Dr. Rob Thacker

A special congratulations to Dr. Rob Thacker from the Board of Directors and the membership of the Halifax Centre for winning the CASCA Qilak award for 2018. This is a back-to-back win for the Halifax Centre for this award, with Paul Heath winning RASC Qilak award in 2017. It demonstrates the great people that the Centre has and the passion of sharing our knowledge and wonder of what is above us in the sky.


**Nova Notes: The Newsletter of the Halifax Centre of the RASC**

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Nova Notes is published five times a year, in February, April, June/July, September/October and December.

**The deadline for the next edition is June 29th 2018.**

The opinions expressed herein are not necessarily those of the Halifax Centre.

Articles on any aspect of astronomy and related activities will be considered for publication.

# The Hunt for Sirius B

- Blair MacDonald

There are a couple of items that have been on my astrophotography bucket list for a while. The first I managed to cross off a few years ago, namely resolving deep sky objects in a galaxy outside the Milky Way (story for another time). The second, I've been trying to get an image of Sirius B for about five years now. I had a desire to get the image without using any optical tricks like a hexagonal mask over the aperture of the scope.

Several years ago I tried with an old Meade SN8, but the scope had some optical issues and although it was a reasonable wide-field imaging platform, it just wasn't up to the task of resolving close binary stars. My second attempt was with a classic 8 inch SkyWatcher Newtonian. I'm still convinced that this system may be able to resolve Sirius B, but I've been stymied by the bright halo around the bright A component. The f/5 scope has a large secondary so diffraction is definitely an issue. These days I'm using an Esprit 120 APO refractor and I thought I'd give it another try using a Celestron 2.5X barlow to increase the system focal length. The scope is a joy to use with a very stable focuser and great optics so I thought this might increase my chances.

February 15, 2018 around 7:00 p.m. I rolled the scope, on a ScopeBuggy, out of our garage and set it up to cool in the driveway. For those that haven't seen a scope buggy, these things are a must-have for the urban astronomer! It wouldn't be until around nine before Sirius cleared the trees so I went back in to watch the news and plan the evening's attempt. I had downloaded several images that all supposedly showed the dwarf, including one from the RASC Sirius B Observing Challenge (rasc.ca/sirius-b-observing-challenge) that I was planning to use as a reference. Around 8:30 I went back outside, polar-aligned the scope, pointed it at Sirius and started up the autoguider, not that easy a task at -12 degrees! One of the advantages of astrophotography from my driveway is the ability to head back inside and control my entire setup remotely. Heading back inside I started a VNC connection to my tablet, which running the scope, so I could stay warm for the rest of the evening. Since I had no idea of what exposure would work, I tried a variety starting at 30 seconds and reducing in two second increments until I saw something close to Sirius A for three frames in a row. I was able to see a faint star with exposures from 10 to 5 seconds so I settled on 8 seconds and shot 64 frames. There was a slight breeze so I used the best 42 and stacked them to produce the image below.

Above: Sirius A, full frame (Blair MacDonald)
Below: Same photo, central crop (Blair MacDonald)

Now things were getting exciting, in close to Sirius A was a faint blue star, slightly elongated due to the breeze moving the scope in some of the sub-frames. This was the same star labelled as the dwarf in all of the images I had downloaded. From here, everything went wrong.

Zooming in on the main target you can easily see the star that I assumed was Sirius B.

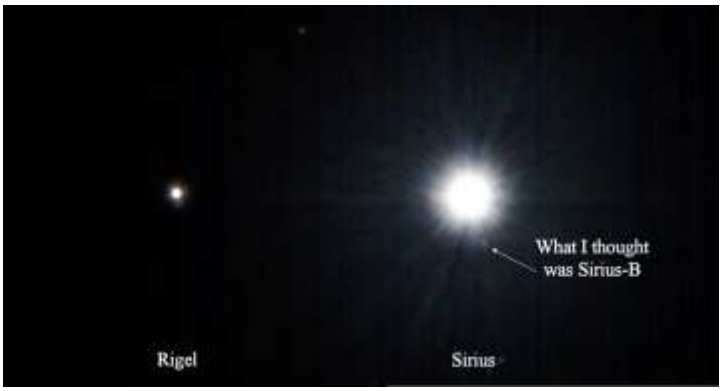
It was roughly in the right spot, or so I thought and wanting to be sure I took a couple of calibration frames to check the position later. After working through the math I came up with an image scale of 0.422 arcseconds per pixel and calculated the position angle of 68 degrees (actual is 72) so I thought I was in the right ballpark. The catch was that I goofed when I measured the separation as I measured the distance from the bright edge of Sirius to the small star and there were errors in my calibration frames as well. I came up with a measurement of 17 arcseconds which was off by quite a bit, but close. This was puzzling so I decided to sleep on it and retake my calibration images on the next clear evening. After a bit of back and forth with Roy I was starting to suspect that the star was not Sirius B. Roy pointed out my error in calculating the separation and I was beginning to doubt my calibration as the image scale seemed off.

The next night I planned to take new calibration frames and image Rigel. Rigel is a binary with close to the same separation as Sirius at the moment, but the stars are closer in brightness so resolving the system would be much easier. The idea was to use a sequence of images to home in on the correct exposure for the next attempt at Sirius. It turns out that my initial attempts were done with way too long an exposure, saturating the entire area where the dwarf would be located. After determining that two seconds was correct for Rigel, I was able to image and easily resolve the system.

Above: Rigel (Blair MacDonald)
Across: Rigel and Sirius Blair MacDonald)

I also took some proper drift shots to calibrate my image scale. By exposing for ten seconds with the mount turned off, allowing the star to drift through the frame at the sidereal rate, I was able to calculate the correct value at 0.315 arcseconds per pixel. I checked the separation on Rigel and got an answer of 9.8 arcseconds with the real value being around 9.5 (an error of one pixel in the separation). Much better agreement than I got in my Sirius shot. It turns out that using a planetarium program to move my mount north was a mistake. Turns out the program uses a goto to move the scope and with my mount set to always approach from the east it moves in RA as well as declination for all gotos. This caused an error in my calibration so the initial image scale of 0.422 arcseconds per pixel that I calculated was wrong and there was a slight error in the direction as well.

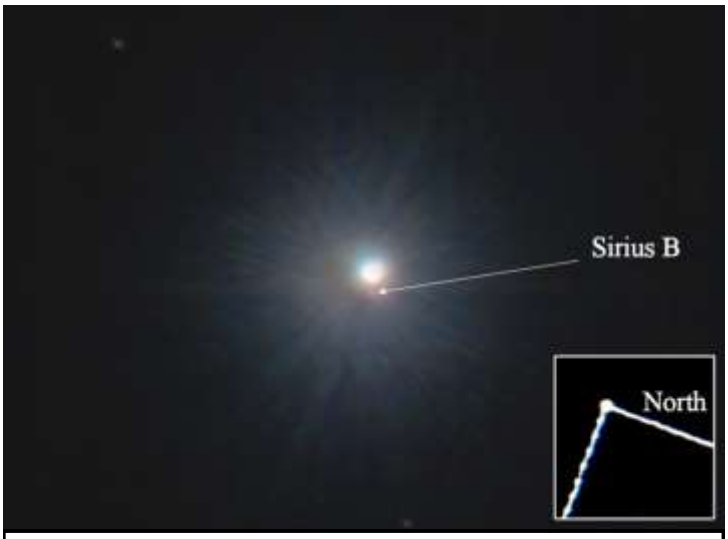
Using the correct image scale and the center to center distance between the stars, it was clear that the faint star was definitely not Sirius B. The central crops of Sirius and Rigel shown below are both to the same scale.



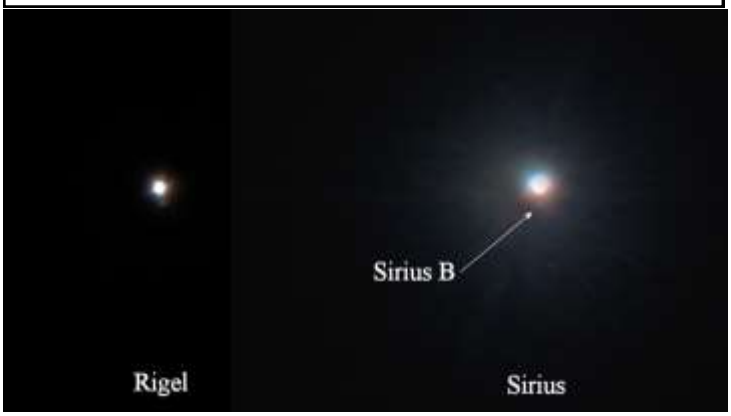

The separation of the two stars in the Rigel system is close to that of Sirius A & B, so it is obvious from the two images that the actual dwarf was still within the saturated area of the brighter star in my original image. It is interesting to note that the star I had mistaken for the dwarf has been labelled as Sirius B in several images online, including one on the RASC, Sirius Observing Challenge page so I'm not alone in my error.

*(Continued on page 6)*

Armed with this and a good image of Rigel I headed back out into the cold on February 19 to try my luck again. This time around I used a sub-exposure of 0.1 seconds which I calculated from the Rigel image below and the difference in brightness between the Rigel and Sirius components. Knowing roughly where to look for Sirius made all the difference. After collecting 122, 0.1 second sub-frames and combining them to produce a stacked image and applying a little image processing I was able to tease out the dwarf. Sirius B was just visible in the correct spot so I knew I had my target.




Above: Sirius A and B (Blair MacDonanld)
Below: Rigel Comparison with Sirius (Blair MacDonald)



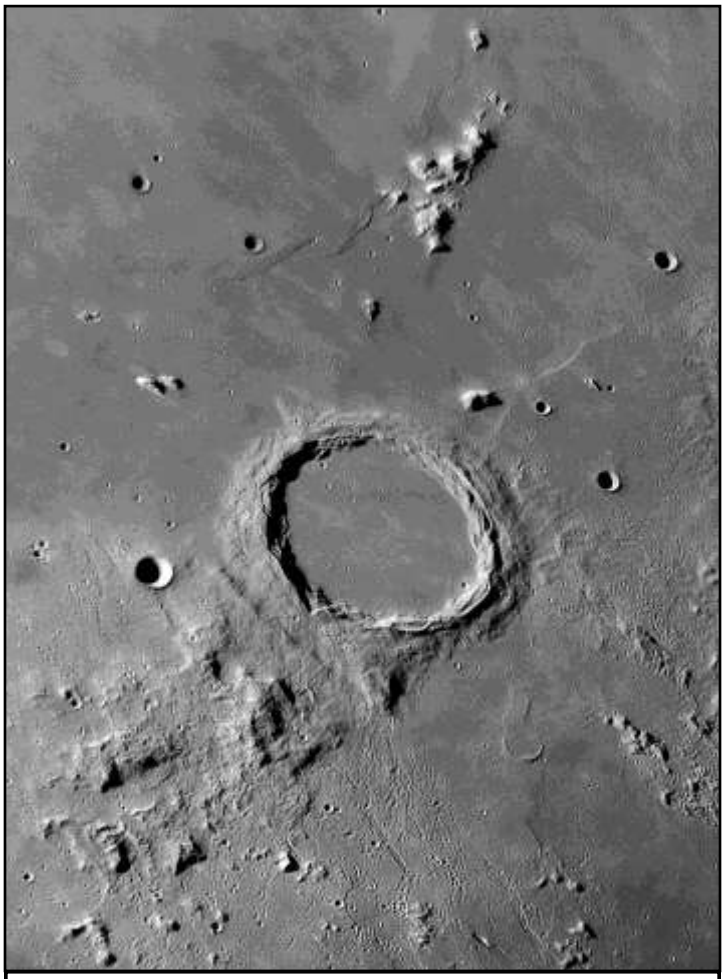

Measurements made from the image show that the stars have a separation of 11.3 arc-seconds with a PA of 72 degrees. This compares very well with the RASC Observer's Handbook value of 10.94 arc-seconds with a PA of 72 degrees (again about one pixel error). Compare the Sirius and Rigel images. The separation of the Rigel components is 9.5 arcseconds while the Sirius components are 10.95. Careful examination of the image below shows that the Sirius components are slightly wider than the Rigel components.

I'd like to thank Dr. Roy Bishop, a mentor to the whole Halifax RASC Centre, for prompting me to re-examine my original data and to calculate the separation and position angle. If it were not for his coaching I would have made the same mistake as many others and reported the faint, blue star I had originally thought of as the white dwarf.

# Lunatic Ramblings 10: Large Craters, Mountains, and a Cliff (Q-day 1)

- Dave Chapman

This column (started in April 2015) is based on *Explore the Moon*, the RASC beginner's observing program with certificate. For details, see www.rasc.ca/observing/explore-the-moon-observing-certificate. This issue, we review features visible on the first night after First Quarter (that, is Q-day 1). The central part of the Moon has loads of features: if you observe on the night of the First Quarter and on one night either side, you would see about 40% of the entire *Explore the Moon* list.



Robert Reeves (San Antonio, Texas) captured Archimedes and the Spitzbergen Mountains in this splendid view.

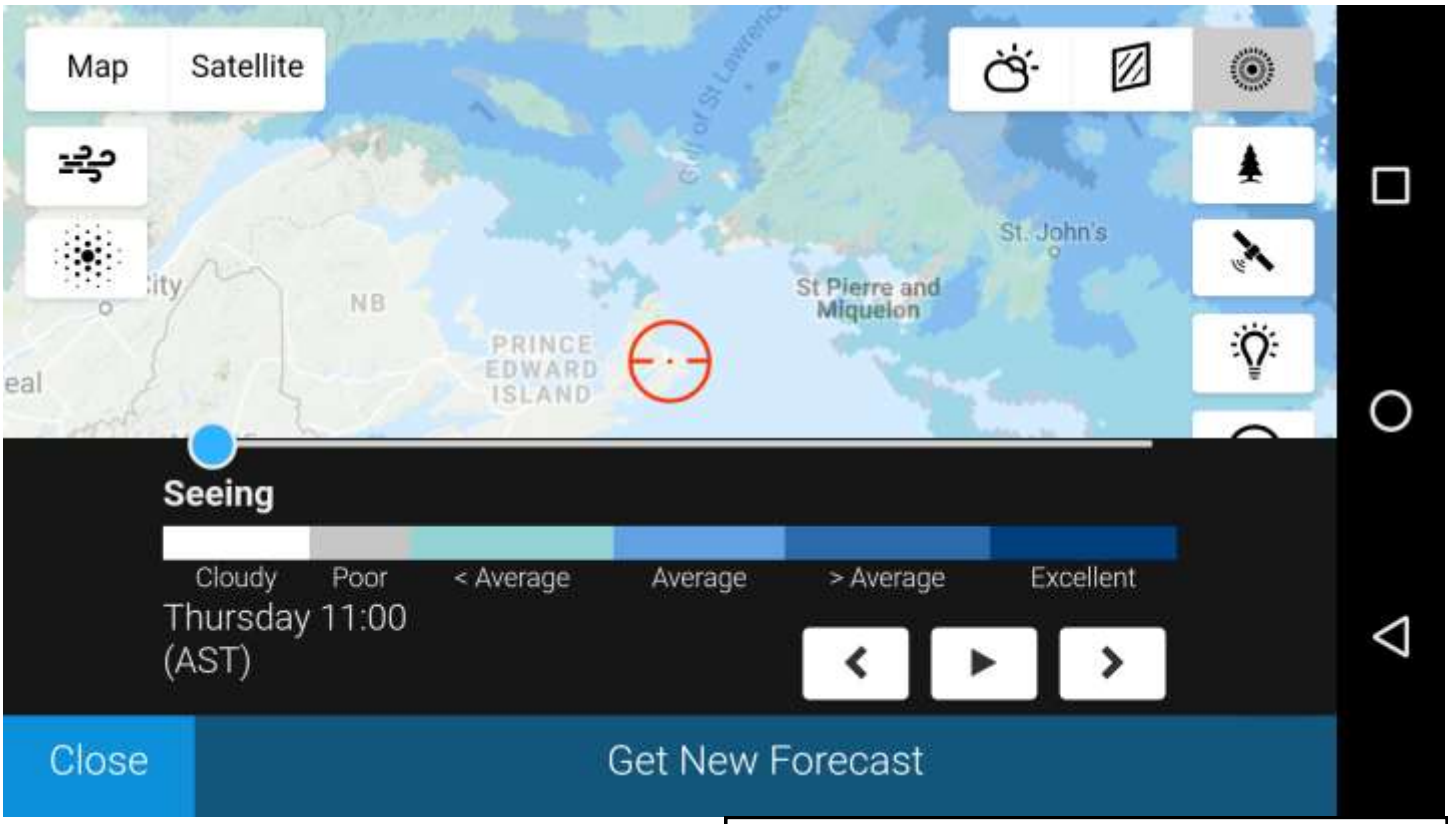
Here are upcoming dates relevant to this article: April 23, May 23, June 21, and July 20 (all in 2018). Remember that the Q-day method is approximate, and uncertainty is part of the fun. To make things easier, below I have marked with a * some of the items you might have to wait an extra day to see.

Staring in the north, Plato* (100 km) is one of the largest craters on the Moon, and its lava-filled floor is pockmarked with tiny craters. How many can you see? To the south, poking up through Mare Imbrium, find the Teneriffe Mountains. Further south again, we find Archimedes (80 km) and the Spitzbergen Mountains. If you are lucky, you will spot Timocharis* (35 km) to the west and Eratosthenes* (60 km) at the end of the Appenine Mountains, with Sinus Aestuum (Seething Bay) to the south.

In the south, you should see the eastern shores of Mare Nubium, and if you do, look for the Straight Wall (115 km long). The Southern Highlands is peppered with craters, and you can easily get lost. Look for Tycho* (85 km), which will show its famous ray patterns in a few days. Further south, you should see the large crater Maginus (180 km), and maybe even Clavius* (230 km). Clavius is one of my favorite craters, owing to the semi-circle of secondary craters on its floor. Do you notice anything curious about them?

There's lots more to see around this part of the Moon, but that should keep you busy for now. In my next article, we'll move on to Q-day 2 and look around—we are over 2/3 complete, but much to come! Email if you have questions or comments!

Dave.chapman@ns.sympatico.ca




Above: "Seeing" layer that can be set on Astrospheric. Below: Astrospheric app icon on an Android device. (Photos: Charles White)

## Reviewing Astrospheric

- Charles White

The weather is clearly important if you wish to look up at any given time. There have been multiple instances where, and I am sure you the reader can recall your own examples of getting equipment setup, letting it acclimatize and by the time your optics are ready for use, the night sky is clogged with clouds.

A friend of mine in the Halifax Centre here brought to my attention a website and an app called Astrospheric and suggested that I give it a try. I will be talking about my experience with the app. Opening it up, I found that it was very similar to another app that I currently have that I use as my primary meteorological source. The primary page as you open the app looks very similar to any standard weather app. It provides an hourly breakdown of the predicted weather for the area you are in. Wind speed and direction, temperature, dew point, as well as when both the sun and moon rise and set.

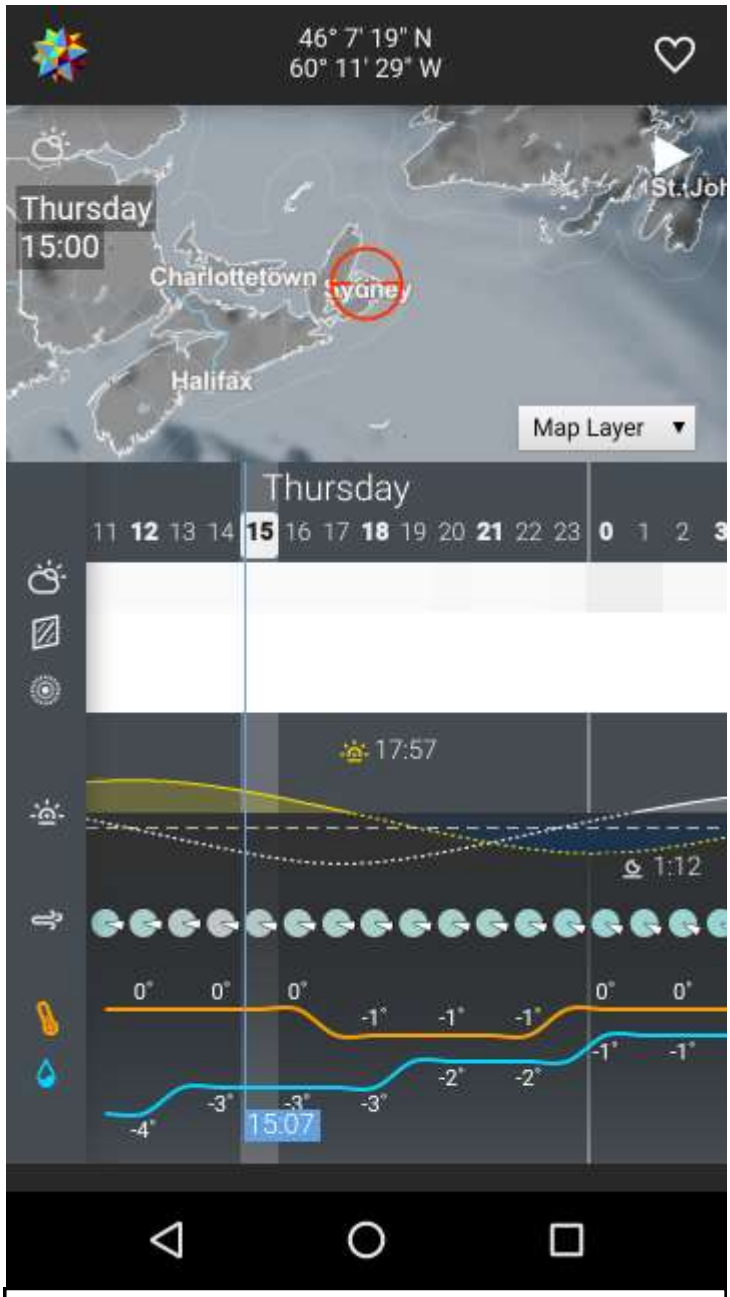
Where things start to deviate is right off the bat, included with the standard weather data, the app has in the hourly break down the “seeing”, “transparency” and “cloud cover” that the *Clear Sky Chart* provides.

The app also allows you to change the layer you are looking at by clicking the “map layer” menu. In it you can get detailed forecasts of seeing, transparency, cloud cover and loads more. The images can be played in a sequence much like the radar on the Environment Canada website. So you can run these maps to see how your preferred observing area will be affected and if you need to adjust to accommodate for the upcoming conditions.

Accuracy is quite reliable, there have been no instances when using the app’s assistance to plan my evenings that it has been wildly off. The transparency and seeing too have been trustworthy. I have set up and as the clouds rolled in or the seeing degraded, opened the app to see if the weather will improve again and base my choices from the maps.

It is for this accuracy and trustworthiness that I would recommend this app. However, there are downsides. I have found that the app can chew through data with all the rendering it can do generating maps or showing satellite imagery. There is also no night vision filter setting, which I found rather strange in an application that is geared towards astronomy and thus caution is recommended when relying on this map in the field. Unless you have taken the steps to put another filter on like *Twilight* or a piece of red mylar over your phone screen.

Final thoughts on Astrospheric are, if you have the space available, data, and a night setting on your phone, try it out I don’t think you will be disappointed. If you do not have a smart phone, or prefer to bring your laptop, I would stick with the tried and true, *Clear Sky Chart.*




Above: Main screen you see when opening app (Photo: Charles White)

# Nova East 2018

- Judy Black

You are invited to attend RASC Halifax Centre's spectacular Nova East (NE) on August 10 -13, 2018 at Smileys Provincial Park. With the New Moon falling just one day before the peak of the Perseid meteor shower on Sunday night, its the perfect reason to stay for 3 nights of observing the dark sky and counting meteors. We are asking the weather gods to only send meteor showers that weekend!

Doug Cunningham, a recent RASC Qilak Award winner, will deliver the public talk on Saturday evening. His presentation, *The Poetic Experience of Astronomy*, will feature examples of amateur and professional astronomers' poetry and will conclude with a personal perspective on coming to terms with a universe filled with dark energy. His wife, Paula Cunningham will present *Building the Dream*, focussing on the building of three private observatories.

Centre members will present other talks on telescope setup, meteor observing, and how to beat the weather challenges of observing in Nova Scotia. There's even a workshop for beginning sketchers and an activity for children. "Telescope medics" will be on hand in the evening to provide one-on-one assistance to novice observers in setting up, orienting, and using their telescopes. As usual, the observing field will offer 20–30 telescopes for viewing planets (especially Mars) and deep-sky objects, with the early evening sky tours and the introductory Ace Amateur Astronomer binocular observing activity (with certificate).

On Sunday, Dr. Roy Bishop will talk briefly about the high tides of the Bay of Fundy and will lead an expedition to view the tidal bores of the Herbert and Kennetcook Rivers—an opportunity not to be missed! That evening, with any luck, participants will enjoy the fireworks of the Perseid Meteor Shower.

All the presentations, observing sessions, the Astronomer's Breakfasts (pancakes, sausage, muffins, donuts, fresh fruit, juice, coffee/tea), Saturday's Potluck BBQ (with Paul Grey preparing a BBQ pork loin roast), and the late-night Astronomer's Lounge (new-to-Nova East) can be enjoyed by all. Also new this year are men's and women's t-shirts silk screened with the newly designed logo by John Read, and a quarter-zip fleece jacket embroidered with he 2018 logo. Be sure to get one!

For those interested in reading more and perhaps attending Nova East 2018, please visit our website: https://halifax.rasc.ca/ne/ Hope to see you on the observing field!