

NOVA

NEWSLETTER OF THE VANCOUVER CENTRE RASC
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Snowbirds and the Southern Sky

by Milan B

For us, Canadian amateur astronomers, travelling south in winter offers double benefit.

First, we trade our cold and dark winter days for usually much warmer and longer days and a chance to get some natural vitamin D.

Also, with every degree of latitude that we descend from the Great White North, we get a chance to see more of the southern night sky that is perpetually hiding from us.

Two weeks I spent in Costa Rica, centred around New Year's, was no different.

Staying right on the beach in Guanacaste, Costa Rica's famous beach province, at 10° of latitude North, I

plenty of time to bake in the hot tropical sun and frolic in the super warm waters (30°) of the eastern Pacific.



A south-facing Costa Rican beach offers plenty of fun in the daytime but also amazing things to see at night as well. Here, Canopus on the left and Achernar to the right decorate the southern sky on each side of the local meridian. Due to the moisture in the air and a bit of light pollution, Large Magellanic Cloud, although above the horizon, to the lower right of Canopus, was not visible.

At night, it was another special treat—southern sky gems, and there were plenty of them. At 10° of northern latitude, an observer at sea level would get to see southern sky objects all the way down to declination 80° south, at least in theory. In practice, due to the moist pacific air, the sky would usually “end” at about 5° above the horizon.

The new year's celebration was especially memorable for me, an avid
continued on page 6

JANUARY 12

NASA Ambassador Matthew Borghese recaps big events of 2022 and looks ahead to 2023. Room A03159 and Zoom.

SFU

SFU

FEBRUARY 9

Dr. Shawna Pandya, Canadian citizen scientist and astronaut candidate. See Meetup for SFU room location and Zoom link.

SFU

SFU

MARCH 9

Our Paul Sykes lecture featuring Dr. Alice Gorman, known for her pioneering work in space archaeology. See Meetup for SFU/Zoom details.

SFU

SFU

Learning PixInsight

by Marla Daskis

PixInsight is an incredibly powerful imaging software product with a reputation for being difficult to learn. I had an opportunity recently to try learning it and decided to document my experience.

As a bit of background, I have not used any imaging software before, nor have I got any extensive experience with imaging: I have taken a couple of pictures with a DSLR camera connected to the back of a Celestron Nexstar 4SE, and some video with a NexImage 10 camera on the same telescope, but none of those images were processed.

Recently, however, I had an opportunity to participate in an imaging session at the SFU Trottier Observatory, and a PixInsight workshop hosted by SFU, and led by Howard Trottier. The images from our telescope session seemed like the perfect opportunity to really give this a try and see if it was something I'd be interested in enough to purchase PixInsight.

PixInsight provides prospective users with a "try before you buy" free software license for 45 days. The sign-up process was easy and the next day I had a link for the download. The PixInsight team manually reviews every application for a free license and indicates that there is some flexibility in the terms of the license depending on circumstances. The nice thing about their software is that the free trial version isn't scaled back or limited in any functionality—you have the full suite

of tools at your disposal and get updates as they are released.

Downloading and installation was not difficult. In my case, I installed it on a newer MacBook Pro. Although my older Windows laptop in theory met the bare minimum specifications, I suspected it would take significantly longer to process, so opted to go for a newer machine. PixInsight does sup-

provides files to help you get started. Howard's documentation/homework from his first workshop referenced the same steps, except for the stacking and alignment, which he covered in the second workshop.

It took me several days to work through all the video tutorials. The biggest revelation from those tutorials was the amount of trial and error necessary for processing astroimages. The other big revelation was that thankfully, most of the processes and scripts have excellent default settings that don't necessarily need tweaking to produce good results. In the end, the image I ended up with from Harry's files was not too far off his finished product, which was gratifying.

At this point I was feeling confident, so I decided to try Harry's processes and the information in the first tutorial to process the image from our session in November. It didn't turn out well, since I was applying a colour LRGB process to a narrowband image, but I did gain more confidence in using the different types of processes and the PixInsight interface in general, within the confines of what I'd learned on my own to date.

The second workshop at SFU was the one I managed to attend in person. We walked through using the Weighted Batch Preprocessing script as a "one-stop shop" for alignment

continued on page 5



port both Apple and Windows products, but if you have a Linux machine, that's their recommended platform.

Once installed, I was eager to get started. I'd heard that the documentation within the PixInsight program is not extensive, and that is indeed true. However, the homework from the first SFU workshop pointed to a fantastic resource, the video tutorials, and resources by Harry Page, located at <https://www.harrysastroshed.com/index.html>—Harry's tutorials work on a project step by step, and he

President's Message

by Alan Jones

Happy New Year! 2023

A new year brings enthusiasm, hope and opportunity. In the northern hemisphere, the days are getting longer and although winter has just started, we are on our way to spring. At the start of the brand-new year, the glass is completely full.

Looking back, RASC-Vancouver had an outstanding year 2022 in spite

of Covid. We have rekindled our relationship with Simon Fraser University. Our volunteers supported every Starry Nights event with enthusiasm, knowledge and telescope views to share with visitors to the Trottier Observatory. We dusted off our loaner telescope collection in storage, called in the loans and re-lent scopes out to members wanting to learn how

to use them. The university invited us back to campus and has provided us with access to their lecture room equipment, enabling us to host hybrid events. We have a new position on council of Imaging Director, currently Rob Lyons. Rob has inspired and qualified or re-qualified more than a half a dozen operators of the Trot-

continued on page 4

About RASC

The RASC Vancouver Centre meets at 7:30 PM on the second Thursday of every month at SFU's Burnaby campus (see map on page 4). Guests are always welcome. In addition, the Centre has an observing site where star parties are regularly scheduled.

Membership is currently \$104.00 per year (\$61.10 for persons under 21 years of age; family memberships also available) and can be obtained online, at a meeting, or by writing

to the Treasurer at the address below. Annual membership includes the invaluable Observer's Handbook, six issues of the RASC Journal, and, of course, access to all of the club events and projects.

For more information regarding the Centre and its activities, please contact our P.R. Director.

NOVA, the newsletter of the Vancouver Centre, RASC, is published on odd-numbered months. Opinions expressed herein are not nec-

essarily those of the Vancouver Centre.

Material on any aspect of astronomy should be e-mailed to the editor or mailed to the address below.

Remember, you are always welcome to attend meetings of Council, held on the first Thursday of every month at 7:30pm in the Trottier Studio in the Chemistry wing of the Shrum Science Centre at SFU. Please contact a council member for directions.

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Honourary President J. Karl Miller

Library

The centre has a large library of books, magazines and old NOVAs for your enjoyment. Please take advantage of this club service and visit often to check out the new purchases. Suggestions for future library acquisitions are appreciated.

On the Internet

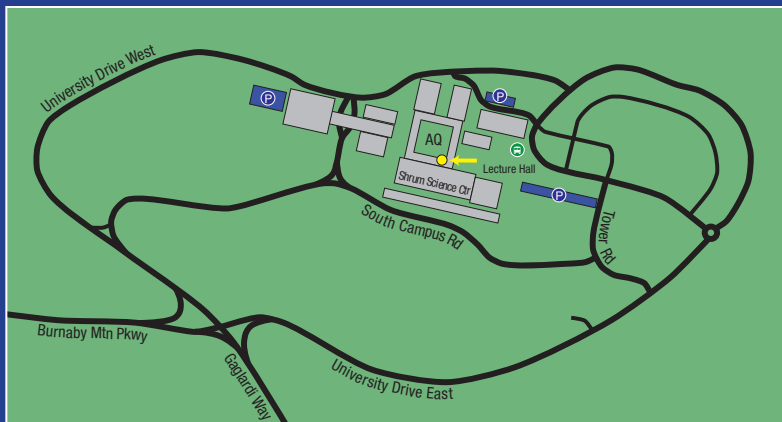
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Map to Meeting Site



Our Jan meeting is in room AQ 3159 of the Academic Quadrangle, near the southeast corner next to the cafeteria, as indicated by the arrow on the map.

Pay parking is available at several locations located around campus (indicated as "P" on the map).

continued from page 3

tier Observatory and he has published and shared several images from the Trottier since taking on the position. He is building a program to maximize our use of our earned time at the facility and has captured the imagination of the members involved and the university Starry Nights group. See some of Rob's astrophotography work here: <https://www.supercreative.ca/photo/robobservatory>

Our members' enthusiasm and energy make this club the incredibly great club it is. We have a dedicated group on council and a pool of members that volunteer to help us host events for the public, including the already mentioned Starry Nights above. Starry Nights, incidentally, hosted between 280 and 300 visitors to the observatory on each of the last three clear Friday nights of 2022. Many visitors didn't wait in the observatory queue and visited our telescopes instead or visited the observatory and then stopped by for a visit with our members and their telescopes. That's almost one thousand sidewalk

astronomy views in three nights! It is so important for us to capture the imagination of the public. We need a population with a curiosity about science that gives them the thirst for knowledge and education. An educated population with logical thinking capacity gives us a better chance to survive and leave a livable planet behind for the next generations to enjoy.

Last year, the Persied meteor shower was during the full moon and we were still shy due to the pandemic. Our club provided nine volunteers to a public of over 3000 visitors to view the event. This is nothing less than amazing. There is hunger in our metropolis to experience stellar events. At the more focused end of the spectrum, our speaker's chair, Andrew Ferreira, found and scheduled eleven guest speakers last year. The familiarity of Zoom meetings allowed us to present speakers from Alaska, Michigan and California. Topics included: Events of 2021 & 2022, Solar Weather, Galaxy Formation and evolution, Black Holes, Outstanding local member Astrophotography, Dwarf Galaxies, the

first Webb data, Space Debris, Avoiding Impacts and Influencing Orbits, Canada's Contribution to Spaceflight, and Biosignature Analysis of Exoplanets Using Network Modelling.

It's hard to imagine topping last year. Looking ahead, we are going to try. Already we have amazing speakers planned from NASA, An outstanding Canadian citizen astronaut candidate, A space archeologist from across the globe, and a local telescope workshop. Many of us long-time members remember the "old days" back at the planetarium auditorium and at SFU when we filled lecture rooms. It is a very different kind of experience to be in a room full of people excited and discussing one of the topics like those listed above. We stimulate each other to think of new questions and there is opportunity to discuss new ideas. Our goal is to return to that through 2023. It is convenient to sit at home and skip the travel across town to an in-person event. I admit I like that too on wet and cold winter nights. But it turns out that I have to host the next meeting and the ones following from

the university and I will do that as long as the pandemic and the university allow it. Our in-person meetings are the best way for membership to see and connect with each other. We also have the Trottier Observatory for our use on our member meeting nights. So, weather permitting, we can enjoy the use of the 700mm telescope!

Last year we reached a major milestone in our Vancouver RASC Observatory revitalization. As we move into utilizing this great resource, we welcome member participation. There are still plenty of opportunities to contribute to transitioning to a smoothly operating facility and we need member help to maintain and learn to use

the facility. Interested and a member? Contact Observatory@RASC-Vancouver.com.

Our council is in the process of choosing key goals for this year. We have a great group on council currently and are looking for a member to join us to lead event coordination. We are carefully selecting events that we can manage. Each event is a lot of fun and even more fun with more members participating in hosting. Interested and a member? Contact president@RASC-Vancouver.com. ★

Alan Jones presents Carl Bandura (right) with the Centre Appreciation award for his work on the VRO



continued from page 2

and stacking, along with some other preprocessing steps. Howard emphasized that it's not much use using the script unless we understood the separate steps that it performs. This was an excellent piece of advice. The workshop also gave me an appreciation of how to save and use processing steps

in a project, which was not covered in Harry's online tutorials.

I decided to look for a tutorial on processing narrowband images and try again. In Howard's documentation, he references some excellent written tutorials at <https://www.lightvortexastronomy.com/tutorials.html>. These ones are very detailed,

which is extremely helpful. I find these a little easier to follow than a video because it's easy to go back to a specific spot in the process and double check settings and steps. Each tutorial has a list of prerequisite steps and may cross reference other tutorials on the same site.

continued on page 7

Membership has its Privileges!

Are you tired of looking at the same objects again and again (planets, moon, etc.)? Is your telescope collecting dust because it's hard to locate deep sky objects? Would you like to bring your observing to a stellar level? Robert Conrad, our observing director, leads the Vancouver RASC observing group and invites you to join by sending him an email at observing@rasc-vancouver.com. Some of the benefits of belonging to this group include:

- Hands on training on how to operate the SFU Trottier observatory
- Weekly observing sessions at the observatory or at dark sky locations
- One-one-one coaching on how to locate thousands of objects in the night sky
- Attend small interactive seminars delivered by Robert on a range of topics including failsafe star-hopping, charting challenging objects and understanding the motions of the cosmos
- Learn to make your telescope dance by locating objects such as asteroids, nova, and supernovae
- Spectroscopy and imaging training from Howard Trottier and an opportunity to collaborate on observatory research projects
- Updates on observable sky events happening during the week like asteroid/comet/deep sky conjunctions
- Access to observing guides and lists that Robert created that took hundreds of hours to create and will help with planning observing sessions
- Knowledge and expertise from other observing group members
- Learn how to quickly and efficiently find and star-hop to deep sky objects using a range of binoculars and telescopes

Upcoming Events

March

8 – Paul Sykes lecture at SFU

April

21 - 23 – Manning Park Dark Sky Festival

May

13 – Astronomy Day at SFU

August

12 - 20 – Mt. Kobau Star Party

December

14 – AGM

Little Problems

Living in an area subject to a lot of cloudy weather, I use my telescopes sporadically. The Christmas and New Year's periods additionally result in family and friends getting together. That means that some clear sky conditions are also bypassed. Because of several days being available, I had time in which I could, and did, check the operation and possible problems on my EQ-type telescope mounts and my telescopes.

From my previous blogposts, you'll know that I much enjoy the public astronomy nights which SFU runs on clear Friday nights. I've been using my 3" refractor most often for our RASC participation. The telescope is not heavy and can be put onto the telescope mount quickly. As well, it is easy to align with the celestial North Pole.

The reason, of course, is the automatic tracking of any object being observed by moving the telescope westward at



The dual-axis motor drive

the same rate as the Earth's rotation eastward.

The EQ4 tracking mount I use for

by J. Karl Miller

the 3" refractor has somewhat of an issue though. No matter how closely I align the telescope with north, the object in the telescope's field of view slowly drifts out of view. It's easy enough to correct this by using the control buttons on the Dual Axis Motor Drive which powers both the right ascension and declination motors. However, it requires my periodic attention to make sure that our public guests will actually see the target to which I pointed the telescope.

There are many cloudy days and nights at this time of year. I set up the telescope and mount in our rec room at home to move through a 24 hour tracking run. The idea was to set the time and direction scales on the mount to a start point (I pointed the E marker on the telescope RA axis to

continued from page 1

sky observer. At the stroke of midnight, just 15 minutes after the local astronomical midnight, Sirius, the new year's star, was hanging very high in the sky, at an incredible 63°.

To the lower right of Sirius, the second brightest star in the sky, Canopus, also known as a Christmas star, virtually invisible to observers north of 37° north, had just passed the meridian and showing off at a respectable 27° of altitude.

Achernar, an early evening blue gem in Eridanus, had just set and missed the great beach celebration filled with music, dancing and fireworks.

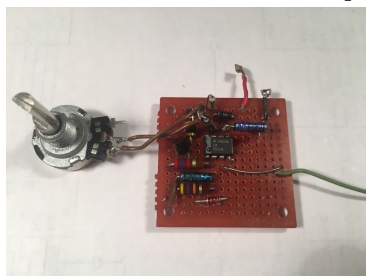
The False Cross was also quite prominent by this hour, lying east of Canopus, gifting late-night beachgoers with a hint of the true Southern Cross which was scheduled to rise just over an hour later.

Another fascinating thing that can be observed only at latitudes below the tropic of cancer is planets and the

Moon transiting the meridian in the northern part of the sky. This time it was Mars that exhibited this, for us Canucks, unusual behaviour. Hanging high in the sky during its post-opposition tour of Taurus, Mars was transiting around 9:30 PM at an incredible 75° but due North. How cool is that?

All in all, the new year's eve and the whole beach vacation was truly memorable for me and I was able to recharge for the remaining winter days in Vancouver. ★

the 0 hour mark on the time scale) and to read the scales at the end of the run, 24 hours (actually 23 hours, 56 minutes, and 4 seconds) later. At that point I would have expected to see the E marker to point again at the 0 hours mark. Lo and behold, it pointed instead to 2h and 50 min beyond the 0 mark. This means that the telescope



Proposed astable timer

actually indicated that it moved past the 0-hour time marker; it incorrectly showed that it had moved a total of 26 hours and 50 minutes. The tracking motion of the mount is therefore 11% faster than the daily sky motion. Since the Earth turns 15° per hour, this result moves the telescope to a position almost 45° ahead of the position it should have after 24 hours tracking. Instead of moving through

360° , it moved almost 405° . I had noticed smaller overruns on other days, even on much shorter test runs. This is what actually made me run the 24 hour test.

My motor drive unit has four control buttons to speed up the RA and DEC stepper motors 2, 4, or 8 times by means of a separate speed switch. Each button is dedicated to one particular direction. The RA motor is controlled by an East button and a West button, the DEC motor by a North and a South button. The East button can be used to compensate for the 11% excess tracking speed, but it requires me to push and hold the button to move the telescope back to the observed target. It is a very basic and very slow slewing system—it would take many minutes to move from Vega to Deneb for example. As it exists, this whole system is not suitable for long-exposure astrophotography, in my opinion. It's ok for visual observation and possibly photography of the Sun or the Moon.

Now the question: what causes this? I was thinking about the gear ratios in the RA motor, or in the mount, the clock frequency in the electronics

of the Dual Axis motor drive unit, the pulse rate applied to the RA motor stepper windings, searched for an adjustment capability in the electronics board (found none), and other electronic possibilities. I also searched the internet for electronic schematics (there are dozens) but did not find the one which exactly matched the Dual Axis motor drive above.

I'm thinking of putting together an astable timer based on the 555 precision timer chip. Its output voltage could control the power provided to the motor drive, i.e. shut off power 11% of the time. That way, the movement of the sky could catch up with my faster-moving telescope. It's a crude approach, but in my working days I built many similar timers to control printers, vending machines, debit card readers, and other equipment. I found the timer shown at left in one of my "junk" drawers which contain all manner of parts, most of which are decades old. The shown timer is an unused piece I started about thirty years ago, and never finished. I'll check it out and may modify it to counteract the tracking error.

Stay tuned. *

continued from page 5

It took several hours and multiple sessions to work through the prerequisite steps. These covered specifics about manually stacking and aligning images, something that Howard had recommended we work through before using the automated scripts available in PixInsight. The main workflow also took several hours to work through, although a lot of this time was due to making notes.

Ultimately, I ended up with the im-

age you see with this article. There is still room for improvement since you can see a diagonal line in the lower left of the picture—somewhere in my stacking and alignment I either missed a step or did something wrong. I also would brighten and sharpen the colours, which requires more experimentation.

I plan to continue to use PixInsight, and will be saving up for the cost of the full license. There is much to learn, however there are many

resources available to help, including books. Howard recommended a book by Warren Keller called *Inside PixInsight*, which is also on my wish list.

If you have been curious about PixInsight and were concerned about the learning curve, I recommend looking at the tutorials on the websites mentioned above to get a feel for the application. I can certainly confirm the learning curve is steep but achievable! *



M33 - The Triangulum Galaxy by Rob Lyons

2.73 million light years from Earth lies the Triangulum Galaxy, a member of our local group of galaxies along with its famous neighbour, Andromeda. This image is the result of 39.4 hours of exposure time over several nights in November. This image was made with the Sky-Watcher Quattro 150P telescope, ASI183MM Pro camera, and Artilia LRGB filters as well as a hydrogen-alpha filter to better capture the massive nebulas contained within the spiral arms of the Triangulum Galaxy.