Newsletter of the Royal Astronomical Society of Canada Winnipeg Centre March/April 2021

Winnicentrics

The Royal Astronomical Society of Canada - Winnipeg Centre

Upcoming Events

RASC Winnipeg Centre Monthly Meetings (via Zoom)

March 12. 2021
April 9, 2021
May 14, 2021
June 11, 2021

Members' Observing Nights

TBA

Oak Hammock Marsh Astronomy Night

Cancelled for telescopes

Regular meetings of the Winnipeg Centre are normally held in the Robert B. Schultz Lecture Theatre in St. John's College at the University of Manitoba, 92 Dysart Road. Free parking is available in the lot across the street. The theatre is on the lower (basement) floor of the College. Meetings are usually held on the second Friday of each month from 7 p.m. to 10 p.m. After the meetings, members who wish to do so usually retire for pizza and more conversation about astronomical subjects.

However, due to the current restrictions imposed by Manitoba Health for the COVID-19 Pandemic all meetings are being held via Zoom at 7:30 PM on regular meeting nights as above. Regular meetings will resume once restrictions are eliminated and our members can meet in safety. We miss you!

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YouTube https://bit.ly/2FrcZJZ

https://bit.ly/3iSmFed

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Winnicentrics is published six times or more each year by the Winnipeg Centre, RASC. Winnicentrics is produced by and for the members of the Winnipeg Centre.
Any opinions expressed are those of the author. Any questions or comments please email:
newsletter@winnipeg.rasc.ca
Or contact one of your Councillors above

Notices:

The Glenlea Observatory LX200 / Dome is CLOSED. Please contact Bryan Stach at bstach@mymts.net or phone 204-295-8506 for current info.

Glenlea Warm Room and Pad are CLOSED.

Members Observing Nights are CANCELLED due to COVID restrictions.

Member Meetings continue to be virtual due to COVID restrictions, please see your email or the RASC Winnipeg Forums for Zoom information.

Boston Pizza after-meeting social events continue to be virtual due to COVID restrictions, please see your email or the RASC Winnipeg Forums for Zoom information.

Visit our web site at:
www.winnipeg.rasc.ca

President's Corner

By Dennis Lyons, RASC Winnipeg Centre President

Welcome everyone!

I just wanted to give you all a quick update on what this year's Centre Council goals are and where you can help. The Council has blasted off by developing a strategic plan to help guide the Winnipeg Centre over the next 3-5 years. This is being done with input from the membership through discussions and surveys. Here is the first place you can help: contact one of your Council members and let them know what you would like to see. Maybe you can sketch out a few ideas, and perhaps be willing to lead a project.

In the short term the Council has restarted the Beginners session and expects to change its format to better address what new members told us they wanted from the last survey. Speaking of members, the Council is recruiting a Membership Coordinator to assist them in making sure every new member is welcomed and our other members feel included. The Council is also focussing on growing the use of Glenlea with a more predicable Members Night, Mentors Program, Youth Outreach and Dark Sky initiatives. Is there some other programming or service you would like? Let us know or better yet, volunteer to launch a new initiative. All these programs will need volunteers to assist. Maybe host a zoom chat room for your area of interest. If you have an hour or two, please consider it.

The Council is moving to incorporate The RASC Winnipeg Centre to be able to tap into funding for some of these projects. To enable this the Bylaws are being updated and will be presented at either the AGM or a special meeting of the Centre Membership. Also, a Centre Operations/Procedures Manual is being developed to capture job descriptions and other things the Centre does but is not necessarily written down in one place.

Some more positive news is that the Council has approved the dates for the Spruce Woods Star Party for the September long weekend. If you are not aware this is the first Dark Sky Preserve in Manitoba and an excellent place to see the night sky and enjoy some time with your fellow amateur astronomers.

Well, another day is dawning, and the future looks bright for The RASC Winnipeg Centre! The Council is looking forward to hearing about your ideas and where you would like to volunteer.

Clear Skies,
Dennis Lyons

president@winnipeg.rasc.ca

Editor's Message

By Gord Tulloch, RASC Winnipeg Centre

Boy, am I looking forward to some clear skies and warm days! The last few months have been disappointing, starting with clouds obscuring the extremely rare Jupiter / Saturn conjunction on Dec. 21 and carrying on through January, and now a deep freeze in February. It certainly will be a pleasure to get out under the stars in March! With the excellent progress made in flattening the COVID curve in Winnipeg as well, we may get to do some group observing soon. I know we're all definitely looking forward to it!

In the meantime please feel free to check out our very active Facebook presence for the Club! You can reach it at:

https://www.facebook.com/groups/rascwinnipeg

This group has been extremely active over the winter, gaining many new members, particularly due to press coverage on the Dec 21 conjunction. The group is a great place to stay in touch with fellow members – if you're only using the RASC-WPG mailing list (which will be sticking around also) you're missing out on a lot. These two channels along with our Forums, Newsletter, and direct mail continue to be the primary modes of communications for the club. Check it out!

With this issue we are no longer able to get the Abrams Planetarium Calendar and Star Maps. The survey we conducted while quite positive on the value of the content (70%) the feelings were mixed on whether we should pay for this content (50/50). We will find an alternative source, or at least post some links to online resources. Thanks for responding!

As always special thanks to Ralph Croning for proof-reading Winnicentrics for me – all remaining errors in this text are due to me not following his good advice!

Any questions or comments please contact me at newsletter@winnipeg.rasc.ca. Clear skies!

GLP-TRAINED USERS AND SPOTTERS
RASC WINNIPEG CENTRE

The following Members have received training in the proper use of Green Laser Pointers and may apply to receive a permit to conduct an astronomy outreach session in accordance with applicable law and RASC policies respecting green laser pointers.

6 February 2021 (expires 5 February 2024)

Paul Paradis

9 August 2019 (Expires 8 August 2022)

Abdul al Manni	Patrick Curry	Kaeren Anderson	Kevin Davis	SHR Bannister
Michael Fry	Michelle Boyce	Darren Hennig	Sean Ceaser	LLoyel Hull
Ralph A. Croning	Paul Karlowsky	Clifford Levi	Dennis Lyons	Alan Macklem
Jim Mcdowal	Krzysztof Keller	Daemon Nightshade	Gail Wise	Brian Renaud
Stan Runge	Bryan Stach	Gordon Sharr		

11 August 2019 (Expires 10 August 2022)

Jay Anderson	Judy Anderson

13 December 2019 (Expires 12 December 2022)

Trevor Bryant	Stephen Altstadt	Ed Johnson	Robin Clarke
Adelle Kennedy	Lucille Eustache	Timothy Kennedy	William McDonald
Kevin McGregor	Michelle Paquette		

Sketcher's Corner

By Gerry Smerchanski, RASC Winnipeg Centre

Who would have thought that one could spend hours outside sketching at the telescope... with bare hands ... in January... in Manitoba...

Fracastorius is a crater that is easy to overlook with its flashier neighbours such as Theophylus to distract one's attention. It is also a crater that has such various looks to it that it is not always easy to recognize. During the three hours I watched it early Sunday morning it was amazing to see just how much this crater changed.
So that is the caveat that accompanies this sketch. Even though I followed the strategy of 'locking in' the shadows first, by the time I got to certain parts of the sketch the scene had changed so drastically that I was documenting a differently illuminated scene. I took a couple of pictures during the sketching period and noted how the end part of the sketch looked like the end image and not like the image taken earlier. So no one image will reflect this sketch. Such is the case with life at the terminator.

Sketch done with graphite pencils, charcoal, ink and whiteout on white paper. Observed in great seeing at almost positive temps using a 9.25 inch SCT with binoviewers. Two sets of eyepieces required due to fogging. Thanks to Silvia for the white ink pen.

The bright crater rim above Fracastorius right on the terminator is Rosse.
Not sure of what peaks were still in the sunshine far on the wrong side of the terminator, but that would be the right location for Fracastorius B. Image was flipped so that it appears correct view, with North up.

From the Winnipeg Centre Workshops

Gord Tulloch's NTT16 16" F4.5 Newtonian Reflector is nearing completion, with only some electronics waiting for some parts for completion. The scope features hexapod collimation and complete computer control including a plate solve based system for alignment and targeting refinement. See another article on its construction in this issue!

Paul Paradis wrapped up his side-by-side dovetail project with an 11" version

Adventures in Planetary Imaging

By Scott Young, RASC Winnipeg Centre

Figure 1 - Lineups at Mars Mania 2003

Back in 2003, Mars came closer to the Earth than it has in living memory, and I decided to try and record the moment. Using the planetarium's 8" Celestron SCT and a Astrovid PlanetCam, I recorded video frames as Mars came close to Earth, and we used the video to project onto a screen at our live events. Some folks will remember the events at Bird's Hill Park in the summer of '03, where we filled the Folk Fest parking lot with visitors and showed about 10,000 people the Red Planet up close and personal. (This was in the "before time", when people gathered in groups to share their experiences. But I digress…)

I recently found that old video, and while it was OK it wasn't really amazing compared to the images you can see today. I figured 17 years' improvements in technology should make a difference, and so in prep for last October's Martian close approach I looked for a new camera for planetary imaging.

Figure 2 - QHY-5-III-224C

After some research, I realized there were a lot of things to consider. I had decided that I would be doing live stream events due to COVID-19, and so one-shot colour was important. (With a higher-resolution-but-monochrome camera, it's too time-consuming to explain to each person online why the image isn't red!) I planned to use the "lucky imaging" technique (explained below), and so I wanted a camera with a fast frame rate, so I could capture lots of images in the minute or two you have before Mars' own rotation will cause blurring in the final image. I also wanted something with a bit of versatility, so I could take some longer exposures to hopefully try to image Mars' moons as well with the same setup. I finally decided on the QHY-5-III-224C camera, which had all the features I wanted and was on sale for $199 on the day I decided I was going to spend the money.

My main imaging scope is an Orion 6" Ritchey-Chretien on a SkyView Pro mount, which has a focal length of 1300mm. To show Mars in enough detail, I'd need to at least double that, so a Barlow was in order. I already had an Orion Shorty 2x Barlow and a 3x Barlow as well, so I elected not to get a higher-quality one for imaging. I reasoned that the small chip of the camera would be right in the middle where even a lower-cost Barlow would be pretty sharp.

The one piece of gear I considered and rejected was an Atmospheric Dispersion Corrector, or ADC. This little gizmo has a pair of prisms that basically adjust for the rainbow effect when light of different

colours passes through the air. It was a fairly pricey bit, and I figured I could do without it. (Foreshadowing…)

With my gear decided and ordered, I learned more about "lucky imaging". The concept is, the Earth's atmosphere is constantly distorting the view of a planet as the heat waves and turbulence refract the light. This is what astronomers call "Seeing", and most visual observers are familiar with it. Every so often, the seeing clears up for a fraction of a second and reveals a clear view, but most of the time the image is fuzzy or distorted. Lucky Imaging basically aims to capture as many frames as possible, and then throw away the distorted ones and just keep the clear ones. This is why a video camera is required: you need to capture thousands of frames to get enough good ones to then stack to average out the other sources of noise and get a good picture.

In the lead-up to the Mars opposition, I was inspired by the amazing images of my friend Martin Radcliffe, who was using a C14 Edge telescope and a similar camera to mine (although Martin takes separate monochrome images through color filters and assembles the images into colour ones later). Even with Mars still relatively far away his images reminded me of the Hubble Space Telescope images of only a decade ago. Martin also quite generously provided me with encouragement and shared some of his imaging tips, which definitely had an impact on my results.

Figure 3 - First light image, Sep. 26. Best 75% of 2,500 frames stacked.

During the same time other RASCals were focusing on Mars as well. Michelle Boyce wound up with the same camera I had, so we could compare notes. The astro-sketching group was also "imaging" Mars and gave me encouragement and something to aspire to. I almost went back to my sketching roots, but having started this imaging project I needed to stick with it.

I began imaging Mars seriously in September, only a month before the closest approach. The first nights were encouraging even though I was learning the ins and outs of the camera. It turns out that while collecting "lucky" frames is important, it's just as important to collect a LOT of frames which helps reduce noise and brings details out. I finally settled on collecting about 10,000 frames in one video, which took less than 2 minutes due to the camera's high readout speed. Since Mars is only a small part of the frame, I could select a small subframe much smaller than the full chip, and the camera would read that out and discard the rest of the black frame. I reached speeds of over 150 frames per second using

this technique! (I used the free version of SharpCap Pro on my Windows 10 laptop for image acquisition.)

Even with this, the images were lackluster until they were processed. I again used free software, this time AstroStakkert 3 to assemble the "lucky" frames into one image, and RegiStax to then process the image to reveal detail. RegiStax also will stack images, but AstroStakkert does a better job of it, so it's worth the extra step.

(Tech Note: Registax does something called "wavelet processing" which is definitely an art. After playing around with it a lot, I wound up using the linear Gaussian option, and then starting by increasing the first layer to 100% and seeing what happened. I would increase the "Sharpen" factor of that channel slowly until the image started getting noisy, and then back off slightly and increase that layer's "Denoise" setting a couple of clicks. Once I had reduced the noise, I'd go to the second layer and repeat. I usually found that I'd only use the first three layers, although I suspect that this was specific to my telescope aperture, camera resolution, and seeing conditions.)

Then it was just a matter of imaging Mars as often as possible to get a bunch of images. I got 2 nights in September, 6 in October, and 12 in November (which is a LOT of observing for me). Some of these nights were literally just setting up the scope, focusing, grabbing a couple of 2-minute videos of Mars, and packing up. Sometimes it was through thin haze or "sucker holes" in the clouds. By December, the combination of Mars' increasing distance and a dust storm that had broken out reduced the detail I was able to capture, so I stopped after 2 nights in December.

Figure 4 - October 26th. The best image with the 6". Solis Lacus, the "Eye of Mars", is center.

One thing that became clear was the importance of good focus. It's one thing to focus visually, but if the image is even slightly out of focus the wavelet processing starts to processing focus issues instead of actual features and you get garbage. I made myself a focusing mask with three triangles in it out of cardstock, which helped a lot. A real Bahtinov mask would have been better, but the one for my scope was backordered from Orion and still hasn't arrived. (Apparently a lot of people took up planetary imaging of Mars during the pandemic!)

I also did one night of imaging with the Centre's 12" Meade LX200 at Glenlea. That image captured more than my 6" scope, but not a huge amount more. I suspect a combination of poorer focus (I didn't have a focus mask for the 12") as well as vibration in the observatory's pier was to blame.

While all this was going on, I also imaged Jupiter and Saturn, but they are so low that the seeing was always terrible. Looking forward to them moving to a higher part of the ecliptic 7 and 15 years from now, respectively!

Figure 5 - November 4th. Lots of detail – as Mars recedes my technique gets better.

Overall, I went from never having done modern planetary imaging, to getting reasonable images, with a $200 camera and some time spent. I'm pretty impressed with how easy it was to get involved, and the amount of free software and available tutorials to get a newbie up to speed. None of my images will win any awards, but they're mine and I made them, and it was great fun.

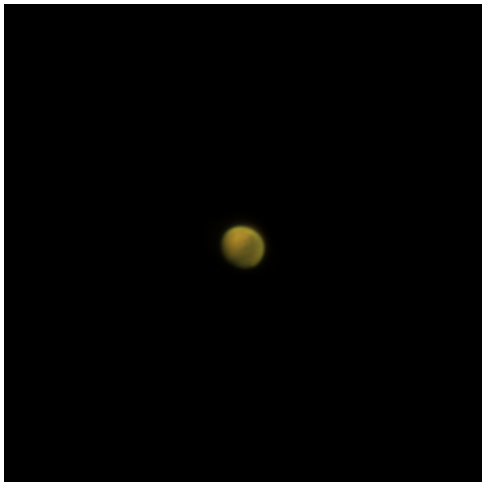
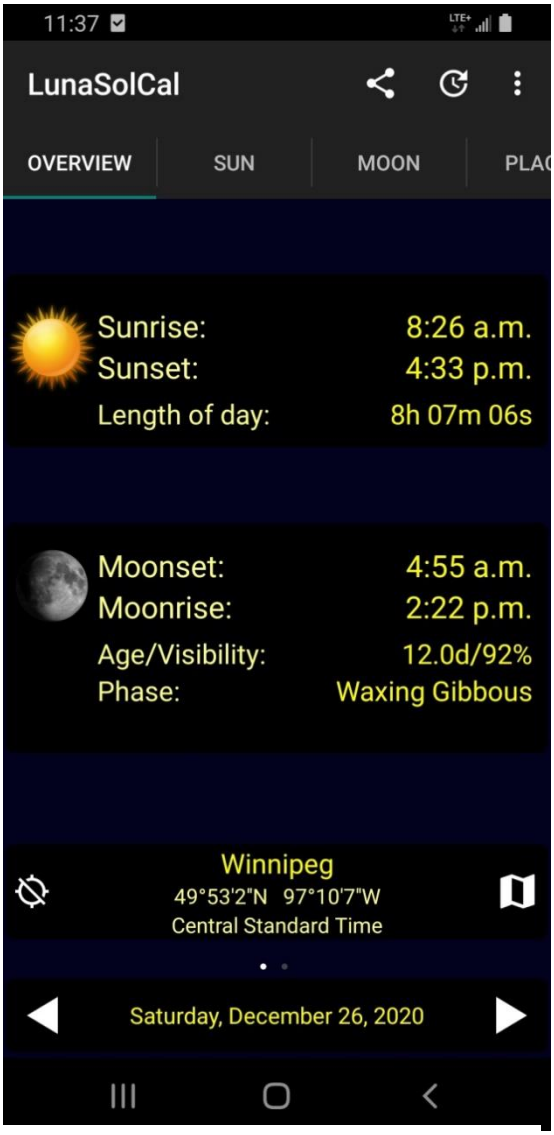


Figure 6 - "last light" for Mars, December 1st. The planet is noticeably gibbous, and the details are very soft due to the dust storm.

Review: LunaSolCal Smartphone App

By Stun Runge, RASC Winnipeg Centre

In my January 2019 Beginners Session presentation called Super Thin Moons, I covered one of my favorite astronomical challenges. I discussed the situation of an upcoming March young crescent moon opportunity, and the methods which I would use to make finding it easier (of course it turned out to be cloudy). I also talked about the use of a Smartphone App (which my good friend Paul Paradis introduced me to) called **LunaSolCal**. I use it with my Samsung phone, and have not evaluated it with an iPhone.



Picture 1 – Screen shot of Overview screen

As with most Smartphone Apps, I usually do not dive deep into all their features and available information. However, during the past year, I have found more and more value in the LunaSolCal App, especially as it relates to seeking young crescent moons. Enough value, that it made me want to write this article, to share them with you. As an added bonus, I find it also helps with the planning of my other Lunar and Solar imaging sessions.

This article will highlight many of the items I found helpful. I hope it convinces you to add this little App to your arsenal of astronomy Apps.

Overview

Since the App provides information based upon your location, you should have the LOCATION option of your phone turned on. The benefit here is that you can get the information for any observing site one chooses. So if I am in Teulon, or have travelled west of Winnipeg to a site with a clear western horizon, the information the program provides is very relevant.

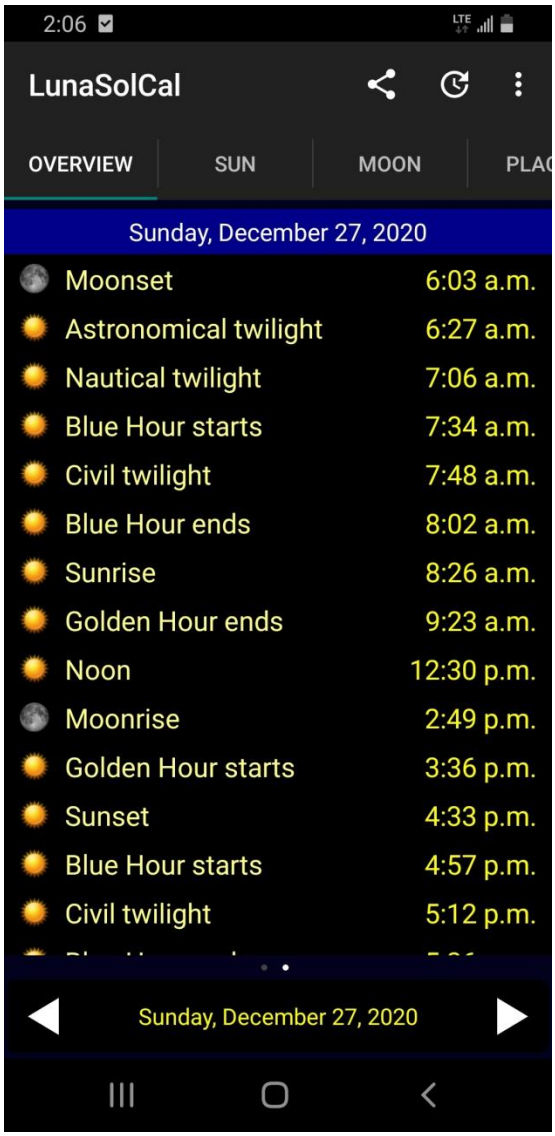
When you first open the App, you come up with the OVERVIEW screen. It shows you the basic details on the Sun: its rise time, setting time and the length of day. It also shows you details on the Moon: its rise time, setting time, current age, percentage

visible and current phase. At the bottom of the screen, it gives you the latitude and longitude, should you need this for your GoTo mount.

At the very bottom of the screen is the date. On either side are arrows, which allow you to adjust the date to help plan for future observing events.

Also across the top of the page, it shows four options including Overview, Sun, Moon and a Places page. We will visit each of these options.

Now, if you the swipe to the left, a second page of information appears; including Astronomical Twilight start, Twilight finish, the actual "noon" when the Sun is highest in the sky, and something called the "Golden Hour start" – which I assume is the time to open the wine bottle.



Picture 2 – Screen shot of 2nd overview page

Sun

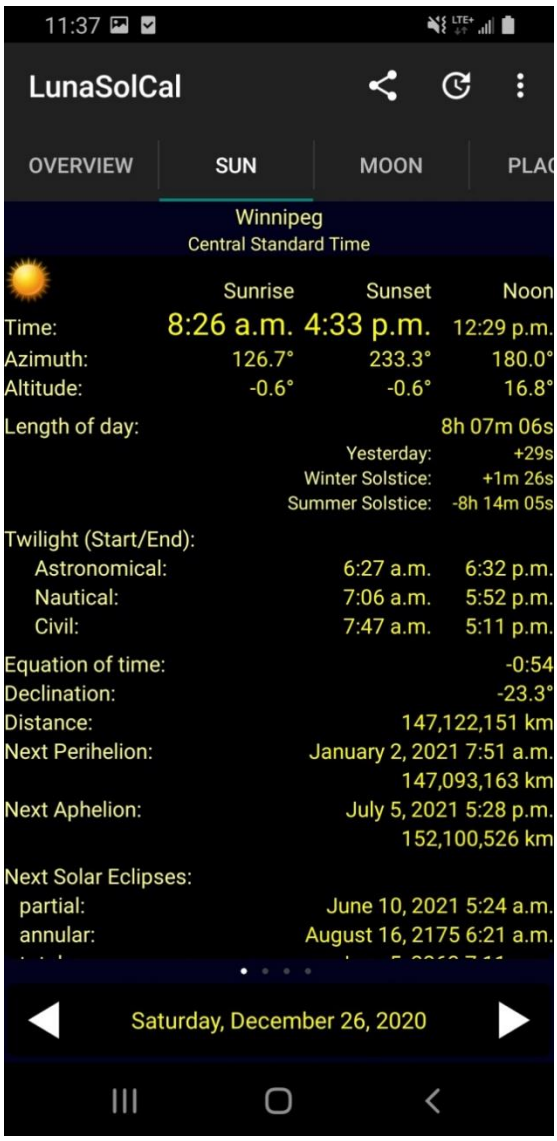
Now if you click on the option SUN in the toolbar at the top, it brings down a screen full of detailed information on the Sun. For my searches of the young moons, it tells you the Azimuth of the Sun at sunrise, and sunset, both valuable details when you want to know where the Moon will be relative to the Sun. Some landscape imagers might find this information useful if they want to plan a shot with the sunset positioned near a particular building.

For the curious, this page also displays the current distance of the Sun in kilometers; the date and time when the sun is in Perihelion or Aphelion plus its distance then. There is so much information that some details didn't fit the screenshot. So where it displays the date and time for upcoming Solar Eclipses for Winnipeg, the next partial is June 10th, 2021; with an Annular on August 16, 2175 and you have to swipe the screen up to see that the next Solar Totality here is on June 5, 2263.

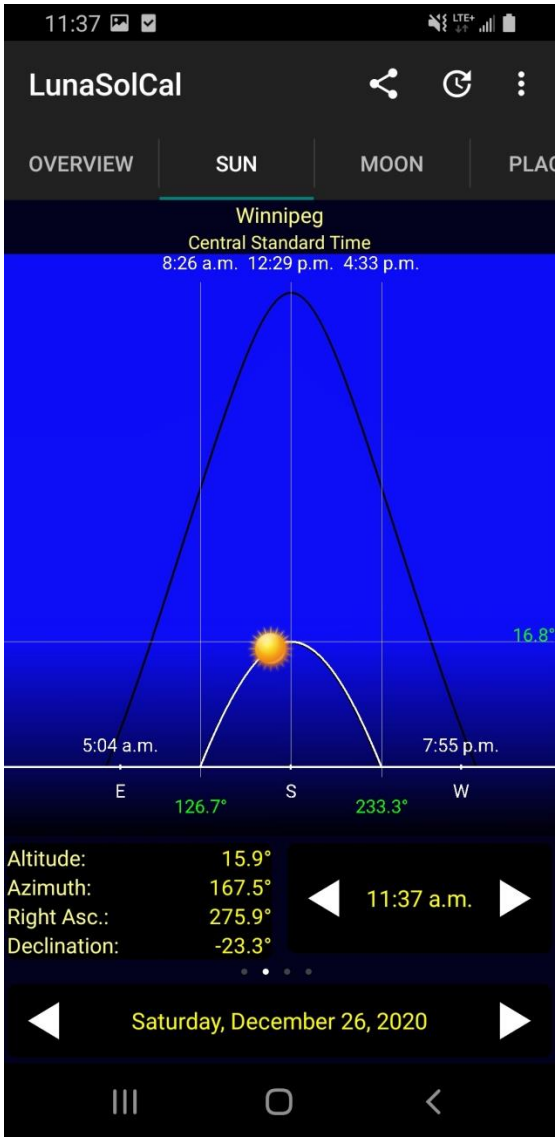
Once again, you can use the arrows near the bottom of the screen to change the date. This is useful for planning other events.

Next, a swipe of the screen to the left reveals a graphic display of the path of the Sun through the sky. Near the bottom it shows the current altitude, azimuth, right ascension and

declination. There is the option to adjust the time, or the date. I find this page useful, to help me know when the Sun is high enough to do solar prominence imaging.

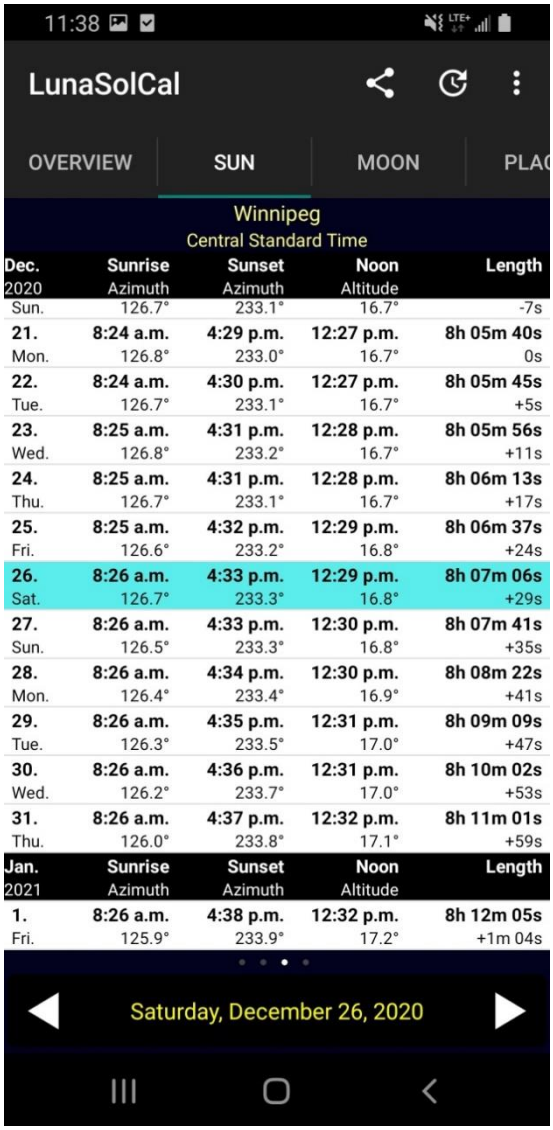


Picture 3 - Screen shot of Sun page 1



Picture 4 - Screen shot of Sun page 2

Another swipe to the left brings a chart with a summary of sunrise and sunset times, the accurate "noon" of the sun, plus the length of day for a week before and after the current date. It is nice to see that our very short days are getting longer and we can enjoy more sunlight.



Picture 5 - Screen shot of Sun page 3

Picture 6 - Screen shot of Sun page 4

A final swipe to the left reveals a chart of all of the seasons in the year. The arrows at the bottom allow you to change the year.

Moon

We will now return to the top menus and select the MOON option.

The first screen is setup similar to the Sun options first page, showing details for the Moon including the rise and set times. Plus it has images specific to the Moon like the age/percentage illuminated, and the upcoming lunar eclipse. The next total eclipse being on May 26, 2021.

Picture 7 - Screen shot of Moon page 1

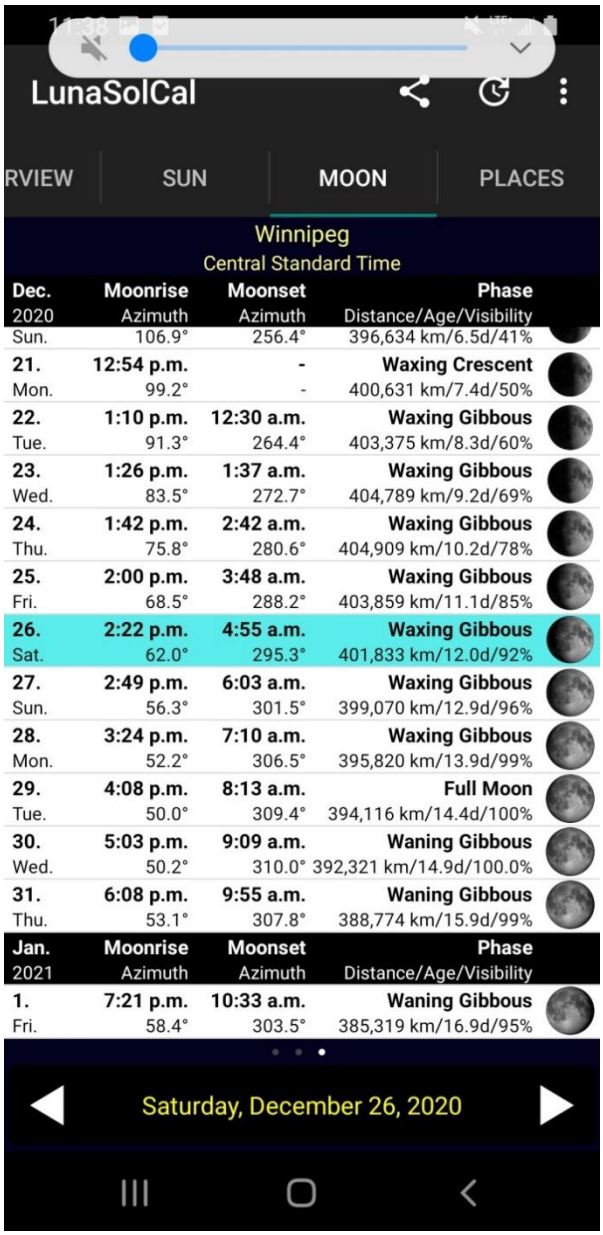
A swipe to the left brings up the screen which really benefits my searches. It has the graphic display of the position of the Moon. Beneath the chart, it shows the RA, Dec. Azimuth and Altitude of the Moon, plus the time clock. By using the arrows, you can adjust the clock and recalculate the Moon's position for the adjusted time. These are the location details I highlighted in my presentation, as requirements to aid in searching for the crescent Moon.

In my talk, I suggested that you should start the search (for the ones after the new Moon) by noting the position of the setting Sun on the horizon. This lets you know an azimuth point at that site. About 20 minutes after sunset, use the APP to check the current azimuth and altitude of the Moon. You then search for the Moon at a spot which is based on where the Sun went down. For example, it might be 6 degrees above the horizon and four degrees towards the south. That is where you focus your attention. Five minutes later, recheck the Moon's altitude and azimuth position; then search the new location. Remember that with the Location on, the information is correct for wherever you are searching from.

One other beneficial detail shown by the graphics screen is how high the Moon will appear in the sky. As you vary this screen month to month, you will see that during certain seasons, the quarter Moon will get very high above the horizon, whereas six months later, it is relatively low in the sky. Use this information for planning your lunar disk imaging sessions.

Another swipe of the screen to the left will show you a screen showing the times of the Moonrise, the moonset plus the phases for a period of a week before and after the current date.

Picture 8 - Screen shot of Moon page 2



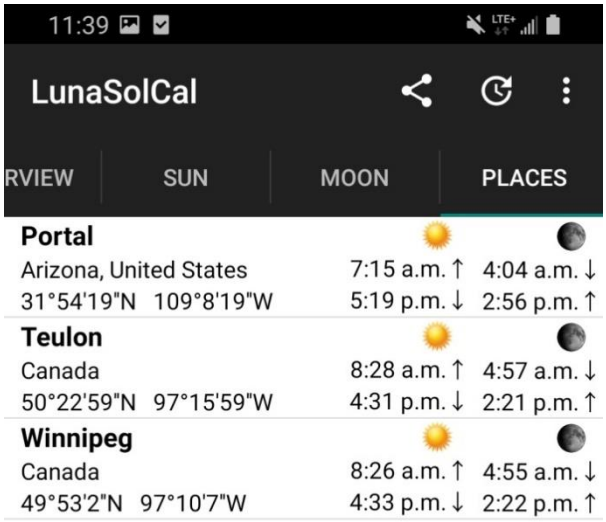
Picture 9 - Screen shot of Moon page 3

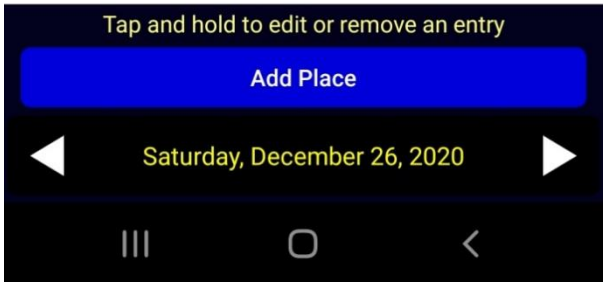
Places

The final OPTION from the main menu is PLACES. This is a page where you can enter your favorite observing locations. This will allow you to see the details as you plan for upcoming vacations.

So in summary, I have found many uses for this handy little "free" program called **LunaSolCal**, and suggest you might want to download it onto your Smartphone.

Editors Note: LunaSolCal is $5.49 at the Apple App Store. Well worth it! Please reward developers of quality astronomy apps by purchasing their apps.





Picture 10 - Screen shot of Places.

Building The NTT16 Part 3 – Upper Tube Assembly and Trusses

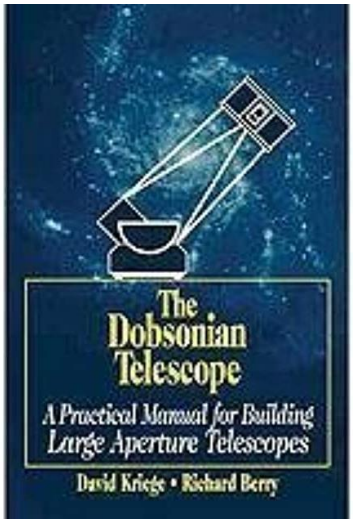
By Gord Tulloch, RASC Winnipeg Centre

Last time we looked at building the mirror cell of the telescope as well as the rest of the lower tube assembly that forms the foundation for the entire telescope. Of equal importance is the top of the telescope, the upper tube assembly, which house the secondary mirror and focuser. As well we'll look at the truss assembly that hold the two together.

As a bit of history, in the 80s when people started looking at John Dobson's simple yet incredibly effective design for telescopes, the design of the day incorporated sonotube tubes and square plywood boxes that were quite tall and bulky. The first telescope I ever built nearly 40 years ago, a 13.1" Dobsonian with Coulter optics, was of this design, see photo (who's the skinny kid with the long hair?)

Bearings were smallish, the mirror cell was basically the back tailgate of the mirror box with three triangles with felt on them to form a 9 point mirror cell. Obviously while this was a huge departure from the equatorially mounted telescopes of the day, it was rather bulky and heavy to move around. As well, the small azimuth bearings meant that the scope was cumbersome to keep on target since the bearings tended to be harder to get moving than keeping it moving (i.e. more static friction than dynamic friction.)

In the 90s and 00s there was a new generation of Dobsonians that refined the design to be easier to move, portable, and generally more amenable to being scaled up to rather excessive dimensions. Using Kriege and Berry's book *"The Dobsonian Telescope: A Practical Manual for Building Large Aperture Telescopes"* published in 2001 many telescope makers both amateur and professional (including Kriege's Obsession company) were churning out large aperture telescopes up to present day with little alteration to the core design. These telescopes combined large bearings for azimuth (translating into smooth "buttery" feel) and a truss tube assembly that allowed the owner to assemble and disassemble the telescope in a fraction of the time required for an equatorial mount to even get polar aligned.

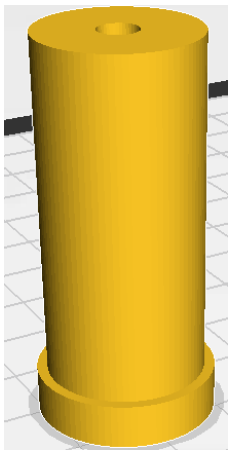


Often these telescopes would be combined with digital setting circles ("push-to") or full GOTO setups that would allow automated slewing to and tracking of targets.

My NTT16 uses a lot of the same principles as the classic Obsession type scope except that I went with a three truss hexapod system instead of the normal 4 trusses. Three points define a plane, so the hexapod system allows the user to adjust the length of the truss poles on the fly to collimate the telescope rather than the usual cumbersome three bolts on the back of the telescope. The hexapod trusses work by having oppositely threaded bolts top and bottom, so when you rotate the tube one way, it gets longer (i.e. both bolts are being rotated out) or shorter (both in.) Rotating two of the tubes that are connected at the mirror box moves the secondary mirror, rotating tubes joined at the secondary cage moves the primary. So effectively once rough collimation is done by shimming the bolts on the back of the mirror cell, you never have to touch them again. All collimation is done by rotating trusses, and can be done at the eyepiece using a star test as the night progresses.

Attaching trusses to the two ends of the telescope have had many approaches applied to them. In Obsession telescopes, a block of wood is drilled to the correct diameter for the truss then split. A bolt is tightened to capture the truss in a tight grip. Other designs use ball joints. In my design, heim bolts (see photo) are used to allow the bolts to move to the correct angle for the truss. A heim bolt is one where there is a ball bearing in a ring at the end of the bolt so the truss angle can be easily made without having to drill a hole at an angle for the truss. So when they are bolted to their respective threaded rods at top and bottom they adjust to the correct angle automatically. The bottom of the trusses are attached by heim bolts to the steel mirror cell, adding stiffness to the truss assembly since there'll be no flex between the mirror cell and attachments.

Another challenge with truss assemblies is how do we actually attach the trusses to the bolts for the truss assembly? My first attempt used star inserts, which are flat round plates with star shaped springy metal plates attached. When you force the plates into the tube, the star deforms enough to allow you to force them in but are stiff enough to not allow the insert to come out. The top plates are threaded for bolts so this seemed a good option (and worked fine for my secondary cage but had a fatal flaw when used with a hexapod – they rotated easily, so when the truss was rotated the insert moved but the bolt didn't defeating the whole purpose. As well, the inserts were right hand threaded, and I needed one end to be left hand threaded. While I tried to run a tap down the insert and it worked ok, it wasn't tight enough and would likely fail. On to Plan B! With my son's 3D printer I printed plugs in PLA plastic, designing them in Autodesk Fusion 360. I was able to design this very simple shape, export it in 3D printable form, and print 12 of them to act as plugs for the truss tubes. It took forever to print them at 100% infill but I was able to tap them easily and the heim bolts are solid when screwed in.



The upper tube assembly is very typical – I used four pieces of 1” aluminum tube as spacers with star inserts to allow bolts to thread through the upper and lower rings.

My secondary assembly uses aluminum vanes, bent on a vise to form a V shape with a flat vertex. This has proven in testing to be the stiffest design for a 4 vane spider by folks on Cloudy Nights and was easy to fabricate. The bolts for adjustment were ¼” threaded rod split with an angle grinder so they could fit over the aluminum vane, pinned with a screw and passed through a hole in the aluminum tube separating the secondary rings. The central hub was drilled with a slight offset as required by Newtonian telescopes – in this case the offset was 0.16”.

The rings were later perforated to reduce their weight – I knew I was going to have some balance issues so the less weight on the secondary cage, the less weight I was going to need to add to the lower end of the telescope. I thought it looked pretty cool as well. Other parts of the telescope will also be perforated when the system is completed to minimize weight as much as possible.

Just how much weight I would require was tested once I added the focuser board, low profile focuser, Telrad, coma corrector (required for F4.5 optics), and the 18mm 2” eyepiece I expect will be the most commonly used eyepiece with the telescope. Turns out I need 15 lbs to be added to the bottom of the telescope, which was, strangely enough, good news for me!

I was pondering ways to power the scope with things like deep cycle battery packs from Canadian Tire, but it’s a bother to have cables plugged into something that by its nature rotates. I also considered putting a battery of some kind in the rocker box but since I wanted to have a large fixed gear in the box to have the motor act against, there wasn’t any room.

So I needed 15lbs of ballast. A quick trip to Amazon.ca and I had it – a 15lb 20Ah scooter battery would provide 12v for the entire telescope for many hours, and could be recharged in the field with a solar cell! Problem solved! Yes, the telescope weight would be increased, but its now one self-contained unit so no multiple trips to the truck for all the bits and pieces needed to assemble the scope. I increased the thickness of the back plate on the mirror box to ¾” and added a box for the battery to slide into.

While I was working on the upper tube assembly I added an Orion Accufocus electric motor so I could avoid touching the focuser at all – I love not having to deal with any vibration as I use the scope! It was a surprise to me I accidentally painted the focuser board brown instead of black so at some point I need to take the entire thing apart for a final paint job. Note to self: dust off the focuser before taking flash photos.

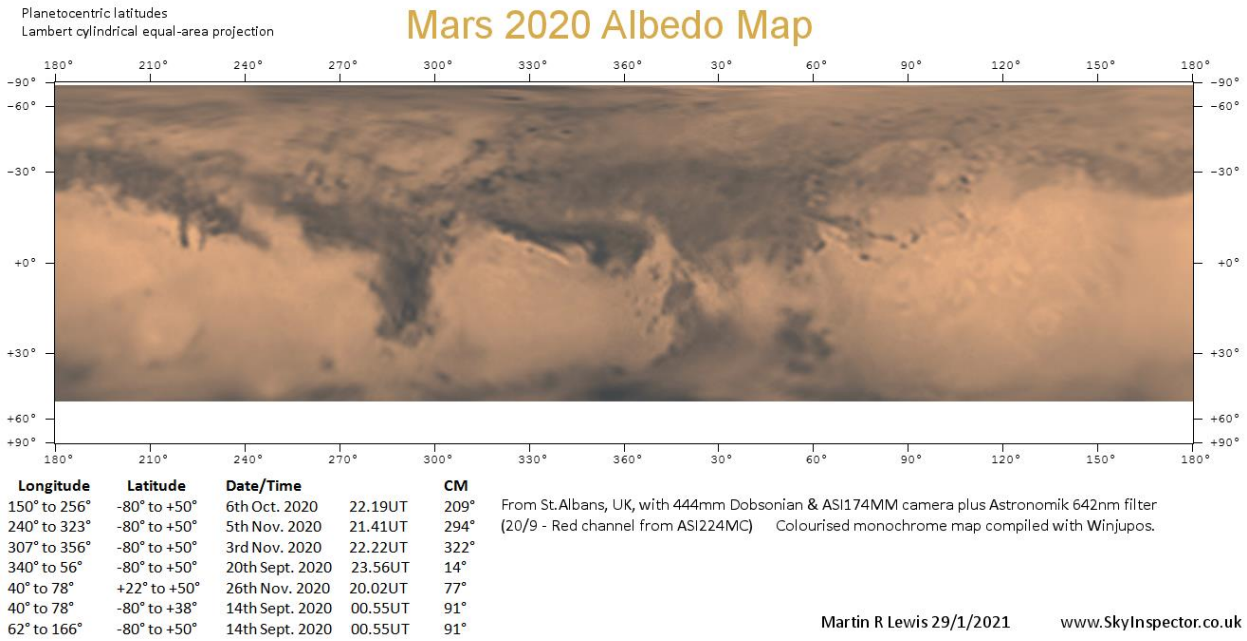
One challenge with the scope as originally built was the attachment of the truss poles was difficult as I was trying to balance the upper cage while attaching poles. To make this easier, I changed from a simple pair of angle aluminum brackets with a piece of threaded rod between them to a block of plywood with two bolts embedded in it (¼ ply – ¾ ply – ¼ ply stacked) and a ¼" bolt that went into the lower ring that screwed into a t-nut embedded in the ring. Two strong magnets were embedded in both pieces so when I got close they clung together while I screwed in the retaining bolt. Assembly is now a snap! Two bolts that don't touch each other are required as eventually the truss members will carry 12v to the secondary cage – no need for wires.

Before and After Views of the Truss Attachments

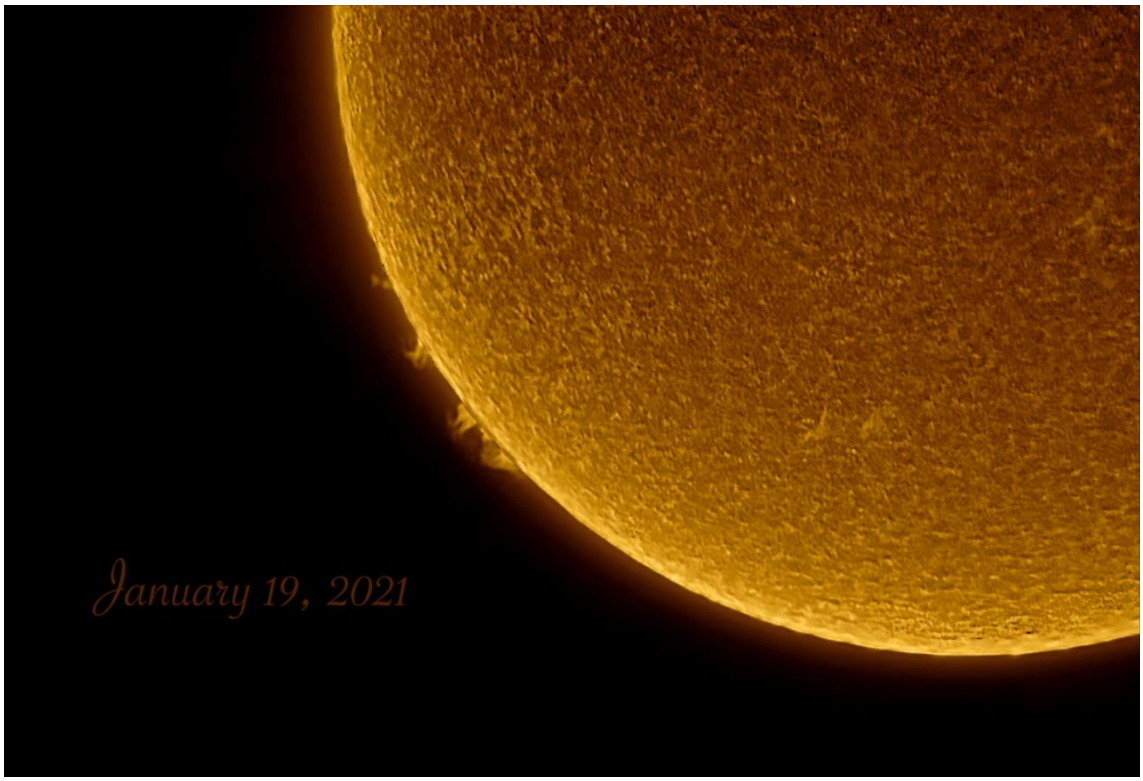
Once the tube assembly was complete, the lower rocker box was fitted with some crude handles so I could move the telescope around more easily. The handles are simple 2x4s with lawnmower wheels attached, and are bolted to the rocker box by passing them through the wall of the box and screwing them into t-nuts on the wall of the box. They need some prettying up but they work! Next time, we'll look at finishing the rocker box and adding motors to make the telescope move!

Make plans to attend the April 2021 Zoom meeting of the Winnipeg Centre when we will feature a presentation by Tom Field, Contributing editor at Sky & Telescope Magazine and Author of the RSPEC Spectroscopy Software on Spectroscopy. Meeting is on April 9 2021 at 7:30PM, watch your email or the Forums for Zoom login info!

Members Image Gallery



Gerry Smerchanski shared this amazing albedo map of Mars compiled from images taken in this past apparition

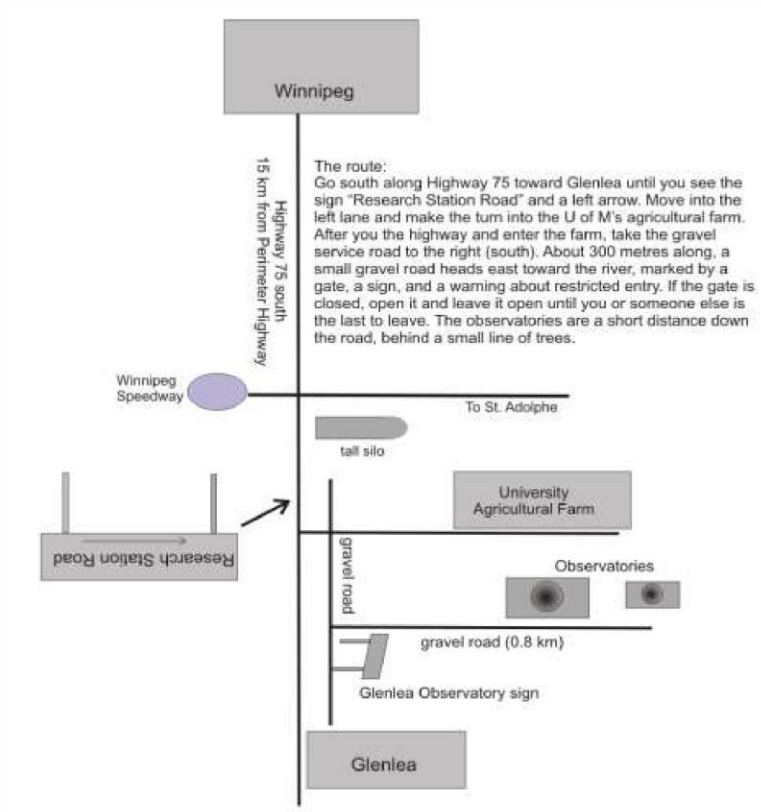


Sheila Wiwchar comments "Yesterday there was a beautiful collection of prominences on the limb of the sun. I set up inside and did test shots before moving outside. When all set up outdoors the prominences disappeared!! I gave up with the cold and moved indoors and those prominences came back!! Well I didn't realize the scope I was using had to be pressure tuned. Trial and error I say. So here is the image with all the indoor comforts. (Yes, this was from INDOORS – Ed)

Jay Anderson commented "Pulled out an 12-year-old image of the Pleiades today and went at it with the latest version of StarTools. StarTools now has a much more flexible set of processing routines and the results were very nice. I wanted to reduce the saturation, but Judy likes the blue"

Bradley Kulbaba posted this excellent lunar image on Facebook after braving the cold on January 19 2021

Finding the Observatory



The Winnipeg Centre maintains a working observatory and warm room at the University of

Manitoba's Research Farm. The observatory contains a 30 cm Meade telescope on a fork mounting. Members of the Centre may sign out the use of this telescope provided they have first taken a short instruction course on its use.

The Meade provides outstanding views of the night sky. Its large aperture collects more than 1800 times as much light as the human eye. It is capable of magnifying more than 500 times under favourable conditions.

The warm room provides a convenient place for members to take refuge from winter temperatures and summer mosquitoes, or to wait out a passing cloud. The building also provides desk space and lighting for planning a night's observing session. A concrete pad in front of the warm room and observatory provides a convenient space to place members' telescopes while conducting personal observing programs.

Etiquette requires that you approach the observing site with your headlights off if that's possible on your model of car. Headlights should remain off, but you can still use your parking lights to drive. Proceed slowly, and be careful about parked cars along the road, or people walking. If you cannot turn off your headlights, make a cardboard or garbage bag mask to dim the lights or, raise the parking brake lever one click-stop. This usually turns the headlights off on most, if not all, cars. You might wish to turn around at the end of the road so that you are facing the direction back toward the highway at the end of the evening.

Remember to close the gate if you are the last one to leave.

Comets in March and April

This section lists all of the comets that are prominent in the sky, the visual magnitude and the declination of the comet. Brighter comets (lower magnitude) at higher declinations (higher h) are the best candidates to observe.

Month	Evening			Midnight			Morning		
	Comet	Mag	h	Comet	Mag	h	Comet	Mag	h
2021 Mar	C/2021 A2 (NEOWISE)	12	80	C/2021 A2 (NEOWISE)	12	27	C/2020 R4 (ATLAS)	10	33
	C/2019 L3 (ATLAS)	13	39	C/2017 K2 (PanSTARRS)	13	21	C/2017 K2 (PanSTARRS)	13	71
	29P/Schwassmann- Wachmann 1	13	44	C/2019 L3 (ATLAS)	13	5	C/2019 L3 (ATLAS)	13	3
							246P/NEAT	13	24
2021 Apr	C/2020 R4 (ATLAS)	9	43	C/2020 R4 (ATLAS)	9	88	C/2020 R4 (ATLAS)	9	82
	C/2017 K2 (PanSTARRS)	13	8	7P/Pons- Winnecke	12	16	7P/Pons- Winnecke	12	60
	C/2019 L3 (ATLAS)	13	25	C/2017 K2 (PanSTARRS)	13	44	C/2017 K2 (PanSTARRS)	13	82
	C/2020 T2 (Palomar)	13	53	C/2020 T2 (Palomar)	13	89	C/2019 L3 (ATLAS)	13	4
	29P/Schwassmann- Wachmann 1	13	19	C/2020 J1 (SONEAR)	13	20	C/2020 T2 (Palomar)	13	54
							246P/NEAT	13	26
							C/2020 J1 (SONEAR)	13	20

Data courtesy of Seiichi Yoshida (http://www.aerith.net/comet/future-n.html)