Regulus

Newsletter of the RASC Kingston Centre

Vol. 52 No. 4 April, 2025

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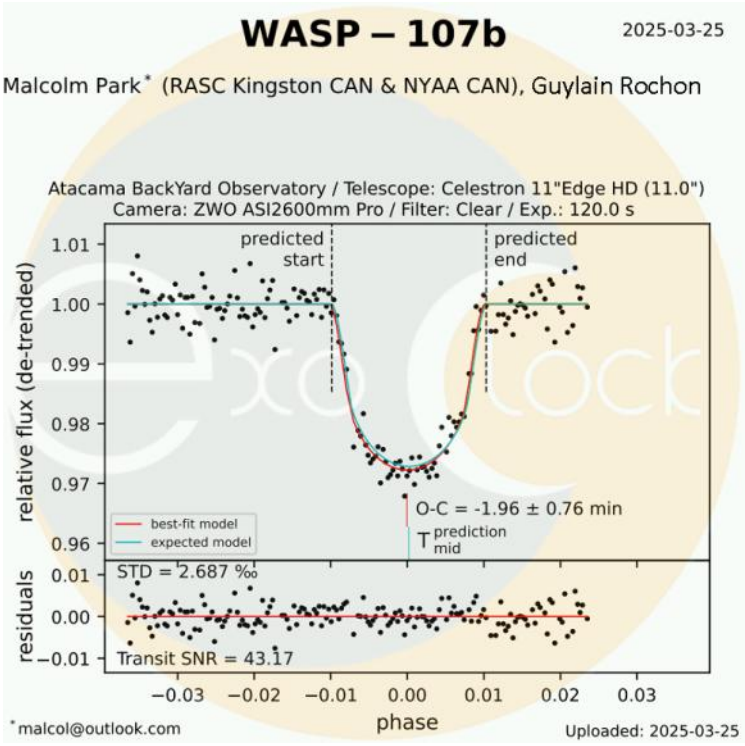
Centre Events for April, 2025:

Apr 2: Zoom Social Meeting—Zoom only
Apr 9: 7pm Monthly Meeting, Zoom only
Apr 13:Astrophotography Zoom session
Apr 16:Weekly Social, Online.
Apr 23:Weekly Social, Online
Apr 30:Weekly Social, Online.
May 4: Star Wars Day and Regulus Deadline
May 7: Weekly Social, Online:

President's Report

Malcolm Park

This chart shows the light curve from an exo planet (WASP-107b) transiting a distant star. The light from that star would otherwise be a steady brightness, producing a flat line, but when the exo planet passes between the parent star, and my telescope, the brightness dips. That's the dip in the horizontal line. I made an indirect observation of a known exo planet in a distant solar system with my amateur equipment.



At NYAA's Starfest last year, Sara Seager gave an amazing presentation on Exo-Planets and one of the targets she has studied is WASP-107b, a low-density gas giant orbiting a star 200 light-years away. Last night, WASP-107b was predicted to transit WASP-107 over the course of a few hours.

It was a perfect setup, the star was transiting at about 1:30am at a peak altitude of 77degrees. I began the guided imaging run at about 10:00pm and ended it at 6:30am.

I acquired 173 x 120s Luminance frames with the 11" Edge HD with .7x reducer and CMOS ASI2600 MM Pro. Conditions in San Pedro de Atacama were excellent, and the moon had no impact. The data was calibrated, aligned, and processed (Photometry and Exoplanet fitting) in HOPS (HOlomon Photometric Software) which requires Anaconda Python installed to run in Windows. Further analysis was performed on ExoWorlds Spies Exo Clock project.

Diagnostics

Step 1: Transit SNR = 43.17

Transit SNR is good (strong detection of the transit)!

Step 2: R_p/R_s drift = 0.93σ

The R_p/R_s drift is good (R_p/R_s in good agreement with the literature)!

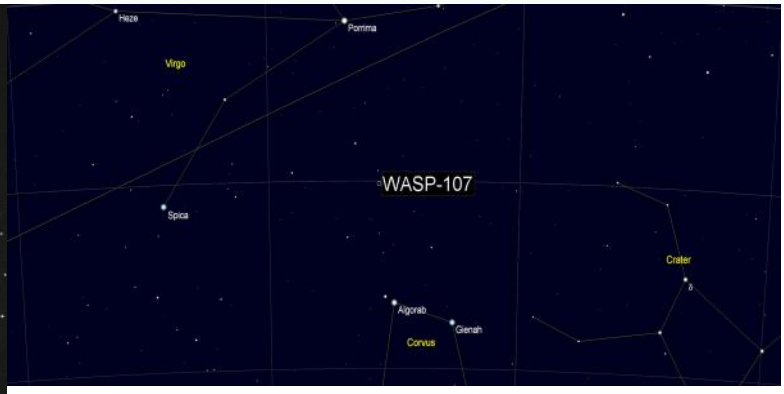
Step 3: AutoCorrelation = 0.156

The AutoCorrelation is good (no systematics in the data)!

Step 4: Shapiro test = 0.004

The Shapiro test is good (few or no outliers in the data)!

The diagnostics were good, with the red line in the graph showing my data matching reasonably well with the prediction in cyan. We are measuring extremely faint fluctuations in brightness, but it can be done!



Editor's note:
WASP-107 can be found in Virgo. Cartes du Ciel V4.3 (currently in Beta) was used to produce the above chart of the area. This latest version has a catalog of stars with exoplanets that can be imported.

The Editor's Keyboard

Roger Hill

So, I managed to survive the cold winter, despite doing little in the way of astronomy. It seemed to me that a week, or ten days, could go by without my observatory seeing any use.

My cold weather gear saw a great addition, though: a pair of electric socks with a rechargeable battery pack and multiple heat levels. The battery packs could be recharged via USB, as well, making them incredible convenient. I do have an excellent pair of winter boots, made by Baffin Boots of Stoney Creek, and while they do an excellent job if I'm walking outside, they'll only last a couple of hours if I'm not moving around. I've also found that as my age increases, so does my intolerance of cold.

Admittedly, I could run my telescope and camera from my basement office, and while this may happened more frequently as time passes, I like being under the stars. I like to play some music through the speaker in the observatory and sit in my zero-gravity chair outside under the stars while using those big CanTire binoculars.

I don't do this every clear night as I'm not sure I want to be visited by the local wildlife! I know there is a fox in the area, for instance, and although I don't think there is a skunk nearby, I don't want any more close encounters with one.

Actually, the night of last months Lunar Eclipse, I did hear something nearby. It had been relatively warm during the day, but the temperature plummeted and was down to –20°C by the time the penumbral phase of the eclipse started. This meant that the snow had an icy crust on it, and while walking to (and back from) the observatory, I broke through the crust, and my left knee tried to bend the wrong way.

Anyway, after getting the cameras set up, I thought I'd go outside to spend some time in the chair and use the binoculars. That was when I heard something outside the observatory breaking through the snow as it moved. The problem was determining where the sound was coming from. An open POD dome will gather sound in, much like a telescope mirror will gather light, making distant sounds seem much closer. The local geese can be quite deafening at this time of year as they gather on the Galop Canal, for instance. It's also very difficult to tell the direction, too. So when I heard something breaking though the ice crust, it sounded very close. I poked my head above the edge of the observatory wall, and looked to see what was making the sound, but I couldn't see anything. I sat back down at my observatory desk and a few minutes later, I heard it again, and did the same thing: looked out, saw nothing, and sat down again.

I was quite spooked by this time so I decided that I'd stay inside the observatory and turn the music up.

There had been talk of using the Centre's Zoom link for those who might be observing the lunar eclipse, so I connected, but there was no-one else there. It's a shame really, because a lunar eclipse is a lovely thing to observe if there are a few others around. The same goes for other occasions like meteor showers, and auroral displays.

So often, we observe on our own. The majority of us don't share our pastime with our spouses, and when we go outside to observe, we are by ourselves. And yet the experience of this hobby of ours can be greatly enhanced when we gather together. We gather together at Star Parties like Fall'n'Stars or Starfest to share the love of the night sky; to get different viewpoints and to learn from our peers. Those of us who have been involved in this hobby for decades can get excited along with someone who has just seen Saturn for the first time.

We humans are social animals, mostly, and while we can, and do, spend time alone, solitary confinement is very much a punishment.

Some of my most memorable times observing have been with friends.

For instance, I went to Chile for Les Nagy's wedding, and about a week beforehand, we were able to spend time together under the dark Atacama skies. The first night I helped him with a tour group, but after they were gone we had a memorable few hours with some telescopes. We watched in awe as a wave of great seeing came through, and we were treated to the finest view of Jupiter either us had ever had. Jupiter looked like one of those amazing images that people like Damian Peach, or Mike Karakas (our January speaker) produce. A couple of nights later, we sat for several hours with some Duty Free Scotch I'd brought, as the centre of the Milky Way wheeled across the sky.

There have been other delightful events, too, like observing a partial eclipse from the shore of Lake Huron as the crescent Sun set with Mark Kaye and fellow Hamilton Centre member Scott Barrie. Although a bank of clouds stopped us from seeing a sunset eclipse, it was a most memorable event.

Anyway, I think that's enough remembrances for one month.

Clear skies to you!

Roger Hill

Sleep, my child, and peace attend thee
All through the night;
Guardian angels God will send thee
All through the night.
Soft the drowsy hours are creeping,
Hill and vale in slumber sleeping,
I my loving vigil keeping,
All through the night.

While the moon her watch is keeping
All through the night;
While the weary world is sleeping
All through the night.
Over thy spirit gently stealing,
Visions of delight revealing,
Breathes a pure and holy feeling,
All through the night.

Ar Hyd y Nos (All Through the Night), , Edward Jones' Musical and Poetical Relics of the Welsh Bards (1784).

I learned about this gorgeous hymn at Twin Lake Camp during the Summer of 1956. I was 8 years old. During one of the three summers I spent at Twin Lake I sang that hymn at least once at a camp assembly. The older campers were extraordinarily patient with my unfortunate voice. My favourite line, "While the moon her watch is keeping" surfaced more recently. There is a singular magic to being out of doors on a clear night and looking at the Moon. There is a sense of delight, and the result for me is indeed "a pure and holy feeling."

The idea of the Moon keeping a watch follows from the idea that the Moon rises at a specific time, and sets at a specific time. And when a lunar eclipse begins at a specific time and ends at another time, the Moon fits the concept of a timepiece well. On the night of March 13/14, 2025, Jean Mueller and I enjoyed a spectacular total eclipse of the Moon. In the days ahead of the event the weather forecast steadily deteriorated, and until the event was actually starting we had no idea whether we would see anything at all.

Our first check of the condition of the sky changed everything. With large breaks in the clouds we saw the Moon with a subtle darkening on its lower side. More than an hour later, the dark, reddish-brown central shadow of the Earth made its obvious first bite of the Moon. By the time the Moon was completely embalmed in the Earth's central shadow, the umbra, the sky had darkened considerably and we were treated to one of Nature's most stunning displays. As beautiful and artistic as the Moon appeared that night, the event followed the calculated times precisely.

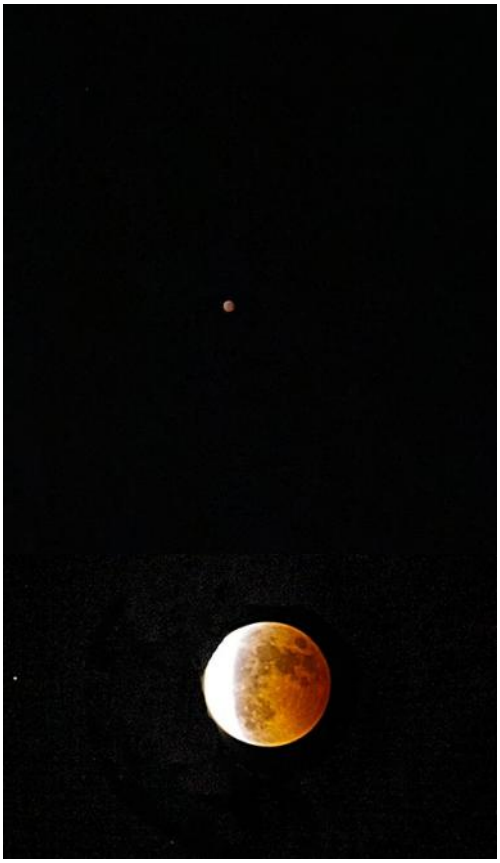
"This is the most amazing, beautiful eclipse I have ever seen," Jean said of her experience. It was electrifying for me too. Eclipses are not just events in the sky. They are awe-inspiring ruses of Nature. They do not just occur; they are inspiring, poetic. Eclipses prove that the sky is not just there; it happens. The shadow of the Earth darkens the entire face of the Moon pointed toward Earth. While an eclipse of the Sun is visible over a small area on Earth, the Moon's eclipse can be seen over the entire side of the Earth that is going through night.

Jean was also moved by the idea of the Moon as a watch, that the starting and ending times of an eclipse can be accurately predicted. Decades ago, my Dad was also exhilarated when the solar eclipse of July 20, 1963, began, to the second, on time. Fascinated with history, he said that the ancient Greeks in Aristotle's time could predict the time, almost to the second, that an eclipse would happen millennia into the future. Dad was overwhelmed with this happy thought.

The always welcome eclipses will continue; another will be visible from my home, and from San Diego, on March 3, 2026. It will be a joyful event to which I can really look forward. If the sky be cloudy that night, we will still detect a noticeable darkening around us. If it is clear, Nature will again demonstrate that just as planets form and stars die over billions of years, the eclipses start and end in periods of time measured by a few seconds.

Picture 1. The weather said there'd be clouds. Instead we got to see this!

Picture credit: David Levy.



Picture 2. In Tucson it was going to rain. Instead we got this!

Picture credit: Tim Hunter.

All imagers supplied by David Levy

The Sky This Month

Rick Wagner

Any night of the week can offer up a broad range of viewing wonders. RASC KC Past President Rick Wagner keeps an eye on the sky for us each month, sharing some of the best viewing opportunities as well as timings to catch your favourite night sky target at its best.

April Skies
05 Apr – First Quarter Moon
11 Apr – Mercury (mag 0.9) and Saturn (mag 1.2) hang 7º below brilliant Venus (mag -4.7) low above the eastern horizon shortly before sunrise (~6AM)
12 Apr – Full Moon (20:22EDT)
18 Apr – waning gibbous Moon reaches nearly the most southerly declination it can, just off the spout of the Sagittarius teapot.
20 Apr – Last Quarter Moon
21 Apr – Mercury at greatest elongation west - very poor apparition due to low tilt of the ecliptic relative to the dawn horizon.
21 Apr – Lyrid meteor shower peaks tonight - best viewing will be midnight to dawn on the 22nd; a relatively minor shower with occasional bursts
25 Apr – Venus (mag -4.8), Saturn (mag 1.2), and the thin crescent Moon (look for the earthshine) form a 5º triangle low in the east before sunrise. Mercury (mag 0.3) is 7º down and left from the Moon.
26 Apr – 4 Vesta (mag 5.6), the only minor planet visible to the naked eye, passes just 0.2 lower right of 4.5mag 16 Librae.
27 Apr – New Moon (15:31EDT)
27 Apr – Venus at greatest illuminated extent in the morning sky.

Target for Tonight: Gemini

Susan Gagnon

What is Leo the king of? Galaxies it would seem! A paucity of remarkable and unremarkable nebulae has resulted in the Messier, Finest NGC, Levy, and Deep Sky Challenge targets to be all galaxies. There are also a couple of groupings of galaxies that are nice to reserve for a short observing session that can be very rewarding. All objects listed here can be found in Cartes du Ciel.

Messiers 95,96,105 cluster with NGC 3384.

NGC 2903: barred spiral galaxy, reported to be bright and I have indeed observed it from my suburban site.

NGC 2964 (Levy 131) : intermediate spiral galaxy, mag 11.3 The next 3 galaxies are a convenient star hop fromRegulus.

NGC 3049 (Levy 209): David describes it as a 'comet like' galaxy. It is a barred spiral, mag. 12.1.

NCG 3070 (Levy 133): a round galaxy, mag 12.3.

Leo I (UGC5470 or PGC29488): A dwarf spheroidal galaxy of mag. 11.2. Leo I should be easy but the glare of Regulus may interfere.

NGC 3521 is what is termed a flocculent spiral galaxy, lacking the well defined structure of the familiar spiral. At mag 11 it lies on the straight line between 62 and 69 Leo, both bright stars.

NGC 3226 (Levy 300) also known as ARP 94, is a dwarf galaxy interacting with a spiral NGC 3227, near the star Algieba.

NGC 3810 (Levy 41) has been classified as a dwarf, round, and finally spiral. It is mag 10.8 and what may or may not be an advantage, it is quite isolated off the back end of Leo.

UGC 6253 (Levy 382 or LeoII) a dwarf elliptical of low mag but a convenient hop from the star Zosma.

Below Zosma is the fairly bright galaxy **NGC 3607**. It is actually part of a well matched pair of galaxies. Of the pair 3607 and 3608, the former is the brighter. There are also several fainter galaxies in the area.

Abell 1367 is a galaxy cluster! The brightest member being **NGC 3842**, an elliptical.

In observing the constellation the bright stars to be noted are Regulus and Denebola.

Double stars listed are Zeta Leonis or Adhafera and its companion 35 Leonis, an optical double, mag 3.4 and 5.9 respectively.

Lucky imaging, Firecapture, ROI and cutouts

Planetary Imaging took a Quantum Leap with the advent of Lucky Imaging and digital cameras.
Lucky imaging is the process of taking thousands of very short (millisecond) exposures, analyzing them, taking the best x% and stacking them to get a great signal to noise ration and images that surpass film based, ground based images from only a decade or two ago.

The shorter the exposure, the better chance of capturing a still image freer of distortion caused by atmospheric bad seeing. So the higher frames per second is the measure to work for. I recently submitted an image of Mars to the BAA along with some information like... 2ms exposure and I was getting 100 frames per second (fps). 1000/2=500 fps theoretical and I was getting only 20% of that. The recommendation to me was to improve! Get a faster FPS! And use the ROI (Region Of Interest) and Cutout boxes in Firecapture.

With the full resolution of the ZWO ASI585MC camera (3840x2160 pixels) and a 3.5ms exposure, I got 47 fps, or about 16% efficiency. The ROI reduces, at the camera, the amount of data coming down the USB 3.0 pipeline and results in increased frame rates.

I had been using a ROI of 1200x1200. That increased the fps to 83 from 47 (full resolution) and 29% efficiency. My best test result was using an ROI of 400x400 that achieved 220 fps or 77% efficiency.

There are issues with tracking and keeping the image in the Field of View (FOV), especially in bad seeing, where the image jumps up down left right and in and out) when the ROI is small.. that is why I had a bigger 1200x1200 FOV to start with.

The next feature I started using recently was the cutout box. This centres the image in the FOV and does it faster than the auto-align feature in Firecapture. It also reduces the amount of data saved to file.

Initially I started using a cutout box of 600x600 and am now testing it down to 400x400.

One other new feature that I was unaware of was the ability to have the ROI centre itself. In the past, I would set the ROI and in the 120 seconds of imaging run, the target would stay in the FOV, but maybe not the next or the next runs, without manually adjusting the tracking. This new feature of ROI auto-centre means that as the target drifts out to the edge of FOV, it would re-enter itself.

Amazing! This would work for at least 10-15 runs that I have tested so far. The limiting factor is when you run out of chip completely.

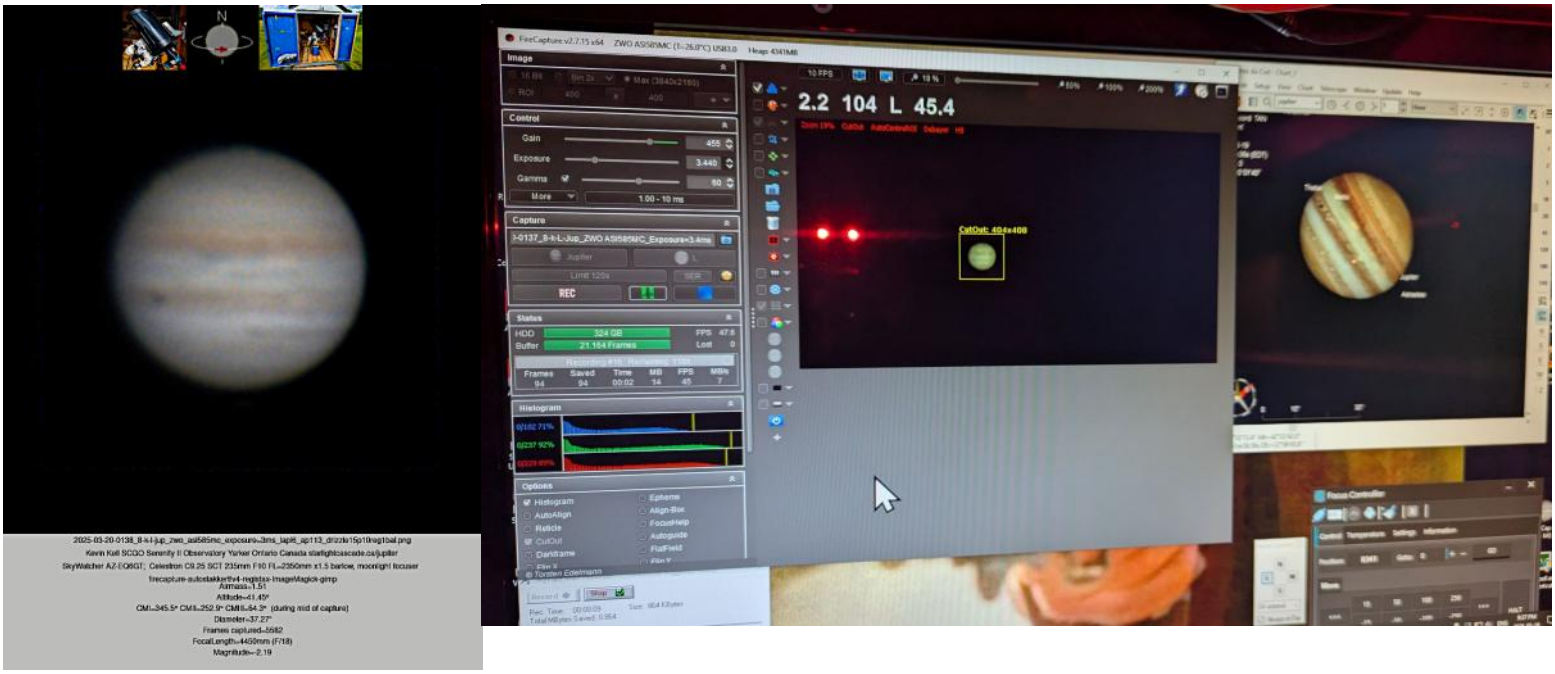
So.. the summary is:
initial starting performance with my setup for Jupiter imaging:
Celestron C9.25, x1.5 Barlow, ZWO ASI585MC
USB cable3m,
HP Mini elitedesk 800 G3 computer
Intel Core I5-6500T; 16GB DDR4; Intel HD Graphics 530; Windows 10 pro 64 bit;
480GB nvme ssd; gigabit Ethernet; USB 3.0
.SER file format
firecapture buffer enabled

ROI cutout test

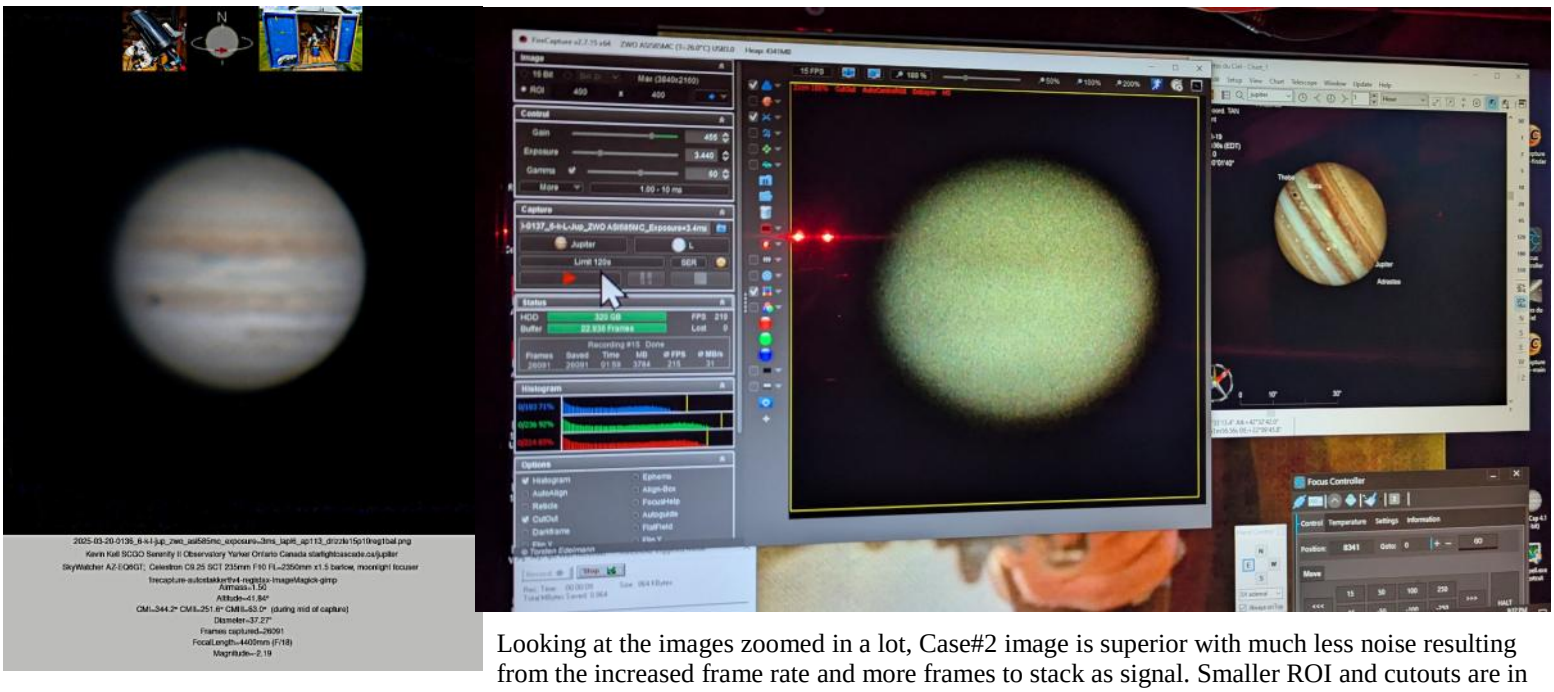
run	image ID	ROI	Cutout	fps	frames	filesize	theoretical max fps	fps efficiency	Best 10% frames
1	101	1200x1200	none	83	9922	13925 MB	285	29%	992
2	104	1200x1200	600x600	83	9920	3487 MB	285	29%	992
3	106	1000x1000	600x600	100	11794	4146 MB	285	35%	1179
4	108	800x800	600x600	120	14535	5110 MB	285	42%	1454
5	110	600x600	600x600	160	18916	6550 MB	285	56%	1892
6	113	1200x1200	500x550	83	9923	2664 MB	285	29%	992
7	116	1000x1000	500x550	100	11793	3167 MB	285	35%	1179
8	118	800x800	500x502	120	14535	3562 MB	285	42%	1454
9	120	600x600	500x502	160	18839	4617 MB	285	56%	1884
10	123	500x500	500x502	200	22086	5221 MB	285	70%	2209
11	125	1200x1200	400x400	83	9921	2431 MB	285	29%	992
12	128	1000x1000	400x400	100	11793	2890 MB	285	35%	1179
13	130	800x800	400x400	125	14535	3562 MB	285	44%	1454
14	134	600x600	400x400	160	18917	2941 MB	285	56%	1892
15	136	400x400	400x400	220	26091	3875 MB	285	77%	2609
16	138	3840x2160	400x400	47	5582	898 MB	285	16%	558

Stuff from Kevin (Cont'd)

Two extreme examples, image ID #138 and 136:
Case #1: Full resolution 120second run at 3.5ms exposure hit 47 fps got 582 frames at 16% efficiency. Using the best 10% in autostakkert! Gave me 558 frames which is a pretty low signal to noise ration giving a not so great image quality.



Case #2: Last nights test of ROI 400x400, autocentering, cutout box of 400x400 hit 220fps giving 26091 frames at 77% efficiency. Using the best 10% to stack gives me 2609 frames, 4 times more signal to noise than before.



Looking at the images zoomed in a lot, Case#2 image is superior with much less noise resulting from the increased frame rate and more frames to stack as signal. Smaller ROI and cutouts are in fact better! These were taken in poor seeing and poor transparency and a lot of wind and wind gusts. I really hope to test this again under much better seeing conditions!

There is still more work to do and maybe gain a little more efficiency. There are potential bottlenecks still: Usb3.0 data rate vs camera output; usb cable quality and length; usb port on computer; usb bus inside computer; data rate to drive (nvme faster than sata);computer cpu and ram

USB cables are the bane of imagers... having spares and testing/swapping them out may have large effects. Ensure that the usb port you are using for the camera is used by nothing else (ie a hub with a usb2 keyboard or mouse connected as well). Those will slow down the bus rate and the camera will be affected.

There are few planetary images in our Centre... so most of this article may not be of interest to you. Now. It will make a great reference in the future if you do enter into planetary imaging!

On Thursday March 20th, Elena, Graeme and I judged the Frontenac, Lennox and Addington Science Far (FLASF*) projects for the Leo Enright Award in astronomy and related sciences.

Our first choice was for project #1380: "Wheelie on the Moon", by Jyotis Jugroot, King's Town School grade 6.

As you can see, the student was quite knowledgeable, and had done some carefully controlled experiments. The poster write up was also excellent.

First Choice *Project1380 Primary - "Wheelie on the Moon"*
The purpose of the project was to design the optimal wheel size and tread patterns for wheels on the Lunar surface using specially selected aggregate to mimic the lunar surface. According to NASA, this is a major challenge in the proper functioning of a Rover on the Lunar surface.

The student used NASA information to design and 3-D print different tread
wheel patters and sizes. Testing was on a simulated lunar surface.

We liked the student's "future studies" section - from his project:

- Designed his own wheels using TinkerCAD based on wheel designs he had seen on various rovers and machines. These were later 3D printed in PLA, discussion of using PEEK later for more serious long-term trials.
- Combine different types of wheels in different positions.
- Make a more complex path to represent the diversity of the Moon landscape.
- Test different types of filament materials for the 3D printing to optimize the wheels for a larger range of temperature representing the Moon seasons and night and day variation.
- Observe wheels using a thermal camera to evaluate eventual wear patterns/evenness.
- Design a self-cleaning system to remove the Moon dust from the Wheels for a longer lifespan, and other opportunities suggested under the "future studies" section.
- Also, the 'sources of error' section provides the sense that the student well understood the project worked on.

Second Choice *Project 2190 Junior: "Can plants detect gravity?"*
Overall, a decent hypothesis, but the experiment lacked a determination between the difference between possible effects of light (provided by lamp and sunlight) vs gravity. Also, other parameters such as leaf size and growth length were not recorded. Only angularity, of the plant upright vs horizontal was reported. The experiment also lacked a critical understanding of multiple samples to adjust for variability between different individual plant growth and positioning (1 sample for vertical, 2 samples for horizontal "in case one failed").

Third Choice *Project 1381 Primary: "Our Rocket"*:
There was a lot of enthusiasm and effort in the design and flight of the propeller powered rocket, but no results on the project board or poster (minimal text with very tiny print with no pics or graphs detailing the design of the rocket) presented.

As an innovation project the rocket used with parachute was on show and while the student was able to discuss the performance of the rocket, he did not cover why certain design decisions were made in relation to selecting the multiple parts selection (except for the addition of wing ailerons).

Fourth Choice *Project 1203 Primary: "How to survive on Mars"*
Basically, they "distilled" (they filtered) water and used it on Chia pets vs regular water (the idea being that Mars doesn't have "soil" or microbes in its water or surface). There was not a good understanding of Mars, the Martian surface or regolith composition & properties (the chia pet was selected as Mars only has rocks) – Project would of benefited greatly from additional research, say from NASA about these kinds of experiments.

Links to the entries:
Project 1203: How to Survive on Mars
https://partner.projectboard.world/ysc/project/how-to-survive-on-mars

Project 1380: Wheelie on the Moon!
https://partner.projectboard.world/ysc/project/wheelie-on-the-moon

Project 1381: Our Rocket
https://partner.projectboard.world/ysc/project/190424

Project 2190: Can plants detect gravity ?
https://partner.projectboard.world/ysc/project/185598

* All students in grades 5 to 12 who attend any public, separate, or private school, or who are home-schooled, in the City of Kingston, Frontenac County or Lennox & Addington County are eligible to participate in FLASF 2025. Students do not need to qualify through a school competition and can enter FLASF directly.

The telescope that ran over a car

It is well known that cars are often in-volved in accidents, either by crashing into something, running over things, slipping off the roads and similar nasty business. This is also true in astron-omy, where accidents do happen from time to time. What is different though, is that while cars can run into things almost everywhere, having something running over your car is a much rarer experience.

Meet the Nordic Optical Telescope (NOT): A nice, 2.5m telescope of a somewhat peculiar design. Whereas all telescopes have some sort of turning dome, that allows the telescope to point to many different parts of the sky, the NOT is constructed in such a way that not only the dome, but the entire tele-scope building turns, when you want to aim your telescope at a different patch of sky. This of course involved some en-gineering challenges, like, plumbing (there's no bathroom in the telescope), as well as an entry staircase that is attached to the telescope. Which, amongst other things, means that you never really know what direction you are facing when you leave the telescope.

One day, the day-time crew were in need of hoisting equipment into the telescope dome, from the observatory pickup. For the crane to be able to reach the equipment, it needs to be positioned right at the wall of the telescope building. Thus, the pick-up was backed up, really close to the telescope, to make it easier to get the equipment in. This being an everyday operation, the crew unloaded the pickup, closed the dome, and proceeded with whatever they were doing.

Shortly after, someone decided that the telescope should be put in the parking position, so it was ready for the night to come. A sensible thing to do, except that no one had checked if the pickup had been moved away from the building. Thus, as the building turned, the entry staircase rammed into the side of the pickup, with the telescope effectively running over the car. Fortunately, the impact cut the wires to the safety system, which happened to run along the staircase, forcing the telescope to an emergency stop. Had this not hap-pened, the telescope building could have been severely damaged, and the pickup as well.

The damages were luckily so small that the pickup could drive out of there, and at the time of writing, is still being used at the telescope. This is also one of the times where it really pays off to pay attention to the warning sign out-side the telescope building.

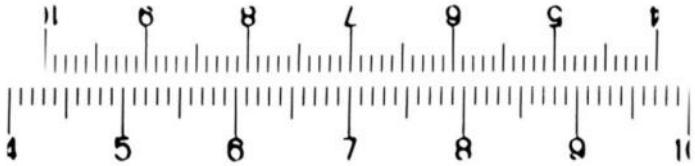
Two Focusing Aids for Camera Lenses

W. John McDonald, Victoria Centre

For anyone contemplating doing wide field astrophotography using camera lenses, focusing can be a challenge. It is also quite important to get a more precise focus in astrophotography than is usually needed in terrestrial imaging but most modern camera lenses are not well suited to manual focusing. The focus rings have too little movement to provide a precise setting and the scales are usually too coarse to allow repositioning the lens once a good setting has been found. Alan Dyer has highlighted the importance of precise focus and given some suggestions for achieving it on page 87 of the November 2007 Sky and Telescope magazine. The methods and devices here are some additional ideas for focusing of camera lenses.

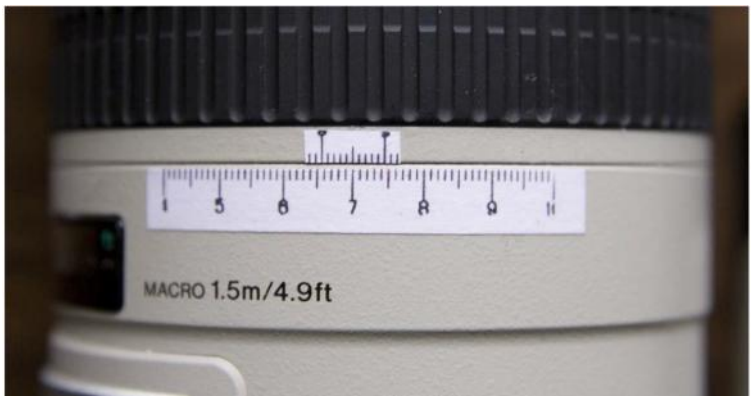
Aid One – the Vernier Scale:

The first useful aid is a simple Vernier Scale as shown below. This is really two scales one of which is 10% shorter than the



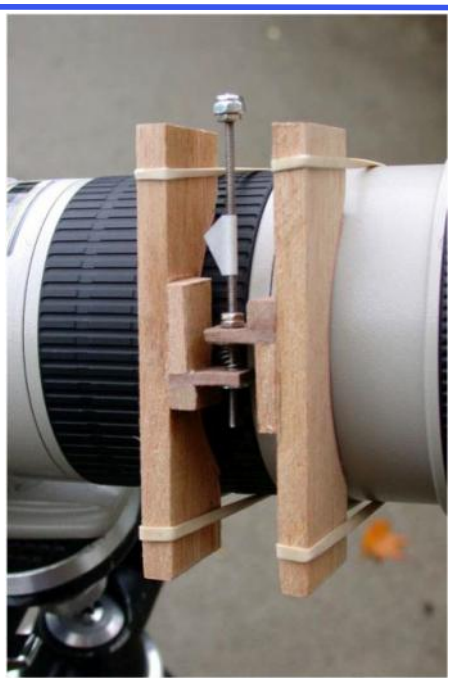
other. By attaching one to the lens body and the other to the focusing ring, it is possible to estimate the focus position to 1/10th of the smallest division of the longer scale. To do this you simply look at where the left index mark on the left of the short scale falls on the longer scale. Suppose it lies between 6.5 and 6.6 as shown in the image below. Then you look for which of the short division marks lines up with those of the longer scale. Suppose it is the 5th one. Then the scale reading is 6.55. A magnifier can be used if needed and of course, a red flashlight is required in the dark.

If you wish to try this, just print an appropriate sized version of the first figure for your needs and cut each scale out. You just need a length of the short one that covers two of the large index marks but it is convenient to have a longer section of the larger scale. I have attached the scales to my lens using paper glue. For weather resistance, the scales can be covered



with clear tape.

Aid 2 – Micro Focuser



The second tool is a micro focuser made from some bits of wood and a 4-40 screw as shown below. The picture is fairly self explanatory. Two plates are connected via the screw such that they can be moved relative to each other with the screw. I have a bit of reflecting tape on the screw as a tab to facilitate counting turns. One of the plates is held on the lens body and the other is attached to the focusing ring using elastic bands.

I use this tool to check for the precise focus position by taking a series of images of a bright star while keeping track of the number of turns of the screw I have made from the starting position. Once I know that number for the best focus position, I use half turns around that spot. The focuser can be repositioned very accurately so it is easy to make repeated checks and be sure of the best focus point. Then I take the Vernier reading for the most precise focus point and use that to reset the focus quickly if it is disturbed for any reason. Unless there is a significant change in temperature it is not usually necessary to recheck the focus using the Micro Focuser during a session or even when setting up on a different night. Checking the Vernier to make sure nothing has changed is usually sufficient. In the case of the 300 mm L series Canon lens I have, I have to use the micro focuser each night because the lens has a slip clutch on the focus ring and the relative position of the two scales will shift if the ring goes past either end of the focus travel.

Using the Focus Aids

The following is a set of steps gives precise focus quickly and fairly painlessly.

1) With the lens on auto focus, focus on a bright star or the moon. If possible, set the cameras to use a single autofocus point in the centre of the screen. The target must be located on top of this focus point for the autofocus to work. For ease in achieving this, it helps to switch on the autofocus led light manually if you can and use it to aim at the target.

2) Read and record the Vernier scale position.

3) Attach the micro focuser and then switch to manual focus.

4) Check the Vernier reading and reset the focus ring if necessary using the micro focuser to get the same reading as found in step 2.

5) Do a series of images of a bright star with different micro focus settings. Avoid overexposure of the star. Try 1/60 second exposure at ISO 400 to start and adjust to get a visible but not to bright image.

6) Pick the best focused image from the series and reset the micro focuser to reproduce that setting.

7) Record the Vernier reading that gave the best focus and the ambient temperature for future reference. If you inadvertently move the focus ring by mistake and need to reset the focus position the Vernier reading will usually suffice.

Footnote: On many cameras, it is possible to select the focus point you want to use instead of having them all active. Often it is also possible to turn the indicator led on manually and have it stay on for a brief period while you centre the target.

March 2025 Meeting Minutes

Elena Zanetti

Wednesday, March 12, 2025
Minutes of the RASC-KC Regular Monthly Meeting

The meeting began at 19:00 EDT. Malcolm Park welcomed Kingston Centre members and guests with 24 on Zoom screens in attendance. The meeting was to be also in-person, but this was cancelled as Queen's University graduate students were able to possibly go on strike on March 10.

Our Centre's ZWO Seestar S50 is now part of our Equipment Loan Program and any member in good standing may request to borrow it. It will also be used at outreach events.

This month's speaker is Dave Chapman, Fellow of the RASC of Canada and a member of RASC Halifax. 'Celestial Birds; Lore and Observing' begins at 4:30 on our RASC YouTube recording of the meeting. The practice to tell stories is worldwide and told through civilizations and David focused on constellations in the sky that are bird related. Whimsical and informative, Dave discussed 9 celestial birds (plus one "honorable mention") based on Babylonian-Grecian-Roman myths as well as focusing on Indigenous constellations from the Mi'kmaq, Cree and Māori cultures.

Rick Wagner:
Astronomy this month - March 2025
Local Events:
14 Mar – Queens U - Burcin Mutlu-Pakdil – Galaxy formation, dark matter

BAA Events:
26 Mar – BAA Mtg

AAVSO Webinars:
05 Apr – M Dwarf Starspots and Transiting Exoplanets

L&A Dark Sky Viewing Area:
Astrophotographers Assemble: 22 Mar
Laser-guided Tour: 28 & 29 Mar (registration required)
S
ky Events – March:
12 Mar – minor planet 8 Flora (mag 9.5) at opposition
14 Mar – Full Moon (02:55EDT)
16 Mar – zodiacal light for the next two weeks
20 Mar – Spring Equinox (05:01EDT)
22 Mar – Last Quarter Moon – sitting on the spout of the Sagittarius teapot
23 Mar – Venus at inferior conjunction high above Sun!
28 Mar – Messier Marathon weekend
29 Mar – New Moon (06:58EDT)
29 Mar – Sun rises partially eclipsed – eclipse ends – 15 min after sunrise

Sky Events – April
05 Apr – First Quarter Moon

Total Lunar Eclipse on March 13/14
Umbral magnitude 1.1804
Occultations
-HIP56388, mag 6.5
-HIP56376, Mag 8.0

T CrB
Transits before morning twilight
Still Faint
"When you think there can't be a reason they follow a certain set pattern, they do – and as soon as you start to rely on them repeating the same pattern, they deviate from it completely."

Major Planets
Uranus (mag 5.8) evening sky, setting before midnight
Jupiter (mag -2.2) high in SW, sets just after midnight
Mars (mag 0.3) high in SE, transits early evening, sets before morning twilight
Major Planets in Conjunction
Mercury (mag 5.8)
Venus (mag 4.2)
Neptune (mag 8.0)
Saturn (mag 1.2)

Occultations
6 Apr 0845UT (14826) Nicollier mag 20.3 UCAC4 576-035591 mag 12.4 7.7 0.8s duration
9 Apr 0204UT (1228) Scabiosa mag 16.9 UCAC4 572-024818 mag 10.5 5.7 0.6s duration

Bruce Elliott:
We will have a table at Science Rendezvous again this year, May 10th. At the FL&A Science Fair, another volunteer to join Bruce and Elena would be very welcome. Contact Bruce for information on volunteering on either of these events.

Kim Hay:
Will be speaking with the Winnipeg Centre on Solar Observing and Citizen Science.

Malcolm Park:
Thanked all for attending and the meeting ended at 20:34 EDT.

From the Editor:
It should also be noted that the Kingston Centre Executive met via Zoom on Tuesday, Febuary 10, 2025. The reason for the meeting was to discuss the budget for 2025. If you are interested, please see a member of the executive for details.

About Us

The Royal Astronomical Society of Canada

The RASC is a national, non-profit, charitable organization devoted to the advancement of astronomy and related sciences. Founded in 1868, The Royal Astronomical Society of Canada is Canada's leading astronomy organization, bringing together over 5000 enthusiastic amateurs, educators, and professionals. In addition to many national services, our 30 Centres offer local programs across Canada.

The RASC Kingston Centre

We are Kingston's Astronomy Club, a local centre of The Royal Astronomical Society of Canada, that was founded on June 2nd, 1961. We hold monthly meetings, on the 2nd Wednesday of each month from September to December and March to June via zoom videoconferencing and in person, from 7:00-9:00pm Eastern Time. Meetings are held in January and February, but are available by Zoom only.

- We do public outreach programs in the form of helping the Cubs and Guides, teachers, Science Fairs and many public Education and Public Outreach events.
- We help our members with questions in astronomy and equipment use.
- We hold private observing sessions.
- We hold public sessions with Queen's University Observatory Open House, on the third Saturday of each month, at Ellis Hall, Queen's University. Details can be found at https://www.queensu.ca/observatory/
- We support the local Frontenac, Lennox & Addington County Science Fair (FLASF) with a prize in astronomy.
- We are happy to answer your questions on astronomy.

Board of Directors & Officers for 2024-2025

Directors:
President: Malcolm Park
Vice President: Kim Hay
Secretary: Elena Zanetti
Treasurer: Susan Gagnon
Regulus Editor: Roger Hill
Nation Council Representative: John Hurley

Officers:
Librarian: Kim Hay
Past President: Rick Wagner
Loan Equipment: Kevin Kell
Webmaster: Walter MacDonald
Honourary President: David H. Levy

The **Royal Astronomical Society of Canada Kingston Centre** was provincially incorporated as a Not-For-Profit Corporation in September 2005 and has been a registered Charity with the Canada Revenue Agency since September 2006. Our CRA Registration: 827905720RR0001

Benefits of Membership:

RASC benefits:
- Annual edition of the Observers Handbook
- Bi-monthly RASC Journal (digital)
- Monthly Bulletin of the RASC (digital)

Kingston Centre benefits:
- Monthly Centre Newsletter – Regulus
- Weekly social videoconference chat for members and invited guests.
- On the 2nd Wednesday evening of the month, there are meetings are open to the public: In-person in March to June and September to December at Queens, July and August outdoors at Lake Ontario Park; and two in January and February that are video-conference only.
- Equipment loan program

Front cover image

I saw two images of the lunar eclipse from the early hours of March 14 that I really liked. The one to the left was taken by Mark Huff, who doesn't post much, but played "Show and Tell" on the Centre's Facebook page with this lunar eclipse pic. He used his orion xt10 Dobsonian and a Samsung s24 ultra phone through a 40mm eyepiece and a 2" barlow. He then used the editing settings built into the phone's camera to help bring out some contrast. Nice image, Mark!

The second one can be found on the front cover. It is from Bruce Murray who, like several of us, has found a home in the Kingston Centre.

Bruce used a Canon R camera, with a Canon 300mm lens and a 2x teleconverter. The camera to ISO3200 using a 1/8 second exposure, at f/11. effectively.