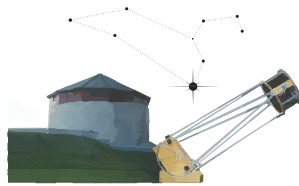


# Regulus

May 2016  
RASC Kingston Centre



## Upcoming Events

**Saturday, April 9** 20:00  
KAON Session  
Queen's University Observatory

**Thursday, April 14** 19:00  
Special Meeting: Dine & Gaze  
Queen's Inn Pub/Glenhaven Memorial Gardens

**Saturday, May 7** 10:00-15:00  
Science Rendezvous 2016  
K-Rock Centre

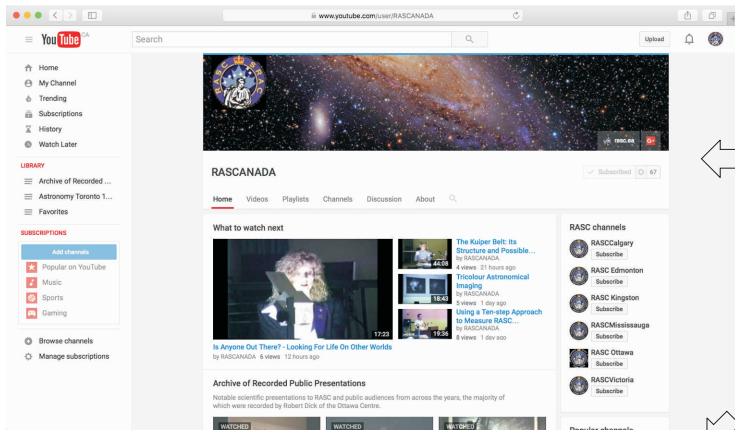
**Thursday, May 12** 19:00  
Regular Meeting:  
*The Secret World of Spectropolarimetry: How We Measure and Map the Magnetic Fields of Stars*—Matt Schultz  
Ellis Hall, Room 324, Queen's University

**Saturday, May 14** 21:00  
KAON Session  
Queen's University Observatory

**Thursday, June 9** 19:00  
Regular Meeting  
Ellis Hall, Room 324, Queen's University

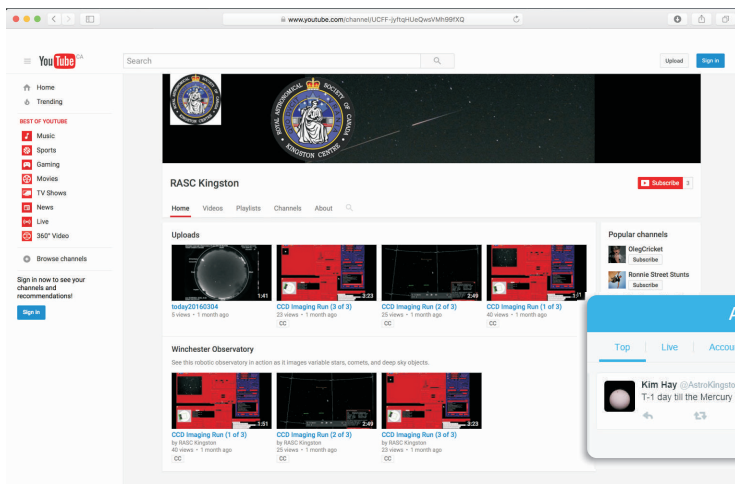
**Saturday, June 11** 21:00  
KAON Session  
Queen's University Observatory

Check [kingston.rasc.ca](http://kingston.rasc.ca) for meeting locations, [kingston.rasc.ca/observing/sites](http://kingston.rasc.ca/observing/sites) for sites. ★



The next expansion phase of the RASC's YouTube channel—the digitization of Rob Dick's voluminous video library, spanning three decades—is underway once again.

Kingston Centre now has its own YouTube channel! So far there are just a handful of videos, but in time hopefully Centre members will add various items of astronomical interest.



Thanks to Kim Hay, Kingston Centre now has a Twitter feed—just search for @AstroKingston (and don't forget RASC's feed at [twitter.com/rasc](http://twitter.com/rasc)).

## Reports and Other Items

### LIGHTING UPDATE

(January 28th): The Town of Greater Napanee expects to save 63% on energy costs now that all 967 streetlights have been converted to LEDs...

### ASTEROID SCHMUDE

Longtime centre member **Richard Schmude** has had an asteroid named after him:

*(30042) Schmude = 2000 EY3; Discovered 2000 Mar. 1 by the Catalina Sky Survey. Richard Schmude (b. 1958) is Professor of Astronomy at Gordon State College (Barnesville, Georgia). He has served as coordinator for five observing Sections in the ALPO as well as Executive*

*Director and Associate Director. He has also received the ALPO Walter Haas and the Peggy Haas awards.*

Congratulations Richard! The Centre will be sending him a congratulatory letter.



(A complete list of asteroids with a Canadian connection can be found at [rasc.ca/asteroids-canadian-connection](http://rasc.ca/asteroids-canadian-connection))

### LPA ARTICLE IN S&T

The June 2016 issue of *Sky & Telescope* has an article by Rob Dick: "Is Red Light Really Best?"

## from Kingston Centre, the RASC, and Beyond...

### RASC EXPANDS

On May 3rd the RASC Board of Directors approved an application from the Yukon Astronomical Society to become the RASC's 29th Centre—the RASC Yukon Centre. Welcome! ★

## In this issue:

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## Science Rendezvous Report: May 7

Susan Gagnon

I ARRIVED AT THE K-ROCK CENTRE at about 09:45 and delivered a big batch of handout material to the RMC grad students running the info depot on the sidewalk. **Laurie** and **Devon** were using a Bader filter, RMC provided two men with Coronados, I had a 1000 Oaks, and **Hank** had a glass filter with a white Bader look to it (?) as well as his Coronado. Hank also treated folks to a view of daytime stars like **Sirius**, **Betelgeuse** and **Aldebaran**, as well as **Venus**. **Mike Earl** had an 8" inch Celestron that he kept on Venus all day.

We had unbelievable luck with the weather. There was no real cloud until 2 p.m. and even then my scope always showed the sunspots, so the cloud was never too thick. Our contribution to the handout table was greatly appreciated and it looked as though the guys made a real effort to show folks how to use the starfinders as I never saw anyone with only one half in their hands.

We had a brief sighting of **Michael Bird**, but he was busy

indoors with a robot workshop! I wore my Kingston GA T-shirt and this started a lot of conversations about what happens in Kingston on a regular basis. We chatted about meetings and the KAON sessions as well as the L & A dark sky events this week. **Laurie Graham** is the official Kingston Centre "interesting ideas" magnet. (You can ask her what that means.) It was a great day for outreach!

Thanks to **Colin Lewis** (our RMC contact) who included us in his group. ★



More Centre newsletters were scanned over the winter and added to the archive at [rasc.ca/centre-newsletters](http://rasc.ca/centre-newsletters), bringing the total past 3500 issues.

## Regulus Needs You!

**ITEMS OF INTEREST FROM MEMBERS**—full articles, or even just a couple of paragraphs are always welcome. Items are gratefully accepted on each and every day of the year! Send items to:

walter (dot) macdonald2 (at) gmail (dot) com



### The Fine Print:

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## RASC-KC Board of Directors

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<b>Treasurer:</b>	Susan Gagnon
<b>Librarian:</b>	David Maguire
<b>Editor:</b>	Walter MacDonald
<b>Nat'l Advisory Council Rep:</b>	Rick Wagner
<b>Directors without Portfolio:</b>	Rose-Marie Burke, Bruce Elliott

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<b>E-mail Lists:</b>	Kim Hay
<b>Equipment:</b>	Kevin Kell
<b>Fall'n'Stars:</b>	Greg Latiak
<b>KAON:</b>	Susan Gagnon
<b>Social Convenor:</b>	Kim Hay
<b>Tardis Project:</b>	Kevin Kell
<b>Webmaster:</b>	Walter MacDonald

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## Meeting Report: April 14

Kevin Kell

IT WAS THE BEST APRIL MEETING in years, notwithstanding that the last two were rainy! Eight people met up for dinner at the Taps on Brock and 11 people arrived at the observing site around 19:00 EDT.

The observing site was easy to find, had a little native activity going on around us, and we were careful not to set up on top of anything... or anyone.

Observing targets of the evening/night were:

▶ **Sunspot** Ar2529 naked eye to those with solar glasses, via filtered telescope for others.

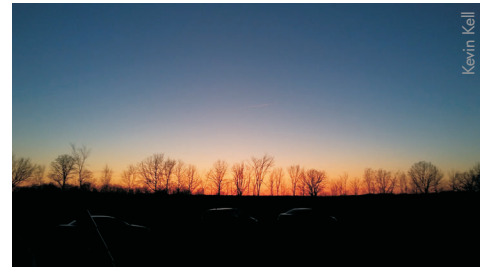
▶ **Mercury**. No it wasn't! Yes it was! No, that's too high! No it's not! In the end, yes it was!

▶ **Jupiter** and 4 moons, then 3 moons.

▶ A 66° altitude pass of the **International Space Station** starting at 20:42. It was great!

It was good to see and socialize with the lot of y'all. I finally got to see some of your equipment as well, and as always, got some new ideas!

Kim & I headed out at 21:00 and despite our best intentions, could not get up at 04:00 the next morning to observe Saturn and Mars. Maybe Saturday! ★



## KAON Report: April 9

Susan Gagnon

FINALLY! Clear skies for an open house in Kingston!

Thanks to **Kevin, Lori, Devin,** and **Brian** we coped very well with the folks who came out to the observing deck. The count from the lecture hall was 128 and I think most came to the roof. With four telescopes we avoided the big line-ups that can frustrate and were able to take the time to get everyone to the

eyepiece and really have a good look. **Jupiter** and the **Moon** were popular targets.

I was disappointed that I did not get to hear the talk downstairs since **Kristine Spekkens** (RMC) is a good speaker, but it was worth having the time to set up and Kevin had a go with the new Celestron we purchased last fall. It was cold but very satisfying as we had something to show everyone!

Let's hope this is the beginning of a stretch of clear KAON nights. If you are thinking of volunteering, there is plenty to do on the deck even if you do not operate a scope. You can point out constellations, make sure everyone knows what the handouts are, and when there are star wheels available, how to assemble and use them. ★

## FLASF 2016 Report

Bruce Elliot, Paul Winkler

THIS YEAR Paul Winkler and I were co-judges for our Centre prize, the *Leo Enright Award for Astronomy* at the Frontenac Lennox and Addington Science Fair (FLASF).

We awarded the prize to **Finn Ferrall** of Calvin Park Public School. The project entitled "Quantum Interference" studied wave patterns of laser light refraction through thin slits on smoke coated glass plates. He had beautiful interference patterns for which he demonstrated an excellent understanding of how light can be diffracted. He was able to relate his findings to quantum theory and some basic properties of photons. The link with astronomy was demonstrated

through his appreciation of gravitational waves predicted from Einstein theory of relativity. As well he understood the significance of earlier observations of light from distant stars being "bent" around an eclipsed sun.

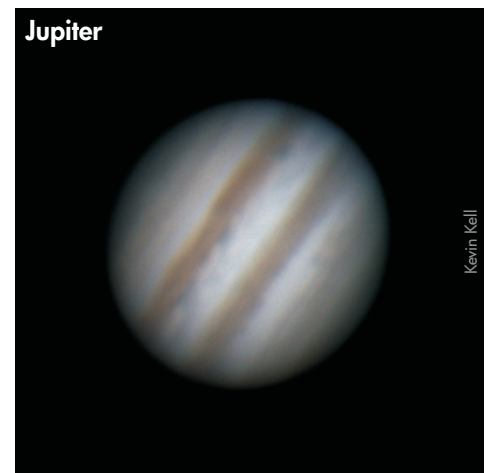
Finn had a genuine interest and enthusiasm for his project as well as the broader significance of his findings to our understanding of the universe.

His project was the only original research study relating to astronomy, although there were other projects which had researched the internet on various topics.

Both Paul and I felt he deserved the RASC Kingston Award. Please

share this with other RASC Kingston members!

Thank you for the opportunity to judge for the RASC Kingston FLASF award. ★

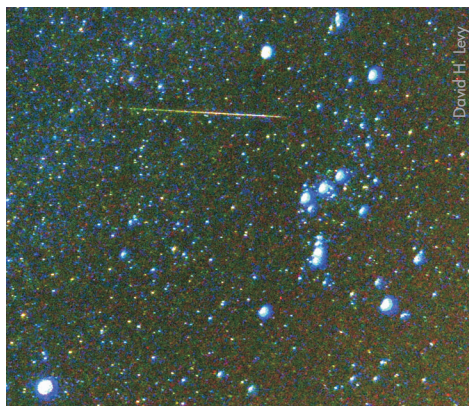


THE NIGHT SKY is not restricted to a specific country, or even to a specific area of the world. In fact, the sky that we see from the United States is much the same, at least for a particular latitude, over all of the world. The sky that we see from Vail, Arizona, (latitude 31.9° north) is almost exactly the same—star for star—as it is over Jerusalem, Israel, or over Shanghai, China; both at almost the same latitude as Vail. This month for example, Jupiter will be just rising at the end of dusk, just as it will several hours later over Shanghai, or hours earlier in the sky over Israel.

I find it exciting that China and the Middle East have some of the richest and oldest astronomical traditions. The Chinese Book of Silk is one of the most famous astronomy books in the world. It was put together by a group of Chinese astronomers belonging to the Western Han Dynasty that stretched from about 200 BCE to 9CE. Discovered in a Chinese tomb only 40 years ago, it records observations of 29 comets describing them either as *po*, or broom stars with long tails, or *hui*, bushy stars with wider, fan shaped tails. Many of the most ancient cometary appearances were recorded only in China, including a bright bushy star comet that brightened the north polar region of the sky around 959 BCE. This comet goes way back towards the dawn of time. It is possible that this, or a comet similar to this, appeared in the biblical first book of Chronicles; this particular comet seemed to protest an ill-advised census ordered by King David; the biblical passage is read every year at the Passover Seder: “And David lifted up his eyes, and saw the angel of the Lord standing between the earth and the heaven, having a drawn sword in his hand stretched out over Jerusalem.”

These ancient Chinese traditions, dating back as far as the middle

Shang Dynasty divided the star patterns into 28 “mansions” that may predate the ancient Arabic and Greek constellations with which we are so familiar today. Colorful and beautiful as this tradition is, the evening sky over modern Chinese cities like Shanghai look precisely like they do over Vail. And it is partly for this reason that I have become interested in spreading my own enchantment with the night sky with the people of that magnificent and ancient land.



A late Geminid meteor, taken by David Levy on 17 December 2015: the 50th anniversary of the start of his comet search.

A few years ago I began a personal journey to share my astronomical enthusiasm with China when I was invited to become a member of the De Tao Masters

Academy, an association based in Beijing and Shanghai, that seeks to enhance and strengthen ties with the West in business, the arts, and in the sciences. It is based on the idea that “Wisdom is the power that develops civilization.” Frankly, I find the prospect of sharing my passion for the night sky with fully one quarter of the world’s population more than tantalizing. Although China probably leads the world in its understanding of ancient astronomy, it has fallen behind the United States and other nations in its understanding of where astronomy is now and where its research is headed. More likely, as the people of modern China traverse through their daily lives, they probably show relatively little interest in the in the slow, deliberate march of time of the universe. The United States will have a new president in a few months. China will also have a new leader one day, but these events will happen far sooner than the forthcoming collision of the Andromeda galaxy with the Milky Way some 3 billion years from now. Who these leaders will be we do not now know. But we do know that if humanity is still around three billion years from now, it will be hard-pressed to survive the ripping apart of our own galaxy that this

Continued on page 16...

## KAON Report: March 12

Susan Gagnon

SATURDAY’S OPEN HOUSE was as good as it can get with nearly a completely overcast sky in Kingston! Approximately 140 members of the public showed up for an excellent talk on planet formation dynamics by Prof. **Martin Duncan**. The talk was summed up with all that goes into the predictions supporting Planet 9.

There was a steady stream of visitors to the dome for a tour and quite a few came out to the deck to see what they could. Through a

soupy haze we could see **Jupiter**, the **Moon**, **Sirius**, and fragments of Auriga, Orion, Gemini, the Big Dipper and by some freak of chance, Polaris! The Pleiades were only seen with binoculars.

There are always questions regardless of the sky quality and Centre members were on hand with answers.

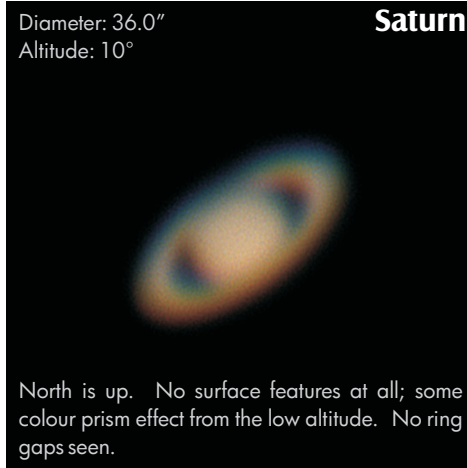
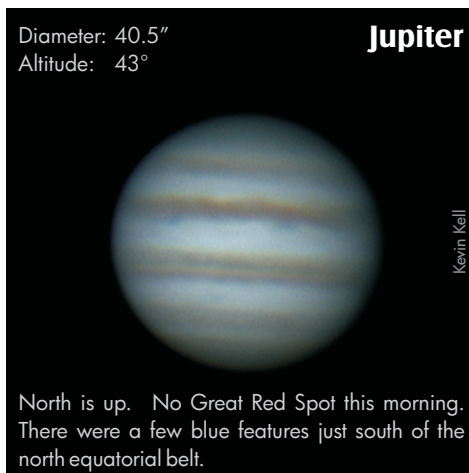
The usual star map handouts were available as well as the RASC starfinders.★

FRI/SAT, JAN 15/16

**Kevin:** Wow. Clear skies this morning...could not resist. I tried not to look at the weather station before going out... good thing too. It was the coldest-ever imaging session I have ever done to date:  $-14\text{C}$ . There was no wind as well, around 05:45.

The observatory roof was a little stuck, but pushed open easily once it started moving. There was a little bit of blown snow by one area of one door. The laptop computer started up fine, no glitches. The hand controller was inside, plugged in and the telescope started up fine. Pointing was good: **Jupiter** was within the 30' inner circle of the Telrad, but it still took me 5 minutes of slewing around to get Jupiter in the camera field of view.

I completed 6 imaging runs in total, 60s and 90s runs at 30ms exposures, with the 20cm SC scope, 2x barlow and ASI 120mc camera. It was getting close to the time to close down and go to work when I noticed that **Saturn** had cleared the south-eastern tree line. So I also got the first two imaging runs of Saturn this season. It was a good thing too because Jupiter is past the zenith now when I get outside and is heading into the backyard trees. Both the seeing and transparency were poor.



All in all not good results today. Go figure. Saturn will only be getting better, Jupiter only worse. These images attached were created from the best 50% of the frames taken.

Processing steps:

- ▶ FireCapture to align target, use ROI for 512x512 to speed up data transfer, flipX, flipY, debayer settings on.
- ▶ Castrator to reduce video size down to 400x400 pixels and to centre the target.
- ▶ AutoStakkert! used both standard and 1.5x drizzle to create .pngs
- ▶ Registax: used Jupiter wavelet settings on both Jupiter and Saturn. Perhaps the Saturn settings should be different.

**Rick:** Man! Where are you living? We were  $-6\text{C}$  this morning, also, overcast vs. clear. That's quite a difference over 40–50km! We didn't get any of the snow that was promised—just a couple of mm of freezing rain and some ice pellets.

**Greg:** And I am south of Kevin and it was solid overcast when the critters roused us at 06:30. We got the freezing rain and ice pellets to be sure. What I have observed on the satellite view through Wundermap is that the cloud cover has the occasional hole. Just a few minutes ago there was one over Toronto about the size of the sprawl that is drifting down lake. So some people can be blessed for a few hours while the rest

of us sit under this Mordor veil...

**Malcolm:** Same here: overcast. We had freezing rain overnight with a nice fresh coat of ice on the truck this morning.

SAT/SUN, JAN 16/17

**Kim:** Once again the weather predictions were wrong. It was clear last night around 22:00; I went out and got the binoculars to see the comet: no luck. Jupiter was nice, then it clouded over.

At 02:00 it was clear. I looked at the Dipper again to try to see the comet by the end star in the dipper handle...nope.

As of 06:30 cloud...

**Rose-Marie:** It was cloudy here as well. I woke up around 05:00, looked out the window: all cloud. Went back to bed.

**Malcolm:** It was clear in Toronto last night after sunset. At least I can confirm that Orion does in fact still exist.

**Rick:** Me too. There were breaks in the clouds  $\sim 23:30$  as I was brushing my teeth, breaks in the cloud again at  $\sim 03:00$  when I got up to check the sky (and dismissed the idea of dragging out the telescopes and went back to bed), then overcast when I got up this morning. We did get one brief period mid-morning when the sky was almost completely clear then back to flurries. And I notice that all the sunshine and clear skies they were forecasting for later in the week has now changed to various amounts of patchy cloud.

I noted with some dismay that at 23:30 Orion is already past the meridian and I've done almost no pretty picture imaging of that area of the sky yet this winter. And the Moon was still up in the sky—this moonless period is pretty much over except near dawn so it will be another several weeks until deep sky imaging at reasonable times of the night is

possible.

**Mark K:** Yes, it was very frustrating. It was cloudy, then I went out to the car ~22:00 to get some luggage we had not unpacked and, lo and behold, it was clear. So I made to get ready to go out and it was cloudy again. Each time after that I checked it was overcast.

**Keith:** I had to get up and water the lillies, about 02:30, sky was clear, grabbed the binocs. **Catalina** was a faint fuzzy bluey ball approx. midway between the last two handle stars.

MON/TUE, JAN 18/19

**Mark K:** Linda reports seeing a very bright **meteor** in the SSE at about 17:45 while she was driving south. Did it show on any meteor cams?

**Kevin:** I'm afraid not. AllSky1 doesn't turn on until 1800 EST and AllSky1's first image tonight was 19:02 EST.

**Rick:** Well, this turns out to have been a big evening for me. I just completed observing my 1000th named object on the Moon. I've sent a note on to the RASC Observing Committee to see how to apply for the 'award' or certificate or whatever it is. Gawd, it's good to have that done. Now if it can just stay clear until Catalina clears the trees so I can get a picture of it...

**Kevin:** Congrats. Does the RASC even have one of those? You may have to apply elsewhere!

I did shovel the snow off the roof of the roll-off roof yesterday, cleared the tracks and did a test opening, just in case the weather report for this morning was wrong and it might be +15C or so.

**Rick:** Well they don't advertise it at all. But if you look at the page for the Williamson certificate there are two files at the bottom to download: Lunar 1000 Challenge. They used to have something about there being a

letter or something as an acknowledgement of successful completion but that seems to have disappeared. Perhaps nobody ever applied?

It must be nice to have an observatory—would turn a cool -21C (though I don't believe it's that cold) into positively balmy. I'm observing out in the parking area (though actually spending most of my time indoors running the scope computer over TeamViewer.) It has clouded over now and that plus a cable snag half-way through means I didn't get many shots of the comet. I think it will be enough to at least show some of the details.

**Rick (3:36 a.m.):** Well it's still clear and the **comet** is where it's supposed to be! So I've changed cameras and started a long sequence of images of the comet. Showing nicely in the first few I've collected.

**Rose-Marie:** It is 04:35 and -18C here. Not happening. I stoked up the woodstove and am crawling back into my warm nest.

**Kevin:** I took some 15s and 60s shots last night when the moon was way, way up. They did not show anything at all. I tried stretching the gamma and zooming way in too. Our weather station is showing -21C and that is well behind safety limits after being under the weather for the last three days.

**Rick:** Yeah, I was shooting 200 and

300s exposures through an f/4.5 apo refractor with a CCD camera. Unfortunately I didn't get enough exposures to do a decent job of separating comet and stars into separate images. I'll keep trying to improve my processing but I don't think I will finally get the result I wanted. [later] Ah yes, I was also shooting starting about 0330 so the Moon was close to the horizon when I started.



**Kim:** I had the ELPH120IS at 15s exposures out this morning to catch the ISS, which was a success, and I also caught a few summer constellations for my friends wishing for summer: **Scorpius** and **Saturn, Aquila** and the **Summer Triangle**, and the **ISS**.

It was a nice morning, -16C no wind. I did capture some pink in the North. Checking Spaceweather, the Kp is at 4 and unsettled, so maybe...

**Kevin:** -16C: a new record for imaging and frostbitten fingertips. OMG! I was out around 05:30 EST: seeing and transparency were poor to average. I got in a few runs of **Jupiter, Mars, and Saturn**.



Excuse typos from both of us—our fingertips are still not functional. Thank goodness there was little to no wind. The seeing/focusing got worse and we packed it in around 06:15 after catching that AWESOME ISS pass overhead. I did not see it coming, it just went BAM! and appeared at mag  $-4$  or  $-5(?)$  near the western end of the Big Dipper.

**Malcolm:**  $-3.2$  at maximum I think. I caught it too, but I had technical problems (read: HUMAN ERROR) which messed up my ISS shots. It's amazing how painful cold can be, and how quickly said pain sets in!

**Rose-Marie:** I was awake at 4 a.m., stoked up the woodstove, looked out the window, saw clouds to the east, haze to the west...said nope, not happening, and crawled back into my nice warm nest. Hearing about painful fingers makes me not regret staying indoors.

**Kevin [later]:** Greetings! You have already read the prequel notes, i.e. "bbrrrr." It has been seven days since the last short, also frigid, imaging session. After 05:30 EST this morning it was  $-16C$ . The hand controller required ungloved hands to operate.

The best **Jupiter** image was the first image. It was a 90s run with 30ms exposure, but only 121 frames were captured. Funny that, it should be around 2700. There is some slowness in the system. There was

no Great Red Spot. It's been some time since I last saw it.

Closer to 06:00 I did a quick run on **Mars** since it was up and then **Saturn**, both after the spectacular overhead ISS pass. Saturn was more challenging, right over the Kingston light pollution dome. It is a very poor image, with not even a Cassini's Division appearing. But it can only get better...

Processing:

▶ Castrator to shrink 2GB .avi files down to 700MB, making a consistent pixel size count and centering the objects.

▶ AutoStakkert!2 to stack using 25% of the best frames, into .png format images.

▶ Registax6 for wavelet processing.

**Rick:** Nice images Kevin. I especially like the detail on Mars. And there is a Cassini's Division on the Saturnian rings—you just have to look harder!

I too was out for just over an hour this morning to image the **ISS** pass and look at Catalina (I forgot to look at it the other morning when I was imaging it.) Like Malcolm I had technical difficulties—apparently I brushed the focus ring at one point and it left me with somewhat blurry images. However, I think at low resolution (i.e. on the meeting projector) they may look OK (you will have to put up with seeing the resulting picture at the next meeting.) But it does show the **comet** as a little green blob, extended slightly with the dust tail. Exposures were 30s at ISO3200,  $f/2.8$ , on a barn door

tracker so it's not surprising that it doesn't show in shorter exposures with a point-and-shoot. In the 20cm Newtonian at 37x the comet was very obvious of course. The dust tail was visible but quite difficult, curved, about 20' long, the ion tail was about twice as long but extremely difficult requiring some minutes of hunting and sweeping back and forth to enhance its visibility.

**Rose-Marie:** It does me good to hear that comet is difficult to image. I was just out there freezing my toes off trying to take a few grab shots. Pics are probably as blurry as my mind at this hour.

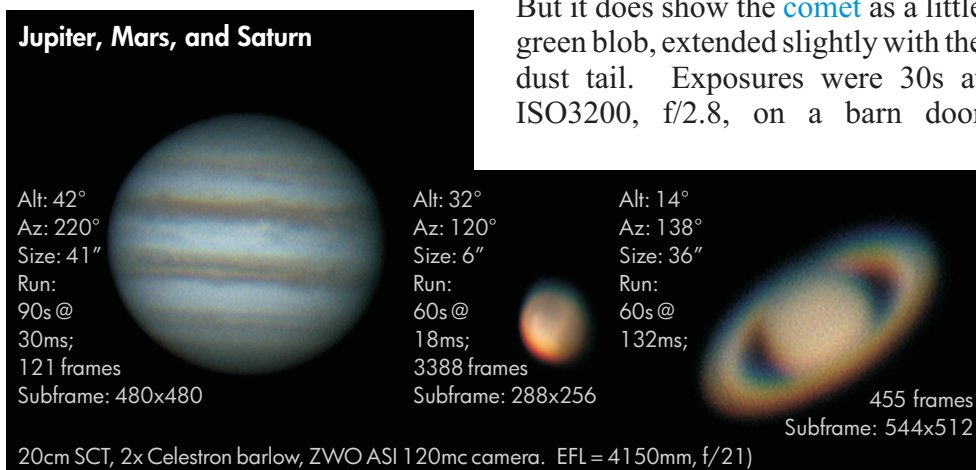
WED/THU, JAN 20/21

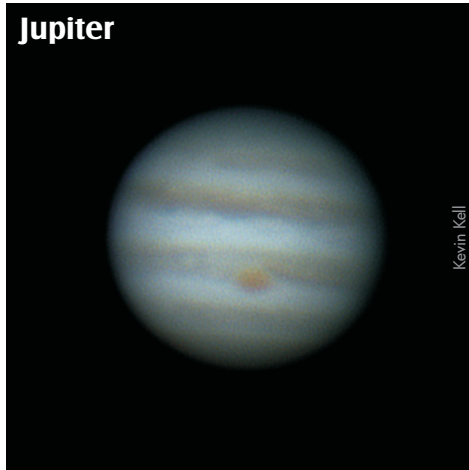
**Kevin:** Wow, it was even colder this morning! Why do I do this again?  $-18C$  at 05:30. I prepared with new thermo mittens, not gloves, in the hopes of keeping fingers working. Hmm, I seem to have bought two left handed mitts. How does that happen? I put them on anyway and ran two imaging runs.

Hmm...**Jupiter** is not nearly so clear as it was. I take a peak outside.. looks clear. The transparency is below average, seeing maybe average. I unlock the primary mirror and redo the coarse focus, and lock it down again. I still cannot achieve a clear sharp image with the micro-focuser. Oh well. I try two more runs and pack it in. Checking the corrector afterward, it is clear.

On the drive into work it became apparent that there was a level of fog starting maybe 10m up that the headlights lit up. That will really kill the sharpness, the focus, for sure.

The Great Red Spot finally appears, but half of some of the northern belts disappeared. I used the same processing as yesterday, but got a much worse image. I did not even attempt to process the Mars or Saturn images.





THU/FRI, JAN 21/22

**Kevin:** As of 07:05 EST this morning, still no sign of Mercury (albeit whilst driving into work on bouncy pothole filled roads) naked eye and or with 10x50 binocs.

Media reports have people coming up to me and asking why all 5 planets are not as bright as Venus and all lined up within a handspan!

Arrgg.

People are also asking about Planet Nine. Can you see it in your telescope?

Double arrgg

I attempted to read through the paper on the topic, and the math is wayyy too over my head. I still get the impression that it is an advanced statistical method that says there might be a single large planet out there disturbing orbits of other dwarf planets. Nothing discovered yet! [Walter: I guess you could say that the proof of the 'puting is in the seeing...]

**Rick:** Wait—so “whilst driving into work on bouncy pothole filled roads” you’re observing with binoculars?! When you get killed doing that can I have your telescopes?

SUNDAY, JANUARY 24

**Richard:** The last of the lunar observations was completed! It was a wonderful evening to be out, only

–10C, and no wind. Only the honking of hundreds of Canadian Geese in Adolphustown Reach to keep me awake!

WEDNESDAY, JANUARY 27

**Kevin:** Every time we get wind warnings now, we keep our eyes open for any new SkyPod arriving in our backyard from the southern regions, of Amherst Island and Prince Edward County!

MONDAY, FEBRUARY 1

**Kevin K:** We relocated the SuperSID (<http://solar-center.stanford.edu/SID/sidmonitor/>) Space Weather Monitor system from inside down in the basement to outside out on the deck. (The antenna is pictured below.) Each arm is 2m across and thin insulated wire was wound around the perimeter to form a loop antenna.



The SuperSID is a multifrequency receiver and in theory can pick up multiple VLF broadcasting stations, but our best is still NAA located in Cutler Maine, almost directly east of us, at 24.0 KHz.

The software takes a reading every 5 seconds and every 24 hours

writes out all of the collected data to a text file. A very large text file. We are attempting to rewrite some code to process it ourselves and turn it into a graph, but also in the near future will upload the data automatically to Stanford. Once there we could then query the database for our own results.

Eventually, the antenna (now on a 25' coax link) will be moved farther out from the house to help reduce interference, along with the receiver and the data logging computer (a very old Intel Atom netbook), as long as it is within wi-fi distance.

THU/FRI, FEB 4/5

**Kevin K:** Both Clear Sky Chart and Clear Outside showed it was to be clear at 03:00 today, getting worse for 04:00 onwards. So I was up and awake at 03:00 only to find it so overcast that no stars were showing. I went back to sleep, and was up again at 04:00. It was still overcast, but thinning.

I was back up at 05:00 and it was clear in the north, cloudy in the SE. I went outside as **Jupiter** was in the clear but after the roof slid open, Jupiter was in the backyard maple tree. Grrr. What the heck, I will image it anyway. I fired up the 2.5.0.3beta software of FireCapture, to try it out for the first time and see what the new features were like. Frustration galore! “Allocating RAM buffer,” which sometimes pops up and takes 1 second, took over a minute this time. And then it repeated every time I changed the Region of Interest (ROI) frame size. Double arrg.

I did two 60s imaging runs of Jupiter in the trees, and two of **Mars**. I tried to do **Saturn** but it was still in cloud. I packed up and just as I was almost back at the house, Saturn popped out of the clouds. Triple arrg.

The upshot of all of this: FireCapture beta is too unstable and frustrating to use. I'll stick with the release version from now on. It was -8C with a wind. The seeing and transparency were poor. The Jupiter images were poor, and the Mars images were really poor and overexposed.

**Rose-Marie:** It does me good to hear of clouds. I was out last night, saw it was clear, but forgot to set the alarm. I wanted to look at and try to photograph the five planets in early morning. When I awoke at 06:45 I saw clouds on the southeast horizon, and figured it hadn't been the best.

At 10:30 p.m. when I walked the BigWetNose the sky was clear, but there was dampness in the air, wasn't as crystal clear as a dry night. I got out the binocs and went looking for Comet Catalina. Couldn't find it. Went back in, double checked the charts, got the tripod and the big binocs, still couldn't find it. Argh. Scanned around with the big binocs, looked at [Sirius](#) and the [Orion Nebula](#), scanned around. By this time my neck was hurting from crouching, damned tripods are not made for tall people and I wasn't motivated enough to find a chair.

**Malcolm:** Here it was clear after sunset for about 90 minutes. Then sucker holes until midnight when I gave up. At dawn the clouds were still in the south, clear on the north. So I knew I wouldn't have seen the planets.

And then of course it was clear all day. In fact it was so clear I thought I would do some H-alpha on the [Sun](#). It was late in the day, about 3 p.m. No sooner had I started to focus...the cloud moves back in.

I'm feeling jinxed.

SAT/SUN, FEB 13/14

**Rick W:** Well, it did clear off here about sunset so, after checking the

## COMPUTERS IN OBSERVATORIES

**Greg:** I am slowly working along getting the dome set up for winter observing from the relative comfort of the house. One question that comes to mind is about observatory-resident computers and screens—what are your experiences with leaving computers out in the observatory?

Do computers need to be kept powered up? Or can they be left shut—and if so, how long before they are usable? And if there is a monitor out there, what works? And does anything NEED supplemental heating to keep it going in the cold? And does anyone use network attached power switches to control things—and if so, which work well?

**Rick:** I too am beginning to think about remote operations. In Ottawa I kept an LCD monitor permanently in the observatory connected to a laptop docking station with mouse and keyboard. I would take the laptop out and push it into the docking station and be ready to go. I never tried leaving the laptop out between sessions. During observing it was under the docking station but otherwise unprotected. The keyboard tended to get very dirty (fly poop?) but otherwise everything always worked fine.

What I have heard from others is that hard drives may not have enough power to start up when very cold but will run fine once they are going. Some people use an old-fashioned (i.e. incandescent) light bulb inside a desktop computer case, some connect it through a thermostat. And of course an SSD doesn't have the problem.

I got a Lenovo Idea Stick computer for Xmas: a Windoze 10 PC with 2GB RAM, 32GB SSD in less than half the size of a Raspberry Pi (\$140 at Canada Computers). I've been thinking of leaving it in the observatory permanently with no monitor. On the occasions when I need to work in the observatory and need a screen (for configuration, debugging etc) I can either drag out a monitor or just bring out a laptop and remote desktop the two computers together.

As with Kevin. I have to go out to open the roof anyway so I haven't worried about remote power control. But with the new observatory I may make the jump—install a garage door opener on the roll-off roof. I wouldn't have bothered even considering such decadence except I saw in Home Depot a WIFI-enabled opener. That just seems to be begging to be installed in my observatory.

I always had a bed sheet over my mount/scope in the old observatory to protect against dust and drifting snow—I never had any wet leaks. Paul Boltwood had a tarp over his but I'm concerned about it trapping condensation/moisture. Paul could hook the 4 corners of the tarp to the roll-off roof and the tarp would disappear with the roof then return when it was needed. Very cool.

**Mark K:** I have had a computer running steadily in The Observatory since 1989. In the summer, it gets blisteringly hot and in the winter, as cold as it can get around here (which compared to Strathmore, is not all that cold) without any problems. I have maintained a constant one-computer-running setup for all of that time, but I also had a standby computer that I can switch on from anywhere that has not failed me. People take all kinds of precautions to create special chambers for their computers. Mine sits on a shelf under the eave. I submit that you do not need to do anything creative to keep your computer running in your observatory 24/7/365.25.

Like the axe, it is the same computer. None of the components are original, but there are still bits of software that have survived from way back then.

**Rick:** In my observatory I almost have the power connected—just need a few feet of 12/2 and a circuit breaker. I was a little worried about getting the Teck 90 connectors to work but they went together slick as anything. Also tried out my virtual OTA (frame of cedar 1x1 the same size as the telescope tube) and it clears all the walls with lots of spare room, lots of room for a desk and some small cabinets. And I've hung the red LED rope lights. Nearly there.



sky a half dozen times through the evening, hoping for clouds, I went out on the dock for ~2.5 hours with the 20cm Dob. Unfortunately I didn't realize how late the Moon would be setting so only the last hour or so was really good observing. However, I did manage to pick out [Barnard's Loop](#), looked for but missed [Jonckheer 900](#), two of the targets on the Deep Sky Challenge list, two targets off the Deep Sky Gems list, plus, while waiting for the Moon to set, passable views of about a dozen [Messier objects](#) and nice very steady views of [Jupiter](#)—seeing was very close to 5/5. It's been so long since I looked at deep sky through a telescope I've almost forgotten how.

How can it be that a Moon which looks like a still relatively new crescent can set at just before midnight? What a waste of clear skies.

SUN/MON, FEB 14/15

**Rick W:** I went out this morning to try to get a better shot of the ecliptic—without that wandering Moon screwing up the line and without the cloud on the horizon obscuring Mercury. But I can verify Kim's comment from the meeting last week: Mercury doesn't exist. I stood down there on the dock for about 40 minutes; Mercury should have been up but I couldn't see it naked eye. I finally gave up once I decided that there was no longer any possibility of photographing the whole line of planets any way—the E horizon would be way too bright to be able to get Saturn and Mars in a properly exposed picture. Anyway I think I got some good shots of the rest of the bunch.

This is a very bad time of year to be looking for Mercury (or indeed Venus) in the morning sky. The ecliptic is at such a low angle that they stay much closer to the horizon

**T Coronae Borealis: Act III?**

AAVSO SPECIAL NOTICE #415 (APRIL 8):  
T CRB BRIGHTER AND BLUER —  
MONITORING REQUESTED

The symbiotic recurrent nova T CrB has entered a super-active state, and it is brighter and bluer than it has been since before its last outburst in 1946. Multicolor and visual ongoing observations are requested.

Visual and multicolor observations in the AAVSO International Database show that the average magnitude of T CrB was V ~ 10.2–10.3 until early February 2015. Its average magnitude then brightened to V ~ 10.0 and remained there until early February 2016, when it began brightening again and has currently reached V ~ 9.2. The B-V is roughly half what it was two years ago. [aavso.org/aavso-special-notice-415](http://aavso.org/aavso-special-notice-415)

**Susan:** If you are out tonight do have a look for this and perhaps make a plan to follow it for a while. This was a personal favourite of Leo Enright.

**Paul:** Yes, he used it as his email address. He was always eager to encourage others to observe it.

**Walter:** He was also in the habit of watching out for an outburst of the recurrent nova T Pyx (which just goes to show you how good his skies were). It finally underwent its sixth eruption (and first in 45 years) just a year and a half after he left us.

This T CrB thing is very exciting though. There is lots going on in CrB these days between this and R CrB's now record-breaking stretch of faintness. (BTW, SU Tau is another R CrB variable that seems to be in a record-breaking funk.)

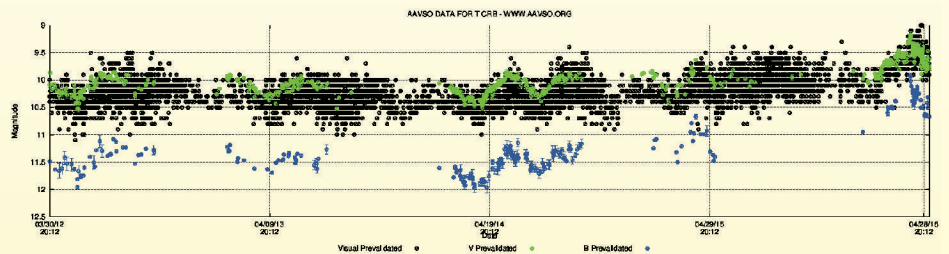
**Rick Huziak** (on RASCals): This latest brightening is pretty spectacular as things go—T CrB has been brightening since early Feb and is currently ~1 mag brighter than it has been since the quiescence state after the last outburst in 1946. The recurrent nova rose in the last few weeks to 9th mag, and is now

fading a bit. Careful photometry shows there seems to be the appearance of "superhumps", possibly reflecting to precession period of the accretion disk at ~2 week quasi-period. (The orbital period of the two stars (spectral type M3III red giant and the white dwarf with the accretion disk around it) seems to be 227 days, indicating a fair separation of the pair, thus long periods between outbursts.)

The last outburst in 1946 appears to have been accompanied by a few pre-burst brightenings, though it seem that those happened months or even years before the main outbursts, but from the bluing of the disk and the optical brightening, it seems this star is preparing for something to happen "soon" (in astronomical terms) and that the accretion disk is filling toward some critical point.

I this highly encourage putting this star on your observing program every night until it goes boom, and then for the next several months afterward. (This could be a longterm project still.) I made a Newtonian and a Cassegrain chart for the star using the AAVSO chartmaker ([www.aavso.org/vsp/](http://www.aavso.org/vsp/)) with fields of view at 1.2 degrees to catch all comp stars. You can make your own chart there, or just download the ones I created (chart ID X16120EB for the Newt and X16120EC for the Cass). Don't just find the star ... make an estimate every clear night and report it to the AAVSO! Finding T CrB is a breeze—an easy starhop from the bright stars of CrB.

Astrophotographers should also take advantage, shooting 5 consecutive frames of the field each night (for statistical purposes) even if you are planning to photograph something else—just include T CrB/CrB constellation in nightly imaging, and archive the frames after taking a quick look. Of course, shooting in a raw format is more useful, but any band imagery might just show the rise of this star when it eventually happens. It reaches 2nd mag when it blows... changing what CrB looks like for a few weeks!



1500 day light curve with U,B,V, and visual observations from the AAVSO ([aavso.org](http://aavso.org)).

than they would in the evening sky (or equally in the morning sky in the autumn.)

**Kim:** We spotted it yesterday morning, in twilight, above the trees, from the back bedroom with 10x50 binoculars. It was very dim and hard to see.

**Susan:** It sounds as though it was anything but a waste of clear sky. A very nice observing session.

TUE/WED, FEB 16/17

**Susan:** I did not get up before 06:30; it was getting bright so I did not enjoy what clearing there was—partial. But last night after we cleared the snow spent a few moments just leaning against the observatory door enjoying the moonlight on the snow, then watching as **Orion** gradually emerged. It was warm and there were sounds of people out and about everywhere. I like the quiet but then there is something cool about everyone coming out in the night at the same time...all with the same problem.

**Kevin K:** awoke at 03:00; it was too cloudy to see. Awoke at 04:00: still too cloudy to see. Went outside at 05:30 for round two of snow moving, and Jupiter was in the clear as were Mars and Saturn. Too bad, that. It was another poor forecast by all services concerned for the overnight period.

I tried to shovel path to observatory yesterday, failed. I tried to remove mucho snowload from observatory roof, failed—got just a little off the edges. I will try again tonight or tomorrow morning as again, it is to be clear Thursday morning.

WED/THU, FEB 17/18

**Malcolm:** 04:00. The moon is setting in 4 minutes. Kp is 6, I think I see something but not sure. I can see

Mars, Saturn, Scorpius and Antares in the south. I can see Jupiter in the west. In the east, Cygnus rises lying on its side, with Vega in Lyra. I can see Polaris and Cassiopeia on the northern horizon. It's -17 outside with windchill of -23 and I'm looking out the windows!

**Greg:** Why does this remind me of Hagia Sophia?



FRIDAY, FEBRUARY 19

**Kevin K:** I finally had a chance to get the snoblo out to the back and carved pathways, almost tunnels, to the observatories. SCGO is now circled by a pathway, ready for me to get in this evening to try and clear the roof again. The garden shed roof does not have a lot of/enough slope for sure... the *next* observatory will be better!

The Tardis observatory: wow. Roll-off buildings are at a bigtime disadvantage: the snow not only covers the rails and the platform, but parts of the building itself as well as doors. I think a roll-off building would need to be higher up off the round rail/track wise... it gives the snow a chance to fall off better.

On the other side of things,

getting out back revealed the reason why the Radiojove system has been so bad the last few weeks: one of the masts holding up the SW corner of the dual dipole antenna has come down and is buried. That's Saturday's project: dig it out and put it back up again.

I still have not had a chance to try out the old imaging laptop, now upgraded with more memory, from a few weeks back now. I am getting very itchy to image again!

MON/TUE, FEB 22/23

**Malcolm:** I have no idea what I'm doing here. I am using a 3x barlow and some video capture device borrowed from a friend. I'm creating an avi using Fire Capture. I used the Jupiter preset and as far as I know I didn't modify any settings. I opened the avi in Autostakkert, and clicked the buttons in order, 1,2,3. The only change to defaults I made was clicking on the GRS to use it as the alignment reference area.

I had to adjust the levels in Photoshop to get some contrast but here's the output. I have no idea if I'm focused or not. The live view isn't sharp enough to tell. Kevin, how do you focus?



**Kevin:** Focusing and sharpness are my two biggest problems. Often I

ramp up the exposure to 10x and try to minimize the size of a nearby moon, usually Io, as it is usually in the field of view. I have *never* had as sharp focus as I think I should have or have seen others. I have also used a two-hole focusing mask made out of black cardboard, laid on the corrector plate of the SC. I also found that our 3x barlow was much worse for focusing than our 2.5x or 2x barlows. Try a smaller one next time.

THU/FRI, FEB 25/26

**Kevin K:** Well, I got up at 01:00 to see a lot of cloud all around but moving quickly away. I was outside by 01:05 and **Jupiter** was in the clear. Too bad it was  $-13\text{C}$  with a good 20km/h gusty wind.

I opened up the observatory (after unfreezing the roof) and actually got 10 imaging runs in until 02:00 when I gave up due to gusty winds blowing Jupiter right out of the field of view.

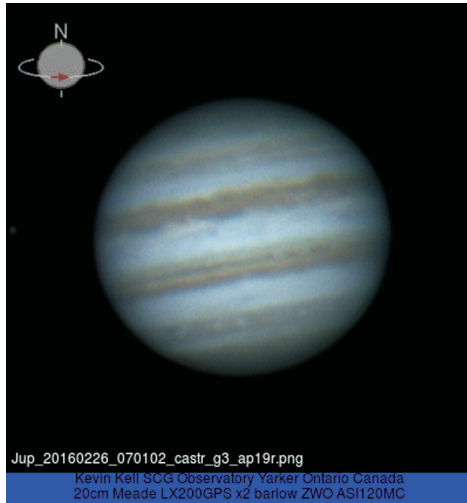
Hopefully there might be *one* frame of Europa's shadow

I went back out at 04:30 and it was clouded over completely for the double shadow transit. Bummer. Better luck next time!

It took a long time to warm back up again and let me tell you, I was bundled up! As noted previously, it was a bad morning for imaging, but what else are you going to do?

The best image of the run was the last one at 02:01 EST. The haze following the cloud cover earlier slowly blew away to better seeing and transparency, although I still rated both as "poor." I missed the first of the two shadows, Europa, which came in around 02:20 EST

All of the previous images had much worse focus and the amount of jitter in the captured 90s .avi was incredible, even with software alignment in real time turned on. This is a 400x400 image below, using about 700 images from a run of 1400.



**Hank:** Nice image in spite of the bad seeing. I give you a lot of credit for going out once never mind TWICE. It is a wonder that no one has as of yet suggested on the "quack" sites that the white dots in the lower band is a coded message from the Jupiterans or God. Nice to see the larger image, is this due to a newer camera or a format change? I am looking to go out and get a solar image shortly. CLEAR SKY!

**Kevin:** Same old ZWO ASI 120mc camera. I am just learning, still after two years now, on the processing side of things. I have settled on 400x400 pixels, with a capture Region of Interest anywhere from 500x500 (in good seeing and transparency) to 1000x1000 this morning in the high winds, in the hopes of keeping the object in the field of view.

Then castrate it down to 400x400, followed by stacking and wavelets, followed lastly by the newly developed scripts to annotate the image (originals without annotation are also kept).

**Hank:** It is amazing how much the focus changes throughout the gif from atmospheric lensing just as it does in my solar imaging. I always take in threes for each exposure and I usually keep less than an average of 1 image per. I had better quit typing and get my ass out there.

**Rick:** Nice shot Kevin. I especially

like the thin black line through the centre of the SEB, and a nice set of white ovals in the STB(?).

And 'what else are you going to do?' How about sleep? That's what I was doing, as with most of the rest of us I suspect.

SAT/SUN, FEB 27/28

**Kevin:** First two-for observing runs in the same day in a very long time.

After the 01:00 run this morning I went back out in the evening at 20:00 EST for an hour. Jupiter was only  $20^\circ$  above the horizon, near the Kingston light dome, and the Moon was slated to rise around 21:30.

Focusing was much more difficult, if not impossible that low to the horizon. I was unable to even get a Moon exposed, much less focused and Jupiter itself moved in and out so fast there was no stable reference.

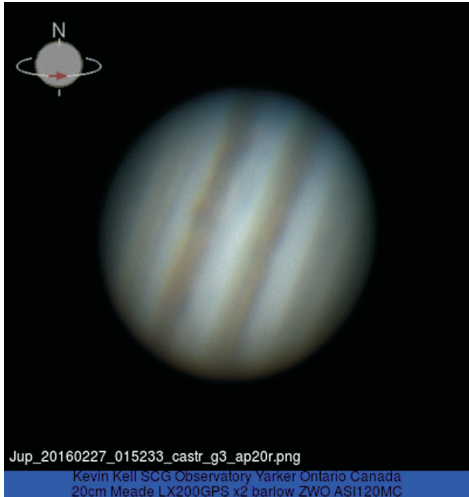
I noticed after processing the run that the colours vary a lot more as well from the turbulent air. This image is the last of the run, as the telescope ran amuck and I lost the target.

This evening also had the first successful telescope remote control in many months as well.

HandyAVI is the utility I use for the manual hand controller window with 4 speeds of guiding and focus control as well. It could never see the telescope until I reran the compatibility wizard on it for XP mode, and presto, it could see the scope again. It was nice to be able to go inside, remote desktop to the imaging computer and guide the scope from in front of the fire. I will start attempting other software again to find the best.

This image was 90s, using a 36ms exposure and getting 1687 frames. This was processed with: Castrator to reduce the window from 512x512 pixels down to 400x400 pixels and centre Jupiter within that as well;

then autostakkert! to generate the best 15%, 25%, 50% and 75%. After looking at them all, I chose to use the best 75% in this case; then Registax 6 to do an auto RGB colour balance and wavelet processing. The images were then all annotated and also turned into an animated .gif



**Hank:** Castrator, who would name a program that? Yuck, too scary to even load in the computer never mind use while sitting in close proximity!

I did manage to get out on Friday as I said for some solar but it was a rather blah sun. There was a C3.3 eruption yesterday and then things calmed down again but SS2506 is continuing to grow. Daylight saving in two weeks: that will change everyone's observing schedules again.

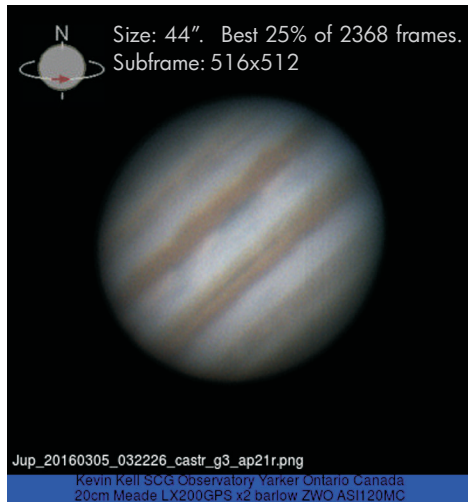
FRI/SAT, MAR 4/5

**Kevin K:** Tonight showed the first promise of clear sky in a long time, with several days earlier this week promising but not delivering. Tonight it delivered. It was not forecast to cloud over until 01:00 but the clouds came early—around 22:00

It was another successful remote session, inside from the comfort of the fireside. 37 runs of 60s and 90s from around 20:00 to 22:22 EST with **Jupiter** barely clearing the horizon (maybe 20° altitude). I tried to use a

focusing mask (two hole) but that did not work out. I tried 5x the exposure to find a moon and focus on it. That did not work out. I ended up with a lot of back and forth focus on the preview image and did the best that I could.

This was the first night using the new, shorter dew shield (was running into the wall when slewing, probably still will, just not as much). I was using a nine year old laptop with memory upgrades to 4GB and a 240GB SSD as well. I was saving images to the local drive instead of across the network. It worked: there were no USB glitches!



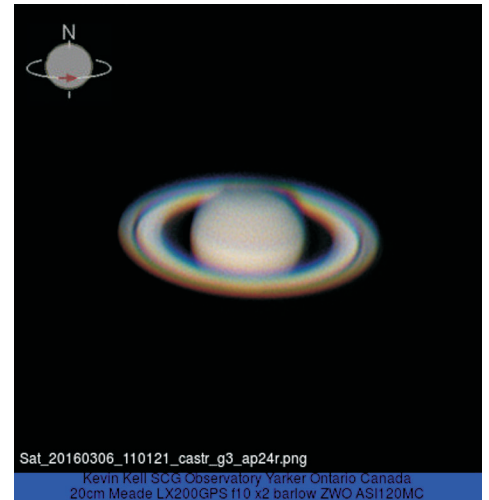
The seeing got better through the 2½ hours, as Jupiter rose in the sky and we were looking through less air. Seeing and transparency were both poor. The Great Red Spot had just exited right and would not be back until well into the morning. One of these days I will get it on the front face again!

SAT/SUN, MAR 5/6

**Kevin K:** Another clear patch was forecast for this morning and presto chango it was kinda not-too-bad clear. Seeing and transparency were poor. At 05:00 this morning it was already well into twilight. I had issues trying to find the \*7#\$\$% % planet. I saw a bright light in the sky,

saw the telescope was a few degrees away, so moved it, put in an eyepiece and hunted for 10 minutes without finding it. I told the scope to go back to where it thought it was and it turned out to be almost in the FOV. It was much dimmer than I thought. Exposures were up in the 100-125ms range, giving only 8-10 FPS. **Saturn** was 23° up, so there was a lot of air in the way.

This was a 90s run using the best 50% of the images (after inspecting the best 15%, 25% and 75% ones as well). The Cassini Division shows up well, but little to no surface features, maybe a couple of belts. The planet shadow appears on the rings in back. Saturn is at opposition in June—I can't wait for that! Saturn is 17 arcseconds big, 39 with the rings.



**Susan:** Saturn is very nice. The shadow detail makes the image since there is not the same surface interest that there is with Jupiter. Well done.

TUE/WED, MAR 8/9

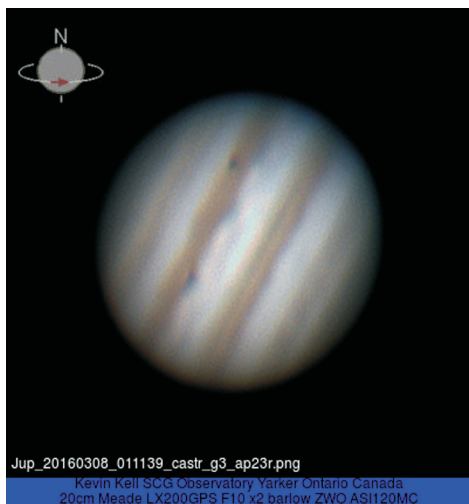
**Kevin K:** The skies cleared unexpectedly Monday evening, with clouds all around and threatening to move in, so I bounced outside to open the observatory and start a quick imaging run. That turned into 80 minutes of images across 30 runs.

The observatory can be opened

and an imaging run started in under two minutes now. This is very good for targets of opportunity. The LX-200GPS hand paddle (2003) continues to come indoors when not in use to stay warm and has been working much better. The shorter dew shield is working, keeping the dew off the optics as well as when it was another 2" longer. The dew heater strap on the corrector plate is still working well. I've ramped down to about 50% duty cycle on a regular night.

**Jupiter** was extremely low to the horizon, starting at 27 deg altitude) and seeing was much worse than poor. The session ended at about 39 degrees. Exposures started at 100ms, much higher than the normal zenith 35ms. There was a lot of atmospheric extinction going on there. By the end of the 80 minute run, exposures had to be dropped down to 70ms.

These images were produced from the best 25% of the frame, each about 1000-1500 frames originally. The big surprise! Karma! Payback! was the unexpected double moon transit of **Europa** (on the right) and **Io** (on the left). An animated .mpg is attached. Still have to figure out how to introduce a delay in the frames of the mpg as they go by too fast. Unlike the .gif where I can say -delay 20 and get a longer running image.

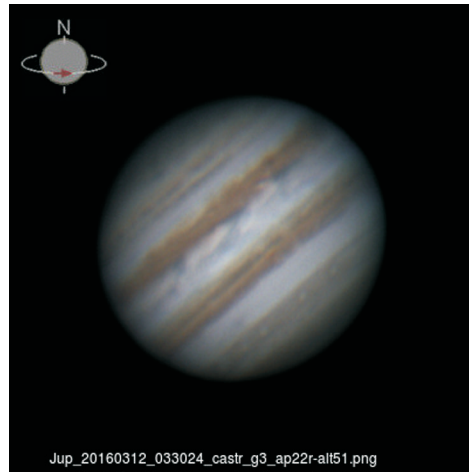


FRI/SAT, MAR 11/12

**Kevin K:** The first nice clear, not-too-cold night in a long time—too bad I could not stay awake any longer than I did: the last images were the best! The seeing was poor to average, transparency was average.

The imaging ran from 20:46 EST to 23:30 EST. The first images were the worst, due to the low altitude of 32° above the horizon. At some point I will set a minimum level and not even bother to image below that because these images are mostly useless. After each 90s run, 210 seconds delay were introduced to get a 5 minute cycle.

The last image was at 51° altitude and was the best of the run. If only I could have stayed up another 90 minutes—it would have been great!



The image annotations were tweaked a little for this run. Image exposures ran from 46ms at the start to 33ms at the end, reflecting the atmospheric extinction. There was no Great Red Spot, but there were some nice ovals in the south.

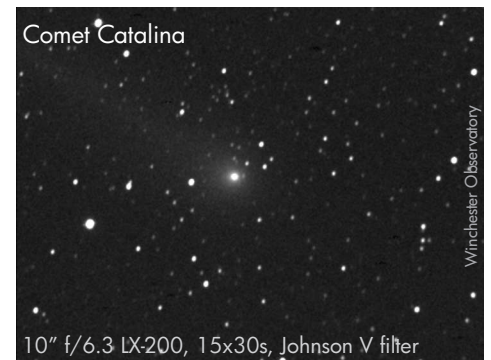
Focusing remains a huge challenge. After the first image run, I removed the camera, put in a 40mm eyepiece (4000/40=100x) and then a 20mm SuperPlossl (4000/20=200x) and re-did the coarse focus. Then the camera went in (slightly offset from

before) and used the microfocuser and HandyAVI stepped numerical display to get the best focus I could estimate.

**Hank:** Very nice Kev. It still amazes me what is being imaged today compared to 10 years ago. You ARE going to get that pristine night of good seeing and focus sometime soon.

**Malcolm:** Nice Kevin. I was out too. I photographed about 60 **Messiers** and then about 1a.m. the fog rolled in. I was well on my way! Sadly I couldn't finish it. I did observe a few visually but in the end I realized that I had to do one or the other, not both, with the time required to acquire and image each object. It may be clear tonight after midnight and if so I will try to finish the project. We shall see.

**Walter:** A clear night, and my first imaging run in two months. Well, it was only mostly clear since there was a bit of cloud that came through in the middle (approx. 23:00–01:00). That will probably be bad for some of the photometry, but we'll see. I bagged 219 **variables** and one 9th mag comet (**Catalina**). The equipment all ran flawlessly and my plan was good too (which means more sleep for me), though I shouldn't have started so far west at dusk.



In the evening before I went to bed I took some videos of the computer screen showing how my system runs. **Mars** and **Saturn** in Scorpius/Ophiuchus made for a very pretty scene. At dawn I was able to get new flat frames. There was lots

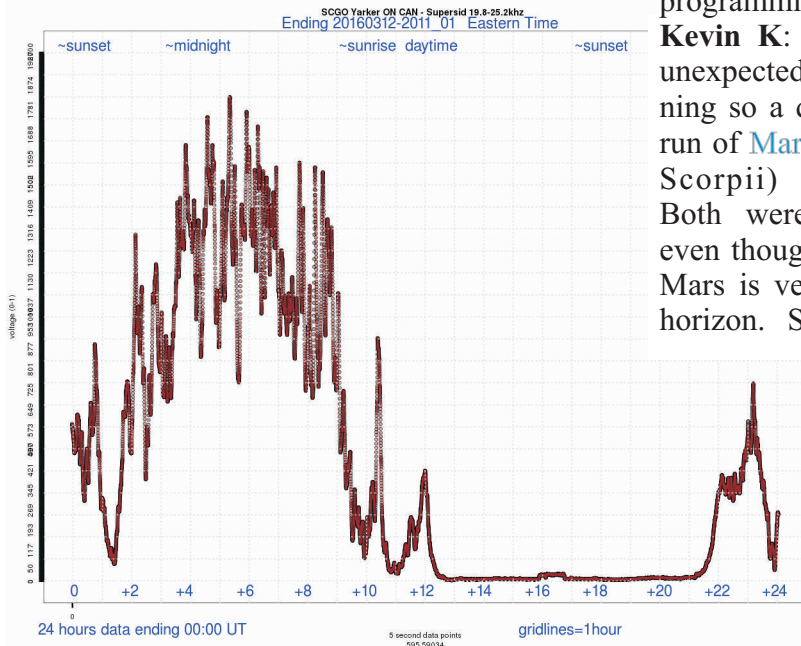
of frost and the sky was bright (from moisture plus the new LED lights in town).



SAT/SUN, MAR 12/13

**Kevin K:** From the looks of the last couple of days of great big solar activity, the SuperSID (Sudden Ionospheric Disturbance) system is going gangbusters. The nighttime signal from the high power, very low frequency transmitter in Cutler Maine is showing up great, and when the Sun comes up the ionosphere expands and loses its ability to reflect signals, so the signal drops to next to nothing.

Radiojove similarly went nuts the last couple of days with base levels well above our audio recording threshold. Something like 3600+ audio clips were recorded.



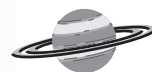
WED/THU, MARCH 16/17

**Malcolm:** I think I resolved my image processing problems (like “out of memory” errors) with Nebulosity. I tried a number of things and the order in which I tried them helped me come to a conclusion. Basically a newer, faster computer with more RAM (12GB vs. 8GB) and with an internal hard drive big enough to work with all the images locally did the trick. From now on, I will always work from my C: drive and export backups when needed. USB3 is another benefit to this move. Importing thousands of large files will be much less painful.

So now I can just open Nebulosity, point it to the folders where my files are, click OK, and let it do its thing. It takes all your darks, flats, bias and lights and combines them as you instruct. Once calibrated it will debayer the raws from mono back to colour files, then you can align and combine for your final step and then you take that image and edit the resulting TIFF in Photoshop. In less than five minutes I had my final image! Voila! Finally!

We now resume our regular programming...

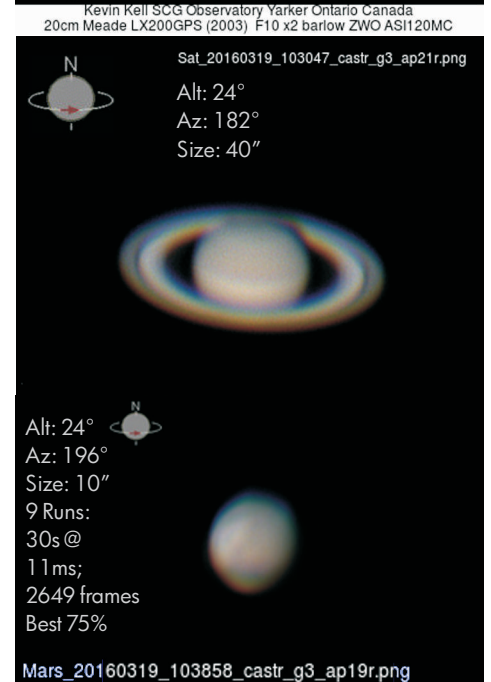
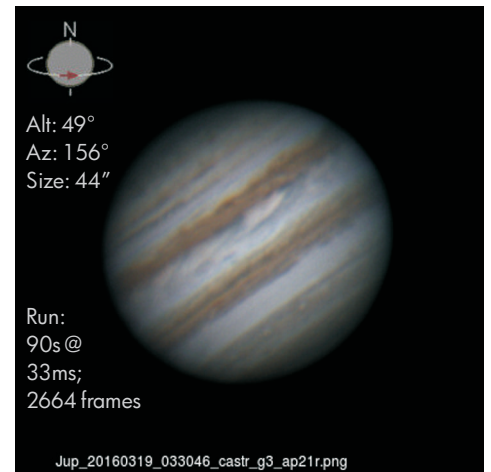
**Kevin K:** It cleared up unexpectedly this morning so a quick imaging run of **Mars** (very near  $\beta$  Scorpii) and **Saturn**. Both were horrible as even though near zenith, Mars is very low to the horizon. Saturn more so in the Kingston light pollution dome.



FRI/SAT, MAR 18/19

**Kevin K:** Tonight’s were possibly the best imaging runs of Jupiter to date. Clear skies,  $-8C$ , average seeing and transparency, and **Jupiter** was near the zenith. The only bad thing was the big bright Moon nearby.

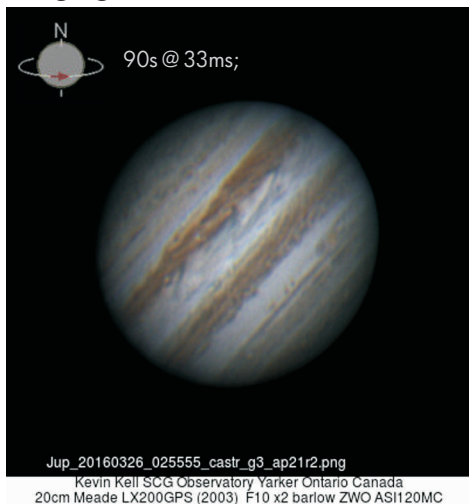
I started imaging at 20:53 EDT and ended around 23:32 as I was totally falling asleep. Then in the morning, after coffee, I noticed it’s still dark at 06:00! So I went back out and imaged **Saturn** and **Mars** near the meridian. It got bright very quickly after that however; I called it a morning around 06:30. I got about 72 imaging runs to process.



FRI/SAT, MAR 25/26

**Kevin K:** I had a very good imaging run, with **Jupiter** crossing the zenith, though the full Moon was up interfering with things. Seeing and transparency were good but deteriorated as the session went on. The GRS was on the other side of the planet—again! It’s been months since I’ve seen it. I tried the beta version of the capture software for a while but that did not go well.

The last few images were 120, 180 and 240s. They actually turned out worse than the ones below as Jupiter itself rotates so much in that time that the features start to blur. 90s seems to be the most with f/20 imaging.

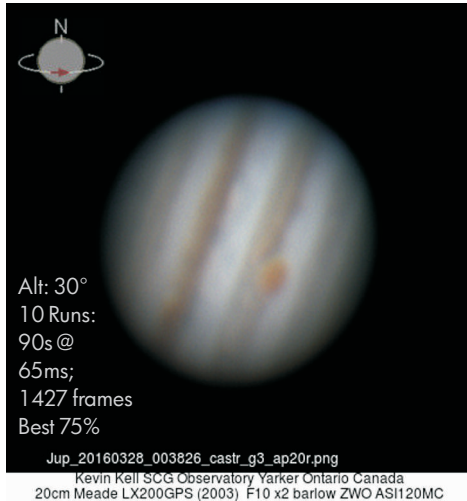


SUN/MON, MAR 27/28

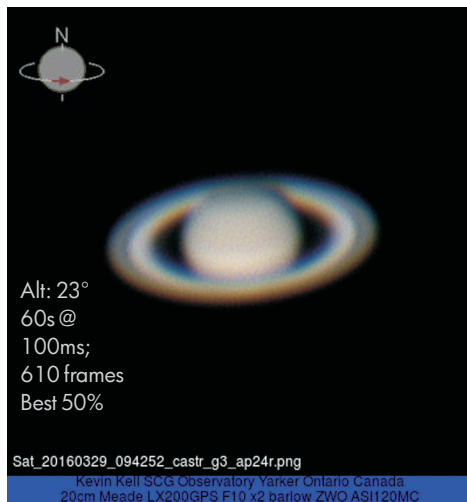
**Kevin K:** Mostly a washout. My jove moon android app showed the Great Red Spot (GRS) showing and I haven’t seen or imaged it in months, so I went out between 20:30 and 21:00. As it turns out, **Jupiter** was only about 30–35° altitude and the seeing and transparency were poor, so what came out of those runs was pretty bad, but the GRS is there!

MON/TUE, MAR 28/29

**Kevin K:** I woke up to clear skies this



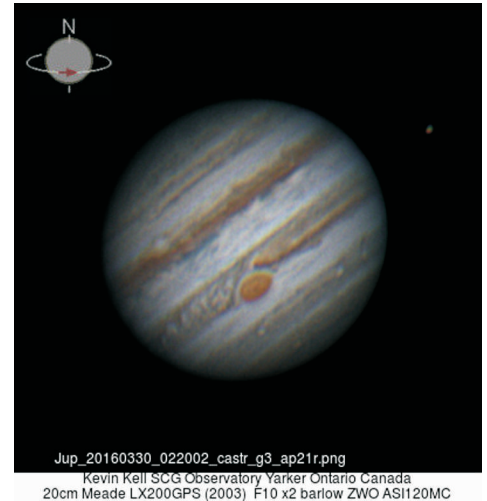
morning. The **Moon** was within 5° of both **Mars** and **Saturn** and the winds were gusting enough to shake both the observatory and the telescope as well.



TUE/WED, MAR 29/30

**Kevin K:** I imaged **Jupiter** from about 21:30–23:30 EDT. To my surprise, the GRS was traversing across the face! Added bonus! ...the atmosphere snapped into as good as it gets clarity. Amazing what 2 or 3 minutes difference makes. Never have I seen the turbulent wake of the GRS. Wow.

Tonight I filled a new 240GB SSD with images (I took 150GB of images from 2 hours alone!). I may have to increase the 30s break time to 90s, just to get a greater overall span



to get more Jupiter rotation.

I have a batch file I run after the end of the session which moves all of the images off the laptop and onto another computer. I am reluctant to try to run this while imaging however.. But I may have to...

I continue to be amazed at how a clear sky that looks perfectly good naked eye can be horrible for imaging. ★

**Editor’s Note:** Due to the delay in finishing this issue of *Regulus*, there is a backlog of observation reports which will carry over into the next issue.

The next issue should be released in early June and will also feature reports on the May 9 transit of Mercury as well as the RASC General Assembly to be held in London on the Victoria Day weekend. (With several members attending, Kingston Centre will be well represented there.)



## ...Skyward

...continued from page 4

collision will bring about.

Long, long before that happens, I hope to meet some of the people living in China today. Perhaps I can help inspire them to look aside from the cares and joys of their daily lives, and appreciate the magnificence of the thousands of starry lights that dot the night sky we all share. ★