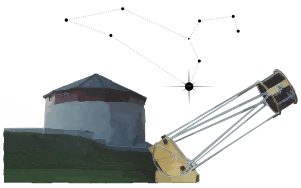
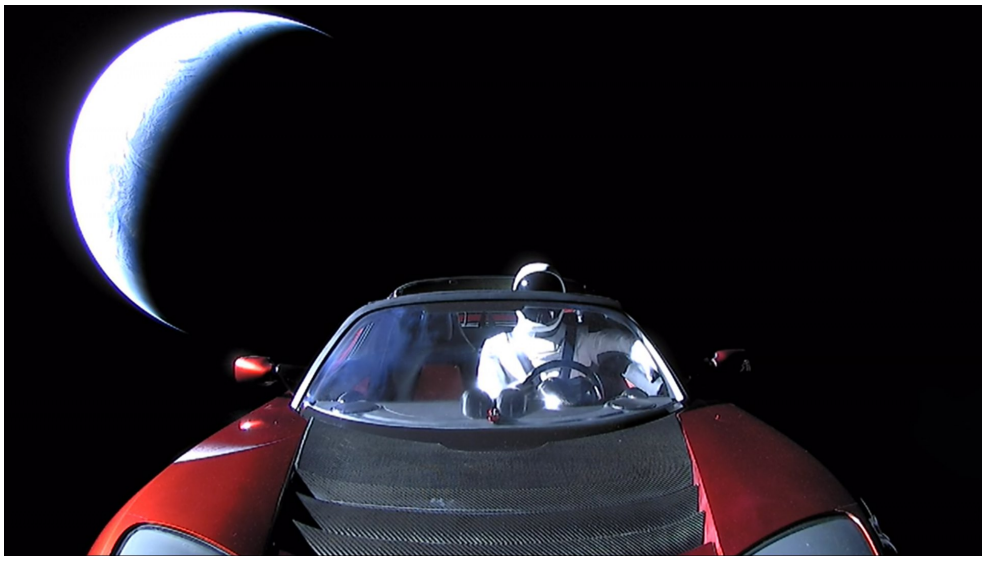
April 2018

Regulus

RASC Kingston Centre





Tuesday, February 6: After some delays, Spacex's Falcon Heavy had a successful launch just minutes before the end of the day's launch window, culminating in hours of live video coverage of Earth's newest astronaut, **Starman**—now cruising the inner solar system in his Tesla Roadster. This is possibly the coolest thing ever! (Well, besides the 3 degree background of course.) It was a flawless mission, except for the centre stage which had a rapid unscheduled disassembly when it hit the edge of the drone ship (so it was just as well they lost the video feed moments before that event). Your editor would like to hereby nominate Starman as the latest Honorary Member of the RASC.

Upcoming Events

Thursday, April 12 . . . . . 19:00
No meeting in April

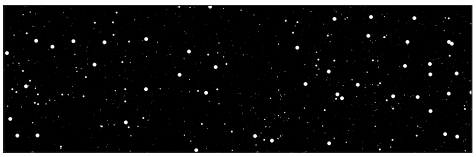
Saturday, April 14 . . . . . 20:00
KAON Session

Thursday, May 10 . . . . . 19:00
Members' Night

Saturday, May 12 . . . . . 21:00
Science Rendezvous
KAON Session

Saturday, June 9 . . . . . 19:00
KAON Session

Thursday, June 14 . . . . . 19:00
Regular Meeting



- Meetings are held at Stirling Hall Theatre 'A', Queen's University, unless otherwise noted.
- KAON Sessions are held at the observatory, Ellis Hall, Queen's University.

Check kingston.rasc.ca for the latest info, kingston.rasc.ca/observing/sites for sites. ★

Reports and Other Items

From Kingston Centre, the RASC, and Beyond

Software Discount

Blake Nancarrow *reports*: The best-of-breed astronomical planning software SkyTools 3 is available to RASC members at 40% off the regular price. Members can buy the Standard, Standard + Real Time, or Professional edition.

Visit rasc.ca/sky_tools-discount for general information. To purchase your preferred edition, visit the order page at rasc.ca/skytools-order-page

IMAGE is Alive

Twelve years after contact was lost, the spacecraft *Imager for Magneto-pause-to-Aurora Global Exploration* (IMAGE) has been found alive and well by amateur astronomer **Scott Tilley** of Roberts Creek, BC, while he was searching for the recently-launched Zuma spy satellite.

Apparently IMAGE came back to life after one or more hard boots due to periodic deprivation of solar energy repeatedly draining its batteries. This is yet another illustration that turning things off and then back on again is always the first, best way to solve electronics issues!

In Memoriam

After a long illness, former Kingston Centre member **John Crossen** has passed away at age 73. After retirement he moved from Toronto to north of Peterborough where he built Buckhorn Observatory. He is best known for the public outreach work he conducted there from 2002-14, and for his contributions to *JRASC* (most notably the Rising Stars feature).

https://kawarthanow.com/2018/03/23/john-crossen/

Calm Before the Storm

As the final days of April trickle away, the next major Windows 10 update looms ever closer. Like this

Continues on page 14...

In this issue:

Windows 10 Woes

various members

YOUR EDITOR WAS PLEASED (at least insofar as misery loves company) to learn that other Centre members are also going through the shifting-sand hell that is Windows 10, with its constant feature updates that are often difficult to install, and sometimes break things.

It's not just the operating system either: software applications are also inevitably moving to the "as a service" model with its accompanying incessant updates, and of course monthly fees. (The service and streaming models are a huge financial windfall for the content providers compared to the old model. Almost gone are the days of buying something up front and using it for a decade or more.)

So as the Internet drives ever more rapid change, many of our intrepid Centre members find themselves in a titanic battle trying to keep up with OS and software updates and their unforeseen side-effects, or trying to hold back change altogether so they can have productive platforms for doing their astronomical activities.

Kevin (January 31): The latest Windows 10 update has killed the old Toshiba netbook that we are using to log data from the Radiojove radio telescope system here at SGCO. (It was previously upgraded from 1 to 2GB of RAM and the spinning hard drive was replaced with a 60GB SSD drive. In this configuration it has weathered –35C winters with ease.)

When I tried to restore to an earlier operating system, I discovered the computer only had Win 10 in the recovery partition. After a reset that took 3 hours, and a final reboot, the computer announced that there was no operating system at all!

Next I wiped the drive and will re-install Windows 7. Then I will download and run a utility called NEVER10 from Steve Gibson Research (grc.com), which will prevent the system from ever upgrading to Win10, no matter what:
grc.com/never10.htm

Continues on page 3...

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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

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...Windows 10 Woes

...from page 2...

Lastly we will finish the install with updates and radio Skypipe data logging software, reconnect, and get it operational again.

Greg: Never10 is not needed now that Microsloth has backed off on their push to subvert the world through involuntary upgrades—which were bad because they were not particular as to how compatible the receiving box was for Win10. As I was told—when the pre-check was inspecting my laptop hardware—my device is capable of running Win10, all I needed to do was replace my unsupported display adapter. What I did was replace the HD with an SSD and installed a prior backup of Win7. I took Never10 off after they went back to pay-to-play.

Last night my dome machine displayed an interesting message: Windows is a service and you are required to accept periodic updates to continue using it. Nice...seems even OEM installs are not exempt from this creeping takeover. Be curious if everything works afterwards: the change in security model around certain kinds of remote actions has broken a few things on my desktop, and I was not in the mood to do a full test of my observatory PC. But I have backups...

The other observatory PC ran Win10 for a while, but the updates tended to break USB connections—the proprietary drivers were regularly removed and replaced with the 'latest' USB generic ones. It gets real boring doing reinstalls and configurations. So it's running Win7 and I just ignore all update messages. It runs fine—none of the updates are for functionality anyhow on hardware this old. The problem with Win10 is it's going to apply updates regardless—there is no way to turn updates off or control anything more than when the machine reboots to finish the install. I am considering blocking it at the firewall...

It is the attitude of MS that they know better...and if what they do breaks something, it's our problem to work around it. They have no responsibility to support the functions for which we bought the machine. Thankfully they are not the only game in town and more vendors that I use have Linux versions...

Rose-Marie: Yet more reasons why I hate computers. My brother gave me a desktop loaded with Win10, lots of RAM, and that machine is dedicated mostly towards downloading pics off the camera. So...I didn't have it on internet all summer. In October when I brought it back to high speed connectivity and it goes nuts downloading all the updates. Now the computer is slow, and has some Microsoft log on popup when I turn it on. I just ignore that and close that window. The old ACER laptop that I use for internet has Win7, and it churns through updates. I used to be able to plug in thumb drives and CDs, and wanted to hook it up to a printer, but all of a sudden it doesn't play with any other hardware.

I hate change, and every time you get a computer they are *constantly* changing something. I bought a Samsung 6 phone from my nephew—there's another contraption that's always bugging me for something. My Samsung tablet wanted updates, which I did, and then the format that I was used to changed. ARGH! You no sooner get comfortable using something and they change it!

Greg: Actually, after 50 years of computer internals I tend to agree with you. In the old days updates were treated with care because they sometimes broke things. So you had control, as your needs superceeded everything.

Updates still break things but somehow pushing them out is more important than the users production. And new products arrive pre-broken with bizarre kinks that even gurus find hard to track down and worse to fix—complexity breakdown at its finest, sad to say.

Mark: I used to know how my computer worked in detail and how to fix it, what parts to get or even what parts to make. Now if I have a problem, I ask Doctor Google for help and get a repair. Soon, nobody will actually know how things work at all so if and when something happens to the Internet, nobody will know how anything works or how to fix anything.★

Remarks from the Chair-man

Don Fernie

The words PLEASE DO NOT SIT FORWARD IN YOUR CHAIRS—THEY TIP have undoubtedly accounted for more chalk usage at the blackboard of the DDO auditorium than all other topics combined. Even so, of course, there has been a crash from time to time.

Now, however, that the University is under the Provincial Health and Safety Act it has become much more safety-conscious, and after an elderly lady took quite a nasty fall on one of the chairs recently we decided the time had finally come to replace them. An order has already been placed, so before long you can expect to see the new look in seating arrangements. I might add that when the chair salesman came round with samples I queried the sturdiness of the model we had chosen. "Long lasting?" boomed the salesman incredulously, "Good heavens, these chairs will last you a good five years or more!"

I didn't tell him the present lot have done for fifty.★

From DDO Doings,
Vol. 18 No. 2, March 18, 1985

Skyward–A Predawn Total Eclipse of the Moon

David H. Levy

In the last two hours of darkness before dawn on the morning of January 31, 2018, the Moon waded into the shadow of the Earth. The result was a total eclipse of the Moon. Despite a forecast of high clouds during the night, the sky remained clear.

There is a profound difference between a total eclipse of the Sun and a total eclipse of the Moon. As some of us witnessed last August, a solar eclipse begins quietly and innocuously, and as the Moon crosses over the Sun, the sky begins to darken, first gradually, and later precipitously and suddenly until, for a magic minute or two, the Sun disappears and is replaced by a jeweled crown. The eclipse of the Moon began gradually around 4 a.m., as the Earth's partial shadow or penumbra began to work its way across the face of the Moon. Instead of a sudden start, the beginning is so gradual that at least half the Moon has to be covered by the Earth's penumbral shadow before it becomes noticeable. I woke up at 4:30 a.m. and crawled out to see the penumbral phase already well advanced.

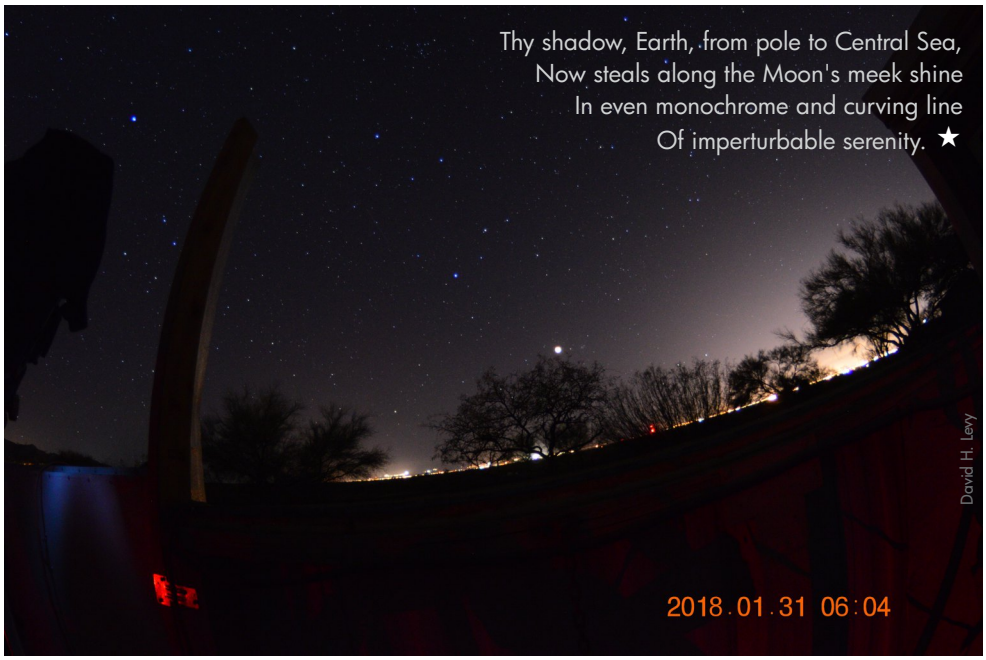
Then, at about 4:45 a.m., the dark edge of the umbra, the Earth's central shadow, began its onslaught. That was obvious. For the next hour, more and more of the Moon became covered as the shadow crossed craters, mountain ranges, and maria. Wendee appeared shortly after 5 a.m. with an idea to watch the event through a closed window in our warm front room. That was a special treat. Even though it was not particularly cold outside, the warmth of the front room was beckoning and fun. As we watched, I noticed a classic eclipse effect: the bright blue sky around full Moon, known to offer only the brightest stars, was giving way to a progressively darker sky filled with thousands of beautiful stars.

I had planned for this eclipse to be a mostly visual event for me. But I did want to take one picture using my camera's fish-eye lens. About twenty minutes into totality, I took a 30-second exposure of the night sky, at full Moon, with the totally darkened Moon in the picture.

There was also a chance to check on my favourite variable star. Discovered by **Clyde Tombaugh**, who found Pluto in 1930, this star is known formally as TV Corvi even though I call it Clyde's Star. It was nice to get a check on my old friend in the middle of a lunar eclipse.

It was certainly time to look back at the Moon. The eclipse was dark, but not particularly dark. On Danjon's luminosity scale for total lunar eclipses, I gave this one about a 2.5. This is also not the first time I have seen this particular eclipse. When I first saw it in the predawn hours of December 30, 1963, dust from the erupting volcano Mt. Agung darkened the shadow so much that the Moon essentially disappeared at totality. By coincidence the volcano was erupting again in the months preceding this eclipse but not nearly as calamitously. That distant eclipse of my youth was a L=0 on the Danjon scale.

Eclipses prove that things happen in the sky. The heavens are not static. Thomas Hardy knew that, and he even wrote of it in 1903:



Imagining the Skies Contest

As part of the RASC sesquicentennial, the *Imagining the Skies* contest is live all during 2018. Submit your astrophotos, sketches, or other creative works, and while you are on the site, vote for your favorites in the different categories.

http://imaginingtheskies.ca

KAON Report: January 13

Susan Gagnon

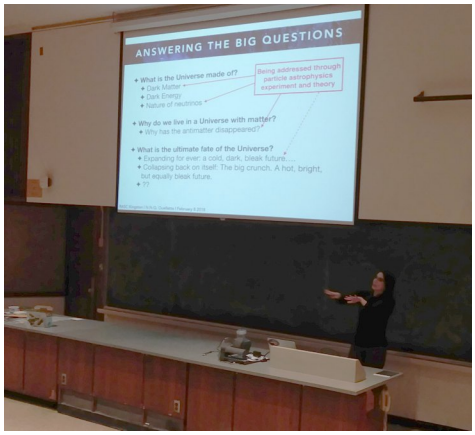
Well, I guess that transparency thing really makes a difference! The clear sky clock gave me hope this afternoon so I dressed for deck-observing weather. The deck was not open, as it was not shoveled. **Ananathan** said they did not anticipate... I'm not sure if they did not anticipate clear skies or bearable temps but there was not much to see anyway, I could make out Orion's brightest and Sirius.

The talk was great. Better than ever Dave Hanes in my opinion. There were about 70 folks in the audience and a good number of questions. Tours of the dome and a crowd management talk in the warm-room followed. I managed to give away a book to a young kid who asked a couple of questions of Dave and deliver a stack of *SkyNews* to the warm room for pick up. All copies now will have a sticker saying 'This copy of *SkyNews* provided by the RASC Kingston Centre.' It was good to see another member out, **Doug Barbour**. If there were others I'm sorry I missed you. The last calendar went to Matt for the observatory.★

Meeting Report: February 8

Kevin Kell

After the usual pre-meeting dinner, our monthly meeting was held once again in Stirling Hall, Theater A with some two dozen members in attendance. This month (now Dr.) **Nathalie Ouellette** was back to talk to us. She was the Queen's Observatory director for years so we know her quite well. She's the new Communications, Education and Outreach Officer for the Canadian Particle Astrophysics Research Centre. Nathalie gave a 45



minute talk on particle astrophysics and CPARC and encouraged people to drop by the new visitors' centre in Stirling Hall Mon–Fri 9:30–4:30.★

Blast from the Past

JRASC

Unique in the history of the Time Service Division of the Dominion Observatory at Ottawa, was the observation of an earthquake with the broken-type Cooke transit.

Mr. J.P. Henderson was observing a time set late Sunday night, August 21, 1949. Conditions were excellent for transit observations.

At transit time of Beta Cephei (approximately 2325 hours E.S.T.), the level appeared to be unsteady, and the star wandered considerably in the field. When the level reading was made during transit, the bubble moved back and forth in an east-west direction with a period of about seven seconds. This oscillation was observed for about ten minutes and had an amplitude of two or three divisions. An earthquake was suspected, though no tremors could be felt.

Next morning both radio and press informed the world at large of an earthquake of major proportions. It had occurred in the Pacific Ocean just west of Prince Rupert and had been felt up and down the coast from Alaska to Seattle.

According to **Mr. Milne** of the Seismological Division, the earthquake was one of the largest on record for this year. Only a small amount of damage was reported from Prince Rupert and elsewhere because the epicentre was located out in the ocean rather than near some centre of population. At maximum the earth movement and Ottawa was of the order of forty microns, which is probably ten times or more greater than the earth movement indicated by the bubble excursions. The bubble represented a pendulum motion of about one-tenth of a second of arc. But the bubble might be considered as a highly damped sluggish indicator for such movements. The period of about seven seconds is in very good agreement with the seismic record.

Within half an hour the tremors subsided to the point where they were no longer perceptible either in bubble readings or in star movements. Seeing became steady again. The seismic record continued for some hours.

Dominion Observatory,
Ottawa,
August 31, 1949.★

- http://adsbit.harvard.edu/full/seri/JRASC/0043//0000209.000.html
- https://en.wikipedia.org/wiki/1949_Queen_Charlotte_Islands_earthquake

Thanks to Eric Briggs for posting this interesting item on the RASCals list.

Helping Out with Astronomy Day

C.L. Hall

Astronomy Day is always a great opportunity to help spread the joy of astronomy, visit with friends, and reach out to people who are interested in our particular science. This year, being up in Ottawa, I helped out with the Astronomy Day festivities put on by the OAOG, the Ottawa Valley Astronomy and Observers Group. Many of us are members of both the OAOG and the RASC. Our festivities were held in the parking lot beside Chapters, at Silver City, in the east end.

It was a good day. A week previous, we went through snow and an ice storm, but the weather improved dramatically and on cue. We had blue skies, some wind, and cool temperatures. I arrived about 8.00 am, and left for home at midnight—a long day but very rewarding. We had over 25 telescopes, and about 1500 people.

The main organizers were Jim Thompson, and my meteor friend Pierre Martin. I assisted with displays, handouts, and decorations, and acted as a 'floater' to spell people off on telescopes. I updated several handout sheets that I had prepared years ago—'Surf the Astro Web!' —and 'What's Up Tonight?', printed them on coloured paper, and brought lots. I brought coloured cardboard stars and balloons to put on telescopes and car windows, and stickable nametags with stars to label the people. That way, the public knew who to ask for questions. **Jim Thompson** made up a number of wonderful displays, including old NASA posters, and **Pierre Martin** brought the poster board displays that I had donated to the group a number of years back.

Some members donated magazines as handouts, and we had a lot of brochures donated by Astronomy Magazine. We also had large orange buttons and stickers from Science Odyssey.

We had a lot of scopes: Sky-Watcher Dobs, a large Discovery Dob, a 12.5 inch Mag 1 Portaball, Meade LX200s, Celestrons, refractors, and a lot of solar scopes for daytime viewing. The view through Pierre Martin's Lunt H-alpha scope was amazing. There were a large variety of scope mounts as well: Sky-Watcher AZ-EQ6 GT, Star Adventurer tracker, HEQ5 Pro, Celestron AVX and CGEM models, Orion Atlas EQ-G, Losmandy G-11, Explore Scientific, and even a homemade barn door tracker, and a Home Depot orange bucket mount for a small ball type scope. A real variety, interesting to look at.

There were a lot of MallinCam cameras, and video displays, from small screens to a large projector display that Jim Thompson and his son brought. In the evening, the main observing attraction was the moon.

However, Rock Mallin also showed galaxies to the public. As we were located right beside one of the major theatre complexes in Ottawa, it was pretty incredible to be able to do this. The MallinCam setups and video screens are really very useful tools for public displays.

The Moon was excellent. The view of the terminator was one of the most interesting I've seen—lots of mountain peaks peeking through the shadow, crater rims amazing. We saw Venus in the early evening. There weren't any International Space Station passes, or Iridium flares visible—but I brought a list of brighter satellites going over. We managed to 'wow' the crowd with a nice magnitude 1.0 Atlas Centaur rocket body going over just before 9:00 p.m., about 63° up in the ESE. Just after that, we caught a magnitude 2.0 Russian Resurs rocket body going over in the WSW. It wasn't as easily seen by the crowd—magnitude 1.0 is probably a good benchmark for public events from city locations.

It was a great day, and a great evening. It was really enjoyable to visit with many of the OAOG and RASC observers that I hadn't seen in a while: **Rock Mallin** and **Micheline, Denis and Natalie Legault**, **Gary and Debbie Boyle**, and many others. I had some long chats about equipment with some of the crew.

Astronomy Day is always an adventure—and a wonderful opportunity to help spread the word about what's visible in the night sky, how to observe the night sky—and how to preserve our night skies for the generations to come! ★

Information on OAOG workshops can be found at: www.karmalimbo.com/aro/workshops/workshops.htm
Jim Thompson's website with interesting reference articles can be found at: www.karmalimbo.com/aro

Observing Reports: January–March

Various Members

Monday, January 15

Kevin: I don't know about the rest of you, but we are going a little stir crazy from the cold, and cloud, and cold and no astro makes Kevin go crazy.

So in the meantime I am:

• Attempting to drill out some new holes in a dovetail mount and then tapping ¼x20 threads into it; so the Meade DS90 refractor can be mounted on the LXD55 mount.

• Replacing fluorescent 8' tube lighting in the garage with LED strip lighting (much more light for the same power!) and hopefully much less radio frequency interference (RFI) for the RadioJove and Super-SID systems;

• Having a Windows 10 laptop (10 years old) die from the latest security patch. Replacing it with a windows7 system that will *NEVER* upgrade to Win10! oh.. and *now* Microsoft says there are issues with older systems! Arrgg!

• Trying to repair the old snow roof rake that broke years ago. There is lots of snow on the observatory roof!

Malcolm: I was able to get out one –20C night to work on the polar alignment of my mount. After using the Polemaster to improve it, I feel that the mount currently has the best alignment it has ever had. Wish I could use it!

[*Looking at the Clear Sky Chart*:] Three hours of clear sky after dark tonight here! (If true.)

[*A few hours later...*] Lies! All lies!

Wed/Thu, January 24/25

Rick: I was out last night, refining my polar alignment a little and debugging a new script I've written to test flat field quality. You centre the scope on a field with a goodly number of moderately bright stars then the script nudges the scope, moving the centre of that frame to 9 different positions within the frame (a 3x3 grid), imaging the field at each position. If my flat fields are good there should be no variation in photometry of the stars which are common to all frames. I then followed up with B and V images of 4 new stars I want to add to my observing program.

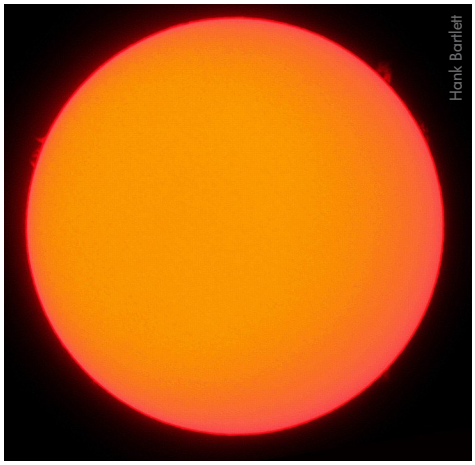
I'm also working on a script to cycle through several objects over and over so I don't create such overly dense data on one star but can handle more targets. This is something I could do with the same software Walter uses [ACP] but I want to do it myself so that when (if ever) I get to move all my work over to Linux all my tools can come with me.

Mark K: While skiing at Blue, I witnessed a pretty impressive set of solar halos. At first, there were just a pair of parhelia or sundogs. On the next chair ride, they became prismatic; that grew into a 22° white halo that was not complete because the bottom of the circle would have been below the horizon. Then it grew a prismatic upper tangent arc and a white Parry arc, a very faint white Wegener arc and a bright prismatic circumzenithal arc with a small section of white supralateral arc. I looked around the horizon for a parhelic circle and 120° parhelia, but I could not see any indication of any of those.

Being the geek that I am, I pointed it out to the other five people on the chair. The snowboarders on my right did not care a hoot, but the three skiers on my left were very impressed and I could hear them talking about it and pointing at it as I skied off. By the next trip up the chair, which I did by myself, most of the extra arcs had faded leaving the parhelia, the halo and a very faint circumzenithal arc. Then it clouded over briefly and when the Sun reappeared, the halos were gone.

Saturday, January 27

Hank: It has been 13 days since I last imaged the Sun, soooo boring. The solar surface is blank but at least the limb has a few decent prominences, unfortunately there is a great deal of haze that has gotten thicker since this image yesterday at 12:34:36 EST. I am going to optimistic and suggest the prominence on the eastern limb is bringing us a new active region to observe.



Tuesday, January 30

Kevin: Note to self when building a new observatory out back this spring:

1. Build higher berms
2. Raise it off the ground—a lot!

Tue/Wed, January 30/31
Lunar Eclipse

Rick [22:20]: Yeah—I can't believe it's clear out; the forecast says cloudy, then becoming partly cloudy this evening. I've collected a set of twilight flats, adjusted my polar

alignment, tried to catch a maximum of ISON_J013244.3+565231 (which turned out to have already happened—clearly an issue with the ephemerides which is one of the reasons I'm observing it), done a mount pointing model, and now am shooting one of my favourite secret variable stars (one that is misclassified, almost nobody else has observed it, and nobody has noticed that it's a close double.)

Next is to make some more efforts to get my multi-target script working. Everything seems to be doing what it should but when I tried it the other night it mis-pointed one of the targets by something like a half degree. I'm not sure if it was just a pointing issue (hence the improved polar alignment and new more detailed mount model) or my precession routine to precess the coords from J2000.0 to 2018.1.

My plan for the eclipse is to try to shoot a brief time lapse from the dock. I figure my 70–300 zoom at around 200 will catch the whole thing —all the clouds and everything.

Rick [00:47]: Observing continues: the script is now chugging away. All pointing is within 1 arcmin, and all necessary data is getting recorded in the FITS headers. Some of the exposures could be a little longer. I've been cycling through V0800 Aur, V0643 Aur, and V0575 Aur, three RR Lyrae stars that haven't seen much work. I'm particularly interested in refining their periods and determining if they exhibit the Blazhko effect. Now moving on to OW UMa, EN Lyn, and GSC3798-492.

Kim [05:29]: It is clear now but I am seeing haze over the moon from the living room.

Kevin [05:48]: Freakin' –26C outside! Where did that come from? Equipment does not work at that temperature, especially equipment named Kevin!

Malcolm [06:50]: Clouds creeping in from the west here, moon is mostly obscured. You can surmise that darkening has begun but it's not photogenic. Binoculars view yields no detail on the moon. Given the temps my view out the window as the moon goes into the trees will have to do.

Kevin [07:20]: We got some 300mm old canon DSLR shots from the living room window after P1, penumbral 1st contact, and were shooting at ISO 800 f/5.6 and 1/4000 sec.

Then we left for work and pulled into the Lowes parking lot on Gardiners road after U1 (umbral 1st contact). Very quickly the clouds came in and the exposures increased to 1/2000, then 1/500 then 1/50 and then we gave up and headed in. Along the way the clouds were so thick that you could barely make out the moon (well before any significant darkening) at all.

Greg [07:25]: Yep...from here the Moon was setting almost over the Bath cement plant. It was nice and clear before first contact. As the shadow moved across the face the cloud layer thickened. The Moon was gone by U1. Sigh...

Rick [07:45]: I managed to see some of it from here. I had to go out into the middle of the lake to get a better horizon. When I started shooting my time lapse there was an obvious small notch out of the upper left side of the Moon but by the time Jeanette got down on the ice it was already disappearing into a narrow band of stratocumulus cloud. It did vaguely come out again under that cloud but the cirrus cloud was thick enough that it was only with averted imagination that you could see the eclipse progressing.

I continued shooting for a few more minutes as the Moon got more and more obscured then finally gave up and came in for breakfast and (now) my morning coffee.

At least it stayed clear overnight. I continued with the multi-target script until about 0300 then changed over to continuous shooting on a single target (CK Tau). At about 0430 I switched again to 3C 279 which has been in outburst (mag 14) lately so the Fermi/LAT gamma ray satellite team has requested observations. My obs should be very useful as they show it on the downslope from the outburst at about 15.5. So, I'm off to do the formal analysis and submit the observations.

Rick [07:58]: It was only –24C here and we can't see it from the window so we both went out on the ice to see it. Plus, the cloud wasn't a problem until we were already out there. I saw enough that it was worth doing, especially since I was up putting the telescope to bed anyway. I'm not sure how Jeanette feels about it.

Mark K [08:35]: It started to cloud over here just after midnight. I did not set my alarm to get up, but when I was up anyway, it was completely cloudy here when the eclipse would have been in the penumbral phase.

Hank [08:54]: I agree Kevin, too cold, too hazy and I have to go watch the kids and take them to school anyway. Also Bell comes this morning to put in REAL TV/Internet service. For other than Kevin who don't know, Eastlink Cable actually kicked us back to ANALOG from digital TV! I tried to send this email about 6:30 a.m. but the Eastlink Internet had gone down at that time, probably too cold.

Rose-Marie [10:59] ...and then there were clouds. I was up late and forgot to set the alarm, but right on cue the BigWetNose had me up at 6:00 a.m. The curtain in my bedroom window open a bit on one side and the bright moonlight shone in my eyes as I woke up. I put on my bathrobe and held the leash out the back door Beastie, and saw how nice and clear

things were. Nothing was happening yet so crawled back into my warm nest, tossed and turned til around 06:45; finally the moon was changing from white to orange as the eastern horizon was turning pink from the rising Sun. I dragged myself back out and got the camera, there was a clear bit above the arc of frost coverage in the kitchen window, so I took a few shots. I was considering bundling up and heading over to the cemetery but could see that the clouds were thickening; good thing I took a few shots when I did, for it wasn't long before the view was spoiled. Sometime today I shall download the pics, got at least one or two of the moon with a wee bite of dark. I stoked up the wood stove and curled up next to the BigWetNose, and gave her doggie biscuits for getting me up in time.

Left: This is the baseline image taken the night before the total lunar eclipse (Jan. 30), taken with an old Canon DSLR from inside the house shooting through a window.

Middle: This is the last image taken from home on the morning of January 31st with the Moon just into the penumbral shadow.

Right: The last image before the clouds came in. The Moon was very low over a parking lot and cloud was coming in. You can see just a little bit of the umbral shadow (a.k.a. cookie bite) in the upper left of the Moon. The rest of the darkness is cloud.

Tuesday, February 6
SpaceX Falcon Heavy Launch

Kevin [11:16]: Got the auditorium. Got the laptop. Got the projector. Got the popcorn. Didn't get the celebratory (or condolence) beverage. A reminder with just over two hours to go of the SpaceX Falcon Heavy Launch. You can watch live at: http://www.spacex.com/webcast
Kevin [11:42]: New Launch window starts at 14:00 EST (A 30 minute slip) [*There were several delays due to wind conditions*.-Ed]
Kevin [15:36]: Lost the auditorium. Darn lectures! Now watching from seminar room. Have popcorn. Bonus cookies! [*Launch at*] 15:45.
Walter [16:02]: Starman rules!
Malcolm [16:03]: Wow. That is all.
Mark K [16:06]: What happened to the main booster? Did it land? That was all pretty neat, but the coolest part was watching the two boosters land at the same time so perfectly.
Hank [16:13]: AMAZING!!! Missed it live by a couple of minutes as I was on the road, but the recap was just as good. Damn Starman looks cool!
Mark K [18:01]: They are streaming a live feed of the Tesla http://www.spacex.com/webcast and it is neat to see the reflection of Earth in the visor of Star Man and on the side of the car. It must rotate, because now a piece of the Earth is in the left of the background.
Susan [20:23]: That live feed is very cool. It sure beats those Russian dash cams! But I would have thought a ride like that would have for sure set off the air bags! NHTSA needs to look into this.

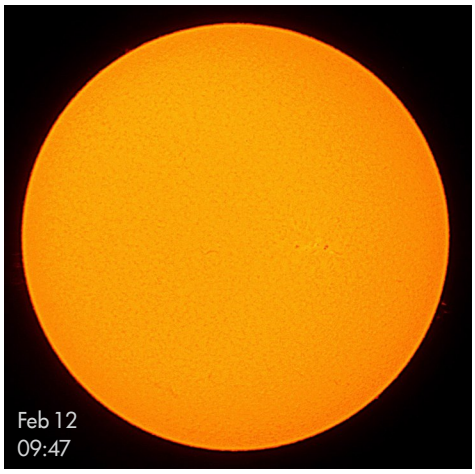
All in all a great spectacle and I agree Mark, the landings give you goose bumps. Sad not to have seen the one on the drone ship.

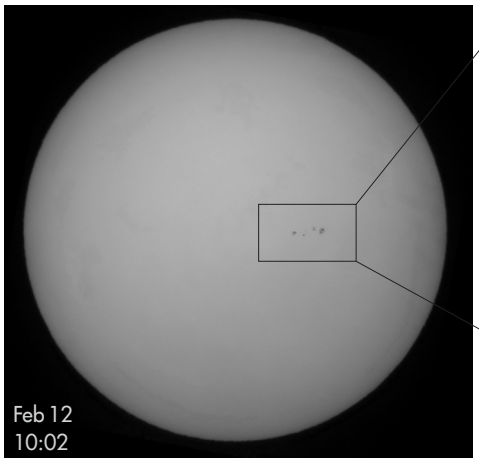
Monday, February 12

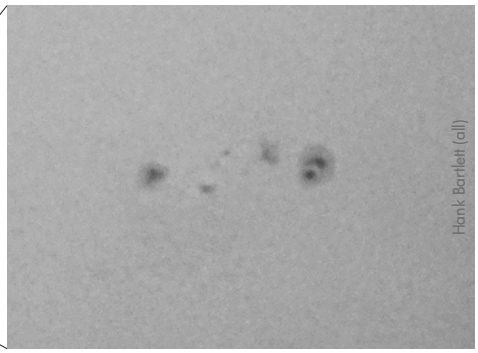
Kevin: We took the solar scope and tripod in the car today and bingo! there was sunshine after work and *GASP* even a SUNSPOT! Remember them? This was a four-part biggie too! Prepare for some solar storms soon.
Rose-Marie: Solar storms... sparklies....it's the Great Pumpkin Charlie Brown! Dare I pay any attention to that prediction?
Hank: Here are a few images [*next page*] from this morning, and seeing as it was clear activity dropped right off.

Mon/Tue, February 12/13

Malcolm: With the opportunity to do some imaging tonight, I thought I would try to capture the Tesla Roadster launched by the Falcon Heavy a few days ago as it heads for

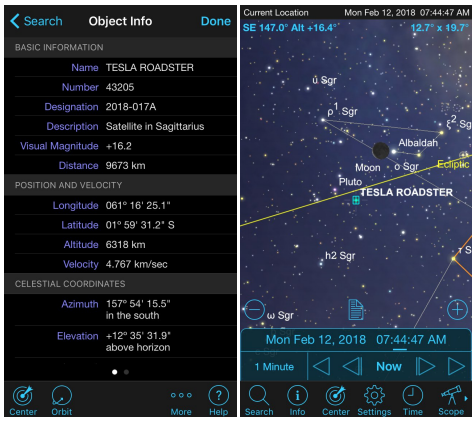






the asteroid belt. Does anyone have any suggestions on how to find the coordinates of it? I have seen a few images posted on FB so I know that this can be done.

LOL!!! It's in Sky Safari:



Walter: Sagittarius in February? Perhaps you should take a quick jaunt down to Chile!

Malcolm: Yeah I hear ya; some guys in Arizona and California had imaged it so I hoped we could too. I'm going to Chile in April but it will be dimming to who knows how dim by then.

Cathy: There is complete information from: https://ssd.jpl.nasa.gov/horizons.cgi#results

Greg: It only looked clear last night around here. When I was focusing in on M42 the starfield was flickering in and out. I decided this was a bad omen... Of course the –12C and a stiff breeze might have been a contributor. I hope others had better success...

Malcolm: I tried. It was too breezy for long guided exposures. Then after so many days of solid wifi reception, as if on cue the signal started to fade until it was gone. It was too cold to operate manually so I shut it down.

Rick: I was 'out' all last night, *i.e.* operating from inside the office. I'm getting better at running more and more without going outside. Though

```
Current Settings

Ephemeris Type          : OBSERVER
Target Body             : SpaceX Roadster (spacecraft) (Tesla) [-143205]
Observer Location       : Geocentric [500]
Time Span               : Start=2018-02-12, Stop=2018-03-14, Step=1 d
Table Settings          : defaults
Display/Output          : default (formatted HTML)

Object Data Page

Revised: Feb 09, 2018  Tesla Roadster (spacecraft)  -143205 (solution #5)

Tesla Roadster (AKA: Starman, 2018-017A)

NOTE:
  The trajectory estimate will be updated here in the days ahead if more
  measurement data is reported.

LAUNCHED:
  2018-Feb-06 20:45 UTC by Falcon Heavy (FH-1) from Kennedy Space Center,
  USA(launchpad 39A)

 BACKGROUND:
  Dummy payload from the first launch of SpaceX Falcon Heavy launch
  vehicle.  Consists of a standard Tesla Roadster automobile and a
  spacesuit-wearing mannequin nicknamed "Starman".

  Also includes a Hot Wheels toy model Roadster on the car's dash with a
  mini-Starman inside. A data storage device placed inside the car contains
  a copy of Isaac Asimov's "Foundation" novels. A plaque on the attachment
  fitting between the Falcon Heavy upper stage and the Tesla is etched with
  the names of more than 6,000 SpaceX employees.

  After orbiting the Earth for 5 hours, a third burn by the second stage was
  completed at approximately 02:30 UTC Feb 7, placing the dummy payload in a
  heliocentric orbit having a perihelion of 0.99 au and aphelion ~1.67 au.

 PAYLOAD MASS:
  ~1250 Kg

 TRAJECTORY:
  This trajectory is based on JPL solution #5, a fit to 128 ground-based
  optical astrometric measurements spanning 2018 Feb 8.2 to 9.5.

  Trajectory name                  Start (TDB)          Stop (TDB)
  -------------------------------  -----------------    -----------------
  tesla_s5                         2018-Feb-07 03:00    2030-Jan-01 00:00
```

I usually step outside for a few minutes every couple of hours to check the sky quality and look for incoming clouds. I also had to get out for a few minutes around 6 to shut up the observatory and paused to take a look at the beautiful crescent Moon with Earthshine rising over the trees at the end of the lake.

I observed 8 stars for ~2 hours each. It was too cold for the refractor (its cables get too stiff in the cold) and the place I set it up is covered in lumpy ice so it would have been too difficult to get and keep polar alignment. And I never even thought about getting out a telescope to look through. I have to try to remember that for Friday night when it's next clear.

Walter: Finally a night that was clear from end-to-end, even if the transparency was not great (as was confirmed from the satellite loop). My last attempt at imaging was December 14th (aborted because the camera had moisture in it). Things got off to a fantastic start, with no problem opening the dome (but with lots of ice crashing off it as I did so), all of the hardware working great, and a very quick focus. But then I couldn't get a plate solve. So I slewed to Aldebaran in preparation for using an eyepiece (gasp!) to figure out where the scope was pointed. Amazingly, Aldebaran was smack in the middle of the frame, so I was off to the races.

I started by imaging a comet, conveniently located at the meridian, then continued with an automated variable star run. I monitored the first couple of hours of the run from the living room via MS Remote Desktop on my MacBook as it continued along, buttery smooth. I tweaked the plan, adding another comet and ditching all vars below the celestial equator so as to avoid probable plate solve issues.

As it turns out, I forgot to put a #REPEAT directive in for the extra comet, so only one frame was taken. The run did stop once due to consecutive plate solve failures (BC UMa field) but I restarted it right away on the next target (this is an advantage of sleeping in the control room). There were several autofocus failures in the middle of the night due to seeing, but the focus was still good enough throughout for photometry.

At 5:30 I needed to re-start the run again, but made a couple of mistakes and pretty much wasted the final half hour of sky time. Oh well, I'd rather have things go perfectly at the beginning than the end of a session.

I was able to get new flat frames at dawn—essential since it could be a while until a usable sky comes along again. Still, I could use another night soon to get that extra comet (and another, fainter, one if we could have some decent transparency) as well as to get the Hercules and Lyra variables.

Jupiter, Mars, and Saturn were nicely strung out across the south (they were even nicer a few days ago with the Moon in their midst) and I was able to easily spot the thin crescent Moon way down in the growing dawn in the SE. It was a nice way to celebrate the 15th anniversary of Winchester Observatory.

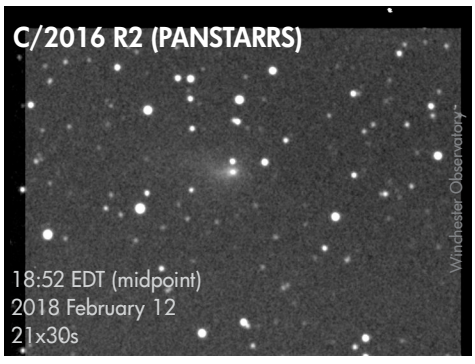
Rick: Congrats on the anniversary! I should look back to see when my first official observations were taken here at Leeside so I can mark anniversaries.

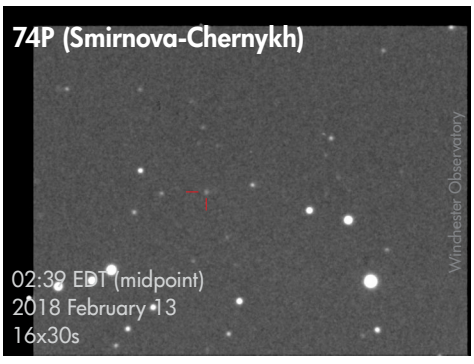
I too had some problems with moisture in the camera last night: when I start it up I get a bright condensation ring in the middle of the frame which disappears over ~½ hour. Unfortunately, I didn't start the camera up early enough to have it clear when it shot my twilight flats so they were all ruined.

I recharged the dessicant about a month ago but I guess I'll give it another try. The dessicant canister has two O-rings to seal it to the camera but it's hard to keep them in place without removing the camera from the telescope (lots of work I'd rather not do.) The rings have some sort of grease on them which sometimes keeps them in place while I insert the canister and which I would like to renew. Does anybody have any idea what grease that would be and where I can get some?

Greg: I use lab stopcock grease on mine. The tube I am working through is at least 50 years old (it was from my dad's stuff). This stuff is pretty expensive—Amazon has cheap stuff (relatively) that might do: https://www.amazon.ca/Silicone-Grease-Waterproof-Gaskets-WAT-750-00/dp/B002RMFTLE
Use this stuff very sparingly...

Kevin: Another possibility is an O-ring lubricant from a pool supply store... I don't recall the name of the product as we bought it years ago, and use it each year to keep the O-ring O-ringing. Shelin Pools on Sir John A. MacDonald at Counter Street

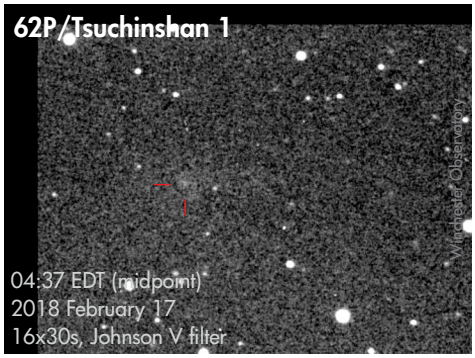


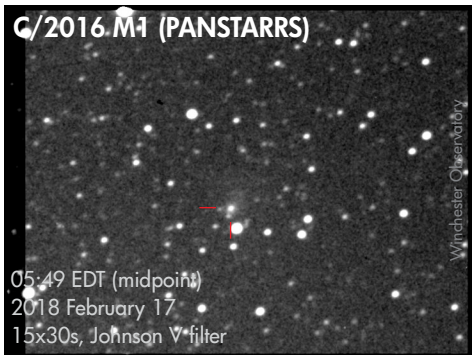


in kingston. Perhaps Canadian Tire?

Fri/Sat, February 16/17

Walter: Another clear night and an 11-hour imaging run. With decent transparency I was able to do the variables in Virgo. At the end of the run I was able to get some Miras in Hercules plus a couple more comets.





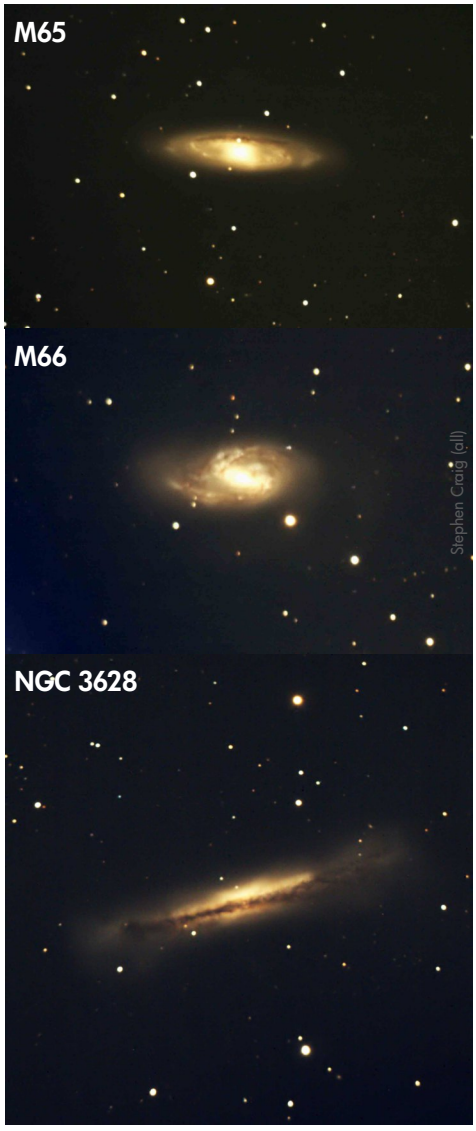
Kim: I was out this morning after 05:30 at –14C to take some pictures with the Cannon ELPH 120IS Powershot and to try the alignment on the i-Optron mount again. (Success.)

It was a beautiful morning. It was by luck that I also caught the Tiangong 1 pass going through Scorpius then further to the SE. As you can see our summer constellations are appearing, that is Sagittarius peeking over the horizon. I need to get out to enjoy the winter constellations before they disappear.

Hank: Nice capture Kim; I like the way the trees cradle the bottom of the images also. Soooo early and on the weekend.

Wed/Thu, February 21/22

Stephen: Now that the weather is warmer I've reopened my observatory. I managed to get a good night last night before it clouded over at 02:00. I photographed what is known as The Leo Trio (M65, M66 and NGC 3628). Lots more good things to come!



I decided to measure my NGC 3628 photo with Astrometry.net. It reported an image scale of just over 0.5 arc seconds per pixel. That's not far off the Dawes limit for an 11 inch! However "seeing" is typically 2 arc seconds or worse on a long exposure. I guess I can't complain. I'm happy with my photo. I've reoriented it so North is up.

Greg: Lucky you... it never did clear up here. Nice work.

Thu/Fri, February 22/23

Kevin: Another great launch from SpaceX just a few minutes ago, and another from Vandenberg in California. The sun will rise soon and perhaps they will see more UFO like exhaust clouds. No scheduled recovery of the 1st stage this time (it has flown before). Apparently they will attempt the first fairing recovery with the ship called "Mr. Steven" in a big net.

Kevin [19:22]: Lunar X is on now.

Hank: It was a beautiful night, did anyone venture out? Not I.

Malcolm: Darn, missed it, and it was clear too. I opened up to work on periodic error and polar alignment but it crapped out around 21:30 and didn't really get much done.

Greg: I spent a few pleasant hours looking at M42 through the DS16c. The mount was a bit unhappy due to the cold. I should never have screwed with the DEC worm settings. Remote operation worked reasonably well considering. Clouds rolled in around 9:00pm—it has been too many weeks.

Kevin: Kim & I went out last night for the first time in weeks.. months... She was getting more familiar with the iOptron mount and I was trying out our new Meade LXD55 equatorial mount and DS90 scope.

I had a jammed tripod leg that I could not extend, so assembled it in the backyard outside the observatory

on some patio stones we placed just for that use. I remember why I dislike refractors: often I was on the ground on knees, sometimes side, trying to aim and align.

I could not find the finder (is that ironic?). I was using a newer Meade hand paddle from another mount as the original had button press issues. Told scope it was something, it gave a limited list of scopes, so I think I told it to pick something close to a 90mm refractor with an 800mm FL. Set date, time, two star align. Sez go to Sirius! Sirius not too bad: low altitude, high eyepiece. Star 2: sez goto something high. I override and say goto Betelguese! It rotates counterclockwise around maybe 330°! The eyepiece is now near ground level...cold ground level! Using very low power 25mm Super-Plössl (32x) and eventually found Sirius.

Align process sez it is happy! I sez goto Sirius! Just to test, you understand. Hmm. Not quite right. I sez goto Moon, and it starts taking the long way around again. Arrgg!

The focuser does NOT like cold! Must regrease.

Found Moon, synced to moon, tracking not too bad. A few minutes later realign resync...at 32x the Moon was very sharp and pretty! Kim sez look for Lunar X! There it was. Added 2x barlow: still not too bad. (Funny...sent out by RASC national but not on *Sky & Telescope* weekly *SkyNews*.) Seemed a little off...a little less Lunar Xy than normal. Oh well.

Brought out laptop, went back in to get a mouse that worked, installed ASI120mc software, installed latest FireCapture 2.6 software and installed camera.

Hmmm reset focus. Nice! Added 0.5x focal reducer to camera, refocused and tried again. Nicer! Full width of moon across horizontal.

Started some imaging...stopped to configure new install of FireCapture...imaged some more. Removed 0.5x focal reducer and zoomed in on Lunar X.

Packed it in shortly afterward. Sprayed stuck tripod leg with lithium grease, left in garage.

So the long and short of it is: I need to add the finder, extend the tripod for easier aligning, learn what is wrong with my alignment process—initial time I told it to find the moon it was 90° off to the east!

I'm looking forward to do some full width lunar imaging, and have started the Explore the Moon certificate!

I discovered the 15 year old roof 2x8 rail is rotted and the roof is about to fall off when opened. It needs replacing!

Hank: Wow you did a lot of stuff there. Did you get in before sunrise?

Mon/Tue, February 26/27

Greg: Finally a chance to use the VRC6 scope and play with the DS16c. Gave me something to do while PHD2 was discovering my tracking errors and inconsistencies. Twenty second exposures, Registax, cleanup in Photoshop. Will do a separate short exposure so the centre is not burned out next time...

Stephen: Nice shot Greg! Considering the moonlight, it is excellent. I was out taking the same shot at the same time. I also tried the Running Man Nebula but it was too washed out by moonlight. I'll try again in a week or so when the moon is out of the way.

[*later*] This is just to show that not all my images turn out great. I tried the Running Man Nebula last night, but the Moon was interfering and I

Our Cloudier Skies

Greg [Feb. 24]: Just for entertainment I went back through my weather data for the last few years and as far as I can tell, this winter is the cloudiest by far. In prior years December and January got way less sun—the rest were brighter. Overall the trend has been for a longer period with more clouds. I have no measure of night time clarity but I suspect the two are not totally independent. Those crisp, clear winter skies seem to be becoming a thing of the past. At least as far back as Fall of 2004 to today.

Stephen: I have noticed a new pattern as well. Years ago when a cold front went through we would get some nice clear weather. Now all we get is a long cycle of wrap around clouds that persist for days. Definitely not conducive to good observing.

Rose-Marie: Since 2004...hmm...that's about the time I started doing night sky photography and getting into astronomy...

Malcolm: And even on the rare occasion when it's been clear the seeing has been brutal.

Mark: It is not like we are getting any snow. Even in Québec, the snow is not very deep. We saw Robins at MSA in the middle of February. But climate change is a myth...

Greg: Since 2004 the average annual mean temperature has steadily risen in my weather data—but the extremes have also grown, masking the effect. Also, amusingly on an island with a wind plant under construction, wind levels have slowly declined year over year. Both effects are small but consistent. I have no doubt that things are changing—as to why, that is a different topic.

waited a little too long to take it. I think I had tree branches in the way. As well I can see that my camera is full of dust. I'll have to clean it out before I use it again. Once the Moon is gone I'll try it again, much earlier in the evening though.

Tuesday, February 27

Rick: I can't believe it. I wanted to buy a KAF3200 camera from SBIG - they've stopped making them. So I decided to try QSI. They've been bought out by Atik and aren't producing anything right now. So I thought at least I'll upgrade my photometric filters (one of mine is in rough shape and badly needs replacing)—Astrodon was bought out just weeks ago by FarPoint Astro who doesn't even list any of Astrodon's filters on their web site! They won't let me spend my money!
Kim: I think Jeanette has been talking to these companies.
Kevin: Honey! Look at how much money I have saved!
Mark K: Give it to me, I can spend it for you...

Tue/Wed, February 27/28

Kevin: Wow wow wow. I stepped outside and saw a brilliant non-moving flare (18:37 EST) near the head of Leo about 25° north of the Moon. It was warm in colour, lasted 4–5s that I saw and was maybe –8 or –9 compared to Iridium flares. It was not an Iridium. The only sat showing was Envisat. Does Envisat flare that much?

Kevin Fetter, watcher of satellites, reports that Envisat is no longer operational and thus can flare on occasion.

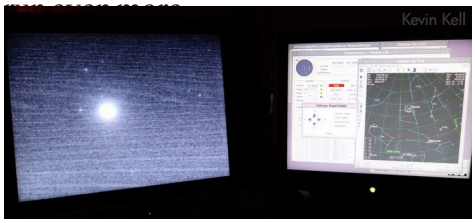
AllSky1 does not start imaging until 19:00 so it did not see anything. AllSky2 did not see anything.
Kevin: The video camera used as a finder is NOT a Mallincam Jr but rather a Micro EX (as seen written on the side of the camera). It came with an 8m dual power/video cable, and a 12Vdc power adapter that plugs in at the far end. The video portion looks thick enough to be shielded and I do not believe that Rock would sell the camera with sub-par accessories.

Here are two images of the video display itself, showing the waves and noise, on the assumption that it should be better. One image is M45, the Pleiades, the other Capella and the control screen beside it.

I fiddled with cables, moved them around, reconnected them and

no good change.

My next plan is to try and find a shorter (say maybe 5m), confirmed shielded video cable and try it. If necessary the composite video input LCD display could be moved closer to the scope and wall mounted perhaps, shortening the cable length



Greg: With my Mallincam Jr Pro there were three factors that influenced the quality of the image—cable connection integrity, cable length and power supply voltage. The bayonet lock for the composite video stays secure but there can be moisture buildup inside the connector—Mallincam recommends using dielectric grease to seal them.

Wavy lines sounds like electrical interference from something—are your cables and power feed shielded and grounded?★

...News

...continued from page 1

issue of *Regulus*, the 1803 update is many weeks late...

Congrats to Dr. Ian!

Ian Levstein *reports*: As some of you know, I seriously curtailed my astronomy activities a few years ago to pursue a doctorate. Well, that journey came to an end when I successfully defended my capstone project. In addition to all the course work, I created a markerless augmented reality app for Android to teach CSI skills to forensic science students. Graduation is on May 12... and that'll be the icing on the cake!★