March 2020

Skyletter

RASC Kingston Centre

Malcolm Park — Leo Trio

Mon/Tue, March 2/3

Rick (23:08): It's looking pretty wet and misty out, but there are stars so I'm cranking out photometric data, including a new target—HT Cam—a cataclysmic variable of interest to the Center for Backyard Astrophysics.

Graeme (23:10): We are driving home from the curling in pea soup but the moon is out! Going to see what home looks like when we finally get there...

Rick (23:42): I'm going to have to watch conditions—I think I'll turn on the secondary heater to prevent dewing up tonight. It's really wet out there even though it's been hours since the rain stopped.

I just discovered there is a potential gamma ray burst that I will try for at 2 a.m. as it comes out of the trees. I'd love to catch another one—it's been about a decade since my only other one.

Graeme (23:54): Good luck with the gamma burst Rick. I'm home and it's clear straight up, but the sky is awful as we have fog all around in every other direction.

Stephen (00:45): It cleared off here too, but there is too much fog for me to do anything. I'm not going to wait for it to improve.

Rick (02:59): Getting pretty foggy here too, but the sky looks really dark yet overhead (SQM 21.7) so I'm going to continue.

I just completed a series of 4 x 400s unfiltered exposures on a potential gamma ray burst afterglow. Nothing visible down to 22.5 mag. Bummer.

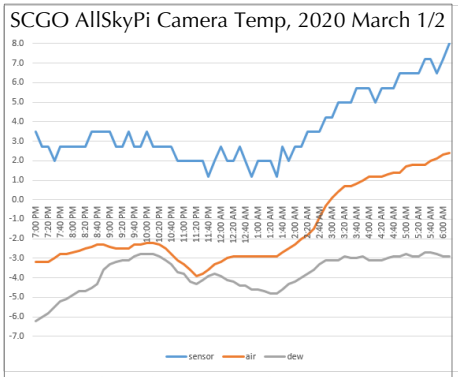
Wednesday, March 4

Kevin: AllSkyPi is an all-sky camera system with a ZWO ASI 120MC camera and wide angle lens protruding out into a 4" transparent dome, with the remainder of the camera and the Raspberry Pi beneath it in the housing. The dome was condensing and frosting, so we added a heater inside the dome. Now the sensor temperatures are higher than we would like, but the condensing and frost problems seem to be fixed.

Kevin Kell — All-Sky Camera

The holes in the lid were drilled pre-dome-heater, hoping to have hot air from inside the housing rise up into the dome. Now perhaps the holes are allowing hot air from the dome heater to infiltrate back into the housing and heat up the camera sensor. I plotted the temperatures of the sensor, air and dew from our nearby weather station and got this below.

So looking at the graph, what more can be done to lower the camera sensor temperature (which causes more hot pixels in a 60 second exposure)? Ideas:



- The dome heater is 3Vdc on a 10Ω resistor giving $V^2/R = 0.9W$.
- The Pi and camera use power inside the housing.
- The 10W Pi power adaptor is outside the housing.

1. Plug the holes in the lid to stop airflow from dome to housing.
2. Add vent holes at the top of the housing, below the lid and dome, to allow hot housing air to escape.
3. Build some kind of air conditioner, i.e. a Peltier cooler, to cool air inside the housing.

Come warmer air temps in the summer, the sensor temp will definitely get too high...already in the last two weeks it has hit 15C!

Graeme: Add a small fan? There should be a few pins usable on the Pi for that function. Fins on the back of the sensor would also help with that function when coupled with a fan.

Air circulation will increase the rate of heat transfer to the outer shell (dome + housing) as you move from conduction to convection heat transfer forces, which should help dew but also reduce the heat in the system.

Keith: Two 10Ω resistors = .45W.

Kevin: Solar image from rogues hollow observatory after 97 days of no sunspots.

Kevin Kell

Hank: Sooooo funny, love it!
Rick: The eternal (infernal?) cynic in me says this was faked. Isn't it awful—I can no longer enjoy any of these amazing/beautiful/awe-some pictures because I've seen so many of them that are faked. But perhaps it's real.
Hank: Life is faked Rick, just enjoy the ride til you hit the beach!

Graeme Hay — Vlog Promo

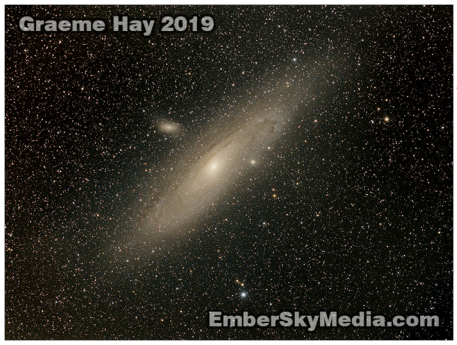
Graeme: My latest Astro Vlog (video log) is out and if you have a keen eye you can catch on video the face-palm moment where I basically "boo booed" and lost a whole night of imaging. Although I do reveal later in the video what happened. Important lesson to re-learn...especially when one's focus is split between making the video and imaging.

Graeme Hay — Leo Trio

Graeme Hay — Andromeda Galaxy

Thursday, March 5

Graeme: Okay...I really have to stop sharing this photo from last July...but I learned a new post-processing trick (and that apparently 99% of people like to see M31 in one orientation...le sigh...) [*New image above*.]
For the forgetful of us, here is the original:



Graeme Hay — M31/32/110

Malcolm: See what happens when you present it right side up? (I'm kidding in case that wasn't obvious.)
Graeme: Malcolm—you can't believe how many comments I got from people that it was originally upside down...
Rick: I must admit I think it looks better right side up—I didn't actually twig to it until you pointed it out, but once you did I realized I was experiencing a subtle sub-concious tension resulting from the upside-down image. Perhaps I just hated to think of all those Andromedans with the blood rushing to their heads.
Malcolm: IMHO this is where science and art collide. Pretty pictures do require proper framing and balance.

If the purpose of this shot was to display a newly found supernova I doubt we would be discussing this. But it's an artistic rendering and as such is held to a different standard. Elements of balance are in play whether we like it or not. It pleases the viewer to see balance and it displeases when the viewer recognizes imbalance. Especially viewers that are not astronomically informed!

It's more psychological than anything else. Or put more succinctly, it's art. But science, it's not.
Hank: Wow, very nice improvement for sure and I prefer my galaxies, sunny side up!
Rick: Yes, from an artistic/compositional viewpoint I always prefer the ~45° angle orientation (but upright of course) as being more dynamic. The horizontal view is too static. If you're looking for

ability on the artistic side of things you won't find any better than Malcolm.

Paul: Some objects I have trouble recognising when the orientation is different, but I don't work to "correct" what I see. With one of my scopes I add a diagonal to help clear the mount, but with the other one I don't bother. To me the views are lovely no matter what.

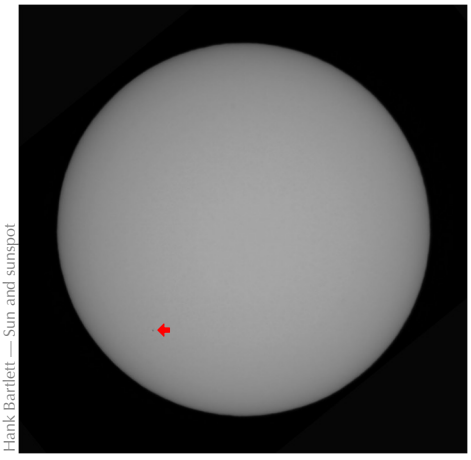
Fri/Sat, March 6/7

Malcolm: This morning I peeked out the window around 4:45 a.m. and I was able to find Saturn in the muck on the horizon and then of course Jupiter was easy and mars to the south. The sky was washed out from the moon, I'm looking forward to seeing the actual conjunction in about two weeks

No pic, it'll be better shot when they're all closer.

Saturday, March 7

Hank: Wow, after 34 days we have a sunspot! EXCITEMENT abounds.



Hank Bartlett — Sun and sunspot

Graeme: For a second there I thought there were two in your photo Hank...then I rubbed off the speck of dirt on my screen...but glad to hear something is finally abound.

Keith: I did the same, at first the dot was large until I brushed it off then saw the really small dot.

Stephen: I am happy for you Hank. Finally you have something! I've had nothing lately. Maybe this is a harbinger of good things to come!

Kim (14:59): Were we were out for two hours taking pics and saw nothing. Going back out.

Kim (17:36): Went back outside this afternoon and saw the sunspot. So that just shows you...the sun is always changing.

Laurie: I have a problem with the electronics on a 10" Meade LX-200. What I have been able to do so far it to detach and reattach the large connectors, then I verified that all of the wires coming into the punchdown connectors are making good contact by using an ohm meter to ensure that the connection through each wire to the back of the board had low resistance. Everything seems good so the problem is more serious. I lack the skills and equipment to dig further. Does anyone have any suggestions other than throwing the thing into Lake Ontario?

MarK: I wished I was around to help. I have a scope and other gear that may be able to help you out. But you have tried the obvious, so it must be more insidious.

Graeme: Sounds like it could be a electronic issue (something has failed) however to figure it out likely requires an oscilloscope and soldering gun...and digikey.ca for sourcing replacement parts. That or see if you can get electronics from a similar fork unit that is still operational.

Malcolm: Tonight after sunset. ~2½° apart.

Kim: Will have to go out. Saw Venus today when out doing solar.

MarK (19:13): Thanks Malcolm! I took Linda upstairs and showed her. She thinks it is really cool. I wish the girls were here, they would too. It is pretty thick out there, but Uranus is an obvious disk. Both are in the same field in our 32mm Panoptic. (That is a type of eyepiece.)

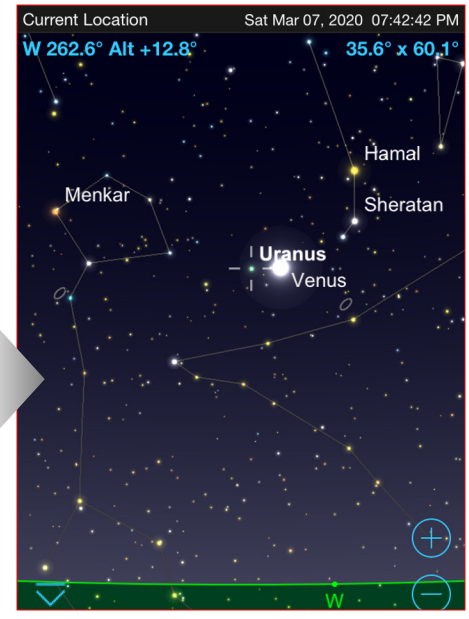
MarK (19:42): Well, I was just visi-bombed by 16 Starlink satellites while I observed Venus and Uranus. Unfortunately, it has now hazed out to the point that only Venus is visible.

Malcolm: Stoopid starlink space junk.

Thursday, March 12

Kevin: Well we had some good discussion...time to move on to some astronomy:

1. Still haven't completed the new AllSkyPi project...have to get outside on a ladder, cover it and make some dark frames and then introduce them into the image processing.
2. Still haven't gotten the python code working for the SuperSID system.
3. Still haven't gotten the 10cm OTA mounted on the Meade equatorial mount.
4. Still haven't got the Meade equatorial mount talking to a computer or software.
5. Still haven't gotten the laser



Malcolm Park — Screen Grab

collimator up against the torus telescope.

Maybe this weekend!

Hank: Well Kevin it sounds like you have been slack-assing it like a retired senior!

Astronomy-wise I have been getting in some solar and may get a chance today. I have also been in contact with Meade about repairing the SM60's BF10, unfortunately there is a parts back order, fortunately it is only US $150 + $20 shipping but 6–8 weeks. I have decided to wait until the parts come in as you all know where they are coming from of course.

I have made a few purchases lately so if the bad weather rolls in it may be my fault. AR 2758 has weakened and proms are low but there is still life there.

Graeme: I'm working on my astronomy videos with the content I produced during the last New Moon sessions.

I'm also trying to figure out a way to image (without flex and unbalancing, nor spending any money) my RedCat and ZenithStar at the same time in time for the Messier Marathon. Also if I can get any camera to live-stack on SharpCap so I can do a livestream of my Messier Marathon Imaging attempt.

Rick: Are you trying to start a competition on who has the most unfinished projects? Shall I give you just page one of my list? Messing with the remote telescope has taken up far too much of my time lately. Hopefully that will reduce in intensity in the not-too-distant future.

Pandemic world shutdown begins...

March 13: Science Fair, March KAON, March KC meeting—all cancelled.

March 16: National Office closes. RASC offers Zoom account to Centres for virtual meetings.

Saturday, March 14

Kevin: Kim had a chance to go sunspot hunting and solar observing with the main observatory scopes...pretty quiet still.

Sunday, March 15

Hank: Here is a little solar update for today:

AR2758 continues to hang in there and retains much of the same structure as on March 8th. There are at least 5 prominences showing, but as Kim stated no filaments were evident to me either, although Gong shows a small one in the north-central region. Also with this image you will notice a red haze in the background especially around the lower right area. I have tried very hard in the past to remove this but I am now worrying less about it as it is true to the observation depending on atmosphere, etc.

Hank Bartlett — Sun in Hα, 2020 Mar 15, 10:25:10 EST

Canon Rebel T7i, Coronado 70mm, ISO 800, 1/5s

I hope everyone is well and planning on getting some fresh air today, walks work wonders.

Graeme: I just tried to give it a go with my SVBONY 7nm Hα filter and got nothing on the surface, so we will have to take Hank's word for it (unless its a sunspot, I don't see squat).

Kim: Now yesterday I took pictures and there was a spot, but I assumed it was because of a dirty Barlow lens.

SCGO Update

Kevin: We poked our noses outside today...just like little critters who have been cooped up inside for months...and it was pretty darned good!

Well, two radio dipole masts had blown down in the high wind in the last day or two, for the radiojove system. More old guy-rope giving way. That was repaired around 15:00. The data looked much better after that.

The SCGO Serenity observatory had a couple of roof-opening ropes break...bad winter for ropes. All good inside. Started some prep work on mounting the 10cm SCT.

RHA Observatory Update

Hank: On March 6, Di and I drove to Focus Scientific in Ottawa to pick up my newest solar acquisition: a Coronado 70mm SolarMaxIII 60mm Doublestack with Richview tuning (shown here above its predecessor the 2009 SolarMax 60mm).

Hank Bartlett — Solar Scopes

I learned there also that my suspicions are correct: that my now retired 60mm has blocking filter rusting and will need a few hundred dollars in repair before I sell it (or keep it as a travel scope). This rusting explains the change in exposures of late, and the lack of surface detail.

I have for months been waffling on this purchase and even reached the point of "adding to cart" the SolarMaxIII 90mm Doublestack but after a few days of consideration and at 792mm

length, 9.8kg, and over $9k, I could NOT justify the purchase. The 70/60 is almost half the length and less than half the weight & cost of the 90mm!

First light was March 7 and, miracle of miracles, AR 2758 showed up right on cue totally contrary to the usual "Curse of Scope Buying!" This scope has double 60mm etalons with a 15mm Blocking filter for imaging and the Richview tuner that allows enhanced surface detail all by reducing the observation to <0.5Å bandpass rather than the 60mm's <0.7Å bandpass. The DSLR image (below) taken with my new Canon EOS T7i of what was a very sedate active region does not capture at all the visual observation that left me "gobsmacked" (a term we learned from "Escape to the Country"). The visual clarity allowed me to easily use the 18mm and 12mm eyepieces to observe a 3-D appearance of this region like I have never seen before. In short I have no regrets with this scope so far.

Hank Bartlett — Sun in Hα

Rebel T7i, ISO 400, 2/5s, 12:34:27 EST

I also managed to image in white light (ES80ED Triplet) a slight penumbra and plage around 2758 on March 7th and then again on the 8th (although a hazy day) I imaged a more detailed spot with a thin division in its main core. Sadly on the 9th the spot had diminished and by the 11th it was gone although the active region is still slightly visible in Gong H-alpha imaging. This was a new cycle sunspot which gave off one of the first solar radio blasts of cycle 25.

In other solar news shortly after GOES-15 began entering its equinox blackout period it totally dropped right off the graph on March 9 and I thought we had lost the satellite, however I found out it was being switched over to the GOES-16 NOAA satellite and is now back on line as of March 13. The data is now at 10^{-8} rather that 10^{-7} and I do not know if that is an actual fluctuation or the satellite is still being calibrated. Last February the data dropped right to the bottom of the X-ray graph at below 10^{-9} W/m^2. The sun is currently blank with very little prominence or filamental activity.

I have yet to test a couple of other small purchases, an Antares 1.5x Twistlock Barlow (to reduce the solar image to better fit my DSLR framing) and a Celestron StarPointer Pro finder which uses 2 red rings similar to a Telrad rather than a single red dot. I think that is going to be it for purchases for a while as I currently have just what I want.

Well unless something big happens in the next few days

Paul: Congratulations on your new acquisitions, Hank. Some beautiful equipment there. I note that the new scope did not prevent your viewing sunspot AR 2758. Well, I don't know if it was your shopping trip or not, but I have been unable to see that spot across the solar face. (I was only using a white light filter, so maybe that was my error. Maybe I should have bought a Lunt or a Coronado!)

Rick: That's awesome Hank. It will be almost like starting all over again—you have much more room for expanding your skills. Already getting better images.

Sun/Mon, March 15/16

Stephen (21:02): We are finally getting a clear, moonless night. It's the first I've had since the 23rd!

I'm continuing my "Galaxies of Ursa Major" project. I have 24 galaxies in the bag and 24 more currently on my observing list. I'll probably get four tonight so I need a lot more clear sky! Mid-week and next weekend look good so far. I can only keep hoping.

Graeme (21:29): I'm testing out my Nikkor lens vs. RedCat and imaging hopefully the Jellyfish Nebula (long story...)

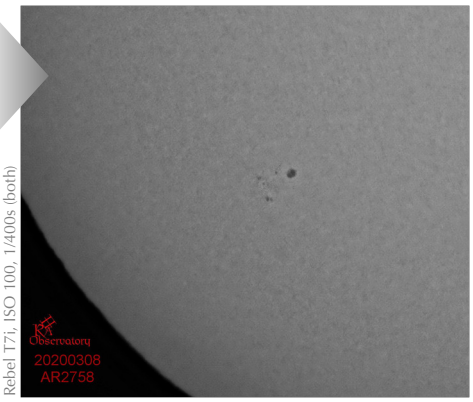
Orion is starting to touch the trees so it's basically done for the season for me.

Stephen (00:54): My polar alignment must be spot on. I just went for 40 minutes without the guider having to issue a command in declination! My declination also stayed pretty well within 0.25 arc seconds the whole time. Good tele-scope balance and no wind

continues on page 7 ☞

Hank Bartlett — 12:39:13 EST

Rebel T7i, ISO 100, 1/400s (both)



Hank Bartlett — 14:06:33 EST

Leeside Observatory Update

Kevin seems to be replacing the [March] *meeting with email updates, so I'll follow that lead.*

Automatic Focusing

Up to now my Boltwood 40cm scope has only had manual focusing—I use an Arduino to control the focuser stepper motor with a small hand paddle. It means that I have to go out to the observatory to focus, which is a pain in the middle of the night. More importantly, I can't shoot unfiltered and B&V filters in the same script since they focus at different points and I don't want to sit out there and manually refocus every third or fourth picture.

So I've been trying to write code to emulate a MoonLite focuser. My focuser will appear to software as a commercial focuser with drivers etc. Filter offsets in Maxim, Max-Focus autofocus, etc. will all just work.

I have the code working to the point that MoonLite's manual GUI focus app sees it and runs it. But I have been unable to get the ASCOM drivers to see it. And that's what I need to get the automation that I really want.

RASC Remote Scope

I've been working on the RASC remote scope—we shot a bunch of images of M67 last week and I'm going through them trying to build some sort of guide to users as to what S/N they can expect for a given filter, exposure, and target magnitude. Or, conversely, given a target, filter and desired S/N what exposure is necessary. Also, what exposure/filter combinations reach saturation at what magnitude. I've tried a fully theoretical approach but it gives me numbers that are off by a factor of 3–5 from what the images give me. Still plugging away.

And we're working on the user manual. Hopefully Jenna (she's been appointed manager) will give me access to the scope myself so I can program some runs and also get all the configuration settings for CCD Commander (see below.) But I haven't heard from her for nearly a week—wonder if they're social distancing?

CCD Commander

The remote telescope uses CCD Commander to script the imaging. I purchased a copy, thinking I could start using it at home as well. But I can't get it to work properly.

It keeps doing silly things, like a meridian flip when slewing to a target which is even slightly on the wrong side of the meridian, in spite of the settings that tell it not to, it keeps wanting to jump ahead in the script to a 'jump to here when sun rises to –12° altitude' that I use to terminate the script in the morning.

It also does a lengthy hunt for guide stars every time it changes filter instead of just when it changes targets.

And if I run a CCDC script for one set of targets then it screws up my guiding for any subsequent work and I have to restart Maxim.

Plus it has nasty little settings all over the place (like it defaulted to JNow coordinates for targets so when the scope precesses them I miss the target by ¼°).

And it doesn't have configuration management. So if I set it up for the RASCRT then it is all screwed up for my scope and vice versa.

And there are a lot of settings. And they don't seem to be saved in a file anywhere that I can find so I can't kludge it by changing config files. Some work to do there.

Photometry Scripts

I'm busy rewriting all my photometry scripts with upgraded, more accurate processes. I'm moving everything over to Python and Astropy.

The first script takes a folder of bias, dark, and flat frames and combines them into master reduction frames. That works.

The second script applies the reduction frames to a folder of images. I though that was working but I've just found several images where the background has been reduced to less than zero. Not allowed, so I need to go back into that one and debug some more.

The third script runs SExtractor photometry software on a folder of images. Works great.

The fourth script takes the output fluxes from #3, determines the best photometric aperture to use and then converts all the fluxes to instrumental magnitudes. Works great.

The fifth script correlates stars from the image photometry files against the stars (target, comparison, check, ensemble, standards, etc) in a target file that I have previously prepared and writes out the photometry data and the magnitudes from the target file into another file. Works great.

The sixth script uses the output from #5 to calculate the zero point for the image and then converts all the instrumental magnitudes of all the stars in each image from #4 to real magnitudes. Almost working—need to refine the output and logging of the process.

The seventh script will take the output from #6 and write AAVSO report messages. This is still vapourware.

The eighth script will database all the magnitudes of all the stars from #6 into a single database so I can do searches for new variables,

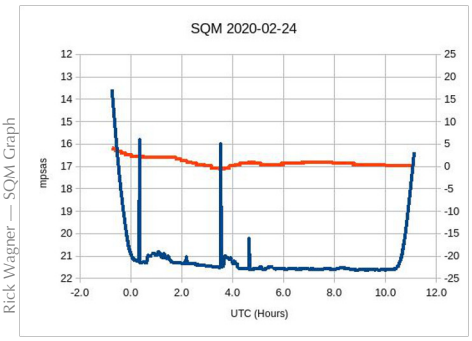
etc. Also vapourware, while I design the database.

PSF Photometry

I've done a bunch of images of M3 and a few of M5 on which I want to try to do photometry (to measure the variable stars and to create a colour-magnitude/HR diagram). But because the stars are so close together (and mostly quite faint) it needs point-spread function photometry rather than aperture photometry. I've never tried PSF photometry before (it's much more difficult than aperture) so I've been working through the Astropy documentation to see how to do that. It's quite complicated and requires significant hands-on, I think, for each image so I won't want to do too much of it.

Sky Quality Meter

I bought a Sky Quality Meter, lensed USB version. The lens restricts the field of view so I'm not measuring the trees and the USB connection lets me connect it to the computer. I installed it a week or two ago and now every image I shoot includes the sky quality in the FITS header and it records data all night while I'm observing. So I include a graph at the end of each night's observing record. In the graph you can see twilight at both ends and the occasions when I turned on the red lights inside the observatory. Once I get the next project (see next para) closer to completion I will move the SQM out to the 4x4 post in the yard.



Weather Station

I am interested in building a weather station for the observatory. I've purchased a whole slew of sensors: temp, humidity, pressure, IR remote temp sensors (wannabe cloud sensor), wind, light sensor, and what seems like another dozen I can't remember at the moment. They will all be connected to either Arduinos or a RPi to log weather 24hr/day. Some of that will be added to image headers, some to observing records, some just for me to know what the weather is out in the backyard.

I had planned to build a little white Stevenson screen like the weather service uses when I looked at the commercial (Davis, etc.) screens. So I headed off to the dollar store and bought about a dozen Melmac dessert plates. I bored a big hole in the centre of most of them, and 4 little holes around the periphery and spray painted them all white. 3/16" SS threaded rod and some lengths of polypropylene tubing to fasten them all together, nicely spaced. I've lined it with heavy screening to keep bugs out and mounted it on a cedar 2x6 to match the 4x4 cedar post on which it will be mounted.

Looks as good as any commercial unit, and a lot bigger too, so it can hold more sensors. When I get a chance I'll take a picture and send it along. Now I need to start wiring up the sensors and writing the scripts to read them, transform the numbers into actual data, and then log, transmit, and database it all.

Autoguiding

For guiding the Boltwood 40cm I currently use the internal guide chip in my ST2000XM camera. It has about the field of view of a gnat at 300m. So I often can't find a guide star, or at least have to offset my target to get one. So I'm trying to build a 15cm f/4 guide scope. I bought a 1¼" diameter ZWO ASI 174MM Mini camera which I intend to mount at the prime focus —no secondary required with such a small camera. I made the main mirror last summer. I've purchased the plywood for the tube and have designed the tube and baffling. Also bought some aluminum tubing to hold the camera which of course needs to be machined to fit. After some months I have yet to figure out how to do the spider and how to hold the camera in the tubing so that I can focus accurately.

There's a bunch more projects, but I think those are the most active ones right now.

Paul: Rick's scientific endeavours are truly inspiring—especially all the little things going wrong (proves that it is true science!)

...continued from page 5 March 15/16

also helps.

I'm getting some interesting galaxies. It's good to be back in the saddle!

Stephen (03:43): Moonrise at 2:41 Cloud at 3:41. Time to pack it in.

Keith: You are lucky again Steve, it was cold last night but I had a fairly brisk breeze from NE, got cold too fast.

Graeme: I forgot to turn on my guider the first hour, and then the battery in the camera died mid-way through another...I think I have 45 minutes of usable data? Afraid to look at it today!

Rick: You need to get an AC power supply for the camera. My Canon will often last through most

of a night on battery but one can never be sure. And when you leave the camera shooting for several hours as I often do it can die and sit there uselessly for hours. And even switching batteries doesn't work—when I haven't had access to AC I have several times been unable to get to the battery compartment because of the tripod or whatever. Then I have to move the camera and that messes up the framing. The AC power supply is cold-proof and never quits. Branded models can be quite expensive but after-market units are probably available.

Paul: I bought an Orion Dynamo Pro power pack a year or two ago, meant for my dew-fighting system. For that purpose it is not suitable (I'm looking for a marine battery next as LiPO4 also seems inadequate) but the Pro does have several output jacks, USB, and grounded AC. I've only tested the AC briefly, but it appears to work OK.

Orion products tend to be a bit overpriced, but I've always liked their Canada-friendly service. A net search will show you several other nearly identical models with the same features, cheaper, and direct from China.

Hank: Speaking of power but not AC in my case, while at Focus Scientific I also picked up the Celestron Powertank Lithium which was on sale for $199 at that time. I have only used it briefly so far but it sure beats the dying 4-year-old CTC 12V beast I have been carting out to the RHA Obs. I also said said 'Hi' to Tristan for Graeme & Malcolm.

Rick: Overall I had a pretty good night last night—it didn't cloud over here until dawn. But several problems as well. As you know I use Perl scripts to image variable stars in groups of 2–4; I slew to near the middle of the group, do a pointing exposure and plate solve, sync the mount (usually corrects by an arcmin or so.) Then I start the script and it cycles around the 2–4 stars imaging each in turn.

Well, when I switched to a group of stars near the hind leg of Ursa Major and started the script, the mount insisted on doing a meridian flip for the first target in spite of that target being well on the current side of the meridian. I finally had to shut down ECU and the mount controller and restart. That seemed to fix that problem except that then the mount pointing was far enough off that I couldn't plate solve, so I had to go out to the scope and manually sync on a bright star. Attempting which shows that, at some point since the last time I used them, the 80mm finder and the Telrad are pointing ~3° apart. Turns out the finder was correct, so I was able to continue.

Then a short while later ECU started showing deep sky objects way off (like dozens of degrees) from their true positions, at wildly larger sizes and with types not matching the corresponding object (e.g. globular symbol for an open cluster). Once again I had to restart ECU.

In spite of all that I managed to collect 80 science images including 29 of my GAIA Cepheids. Also a couple of new cataclysmic variables that I'm giving a try, just a few exposures each to see how they work out. Plus a series of images of M67 in red, B, and V filters and unfiltered at 10, 14, 20, 28, 40, 57, 80, 113, 160, 226s (every root 2 factor). These will hopefully give me some sort of a nomogram or app that tells me the relationship between exposure, filter, magnitude, and S/N/saturation. I also shot a series of 2x2 binned twilight flats at dusk.

A couple of nights ago I tried some ultra-precise photometry on an RR Lyrae star (TV Lyn) that a Czech astronomer is interested in. So I shot defocused to allow longer exposures without saturating, binned 2x2, autoguided. I don't have all the calibration frames required (still need the bias and darks tonight after dark) so I couldn't reduce the images. But I tried photometry on the raw images and was able to get stability of ~0.001mag on some of the brighter comparison stars in the field. That's as good or better than most professionals manage with 2m telescopes so I'm reasonably happy. I hope that will improve slightly when I reduce (calibrate is the more common but less correct term) the images.

Keith Neumark — Dewcap & Heater

Keith: Since everybody is now stuck at home and telling what they are up to, I might as well do the same: Since I have a big problem with dew, I decided to make a dew shield to fit the 11-inch, I ordered a heater which came Friday, so I need to assemble further. While waiting for the heater, I have made and still making a Bahtinov Mask for the 11-inch, the 5-inch, and one for the camera lens [*picture next page*], hopefully that will help focusing with my poor eyesight, so there are my activities. I just need some clear skies and no wind!

Rick: They look great. Cutting those Bhatinov masks must have taken a while. What are you using for the dew shield? Al flashing?
Keith: Cutting out the pattern was not too bad but to get the pattern for just right fit took awhile. The shield is out of aluminium, once I glue the heater on, I will make a blanket to fit over the whole thing.
Hank: Very nice, glad to see you have a couple of projects rolling to help you get your observing situation under control. Even if it is hazy, if you can keep it off the glass you are still in business running 280mm of glass.

Stephen: I had a good night last night. I did 4 galaxies in Ursa Major. The stuff I'm going after tends to be very faint, so it is a challenge.

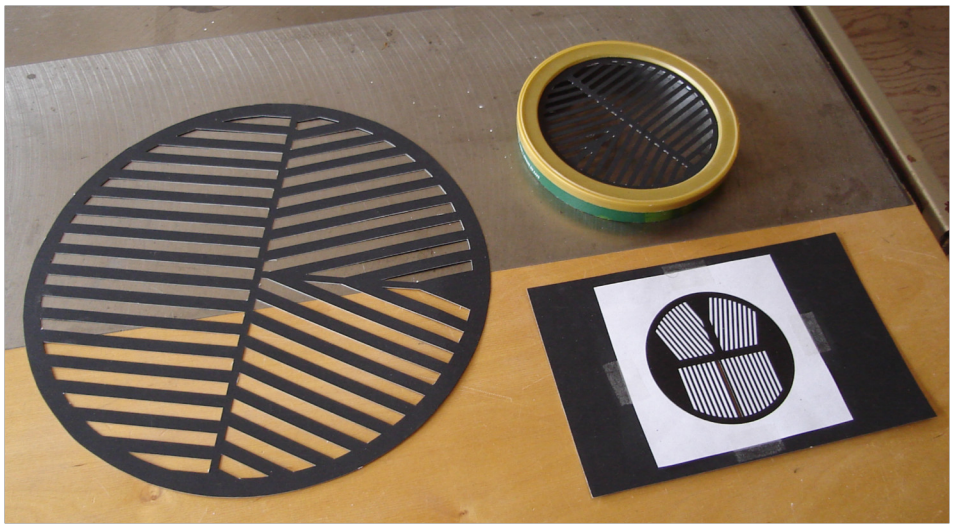
My favourite is NGC 4100. I found a swarm of small faint galaxies right beside it. So I included them in the image. They are on the right hand side of the image below the caption.

Stephen Craig — NGC 4100

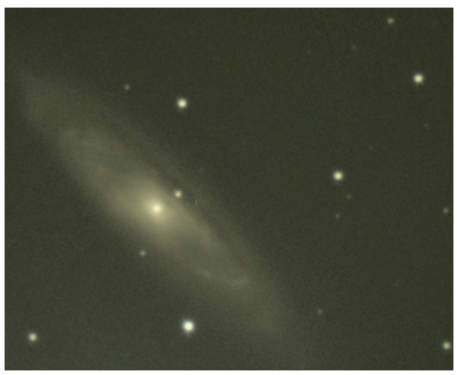
Not all my images are yellow. That is the colour I get from the very faint stuff. The brighter the object the greater the colour range is. I haven't spent a lot of time adjusting the colour balance as it tends to distort the background.
Mark D: Hey that is a great image. I have a long way to go yet.

Tue/Wed, March 17/18

Stephen (21:46): I have my first galaxy of the night in the bag. My guiding is not as good as the other night. Probably because of wind.


Keith Neumark — Bahtinov Masks

As well I'm in a part of the sky largely devoid of stars. So I have few guide stars to choose from. I'm on a 6s guiding cycle to get a good enough SNR. That doesn't help when the wind is buffeting the scope. It hasn't affected my image quality too badly though so I am satisfied. I'm hoping that the wind will die down as the night progresses.
Graeme (23:03): It was windy at the start of the night but it has completely died down. I'm on night #2 of imaging the Monkey Head Nebula, Jellyfish Nebula, and some sort of nearby open cluster... Then I want to try something a little different to end off the evening (single sub imaging)...oh what target should I pick?
Graeme (01:29): Packed up and heading to bed, hope you are getting great stuff Steve (and anyone else still up). Busy day tomorrow.
Stephen (01:51): The night is yet


Mark DesLauriers — M65

young! I'm into my third galaxy of the night. The wind has died down so my guiding has improved. The moon doesn't rise until after 4:30 It's a good night!
Kevin (06:07): A little on the cool side this morning but it was nice to get out.

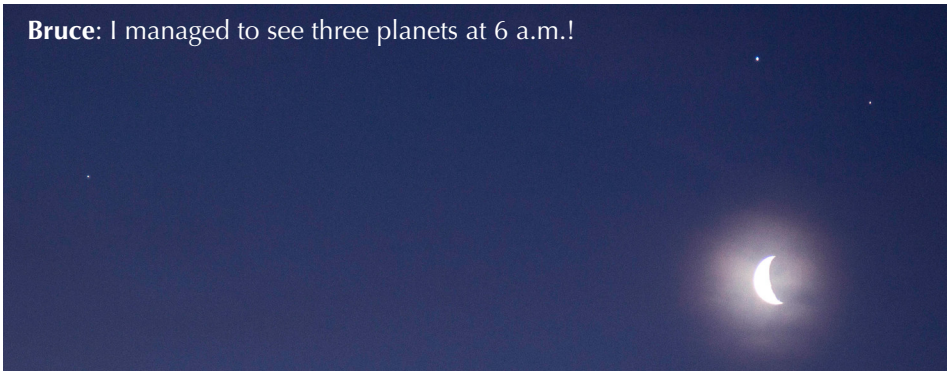
I saw a bunch of Starlink satellites for the first time...maybe got some images as well. From what I remember of the latest, these are still in transition to higher orbits and once there, will not be naked eye visible.

Kim Hay — Moon & Planets

Dieter: I had a great view from the South parking lot of the Lemoine Point Conservation Area, sharing the experience with a friend from Rwanda, who was thrilled to see the conjunction, along with a fast tour of the predawn sky—Scorpius, Antares, Sagittarius and the Centre of the Milky Way, the two Dippers and Polaris, Arcturus, the Summer Triangle, Cassiopeia, and the departure of Flight 8001 to Toronto!
Paul: I was lazy and observed the

conjunction from my well-lit property in the city. Jupiter and the moon were very clear, Mars was so-so, and Saturn was entirely invisible despite me watching for it for about an hour til dawn. (I didn't have access to my astro equipment, so it was naked eye all the way!)

Rick: I was out with the DSLR with 18–50 and 100mm lenses in the evening to do a bunch of shots of Polaris to try DSLR photometry. For those who don't know, Polaris is a Cepheid variable but with a very small amplitude of only ~0.01 magnitude. The amplitude seems to have been decreasing over the past decade or so but recently started increasing again (though there was one paper that argued it is actually an artifact of our changing photometers over the years.) It's not an easy star to observe because it's so bright—you can't use a telescope, and the comparison stars are fainter and far away. It has a 5.7 day period so observations a couple of times per night are best.



Bruce Elliot — Moon & Planets

Then this morning I was up to change targets about the beginning of astronomical twilight, so while I was out anyway I did more shots of Polaris and tried some shots of the planetary alignment from several different locations. I'm trying to match the fabulously artistic shots that Malcolm is going to get. I don't have much hope. But it was very attractive. And the coyotes were howling from very close out on the ice.

Malcolm: I have been staying in Kingston this week while some work is being done at home. The place I am staying at has a SE view from the second storey. I saw Saturn at al quite nicely from the spare bedroom window over the rooftops. It is from near Division Street at the police station, for light pollution comparison's sake.

I found Saturn at first with averted vision through some trees but then it rose a little higher and was easier.

Hank: It is good you have a room with a view, did you bring equipment?

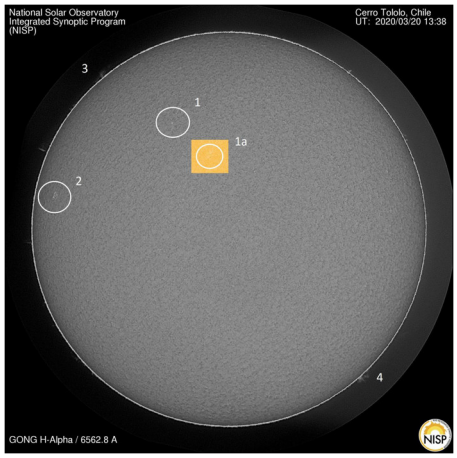
Malcolm: Not really. iPhone? Laptop?

Hank: You may have to pick up a phone tripod and telephoto.

Friday, March 20

Hank: Good morning all, a little solar info... Here is an Hα image courtesy of Gong (Cerro Tololo, Chile) which I have annotated:

1. The sunspot that didn't, but it really did try (reported by space weather.com on March 18) as you can see in inset 1a, today the region is still slightly active.
2. The sunspot that may be.
3. (& 4) A pair of more prominent prominences that have been around for a few days now and are joined by at least a half dozen more around the limb. Most of these proms are very diffuse these days and do not often show as filaments as the track across the solar disc.



Of course it would be lovely to get out there and observe and image, but even if it were clear the impending doom of 100km/h wind makes it a no-go. I would hate to have my roll-off become a blow-off and imaged over Yarker by all-sky as a UFO!

Stay in, Stay safe.

Malcolm: So this is a...wait for it... *Gong show*?

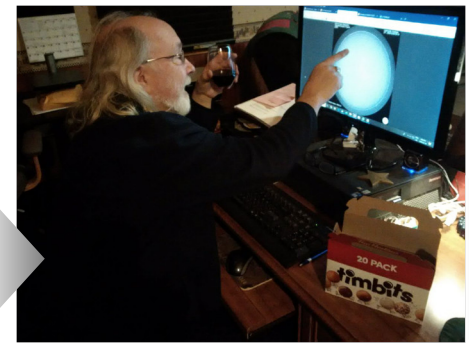
Hank: Why, oh why, did I not think of that?

MarK: I skipped reading anything and went straight to the image. "Holy sunspots Batman!" I thought, "That new 70mm Coronado kicks butt." Then I read the captions...

It was a clear, starry night and above us the constellations of the equator hung at angles I had never seen before, being too addicted to sleep to be a good astronomer.

—Arthur C. Clarke

(G)Astronomy 101 with Professor Hank



Hank Bartlett (all)

Thursday, March 19

Hank: Hello all. I bought the TimBits and no one came! Here I am presenting the newest sunspot and Comet Atlas!

Get out there and get the images rolling in so I can post them on our FB site for all to enjoy.

A good evening and good health to you all my friends, miss you all.

Susan: Are we to assume that you will be adding a festive beverage to future meetings?

I have spent my time well, baking muffins and catching several EmberSky videos—excellent content Graeme!

Hank: Ah! Thank you Susan, I wondered who would spy and comment on the bevy.

Dieter: Thoroughly enjoyed your "meeting," Hank. Stay safe,

Mark D: Hank, did you eat the whole box?

Hank: Di had a couple, 4 plain left out of a 20 pack! It was a good meeting but short (10 minutes), no door prizes, and no applause.

Rose-Marie: Hey! Was there a podcast? I missed it! Didja film it for a YouTube episode?

Hank: No, just Hank goofing around!

Thank you Dieter, I hope there were still some Timbits in the box when the picture got to you.

Dieter: The box was still pretty full! I feasted on them with my eyes (averted vision, so as not to overwhelm my cravings).

One great thing about virtual Timbits: one doesn't have to worry about the calories.

Thank-you for sharing, as well as your selfless sacrifice, eating the lot to spare us the pain.

Graeme: Since the last meeting I've been imaging the Leo Triplet and the Jellyfish + Monkey Head Nebulae for some of my astro videos (great to hear you are enjoying them Susan!).

If I get my act together I'll have a new video up this afternoon, taken a while as I'm trying to get more technical...

I also reprocessed my Andromeda Galaxy photo (again!) so I could make a video and get some feedback (I got quite a bit of useful feedback on one FB group...) round 5 p.m. (?)—may happen sooner than expected. There is still some time until the Andromeda Galaxy is a valid imaging target again...so I can get some additional integration on it.

I'm also trying to sort out a guiding issue I'm having, working out a few ideas but hoping to be able to push my mount's capability to do hour-long exposures (which then allows me to image 20–30 minutes at a time with confidence rather than 5 minutes).

I'm prepping for the Messier Marathon I want to attempt this month, so the next clear night I'll be doing that (mainly planning with my specific horizon and camera/telescope combination, which targets, and in what order, to maximize my potential success).

Also Comet Atlas is getting brighter and closer to the sun, so

after the messier marathon I think I will try to grab a night of tracking it as it traverses the night sky (before it gets too close to the sun it enters twilight...).

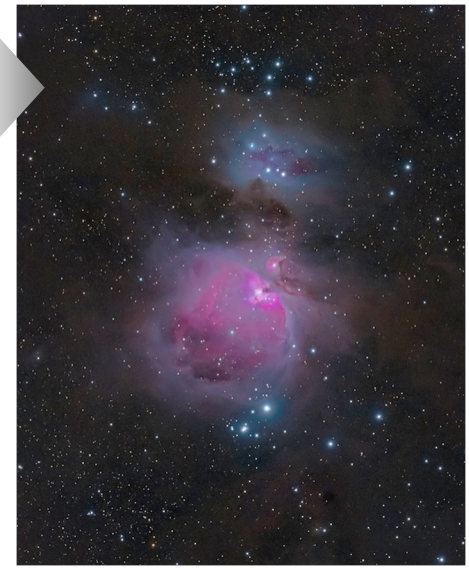
Clear Skies and Stay Safe! ★

From: Outreach Faculty of Education
Queen's U, March 19

Dear Science Rendezvous Station Coordinators:
...Although we are sure that it comes as no surprise, we are saddened to inform you that Science Rendezvous has been cancelled for 2020. This is a decision that was made by our national governing body in response to the COVID-19 pandemic...

Malcolm: Hey folks, hope you are all safe and healthy. Here's the first of a few images from backyard social distancing a few days ago...

- Nikon D810a, AT65
- AP Mach1 guided/dithered with PHD2 and BackyardNikon
- 10x30s (ISO 800), plus
- 10x60s (ISO 1600)
- Pre-processed in Lightroom
- Registered in Registar
- Combined in PS CC
- Edited in PIX
- Edited again in PS LR



Malcolm Park — Orion's Sword

Rick: That's a spectacular result for only 15min exposure. I like how well you caught the dust extensions.

I had been planning to take out my little refractor to do some imaging but completely forgot until after dark and I was too lazy to try to do it in the dark. Plus, I'm trying out a new camera which I haven't been able to get running with Maxim so I'd be messing around trying to get things working rather than imaging. If we get another clear night this New Moon I'll try harder to get it out in the afternoon.

I've been so busy programming through the day that I completely forget anything else. I just found another half-dozen scripts for which there are important enhancements I want to implement.

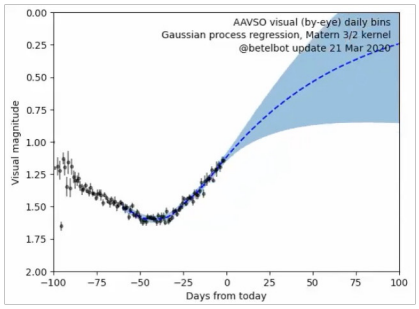
Malcolm: Thanks, one of the great things about PixInsight is targeted masks. By masking the nebulous region you can easily brighten the fainter wisps.

Here's another example, processed similarly, although 10x5 minute exposures: Leo Triplet, taken the same night.

Malcolm Park — Leo Trio

Sat/Sun, March 21/22

Malcolm: *From the Betelbot*: Betelgeuse is back!



Stephen (23:35): I don't know if anyone else is observing tonight. My incoming email is offline. It's a great night. I'm into my second galaxy of the night with lots more on my list. I'll catch up when my email finally comes back online.

Graeme (23:39): I'm live at the moment; switched to the Z6 and imaging as many Messier objects as possible, currently imaging the Virgo Nebula; ~29 objects so far!

Kevin: Last evening (Saturday) we sat in remotely and watched Graeme Hay livestream on youtube and also Paul Gray in Nova Scotia on Zoom. Both were enjoyable with a chance to text chat and full a/v chat respectively with friends we have not seen in some time.

Otherwise, we have stayed home Friday, Saturday, and today, with more personal observing than "normal" to be sure.

There was a nice 71° ISS pass just after sunset, also some nice planetary conjunctions this morning before sunrise.

I will be intermittently working from home, not sure yet about Kim. I do not have a lot of motivation to work on that deferred list of astro projects posted last week, but with more rest perhaps some of it will happen.

We are encouraging people to sign up to free zoom.us accounts. You will get a videoconferencing

account that is good for 40-minute sessions (this is what Paul Gray used last night—3x40 sessions—it stops, then you publish another link and continue).

EOS Backyard looks like a good software package. We've talked about it in the past. It is around $75 and looks like the best way to control a DSLR mounted to a telescope. Paul also had a very old guidescope with a PHD auto-guider communicating with it and his mount. We noted that Graeme was using SharpCap for his camera capture and control software. We have not yet had a chance to try it out either.

This leads to the opportunity for individuals to step up, run a remote imaging session where equipment and setup and processes can all be shared with other members and the public. This can be *ad hoc* for sure. Maybe later on we can try to add some support in organizing, managing, advertising, etc.

In any event, stay safe! Will see you in the next week or two as we start to get organized to host a remote RASC KC meeting.

Graeme: Just an addendum to that Kevin: later in the evening I switched from the FS700 & SharpCap to BackYardNikon and the Z6—with the latter setup far more impressive to viewers (SharpCap is nice but you really need a dedicated astro camera to get decent photos out of the live stack function).

Susan: I also opened the observatory last night. Continued with some more experimental photo work but mostly really enjoyed a clear steady sky! Wow!

I will spend some time today setting up for warmer weather observing.

Hank: Yesterday I took a couple of purchases out to the RHAobs to try/install them.

1. For white light solar images with the ES80ED I have been using the Coronado 2x Barlow which gives me a solar disc that just nicely fits into the frame but little drift room (not a big problem but can be on some days). To make this better I bought an Antares Twist-Lock 1.5x Barlow for a smaller disc.

Wouldn't you know that using this means I have to remove the 2" extension tube I added to bring the 2x and 2.5x Barlows to focus for viewing and imaging! Frickin physics of astronomy. I will work this out.

2. I also intended to install my Celestron StarPointer finder. You may recall from a previous image that on the MTII I have the Coronado on the right and ES80ED on the left. When I went to install the finder of course the mount on the 80 is underneath the tube (wouldn't it figure). This means I will have to switch the 80 to the right side as it does not rotate on its mount and put the Coronado on the left.

Is this a problem? Yes if you are a senior who has had the set up for some time and it will now be reversed, oh duh! I did not do it yesterday as I was cold by the time I got done imaging and also it was "walkies time." Maybe today if it warms up some I will address these problems further, but we do have the boys for a few hours today also.

That is my blah, blah , blah for now, not whining as much as keeping in touch.

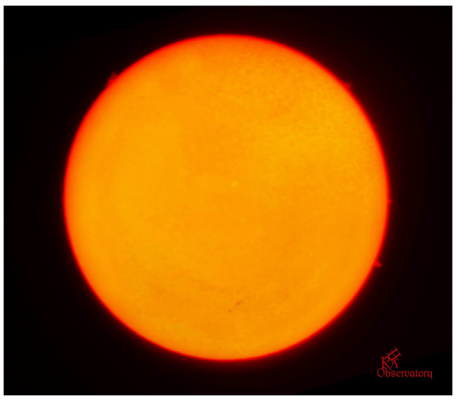
Stay home, Stay safe.

Rose-Marie: Take heart, Hank, you are FAR more knowledgeable and proficient on these things than I! This is why I keep my observing simple, although there are times when I do some very unladylike cursing when fiddling with the settings on my camera.

It is a nice day. You solar observers can have fun with the sun.

Sunday, March 22

Hank: There is a new active region near solar centre today and some small but nice prominences. I had a rough time getting the surface granulation to be even in shading so do not judge, I am still adjusting to the new equipment.



Hank Bartlett — Sun in Ha, March 22, 12:13:26 EDT

Coronado 70mm SolarMaxIII 60DS, T7i, ISO 400, 386ms

Susan: Equipment trials or not, it is just nice that there was something to see.

Hank: Thank you Susan, it is almost like starting over again. The imaging is entirely different.

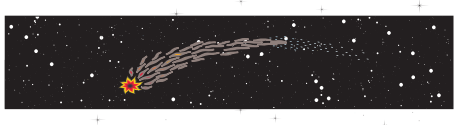
Kim: I was out for a couple of hours and saw squat. Your scope must be that much better.

Have you ever written down your process for imaging, capturing, and processing?

Thanks for sharing.

Hank: I know I need to, but I am poor at that. I swear to start something and post it. It is amazing the difference with the double stack, and also the complications. I would be happy to set up and you could come and play with it alone for a while. That said, clear your credit card first as you will be ordering one.

I am so glad I did NOT order the 90, as it is much longer and with the 70 I can JUST still look in the eyepiece and still make adjustments.



Sun/Mon, March 22/23

Kevin: Last evening we were finally able to create a dark frame for the AllSkyPi camera system. The trick was to take a dark frame in the total darkness with a dark dark cover over the dome in the dark, with your eyes closed. The previous attempt was during the light part of the evening with a cover that was not great...the dark frame processed out almost all of the signal of the real image!

So today's images and mp4 video show a not-too-bad image at all: all of the hot pixels are gone, but I did notice a few artifacts here and there on occasion.

The star trails generated image is now working as well...before there were too many hot pixels for it to process correctly.

These can be seen at:
starlightcascade.ca/allsky1/
A static image is updated hourly and is linked on the main landing page of kingston.rasc.ca as well.

Stephen: I've been offline for a while. My web host went belly up last week, leaving me with no website or email. But I have been observing!

I am finally established with a new web host and have my email back. It looks like Tuesday night may have a few clear hours. I'll be back!

Tuesday, March 24

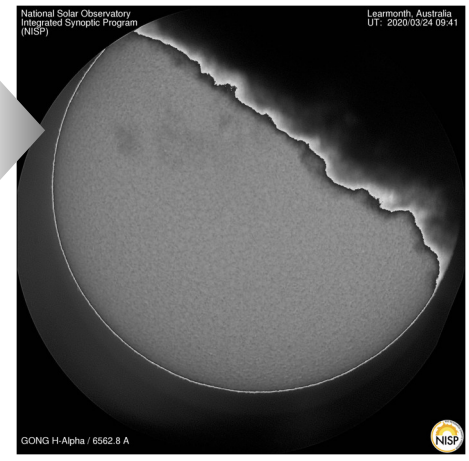
Hank: I just got up and checked Gong and the last image from Learmonth, Australia (9:41:30 UT) from early this morning EDT shows this.

What a terrifying sight it would be if it were real! I have no idea what causes these types of images but looks amazing. Sometimes trees and buildings get in the path but this looks like the sun is burning up or out.

AT65, Nikon D810a, 10x300s, ISO 800, BYN, PHD2, Registar, PSCC, PSLR and Pixinsight

Malcolm (March 22): Here's another one from backyard social distancing: The Beehive (M44) in Cancer.
Hank: So very nice, love the colours!
Susan: Yes, the contrast in colours really make it! This is the first time 'insects' came to mind, but it was fireflies not bees.
Graeme: Well done as well!
MarK: Very good, 3D if you look at it right. You have captured the stellar hues very nicely too.
Rick: Amazing picture as always Malcolm.

I'll have to try it myself to see if I can get the colours like you do. I do my stacking in Deep Sky Stacker and I'm coming to think that it seriously mutes the colours



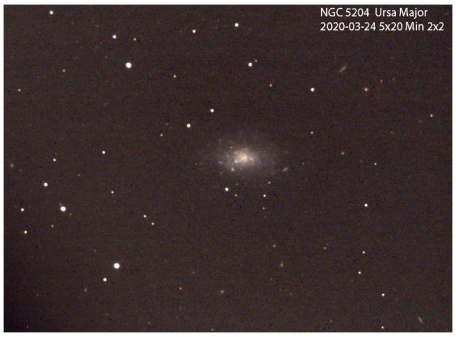
(I try to increase the saturation in the stacking but it doesn't bring them back enough.) Recall, if you can, my shot of the comet going past the Double Cluster—could hardly tell it was a colour photo. Punching them up to a nice level seemed to bring out all sorts of problems in the background etc. Perhaps I just don't go the extra mile (and miles and miles and miles) to figure out the processing you do. And of course I don't have the camera you do—the cropped sensor doesn't have the well depth yours does, so stars tend to saturate sooner which mutes the colours.

I've been wondering about trying to add to each stack a few shorter exposures, perhaps even very slightly blurred, which might pick out the star colours better. Then add them into the stack in Photoshop in colour overlay mode so the blur doesn't affect image sharpness.
Malcolm: Thanks. I've had the same experience with DSS.

Want to share your original comet subs with me via dropbox or something just as an experiment? I'm starved for processing right now...

Tue/Wed, March 24/25

Stephen (21:39): It cleared up here right on schedule. I'm already on my first target. The clear sky may only last a couple of hours but I'll take anything I can get!
Malcolm (22:05): Yes! I'm finally imaging C/2019 Y4 (ATLAS).
Malcolm (22:50): Just ended for me (clouds are moving in) but it was a real bonus to get anything at all.
Stephen (00:15): Cloud at 12:13. Oh well, I knew it was coming. I got two galaxies, which is better than I expected.



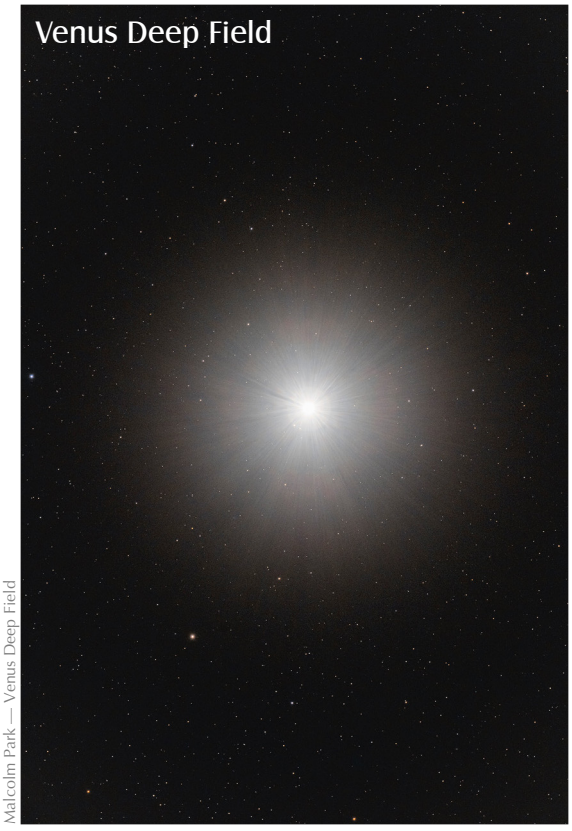
Stephen Craig — NGC 5204

Stephen: I got one good image last night. This is NGC 5204, a dwarf irregular galaxy about 14.5 million light years away in Ursa Major (and part of the M101 group of galaxies). It is similar to the Large Magellanic Cloud.
Malcolm: Nicely done. I need to shoot more galaxies.
Graeme: Very nice! I'm always jealous of people's tiny galaxy photos.
Rick: How did Atlas work out? Is it worth shooting? Big/small tail?
Malcolm: I didn't use enough magnification to form an opinion on the tail. But it is certainly bright and worth the effort
MarK: Certainly, there is not any tail visible visually. It is easy to find, but it is just a like a small elliptical to the eye. All images I have seen match pretty much what I see through the scope, sans the cyan.
Malcolm: I got a shot last night at about 9:00 p.m., just before the end of astronomical dusk of Venus and friends. I tried to do a 2-panel mosaic to get more sky at the bottom of the frame, but hydro wires prevented that. I was happy to fit all these objects into a single frame.

Processing was fun.
Hank: Beautiful images Malcolm, I have not perused your Photopark [gallery] for a while. I was going to go out last night and look for Atlas but it never cleared here.
MarK: You are the Master! The California Nebula, Pleiades, Hyades, plus a mag –4.5 planet—all in one shot.
Rick: Though Venus is rather blown out. Stunning, as always, Malcolm.

I was working all last night til it clouded over AND fogged in about 4 a.m., but once again I forgot to take out the little scope. It has been so long since I last used it as I couldn't manage it with the broken and then gimped arm.

It's supposed to be clear Friday night—I will take it out, I will take it out, I will—wait what was I saying?
Malcolm: Hehe.



Malcolm Park — Venus Deep Field

Wed/Thu, March 25/26

Hank (23:24): A few minutes ago I looked out and it is clear! I mapped Comet Atlas on Starry-Night, gathered the necessary gear, dressed warmly, went outside, and —FN CLOUDY!
Kim: Was up at 4:30 a.m. clear at zenith cloud everywhere else.
Malcolm: Stars were visible, but transparency sucked.
Rick: I looked at the clear patches on the satellite imagery and decided that a good night's sleep was worth more to me than a couple dozen data points and a couple of hours of frustration trying to deal with lost guide stars, disappearing targets... Even at that, it still wasn't an easy decision to take.

I'm trying to debug a (hopefully) much improved flat frame script. It works for dome flats, it works on the simulated camera on the computer but it didn't work on the real sky for twilight flats the last two clear evenings. I think I've got everything fixed but won't know until I get another clear evening to test it. Hard to debug a program you can only run once or, if you're lucky, twice in an evening a couple of times a week.

Thu/Fri, March 26/27

Malcolm: Did anyone go out this morning? I set my alarm for 4:45 a.m. and was out until sunrise. It was very nice. Not much wind to speak of, a little hazy but that faded away

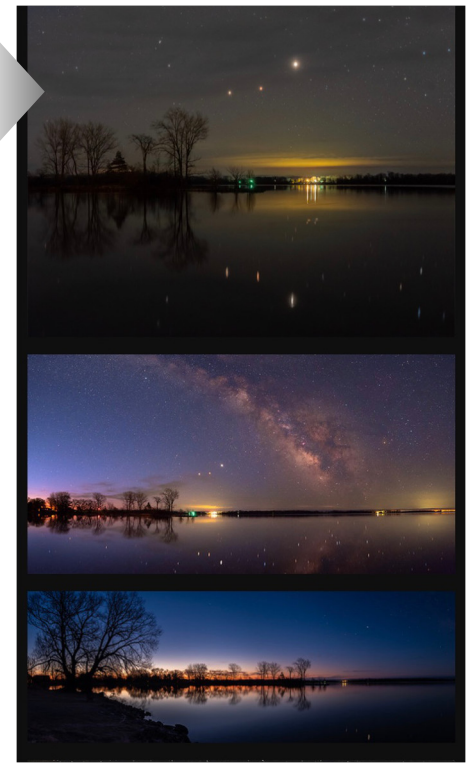
and Saturn, Mars and Jupiter were brilliant. The Milky Way was wasn't bad either.
Rick: Nice shot Malcolm. It was overcast here until mid-morning. Not that I was up early enough to see any planets anyway.
Paul: I know this is late, but that is one of the most gorgeous photos I have seen!

Fri/Sat, March 27/28

Stephen (21:16): I found the comet with little difficulty. Now I am guiding on the comet and trying various exposures.
Graeme (21:22): I'm about 5 minutes behind you; bunch of stuff flying by it though...it's Starlink—one or two every few minutes...
Hank (00:07): I didn't get out til later than I planned, about 10:30 I set up the new finder on the ES80ED and ran the MTII to Betelgeuse. I was able to sync it all together and go comet hunting. I fed in the RA and DEC and thought I had missed it but, nope, dimly there it was. It took a little averted vision to see it at first, but once spotted it was a nice little glow in my little scope. I did put the DSLR on and shot some images at ISO 25600 but I didn't catch anything. All I was hoping for was a slight glow to show it was there. Putting the camera on may have even edged it out of the view. I know you pros will have success; I am glad to have seen it at this point in time and look forward to it getting brighter. If it was closer to a brighter star, and a warmer night, I might have tried the C9.25.

Good luck all.
Susan (00:27): Shoot! I forgot to look for the comet.

It is a nice night. Midway through observing I had to go in for winter boots and a tea-to-go. I've packed it in now. Carry on folks.
Rick (00:39): I'm running two cameras/scopes tonight and it's



Malcolm Park — Dawn Vistas (3)

really been keeping me hopping. I think I have things organized enough now that I can hit the sack for 90 minutes or so.

I started the evening trying once again fruitlessly to debug my twilight flats script, shot some flat field testing series, and am now moved on to shooting some RRLs and GAIA Cepheids with the Boltwood 40cm. I've also done a bunch of shots of Y4 ATLAS and now shooting M81, M82 & NGC 3077 with the 9cm apo and a new QHY183 mono camera. It was recommended to me for photometry but I'm trying out a few (hopefully) pretty pictures first. I hate shooting in the spring with short focal lengths (405mm)—there's almost nothing large enough. I haven't got much of a clue about gain and offset settings for the CMOS cameras, so am winging it tonight. That will be some research for the next couple of days.
Malcolm (01:10): Wow. What a night. It's a stunner.

I agree it's time for long focal length. Shooting some galaxies with my edge HD 9.25 and D810a. I should have set up the motorized focuser, but I opted for a Bahtinov mask for simplicity. Soon I'll have to get the AT-12RC out of storage. Guiding is impeccable tonight, but I'm running out of gas after getting up at 4:45 a.m.
Graeme (01:46): Heading up in a few minutes to shut down for the night, I need to swap over to the Edge HD 8 for a while, but doing so I need to figure out how to improve the guiding.

Mark: Looking forward to the results. I got out and observed for a while last evening. Comet Atlas is improving: it is brighter, and it does move quickly.
Rick: After a great night, it is rather dismaying to look at Clear Outside and see solid red, 24 hours per day for the coming week.

Oh well, I have lots and lots of data to analyze from the past few nights—dark frames at various exposures (100 to 1000s) to evaluate hot pixels and noise growth, full reduction sets at 1x1 and 2x2 to build into masters with a revised script that needs some debugging, M67 images (from both the Boltwood 40cm and from the RASC remote telescope) at many different exposures to evaluate S/N and saturation as a function of exposure, magnitude, and filter, many short images with M67 centred at different points in the frame to evaluate quality of my flats, master twilight and dome flats and—a new technique for me—combined twilight and dome flats to compare against the M67 images to see which is best. Not to mention all the pretty pictures from last night and photometry images since forever.
Graeme: Ditto. I have a pile of stuff and new videos to release (like I'd release astronomy videos during clear skies...)
Kevin: Kim & I were both outside last evening, hunting for Comet

C/2019 Y4 (ATLAS). Unfortunately we could not locate it visually, with 10x50 binocs or the 20cm dob.

We thought we had an accurate chart printed off but there was poor transparency, verging on fog. That may have been enough.

We did see many visual Starlink satellites between 20:00 and 21:30 EDT. A group of 13 went by once.

In other news, OneWeb has filed for bankruptcy, ending plans for a 2nd competing megaconstellation of low earth orbit comm satellites.

Susan: Read as "In other **good** news..."

Malcolm: Last night, regardless of how my images turn out (and I'm 50:50 on that because the EDGE HD and I don't get along), everything in my setup worked. Amazing!

- My first task in setting up the portable rig is to be as close to polar alignment as possible.
- Balance next.
- Make sure it's all plugged in and connected to the laptop and all devices are recognized in Windows.
- Then wait for darkness and the emergence of Polaris. That's when the magic began. The pole master is without a doubt indispensable. Perfect polar alignment in 10 minutes.

Then I do a three-star alignment; at 2350mm focal length that can be tricky. My trick is on the first star, if it's not in the FOV, I put the camera in live view, loosen the clutches, and centre it physically by pushing the scope. Once centred in live view, I tighten up the clutches.

At this point I also put on the Bahtinov mask and focus.

I sync on the star in Maxim and EQMOD starts to build its pointing model. I used Procyon, Capella, and Regulus to align last night. Each object I slewed to was in the FOV every time. I had to nudge it a little to centre it but at that focal length, that's amazing to me.

All because of the pole master.

As I slewed and synced on more objects the pointing got better and better.

Once I got going, guiding was very good. It was somewhere around 0.12 RMS error for reference.

I was shooting mostly 300s images on the galaxies, and because it's f/10 I boosted the ISO up to 5000.

Pics? Maybe.

MarK: I actually have a bit of a dilemma created by last night's observing run. Unbeknownst to me, rot has set in to the south facing roof edge hinge mount on our Observatory. This is one of the biggest problems with not living here. Maintenance gets left behind. Moisture seems to have crept into the low edge of the wood and rotted out where the hinge mounts to the shutter. So when I opened the roof last night, the left-most hinge popped a rectangular hole out of the board the same size as the hinge. The middle one is also punky.

I am really lucky that the roof did not fall off as I opened it last night. I will have to replace the shutter piece. I specifically replaced the original roof with marine plywood to thwart this issue and it did not work. I will not be able to use the Observatory until I effect a repair. I cannot risk having the roof fall off as I open it. Of course, I cannot enlist any help to fix the roof until the present situation is over. I cannot even get another piece of plywood. I need to research the best wood to get or figure another style of roof to make that will last.

Rick: You might try medium density overlay (I think it's called) —plywood with a smooth paper coating on the face. It's what they use for highway signs in many jurisdictions. Even so, exposed edges of plywood are begging for rot. Maybe try soaking the edges with epoxy?

MarK: I cover the plywood with an elastomeric roof paint. But I let my inspections slip, and the paint has lifted across the lower edge, and water has gotten in. I will have to make a drip edge for the next roof iteration.

Stephen: I got several successful images last night. This was my best. I am happy with the result:

Stephen Craig — Comet 2019 Y4 (ATLAS)

MarK: There is the tail. Great!

Hank: Nice, Steve, well worth the evening of work and enjoyment.

Malcolm: Very nice!

Graeme: I finally got my time-lapse video of Comet Atlas uploaded: youtu.be/C60stwFFECc


Graeme Hay — Comet Atlas, RedCat 51, Z6, 60s

Stephen: Very nice Graeme.

Ian: Outstanding. Great video!

Graeme: Thanks Ian and Stephen for the good words!

I'm hoping with all this time at home and renewed conviction I can get a bunch more videos out in April and maybe even do a few live streams (although slightly different format than before, which didn't work out as well as planned). Although I'm trying my best to keep to my budget of $0, so working with what I have, so by the end of it I'm sure everyone will be sick of wide-field photos and videos with the RedCat...until then!

Hank: Thank you Graeme, that is a nice video that really puts the comet's movement into context. I did not get out tonight, but plan to next chance to see if it is any easier to observe.

Telescope for Sale
Sunday, March 29

Kevin: I stumbled across a kijiji ad for a telescope for sale. It was for a standard Tasco-style. The ad showed the telescope pointed the wrong way, and of course was overpriced for what it is. But the kicker was this: "Educational for kids, good for romantic evening."

Rick: Wow, what a piece of trash that looks like.

Paul: A few years ago a lady called me to say she had a couple of telescopes she wanted to give me. GIVE me. I was hesitant but if one was any good I'd sure accept it. Her husband or brother had passed away without ever having used either scope. She had read one of my astronomy columns in the local newspaper and was quite insistent.

You guessed it—they were both 50mm "department store" telescopes. I simply could not find any use for them. I do not recall how I got rid of them—where I was living there were very strict limitations on garbage.

You get what you pay for.

MarK: Do not be too tough on those old scopes. Some of the best observing I have done has been with a 50mm Tasco. Granted, the conditions were such that M33 was an easy naked eye target larger than the Full Moon.

Brian: My first telescope was a 60 mm Tasco (or some other weird manufacturer). To this day, I envy my views through that telescope. The Great Red Spot was an easy object (I was 15 years old—61 years ago). I guided many a long exposure on my 35mm film camera with it. Spit on TASCO at your peril.

Paul: On second thought, I have a 4½-inch Tasco reflector in the cellar. A couple of stepping motors and an Arduino, and welcome to the 21st century. A brilliant COVID project. Track the ISS and take photographs; DONE. Well maybe. Rick provided the steppers; el cheapo.

Hank: Remember of course we had much younger eyes then also, and no floaters.

MarK: Likewise, and it was mounted on an equatorial much like the one in the ad. Did a lot of great observing with that scope too. I still have the optics, but I sold the mount back in the 1980s to a couple of excited students who had big plans for it. I wonder what happened to it? The mirror has fogged unevenly, it will need to be re-coated.

I made a synchronous clock drive for that mount. I would use my Heathkit signal generator to drive one half of our Harmon Kardon amplifier and then instead of a speaker on that channel, I put a transformer backwards. I would crank up the volume until I got 120 volts out of the transformer and then use the variable frequency of the signal generator to control the speed. I could then guide by slightly adjusting the frequency of the generator. Used the same method to track my SCT when I upgraded. The HK used separate power supplies for each channel, so I could listen to music out of one channel and guide with the other. I used to time exposures by counting songs.

Rick: OMG, the whole thing sounds like a roadie's tall tale. Coming from almost anybody else I wouldn't believe it. I love it.

Brian: Only us old farts would know that HK was Heathkit. For what it is worth, my old HK receiver is still on line.

Malcolm: The first time I ever used a telescope was one of those Tascos that was collecting dust in a closet at my sister's place. What did I observe? The impact of Shoemaker-Levy 9 on Jupiter. It worked like a charm as far as I could tell, never having used anything else at the time.

Mark: Actually the HK was the Harmon Kardon HK 670 Receiver. It was the backbone of my stereo system for decades until I replaced it with an Audio Institute VR120 tube amplifier. (Note I say "my," everything else I say "our," but this is my stereo amplifier...) Twin KT88s putting out 55 watts RMS. The great thing about modern tube amplifiers is that they use modern capacitors that provide excellent filtering, so you get all of the music of tubes without the hum and noise.

I sorrily miss Heathkit, on the other hand. They made reliable, fixable kits that were fun to make and use. My tuner is an old tube Heathkit mono, but it puts out the multiplexer, so the only solid state part of the chain is a home made stereo demodulator that gives me stereo-FM. I was so pissed with the CBC! I spent years putting together a sweet sounding FM system to listen to Radio 2 and then when I got it working properly, they changed their format and ruined the station. Over the years I built a VTM, a scope, a signal generator and other kits that I cannot remember. I wish there was something like that available today. Q-Kits is pretty sterile in comparison, although I do like the Velleman 8021 preamplifier that I made from them.

Graeme: Well you guys are clearly getting your value out of this old telescope for sale post...

MarK: Graeme, once you get us old farts going, it is pretty hard to get us to stop...

Hank: Really think one of you should buy it and make something of it! ★