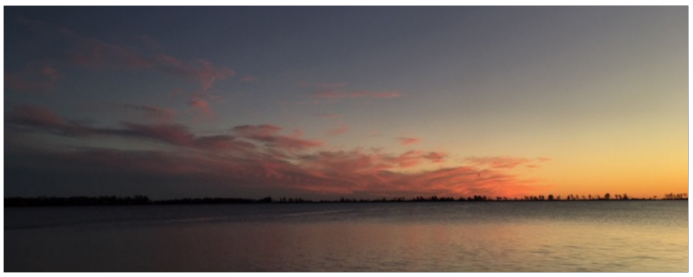
Skyletter

October 2020

RASC Kingston Centre



Malcolm Park

Mon/Tue, October 5/6

Stephen (20:19): Well, it has cleared nicely. I'm going to take a pass however. The moon will be up in a few minutes and it's still 85% full. That's too bright for me to take long exposures. Thursday and Sunday look good. The moonlight should be diminished enough by then.
Rick (21:46): I've been shooting for about an hour and a half now. It has been a too long break with no observing so it's nice to be getting data again.
Rose-Marie (22:19): Also taking a break. Moved firewood this morning and then felt unwell. Time for sleep.
Kim (05:14): Mars was very bright at 9 p.m. Saturn and Jupiter as well. It's still clear this morning.

Glad to see people getting out. Remember Mars is the best it will be until 2035.

Wed/Thu, October 7/8

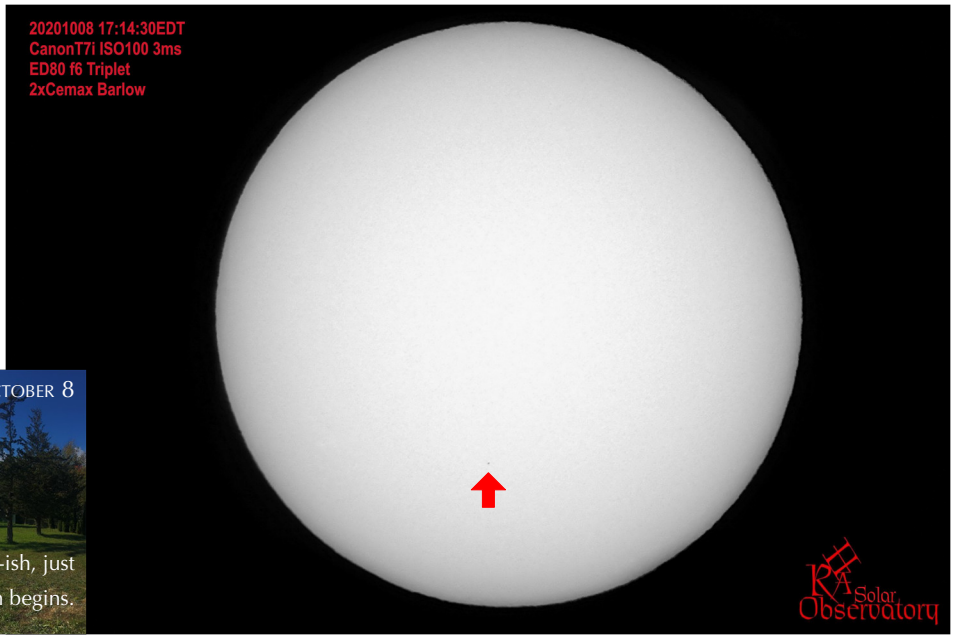
MarK: I tried to view Mars last night. Well, it is a red disk. Every once in a long while I could see just the hint of some darker smudges on the disk. The air was really moving last night. Hope it improved for imagers later in the morning.
Rose-Marie: I took Kerrie (BigWetNose) out for a walk around 9:00, stared at the head of Draco and saw one small meteor. I was thinking about putting on a warmer coat and setting up the camera, but along came the clouds.

Thursday, October 8

Rose-Marie: Spaceweather is reporting a new sunspot forming. Place yer bets, grow or fizzle?
Hank (09:28): It appears there may be a second group W of that one. I am going out shortly for imaging. The first one was there yesterday but imaging was poor.
Hank (11:55): I went, I did not see nor image a sunspot. Of course a pristine clear sky clouded within 10 minutes of my going out; I did shoot between when opportunities came, but nothing in white light. I did get some H-alpha to be processed later.
Graeme: Hmm...
Susan: I see it I see it! I am happy that it is not just a dirty monitor!
Kim: Got home too late to view the sun today and then there were clouds.
Hank: Once the birthday festivities were over I was able to spend some more time with this image and come to the conclusion that the smaller spots I detailed to the east were NOT the dimmer pair and I was unable to discern them otherwise. Oh well, never rush, measure twice. These were obviously granular artifacts that fit the location before rotation but did not end up in the right spot. Maybe tomorrow will be a better solar day.

Thu/Fri, October 8/9

Malcolm (22:54): Lacking any observing instruments other than my 14x50 binos...I had a look at the Pleiades tonight in a rather murky sky. Mars of course is nice to see how bright it is naked eye.



Malcolm: S/W view of new backyard (Sydenham-ish, just south). Picked up the keys today. Now the fun begins.

Malcolm Park

Hopefully sometime before it dims too much, I'll get a look through a scope.

Rick (23:49): It's clear and that's great. AY Lacertae is a cataclysmic variable of some sort (dwarf nova, *etc*.) which went into outburst last night—brightened by about 5–6 magnitudes. Uncharacteristically, the star is in 'my' sky, *i.e*. above the trees. "They" are urgently requesting time-resolved (*i.e*. continuous shooting) photometry so I'm shooting non-stop series of 200s V images for the ~4 hours that I can see it. It's burbling along about 14.0 mag. I've already posted an accurate position for the star (there has been some doubt in the literature) and an initial 4 magnitudes—first person to get data out. This is one case when I'll be doing the photometry and submitting it to the AAVSO database as soon as the star disappears into the trees.

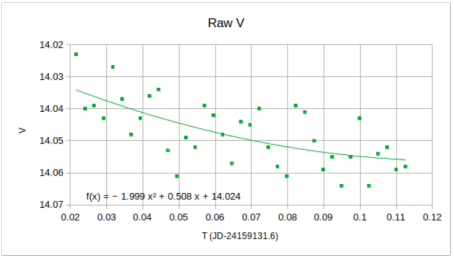
Hank (00:01): This is when it becomes interesting.

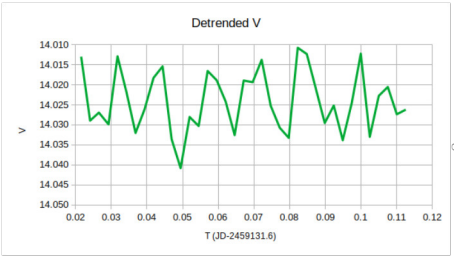
Walter (00:56): Cool! It clouded over at 9 p.m. here so I had to stop. By 12:30 a.m. it was clear again (I could see the cloud moving off to the S). So I am underway once again.

Rick (01:48): Looks like AY Lac has a period of about $16^{m}45^{s}$, just over a quarter of an hour. But the amplitude is only 0.02 magnitudes so it's pretty iffy.

Walter: My imaging run ran until 06:05 this morning. I had to stop and dump the Gemini vars because the moon was there!

Rick: So I did the photometry last night and submitted the obs to the AAVSO about 01:45. At first glance they look pretty bad—the first graph [*left*] shows the data point with a parabola fitted to what is probably the effect of changing airmass. And it looks like poor photometry with random scatter of a couple hundredths of a magnitude. However, after removing





the quadratic fit and changing to plot lines instead, the view looks much rosier—there is a clear periodicity to the 'scatter,' so there is likely some orbital motion with a period of 16.75 minutes [*right*]. Astonishingly fast considering this is probably rotation of an accretion disk around a star at nearly 4 orbits per hour! Standard deviation on my check star magnitudes was 0.0035 magnitudes which I consider pretty darn good.

And I was the first person to submit data to the AAVSO on this outburst. In fact these are the first actual magnitudes on this star in about a decade—most observations are reports that the star was 'fainter than,' *i.e*. invisible, which means that it was not in outburst. These come from both visual and CCD observers. The deepest CCD reports are that the star is below 18.4 so it has brightened at least 4½ magnitudes.

Malcolm: Perhaps I'll join the photometry club later on...it looks fascinating.

I shot the Small Magellanic Cloud in luminance last night until moonrise and then I switched to Hα. I'm doing a four panel mosaic of the SMC.

Susan: SMC? Oh yeah, Chile. I am forever sucked in by that! I am like that guy in the peanut butter ad who can't seem to remember tasting it before.

Malcolm: Those are great ads!

Kevin: A clear forecast it was for Thursday evening! Moonrise was at 22:40, so I was going to wait until 22:00 to let Mars get higher than I have imaged it in the past. I went outside a little early to set up and was greeted with NOT-predicted-overcast. Mars was in the clear so I rushed to do an alignment and find it in the FOV and presto!—it clouded over so bad I could not see it at all.

Ditto for Jupiter and Saturn in the SW. *Sigh*. Back inside. Hope for Friday night. Check forecast. Crap.

Friday, October 9

Susan: We have had a few wide misses of the weather target lately. I was out to the observatory today to take off the extra tie-downs for tonight.

Hank: I feel your pain Kevin, sounds like my solar sessions. Today I set up, left it open, and grabbed the opportunity when it happened.

Kim: I tried to quickly view late in the day but saw nothing.

Fri/Sat, October 9/10

Susan: What a lovely night to be out! Warm and breezy. It was a nice night for planets even without great seeing. I found the quality of seeing was well demonstrated by my variable views.

Two out of three planets were washed out. It was not until this a.m. that I realized what made the difference. Mars and Jupiter were the washouts, but Saturn's Cassini's Division was visible and the shadow of the planet on the rings was knife-edge crisp.

So seeing fell between the very different qualities of features: Mars and Jupiter with blended colours and soft edges *vs* Saturn which had

more sharp edges and a higher dark-to-light contrast.

And that is why it is nice to see more than one planet at a time!

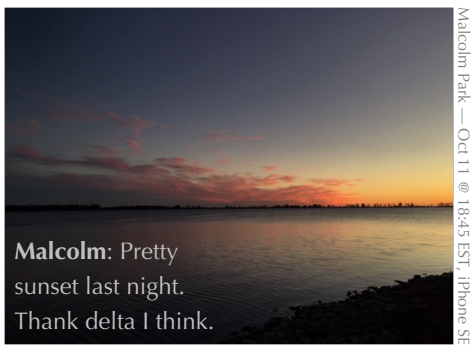
Susan: Greg Latiak is leaving island life behind and moving to Belleville. He believes that emphasis on narrowband [imaging] will make up for his increase in light pollution.
Elena: Greg and Ann will be missed!

Sat/Sun, October 10/11

Stephen (21:39): It was calm and clear when I opened my observatory. Then it quickly clouded over. After a while it cleared, but the wind picked up. It's wreaking havoc with my guiding, but my images seen alright. I'm hoping that the clear sky will remain and the wind will die down soon.
Rose-Marie (23:38): I had Kerrie out for a walk earlier, beautiful clear sky, but I'm just too exhausted to go out and observe. How I hate having to waste good conditions.
Graeme (00:05): I spent the day moving wood and pallets so I'm spent.
Stephen (01:43): The wind died down pretty well. Transparency is good, though seeing is a little rough. I'm having a good night.
Rick: I too had a good night. I wasn't expecting it to stay clear right through to dawn. Between the wind and my residual tracking errors (I'm not guiding anymore and haven't got PEC working yet) none of the images is in any way pretty, but with the exception of two they are all usable.
Keith: I managed to collimate the big scope but could not really see anything—too much crap in the air, although I could see Mars a little better than I have before and now that the scope is clean inside.

Sun/Mon, October 11/12

Stephen (21:39): I'm having a good night. The wind is calm. Transparency and seeing are good. I'm imaging galaxies in Pisces and Aquarius tonight. Judging by the satellite image it's going to be good all night.
Rick (22:48): Yeah, I'm not sure where the forecast 'increasing cloudiness' is supposed to be coming from. I haven't been watching but I guess the system to our S is the remains of the latest Louisiana hurricane [*delta*] and it looks to be going to stay S of us.
Stephen (23:38): I see some crud coming across the lake. It's hardly visible. I don't know if it will affect us.
Stephen (01:52): My SNR dropped a little while ago. I thought I might be getting cloud, but it came back up again—though not to its previous value. I suspect that transparency has degraded. The crud coming across the lake seems to be evaporating as it hits land. We may be okay for a while.
Stephen (03:29): Clouds at 3:28. I'm quitting for the night. Next chance: Tuesday night.
Walter (06:04): I saw cloud low in the S at dusk, but the sky has been clear all night. My imaging run ends in just a few minutes from now. Got the Miras in Hydra and then made it up through Cnc and into LMi! But mostly CVs through the night.



Rick (07:32): It clouded over here about 6:30, after I had completed my run so I got 173 good images.
Susan: I was headed to bed after a busy day and 2 glasses of wine at dinner, then I thought, "Well, I'll just nip out to take advantage of that sky," and came in two hours later. I had no idea how crappy the sky had been for the last few weeks until I saw what it should look like. A super night!
Kim: We were out from around 7:30–10:00 p.m. It was a good night, though at times the transparency started to waver. Planetary and some galaxy sketching for me, Kevin was out back with his setup doing planetary imaging.

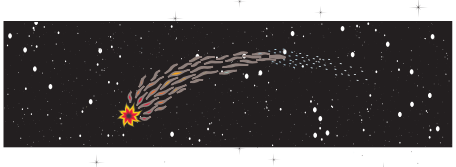
I was using two telescopes and eyepieces with different Barlows —the 2x wins out. The 2.5x and 3x Barlows made the planetary views soft.

I need to go out early to catch Saturn and Jupiter from the observatory, and even then they are low for the Dob, and the walls interfere. So I used the 80 mm Celestron refractor and the iOptron mount. Everything was lining up well last night. There were issues with the red dot finder and the scope, but it's all okay now.

Temps were 5C and there was a nip in the air from the N/NW wind that would kick up every now and then.

I did my binocular observation of rho Cas. I got a note this week from the AAVSO of the 25th Anniversary of my first variable observation, that being rho Cass. Wow.

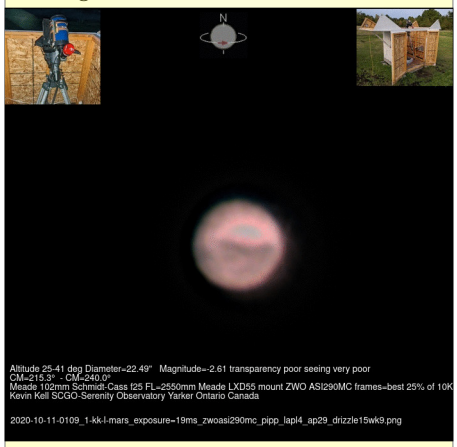
Now it will be crappy for the next few days. Next is to try out the 5mm Hyperion on the 80mm with the 2x Barlow. The 9mm Nagler worked great.



Mars on the Nights of Oct 10 and 11: There were great plans afoot to image the planets this long weekend: Friday, Saturday, and Sunday evenings.

Friday evening, the observatory was opened, the scope cooled down, and was just about to align it to Mars… when the clouds rolled in. And boy did they roll in. I could not see a hint or speck of Mars, at magnitude –2.6.

Saturday was better, albeit very windy, and the wind did not die down. I eventually closed half of the roof, which helped a little, but not a lot. This is from the summary of all runs that night:



I called it very poor seeing and poor transparency that night.

Sunday night was better. Less wind, colder air, but still poor seeing and poor transparency. I had also removed the 2.5x Barlow in favour of the 2x Barlow, for better focusing and better contrast.

I made only 4 runs Sunday, each run about 20k individual images and used the best 5% of them to get this:

Tue/Wed, October 13/14

Stephen (20:09): We just got home from a quick trip to Ottawa. I saw lots of cloud on the horizon. EC says clearing this evening, but I don't believe it. The satellite shows lots of cloud. The Clear Sky Chart says cloudy. I'll go with that. I'm tired from the drive anyway.
Graeme (20:21): It's just clearing here in Napanee.
Rick (20:25): It's hard to look out at a really clear sky and not gear up for observing. But there is a deck of cloud on our doorstep and moving quickly our way, so I'm pushing myself to focus on other things.
Stephen (21:30): I just got up from an hour-long nap to find it is perfectly clear. But the satellite says more cloud coming, so I'm not going to take the bait.
Susan: I opened the roof, then retreated to the lounger to wait it out. Finally got a look at Saturn and Jupiter—not great. I was having issues finding stuff and realized that there was a high thin film everywhere. I did get a look at Mars before a total collapse in conditions, and I was inside by 2140.

Friday, October 16

Kim: I did see the sunspot this afternoon.
Hank: Certainly you imaged it. I had no opportunity here that lasted long enough to open and image. Well, that is until the sun was below my horizon of course.
Kim: No imaging. Just white light observation. I cannot see the sun from the back of the house in the west. That is why I can only do H-alpha in the morning.

Fri/Sat, October 16/17

Kevin (20:42): We went out, noted the receding clouds, opened up the observatories and went back inside to wait. We did some paperwork inside while waiting for twilight, went outside just after 19:30 EDT and it was already +0.8C.

My 102mm SCT had the corrector plate dewed over already. I wiped it, added the dew shield, found Mars, and started imaging. Turned out I had to stop and wipe the lens between each run. At 08:30 I called it quits—I could not keep up with cold metal and glass. I came inside and it was now –0.8C and still falling. Some clouds were coming up from the SW.
Rick (21:37): Oh man! It is so clear out! And I wasted the first part of the evening (and a good part of the afternoon) drinking and having fun with a few of the neighbours (socially distanced of course)! Now that I'm open and running I can see cloud moving in on the satellite image. That's what I get for wasting my time having fun instead of observing. What a fool. Bad Rick, bad Rick! (Channeling Crazy Eyes Suzanne from *Orange is the New Black*.)
Stephen (21:59): I got off to a late start too. We had to make a quick trip to Ottawa this afternoon. When we got home I had dinner and lay down for a nap. When I woke up it was dark. I opened the observatory and ran into a few technical hitches. I have a few images in the bag now but I see my SNR dropping. Clouds can't be far away. I'll hang in tonight and wait for it to clear later.
Rick (22:21): The cloud area is narrow and may not interfere for very long. We can remain hopeful.
Graeme (22:50): Just went to let the dogs out; Mars (and one other star to the NE) is just peaking through the cloud layer.
Stephen (23:17): I've got cloud at 10:45. A few stars are visible. I'll wait it out for a while.
Susan (23:34): First session of the season with long johns! I had a nice 90 minutes out before a sudden chill and thin cloud set in. Planetary was poor but still remains enjoyable to see those three in the same sky!

I did my best-to-date variable observing on RR Peg! It has been a bit of a job getting to know the charts well enough to remember that there are stars that are useless to compare to as they will not be estimated on the chart. You really have to know the field well to make any time on these things visually. That does not seem to hamper enjoyment though.

Wrt eye relief and short focal length eyepieces, thanks for the offer Hank, the model I have chosen should take care of those issues. I am borrowing a 4mm from Brian to test the waters and may return to your offer if the scope cannot handle the magnification of the 4mm. My original plan was to buy a 2-inch, 3x Barlow. I did the little chart with my 2-inch eyepieces to see what would provide the greatest range of magnifications. Then I had a few more observing sessions and I suspect that I would not use those other combinations and would resent the bulk it would add to the setup.

Wrt dew heaters, yes Rick I am under the impression that I would be safe with one of those low power heaters. It sounds like you made yours? Is it a USB or something else?
Rick: No, I use an old 12V computer power supply. I used RCA jacks for the connections and I made a small box splitter. It has 4 outputs, a switch and an LED for each to show it's on. Mark's web site is about the best on making them unless you go with discrete resistors. I have one with resistors (my older eyepiece/camera lens/guide scope heater) and one with nichrome wire (pulled from a dismembered pipe heater cable) for the Tak 90mm objective.

I'm about to update the connections. Currently the heaters have RCA plugs on ~5' long wires (just cheap speaker cable from Radio Shack) which I have to wrap around the scope when not in use and they can't be bundled with the other power/signal cables to the scope and so they threaten to catch on slewing. So I'm going to cut them off short and put on 2.1mm DC power jacks and then use slightly heavier wire (still speaker wire) 'extension cords' to connect between my splitter box and the heaters. That way the wires from the ground to the heaters can be bundled with all the other cables.

I still want to build a few more heaters: a 10–20W to warm the focuser on the Tak which tends to get too stiff in the winter for the RoboFocus to drive it; a 20–40W to warm the RA gear of the Losmandy Titan which gets too tight in the winter, jams the worm gear, and burns out the ($500) servo motor; and a couple ~2W for upcoming guide scopes and eyepieces. I built a ~2W heater for the 12.5" Dob's secondary but haven't managed yet to install it.
Walter (23:42): Crap, I was just out covering up as many tomato

and tomatillo plants as possible, and moving pots into the carport in case there is frost tonight. And of course it is clear and Mars is blazing away. CSC was calling for close to nothing tonight and we got more than that.

The SSEC site shows a dagger of cloud moving rapidly N and the sliver of clear we're in should be closing up in the next hour.

I need to heat soak the camera (wrap a Kendrick heater around it) for a few hours before I use it again since it was starting to show signs of moisture in the circuitry during the last imaging run. (I have to do this 2 or 3 times a year.) Perhaps I'll do that tomorrow afternoon. CSC shows a possible run from dusk to midnight, though if recent trends continue that will disappear as we get closer to tomorrow night.
Stephen (01:42): Clear sky at 1 a.m. It was worth the wait. I'm back in business!
Stephen (02:24): My SNR dropped again at 2:15. Picking up a bit of cloud. It's moving fast. I'll wait it out again.
Stephen (03:58): Clear sky at 3:20. Back on track!

Rick: So what are the symptoms of moisture in the camera, Walter? I wonder if it might be the cause of some of my intermittent problems.
Walter: I get patterned black and white pixels in the images, and if it gets really bad you get a posterized image. Fortunately it didn't affect the stars I was using for doing the photometry!

CSC looking better for tonight. I will heat the camera this afternoon and be good to go again.
Rick: I think I may be having shutter problems. If I try to autoguide with the internal guide chip it looks like the shutter spontaneously closes during the exposure—the guide star disappears and, if I complete the main exposure it is very low signal. If I restart the main exposure instead of letting it finish it is generally fine though the problem sometimes recurs. And I can't do scripted observing with guiding because it just happens too often. Sometimes the guider camera gets stuck in the middle of a download and hangs, I have to restart the script. AAAAnd, Maxim is acting peculiarly (in fact maybe Maxim is causing all the problems) in that often if I terminate an exposure the camera status/exposure progress bar goes yellow and says the scope is slewing but of course it isn't. I'm planning at some point to upgrade Maxim to the latest version (I'm on 6.16) and maybe that will fix it.

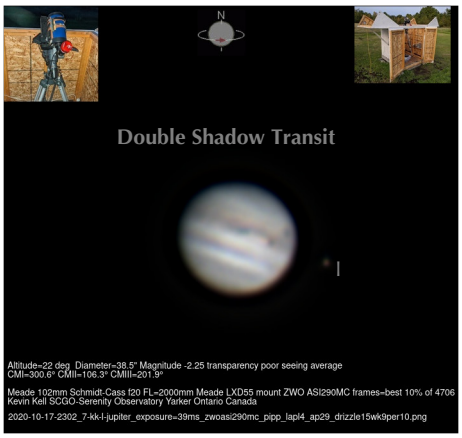
Walter: I've always been thankful that my camera doesn't have a mechanical shutter given the multitude of problems I've heard people having with them. I don't use a filter wheel either, so that saves even more potential mechanical issues. And I don't guide. So I just have to worry about the telescope mechanics! (Touch wood, my 10" f/6.3 LX-200 has been going strong for 23 years now! I'm assuming by now repair parts would be pretty much non-existent…) Add to that, I've been using the same computer and software for 17 years and things are pretty stable! (Best of all, there are no pesky Windows updates installing at inconvenient times, breaking applications, or destroying data! Long live XP!)

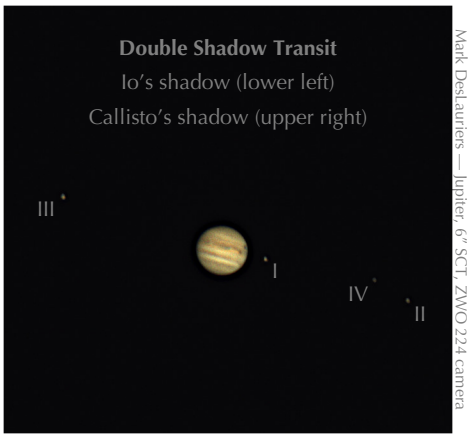
Rick: I've started shooting binned 2x2 and unguided. The tracking errors are enough to spread the PSF over a few pixels to keep the photometry good. And without guiding I eliminate several problems: CCD Commander really doesn't handle selecting a guide star very well, so by not guiding I can script the whole night with CCD Commander and get nearly my full 8 hours of sleep. When guiding, if the sky clouds over even for a quite short period of time Maxim loses the guide star and starts 'guiding' off into the hinterlands so by not guiding I eliminate that. The guider chip is very small so I often have to position my target away from the field centre in order to acquire a guide star which adds complexity to setting up targets. If the pointing is off slightly the guide star may not be on the chip and guiding fails. So not guiding is much nicer. I would just like to get PEC working so that the tracking errors aren't quite so large. But it appears not to be trivial to do and I can't figure out if PEMPro will work with the SiTech controller.

Sat/Sun, October 17/18

Walter (19:57): Heat soaked the camera this aft, and starting imaging almost on time this evening (got a full load of vars tonight!). I see from the satellite loop the cloud has reached Toronto. Hopefully we can get another 4 hours or so of clear sky.
Stephen (20:55): I got off to a late start. Have to get that after-dinner nap in! But I'm imaging now. It will be a good night even if the clouds cut it short.
Malcolm (21:27): Hoping to finish the SMC tonight. Data looks promising so far. I'm doing a 4 panel mosaic to fit it all in one combined image.

I looked at the LMC to see how many panels it would need. 4x4 = 16 panels to get the whole thing—that's not happening in one season...but it's very tempting to start it off and try to piece it together.
Walter (22:34): Cloud is at Rice Lake (should be taking out Oak Heights about now), except for the bit that has raced along Lake





Ontario and is now at Kingston!

Rick, are you imaging tonight?

Stephen (00:39): I have cloud at 12:35. Time to quit.

MarK: What is heat soaking? Does this remove latent images from previous exposures?

Walter: No, I just wrap a dew heater around the camera, turn the control to high and let the gentle heating drive any moisture out of the inside of the camera. I usually only have to do it 2–3 times a year, usually after a rainy/damp period. It's been fairly wet this month!

My camera has no latent image problems (and no shutter problems, since it has no mechanical shutter).

Walter: The skies held out until almost 3:30 here. I'll know better when I do the photometry—the cloud didn't provide the sharp cutoff I was expecting and I suspect the skies were starting to deteriorate by about 0300. Anyways, I was able to image 207 variables, mostly Miras.

Rick: Sorry, I went to bed without checking my email. I was imaging through the night—got up about 4 to check the skies and it was cloudy so I shut down. Looking at the images it actually clouded over at 1:50 so I have about 2 hours of cloud pictures. I'll stack them and see if I can pull out any detail.

Kevin: The double shadow transits and the Great Red Spot were to begin at 17:25 EDT but it was still daylight. The telescope pointing could not find Jupiter, not until 18:27 when Jupiter was visible to the naked eye and the Telrad finder helped aim the scope. Images were taken every five minutes until the end of the event at 19:25 EDT. So instead of 2 hours, only 1 hour of images were captured [*above left*].

Mark D: I also attempted to catch the double transit [*above middle*].

Wed/Thu, October 21/22

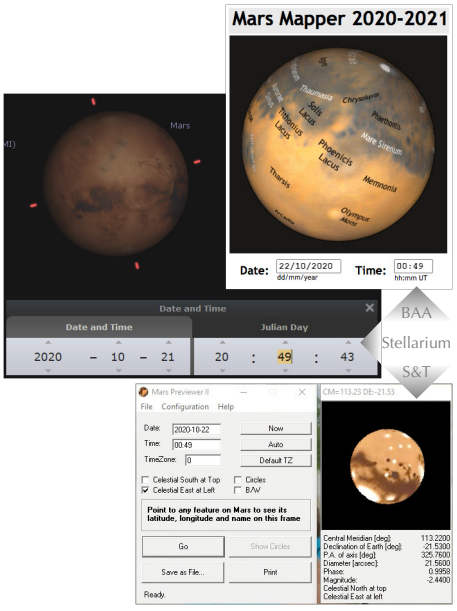
Kevin: It was unexpectedly somewhat clear, at least in the direction of Mars. This was a run of 8, ~180s each, shorter for the initial run as usual.

Identifying features: I used to use the *Sky & Telescope* Mars Previewer, but it is finicky to time zone settings and often confusing. Since then I have started to use the British Astronomical Association Mars Mapper. One issue I have with it, it does not seem to allow a N-S switch. I image with N up, it shows S up. I also looked at Stellarium, but do not believe it shows correct surface features for the time.

The south polar ice cap shows a little. The lighter colour of the northern hemisphere is the Tharsus region, with Olympus Mons (not really showing detail). The darker southern hemisphere contains features such as Solis Lacus, but again you can't really identify these in low resolution images.

Of these three, the BAA is the only one to overlay names, which is very handy when you are first getting used to the topography.

Since then I have also started to use the S&T Mars Previewer again, this time setting it to UTC time. It seems to work better and I will go back to using it to compare what I image to what is supposed to be reality.



Keith: If you went out last night, you would not have seen anything, too cloudy—or at least 2.3 km away it was.
Susan: I was also out for about 45 minutes after the social and my seeing was not great but my view is consistent with your image. I will check with the BAA Mars Mapper as well for previous sketches.

Thu/Fri, October 22/23

Rick (23:58): I looked out just before heading to bed and there were all kinds of stars so I scrapped that idea and opened up the observatory. By that time most of the stars were gone. However, the satellite image seems to show that it should be breaking open here and should be clear everywhere to my S. Everybody out observing? Or is this a low cloud situation that doesn't show on the satellite?
Graeme (01:10): It's clear at the moment, cleared up by midnight. Had a look, but currently doing Zoom training for a beginner astronomer so I'm observing his skies via Zoom (not quite Chile, but California).

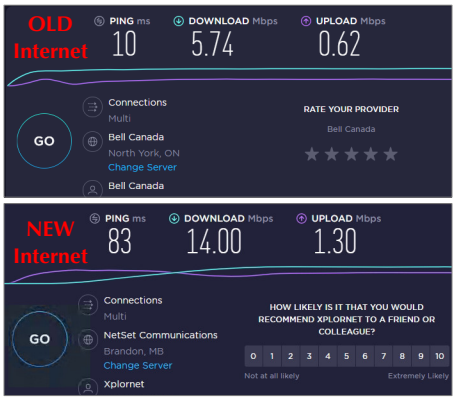
Monday, October 26

Malcolm: The deck and pod bay doors are installed, now I just need wifey to help me lift the roof up. Then I can actually start setting up the scope. I'll share some pics on Wednesday of the design changes I made to the deck and how it should benefit.

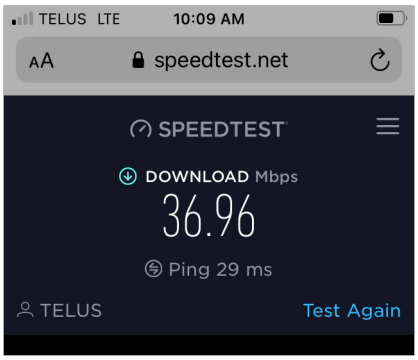
Internet is up and running: 4 bars on wifi at the observatory which is about the same distance from the house as it was in the county. I only got two bars—and often 1—at the county address, resorting to power line network plugs at one point.

Call me crazy, but for the time being (at least until Fibe arrives) I'm on Xplornet. I'll learn the local patterns and dread what happens in the evenings. But if it stays above 6 Mbps I'm still ahead.

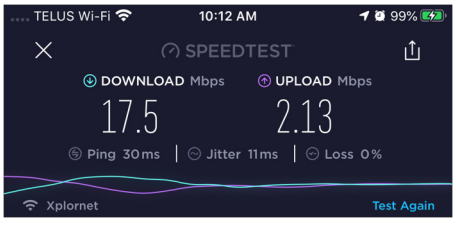
The one good thing I will say about Bell DSL is for the most part, that number did not fluctuate much at all intraday and was consistent for years.



MarK: Your Xplornet is better than ours! Not fair.
Malcolm: Wow! On a whim I thought I would test my cellphone:



Graeme: Xplornet put up a new tower nearby that our modem can read (~3.5 km away *vs* 12 km previously, but it's off axis to the modem). Therefore we are getting much better speeds but I think wind/evenings things can get really hectic and it seems to have 60–90s blips where it shuts off. I'm exploring the reason for that, but it is still much better that 3/0.5 we had before most of the time:

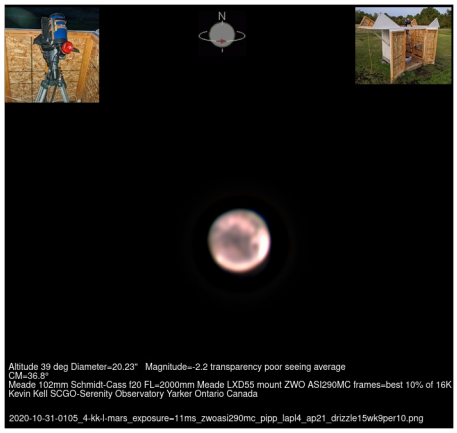


Walter: Malcolm, your new Xplornet service is about 20% faster than what Fibe 25 was giving me here in Winchester, so you are doing very well!

Fri/Sat, October 30/31

Kevin: A good clear night, the first in a long time, albeit a little cold. Mars is now up high fairly early on in the evening, so we went out and imaged it from 20:45 to 21:12 EDT. The almost-full moon was up and fairly close to Mars, so it would not have been a great night in any event.

All of the images were over-exposed, even though I progressed down from 13ms to 11ms. It wasn't enough. There was a lot of skyglow from the moon and so far I am attributing it to that.★



"Twinkle, twinkle, little star,
How I wonder what you are.
Up above the world so high,
Like a diamond in the sky.

"When the blazing sun is set,
And the grass with dew is wet,
Then you show your little light,
Twinkle, twinkle, all the night.

"And if I were in the dark,
I would thank you for your spark;
I could not see which way to go
If you did not twinkle so.

"And when I am sound asleep
Oft you through my window peep.
For you never shut your eye
Till the sun is in the sky." ★

As printed in the *Unparalleled Discoveries of T. J. J. See*