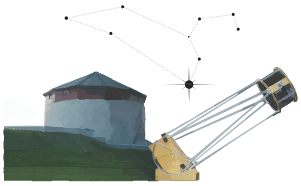
June 2015

Regulus

RASC Kingston Centre



The Green Bank Radio Telescope

Ian Levstein

I DON'T POST MUCH THESE DAYS, but just this weekend, my wife Sheila and I were in Pocahontas County, West Virginia—home of the largest radio telescope at Green Bank. I managed to take some photos. You aren't allowed to take any digital photos within 1.5 miles of the telescope because it causes too much RF interference, so the best I could do was from an observing platform at the 1.5 mile limit. Not a great photo from my Galaxy S4, but not too shabby either! If you get a chance to go, the Center is free to enter, but they charge $6.00 for a tour which includes a 15-minute video presentation, a quick chat from one of the people there, and a bus ride right to the telescope. Of course you can't take photos (unless you have a film camera—which none of us did) but, the thing is huge—a 100 meter diameter collection area. We were so close to the telescope, you could have spit and hit it.

I'm sure the long-time members will remember **Arthur Covington**, the noted Canadian radio astronomer pioneer, a member of the Kingston Centre, a President of the Ottawa Centre, an Honorary RASC President, and the namesake of asteroid 5424 Covington. I was thinking of Arthur throughout my visit to Green Bank.

Kim: Thanks for the post Ian. I have been there twice myself for the SARA conferences in the past. We were thinking of going last year, but it was not meant to be, so caught the conference on video.

Its a beautiful place, and they have done so much work on it since the last time I was there. The first time I was there, the 300 meter telescope and been destroyed (1988), and they had cleared it away, to start constuction of the Large Radio Telescope. The next time, the LRT was being tested, and was ready for commissioning.

If you ever get a chance to read *But It was Fun, the First 40 Years of Radio Astronomy at Green Bank,* edited by F.J. Lockman, F.S. Ghigo and D.S. Balser it is a very educational book on the development of Radio Astronomy and the story of Green Bank.★

Upcoming Events

Thursday, June 11 **7 p.m.**
Regular Meeting
Rick Wagner:
Creating Variable Star Light Curves

Saturday, June 13 **9 p.m.**
Observing Session
North Frontenac Dark Sky Site

Saturday, July 11 **5 p.m.**
Kingston Centre BBQ
(Members only; contact us for directions.)

Saturday, July 24 **9 p.m.**
Observing Session
North Frontenac Dark Sky Site

Saturday, August 12 **8 p.m.**
Observing Session
North Frontenac Dark Sky Site

Saturday, August 21 **8 p.m.**
Observing Session
North Frontenac Dark Sky Site

Thursday, September 10 **7 p.m.**
Members' Night

Friday-Sunday, September 11-13
Fall'n'Stars 2015
Vanderwater Conservation Area

Check kingston.rasc.ca for meeting locations.

The North Frontenac Dark Sky Site is at 5816 Road 506, just south of Plevna.
kingston.rasc.ca/observing/sites★

In this issue:

Torus Updates

Kevin Kell

THURSDAY, APRIL 30

I fired it up in the evening, immediately moved another 5° left in RA.

- Home Focus and Dec worked.
- Home RA did not move.
- Slew, track did not move.
- Manual paddle did not move.

This is now a trend. Why did it behave on last Saturday? Flawlessly!

We did discover a new critter living underneath the decking. It is larger than a vole, brought out a smaller version of itself, dropped it on the ground, ran away, then came back and got it again.

Methinks a light plastic hose is not enough. I will try to reroute wiring on the surface of the decking, between 2x4s.

Mark K: Because we had all kinds of people present prepared to work on it. Now that I am back in Gtown, of course it acts up. I will hopefully be back for the meeting and possibly the weekend before.

SATURDAY, MAY 2

Another 4 hours spent on Saturday with **Brian** determining that the Torus RA axis control got worse and worse and then failed completely.

We did a plethora of trouble-shooting, tested the RA limit switches (OK), pulled out the RA servo controller and discovered it was showing a fault status. One of 10–15 items could be causing that. Along with some intermittent software logged errors.

In the working days, when the telescope hit a limit switch you were still able to move it back in the other direction. No more.

The good news was, we got the new video finder tested and working. We looked at some clouds with the 135mm Pentax K mount lens with a PK to Cmount adapter and a Mallincam micro camera. Handy-AVI shows a nice image for alignment.

So, a little research showed that a new servo controller (not the problem we think!) runs US $1400. Wow. The most probable cause of failure now is an "enable" line is not working, and another broken cable somewhere in the link. Previous images showed everyone the bad state of wiring wrapped around the RA axis, pulled, split insulation and possibly some split wires. We worked on that area a bit last

Continues on page 4...

Regulus Needs You!

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

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

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Meeting Report: May 14

Various Members

Kevin: So, we had 25 people last night in MacCorry D209, a room rated for 24 people, but really only 15 around three sides of the table, and with narrow, close walls. Some thought it was too tight and too packed, so we are looking for an alternative for June's meeting.

Greg: It seemed the windows got in the way as a light source, save for the obvious need of ventilation. I would be partial for the larger room without windows if the building ventilation system were running (some places shut this kind of stuff down at the end of the 'day,' so late meetings get a bit stuffy). Still, that sort of environment seemed to facilitate more interaction than the usual lecture hall format.

Hank: Great meeting NO KIDDING! Some of you probably know I would say this: I dislike large rooms, although last night was a little cramped. But did you all notice how much more interactive we were? I know we have the potential for a lot more people, but until that happens and we have to drag in chairs against the wall, I would love to see us in a room for 25–50 people.

It was great to see a variety of observatory designs last night. It was also great to see new members /guests, one of whom is currently building a multi-mirror scope.

Kevin: Great meeting last night; I had a blast. I got home just after 22:30 and tried to go out to do some imaging. Unfortunately Jupiter was now behind our fully leafing maple tree and Saturn was still low in the gunk of the Kingston light dome. So I called it a night instead and went inside.★

Science Rendezvous in Kingston: May 9

Susan Gagnon

I WAS ABLE TO TEAM UP with Queen's U and Royal Military College for this event. We did not organize, just showed up; it was great. RMC had purchased an incredible number of star wheels and they spent a great deal of effort making sure that the 'how to' was covered.

I added our handouts to the RMC booth set up, and spent the day in the street with my solar scope. There were a total of four scopes set up with Queen's and RMC supplying the other three.

It was a very busy day, 5 hours minus a 20 minute break from Sun exposure. There were continuous line ups for all scopes and since two were Coronados, one Bader, and one 1000 Oaks, all were encouraged to sample all scopes as the views were very different... and most did take the time to do that.

As usual some adults had to be coaxed to look—I guess they seem to think that it is a day just for the kids. None were disappointed when they looked! The little kids seemed to prefer the big orange view of my scope as compared to the H-alpha: easier to see detail if it was the first time at an eyepiece I think.★

Meeting Report: June 11

Kim Hay

GREAT MEETING! There were lots of great topics, images of the moon from **Leslie**, M51 from the Torus using Brian's Starlight Xpress camera, of the work done this week with **Brian**, **Mark** and **Kevin**.

Rick talked about photometry and how you can submit data to the AAVSO for science; he also showed us a few pretty images with his camera. **Doug** showed us how to examine the pixel values in an image by extracting them into a spreadsheet. **Greg** gave us updates on his SkyPod that arrived on the Island. It's on location, so let the construction begin. **Susan** gave us updates on the land search: oh, the many levels of government! She also brought along some very good lemon squares. **Malcolm**, showed us some images from his new camera, which he had brought, and the images of the tornado rope that he saw.

We got home after 10:00 pm, and the Starfest Flyers were in the mail, as were the *Getting Started in Astronomy* booklets.

Kevin and I will be hosting a **BBQ** and tour/work party on the Torus on July 11th at 5:00 p.m, rain or shine. If you would like to bring along a small salad, or desert, that would be fantastic. We will be supplying hotdogs and hamburgers and juice, pop, water. If you would like to come, and don't know the directions, send us a note privately and we will send you a map.

Announcements: the dates of this summer's **Frontenac Dark Sky Nights** are on the website. The **RASC GA** is July 1–4th in Halifax. If you wish to go Register at rasc.ca. **Starfest** is August 11–16th, with the peak of the **Persieds**. **Fall'n'Stars** is Sept 11–13th: we will have forms at the BBQ.

Since we have no meetings in July or August, we hope to see you at the BBQ. If not, have a safe and happy summer, and as they say, see you in September. (Our next meeting is September 10th, hopefully back in Ellis Hall Room 324.)

Kevin: Thanks Rick for a great talk. You put a lot of work into that, exposed us to new AAVSO resources, and inspired me to try some variable observing again!★

weekend but there may be more.

One wonders what replacing the entire cable harness would be like? Oh well. This week is researching the wiring diagrams, and coming up with more ideas to troubleshoot.

Current status: not operational.

Brian: It turns out that we do have wiring diagrams.

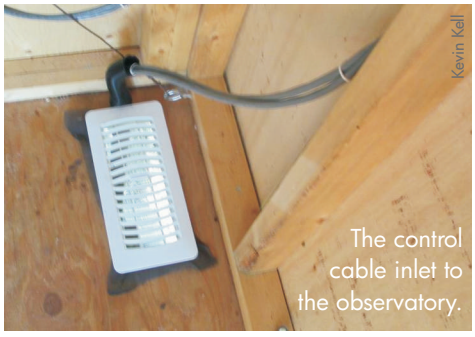
Mark K: I vote for re-wiring. I have a lot of the cables we will need in stock. We can tidy it up, streamline the connections and remove redundancies. At the same time, we can create a set of schematics.

If truth be told, I vote for a new modern mount with one etherbunny cable controlling the whole lot, or maybe a wireless hookup...

Sunday, May 24

The end project/goal was to work inside with both doors closed, to avoid the bugs. To do this, two screened windows were created in the doors. The airflow is very nice, you can see the telescope, you can hear people outside talking and, later on, be protected from the bugs.

The new south-facing screened windows.



The control cable inlet to the observatory.

The 110VAC electrical was rerouted as it now could now longer come through the closed doors. It was encased in a 1" slitted plastics conduit hose and run underneath the roll off building. It connects to a switched power bar at the right elbow of the telescope operator.

The control cables were similarly unplugged, encased and run underneath.

At the end of all that, we powered up the scope, ran through a Dec home sequence, then an RA home sequence...AND IT WORKED. We actually had not yet performed any of the troubleshooting steps to get the RA operational again. If you can say "intermittent fault" you are correct. These are the most frustrating of faults to solve.

After that we ran through at least 10 power cycles, in various positions, after replugging various connections, and it was all 100%.

We took the time to gross align the video finder system to the primary optics using a nearby tree. More fine tuning will require a smaller object farther away in the dark.

A couple attempts were made to see the Moon or Venus, but the cloud haze was too heavy. We packed it in around 14:30 with the next step being to attempt to image the next first clear evening (not tonight or Monday, at least).

The USB cabling still needs a little work as well. All in all it was a great Sunday, even with the 26–27C temperatures.

Susan: Surely a full day's work! It is frustrating when things fix themselves without providing any confidence that they are fixed for good, but you take what you can get.

Proposed new paint job for the shelter...

Monday, June 1

Lighting controls were rearranged slightly, putting the dimmer red lights on the same master switch as the telescope, video finder, powered USB hub, and the D-to-A video converter.

Wednesday, June 3

Brian, **Mark** and I spent three hours in the dark attempting to get the collimation more finely tuned. The mosquitoes were ferocious, the skies were poor, and the seeing was poor, but we think we made a little progress!

The new ventilated doors with screened windows also work well for seeing the scope, hearing the scope, hearing people outside working on the scope and keeping the bugs out.

The ZWO ASI 120MC camera does not do deep sky objects well at all; more and more I have to think of it as strictly a planetary imager.

In the end, after working on both secondary and primary mirrors, that we are starting to believe that something more extreme will be needed, possibly adjusting the mirror cell mount itself. Time will tell.

Saturday, June 6

Mark, **Brian** and myself spent another four hours Saturday night through the late evening running

Continues on page 8...

Observing Reports: May

Various Members

Sat/Sun, May 2/3

Malcolm (20:55): I'm out at Sandbanks looking at an amazing view of Mercury hope you get to take a look before its gone!
Mark K: Tanks! Grabbed a view.

Sun/Mon, May 3/4

Kevin: wow. nice meteors last night! north is up, west is right on these images from AllSky2, aka UWO #10 AllSky1 was completely wiped out by the full Flower Moon overnight... totally overexposed.

Wed/Thu, May 13/14

Kevin: No aurora seen last night.
We were out looking from around 21:00-22:00 EDT. I also did a Jupiter imaging session but got some setting on the FireCapture software wrong and all of Jupiters showed up with a B&W grid pattern. I think that was the lack of "debayering" checkbox.

Also imaged Saturn as it had just cleared the trees...wow...talk about turbulent air! You could see ripples rippling across the image.

I still have not started on the SCG Observatory renos. Hopefully this weekend, to gut the insides and rebuild.

Thu/Fri, May 7/8

Kevin: After catching up on a little TV, waiting for the black flies to die down, and seeing Montreal was losing yet another hockey game, we went outside around 21:00 EDT and did a little observing and imaging of Jupiter.

The LX200-GPS hand controller continues to have issues. Barely a minute into operations it locked up, requiring a power cycle and a 15 minute re-alignment. I am seriously looking at the StarPatch firmare upgrade this weekend; this third party software fixes a lot of issues and introduces some new features.

We did 7 imaging runs of 30 and 60 seconds over the course of 10 minutes. All turned out not too bad despite a low level of haze/high humidity. Sometimes planetary imaging turns out a little better when that happens—better contrast ?

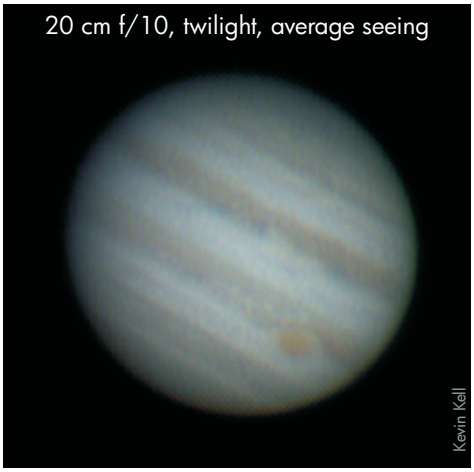
I would have loved to stay out all night but some sleep was needed for work. Eventually I will get a dusk-to-dawn time lapse every 5 or 10 minutes and put that together. It will be awesome!

Sat/Sun, May 16/17

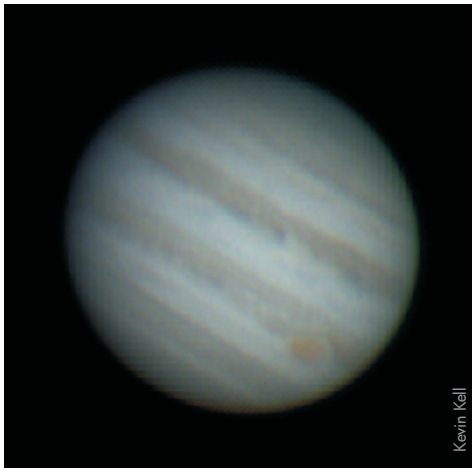
Walter: I headed up to the NYAA's Oak Heights site and got there before sunset. It was like old home week with the people I knew there! Malcolm was there and ran his cameras all night. I attended Andreas' evening tutorial on using their Remotely Accessible Telescope and then did a night of visual observing with my C8 and with the 12.5" White Scope (housed in the newest flip top observatory on site). I also got to see a Comet Siding Spring in Ursa Major and M3 in an 18" Dob with a bino-viewer. Very nice!

It wasn't the greatest night transparency-wise (especially just after twilight) but at least it was usable. There were a few gentle cool breezes later on so dew was just moderate. I was wearing my winter coat as the temperature dipped to around 10C. Only one mosquito was encountered all night. Bonus!

Sunday morning I went back to Oshawa to feed the cats and get caught up on sleep. Sunday night was looking like a carbon copy of



01:28UT: a 30 second exposure showing the Great Red Spot clearly near the South Equatorial Band to the right side. There are some interesting features in the North Equatorial Belt as well.



This is the last image, taken some 10 minutes later than the one at left. The GRS has moved noticeably. I have attempted to get some animated combinations but there is some glitch.

Observing Reports: May

Various Members

Saturday night—at best—and I was still exhausted so I gave Sunday night a pass.

Malcolm: Walter it was a nice surprise to see you! The sky seemed to improve as it got later but it was less than perfect. Good for a timelapse though. I caught a bright meteor at about 01:45 in the north west, Kevin any chance you recorded it too?

Kevin: We do overlap with UWO camera #12, but normally it would have to be to its east and to our west. There is nothing for 01:45 EDT Sunday the 17th. It was clear. AllSky1 is very old and it takes ~10s each image cycle to download, so we do miss events from time to time in the 10s/90s cycles.

It's been many years since we were last at Oak Heights. We may have to do a road trip later this summer.

Rick: The variability in mosquito coverage is quite interesting. Kevin can hardly stay outside, yet Walter sees only one. I was at Rob Dick's cottage doing some work with one of his new luminaires on both Saturday and last night. Got two mosquito bites in Rob's car Saturday evening and one last night while standing next to his observatory. Other than those, there were a few mosquitoes buzzing around my ears last night but they never landed. And we were standing out in a field near the bushes for a couple of hours both evenings. Last week I was out for a night's observing behind the house and again, no mosquitoes around my place. And, lest you think I am one of those lucky sods who just doesn't get bitten, I am absolutely the most attractive person in the world (to mosquitoes). I can be driven indoors with a couple dozen bites while everybody around me is unaware that there are any mosquitoes around.

Sun/Mon, May 17/18

Kevin: The first night in a while we were home in time but not too late before Jupiter went in behind the trees, Sunday evening the 17th around 21:20 EDT. There was cloud but the primary point was to check out the software and see why the last run was in monochrome and had hatch patterns on it.

Again this is the 20cm LX200 with ASI 120MC camera, FireCapture using 5–7 ms exposures over the course of 60–120 seconds (I varied the runs, with a moon (Europa) and its shadow on the cloud tops. "Debayer" was checked ON, and FlipX was on so the orientation should be correct.

I was outside in full bug jacket, gloves, long pants, etc. I had to zip open the hood to actually see and focus the image, as looking through the mesh gave me a headache.

20 minutes and inside to escape the black flies and mosquitos.

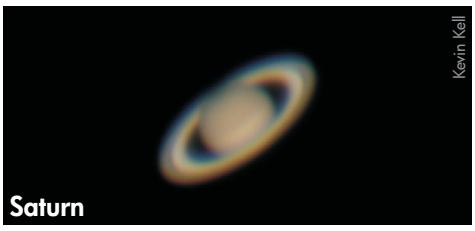
Fri/Sat, May 22/23

Kevin: This week has been one of a week long catch up of yard chores and gardening. Friday was a 7-hour session of renovating the SCG Observatory. We emptied it of all movable stuff, stripped down the inside of all and started fresh. A new 6'x2' work surface on the northeast wall, the old 4'x1.5' moved to the south west wall, new shelving and more. Work flow is much better and we even went out and used it last night after it cleared up and the wind died down a bit.

Jupiter, Luna and Venus were all behind the yard tree around 22:00, so Saturn was the only available target for imaging. It is still very low on the horizon over Kingston (still can't stay up until transit around 01:00). There was heavy frost overnight with a low temperature of –5.4C.

Walter: I went up to Oak Heights and had a great night. Transparency was good and the wind died down early on. Things started out dry then got just a little dewey and finally become lightly frosty as the temperature dropped to freezing. Needless to say, there were zero mosquitoes.

The Moon added to a very nice skyscape in the west along with Capella, Castor, Pollux, Venus, Jupiter, and Procyon. Andreas fired up the remote scope and after a couple of minor glitches the system eventually ran for several hours unattended (right through dawn with calibration frames taken at the end). It was a thing of beauty. As Andreas noted, "when it works, it really works." CCD targets for the night were M81+82 and M13 in LRGB.



Observing Reports: May

Various Members

After the Moon set, I spent the rest of the night doing visual deep sky with my C8 and the club's 12.5" scope. It was fantastic to get a few hours with the riches in Scorpius and Sagittarius. I haven't done this in years!

Andromeda and Perseus were rising in twilight at the end of the night. It was very peaceful since the low temperatures silenced the normally very noisy frogs. The great thing about Oak Heights is that you can still look out over the rest of the valley and not see any lights. Hopefully it will stay that way for years to come. I slept in the cabin's sunroom and just after I laid down and closed my eyes, I heard the dome close. It was a fitting end to a very good night.

Kevin: Sounds like an amazing night, especially the no mosquito part! And an observatory on a hill—what a radical concept! Glad you got to be back in touch with your visual self.

Walter: Well, to be fair it is not the highest hill there. I've actually thought that the site should be called "Oak Depths." It is the neighbouring winery that is truly Oak Heights. (The winery is for sale if anyone is thinking of changing their life!) Still, the southern horizon is very low.

Mark K: Actually, the bowl effect, with the central plateau works very well. The site is well protected from light pollution, but still has a certain amount of both bug and fog protection. It is one of the best observing sites in central southern Ontario.

Oak Heights at 8 a.m. May 23rd. The flip-top observatory at left holds a 12.5" scope.

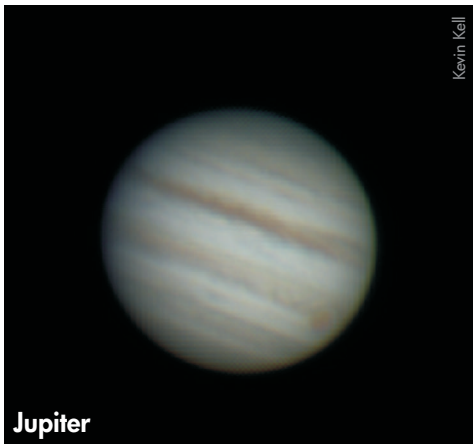
Susan: That sounds like a great night with a chance to snooze before getting back on the road. Perfect!

Walter: It is so nice not to have to drive back at the end of a session. Andreas was running a small heater in the sunroom and since nobody was using the chesterfield, I did (Andreas slept in the cabin proper). There were only five of us there. I thought the turnout would be larger but I guess it is the Friday Effect in operation.

Rick: I would like to get down to see this remote scope. Sounds cool. I'd probably like to incorporate some of their ideas into my new observatory/mount/telescope. And in Ottawa they're having problems with SMARTScope again—the dome motors burned out this time. It never ends.

Sat/Sun, May 23/24

Kevin: I went out into the newly renovated SCG Observatory last night, early enough to catch Jupiter before it went in behind the maple tree. Not bad! The seeing was better than normal, maybe "average" instead of "poor." The GRS is on the lower right and is just leaving the field of view. Some artefacts along the planet edges (don't zoom in too much!) but very nice nonetheless.



Jupiter

Walter: Despite a SW flow and some cirrus in Oshawa, I went back to Oak Heights and arrived at sunset. (CSC was predicting clear all night and this matched well with the satellite loop and forecast.) There were a good dozen people out this time.

Andreas ran another remote scope tutorial which was attended by six people. Since the Moon was up for a few hours I took this opportunity to sit in again and really get up to speed on the software interfaces. (They are using CCD Commander while I am an ACP guy.) Objects imaged (LRGB) included M101, 51, and 92. With the large FOV on this system you really need to find big objects to try to fill the chip. This is not a great time of year for big object availability. OTOH it is kind of neat to have a bunch of empty space around the object in the frame.

At moonset I went out and did some more visual. The winds didn't totally die down tonight (upside: no dew) and I had to secure the two halves of the flip top observatory to keep them stationary. The low temperature was +6C, warmer than Friday night but still cool enough that there were no mosquitoes. The

L&A DARK SKY AREA

Mike Watson on RASCals, May 25th

This past week and a half has been a frustrating one. First, around New Moon I went to try out the Lennox-Addington Dark Sky Viewing Area. The sky conditions turned out not to be great, but what surprised me was the amount of light in the south from Napanee and in the southeast from Kingston. The sky there is actually brighter than at Torrance Barrens. It also has the disadvantage of being just metres from the OUTSIDE rising curve of a regional road, so headlights from oncoming cars hit you squarely in your formerly-dark-adapted eyes, at least in the spring before all the screening leaves are on the trees. What also surprised me was a tall tree standing due south of the observing pad; I can imagine it bisecting Scorpius and Sagittarius later in the summer...

...Observing Reports: May

Various Members

transparency was not great (though it did improve slightly around 02:00) and the seeing was atrocious. I visited the Coathanger, M71, 57, 56 and 29 as well as Albireo and the Veil Nebula (both 6960 and 6992-5) and did some sweeping through Cygnus, all with the 12.5" scope.

To finish off, I lay down on the bench by the observatory and watched the sky. Initially I was lying with my feet to the N but the constellations were upside down, so I switched 180° and continued on. No meteors appeared during my short watch. There was no sign of aurora either.

The sunroom chesterfield was available again, so I slept there for a few hours before packing up and heading back to Oshawa.

Rick: Sounds like a great session Walter. Isn't it great with no mosquitoes? I was out with the Ottawa Centre council at our FLO observatory Thursday night and there were more but still not bad. We also spent the afternoon today touring one of the trails at Queen's Elbow Lake facility and, where last year there were thousands of mosquitoes, this afternoon I got one bite.

I too was out last night, imaging Z CVn with the 90mm refractor and looking at the Moon with the 20cm dob. Unfortunately the Moon set behind the trees far too early (22:30) and I didn't get to see a lot of the things I was planning for. And the sky clouded over about 01:00. In fact, I thought I could hear extremely distant thunder so, instead of just covering the scope with a sheet (or with sheet and tarp if a little rain might be expected) I tore the whole thing down and put it all away in the shop. Based on the patterns in the omnipresent dust on the car this morning, we had the slightest of sprinkles. Time to build a roll-off or tip-off building for the small scope, in addition to the big observatory for the new scope.★

LED STREETLIGHTING

Rick Huziak on RASCals, May 26th

LED lamps are not inherently full cut off and many are very poorly shielded since the manufacturer's will argue that LEDs are directional, thus shielding is not always necessary. This is far from true, and many streetlights and area lights glare. However, depending on what the utility chooses, there can be good ones. Saskatoon and other places have LED streetlights in new neighbourhoods and they are pretty fine (except for the colour).

Often, due to ancient habits, the installers also tend to old-school toe-up the light 5-degrees or more since old glass drop lenses tended to sag poles over time, but new lights are lighter and do not sag poles, so the lights should be mounted level. They will likely be toed-up, and they will glare, so you may want to assure ahead of time they will be mounted flat...

...continued from page 8

...Torus Updates

various tests and collimating procedures on the Torus Telescope, after a three-hour run Wednesday night.

We removed the focuser spacer and the filter wheel, and remounted the focuser directly on the telescope in an attempt to minimize the potential problems and slop.

We started visually this evening instead of using cameras. We also tried out two laser collimators. The experience with the laser collimators suggested that the secondary convex mirror was pretty good and that it took a lot to make a noticeable change in the defocused image of a bright star (Arcturus), and then a dimmer one (Castor) and others.

Moving the collimating screws by approximately half a turn moved the image right out of the field of view and required the telescope to move during this operation (a three-person job: one on the step ladder turning the screws, one at the eyepiece, one at the telescope controls).

We also then experimented adjusting the primary mirror and came across much the same results. In the end we believe the out of focus star pattern was better than before but not perfect.

We moved away from the laser collimators (we had used 2x and 3x barlow lenses to spread the beam so we could see it around the secondary mirror mount bolt, right on the mirror itself and then see the return spread beam on the primary mirror). We discovered one laser showed a bar, not a dot, and the other showed a D shape. More complexity had to be added to the testing and adjustments because of that. Eventually we got the return beam roughly circular around the primary mirror hole.

We took the time to look visually at M13, M57 and they were very good. Tracking was very good at high power (4000/26=153x) and at

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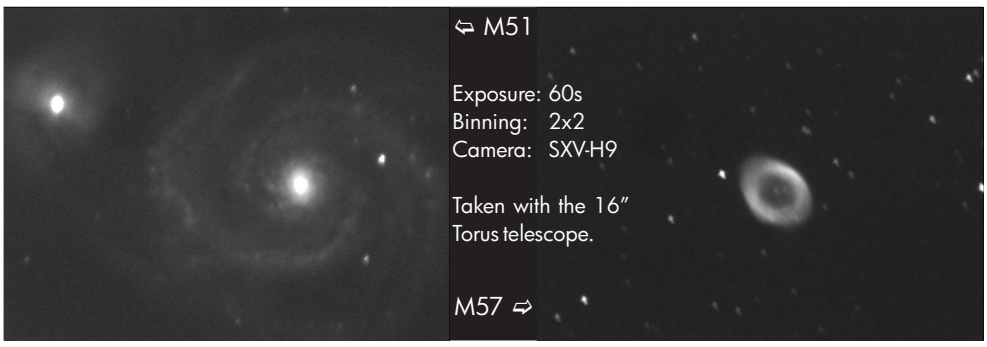


Huntsville Roundtable Meeting for Outdoor Lighting

Robert Dick, RASC-LPAC

EXTENDING NORTH AND WEST of the Torrance Barrens Dark Sky Preserve are three towns that mark the "axis" of the Muskoka District—Cottage Country for Southern Ontario. The Torrance Barrens DSP has been a catalyst for the popular demand to protect this part of Ontario from the proliferation of artificial outdoor lighting. All three towns: Huntsville, Bracebridge and Gravenhurst have policies that state the need to protect the dark skies of the region. However Huntsville would like to strengthen this protection and held a Roundtable discussion on April 17 about the future plans for lighting in the Town.

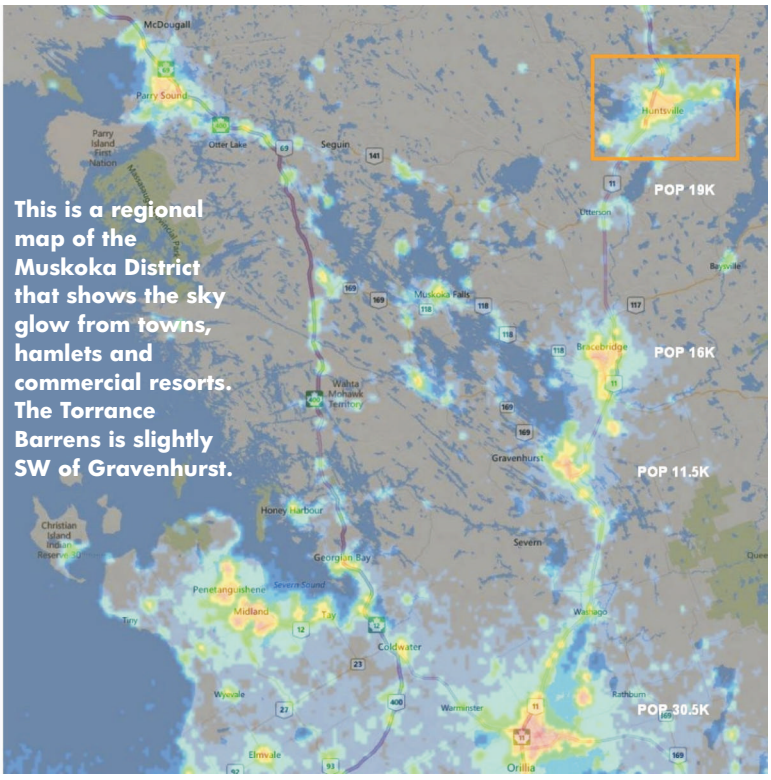
Huntsville is the largest of the towns with a population of 19,200 and sits at the junction Hwy 11—the highway from Toronto and Hwy 60, the road from Ottawa through Algonquin Park. (A wonderful 4-hour drive on a sunny day!) The Town of Huntsville has issued a Request for Proposal to replace all their street lights but there is a concern about the impact that existing and future lighting has and will have on the region. The pending replacement of good, bad, and ugly street lighting with white LED luminaires may exacerbate the glare and sky glow from the Town.

I was invited by the Senior Planner for the Town to attend the Roundtable discussion about the future of Huntsville's regulation of outdoor lighting and the development of a Lighting Policy or Bylaw. (They paid my travel expenses.) Although it was a short 1½-hour meeting, the diverse stakeholders at the table allowed everyone to voice their concerns about regulation, and how it should be fair for all. There were representatives from car dealerships, outdoor industrial areas, the police, commercial campground operations, private cottagers, a hi-end lighting design firm, Town Councillors and support staff—and me.

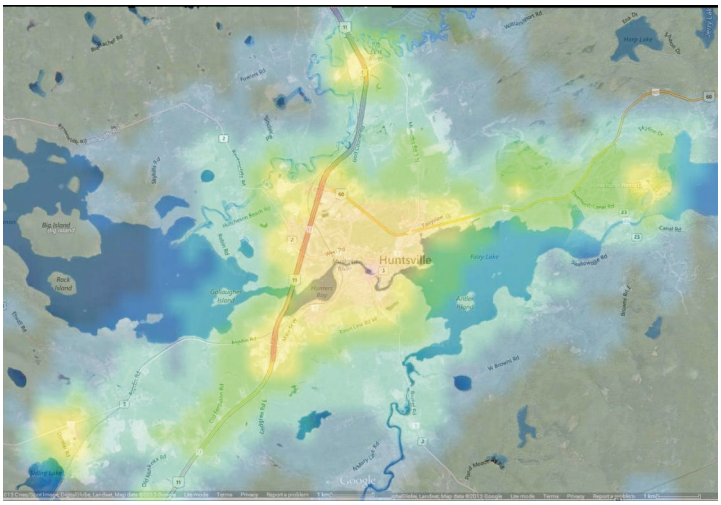
To help kick-start the short meeting, I arrived the previous evening with a carload of lighting equipment. I had invited staff, and politicians from all three towns to a secluded running tract near the centre of town that was shielded by hills and

Along Main Street in Huntsville, many of the merchants have installed low-glare and FCO lighting. However, the Town's present low-height, non-shielded, decorative streetlights undermine all the good the merchants have done.

The Forbe's Hill Rd road towards Lion's Lookout has modern white LED lighting that overwhelms the visibility provided by car headlights! The LED luminaires have the relatively standard flat-panel of LEDs but they are also tilted up— presumably to illuminate the vertical rock face beside the road (?).



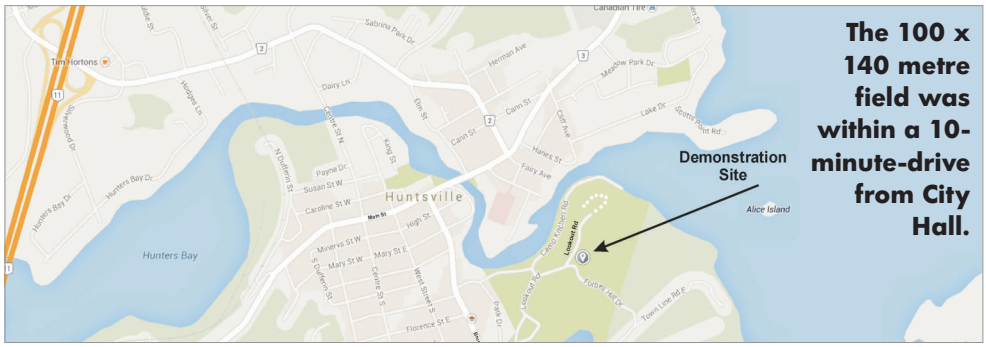
This is a regional map of the Muskoka District that shows the sky glow from towns, hamlets and commercial resorts. The Torrance Barrens is slightly SW of Gravenhurst.



The Huntsville map shows the urban core and the effect of current glare as the light shines across the fields and water to illuminated the distant hillsides. Cottagers on the shorelines see this as "in-your-face" urban pollution. LED luminaires will increase this impact because they have relatively poor shielding in "glare zone" just below he horizon —you will see bright white lights from the city across the water.

...Huntsville Roundtable Meeting for Outdoor Lighting

There is some unshielded commercial lighting along Main St., but I got the impression this was unusual. A very simple home-made shield would fix this problem. However the concept of "do-it-yourself" does not seem to be in peoples' minds—I was told, "they weren't engineers." This is a common comment as our society evolves towards buying things rather than building them.



trees from eye-shot of any artificial light. (Thanks to recommendations from the City Planner, and Google Maps).

I had hoped to show what could be seen in the sky, even from within an urban area, as long as there was no glare. Tragically, the sky clouded up an hour before the arranged time and began to sprinkle rain. However six of the ten invited people braved the damp and arrived on time at 9 p.m. No one from Gravenhurst arrived.

I set up two different LED lights that showed the visual impact white light and the low-impact amber to demonstrate what is called "colour temperature." I also demonstrated a simple set of lights for illuminating a pathway or staircase that produces no glare or light trespass off the path AND draws only 1/10-watt. I would have taken pictures, but it had started to rain!

I mounted the larger demo-fixture (a streetlight) 4.6 m high (the length of my pole) and lit an area of about 7x15m (4x the area of the building's footprint) to 3-lux with about 7-watts. It uses low-impact amber LEDs with, not just Full Cut-Off shielding—but Sharp Cut-Off! FCO fixtures still allow 10% of their light into "glare zone" just below the horizon, whereas ShCO allows less than 1%. Stepping outside the illuminated area, a Councillor reported that he could not see the LEDs—someone in a house would not know the light was on even though the street would be illuminated.

My goal with the demonstration was to give some of those attending the Roundtable the visual experience of the technical jargon that was bound to be presented at the meeting, and to demonstrate what can be achieved with the LED technology, and what they could hope to achieve if they did NOT take the route of least resistance and settle for "big-city" lighting.

It was very helpful to have those in attendance "understand" how shielding and colour temperature affect visibility. Ironically, it was a good to have the "terrible" lighting on the road towards the demonstration site. I encourage those planning to take part in similar meetings in their towns to take advantage of demonstrations and local LP maps to put the discussions into a vivid context. Huntsville suggested there might be follow-up meetings in the future and I hope to be there.★

The short Roundtable Meeting brought ideas and concerns from a wide range of stakeholders to hear their concerns. A comment from the Lighting design firm was to NOT take advice from the luminaire salesmen. Rather know what affect you want and ask for third-party recommendations. Although he represented a design firm, it is one of the "better ones."

...Torus Updates

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(4000/15=267x) with Meade Super-Plössl eyepieces. We looked at double stars to determine angular resolution and it was good: about 2 arc seconds. Venus, Jupiter and Saturn could not be focused very well at all. Poor seeing was a large part of this, but not all.

We will be swapping out the 135mm f/2.5 video finder lens with a 50mm f/1.2, to get a wider field of view and more magnitudes. It worked very well last night as is.

In the end, we are confident that we are *mostly* collimated. There can be more work done but we run into diminishing returns. That leaves the problem of a lack of sharp focus. We come up with these possibilities: mirror issues: primary figure or polish or both. Secondary less so. We are going to find out how this can be tested on site if at all possible and look at refiguring/repolishing options as well.

Failing all of that, we can attempt to use it for other non planetary imaging targets.★