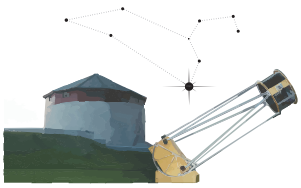
February 2012

# Regulus

RASC Kingston Centre




Comet Lovejoy is visible near Earth's horizon in this nighttime image photographed by NASA astronaut Dan Burbank, Expedition 30 commander, onboard the International Space Station on December 22, 2011.

## Upcoming Meetings

### Saturday, January 14, 2011

**Regular Meeting** 6:00 p.m.
James Silvester spoke on:
*New analysis of stellar magnetic fields, rotational velocities and the distribution of rare elements*
**KAON** 7:30 p.m.
Joel Roediger spoke on:
*Pioneering the Exploration of the Universe with Space Probes*

### Saturday, February 11, 2012

**Regular Meeting** 6:00 p.m.
**KAON** 7:30 p.m.
Prof. Larry Woodrow (Queen's) will speak on: *Bars, Spirals, Haloes, and PAndAS: Galactic Dynamics in the Nearby Universe*

### Saturday, March 10, 2012

**Regular Meeting** 6:00 p.m.
**KAON** 7:30 p.m.

Meetings are held in Room 324 at Ellis Hall on University Avenue at Queen's University in Kingston, Ontario. Our meetings are co-sponsored by the Queen's Physics Department and are open to the public. KAON (Kingston Astronomy Outreach Network) sessions are held at Queen's Observatory on the 4th floor of Ellis Hall.

## In this issue:



## Reports & Other Items

**From Kingston Centre, the RASC, and Beyond...**

### Sat Man Strikes Again

Congratulations to **Kevin Fetter**, who secured video footage of the ailing *Phobos-Grunt* spacecraft, before it burned up in the Earth's atmosphere.

### RASC Website News

Within a few hours of the announcement that the February *JRASC* was available, the society's website had 465 members logged in. The new site is very popular with members!

### KC Facebook Page

The Centre's facebook page is continuing to do well. **Kim Hay** has now been added as an administrator to take its activities to the next level. Thanks Kim!

### AAVSO Offers CHOICE!

Starting March 1 the AAVSO will offer month-long, low-cost, online courses geared to the beginner, through its *Carolyn Hurless Online Institute for Continuing Education* in Astronomy. Read more at:
aavso.org/choice-astronomy

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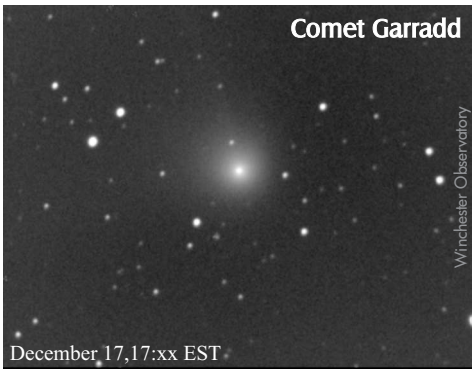
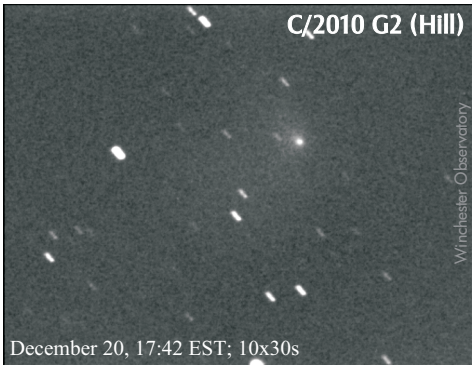
# ...Reports & Other Items

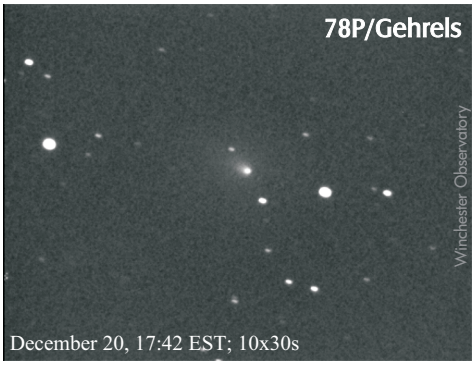
...continued from front page

## Comets in December

Comet Garradd, at 7th magnitude, was the brightest of the current crop.



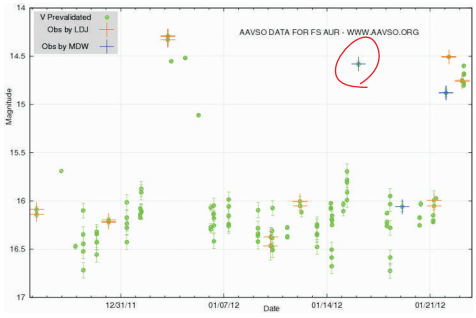




## The Antics of FS Aurigae

*Your editor reports*: January 24th was just a normal day at Winchester Observatory. The scope was snuggled in the dome awaiting the next clear night and the variable star photometry was all done and submitted to the AAVSO. Then an email arrived from Dave Lane (LDJ). He is part of a group working on FS Aur and the group was curious about my latest observation (circled in the light curve below).

It turns out that FS is a very active star and I just happened to catch a mini-outburst on the night of January 15/16. The team figures it is part of "another instance of the mini double short incidence outburst, that we observed in the previous season." It is so cool to think I may have been the only one to catch this! You can read about the FS Aur story here: itelescope.net/aartscope-t11/2011/12/4/fs-aur-weird-and-weirder.html ★




# 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:

walter2 (at)
starlightccd (dot) com

or:

Walter MacDonald
PO Box 142
Winchester ON K0C 2K0

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# Meeting/KAON Reports: 2011 December 10

**Susan Gagnon**

THE DECEMBER MEETING was held in the warm-room of the observatory thanks to **Nathalie Oullette**, the Observatory Coordinator. Our 3rd floor room was taken over for exams and therefore unavailable. All but one face in the audience were well-known regulars. Our visitor turned out to be a transplant from Halifax where he had been a member years ago. We had the usual survey of executive present, a veritable *tour de force* as we had had an executive meeting just before hand. The topic for the evening was getting started in the study of variable stars. I began with a variable-observer-wanna-be vision and **Kim** helped out with some practical experience.

WHY OBSERVE VARIABLE STARS?

Because observing variable stars is dependent on a comparison of magnitude with a pair of stable stars in the same field, observing conditions can be quite variable themselves and with practice, not interfere with the results. A careful selection of stars to observe on a regular basis will give observing targets for all seasons. It can be a great warm-up activity for an extended observing session in that you are still getting adapted to the darkness. It may be the only thing you plan to observe, but it gets you out. It can be done with naked eye, binocular, or telescope. You can participate in a major observing endeavour. Variable stars need to be systematically observed over decades in order to determine their long-term behavior. The evolution of stars and their internal workings are revealed through these cycles. The AAVSO is the repository of decades of data collected by amateur observers. All of the classifications discussed and much more info is listed in the *Observer's Handbook*. We looked at a couple of AAVSO charts and the scales that are available. The charts are listed A to G with the A chart having the widest field of view. The AAVSO also gives details on how to read their charts. They also have a training program called *Citizen Sky* that can get you started. We ended the meeting and made way for Nathalie to set up, and many of us stayed to visit and/or man the scopes on the deck.

KAON SESSION

After some unexpected snow and cloud north of Kingston in the afternoon, the skies did clear for the **K**ingston **A**stronomy **O**utreach **N**etwork open house at the Queen's University Ellis Hall Observatory Saturday night.

The session started with a talk. Ms. **Gwendolyn Eadie** from Queen's University on the topic of "The Winter Hexagon" at 7:30 p.m. It was a full house in the warm (cold) room as there were exams in the regular room in Ellis 324 downstairs. The observatory scope is still out of commission and I don't think there were tours inside the dome at all. We had an estimated 80 people out on the deck with Queen's 20cm LX-200 scope, **Susan Gagnon**'s scope, Queen's Questar, and the centre's 20cm Fitzgerald Telescope.

The observing targets for the night were the full moon and Jupiter. Jupiter was a prize, being high in the southern sky with Ganymede, Io, Callisto on one side and Europa on the other side. We packed it in around 9 p.m. It was cold out and we had to go in to warm up occasionally. It was another good night. Manning scopes from the centre were: **Susan Gagnon**, **Kim Hay**, and **Kevin Kell**. Many other members stuck around to chat with folks as well. We also donated a 2012 RASC *Observer's Calendar* to the observatory.★

# Getting Started in Variable Stars

**Walter MacDonald**

Not surprisingly (it is their specialty after all) the AAVSO has great resources for getting started in variable star observing:

THINGS TO DO
aavso.org/get-involved

ONLINE FORUM
FOR HELP AND ADVICE
aavso.org/forums/getting-started-aavso
An e-mail list you can use to talk to AAVSOers and tap into their knowledge and expertise.

STAR TUTORIALS
aavso.org/tutorials
There is one tutorial for observing, or if you prefer armchair Astronomy, one for data analysis.

VISUAL OBSERVING MANUAL
aavso.org/visual-observing-manual
Full of info and tips on observing, and available in ten languages!

CHAT ROOM
aavso.org/chat
Talk to AAVSOers in real time! This is probably the greatest AAVSO resource. It is text-based and can run in a web browser, so no special software is required; a great place to ask questions and get immediate answers!★

Stars are the flowers of the Universe, flowers are the stars of the Earth.
*–Janet Mattei*

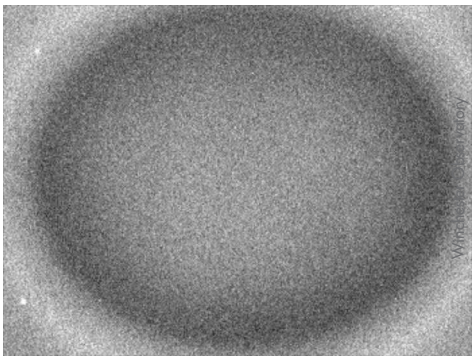
Never sleep more than 90 feet from your telescope.
*–Clinton B. Ford*

# Observing Reports: December-January

Various Members

### Wed/Thu, December 11/12

**Walter:** The image below shows what happens when I don't heat the camera periodically for several hours in order to keep moisture out of its CCD chamber! The glass was perfectly clear except for a round spot directly over the CCD chip (where cooling is applied). D'oh! So, a lost night and a lesson learned (again!).



### Mon/Tue, December 12/13

**Kevin Kell** *produced a movie showing Jupiter's rotation over a 3-hour period which was featured in the January issue of the RASC* Bulletin.

### Wed, December 14

**Hank**: Last night Di called to me, "Hank, Hank, come quick!" I rose from my bed to see what was the matter and why Di was making all of that clatter, when what to my wandering eyes should appear? A report on CKWS news from the Starlight Cascade Observatory/ RASC-KC with regard to the recent fireball! [Dec 12, ~18:04 EST] Way to go Kim & Kevin!

Apparently it was the news that contacted RASC-KC, WOW!!!! Someone knows we are out here! I think a lot more know now and they are all rushing to buy telescopes for Christmas, they should have come to the RASC-KC seminar on how to buy a telescope.

### Sat/Sun, December 17/18

**Walter**: It was clear almost the entire night—cloud started to move in around 05:55 just as the observatory was doing the last handful of variables (over 12h into the run). As I was closing up the dome at dawn, Mercury was easily visible low in the SE.

### Tue/Wed, December 20/21

**Walter**: CSC said it would be clear until 3 a.m., but cloud moved in early around midnight.

### Thu, December 22

**Hank**: The images of Comet Lovejoy are nauseatingly beautiful!!!! The northern hemisphere got burned again. That is it. I must move south!!!!

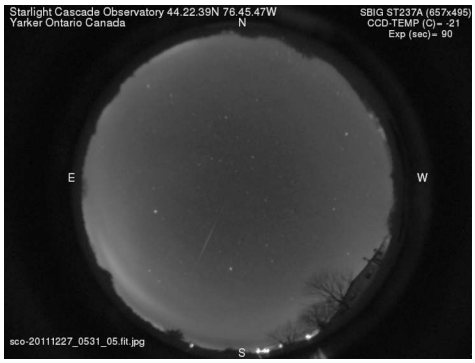
*As* **Ken Kingdon** *had pointed out, Comet Lovejoy put on a great show in the SOHO LASCO C3 camera as it passed through perihelion. Incredibly, the comet survived a very close passage to the Sun and its nucleus was even photographed in the daytime!*

### Mon/Tue December 26/27

**Kevin K**: At least I think this is a nice meteor just before 05:31 this morning. Mars is the bright object in the south, Arcturus the bright star in the east. Saturn (left) and Spica (right) are the two brighter objects low in the southeast.

First I checked for Iridium flares but they typically do not have that long of a trail/train. No Iridium flares this morning in any event.

### Fri/Sat, January 3/4
### Quadrantid Meteors





**Rose-Marie**: If you missed it last night, you didn't miss anything. I set my alarm for 1:00 a.m. after reading reports that the peak was to be at 2:00–2:30 a.m. I smacked the snooze button once, then dragged myself out of my nice warm bed, bundled up in layers of clothes, boots, hats, and mitts and went out at 1:26 a.m. to see what was brewing. Clouds is what was brewing, high thin clouds coming in from the west. I stood in the driveway for a half hour, only saw 4 piddle little *pfffft!* meteors, while some idiot in an oversized pickup truck and loud muffler went roaring around the neighbourhood, followed a few minutes later by sirens from the fire trucks in the station just up the road. Entertainment to pass the time and startling effect to keep one awake.

Toes and cheeks were getting cold around 2:00 a.m., so in I went to stoke up the woodstove and warm up a bit. Went back out, saw one more *pfft* and then one moderately bright meteor streak up the length of Ursa Major, this got me all excited so out came the tripod and camera. Now, if you want to put an instantaneous halt

continues on page 8...

## Some Notes On Celestial Photography

*Read by Mr. G.E. Lumsden at the meeting of 1895 November 12, and followed by "an exhibition of astronomical photographs, projected on the screen."*

...1839...the French astronomer **Arago**...expressed the opinion that it would yet be possible "to make the Sun and Moon record their own features by photography."

By 1840, **Draper** had succeeded in taking a picture of the Moon...Of course, in his day the difficulty was vastly greater, because the exposures were very long. To-day, the Moon may be photographed in a fraction of a second. In Draper's day the exposures lasted twenty minutes. The pictures were also very small, being only an inch in diameter, though taken with a photographic lens of five inches' aperture, armed with an eye-piece to increase the magnifying power. That Draper was far in advance of most of his fellows, was proved by the exhibition before you two years ago of a copy of the first portrait of a human face taken by sunlight. The subject of the picture was **Miss Draper**, the Professor's sister, who sat as still as she could before the camera for ninety seconds. The exposure was made on the roof of a flat building so as to get the full benefit of the sunshine, and Miss Draper's face was dusted over with white powder in order that, in impressing the sensitive plate, the Sun should be assisted in every way possible.

...On the 17th of July, 1850, **Bond**, at Harvard, assisted by **Whipple**, took the first known daguerreotype of a star. The subject chosen was Vega, a brilliant bluish-white star in Lyra. The time of exposure is not now known, but it is on record that Polaris, a star of the second magnitude, made no impression on the sensitized plate no matter how long an exposure was given, and that the bright, easily separated, yellowish-white, first magnitude, double star Castor, gave only an elongated image.

...**Bond**, who had persisted in his stellar work, succeeded in 1857 in photographing, in two seconds, Mizar, one of the components of Zeta Ursæ Majoris, and in eight seconds, Alcor, the other component which is green in colour. Both these intervals of two and of eight seconds respectively, are each fifty-three times as long as the periods now required to photograph the same stars with rapid dry-plates. **Lord Rosse** himself tried celestial photography with his six feet reflector, but his efforts, for want of a driving-clock, could not have been successful; at least no photographs taken by him were ever published.

...In 1858, Mr. Underwood exhibited what was claimed to be the first photograph of a comet, being that of **Donati**, taken in seven seconds with a small portrait-lens, which gave an image about one inch in length. In 1861, **De la Rue** disputed the accuracy of the claim, alleging that all of his own attempts to photograph the cornet of 1861, as well as that of Donati, had failed, though he had employed both a telescope and a portrait-lens, and had given exposures as long as fifteen minutes.

...In 1864, **Rutherford**, of Harvard, figured the first telescopic objective intended for photographic purposes, and with it succeeded in getting on his plates in three minutes impressions made by stars of the ninth magnitude. On the 11th of January, 1869, **Janssen** pointed out that it was possible to isolate any part of a spectrum by placing a second slit near the eye-piece...

...In 1872, **Draper** having made a 24-inch reflecting telescope, photographed the spectrum of Vega, "showing four strong lines."

...The year 1876 was made notable by **Huggins** who, after many experiments, announced his preference for dry-plates, which had been introduced in 1871, and, as a result, the use of the collodion process in astronomical photography was gradually relinquished. One decided advantage derived from the adoption of the dry-plate was the acquired ability on the part of the photographer to extend his exposures, necessarily short with the wet-plate process, to hours, and even to days, did the faintness of any given object require it.

...In 1883, **Dr. E. C. Pickering** designed a very ingenious star-camera for the purpose of making regular comparisons of star magnitudes. In 1884, the worthy **brothers Henry**, of Paris, while photographing the small stars in the ecliptic found upon their plates the trails of asteroids, and since then photography has been successfully resorted to as a means of discovering these minute planets, of which more than four hundred are now known to exist. In 1885...even succeeded in getting on their plates stars of the seventeenth magnitude—that is, stars which have never been seen by the human eye, though assisted by the most powerful telescopes of the age, thus incontestably proving the superiority of photography over visual work in some fields of research.

...There are in this city two equatorially mounted clock-driven refracting telescopes which can and have been employed for the purposes of astronomical photography of the more difficult kinds. But for the majority of our members such instruments of precision are beyond their reach. For this reason, some of the special pleasures associated with the art are denied to some of us, but,

## ...Blast From the Past

happily, this denial is not so sweeping that we must be deprived entirely of a share in this work. With any telescope howsoever mounted, very good photographs of the Sun and Moon may be taken, the requisite exposures being practically instantaneous...

...There is no reason why the pleasure of making instantaneous views of the Sun and Moon should not be participated in by scores instead of a dozen or so members of the Society. To this pleasure may be added the delight attaching to the development of one's plates and the printing of pictures from them. And now that facilities for making lantern-slides are within reach of any of us, there is still another pleasure to be derived from photography, namely, the exhibition of slides.

...For the Moon, the most popular object for the amateur, one authority recommends that the photographs be taken in the principal focus of the telescope and be enlarged, though he cautions the astronomer that the grains of silver in the films, fine as they are, are still sufficiently coarse to give trouble on enlargement.

...Speaking of the performance of this [36" Lick] telescope on the Moon, it is interesting to know that, when observing [visually] under favourable conditions, the view is "sublimity itself." Under exceptional aspects when the highest powers may be used, the lunar scenery is fascinating in the extreme. "You seem," **Barnard** says, "to be suspended only a short distance above the mouths of the stupendous craters. The dreadful feeling forces itself unconsciously upon you that you may at any moment lose your hold on Earth and be dashed to pieces within their yawning cavernous depths." These realistic effects can-not as yet be brought out in the photographic plate, but the future may have surprises for us even here. ★

## Donations to the Kingston Centre

**Kevin Kell**

THE RASC KINGSTON CENTRE is a registered Canadian charity (#827905720RR0001), able to receive donations and issue tax receipts. In the calendar year of 2011 (January 1–December 31) we received 8 donations totaling $360.

2011 tax receipts went in the mail on January 22nd, 2012 and you should receive them soon. (Tax receipts are based on the calendar year and depending on when you sent them in you may or may not receive one now—*i.e.* your donation was in December 2010 or January 2012).

We would like to publicly thank our donors for helping to further our efforts in promoting Astronomy in our local area.

All of these donations were either targeted for our Observatory Fund, or untargeted—in which case we put them into the Observatory Fund as well. (The Leading Edge donation went towards our outreach meeting as a gift certificate at the Kingston Library Meeting in October 2011.) Someday this will allow us to build our own Centre observatory and warm-room to house our library and equipment.

For more information, please see: kingston.rasc.ca/donations.php and cra-arc.gc.ca/charities/ ★

**DONORS FOR 2010/2011**
(2010 Oct. 1–2011 Sept. 30)
Year Total: $360

| | |
|---|---|
| **Tessa Clarke** | Kingston ON |
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Year-To-Date Total: $315

| | |
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*Thank You!*

## Meeting/KAON Reports: January 14

**Kevin Kell**

THE CENTRE'S JANUARY MEETING was on Saturday, January 14th, 2012. We started at 16:30 with dinner with our guest speaker at the Queen's Inn Pub on Brock street. It was not a busy time for the pub, so things went well.

We were at the meeting room of Ellis Hall 324 about 10 to 6, after stopping to put up some signs at the front door. Mr. **James Sylvester**, a Ph.D. candidate from Queens/RMC gave a short 40-minute talk on his thesis work "New analysis of stellar magnetic fields, rotational velocities and the distribution of rare elements."

About 15 people were in attendance, including at least one of our new members. We had Baader solar filter film available and sold some, as well as a couple of planispheres. There were very few observing reports due to cold weather and/or cloud. **Rose-Marie Burke**, **Steve Manders**, and **Doug Angle** were among those with short reports.

We adjourned to the KAON session starting at 7:30 where Mr. **Joel Roediger** from Queen's University talked on the topic of "Pioneering the Exploration of the Universe with Space Probes" to a crowd of approx 60 people.

The talk went on for over an hour, but most people still came up to the deck afterwards to observe Jupiter

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# Upgrading the SCO All-Sky Camera System

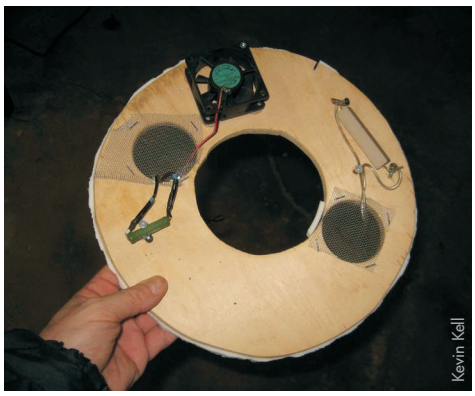
Kevin Kell

THE ALL-SKY CAMERA SYSTEM has been around in its current configuration for some years now, and we've been meaning to renovate it for some time now.

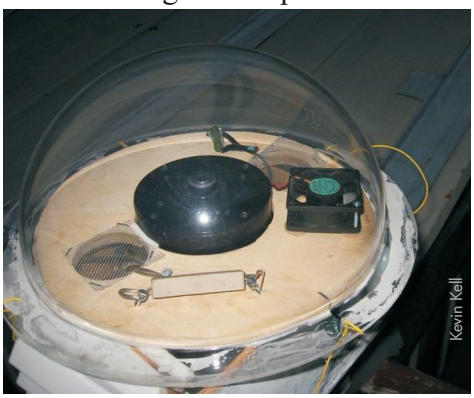

As seen in the image above, we've had water seep in and discolour the wood platform, the two resistive heaters were actually touching the wood surface and burning it, the 12Vdc circulation fan had stopped working, the dome was getting foggy in places, and there were a bunch of hornet, bees and flies inside the dome that we could not get out.

So on the weekend of December 5-6 we took it down and:

- replaced the dome,
- replaced the platform, and made many modifications.




- To counteract the water seepage we put the platform up inside the dome.
- The hole for the camera lens was enlarged to have the entire camera come up inside the dome. This would reduce the amount of air inside that needed to be heated, and reduce the surface area of the dome that is looked through and kept clean.




- The 12Vdc fan was replaced with a larger one, this time mounted inside the dome instead of underneath. Underneath it lost much of its airflow, and there was little if any circulation in the dome. Now, inside the dome, it will give good circulation to keep the condensation down.
- The two resistive heaters (24Vdc) were mounted off the surface of the wood 180 degrees apart, instead of being close together on one side before.
- The dome used to be sealed with silicone to the platform and there was no easy access inside.
- Now the dome is removable, as is the platform itself.
- The two platform vents are covered with mesh to stop bugs from getting in.

The net benefits from all of this work: fewer bugs inside the dome, less condensation and fog inside the dome, faster melting of ice and snow on the dome, better cooling efficiencies of the Peltier-cooled CCD camera, easier maintenance in the future.

And that is the final assembly for now, with some more minor revisions in the near future, including the replacement of the blocking band around the bottom of the dome to block out local low-elevation light sources, RainX on the dome surface.

DISCUSSION

**Hank**: That is quite the overhaul and your changes all seem well-thought and should make quite a difference. I envy you your dedication to these projects and enjoy the pics that you send out. I was thinking it was kind of strange to be heating while cooling, but then of course the heat will rise to the dome and the cooling within the camera should stay basically there, should it not? We look forward to the next bolide image.

**Kevin K**: Yes, the camera cooling system pushes out the bottom of the camera into the housing, which has had new vents put in to allow that heat to more easily escape, and/or rise up into the dome. We noted the efficiency of the cooling dropped within an hour of startup from about 30C to maybe 20C and thought it was from the housing heating up from air that could not escape the system.

We're starting up research on the next generation system here with an eye to creating a small network of cameras in eastern Ontario to fill the hole in Canada-wide coverage as seen here: allsky.ca/NAdatabase.html. ★

This image, taken from the ISS, shows most of southern Ontario and its light pollution quite nicely. The Golden Horseshoe is at bottom (right of centre) and Ottawa and Montreal are quite conspicuous just below centre at right.
The Earth's atmosphere is visible as a nice arc along with some green aurora. Part of ISS is visible at top centre.

## ...Observing Reports: Dec.-Jan.

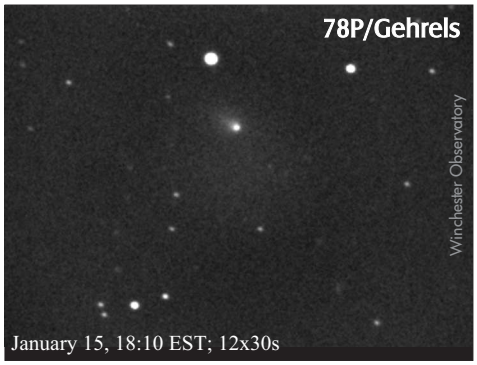
...continued from page 4

to any meteor shower, just have me point a camera lens at it. Between 2:30 and 2:50 I took about 30 shots: nada, zip, zilch. Only the brightest of meteors would have shown up with the layer of thin clouds and moonlight. Seeing the moon was about to set between bands of clouds I took a couple of "artistic" shots. By 3:08 the –16C temp had its effect on both me and camera, I figured that was enough and headed back inside, crawled back into my nice warm bed.

Here's a shot of the sky, tweaked just a bit to show the thin clouds. Do we get points for trying?


**David Levy**: I observed the Quadrantids, one of my favourite showers. I counted 76 meteors in just under two hours of observation from moonset to dawn on the morning of January 4th.★

**Rose-Marie Burke**'s *moon pillar montage of Jan. 8 was featured in the February issue of the RASC* Bulletin.




## ...Meeting Report

...continued from page 6

and the Great Orion Nebula in the Centre's 20cm Fitzgerald telescope, the Queen's 20cm LX-200, and Susan's 9cm(?) scope. It was COLD and hazy with poor seeing conditions and transparency. We finished up at 9 p.m., packed up and went in to warm up. Thanks to **Doug Angle** and **Paul Winkler** for sticking around and helping chat people up outside on the deck, as well as **Kim** and **Susan**.

**Natalie** (Queen's Observatory Coordinator) opened up the dome for public tours but the scope itself is still not functional. **James Sylvester** and **Terry Bridges** were on hand outside on the deck as well.

Here's hoping that February will be warmer!★

THERE IS MORE on observing on page two: comet images, and a brief report on the variable star FS Aurigae.

## Secretary's Report 2011

**Steve Hart**

WE CURRENTLY HAVE a total of 76 society members: 61 regular members, 1 youth member, 7 life members, 5 associate members, and 2 affiliate members.

For the first half of the year, meetings were held on the second Friday of the month in Stirling Hall, Queen's University. In the fall, we moved to the second Saturday of the month in Ellis Hall, Queen's University. The October meeting was held at the Kingston Public Library, Central Branch.

JANUARY 14: Member's Night and 50th Anniversary Celebration.
FEBRUARY 11: Professor Larry Widrow "The Tangled Past of the Andromeda and Triangulum Galaxies"
MARCH 11: "All About Meteorites"
APRIL 8: Larry Hum "Total Solar Eclipse Trip to China in 2008"
SEPTEMBER 10: Member's Night featuring short presentations by Brian Hunter, Kevin Kell.
October 22: Brian Hunter "Telescope Seminar"
October 22: 50th Anniversary Banquet; Patrice Scattolin "Space Exploration From The Ground Up: With Reality And Fiction"
November 12: Annual General Meeting; Doug Angle "New Mexico Skies"
December 10: Member's Night with short presentations by Susan Gagnon, Kim Hay, and Kevin Kell, all relating to Variable Star Observing.

Kingston Centre members gave presentations at several area schools, local clubs, and offered public observing at the Charleston Lake Star Party. As well, a judge and a prize was contributed to the area Science Fair.

Public observing sessions were held at the Queen's University Observatory, in partnership with the Queen's University Physics Department.

The Fall 'N' Stars 2011 star party, hosted jointly with the RASC Belleville Centre, was once again a great experience for all who attended.

**2012 EXECUTIVE**

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|---|---|
| President: | Susan Gagnon |
| Vice-President: | Kim Hay |
| Secretary: | Steve Hart |
| Treasurer: | Kevin Kell |
| National Rep.: | Brian Hunter |
| Librarian: | David Maguire |
| Newsletter Editor: | Walter MacDonald |

Respectfully submitted,
Steve Hart
Secretary, RASC-Kingston Centre★