# Nova Notes

The Newsletter of the Halifax Centre of the Royal Astronomical Society of Canada

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## In this issue:



## From the editor

*Quinn Smith*

Welcome to 2009 and the International Year of Astronomy. Welcome as well to our new executive and in particular to new members Andrea Misner, Chris Young, Robert Bussieres and Sean Dzafovic. You will notice that we are still short one member, second Vice President, so if you feel like getting involved in organising your Centre, here is an opportunity.

When I took on the job of Nova Notes editor in 2007, I thought I would be in the role for a year, maybe two. Well here I am starting year three and I'm still enjoying it. I get to work at my own pace and, as Dave Chapman (who proof reads the editions for me) will testify, my spelling has improved (slightly!). If you would like to contribute to Nova Notes please feel free to send me an article. It does not have to be "professional". What I am looking for is interesting astronomical information, that you would like to share with your fellow members.

I hope you all enjoy reading Nova Notes, and please feel free to make comments and suggestions. It is after all, your Newsletter.

# Meeting Announcements

**Meetings begin at 8:00 p.m.**

Meetings are held every third Friday of the month, except for the months of July and August, when there are no meetings.

Meetings take place in room SB 260, Sobey Building (#2 on map) at Saint Mary's University.

All members—but especially new ones—are invited to come to the meetings 20 – 30 minutes early to participate in our new informal "Meet and Greet". It's a chance to ask questions about astronomy, the RASC, memberships, or to just say hello.

Executive meetings begin at 7:00 p.m. in room SB152, and all members are welcome to attend.

**Note that the meeting room for February (only) is SB 255**

**February 20th, 2009 - Speakers night**
This month, former Haligonian science writer Dan Falk will give a talk on the subject of his latest book "In Search of Time"

**March 20th, 2009 - Regular meeting**
Our regular monthly meeting. This month RASC members will describe their "Galileo Moments" Room SB 260

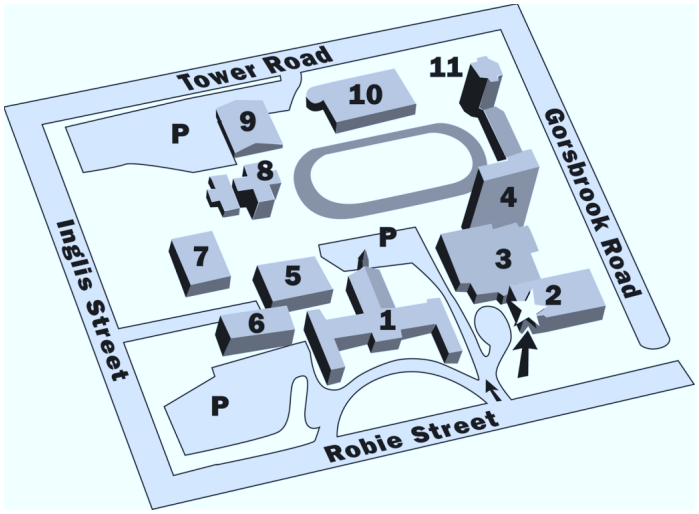
**April 17th, 2009 - Speakers night**
The topic for the April talk is yet to be decided. Stay tuned. Regular room SB 260

[The content of all meetings is subject to change]

# Meeting Location:

1. McNally
2. **Sobey Building**
3. Loyola Academic Complex
4. Loyola Residence
5. Patrick Power Library
6. Science Building
7. Burke Building
8. Bookstore
9. Alumni Arena
10. The Tower
11. Rice

P Parking




# Halifax RASC Executive, 2009:

| | | |
|---|---|---|
| Honorary President | Dr. Roy Bishop | 902 542 3992 |
| President | Andrea Misner | 877-6723 |
| 1st vice-president | Wes Howie | 252-9453 |
| 2nd vice-president | | |
| Secretary | Chris Young | 466-0489 |
| Treasurer | Pat Kelly | 472-2322 |
| Nova Notes Editor | Quinn Smith | 852 3894 |
| National Rep. | Pat Kelly | 472-2322 |
| Librarian | Robert Bussieres | |
| Observing Chair | John Liddard | 902 865 7607 |
| Councilor | Paul Heath | 457 0610 |
| Councilor | Sean Dzafovic | 430 9062 |

## Members' Astro Photographs

### Planets and Young Moons

Jeff Donaldson: Eyepiece view of 17 hour old Moon

Dr Roy Bishop: Crescent Moon plus Jupiter and Mercury (Venus is out of the picture above the moon)

Dr Roy Bishop: 19 hour 50 minute Moon taken on April 6th 2008 at 23.45 UT
300mm, for 1.5 seconds at f/6.7 (1 stop under exposed) Canon XTi camera

## 2008 President's Report

### Paul Evans

**General**
The membership numbers of the Centre have been fairly stable over the last couple of years, holding at about 170 members. Please remember to renew your membership if you have not already done so. The Centre continues to operate well and is an important institution within the amateur astronomy community.

**Our Meetings**
We've attempted to have a mix of meeting formats with the goal of alternating meetings made up of several short talks with those with a main speaker. This varied approach seems to work well. In May we had a 'Beginner's Night' that was a well received event, and one I believe we will repeat in the future. Thank you to Saint Mary's University for their continued sponsorship by hosting our meetings.

Our meetings for 2008 included:

- **January**
  Dave Chapman: 'Lunar Libration for Beginners'
  Dave Lane: 'Star Spectroscope';
  Paul Evans: 'Mercury Messenger';
  Roy Bishop: 'Flashlight/Laser Demo'
- **February**
  Paul Gray: 'RASC Observing Programs John Jarvo: 'Isabel Williamson Lunar Certificate'
- **March**
  Mary Lou Whitehorne: 'The Lives of Stars'
- **April**
  Pat D'Entremont: 'Deep Sky Tourism from my Backyard'
- **May 'Beginner's Night'**
  Quinn Smith: 'Telescopes for Beginners'
  Gilles Arsenault: 'Preparing to Observe'
  Andrea Misner: 'How to Observe'
- **June**
  Dr. Roy Bishop: 'Water and Sky in the Deep South'
- **September**
  IYA committee: 'International Year of Astronomy'
- **October**
  Dr. Rob Thacker: 'Computing the Cosmos'
- **November**
  Dr. Luigi Gallo: 'Super Massive Black Holes'
- **December**
  AGM and Tim Donovan 'Adventures in Aperture Fever'

**Nova East**
We had an excellent though soggy Nova East. The Nova East Committee put together a fantastic three day program. The number and variety of speakers was truly impressive. Everyone really enjoyed keynote guest Terence Dickinson and the awesome astronomy auction was a hit!

**Astronomy Day**
For Astronomy Week in May the Centre organized outreach events including a public talk, public observing, and a mall display. These events were well organized (thank you to all involved!) and were a great catalyst to start preparing for International

**International Year of Astronomy**
The International Year of Astronomy committee, chaired by Quinn Smith, is doing an absolutely fantastic job of organizing our efforts for the full year of planned activities. Check out www.AstronomyNovaScotia.ca and read all about it!

**Challenges**
This year has included a few challenges. Centre members Mary Lou Whitehorne and Dave Lane have been providing tremendous leadership at the National level including addressing challenges resulting from complying with recent CRA regulatory changes impacting charities. Locally, our St. Croix Observatory was the victim of vandalism resulting in broken windows and a damaged door. John Liddard, our Observing Chair, did a fantastic job of looking after the repairs.

**Departing and Incoming Executive Council Members**
Thank you very much to Alex LeCreux, Gilles Arsenault, and Gary Weber for their service on the Council. A warm welcome to Andrea Misner, Chris Young, Robert Bussieres and Sean Dzafovic who are joining the Council.

**Parting Words**
As I descend from the Presidency into heckler's row, I can reflect on the last nine years I have been on the executive in the roles of Observing Chair, Treasurer, 1st VP, and President. I've enjoyed each of those roles and I encourage everyone to remember that getting involved with the Centre is a lot of fun! I'm now setting my objectives for the hobby to include a little more attention to my observing projects, advancing my wide-field astrophotography skills and participating in public observing. I also have a couple of topics I want to do some thinking and reading about – which I hope will provide material for presentations or Nova Notes articles in the future.

All the best to the membership for 2009!

Editor's comment:

I'm sure that I speak for all members of the Halifax Centre in thanking Paul Evans for the outstanding job as the President of our Centre for the last two years.
The Halifax Centre has a fantastic group of members, but like most organisations, direction and guidance for the group is very much dependent on the leadership of the President. Paul has done a wonderful job, not only in leading us for the last two years, but during the many years he was on the executive. Have a great rest Paul!

## December Meeting Report

**Andrea Misner**

The meeting was opened by President Paul Evens with approximately 40 members present. Paul welcomed guests and new members and began the Annual General meeting

The Annual General Meeting is the time of year when the executive give a summary of the past years' activities and deliver an outline of the financial situation of the Centre. Paul Evans opened the AGM with his President's report of the year's astronomical adventures (see page 4).

Pat Kelly then gave his treasures report. A huge thank-you goes out to Pat Kelly for his sleepless nights in sorting out Quickbooks! (a complete financial report and auditors' report will appear in the next edition of Nova Notes)

A talk was then given by Tim Donovan, called: "My Adventures in Aperture Fever".

Tim explained that it all started at Nova East 2006 when he got a chance to peer through the eyepiece of a 12'' Truss Dob and was forever hooked. The desire to build his own telescope brought him to the decision to purchase a 12.5'' F.4.4 mirror.

Tim now had a mirror and with his youngest son,, and observing buddy Sean, he started on the telescope construction designs.

He used a program called "Newt" that calculated the specific measurements of the optics. This is the part where Murphy's law, "nothing is as easy as it seems", raised its ugly head.

Tim's first attempt yielded a very heavy and tall scope. Further experimentation brought questions, such as, why do the stars have tails?

Tim's worst fears about the telescope making were confirmed. He discovered that the mirror he had purchased was poorly ground . Instead of a telescope mirror, Tim had a 12.5" shiny paper weight!

However, Tim never backs down from a good challenge. Pressing on he got his telescope into operating order after purchasing a new 12.5'' F5 mirror from a gentlemen named Normand Fulkern.

With a functional, newly polished, handcrafted telescope Tim decided to take this aperture adventure to a whole new level and built a "Mount Palomar observatory" in his backyard!

Tim was able to utilize some construction space at the ship yards where he works. With help from family and friends the 10ft dome to the observatory was constructed and transported to the Donovan's backyard. Tim's observatory is nothing short of amazing as it stands 8ft tall with the impressive 10ft dome to top it off. Fully functional with solar power panels it is a self-sustaining feet of engineering.

Photo: Tim Donovan

Thanks to Tim's background in ship building, and his friends and family, the telescope and observatory become a reality this past year. Congratulations to Tim Donovan on his new observatory! We look forward to hearing updates on your aperture fever adventures.
play.

After a question and answer session the meeting was closed by Paul Evens who thanks all members for their participation.

The group enjoyed the normal round of cookies and pop and more discussions about telescope and observatory construction.

## January meeting Report

### Quinn Smith

The first meeting of 2009 was not held in our usual location of Saint Mary's University, but rather at Dalhousie University at the Sir James Dunn building. This was to allow the membership to tour the Halifax Planetarium, located in the Sir James Dunn building.

The meeting was brought to order by our new President Andrea Misner at 8pm. There were approximately 45 members and guests present.

Andrea welcomed all present, especially guests and new members and outlined the advantages of membership to the Halifax Centre. She then introduced the new executive (see page 2). We are still short an executive member (2nd VP) and Andrea outlined the responsibilities of this position. There were no volunteers at the meeting and so the position still needs to be filled.

Dr David Tindall, a RASC member and a member of the Dalhousie faculty of Physics and Atmospheric Sciences, then took to the floor and gave a brief history of the Planetarium (see page 7).

The main intention of meeting at Dalhousie was to allow the membership a tour of the Planetarium. Since we had more members present than the Planetarium will easily accommodate, the meeting was split into two groups.

One group remained in the meeting room and enjoyed a 30 minute DVD presentation from Perimeter Explorations entitled "The Mystery of Dark Matter". Perimeter Explorations are a series of short videos that are designed for physics educators around the world. This presentation gave a detailed look at the history of dark matter as well as the current theories as to what it is. The video itself can be found at:
www.perimeterinstitute.ca

The there group went to the planetarium and were given a 30 minute "tour" of the facility by Quinn Smith.

Quinn started by describing the projector and pointing out some of it's features and limitations. The projector is a Spitz model A1, built in the early 50's. It is a modification of the type of projector used in the 2nd World War to train sailors and aircrew in celestial navigation. It's primary limitation is that it is a single "sphere" projector and as such cannot show sky views below the equator. The other limitation is that although the Moon and up to four planets can be displayed, their position is fixed relative to the sky, requiring manual repositioning each day.

Quinn started the presentation by slowly darkening the inside of the dome and showing the night sky for the Halifax at the time of the meeting. He began with the sky view from the city (with light pollution) and then gave the view from a dark sky location outside the city. The main constellations were pointed out and some of the brighter stars and other constellations were located using a few primary constellations as direction references ("star hopping").

The projector was then put into motion showing the apparent motion of the sky throughout the evening.

Quinn then showed some of the auxiliary features of the projector, such as the meridian indicator, the celestial coordinates and the ecliptic. The projector also showed how temperamental a 50 year old piece of equipment could be. As we watched the presentation the coordinate display flickered like a distant thunderstorm.

Quinn then slewed the projector axis to show the sky (and its motion) from the North Pole and then the Equator.

The "tour" finished with a short question and answer session. The group headed back to the meeting room to view the video presentation while the next group took the planetarium "tour"

The meeting concluded with the usual meet and greet session with pop and snacks supplied by the Halifax Centre's very own "snack fairy".

The meeting ended at approximately 10.30pm

HALIFAX CENTRE

**Nova Notes The Newsletter of the Halifax Centre of the RASC**

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**E mail: novanoteseditor@rasc.ca**

**Newsletter editor: Quinn Smith**

Nova Notes is published bi-monthly in February, April, June, August, October and December. The opinions expressed herein are not necessarily those of the Halifax Centre. Articles on any aspect of Astronomy will be considered for publication.

**Deadline for the next edition is March 23rd 2009.**

## Halifax Planetarium

### Stephen Payne

Planetarium History:

Accounts of the earliest days of the Halifax Planetarium appear in RASC Journal articles by M.W. Burke-Gaffney (1959) and W.L. Orr (1964). Of relevance: In 1951 the Nova Scotia Astronomical Society was founded and, in 1955, became the Halifax Centre of the RASC, with Mr. Donald Crowdis, Curator of the Nova Scotia Museum of Science, as its first secretary. (Crowdis was recently honoured, in person, by the Halifax Discovery Centre for his work through the Museum.)

It was his zeal to bring knowledge of astronomy to Nova Scotia that resulted in the purchase of a Spitz Model A-I star projector in 1955, followed by other, ancillary projectors. The challenge for Crowdis and his staff was the construction of the 20 foot projection dome; with some modifications it stands as soundly today as it did in 1955. The original covering for the dome, "a flannelette, of fairly good grade" was sown together by the province's foremost sail-maker, Randolph Stevens of Lunenburg). The first show occurred on February 6, 1956.

With the move of the Nova Scotia Museum from Spring Garden Rd. to Sumner St. there was no longer space for the dome and the planetarium went into storage. Through the efforts of members of the Physics Department and the NS Museum, it was eventually placed in the Dunn building and reopened in January 1979. Regular shows to classes of all ages - junior grades to university level - have occurred since, as well as weekly shows to the public and community groups. The number of shows peaked in the late 80's – early 90's, with up to 4,500 people passing through each year. Both Museum and RASC volunteers were instrumental in maintaining this attendance, but when the volunteers fell away in the mid-90's, so did the attendance numbers. Currently public attendance is approximately 1,100 -1,200 per year.

Last year the Physics Department, the Museum and the Halifax Centre RASC, separately (and coincidentally), decided to re-inject life into the planetarium. For its part, the local IYA committee of the RASC chose the revitalisation as one of its two legacy projects.

The outlook now looks good. New partnerships are being forged between the Museum, Dalhousie, RASC and other groups interested in science education, (such as SuperNova). There is a common intent to move the planetarium into the 21st century, with the eventual purchase of a modern projector. Advertisement of shows has begun, in conjunction with that for IYA. Finally, operators, mainly RASC members and university students, are now being trained to support an increase in attendance.

Despite its age, the projector is still capable of delivering an impressive show to the 40 people that can fit into the inside of the dome. The projector displays images of the stars of magnitudes 2 -5 via pinholes, as well as the Andromeda Galaxy, Magellanic Clouds and star clusters. To produce sharp images of first magnitude stars and diffuse images of the Milky Way lenses are used. Separate projectors exist for the planets and the moon, in its different phases, the celestial coordinates and a (fuzzy!) meridian - (Huston, we have a problem with the meridian!). The system allows for rotation about the polar axis, simulating the motion of the night sky from season to season and this axis can be varied to show the view from the equator to the North Pole.

Thanks to Stephen Payne and David Tindall for their fantastic efforts in getting the Halifax Planetarium back in regular operation. If you would like to become an operator please contact the editor.

View of the inside of the 20ft diameter planetarium dome.
Photo: Dave Chapman

Close up of the 1955 Spitz model A1 planetarium projector
Photo: Quinn Smith

## IYA Kick-off Events

### Dave Chapman

***Astronomy Nova Scotia* Scores "Field Goal" with IYA2009 Kickoff**

Is there anyone left in Nova Scotia who has not heard about the International Year of Astronomy 2009? After months of preparation and several weeks of nail-biting, the opening week for IYA2009 was—by any measure—a huge success in Nova Scotia: 11 activities involving 7 organizations providing around 1000 "Galileo Moments" to members of the general public of all ages. Members of the RASC Halifax Centre were instrumental in this achievement, along with individuals from Saint Mary's University (SMU) Department of Astronomy & Physics, Acadia University (AcadiaU), Minas Astronomy Group (MAG), the Discovery Centre (DC), the Halifax Planetarium Committee at Dalhousie University (Dal), and the Halifax Public Libraries.

In the "warm-up" to the game, there were several media events. In October, RASC member Andrea Misner appeared on CBC TV's *Living Halifax* in a brisk but entertaining primer on amateur astronomy. In 5 minutes, she covered topics such as observing with binoculars, red lenses for flashlights, star charts, and light pollution, concluding with "IYA: we are bringing the Universe down to Halifax." During kickoff week, RASC National President Dave Lane appeared on ATV's *Live at 5* suppertime show giving his "sermon from the telescope mount" at SMU's Burke-Gaffney Observatory, plugging IYA and Astronomy Nova Scotia. Dave and SMU Lecturer Doug Pitcairn "appeared" on CBC Radio's *Maritime Noon* for a 53-minute astronomy phone-in answering questions from about 10 callers on extrasolar planets, black holes, and bright objects in the night sky. SMU Prof. Rob Thacker enjoyed his 7 minutes of fame on CBC Radio's *Main Street*, describing his interest in life on other worlds. Finally, Andrea Misner (now Centre President) appeared live on ATV *Breakfast Television* for another brief but enjoyable promotion of astronomy and IYA. Some of Blair MacDonald's superb astrophotos illustrated this presentation, causing some amusement on the set, as everyone assumed they came from the "professional" telescope at the Burke-Gaffney Observatory. (Audio and video clips are available at AstronomyNovaScotia.ca)

The first in-the-flesh IYA event in Nova Scotia was the *Café Scientifique* at the Halifax coffee shop Uncommon Grounds on Friday January 9. The capacity crowd of 55 enjoyed a brief presentation by Prof. Rob Thacker entitled "Where are the Aliens?" and afterwards took part in a lively discussion that included McMaster University Prof. Doug Welch (live video over the internet using Skype). This is a new type of event for RASC and we hope to reprise it as an *Astronomy Café* during the IYA *100 Hours of Astronomy* project in early April

The next day, RASC Halifax Centre IYA Chair Quinn Smith and his team promoted IYA to 250 people at Dartmouth's Mic Mac Mall, showing off telescopes and giving away StarFinders, Astro-cards, and other items. The team included: Dave Lane, Wally Moore, John Nangreaves, Kathy Brain, Mark Dryden, Alex LeCreux, Blair MacDonald, Wes Howie, and John Higgins. At the same time Andrea Misner presented 6 StarLab sky shows to 150 children at the Discovery Centre. There was also a "mini-mall" display (manned by Gilles Arsenault, Karl Penney, and Pat Kelly) at DC with a telescope, information, and some give-aways.

That night at SMU, the student "busking astronomers" set up their telescopes early in front of the lecture hall to show the crowd the Full Moon and Venus. The student observers included Mark Richardson, Mike Hiland, James Wurster, Andy Marquis, Alex Razoumov, and Elie Khoury. RASC members Gilles Arsenault, Blair MacDonald, Paul Heath, and Alex LeCreux joined the students in showing and interpreting the sky to about 100 people. SMU Prof. Marcin Sawicki presented "Imperfect machines: how telescopes have changed our understanding of the universe and of our place in it" to a capacity crowd of 160. He traced the history of the astronomical telescope and its impact on how we view the universe, concluding with a preview of some much-anticipated space- and ground-based telescopes with enhanced performance. After the lecture, a small group of 25 people toured the Burke-Gaffney Observatory.

Meanwhile, in Wolfville, AcadiaU Prof. Svetlana Barkanova and MAG member Roy Bishop collaborated on a talk to 150 persons on the history of the astronomical telescope and Valley IYA activities. Roy illustrated his portion of the talk with photographs from his personal collection of visits to some historical and important observatories.

The 20 cm of snow the next day put a bit of a damper on things. DC presented one StarLab show to 30 kids before closing. "The show must go on," was the theme at Dal, where Walter Zukauskas and Pat Kelly presented two sky shows with the antique Spitz A-1 planetarium projector to 25 and 15, respectively (capacity 30-40) supported by Prof. David Tindall and Stephen Payne.

The final opening event was the public talk "Gravitation and Black Holes" presented by Blair MacDonald to an attentive all-ages crowd of 60 at the Spring Garden Road branch of the Halifax Public Libraries. Blair is a brave man!

If this kickoff is any indication, then IYA2009 will be a high scoring game for Astronomy Nova Scotia. Stay tuned for follow-on events!

Dr Rob Thacker answering questions at the "Café Scientific " held at the Uncommon Grounds coffee house.


A view of the Mall display held at the Mic Mac Mall on January 10th 2009.

Andrea Misner helping a guest enter the inflatable "Star Lab" planetarium at The Discovery Center


Professor Marcin Sawicki begins his lecture on "Telescopes - Imperfect Machines" to over 160 people at SMU.

Public observing on a cold and frosty night outside the lecture hall at SMU on Saturday January 10th 2009

## Observing a young Moon

### Dave Chapman

At a recent Halifax RASC meeting, someone asked about upcoming opportunities for observing young Moons (less than 24 hours after New Moon). I did not have a ready answer at the time, but I have done a few desktop planetarium simulations and can now provide a proper briefing. Interest in this astronomical sport has intensified owing to its inclusion in the requirements for the RASC's Isabel Williamson Lunar Observing Certificate: no young Moon, no Certificate! Before that, and continuing to this day, the sighting of young Moons has been an important event in certain traditional calendars.*

Observing a young Moon is challenging. No one has seen a Moon less than 15 hours old with the unaided eye; using optical aid, the minimum observed age is around 11 hours. This only leaves a short time window of duration 9-13 hours every month. However, the Sun must be below the horizon at the observer's location, so the sky is dark enough for the thin sliver of Moon to be visible. But the time of observation cannot be too long after sunset, as such young Moons set within an hour or so of sunset. Needless to say, in a given location, most months of the year do not readily admit good circumstances for seeing a young Moon!

As the Moon moves rapidly with respect to the background stars, the chances of succeeding are strongly dependent on longitude: sunset in England may be too soon for observing a young Moon (sky too bright), sunset in Nova Scotia might be just perfect, and sunset in Vancouver may be too late (observable, but too old). Couple this with the requirement that the sky be cloud-free at an unobstructed horizon, and the challenging observation of a young Moon degenerates into a crap shoot!

Luckily, last year, on 2008 April 6, conditions were perfect in Nova Scotia and several of us (including me) succeeded in observing a young Moon with the unaided eye. Some managed photographs. Others were not so lucky! One observer did not see the young moon but discovered it on his digital image after the fact!

**2008 April 6 (recap)**
Halifax sunset at 7:48 p.m. ADT
18h 53m after New Moon
altitude 10 degrees, separation from Sun 11 degrees
Most observers spotted the Moon about 30 minutes after sunset.

In what follows, I will alert you to upcoming opportunities for Halifax in 2009 and provide some observing tips based on "lessons learned" from last year.

**2009 February 25**
Halifax sunset at 5:56 p.m. AST
20h 21m after New Moon
altitude 9 degrees, separation from Sun 10 degrees
Somewhat similar to 2008 April 6

**2009 March 26**
Just forget about it!

**2009 April 25**
Halifax sunset at 8:11 p.m. ADT
19h 48m after New Moon
altitude 10 degrees, separation from Sun 11 degrees
Very similar to 2008 April 6

To prepare for this type of observation, it is important to establish in your mind in advance what you expect to see and where in the sky you should be looking. I always use my desktop planetarium software (Voyager III for Mac) to simulate the circumstances. Become familiar with the location of the Moon in relation to the Sun at sunset and shortly after. If possible, scout your location a day or so before, to ensure you have a low horizon. Dress warmly! Synchronize your watch!

Arrive at the observing point before sunset to orient yourself and ready your camera gear, if you have it. Use a tripod to hold the camera. Don't forget to look with your own eyes! Typically, the sky is too bright at sunset to see a young Moon. Scan the expected location with binoculars. The Moon may not become visible until about 30 minutes after sunset. If at first you don't succeed, keep looking, as a few minutes makes a big difference.

I have only considered young Moons, less than 24 hours after New Moon. Technically, to qualify for the RASC certificate, one could observe old Moons less than 24 hours before New Moon. These tend to occur in the Autumn. I will leave the calculation of those circumstances to those inclined to observe them.

Photo: Dave Chapman

## Cosmic Debris

### Odds and sods from the world of Astronomy and Cosmology

**SEVERE SPACE WEATHER:**

The National Academy of Sciences has just released the results of a study entitled Severe Space Weather Events--Understanding Societal and Economic Impacts.

The 132-page document examines what might happen to our high-tech modern society in the event of a super solar flare followed by an extreme geomagnetic storm. Such a storm did occur in the year 1859. It electrified telegraph lines, shocking technicians and setting telegraph papers on fire; Northern Lights as far south as Cuba were so bright, you could read a newspaper by their eerie glow.

According to the report, "a contemporary repetition of that event would cause significantly more extensive (and possibly catastrophic) social and economic disruptions." The report warns of widespread failures in telecommunications, electric power, banking and finance, and transportation; even water supplies could be disrupted. The total economic impact in the first year alone could reach $2 trillion--about 15 times greater than the costs of Hurricane Katrina. Depending on damage, full recovery from the solar storm could take 4 to 6 years.

No one knows how often super solar storms occur. We've only seen one like it in the past 200 years. The next one could be another 200 years away--or just 200 days. All the more reason to study space weather!

Clear skies
---
Michael Boschat
Halifax Center - Royal Astronomical Society of Canada
Astronomy page:
http://www.chebucto.ns.ca/~aa063

**THE BIGGER THE BETTER**
(NASA Jan. 14th 2009)

"The bigger the better," says astronomer Harley Thronson, who leads advanced concept studies in astronomy at the Goddard Space Flight Center. And he thinks "NASA's new Ares V rocket is going to completely change the rules of the game."

Ares V is the rocket that will deliver NASA's next manned lunar lander to the moon as well as all the cargo needed for a lunar base. Its roomy shroud could hold about eight school buses, and the rocket will pack enough power to boost almost 180,000 kg (396,000 lbs -- about 16 or 17 school buses) into low Earth orbit. Ares V can haul six times more mass and three times the volume the space shuttle can.

Optical engineer Phil Stahl of the Marshall Space Flight Center offers this example: "Ares V could carry an 8-meter diameter monolithic telescope, something that we already have the technology to build. The risk would be relatively low, and there are some big cost advantages in not having to cram a large telescope into a smaller launcher." For comparison, he points out that Hubble is only 2.4 meters wide.

An 8-meter monolithic telescope would see things more than three times as sharply as Hubble can. More importantly, in the same amount of observing time, the larger mirror would see objects that are about 11 times fainter than Hubble sees because the 8-meter telescope has 11 times the light collecting area.

But Ares V can go yet bigger. It could transport a huge segmented telescope – one with several separate mirror panels that are folded up for transport like the James Webb Space Telescope--but three times the size!

The Space Telescope Science Institute's Marc Postman has been planning a 16-meter segmented optical/ultraviolet telescope called ATLAST, short for Advanced Technology Large-Aperture Space Telescope. The science from an aperture its size would be spectacular.

"ATLAST would be nearly 2000 times more sensitive than the Hubble Telescope and would provide images about seven times sharper than either Hubble or James Webb," says Postman. "It could help us find the long sought answer to a very compelling question -- 'Is there life elsewhere in the galaxy?'"

"With our space-based telescope, we could obtain the spectrum of Earth-mass planets orbiting a huge number of nearby [60 - 70 light years from Earth] stars," says Postman. "We could detect any oxygen and water in the planets' spectral signatures. ATLAST could also precisely determine the birth dates of stars in nearby galaxies, giving us an accurate description of how galaxies assemble their stars."

This telescope could also probe the link between galaxies and black holes. Scientists know that almost all modern galaxies have super massive black holes in their centers. "There must be a fundamental relationship between the formation of super massive black holes and the formation of galaxies," explains Postman, "but we don't understand the nature of that relationship. Do black holes form first and act as seeds for the growth of galaxies around them? Or do galaxies form first and serve as incubators for super massive black holes? A large UV/optical telescope could answer this question: If our telescope finds ancient galaxies that do not have super massive black holes in their centers, it will mean galaxies can exist without them."

Editors'note:

Don't get too excited! The Ares I is due for it's first test launch in 2009, however the first Ares V test is not planned till 2018.

Currently there are a few small technical problems with the Ares - like solid fuel boosters blowing up at an alarming rate.

Where is the Saturn V when you need it?

# St. Croix Observatory

### Observing Chair: John Liddard 902 865 7607

Part of your membership in the Halifax RASC includes access to our observatory, located in the community of St. Croix, NS. The site has grown over the last few years to include a roll-off roof observatory with electrical outlets, a warm-room and washroom facilities. Enjoy dark pristine skies far away from city lights, and the company of like minded observers searching out those faint "fuzzies" in the night.

### Observing Nights:

Every weekend closest to the new Moon, there is an "Observing Night" at St. Croix. The purpose of "Observing Night" is to encourage Centre members, their guests and visitors to share an evening of observing at St Croix. It's also a great night for beginners to try out different scopes and see the sky under dark conditions. For more information or transportation arrangements, please contact the Observing Chair.

### Future dates for Observing Nights:

There is no Observing night in December
February 27th, 2009
March 27th, 2009
April 24th, 2009
May 22nd, 2009

These dates are all Fridays. If this is a meeting night, or cloudy, the alternate date will be the following Saturday.

### Directions from Halifax:

1) Take Hwy 102 (the Bi-Hi) to Exit 4 (Sackville).
2. Take Hwy 101 to Exit 4 (St. Croix).
3. At the end of the off ramp, turn left.
4. Drive about 1.5 km until you cross the St. Croix River Bridge. You'll see a power dam on your left.
5. Drive about 0.2 km past the bridge and take the first left (Salmon Hole Dam Road).
6. Drive about 1 km until the pavement ends.
7. Drive another 1 km on the dirt road to the site.
8. You will recognize the site by the 3 small white buildings on the left.

### Become a St. Croix Key Holder:

For a modest "key fee", members in good standing for more than a year, who have been briefed on observatory , may gain access to the St.Croix facility. For more information on becoming a key holder, contact the Observing Chair.

### Rules for using the SCO equipment:

There are several pieces of astronomical equipment available for members (and guests) to use, including a 17.5" dob and a magnificent pair of tripod mounted, 100mm binoculars.
If you are unfamiliar with the use of these pieces of equipment, please ask for assistance—any knowledgeable member would be more than willing to help you out.
Please ask before using laser pointers - other members may be taking astro-photos.
Please share the equipment with other members; and treat the equipment, the facilities, and the site with respect.
…… Enjoy!