Volume 21, Number 3 January 2014

From The Editor

Well... Happy New Year, everyone!

This edition of the Event Horizon is an exciting one to kick off the new calendar year! In addition to our usual monthly features, this E.H. has the first of a series of articles by Dr. David Galbraith on the use of remote timerental observatories over the Internet... astroimaging from home!

Enjoy!

Bob Christmas, Editor

Chair's Report by Jim Wamsley

As we start a new year, we look back at the great year that 2013 was for the club. This past year has been very enjoyable for me, as chairman, and I feel that it's been a year full of success for the club. Our speaker lineup has been terrific, and the club's outreach program has also been one great event after another, with two telescope clinics, fall, and spring, as well as public observing nights in several locations around the Hamilton area. Even on nights the cloud cover hampered the viewing, we had great turnouts by both club members, and the public. At the club picnic and Perseids Meteor Shower night at Binbrook Conservation area, even though the night sky was totally cloud covered and we saw no Meteors, over 400 public came out. Everyone had a great time and went home happy, as club members were able to keep them entertained by showing off their scopes, and passing on their knowledge of astronomy. At all of these events and club meetings, we collected nonperishable food items for the food bank. This food has gone to the Salvation Army, and the Neighbor to Neighbor food banks. Both of these organizations have expressed their appreciation for your help.

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Of course the highlight of 2013, has to be our 20th anniversary banquet. Club members enjoyed a fine meal under the wings of the Lancaster bomber. The speakers, John Gauvreau, Kevin Salwach, Matthew Mannering and special guest speaker Bob MacDonald, were both entertaining and informative. Several great door prizes were awarded. By all accounts, everyone enjoyed themselves completely. (Continued on page 2)

IN THIS ISSUE:

- Last Call For The 2014 HAA Calendar
- The Sky This Month
- Remote Astronomy With Sierra Stars Observatories
- Astronomy Crossword
- Through The Looking Glass
- NASA's Space Place

- Treasurer's Report
- Upcoming McCallion Planetarium Shows
- Cartoon Corner
- Upcoming Events
- Contact Information

Chair's Report (continued)

Now looking forward to the club's 21st year, I think the club will be equally, if not more, successful. Your Council has made plans for public events this year which will be soon posted on the web site.

Make sure you keep an eye on the web site, as there will be huge changes to the site. Plans are in the works to make the site much more user friendly, with an easier to use blog, and a photo gallery that will be much easier to post your astro photos on, so you can share your prize photos with fellow club members. There will be other changes as well, to make the club web site more enjoyable for you and public visitors.

We will be starting a new Astro 101 course this February, for our beginner Astronomers. This course will consist of 3 classroom sessions and a night out observing. If you are interested in taking part in this course, contact me at chair@amatureastrony.org or call me at 905-627-4323.

The club loaner scope program has a full complement of instruments available. There are two 8"Dob's, two 80mm refractors, one of which is a goto scope. We also have a pair of Pentax binoculars, and an 80mm birding scope. For the more advanced observer, an 8" Schmidt-Cassegrain. There is no cost to members to borrow scopes. If you would like a scope, just contact me.

In January, we begin the New Year's speaker series with Steve Germann. Steve will be speaking on the new sky stopper device he has invented and is currently marketing. February will bring Dr. Rob Cockcroft with a talk on Ancient Egyptian Astronomy. A great start to the New Year. I also have several people from McMaster University's Astronomy & Physics Dept. lined up to speak for later months.

All this and more coming for the New Year. I hope Santa was good to you all, and you got all the astro goodies you wanted, and that the skies are clear every night you wish to observe. See you all soon.



Last Call for the HAA 2014 Calendar!

Prices: \$15 each, or two for \$25.

We still have a few HAA 2014 Celestial Events Calendars available, but you better hurry! They're almost sold out! Contact Jim Wamsley at 905-627-4323 for purchases.

These are excellent calendars with some wonderful photos taken by your fellow club members. They're perfect for the home or office.



HAA Helps Hamilton

To support our community, we will be collecting non-perishable food items and cash for local food banks at our general meetings. Please bring a nonperishable food item to the meeting or a donation of cash and help us help others in these tough economic times.

If you would like to help or have any questions about this initiative, please contact Jim Wamsley at 905-627-4323.

Masthead Photo: This month's image is of the Comet PanSTARRS (C/2011 F4), taken early on the morning of June 19, 2013, by David Galbraith *remotely* with the Schulman 0.81m Mt. Lemmon SkyCenter telescope in southern Arizona. David took this from the comfort of his own home in Hamilton, Ontario! This is a stack of images (one each, L, R, G, B) of 90 seconds each. The default setting for the camera is a 2x2 binning.

The Mt. Lemmon SkyCenter 0.81 meter telescope is an f/7 Ritchey-Chretien equipped with an SBIG STX KAF-16803 camera that covers 22.5 x 22.5 arc minutes. *Read David's article on Pages 7 thru 10.*

The Sky This Month for January 2014 by Matthew Mannering

Welcome to 2014! After a mostly dismal December let's hope for a few more clear nights this month. With cold weather observing now at its peak, make sure you dress appropriately. Try a pair of those cheap wool gloves (about \$1.00 per pair) along with a set of hand warmers in your pocket. I've tried gloves where the finger portion folds back so that your fingers are free to use. They don't seem to work for me but don't be afraid to give them a try. Using heavy gloves or mitts is a sure fire way to test just how resilient your eye pieces are when they hit the ground.

During the winter you may find that your scope's electronics will start to freeze and your power pack will run out of juice a lot faster. Any grease on your mount is likely to turn into mud as the temperature drops. This is why a grab and go scope on an alt-az mount or binoculars are much more user friendly at this time of year.

The up side of the cold temperatures occurs on those nights when the seeing is wonderful. The atmosphere is clear and steady and the stars look like diamonds. I have enjoyed some of the best viewing of the year during the winter. Dress warmly and give it a go. You won't be disappointed.

Easy Targets

At this time of year, the eastern and southern skies are fantastic. You get a ton of great targets - all in a relatively small sector of the sky.



For the price of a cold nose you can see Canis Major, Orion, Taurus, Gemini and Auriga. You can spend hours in Orion alone, between the nebulas, double stars, clusters and the winter Milky Way running down the East side of the constellation. The Pleiades in Taurus are beautiful with binoculars. Don't miss M42, the Great Nebula in Orion. Check out the string of stars that snakes it's way between the belt stars of Orion. It goes by the name of Collinder 70. Rigel, the bluish bottom right star of Orion, has a secondary star that is a bit of a challenge to see. It is very small and dim compared to Rigel, appearing just outside the glare. Definitely worth a look.

(*Continued on <u>page 4</u>*)

The Sky This Month (continued)



Canis Major is known for its brightest star - **Sirius**. Also known as the Dog Star; Sirius is the brightest star in the sky. Scan below and to the right of Sirius and look for the cluster **M41**. It's an easy target. Once Canis Major is completely above the horizon, see if you can see the outline of the dog. In the evening at this time of year, the dog is standing on its back legs.

Monoceros is a relatively dim constellation above Canis Major. Use a scope and fairly high magnification to look at **Monoceros 'B'**, about 10.5 degrees from Sirius. It is a triple star system with about 7 seconds of arc separation between Mon 'A' and the 'BC' pair. The 'BC' pair are separated by about 3 seconds of arc. Even a small scope will be able to show all three components.

Lastly, at around 10pm, try to find M47 (easy) and M46 (not so easy) 2½ binocular fields east of Sirius and 2/3 of a field down. M47 is a bright open cluster which looks nice through any scope. M46 is a fainter cluster slightly below and to the east of M47. What makes M46 interesting is the planetary nebula within the cluster. Use an ultra high contrast. (UHC) filter, or an Oxygen 3 (O3) to brighten the nebula. These filters cause the image to darken. This may make the image too dark if your scope is less than 6" (150mm).

The Moon

This month we are lucky and get two new moons. We start the new year with a new moon and finish the month with another. At mid month, we get the smallest full moon for the year. It will be 406,530 km away at Apogee at that time. Hopefully we will break the recent trend of having clear skies only around full moon! Instead, let's hope for clear skies in the first and last thirds of the month.

The Planets:

• *Mercury* has just passed Superior Conjunction and will start to appear in the western evening sky by mid month. At months end it will reach its greatest elongation from the Sun. This means that visually the angle between the Sun and Mercury will be at its maximum. It is going to be one of the better appearances of Mercury for the year, so check it out. Wait for the Sun to set before *(Continued on page 5)*

The Sky This Month (continued)

looking for Mercury so that you don't inadvertently point your binos at the sun and blind yourself!

- Venus is still visible in the western evening sky for the first week. It's crescent shape will appear to get thinner with every night that passes, but it won't appear to dim to us. That's because even though less of the planet is lit by the Sun, the planet itself will be moving closer to the earth. The two effects just happen to roughly cancel each other out. On January 11th it will be at Inferior Conjunction. When this happens, Venus is as about as close to the Earth as it can get (allowing for minor variations in distance due to the shape and inclinations of our orbits). It also means that it is directly between us and the Sun. About a week later, on January 18th, Venus will be visible in the eastern morning sky.
- *Earth* has just passed its winter solstice and the days will start getting longer and eventually warmer. At this time of year the 23.4 degree axial tilt of the Earth is pointed directly away from the Sun. This means the Northern hemisphere receives a lot less energy per square meter than it does in the summer. As the Earth moves around in its orbit, the tilt will start to favour the northern hemisphere and we can put our shorts back on.
- *Mars* is still in Virgo and rises around midnight. On January 3rd it will reach Aphelion. It's easy to mix up the meanings of <u>Aphelion</u> and <u>Perihelion</u> (furthest and nearest positions relative to the Sun). So I remember which is which by looking at the first letters of each word. Aphelion is 'a'far and perihelion is 'p'retty close. Not exactly brilliant comparisons but it works for me.
- Jupiter (in Gemini) is rising in the East by sunset. On January 5th it will reach Opposition. Opposition and Inferior Conjunction are similar events but the relative positions of the Earth and the planet in question are opposite. With Inferior Conjunction, the planet is between us and the Sun. Whereas at Opposition the Earth is between the planet and the Sun.

Hyperion		
_	Enceladus Saturn Mimas	Titan
Tethys	Pione	urn and 7 Moons on Jan. 3rd at 5:30am
Rhea		

• Saturn is in Libra at the moment. It rises in the East South East around 4am at the beginning of the month. Look for it about 20 degrees above the horizon after 6am in the South East. The ring system is going to be spectacular this year due to it being tilted at over 20 degrees from our

(Continued on <u>page 6</u>)

The Sky This Month (continued)

viewpoint. If there was ever a time to see the Cassini division and the shadow of the planet on the rings, this is the year. Even a small scope will give you a beautiful view. Use planetarium software or a phone app to figure out which of the moons you can see. I wonder how many of us got hooked into astronomy by our first views of Saturn and it's fantastic rings?

• **Uranus** is visible about 40 degrees above the horizon in the south west at 7:30pm while **Neptune** has begun its dive towards the western horizon. You'll have till about the 10th to have a look at it.

Other Events:

-January 3rd: The Quadrantid

It's not a particularly event filled month this time around. But there are a couple of nice binocular or eyeball sights.

-January 2nd: Venus will be 2 degrees south of the Moon low in the west at dusk (see below). Check it out as soon as the Sun sinks below the horizon.

Meteor Shower peaks just a couple of days after new moon. The Dubhe Ursa Majo Ouadrantid shower is named after a now mostly forgotten constellation Ouadrans Muralis. Phad Look for them after midnight in the north east between the bottom of the big 0 dipper and the Alioth horizon (see right). -January 23rd: Mars is just 4 degrees Mizar north of the moon at Canes Venatici 2am. The Moon will pass about 1 degree Cor Caroli M101 north of the bright Alkaid O star Spica at around 6am. Coma Berenices 0 Quadrantids Meteor Shower Radiant Muphrid

Izar

Arcturus



Trying Remote Astronomy with the Sierra Stars Observatory Networks by David Galbraith

There are many different ways for amateur astronomers to be directly involved in our hobby, and most of them, at some point, involve using a telescope. Deciding just what telescope to use, and for what purpose, can be a complex process. For many, being an amateur astronomer means owning a telescope. Although there wonderful telescopes available commercially, you don't have to own one, or even to borrow or rent one in person, to get access to excellent equipment. It's possible to have access to excellent - even research-grade - telescopes on-line, from the comfort of your home, through a variety of remote astronomy options.

Some people own their own telescopes at remote locations with excellent observing conditions, often renting a pier and services like power and Internet connections from "telescope farms". Other options include joining a service to rent time on a telescope. Some of these like SLOOH, are designed for the general public. Others, like the Sierra Stars Observatory Network (SSON) are more academically oriented but are still available to the general public.

Over the past year I've been experimenting with the Sierra Stars Observatory Network (<u>http://www.sierrastars.com/</u>). Starting at less than one dollar per minute of exposure time, the net-

work lets you use one of three research telescopes in the south-west USA, to capture images that are returned to you as FITS files. The cost increases with the size of the telescopes on the network. Users are only charged per minute of exposure time, and in my experience the network administrators are very willing to provide refunds if things don't go well on a particular exposure.

Using a remote observatory isn't for everybody, and it certainly doesn't provide the experience of gazing at a beautiful celestial object with your own eyes through a large telescope. In the case of the Sierra Stars Observatory Network an observing session isn't even in



(*Continued on page 8*)

Messier 27, the Dumbbell Nebula, an LRBG image captured on 9 May 2013 using the University of Iowa's 0.37 meter Rigel telescope. The image was prepared by taking four exposures of 300 seconds each, one with each of the red, blue, and green filter, and one without a filter. Photo by David Galbraith

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No filter (clear)	N		ever, stars, galaxies, comets and asteroids are all fair			
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		Hamilton	Amateur Astronomers Event Horizon January 2014 Pa			

Remote Astronomy with Sierra Stars (continued)

All of that means that the process of using this particular system isn't terribly exciting. There's no "eureka" moments of gazing through an eyepiece and spotting a distant comet or nebula. However, you do get you own images of extremely faint objects, to do with as you wish, accompanied by the FITS header data that details exactly what the image records.

The Sierra Stars Observatory Network Telescopes

The Sierra Stars Observatory Network at present provides access to three professional, research-grade telescopes. The network manager Rich Williams has indicated that more facilities will be added in the future. Two are located in Arizona, and one in California.

Sierra Stars Observatory's 0.61 meter (24 inch) F/10 Optical Mechanics Nighthawk CC06 Classical Cassegrain telescope is located in Alpine County, California. It is equipped with a Finger Lakes Instrumentation ProLine CCD camera that cools to -65 C below ambient. The camera imager captures a field of view of 21 x 21 arcminutes, based on a Kodak KAF-09000 3056 x 3056 pixel CCD chip. The camera is equipped with a five-position filter wheel, equipped with Blue (B), Visual (Green or G), Red (R), and Infrared filters (IR) and a clear slot.

The University of Iowa Rigel Telescope is a 0.37 meter (14.5 inch) F/14 Optical Mechanics Classical Cassegrain telescope. It is operated by the Iowa Robotic Telescope Facility of the Department of Physics and Astronomy at the University of Iowa, from the Winer Observatory outside of Sonoita, Arizona. The camera on the Rigel telescope is a Finger Lakes Instrumentation ProLine camera, built around a Kodak KAF-16803 4096 x 4096 pixel CCD chip, with a field of view of 25 x 25 arc minutes. The filter set on this system includes R, G, B, H-Alpha, and clear filters. This camera is also equipped with two spectroscopy



gratings.

The largest telescope on the system is the Mt. Lemmon SkyCenter 0.81 meter (32 inch) F/7 Schulman Ritchey-Chretien telescope Optical telescope. The Mt. Lemmon SkyCenter was launched by the University of Arizona College of Science launched at Steward Observatory's Field Station, on a mountain peak east of Tucson. This large instrument is equipped with an SBIG STX KAF-16803 camera, which includes a Kodak KAF-16803 4096 x 4096 pixel CCD chip and which covers a field of 22.5 x 22.5 arc minutes. The filter wheel includes R, G, B, L, and 4.5 nm H-Alpha filters.

The cost for using these instruments varies with how much time users are able to buy as blocks. The basic price runs from \$50 per hour (\$0.83/min) for the Rigel 0.37 meter telescope, to \$160 per hour (\$2.67/min) for the 0.81 meter Mt. Lemmon SkyCenter telescope.

The 0.37 meter Rigel telescope, owned by University of Iowa, is located in Arizona. Photograph courtesy of Mr. Rich Williams.

(*Continued on page 10*)

Conclusions

Remote astronomy is not for everyone. It does not allow you the hands-on excitement of finding a difficult object yourself, or seeing beautiful astronomical objects with your own eyes. However, it does allow you to have interesting experiences that are not dependent your own local weather, and it also allows you to use equipment that may be far more expensive than an amateur can afford. Furthermore, in the case of professional telescopes such as those on the SSON, the resulting FITS files include detailed metadata in the FITS header that documents the conditions under which the images were captured, including RA &DEC details not usually captured automatically by amateurs.

These telescopes let amateurs go another step further, too. They are set up for astrometry and, in the case of Rigel, for spectroscopy. If you'd like to experience the process of setting up your own imaging run on a major telescope, this is the way to do it. There are other options that you should explore if this process interests you. There are a variety of telescope networks, like iTelescope (<u>http://www.itelescope.net/</u>), SLOOH (<u>http://events.slooh.com/</u>) and the MicroObservatory Robotic Telescope Network (<u>http://mo-www.cfa.harvard.edu/MicroObservatory/</u>) that should be explored before committing too much in the way of resources. I chose to try SSON for several reasons. First, there was no membership commitment involved. You sign up and pay only for the time images are actually being exposed. Second, I liked the idea that SSON was using and supporting telescopes that are used for educational and research purposes. Third, I wasn't too interested in some of the other features of networks like SLOOH, which has on-line programming, videos, etc., but not as much direct and simple access to good telescopes. I've found that the administrators of the Sierra Stars Observatory Network go out of their way for customer service, and handle problems users encounter right away.

I've also enjoyed the process of becoming familiar with FITS files and making use of the kind of data that some professional astronomers generate. There are lots of sources of FITS files on-line - such as the Hubble Legacy Archive (<u>http://hla.stsci.edu/</u>). It's nice to be able to get access to the incredible banks of data from Hubble and other major observatories, but it is also really nice to be able to use a network like SSON, take control of wonderful instruments from the comfort of the proverbial armchair, and call the resulting images wholly you own.

Acknowledgements

Many thanks to **Mr. Rich Williams**, founder and system administrator for the Sierra Stars Observatory Network, for permission to use the photo of the Rigel telescope, and for advice in using the system over the past year.

[Editor's Note: This month's Masthead Photo at the top of Page 1 of Comet C/2011 L4 (PANSTARRS) is another example of David's remote astronomy work on the SSON. See the photo's description at the bottom of Page 2.]

Dr. David Galbraith is Head of Science at Royal Botanical Gardens in Burlington, Ontario, and is an active member of the H.A.A. David was the main speaker at our September 2013 monthly meeting.



Across

- 2. For all of 2014, the Jan. 15 full moon will be the . . .
- 3. On Jan. 4 the Earth is closest to the Sun at . . .
- 6. This type of moon will appear on Jan. 7 and Jan. 24?
- 8. On Jan. 25, the waning crescent moon will be one degree below this planet?
- 9. Starting Jan. 28 for the next week, the waning crescent moon will be seven degrees from this planet in the eastern dawn sky?

Down

- 1. On Jan. 5, Jupiter is closest to us at . . .
- 2. On Jan. 22, the moon is .5 degrees above this star?
- 4. On Jan. 11, Venus is at what type of conjunction between us and the Sun?
- 5. On Jan. 31, this planet will be at its greatest elongation from the Sun?
- 7. On Jan. 28, this planet and Spica will be .5 degrees apart.

Answers can be found on page 17 . (No peeking!)



Missed Opportunities

Well, yet another year has gone by. It has been a blur, with no real justification as to how the time was spent, or the hours filled. Many of us spend so much time running from A to B that our lives are spent simply trying to get somewhere, trying to get something accomplished, trying to work more so we can have extra money so we can relax more.

As another holiday season approaches we try to pick out a few moments from the previous year and play them up in a Christmas letter to friends and family. I am usually truly glad to get those letters and I eagerly read them. By about the middle of the second paragraph I am lost. If the letter was a TV program I would turn the channel. Is everyone's life so truly wonderful (or mine so terrible) that their kids are all budding geniuses, all of them have gorgeous wives/husbands/kids with fantastic jobs and are on a seemingly endless string of promotions? To set a precedence, here is my Holiday Letter, about astronomy, for all my friends and family at the Hamilton Amateur Astronomers.

Happy Holidays to Everyone at the HAA

At this time of year I would like to wish all of you a Happy Saturnalia! I would say Christmas or Chanukah or Kwanza - but I would invariably exhaust my list and still offend someone either by inclusion or exclusion - so Saturnalia it is.

I had some wonderful observing opportunities this past year. In late January and February I was in Thailand. The water was warm, the weather hot and humid and the Singha beer was cold. I had brought my 9x63 Celestron binoculars with me. The best chance I had was from a beach where the horizon was to



Sunset in Thailand, February 2013.

the southwest. Orion danced right over head. Walking down to the beach late at night I would try to find a dark spot and search for things to see. Directly west of the beach was the shrimp fleet. They now use green lights (apparently it attracts the shrimp to the surface better). It was bright enough that anything with about 25 degrees of the horizon was out. The warm (40 °C) days and high humidity left enough broken cloud cover to make observing spotty, although the sunsets were absolutely fantastic. Needless to say I was basically clouded out from some of my targets. Getting that close to the equator and not really getting to see

(Continued on page 13)

Through The Looking Glass (continued)

much of the southern sky was somewhat of a disappointment, but not a large one. It was a family vacation, and I was with my family so all was well.

In March I had another chance for some southern observing, this time from the southern hemisphere. We took a quick hop to Bali, Indonesia. The island was fantastic. Our first two nights were up in the mountains at an eco-resort on a working coffee plantation. At night the Southern Milky Way jumped out. Within literally a minute of turning out the lights on the deck, the Milky Way was jumping out. The cloud cover was hit and miss, but the big name targets were pretty much naked eye objects. As an astronomical adventure this would rank high for quality and quantity of deep sky targets, low for sky condition and total observing time. Overall it was fantastic, and I was able to share it with my wife and two younger kids.



My daughter and I watching the clouds roll up the valley in Bali.

The final astronomical disaster - sorry I mean trip - was an impromptu Thanksgiving jaunt to Arizona. A timely seat sale enabled my wife and I to take a long weekend in Arizona over American Thanksgiving. Part of the trip was for us to explore the Tucson area, so an observing session at Kitt Peak is part of the Tucson area, mais oui? Comet ISON (you remember that flash in the sun right?) was set to make a dramatic turn around the sun while we were in the desert, what could be better as (Continued on page 14)

Through The Looking Glass (continued)

an early Saturnalia gift? While sitting in the airport we learn the comet did not really survive - but so what? Still had time booked at KPO (that's what those of us who have been down to the Tucson area call Kitt Peak Observatory), I will be in Tucson where it is 24 °C, I plan to eat nothing other than Mexican food - life is good. Had a total of 8 burritos, as well as chile rellenos in a five day period. We took a drive and a great hike in the Saguaro National Park outside of Tucson. As evening approaches I am ready, willing and able for some time at Kitt Peak. Unfortunately I have one little companion with me that I had not planned on - no it was not traveller's diarrhea or any other gastro-intestinal payback for my love of Mexican food and salsa verde. Seems I am the astronomical pig-pen in the cartoon strip that is my life. The clouds from Thailand, and Indonesia (and Hawaii and Chile) must have stowed away in my luggage, made it through the TSA security (the clouds could not of been on my person as the TSA has photographic data of every nook and cranny of my person to such an extent that they could produce top-ographic maps - should the need or desire arise) and resided over Tucson and KPO.

So I had a great deal of fun and adventure this year, saw some beautiful skies and a huge amount of clouds from various continents, in multiple hemispheres and varying elevations. In fact in terms of the HAA I do believe that I am somewhat of the in house expert at the nocturnal viewing of clouds. Hope you have a happy and star-filled 2014!



Me in the Saguaro National Park (I am on the right).

My wife Joanna and I in a warm, happy place (Thailand).

NASA's Space Place



The Big Picture: GOES-R and the Advanced Baseline Imager

By Kieran Mulvaney

The ability to watch the development of storm systems – ideally in real time, or as close as possible – has been an invaluable benefit of the Geostationary Operational Environmental Satellites (GOES) system, now entering its fortieth year in service. But it has sometimes come with a trade-off: when the equipment on the satellite is focused on such storms, it isn't always able to monitor weather elsewhere.

"Right now, we have this kind of conflict," explains Tim Schmit of NOAA's **National Environmental Satellite, Data, and Information Service** (NESDIS). "Should we look at the broad scale, or look at the storm scale?" That should change with the upcoming launch of the first of the latest generation of GOES satellites, dubbed the GOES-R series, which will carry aloft a piece of equipment called the Advanced Baseline Imager (ABI).

According to Schmit, who has been working on its development since 1999, the ABI will provide images more frequently, at greater resolution and across more spectral bands (16, compared to five on existing GOES satellites). Perhaps most excitingly, it will also allow simultaneous scanning of both the broader view and not one but two concurrent storm systems or other small-scale patterns, such as wildfires, over areas of 1000km x 1000km.

Although the *spatial* resolution will not be any greater in the smaller areas than in the wider field of view, the significantly greater *temporal* resolution on the smaller scale (providing one image a minute) will allow meteorologists to see weather events unfold almost as if they were watching a movie.

So, for example, the ABI could be pointed at an area of Oklahoma where conditions seem primed for the formation of tornadoes. "And now you start getting one-minute data, so you can see small-scale clouds form, the convergence and growth," says Schmit.

In August, Schmit and colleagues enjoyed a brief taste of how that might look when they turned on the GOES-14 satellite, which serves as an orbiting backup for the existing generation of satellites.

"We were allowed to do some experimental imaging with this one-minute imagery," Schmit explains. "So we were able to simulate the temporal component of what we will get with ABI when it's launched."

(Continued on <u>page 16</u>)

NASA's Space Place (continued)

The result was some imagery of cloud formation that, while not of the same resolution as the upcoming ABI images, unfolded on the same time scale. You can compare the difference between it and the existing GOES-13 imagery here: <u>http://cimss.ssec.wisc.edu/goes/blog/wp-content/uploads/2013/08/GOES1314_VIS_21AUG2013loop.gif</u>

Learn more about the GOES-R series of satellites here: <u>http://www.goes-r.gov</u>.

Kids should be sure to check out a new online game that's all about ABI! It's as exciting as it is educational. Check it out at <u>http://scijinks.gov/abi</u>



The Advanced Baseline Imager. Credit: NOAA/NASA.

Download photo at: <u>http://www.goes-r.gov/spacesegment/images/ABI-complete.jpg</u>.



Treasurer's Report by Steve Germann

Treasurer's report for December 2013 (unaudited)

Opening balance:	\$4924.05
Revenue:	\$2493.00
Expenses:	\$71.71
Closing Balance:	\$7345.34

Revenue included \$2145 for Calendars, \$28 for 50/50 and \$320 for memberships. Expenses included \$71.71 for software.



SkyStopper Equatorial Platform

The SkyStopper equatorial platform, custom made for your telescope and latitude, can be yours in just a week, for only \$649 plus shipping. (Local pickup save \$25 and all the shipping)

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- do guided astrophotography and manual fine centering with your Dob
- effortless tracking through the zenith
- compatible with push-to digital setting circles
- compatible with goto Dobs that can stop their clock drive
- runs on 12v accessory power from your tank
- star, sun, moon, half-solar, and tuned rates
- easy to assemble, adjust and maintain
- adjustable bubble level allows quick setup at a variety of sites
- made in Canada, ships from Canada
- quick release magnetic linkage
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- pushbutton override possible instead of remote
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- high weight capacity and stability
- typically 90 minutes run time
- quick rewind or re-center
- low power
- dimmable led display

http://www.skystopper.ca/ or email smrg@cogeco.ca



Answers to Astronomy Crossword on Page 11





William J. McCallion Planetarium

McMASTER UNIVERSITY, HAMILTON, ONTARIO

- Public shows every Wednesday (7:00pm)
- Public transit available directly to McMaster campus
- Tickets \$5 per person; private group bookings \$100
- Different shows every week
- Upcoming shows include:
 - Jan 15: Introductory Astronomy for Kids (1st Wed of every month)
 - Jan 22: Moons of the Solar System
 - Jan 29: Icy Worlds
- For more details, visit

www.physics.mcmaster.ca/planetarium



UPCOMING EVENTS

January 10, 2014 - 7:30 pm — *General Meeting* at the Hamilton Spectator Auditorium. Our main speaker will be **Steve Germann**. Steve, a member of the HAA since 2006, Past Chair of the HAA and our current Treasurer, will speak about the SkyStopper Equatorial Platform for large Dobsonian telescopes.

February 14, 2014 - 7:30 pm — *General Meeting* at the Hamilton Spectator Auditorium. Our main speaker will be **Dr. Rob Cockcroft** of McMaster University. Rob's topic will be Ancient Egyptian Astronomy.

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