ROYAL ASTRONOMICAL SOCIETY OF CANADA - VICTORIA CENTRE

SKYNEWS

IN THIS ISSUE

NGC 6946 - *The Fireworks Galaxy*
by John McDonald

A Supernova *Hot Zone*
See Page 7

NEXT MEETING

Next Monthly Meeting
Wed Sept 13th 2017
Rm A104
Bob Wright Centre
UVic Campus

w w w . v i c t o r i a . r a s c . c a

On the Cover

NGC 6946 - The Fireworks Galaxy

By John McDonald

NGC 6946 is called the "The Fireworks Galaxy", because it is the source of so many supernovae. John McDonald captured the cover page image using a 20 inch f4.1 reflector with an SBIG ST2000 XM camera at the SDG observatory of Garry Sedun located in Arizona. Total exposure time was 208 minutes and John processed the data on Dec 16 2016 using Images Plus and Photoshop. On May 14th 2017 amateur astronomer Paul Wiggens discovered a supernova in NGC 6946. **Learn more of this event and see Dan Posey's image of this supernovae on page 7.**

President's Report

by Chris Purse

Another year of Astro Café has concluded. I would like to thank Barb, Reg, and John for the great series of topics, photos, videos, and of course, snacks we shared. With the installation of the larger television screen earlier this year, it is much improved for the sharing of astrophotography, videos, and the like. Astro Café continues to be a well-attended centre event and we look forward to another year starting in September. If you have not been to Astro Café recently, or ever, I encourage you to come by one Monday evening. I don't think you will be disappointed!

The 2017 Summer Star Parties at the DAO are in full swing and we have had some good observing weather. As we enter summer, the emphasis will be on solar astronomy and targets that can be seen while the sky remains light. If you are not already on the volunteer's list, and want to help out, please send me an email at president@victoria.rasc.ca. There are many more Saturdays on the calendar and new volunteers are most welcome.

As space exploration is in the news frequently, we have some great conversations at the star parties. I really enjoy sharing that time at the telescope that is often someone's first time seeing a solar prominence or looking at the moon through a telescope. We've even had astronomical events that centre members have not seen before. For example, on 3 June, we saw the double shadow transit of Jupiter's moons Ganymede and Io during the evening. That was a first for me and something I will look out for in the future. The shadow transit coincided with the Great Red Spot being visible so that was great all around!

Since the general interest in astronomy is high, I have long thought it is under represented in the school curriculum. Considering the major contributions of Canadian astronomers, it is surprising that our students do not have more exposure to space science and, in particular, the opportunity to take a senior level course in astronomy. I was very happy to learn that teachers at Victoria High School are working to correct that with the introduction of an Astronomy 11 course. The course launches in the 2017 – 18 school year and the initial impressions are that quite a few students are interested in taking this new course. That is a great step forward and I hope it proves to be a great success. As part of the launch of this new course, Victoria High School is hosting a Star Party on Saturday 17 June starting at 8:30 p.m. If you are in the area why not attend? Please see cuyeda.weebly.com/star-party.html for more information.

Finally, as a reminder, our RASCals Star Party will be held on weekend of 28 – 30 July on the District of Metchosin municipal grounds. Information will be posted on our website once we have more details about the events that day. Saturday 29 July has been identified as the National Star Party day with events taking place across Canada as part of the sesquicentennial. I hope many members will come to the party

2017 Summer Star Parties

Star Parties at the DAO: Every Saturday at 7:30 PM except Canada and Labour Day. **Click here for tickets**.

Fernwood Star Party: Saturday June 17th starting at 8:30 PM with a **talk by David Lee in Vic High Auditorium**.

Mechosin Star Party Weekend: July 28th to 30th. Monitor **victoria.rasc.ca** for details as they become available.

June 14th Meeting Presentation

Radio and Microwave Astronomy – History, Canadian Involvement, and Interesting Tidbits by Dr. Lisa Loche

7:30 PM:Rm A104 - Bob Wright Centre, UVIC

Radio astronomy started in the early 1930's as an electrical engineering project and it took many years for the optical astronomy community to include it under the gilded Astronomy umbrella. Early experimentalists had a field day with surplus World War II equipment and the increased world-wide collaboration between researchers. I will explain and guide through this history up to the present, contrasting the new radio astronomy with the classic well-understood optical ideas, highlighting Canada's significant role in the growing field. Details on current instrument projects and observatories will also be presented.

Bio: Dr. Lisa Shannon Locke was born in Hay River, NWT and received a B.Sc (Alberta), an M.Sc. (Cape Town, 2001) and PhD (Victoria, 2014) degrees all in electrical engineering specializing in low-noise microwave astronomy instrumentation. As a student, she worked at the Canadian Space Agency, CalTech's Owens Valley Observatory and the National Radio Astronomy Observatory in Green Bank, WV. After graduating, she spent 5 years at the Arecibo Observatory in Puerto Rico and joined the National Radio Astronomy Observatory's , expanded very large array (EVLA) at Socorro, NM. Her Phd thesis investigated the design and construction of a K-band feed for use on large radio astronomy reflectors. She is currently employed with NRC Herzberg and leads a multi-disciplinary project to build a S/C-band (2.8 – 5.18 GHz) receiver system.

See Page 4 for Upcoming Speakers

Our weekly **Astronomy Cafe** is an excellent, informal, way to meet us. New comers are especially encouraged. http://victoria.rasc.ca/events/astro-cafe/
Fairfield Community Centre - 1330 Fairfield Rd. Victoria.7:30pm.
Contact: Reg Dunkley for further details: vp@victoria.rasc.ca

Closed for the Summer but **Reopening after Labour Day**
Every Monday at 7:30 PM

Email Lists

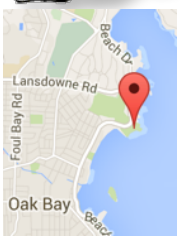
Observer / CU Volunteers / Members

Contact Chris Purse to subscribe

membership@victoria.rasc.ca

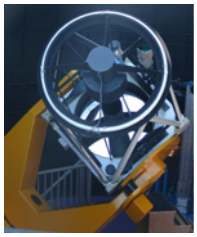
New Observers Group

Hosted by Sid Sidhu - 1642 Davies Road, Highlands. Call 250.391-0540 for information and directions.



Cattle Point observing in Victoria's own Urban Dark Sky Park:
http://victoria.rasc.ca/events/rascals-cattle-point/
Next Sessions : *Weather Permitting*
Friday October 6th at 7:00 PM

Victoria Centre Observatory: Every Friday Evening.
*Open to those on **the Active Observers list only***
Weather permitting.



UVic 32 Inch Telescope
RASC Victoria Centre Session 2nd Friday of Month. Resuming in the Fall. Meet by the Elevator in the Bob Wright Centre at 7PM

Membership Report - June 2017

Total membership is currently **250.** There are 17 members in the grace period which means their membership has expired in the past 2 months. Please contact Chris Purse (membership@victoria.rasc.ca) if you would like to check the status of your membership.

All Splendours, No Fuzzies.

On the following two pages please find the list of **Summer Splendours** that were selected by Okanagan Centre RASC member **Alan Whitman.**. Why another list? Well sometimes ***Less is More*** and that is the appeal of Alan's ***All Splendours No Fuzzies*** observing list. He has eliminated some of the more modest Messier objects and has included a number of splendours that deserve more attention. Beware that Alan has also included a number of Southern Hemisphere targets. So if an object has a declination lower than minus 30 degrees you may want to head south. Table abbreviations are to the right. An empty column has been included to the far right of the table so that you can mark your progress. This list is is not as overwhelming as some so give it a try. The full list can be viewed at the following link: http://www.ocrasc.ca/All%20Splendor.html Splendor lists for the other seasons can be found in the following SkyNews issues:
Fall Splendours: October 2016
Winter Splendours: January 2017
Spring Splendours: March 2017

Enjoy Savouring the Summer Skies!

Upcoming Speakers

Wednesday September 13th 2017
At UVic: Ted Stroman. Formation and Geology of the Moon.
Wednesday October 11th 2017
At UVic: Wendell Shuster. Historical Supernovae
Saturday November 18th 2017
AGM at Cedar Hill Golf Course: Dr Chris Willott. The James Webb Space Telescope
Wednesday December 13th 2017
At UVic: Dr. Chris Pritchett. Type 1a Supernovae

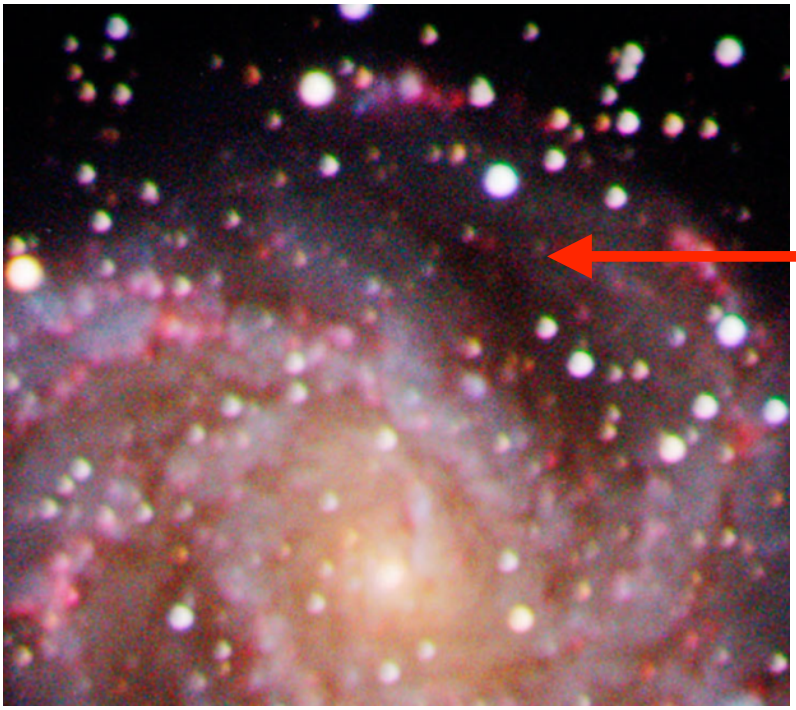
A	**component A of a double or multiple star**
adj	**adjacent**
B	**component B of a double or multiple star**
B	**(with number) Barnard's catalogue of dark nebula**
C	**component C of a multiple star**
CC	**concentration class for globular clusters, from I to XII**
Cl	**cluster(s)**
cn*	**central star of planetary nebula**
d	**degree**
Dbl	**double star**
dl	**dark lane in galaxy or emission nebula**
DN	**dark nebula**
EN	**emission nebula**
G	**galaxy (with type)**
GC	**globular cluster**
IC	**Index catalogue**
-in	**inch (as in "8-in", meaning a telescope of 8-inch aperture)**
inv	**involved**
LMC	**Large Magellanic Cloud**
M	**Messier catalogue**
m	**visual magnitude**
mag	**visual magnitude**
Mlt	**multiple star**
[name]	**the originator of a descriptive name**
NE	**visible with the unaided eye**
Neb	**nebula**
NGC	**New General Catalogue**
OC	**open cluster**
OIII	**An Oxygen III nebular filter is recommended**
p	**photographic magnitude**
PN	**planetary nebula**

ID	Con	Type	RA(2000)	Dec	Mag	Size(')	Remarks	
6025	TrA	OC	16 03.7	-60 30	5.1	12		
Beta	Sco	Dbl	16 05.4	-19 48	2.8,4.9	14"	White,pale blue	
M4	Sco	GC	16 23.6	-26 32	5.9	26	Central bar of st; CC IX	
Rho	Oph	Mlt	16 25.6	-23 27	5.2,5.9	3.1"	Both bluish; two wide mag 7 companions	
Alpha	Sco	Dbl	16 29.4	-26 26	1.0,5.4	2.6"	Antares; beautiful orange, emerald; requires very steady seeing. Sep. changing quickly. Data 2016	
M13	Her	GC	16 41.7	36 28	5.9	17	NE; star chains at margins; CC V	
M12	Oph	GC	16 47.2	-01 57	6.6	15	CC IX	
6231	Sco	OC	16 54.0	-41 48	2.6	15	NE; False Comet [Whitman]: with Zeta (nucleus), 6231 (coma), OC H12 (tail)	
M10	Oph	GC	16 57.1	-04 06	6.6	15	Pair with M12 3d NW; CC VII	
M62	Oph	GC	17 01.2	-30 07	6.6	14	CC IV	
M19	Oph	GC	17 02.6	-26 16	7.2	14	CC VIII; oblate	
Alpha	Her	Dbl	17 14.6	14 23	3.5v, 5.4	4.7"	Orange, blue-green	
36	Oph	Dbl	17 15.3	-26 36	5.3,5.3	5.1"	Orange twins. Sep. changing quickly. Data 2016	
M92	Her	GC	17 17.1	43 08	6.5	11	8-in: bulging rectangle; CC IV	
Pipe Neb	Oph	DN	17 21	-27	--	7d long	NE; B59, 65, 66, 67, 78	
Rho	Her	Dbl	17 23.7	37 09	4.6,5.6	4.1"	Both white	
Nu	Dra	Dbl	17 32.2	55 10	4.9,4.9	62"	Both white	
M6	Sco	OC	17 40.1	-32 13	4.2	15	NE; Butterfly Cluster [Burnham]; four OC adj	
6397	Ara	GC	17 40.7	-53 40	5.7	26	Easily resolved, st m 10; CC IX	
IC 4665	Oph	OC	17 46.3	05 43	4.2	41	NE	
M7	Sco	OC	17 53.9	-34 49	3.3	80	NE; fine in binoculars	
M23	Sgr	OC	17 56.8	-19 01	5.5	27	NE; Star cloud M24 and OC M25 to east	
6543	Dra	PN	17 58.6	66 38	8.8	0.3	Cat's Eye Neb; 8-in: oval, cn*	
40-41	Dra	Dbl	18 00.2	80 00	5.7,6.0	19"	Yellow st	
95	Her	Dbl	18 01.5	21 36	4.9,5.1	6"	Silver, gold	
M20	Sgr	E/RN	18 02.3	-23 02	6.3	29	Trifid Neb [J.Herschel] but has FOUR dl; OC M21 adj	
B86	Sgr	DN	18 03.0	-27 53	---	4.5x3	OC 6520 adj	

ID	Con	Type	RA(2000)	Dec	Mag	Size(')	Remarks	
M8	Sgr	EN	18 03.8	-24 23	5.8	90	NE; dl; OC inv [note: I intentionally avoided the inappropriate name, "Lagoon Nebula"]	
70	Oph	Dbl	18 05.5	02 30	4.0,6.0	6.4"	Yellow, orange. Sep. changing quickly. Data 2016	
6541	CrA	GC	18 08.0	-43 42	6.6	13	CC III	
B92	Sgr	DN	18 15.5	-18 14	---	15x10	In spectacular star cloud M24; B93 adj	
M16	Ser	EN/ OC	18 18.8	-13 47	6.0	35	Eagle Neb; UHC; DN inv: The Star-Queen Neb[Burnham]	
M17	Sgr	EN/ OC	18 20.8	-16 11	6.0	46	Swan Neb [Burnham?]; DN inv	
M22	Sgr	GC	18 36.4	-23 54	5.1	24	Oblate CC VII; 3-in resolves	
Epsilon	Lyr	Mlt	18 44.3	39 40	5.0,6.1 ; 5.2,5.5	2.6"; 2.3"	The Double-double; four white st	
M11	Scu	OC	18 51.1	-06 16	5.8	14	Dense; 200 st m 11; DN adj	
M57	Lyr	PN	18 53.6	33 02	9.0	1.3x1	Ring Neb [W. Herschel]; 16-in at 400x shows cn*	
Otto Struve 525	Lyr	Dbl	18 54.9	33 58	6.0,7.7	45"	Albireo-like	
6723	Sgr	GC	18 59.6	-36 38	7.3	11	CC VII; in superb field of DN, RN, Var and Dbl st	
6752	Pav	GC	19 10.9	-59 59	5.4	20	CC VI	
Beta	Cyg	Dbl	19 30.7	27 58	3.1,5.1	35"	Albireo; yellow, blue	
M55	Sgr	GC	19 40.0	-30 58	7.0	19	Brightest CC XI	
B142/43	Aql	DN	19 41	11	---	80x50	Difficult NE; Fine in binoculars	
6826	Cyg	PN	19 44.8	50 31	9.8	0.5	Blinking Planetary [Mullaney/McCall]; cn* m 10	
M27	Vul	PN	19 59.6	22 43	8.1	7	Dumb-bell Neb [J. Herschel]	
6940	Vul	OC	20 34.6	28 18	6.3	31	Ri	
6960	Cyg	SNR	20 45.7	30 43	---	70x6	Veil Neb; OIII; longer Nile-like nebulosity adj for many fields	
Gamma	Del	Dbl	20 46.7	16 07	4.3,5.1	10"	Yellow, pale green	
6992/5	Cyg	SNR	20 56.4	31 43	---	78x8	Veil Neb; OIII; 6992 in 7x50s	
7000	Cyg	EN	20 58.8	44 20	---	120	NE; North America Neb [Wolf]; DN inv; UHC	
Funnel Cloud	Cep/ Cyg	DN	21 00	55	--	12d long	NE Funnel Cloud Nebula [Whitman] cuts almost across the Cep/Cyg Milky Way	

A Supernova Hot Zone
by Reg Dunkley

In the past 100 years 10 supernovae have been detected in NGC 6946, the Fireworks Galaxy. In contrast the Milky Way only averages one supernova per century. The latest Fireworks supernova, SN2017aew, was discovered by amateur astronomer Paul Wiggens on May 14th 2017. This is the third supernova discovered by Wiggens. The bright star did not appear on a similar Fireworks image he captured on May 12th. This early detection allowed many professionals to measure the initial stages of this supernova with powerful instruments. While these are early days, many have classified this as a “type IIp" supernova. Type II supernovae are associated with the sudden core collapse of Red Super Giants. The “p” indicates that after the initial peak, the intensity of the supernova “plateaued”. This temporary pause in the brightness decline enabled Victoria Centre RASCal Dan Posey to photograph SN2017aew at the VCO on Friday May 26th. He took and stacked 97 one minute exposures using his Canon 6D at iso 3200 through his SVR90T refractor at f7. The Fireworks appears as a tiny object in Dan Posey’s image (below) with a nearby neighbour, the open cluster NGC6939. They are located on the boundary of Cepheus and Cygnus. The early detection of SN2017aew by Wiggens is an excellent example of the important contribution that amateurs can make.



The Fireworks Galaxy shows up as a tiny object in the May 26th image taken by Dan Posey (top right) but when zoomed in (bottom right) and compared to a similar portion of John McDonald’s December 2016 cover photo (bottom left) the new supernova is obvious.

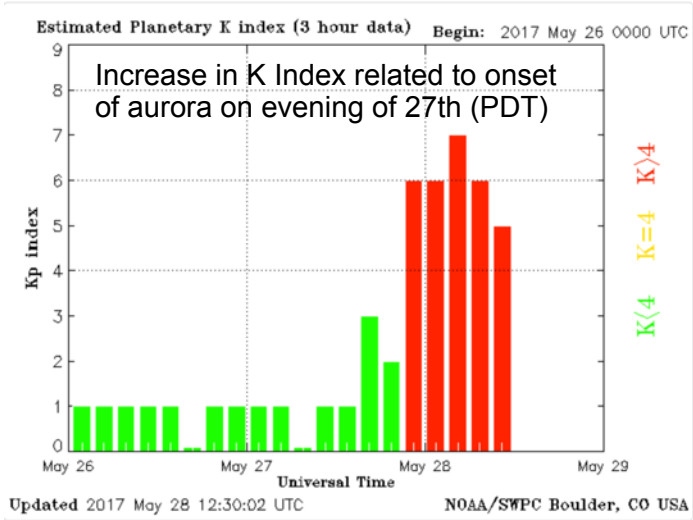
An Aurora Visits Victoria …
and Launches an Internet Adventure
by Reg Dunkley

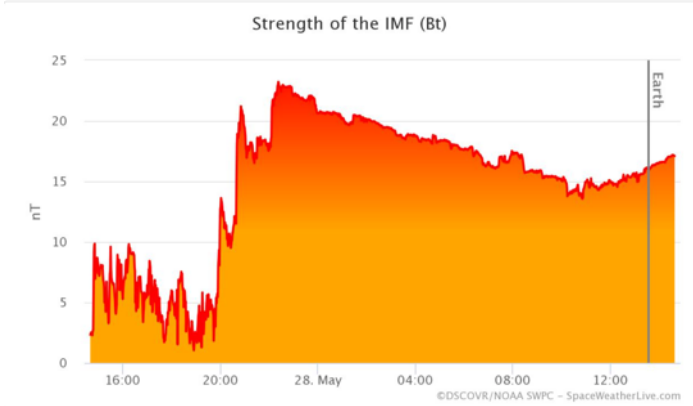
As I stepped onto my balcony late on the evening of Saturday May 27th I noticed a long luminous cloud in the north extending from the west to the northeast. Since it was near a New Moon there was no obvious source of illumination. It was similar to strange phenomenon called “Steve” that was the topic of discussion at a recent Astro Cafe. This talk was inspired by a New York Times article. So I set up my camera and started to snap away a series of 4 second exposures at ISO 3200. When I stepped through this sequence I could detect a faint dance of northern lights below this “Steve cloud” on the northern horizon.

I then checked my e-mail and found that Past President and Aurora Evangelist Sherry Buttnor had sent a “Heads Up Warning” about a K 6 magnetic storm. This inspired me to return to the camera and I continued to take photos until around 2AM when my memory card filled up. Both the aurora and I were winding down at that time. The long luminous cloud I thought was “Steve” soon faded but the aurora on the horizon brightened and became more active. At times it was bright enough to cast a reflection on the waters of Oak Bay.

Although I had seen aurora on many occasions during my time in the Yukon this was the first display I could enjoy in short sleeves in Victoria. I became curious about what caused this rare episode and it was time to descend into the bowels of the internet. Starting with that magnetic storm warning, I was soon wading through a wonderful treasure trove involving the NOAA Space Weather Prediction Centre.

In addition to graphs of the magnetic K index I was checking out changes of solar wind and magnetic fields measured by the recently launched DSCOVR satellite (sometimes called the “GoreSat” but that is a sad tale). Deployed at the L1 Lagrangian point located 1.5 million kilometers away from the Earth towards the Sun, it serves as an early warning system. It can take a lag time of several hours before an abrupt change in the solar wind or magnetic field detected by DSCOVR reaches the Earth or orbiting spacecraft. This provides a heads up to prepare for power transmission problems or telecommunication disruptions.





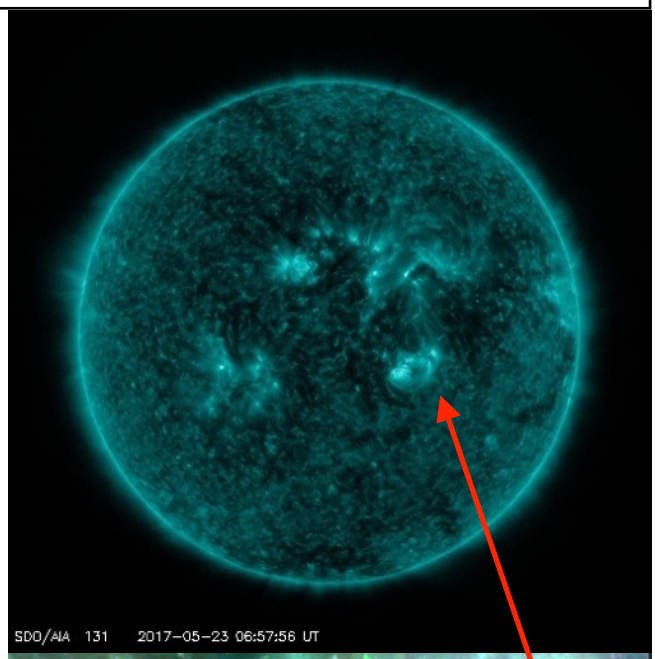
Above: Magnetic field rises at DSCOVR Satellite in afternoon of 27th (PDT) and reaches Earth that night.
Below: Northern Lights Reflected on Oak Bay at 1:04 AM

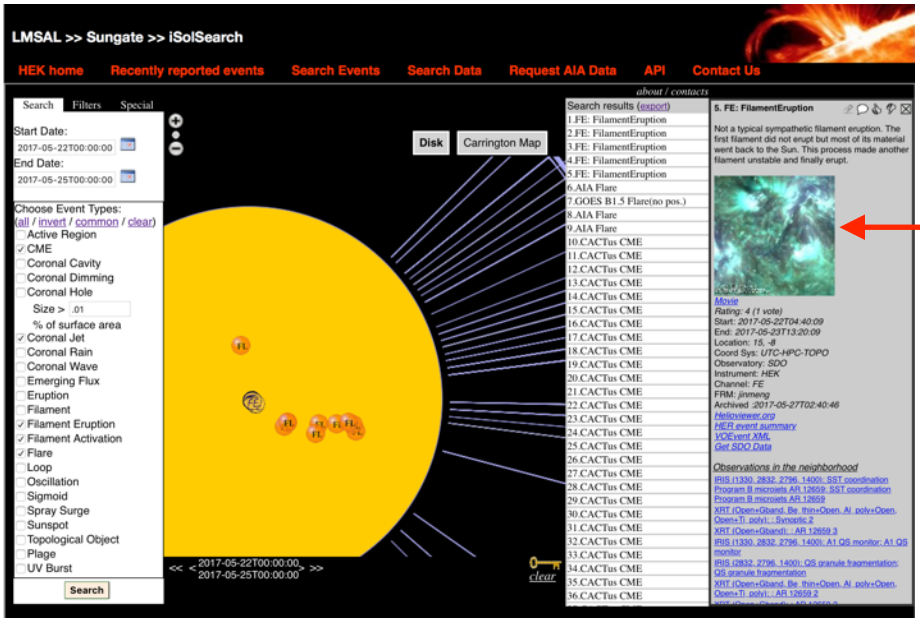
But what causes these solar wind and magnetic field changes? That is where things get really interesting.There are a suite of satellites devoted to monitoring the Sun. The Solar Dynamic Observatory (SDO) is one of the most recent additions. Launched in 2010 for a 5 year mission it actually has sufficient fuel to operate in a geosynchronous orbit for 100 years and is still going strong!

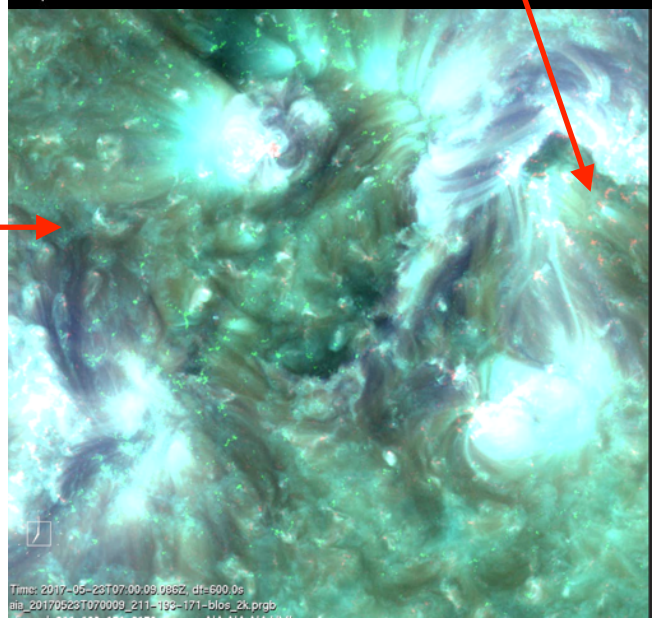
The SDO has three suites of instruments. The Atmospheric Imaging Assembly (AIA) consists of 4 telescopes which use filters to observe the full disk of the solar surface and atmosphere in 10 wavelength bands. These range from visual to the extreme ultraviolet where very high energy photons are detected. The imagery has a high cadence and spatial resolution of 1.2 arc seconds. The Extreme Ultraviolet Variability Experiment (EVE) collects a solar ultraviolet spectrograph every 45 seconds as well as extreme ultraviolet irradiance data and X-Rays. The Heliosesmic and Magnetic Imager (HIA) measures the magnetic and velocity fields at the Sun's surface every 45 seconds.

The NASA team and their partners have developed an absolutely brilliant website that allows quick and easy access to realtime and historical SDO data. The **iSolSearch** webpage allows you to specify a time window which displays the location of significant solar features. When I clicked on an item labelled FE for Filament Eruption it magically provided an annotated link to the high resolution movie. This displayed the eruption which launched the particles that generated the aurora that I witnessed 5 days later. *Is that not amazing!* The feature responsible for the May 27-28th aurora event was effective not because it was powerful but rather because it hit the Earth squarely on target. I encourage you the check out the hyperlinks in this article and begin your own voyage of discovery!

Below: Full Disk AIA image at time of Filament Eruption







RASC Victoria Centre Council 2016 / 2017

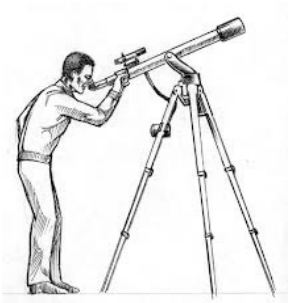
POSITION	NAME	E-Mail
Past President:	Sherry Buttnor	pastpres@victoria.rasc.ca
President	Chris Purse	president@victoria.rasc.ca
First Vice President	Reg Dunkley	vp@victoria.rasc.ca
Second Vice President	Deb Crawford	vp2@victoria.rasc.ca
Treasurer	Bruce Lane	treasurer@victoria.rasc.ca
Secretary	Leslie Welsh	secretary@victoria.rasc.ca
Librarian	Michel Michaud (Diane Bell)	librarian@victoria.rasc.ca
Technical Comm Chair / E-Mail	Matt Watson	admin@victoria.rasc.ca
Skynews Editor	Reg Dunkley	editor@victoria.rasc.ca
Public Outreach	Ken Mallory	outreach@victoria.rasc.ca
School Outreach	Laurie Roche / Sid Sidhu	
Telescopes	Sid Sidhu	telescopes@victoria.rasc.ca
National Representative	Nelson Walker	nationalrep@victoria.rasc.ca
Light Pollution Abatement	Dave Robinson	lighting@victoria.rasc.ca
Membership Coordinator	Chris Purse	membership@victoria.rasc.ca
Observing Chairperson	Michel Michaud / Jim Stillburn	obschair@victoria.rasc.ca
Website Content	Joe Carr	web@victoria.rasc.ca
Members at Large		
National Officer	Chris Gainor	
Astro Cafe	John McDonald	
NRC Liaison	James di Francesco	
Nat RASC Anniversary Wrkg Group	Dr. James Hesser	james.Hesser@nrc-cnrc.gc.ca
Nat RASC Anniversary Wrkg Group	Laurie Roche	
UVic Liaison	Alex Schmid	
Observing	David Lee	
Historian	Bill Almond	

Online Resources

Magazines

SkyNews Our National RASC Newsletter
Sky & Telescope Magazine
Astronomy Magazine
Astronomy Now Astronomy in the UK
Amateur Astronomy Magazine
Astrophotography Magazine

Borrowing Telescopes



The centre has telescopes for new and seasoned observers that members can use. Contact Sid Sidhu from the email list