

# NOVA

NEWSLETTER OF THE VANCOUVER CENTRE RASC  
VOLUME 2018 ISSUE 1 JANUARY FEBRUARY 2018



## Paul Sykes Lecture – Sat, Jan 27 @ 7:30pm

**Ice on Mercury, Featuring Dr. Nancy Chabot of Johns Hopkins University**

**SFU Burnaby Campus, Room SWH 10081**

Even though Mercury is the planet closest to the Sun, there are places at its poles that never receive sunlight and are very cold—cold enough to hold water ice! In this presentation, Dr. Chabot will show the multiple lines of evidence that regions near Mercury's poles hold water ice—from the first discovery by Earth-based radar observations to multiple data sets from NASA's MESSENGER spacecraft, the first spacecraft ever to orbit the planet Mercury. These combined results suggest that Mercury's polar ice deposits are substantial, perhaps comparable to the amount of water in Lake Ontario! Where did the ice come from and how did it get there? Dr. Chabot will discuss these questions and others during this presentation of water ice on our Solar System's innermost planet.

Dr. Nancy L. Chabot is a planetary scientist at the Johns Hopkins Applied Physics Laboratory (APL). She received an



undergraduate degree in physics at Rice University and a PhD in planetary science at the University of Arizona. Prior to joining APL, Dr. Chabot worked at NASA Johnson Space Center

and Case Western Reserve University. She has been a member of five field teams with the Antarctic Search for Meteorites (ANSMET) program and served as the Instrument Scientist for the Mercury Dual Imaging System (MDIS) on the MESSENGER mission. Her research interests involve understanding the evolution of rocky planetary bodies in the Solar System, and at APL she oversees an experimental geochemistry laboratory that is used to conduct experiments related to this topic. Dr. Chabot has served as an Associate Editor for the journal Meteoritics and Planetary Science, chair of NASA's Small Bodies Assessment Group, a member of NASA's Planetary Science Subcommittee, and other professional positions. Asteroid 6899 Nancychabot is named in her honour. ★

### JANUARY 11

SFU

Terence Lee, senior engineer at MDA: The Sapphire Space Telescope and a history of MDA's space missions. Room AQ3159

SFU

### FEBRUARY 8

SFU

Dr. Sean Dougherty, Director of ALMA (Atacama Large Millimeter/submillimeter Array). Room AQ3159

SFU

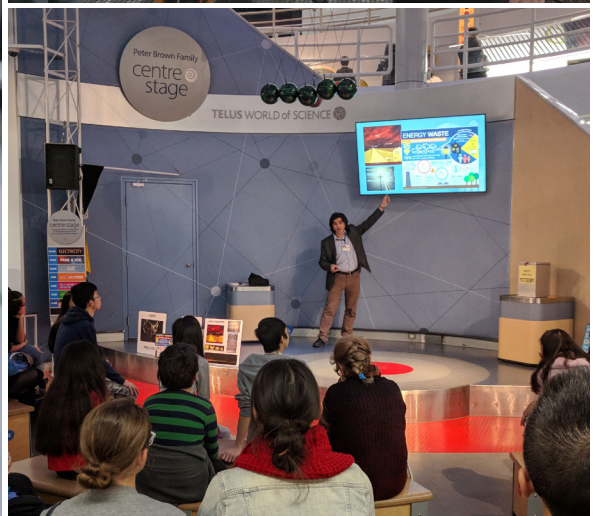
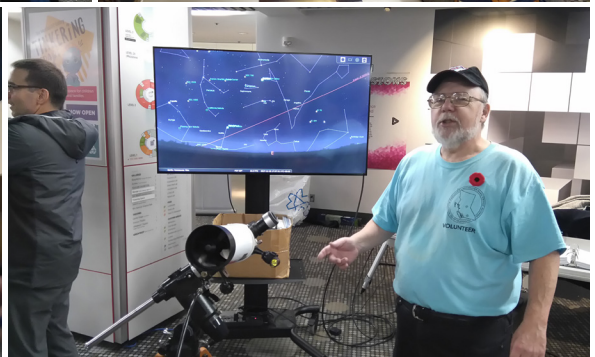
### MARCH 8

SFU

Patrick Earl and Matt Cimone (see Meetup for details). Room AQ3159

SFU

# SWEET Event at Science World – Nov. 10, 2017



# President's Message

Greetings to all my fellow star gazers. 2018 marks the 150<sup>th</sup> anniversary of The Royal Astronomical Society of Canada. We have some great things to look forward to in the coming year starting on January 27<sup>th</sup> with a cross-country Star Party that combines solar and lunar observing, local Centre exhibits and displays, as well as many other fes-

tive events, starting on the Atlantic coast and reaching westwards (and of course northwards) to encompass many of our Centres. A nation-wide online welcoming between centre presidents is also planned for that day. Throughout the year, there will be events held in collaborations with other centres as well as with some of our other partners in science in

by Leigh Cummings

the lower mainland. There will be monthly podcasts from RASC National telling odd stories and history from the archives. There will also be images and documents of rare RASC artifacts to enhance the podcast experience. RASC National also has plans for special projects and competitions for our members to

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## About RASC

The RASC Vancouver Centre meets at 7:30 PM on the second Thursday of every month at SFU's Burnaby campus (see map on page 4). Guests are always welcome. In addition, the Centre has an observing site where star parties are regularly scheduled.

Membership is currently \$78.00 per year (\$45.00 for persons under 21 years of age; family memberships also available) and can be obtained online, at a meeting, or by writing

to the Treasurer at the address below. Annual membership includes the invaluable Observer's Handbook, six issues of the RASC Journal, and, of course, access to all of the club events and projects.

For more information regarding the Centre and its activities, please contact our P.R. Director.

NOVA, the newsletter of the Vancouver Centre, RASC, is published on odd-numbered months. Opinions expressed herein are not nec-

essarily those of the Vancouver Centre.

Material on any aspect of astronomy should be e-mailed to the editor or mailed to the address below.

Remember, you are always welcome to attend meetings of Council, held on the first Thursday of every month at 7:30pm in the Trotter Studio in the Chemistry wing of the Shrum Science Centre at SFU. Please contact a council member for directions.

## 2018 Vancouver Centre Officers

<b>President</b>	Leigh Cummings president@rasc-vancouver.com
<b>Vice-President</b>	Gordon Farrell vp@rasc-vancouver.com
<b>Secretary</b>	Olivier Eymere secretary@rasc-vancouver.com
<b>Treasurer</b>	Phil Lobo treasurer@rasc-vancouver.com
<b>National Rep.</b>	Kenneth Lui national@rasc-vancouver.com
<b>Librarian</b>	William Fearon library@rasc-vancouver.com
<b>Public Relations</b>	Scott McGillivray publicrelations@rasc-vancouver.com

<b>LPA</b>	Pascal Pillot-Bruhat lpa@rasc-vancouver.com
<b>Dir. of Telescopes</b>	Don Duthie telescopes@rasc-vancouver.com
<b>Observing</b>	Robert Conrad observing@rasc-vancouver.com
<b>Membership</b>	Suzanna Nagy, Francesca Crema membership@rasc-vancouver.com
<b>Events Coord.</b>	Jeremy van den Driesen, Hayley Miller events@rasc-vancouver.com
<b>Education</b>	Robert Conrad, Tim Stephenson, Andrew Krysa education@rasc-vancouver.com
<b>AOMO</b>	Alan Jones aomo@rasc-vancouver.com

<b>Merchandise</b>	Kyle Dally merchandise@rasc-vancouver.com
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<b>NOVA Editor</b>	Gordon Farrell novaeditor@rasc-vancouver.com
<b>Speakers</b>	Scott McGillivray speakers@rasc-vancouver.com
<b>Past President</b>	Suzanna Nagy
<b>At Large</b>	Howard Trottier, Ken Arthurs, Bill Burnyeat, Isabelle Eymere
<b>Trustee</b>	Pomponia Martinez
<b>Honourary President</b>	J. Karl Miller

## Library

The centre has a large library of books, magazines and old NOVAs for your enjoyment. Please take advantage of this club service and visit often to check out the new purchases. Suggestions for future library acquisitions are appreciated.

## On the Internet

<http://rasc-vancouver.com> or  
<http://www.rasc.ca/vancouver>  
<http://astronomy.meetup.com/131/>  
<http://www.facebook.com/RASC.Van>



@RASC Vancouver

## Mailing Address

RASC Vancouver Centre  
PO Box 89608  
9000 University High Street  
Burnaby, B.C.  
V5A 4Y0



## Map to Meeting Site



Our Jan-Mar meetings are in room AQ3159, located near the southeast corner of the Academic Quadrangle as indicated by the arrow on the map.

Pay parking is available at several locations located around campus (indicated as "P" on the map).

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take part in. Check out our webpage ([rasc-vancouver.com](http://rasc-vancouver.com)) to be kept up to date on what is planned for this big celebration.

We start 2018 off with a new council for RASC-Vancouver. As a new president, I am lucky to have such a large and enthusiastic council to help accomplish our goals in the next 2 years. I think our council is a good reflection of our membership at large as we have a good mix of men and women both young and more mature (as well as a few of us more ripened fellows). Our new council has a healthy blend of both experienced members and those freshly new at their responsibilities. A wide variety of backgrounds also means a broader spectrum of talent to bring to the table. I look forward to working with every one of them.

Suzanna Nagy, our past president, has stepped into the position of Membership Chair. For the last two years as president, Suzanna did a fantastic job of navigating our council through some stressful

times. We had to re-apply for our charitable status with the CRA as well as re-register with the BC Societies branch. To accomplish these tasks we also had to update and re-write our by-laws and have them passed by our general membership. Suzanna and Bruce Hutchison were the main drivers behind all of these accomplishments and I do not know if we would have been successful had it not been for their keen organizational skills and ability to weave their way through the bureaucracies of our governments. Somehow during all this turmoil, Suzanna found time to put together a President's Manual to assist her followers in doing their (my) job as President. For that I am so very grateful!

Sharing the duties of Membership Chair with Suzanna will be Francesca Crema who served last year as an At Large Councillor. Guests interested in joining RASC-Vancouver will find them to be a friendly and knowledgeable pair to help you start your astronomy adventure. You will find one or both of them outside all

our meeting locations with helpful information and possibly a few freebies.

A new face on council will be Olivier Eymere who is taking on the role of Secretary. He has the essential duty of keeping official records of our meetings, events and programs throughout the year. The importance of his job cannot be overstated, and I'm very thankful he is taking it on.

Phil Lobo has stepped up to take over the Treasurer's Chair from Bruce. This is another essential job on council, keeping watch over the purse strings so our members can know their fees are being spent wisely. We look forward to working with him in order to accomplish as much as we can while trying to stay on budget.

Gordon Farrell is continuing to take on the arduous task as Nova Editor. As the editor, he has the unenviable job of rounding up a bunch of procrastinating contributors and making our scribbles into a sensible and serious bi-monthly publication

for our membership and the public to find out the comings and goings in our club. And just in case that wasn't enough, he has agreed to take on the role of Vice President as well. I am very grateful to have such an experienced council member ready to take charge if I find myself needing time away from my position of President. Vice President is one of those positions that does not seem too busy, until it is.

Bill Burnyeat has stepped down as Education Co-Chair, but will stay on council to help out as an At Large Councillor.

We have three co-chairs taking over the Education folder. They are Robert Conrad, Tim Stephenson and Andrew Krysa and they are keen on public outreach and education about astronomy and its related sciences.

Hayley Miller has jumped on board with both feet as she has volunteered to join Jeremy with the Events Chair position. Jeremy van den Driesen has been doing a yeo-

man's job as our Events Chair, but I know he is looking forward to having Hayley's help with all the events that will be coming in 2018, especially with this being our 150<sup>th</sup> anniversary year.

For our members who want to learn more about observing and possibly earn some recognition for their accomplishments, RASC National has introduced some new observing programs. If you are interested, please get in touch with our Observing Chair, Robert Conrad, who is itching to bring more observers into his fold.

Don Duthie will continue to take on the job of Director of Telescopes. As you might guess, this is an important job with an astronomy club. Who would have thought? If you are a member and want to borrow one of our loaner scopes, he is your man.

Also staying in their positions are: William Fearon as Librarian, Kenneth Lui as National Rep, Alan Jones as AOMO Chair, Ken Jackson

as Webmaster, Pascal Pillot-Bruhat as LPA Chair, Scott McGillivray as PR and Speakers Chairs, Kyle Dally as Merchandise Chair and Howard Trottier as an At Large councillor. Thanks to all of them for continuing to step up to the plate.

Another couple of new faces on council are Ken Arthurs and Isabelle Eymere in At Large positions. They will help out all the other members of council who need a hand as well as being available to bring members concerns to the rest of council at our monthly council meetings. Both have been enthusiastic event volunteers in the past and I am sure will continue to be.

I am also glad to announce that Karl Miller will continue on as Honorary President. He is also the busiest volunteer on council, always ready to jump in and give any one of us on council a helping hand. I cannot begin to tell you how many times he has come to our rescue when we have needed that one extra

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## Membership has its Privileges!

Are you tired of looking at the same objects again and again (planets, moon, etc.)? Is your telescope collecting dust because it's hard to locate deep sky objects? Would you like to bring your observing to a stellar level? Robert Conrad, our new observing director, revived the Vancouver RASC observing group and invites you to join by sending him an email at [observing@rasc-vancouver.com](mailto:observing@rasc-vancouver.com). Some of the benefits of belonging to this group include:

- Hands on training on how to operate the sfu Trottier observatory
- Weekly observing sessions at the observatory or at dark sky locations
- One-one-one coaching on how to locate thousands of objects in the night sky
- Attend small interactive seminars delivered by Robert on a range of topics including failsafe star-hopping, charting challenging objects and understanding the motions of the cosmos
- Learn to make your telescope dance by locating objects such as asteroids, nova, and supernovae
- Spectroscopy and imaging training from Howard Trottier and an opportunity to collaborate on observatory research projects
- Updates on observable sky events happening during the week like asteroid/comet/deep sky conjunctions
- Access to observing guides and lists that Robert created that took hundreds of hours to create and will help with planning observing sessions
- Knowledge and expertise from other observing group members
- Learn how to quickly and efficiently find and star-hop to deep sky objects using a range of binoculars and telescopes

# Upcoming Events

## January

27 – RASC 150th Anniversary celebration opening event  
27 – Paul Sykes lecture at SFU (see page 1 for details)

## March

24 – Night Quest at Pacific Spirit Regional Park

## May

12 – Astronomy Day at SFU

## June

28 - July 2 – RASC General Assembly in Calgary

## July

28 – Mars close approach at Science World

## August

4 - 12 – Mt. Kobau Star Party

## September

8 - 16 – Merritt Star Quest

## December

13 – AGM

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body.

I would also be remiss if I did not pass on a big thank you to our departing council members: Elena, Adrian, and Bruce. They set the bar high for those taking over from them.

Rounding out our fine group is our “Canine Unit” consisting of Star and Kepler. Their duties consist of tail wagging, floor cleaning and council stress relief.

On a sadder note, I wish to mention the passing of Paul Greenhalgh

on Thursday, December 7<sup>th</sup> after a brave fight with cancer. He was not a member of RASC but a member of the Fraser Valley Astronomical Society, where he served as president. He also was president of the Merritt Star Quest which is where I first met him. None of us will soon forget hearing his booming voice breaking the wilderness silence when some unwary soul foolishly allowed some white light to leak out across the pristine darkness of our gravel pit. He also had a mischievous sense of humour when foul weather gave

him too much time on his hands. I won't soon forget two years ago when he decided to try out some “Bear Bangers” late one dark and cloudy night. You didn't need any caffeine to stay awake after that. I shared many an afternoon, as well as some cloudy nights, sitting around his campsite soaking in the stories and knowledge that years of observing produce in a person. We will all miss him.

I know that Paul would wish us a New Year full of clear sky and burned-out lights. ★



## How to View Iridium Flares in the Telescope Eyepiece by Robert Conrad

An Iridium flare is a specific type of satellite flare made when the antennas of an Iridium communication satellite reflect sunlight directly onto the surface of the Earth. At this moment, the object can be as bright as  $-8.5$  which is almost 20 times brighter than Venus. There are apps that you can obtain that tell you where to look in the sky and when but how about if you could see it move through your telescope eyepiece at the *very moment* that it hit peak brightness for a few seconds? This guide will walk you through how to achieve this with precision.

Part 1: Find out when Iridium Flares will pass overhead from your location

Access the following website:

<http://www.heavens-above.com/>

In the upper right corner of the screen you will see the following box:

User:	anonymous	<a href="#">Login</a>
Location:	Greater Vancouver, BC, Canada (49.2821°N, 123.1567°W)	
Time:	12:06:51 (UTC-08:00)	
Language:	English ▼	

I've set my location to Vancouver, but you will likely need to set your location initially. If you clear your browser history, you'll need to update each time, or alternatively you can set up a free account and select your default location, so it appears each time. However, again if you clear your history, you'll need to login again for it to show your location.

When you set your location, you will

see a screen like the one at the top of page 8.

Enter your location in the **Enter place to search** field and click the **Search** button.

Enter place to search for

Scroll to the bottom of the page and click the **Update** button.

You will be taken back to the main page. From here click on the **Iridium Flares** link in the **Satellites** section:

### Satellites

- [ISS Interactive 3D Visualization](#)
- [10-day predictions for satellites of special interest](#)
- [ISS](#)
- [Tiangong 1](#)
- [Tiangong 2](#)
- [N. Korean satellite](#)
- [Hubble Space Telescope](#)
- [Envisat](#)
- [OTV 5 \(USA 277\)](#)
- [Satellite database](#)
- [Daily predictions for brighter satellites](#)
- [Iridium Flares](#)
- [Spacecraft escaping the Solar System](#)
- [Amateur Radio Satellites - All Passes](#)
- [Telescope](#)

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## RASC – Celebrating 150 Years by Suzanna Nagy (with excerpts from www.rasc.ca)

On December 1, 1868, the Toronto Astronomical Club met for the first time having for its objective “the aiding of each other in the pursuit of astronomical knowledge.” On March 10, 1890, the organization was incorporated as The Astronomical and Physical Society of Toronto.

In early 1903, the King of the Dominion, Edward VII of England, was petitioned through official channels to allow the Society to adopt the “Royal” style. On the 27th of February, the Society was informed that “His Majesty the King has been graciously pleased to grant permission to the Toronto Astronomical Society to adopt the title of the Royal Astronomical Society of Canada.” We have been known by that name ever since.

2018 marks the 150th year since the Society's inception.

A number of celebratory activities will be held throughout 2018. The first event will be Saturday, January 27. Our National Office has organized a cross-country Star Party that will combine solar and lunar observing, local Centre exhibits, and other activities. The event will start on the Atlantic coast and reach westwards (and of course northwards) to encompass many of our Centres, and thus our membership.

Starting at 3 pm in Atlantic Canada, and then as each Canadian time zone reaches 3 pm local time, RASC Centres will join the internet gathering. Towards 5 pm EST, there will be 3 minutes of time per Centre starting on the Atlantic coast and again working westwards to send greetings across the country to all astronomy enthusiasts.

By 6:00 pm EST, all Centres who

wish to join the Star Party will be active and online. At 6:15 pm EST, the president of the RASC will deliver greetings, and announce officially the commencement of the celebrations for the 150th anniversary of the RASC. The cross country link-up concludes at 8 pm EST.

By chance, the date of January 27 is also the date of Vancouver Centre's annual Paul Sykes Memorial Lecture (details of the Memorial Lecture can be found on page 1 of this newsletter). Therefore, your Vancouver Centre will be celebrating the RASC 150th opening event at SFU in conjunction with the Memorial Lecture.

For more information on the nation-wide January 27 event as well as other anniversary events planned throughout the year, please refer to the national website, [www.rasc.ca](http://www.rasc.ca). ★



## Select location

The red marker shows your currently selected location. You can change the location by either;

1. Searching for a place name.
2. Enter your [what3words](#) address
3. Dragging the marker or clicking on a new location on the map.
4. Entering your coordinates and time zone manually.

Enter place to search for

Search results

Use the mouse to drag the map, and if you have a mouse wheel, you can use it to zoom in and out, otherwise, use the controls in the top left corner of the map to zoom and scroll.



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You will see a table that looks like this:

the screen and click the **Configuration window** icon then click the **Plugins** tab.

Iridium Flares

Search period start: 11:58 Monday, 25 December, 2017

Search period end: 11:58 Monday, 1 January, 2018

☐ include daytime flares

Clicking on the time of the flare will give more details about the flare, including a sky chart.

Time	Brightness	Altitude	Azimuth	Satellite	Distance to flare centre	Brightness at flare centre	Sun altitude
Dec 26, 06:03:45	-2.0	42°	346° (NNW)	Iridium 46	22 km (W)	-7.9	-19° 🌙
Dec 26, 17:34:31	-2.3	24°	196° (SSW)	Iridium 94	21 km (W)	-6.6	-11° 🌙
Dec 27, 05:57:46	-5.0	40°	348° (NNW)	Iridium 49	9 km (W)	-7.9	-20° 🌙
Dec 27, 17:28:22	-1.8	25°	196° (SSW)	Iridium 23	25 km (E)	-6.6	-10° 🌙
Dec 28, 18:48:48	0.4	30°	152° (SSE)	Iridium 91	49 km (E)	-7.5	-23° 🌙
Dec 29, 05:45:52	-1.8	37°	351° (N)	Iridium 25	23 km (E)	-7.7	-22° 🌙

This will show you about a week's worth of Iridium flares. To advance to the next week, click the next arrow:

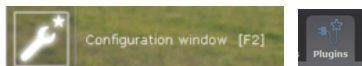
Note that if you set your location and time zone correctly earlier, then the times will show correctly, and you won't need to do any time zone conversions.

So, let's say that we want to view the Iridium flare that will appear on the morning of December 27 at 5:57:46 am. We will need to make a note of the date and time, brightness (-5.0) and the Satellite # (Iridium 49) and use this information in Stellarium.

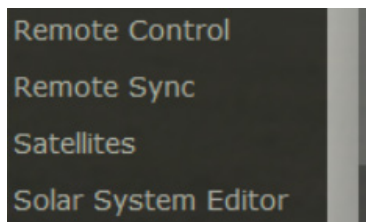
## Part 2: Set up Stellarium for satellites

Let's make sure that we have the Satellite plugin installed.

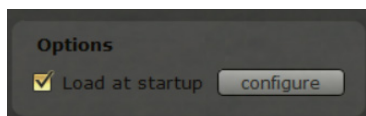
Hover your mouse over the left side of



On the left side of the screen, scroll near the bottom of the list and highlight **Satellites** in the menu.



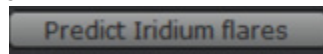
Place a checkmark in the **Load at start-up** checkbox. Then click the **configure** button:



You will see the screen at the top of the opposite page (**be sure at this point you are connected to the Internet**).

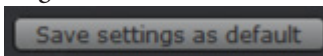
The default **Update frequency (hours)** is set to 72 hours. Change it to 1 or 2 and click the **Update now** button.

Now, click on the **Iridium flares** tab, then click the **Predict Iridium flares** button at the bottom (be patient as it takes a few seconds to refresh and if you start clicking before the list populates, it will freeze).

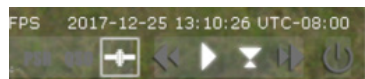


Notice that the Iridium flare that we want to chart is also in the table at the bottom of the opposite page.

Before we leave the Satellites Configuration window, click the Settings tab and at the bottom of the window, click the **Save settings as default** button:

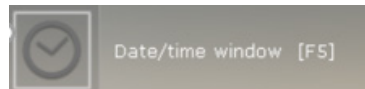


To turn the satellites on in Stellarium, ensure the **Satellite hints** button is enabled (See square box around icon in the image below).

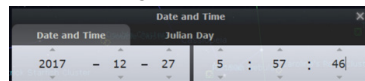


## Part 3: Find the Iridium satellite in Stellarium

Now advance to the date and time for the Iridium satellite you want chart. Hover your mouse over the left side of the screen and select the **Date/time window**:

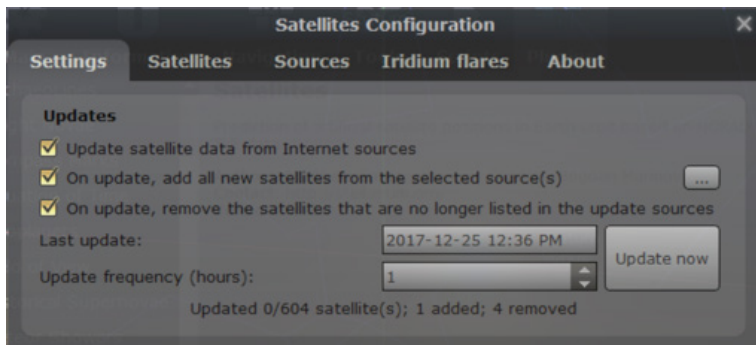


Enter the date and time from Heaven's Above. Recall that the Iridium flare peak for the morning of the 27<sup>th</sup> is 5:57:46 am.

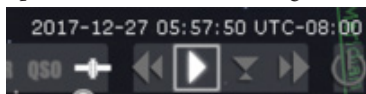


To pause Stellarium at the exact time, you can click the play/pause button on the





menu at the bottom of the screen. See the square around the icon in the image below.



When Stellarium is paused, the play/pause icon will change to the following:



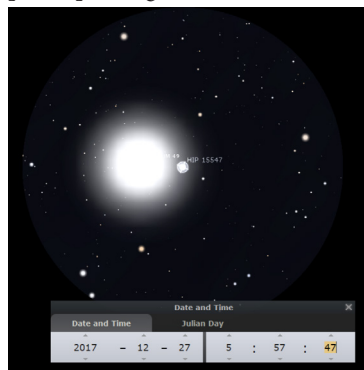
Notice that the Iridium flare 49 is bright at 5:57:46 am, near the constellation Camelopardalis.



If you turn on the ocular plugin (See my general Stellarium guide starting on page 10 in the linked document below for instructions

on how to set up and use the ocular plugin: <https://drive.google.com/open?id=0B3OWWyrmlJowNnZYWmlmUkV/BdXM>)

You will see that at that time, the Iridium flare will be passing through the 5.4 magnitude star **HIP 15547**. A few minutes before 5:57:46, this is the star that we will want to have centred in our eyepiece so that we can watch it pass through our eyepiece at peak brightness.



So, we need to make a note of the RA and DEC (J2000) coordinates **for the star**. Look in the upper left corner of the screen when you have the star selected. RA

= 03:20:20.23 and DEC = 77:44:04.9

## HIP 15547 - SAO 4875 - HD

Type: double star  
Magnitude: 5.40 (after extinction: 5.60)  
RA/Dec (J2000.0): 3h20m20.23s/+77°44'04.9"

**Note:** If there aren't any bright stars in the field of view at peak brightness you can always advance forward or backward a few seconds until the Iridium flare passes a brighter star that you feel you will be able to starhop to comfortably.

Part 4: Deciding your starhop to the star that the Iridium flare will pass by

You have a few options as your starting star for your starhop—the closest ones are Polaris (mag 1.95), Gamma Cephei (mag 3.2), or Gamma Camelopardalis (mag 4.55). The closest is Gamma Camelopardalis but it is also the faintest of the three. Which star you choose will depend on your experience.



Part 5: Using the AAVSO Plotter to chart the star that the Iridium flare will pass by

Refer to my Charting Asteroids guide to complete this step: <https://drive.google.com/open?id=0B3OWWyrmlJowQUi2dlytUiz4Qmc>

Final Notes:

Be sure to give yourself ample time to starhop to the star and to account for differences in your watch time. Ideally you want to make sure that you are at your star 2-3 minutes prior to the peak time and be sure to keep centring that star since it will slowly move from the centre due to the Earth's rotation. ★

Satellites Configuration				
Settings Satellites Sources Iridium flares About				
Time	Brightness	Altitude	Azimuth	Satellite
2017-12-24 17:00:38	-0.6	+11°46'28"	+219°38'18"	IRIDIUM 24
2017-12-24 19:05:32	-4.6	+1°07'49"	+311°05'03"	IRIDIUM 71
2017-12-25 06:09:47	0.9	+43°16'54"	+345°04'12"	IRIDIUM 76
2017-12-26 06:03:47	-2.4	+41°48'05"	+346°35'06"	IRIDIUM 46
2017-12-26 17:23:43	-5.4	+2°52'02"	+230°15'35"	IRIDIUM 24
2017-12-27 05:57:48	-6.7	+40°14'05"	+347°58'55"	IRIDIUM 49
2017-12-27 17:11:37	-5.8	+15°48'59"	+212°13'55"	IRIDIUM 69
2017-12-27 18:45:48	-4.7	+4°27'03"	+304°41'11"	IRIDIUM 69

# Photographing an Iridium Flare

by Elena Popovici

I like photographing things in the sky. Whenever I go observing, I take my camera along and often I get rewarded with spectacular views to be captured. And sometimes I go out with the explicit goal of photographing a particular event or phenomenon. This is the story of the latter type of fun. What further made it different from all my other astro-photo outings was the fact that I was going to have a single opportunity to press the shutter-release button to get the photo I wanted. I was going to photograph an Iridium flare. I needed a lot of preparation and, as it turned out, also a fair bit of luck.

What is an Iridium flare? From an observer's point of view, it is a moving star-like light that suddenly brightens and then just as suddenly dims and disappears—thus the “flare” name. If seen by chance by someone not accustomed to the various things visible in the night sky, it would probably look eerie or perhaps scary and suspicious. Here's what actually causes such flares, quoting from [heavens-above.com](http://heavens-above.com) (which is the website to check for when such flares are visible from your location): “An Iridium flare is caused by the sun being reflected from one of the three main mission antennae (MMA) of an Iridium satellite. The MMAs are flat, highly polished aluminium surfaces, and when the angles are just right, they can reflect the sun just like a mirror. There are over 70 of these communications satellites in orbit, and they are operated by the Iridium LLC Consortium.”

I like watching Iridium flares and they're fairly frequent. Most days there's one or more, though they vary

a lot in brightness and the brighter a flare is the more impressive it is to see. So, during spells of clear weather, I regularly check the above website for flares of 0 or negative apparent magnitude (that's brighter than Vega) and go out and watch them whenever I can.

Back in August of 2016, I was planning an astro-photo outing to capture the day-to-day change of a pretty Mars-Saturn-Antares conjunction and I checked for Iridium flares as well and discovered there was going to be one of peak magnitude  $-8$ ! For comparison, at its very brightest the planet Venus only reaches  $-5$ , the full moon is  $-13$  and the Sun  $-27$  (keep in mind it's a logarithmic scale). So  $-8$  sounded pretty darn impressive and I decided to add that to my task list for the evening.

I had never photographed an Iridium flare before—nor since, as it turns out it's not an easy feat. So I started thinking about what would be involved and how to go about it.

Location-location-location: The chart from [Heavens Above](http://Heavens Above) showed the Iridium flare would be at its peak brightness a little before 10pm somewhere in the constellation of Lacerta, to the right of Cassiopeia, due East and about  $60^\circ$  high. So one of my favourite photo-op locations, Yaletown's George Wainborn Park, sounded like a promising spot: hopefully the tall towers lining the edge of the park would provide some foreground elements for the photo, as  $60^\circ$  is pretty far up from the horizon.

Camera settings: To get a nice streak of the satellite I had to use a long exposure. I did not have a remote control for my camera to allow me use the “bulb”

setting for arbitrarily long exposure, so I had to settle for the maximum of 30 seconds available via the shutter-release button. The chart showed the satellite would travel a reasonable distance in the sky over the course of 30 seconds, but it didn't tell me how bright it would be the beginning and end of such an interval. But since the name “flare” indicates sudden brightening and dimming I hoped I would catch a wide range of brightness.

My prior experience photographing the International Space Station (ISS) had taught me that ISO was key as well, given the light pollution of an urban environment: for a long exposure, even a typically low ISO value could yield a washed out photo. So I planned to arrive at the location a little earlier and take some test shots with different ISOs to figure out the right value (and hoped that the lowest of 100 that my camera allowed was not already too high).

When to push the button: This was the trickiest issue. I couldn't just rely on my phone's clock, as it could be off by a significant number of seconds, and seconds were of the essence. So, using a ruler, the [Heavens Above](http://Heavens Above) chart, as well as more detailed ones from [skymaponline.net](http://skymaponline.net), I found a reference star that the satellite would pass by approximately 15 seconds before peak brightness. The problem? It was a magnitude 5 star. There was no way I was going to be able to see that with the naked eye in downtown Vancouver. The plan? Arrive early, take some long-exposure test shots, hope the reference star would show on them and corroborate its position with some foreground

objects; then for the actual shot press the button when the satellite reached the determined location with respect to the foreground.

As you may have noticed, the word “hope” featured a lot in my plans. If I had noticed the predicted flare a few days earlier, I would have done a separate trip on an earlier day to check whether what I was trying to do was feasible at all.

One thing that didn’t even dawn on me that I should hope for was clear skies. The forecast for that evening had been spotless on all websites, including [cleardarksky.com](http://cleardarksky.com). And yet, as I got to my location, a fairly large area of white fluff loomed over the towers to the right of Cassiopeia. Uh-oh. I got to shooting the planetary conjunction to the south, nervously checking over my shoulder the cloud situation to the east.

With 8 minutes to go, I took my first test shot to check the ISO and the framing of the scene. Luckily it showed that setting 100 didn’t wash out the photo. But there were some street lights that came out really bright and were competing with the sky for attention. More importantly, Lacerta was nowhere to be spotted amongst the clouds! I wasn’t even sure it was in the frame. Not only did I not see my reference star in the test photo, but if the clouds didn’t move out of the way fast, there would be no flare to photograph anyway. Luckily, they did appear to be moving slowly towards right. Nervous waiting ensued.

With 4 minutes to go, I took a second test shot, adjusting the framing to catch more of the sky and less of the ground. It just barely showed my reference star at the edge of the clouds. I

worked out that it was roughly vertically above a top corner of one of the towers. Figuring that out was not easy either, as I had to zoom in and scroll around on my tiny camera screen.

Just in time, too! As I was determining all that, miraculously, the clouds continued to drift off, appearing to clear my area of interest just as the satellite appeared off to the left as a very dim moving light. I kept glancing back and forth between the brightening satellite and the corner of the marker tower until finally... I pressed the button! This was it, there was no second try, nothing else could be changed at this point, so I just let the camera be, crossed my fingers, and watched the flare.

The -8 was amazing. At the peak it was so incredibly bright, I have nothing to compare it with, because I’ve not seen anything else similar. The full moon, while much brighter, is not concentrated in a single spot.

As the flare faded away, I heard the camera shutter close and hurried to see the results of my efforts. Still had to wait for a few tantalizing seconds for

it to process the 30 seconds exposure for display. Yes! There was a tiny white streak of light in the small preview. Zoom, zoom, zoom... hurrray! It had captured all of the peak brightness and was nicely centred around it. And the clouds off to the right actually added a little extra pizzaz to the scene.

At home, on the large computer screen, it looked even better. And, unlike most of the photos I’ve had published in past NOVAS, there was no sifting through a dozen shots of the same scene to pick the best one for submission. There was only one photo, and it didn’t even need any further processing! The only reason I didn’t submit it right away is that I wanted to make the time to write its story.

It is one of the photos I am most proud of, and yet, looking at it, I know it can’t by itself convey what it was like seeing the flare with my own eyes. But it does help me relieve it in my mind’s eye. So the next time there’s clear(-ish) skies, go out there and look up. And maybe snap a handful of photos (or just one!). There’s always wonders to be seen and then reminisce about. ★





## Members' Gallery



### **The Running Man nebula** by J. Karl Miller

I connected to one of the remote-controlled Slooh.com telescopes on the Canary Islands and acquired a picture of the Running Man nebula. I leave it to you to discern the shape which gives that object its name. This is a reflection nebula (actually three separate ones) located near the famous Orion Nebula and illuminated by bright stars in the vicinity. Its distance is about 1,500 light years and it is about 7.5 light years in diameter. The Running Man Nebula is actually made up of three different HII gas clouds, each of which has its own designation: NGC 1973, NGC 1975, and NGC1977.