

NOVA

NEWSLETTER OF THE VANCOUVER CENTRE RASC
VOLUME 2019 ISSUE 3 MAY JUNE ASTRONOMY DAY 2019



Jim Bernath, In Memoriam: 1929-2019

by Suzanna Nagy

“One person’s trash is another person’s treasure—especially if you are collecting old space junk.” (excerpt from interview of Jim Bernath by Flash News, July 1998)

It is with a sad and heavy heart that RASC Vancouver announces the passing of long-time RASC member and good friend, Jim Bernath. Jim was a member of RASC since 1975—that is 44 years.

Jim was best known for his travelling collection of astronomy/space artifacts and memorabilia. To many, he was known as “Mr. Space of Canada” and a self-described “Specialist in NASA and the Space

Shuttle Programs.” Unlike many collectors, Jim didn’t keep his artifacts private but instead chose to display in public and share them.

Jim regularly travelled with his

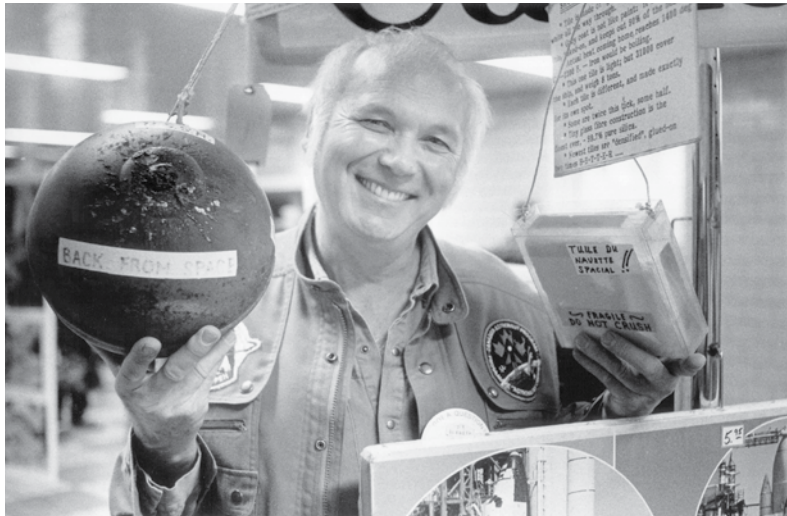
would meet like-minded enthusiasts/collectors and would always be adding to his ever-growing collection.

At the RASC General Assembly

in October of 1981, Jim was one of the recipients of the Best Centre Display.

I first met Jim 15 years ago during my very first year of volunteering with RASC Vancouver at its annual celebration of International Astronomy

Day. Jim was a regular for this annual event. RASC Vancouver’s past president, Pomponia Martinez, was the first to invite Jim to present his
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van of curiosities across Canada and the United States. He would set up displays in schools, auditoriums, and malls—wherever he could find a crowd. During his travels, he

MAY 9 - CANCELLED SFU
Due to a last-minute cancellation by our speaker, the May meeting has been cancelled.

SFU

JUNE 13 SFU
Our speaker will be Michael Landry from the team that discovered gravity waves. Room AQ3149.

SFU

JULY 11 SFU
Ted Stroman and Leigh Cummings on the Apollo missions and the future of manned Moon missions. Room SWH10041.

SFU

Astronomy Day Lectures at SFU

In the Academic Quadrangle

12:00 AQ3149 Robert Conrad &
Andrew Krysa

Interactive Stellar Constellation Tour

1:00 AQ3149 Robert Conrad

**Introduction to the Art and Science of
Observational Astronomy**

2:00 AQ3153 Stanley Greenspoon

**What's New in the Search for
Exoplanets and Extraterrestrial Life**

2:30 AQ3153 Ted Stroman

Creation of the Moon and Lunar Geology

Astronomy Day Activities

East Concourse, Academic Quadrangle

11:00am to 3:00pm

- Apollo Rockets and Mission display
- RASC's Jim Bernath collection
- Solar system and Our Planets display
- Planetary Society display
- Solar telescopes (outside the Trottier Observatory, weather-permitting)
- 3 craft tables for the children including alien masks, and phases of the Moon with Oreo cookies.
- Space survival suit to try on
- Solar System Walk and bag toss
- Ted Stroman's Moon display
- Light pollution abatement display

The Trottier Observatory will also be open for tours throughout the afternoon!

President's Message

I want to take this opportunity to thank our members who volunteered for Astronomy Day. This is one of our biggest events of the year and requires a big commitment from our council members and our volunteers to make it a success.

Ever since we have made our home at Simon Fraser University,

we have dovetailed our Astronomy Day with their Science Rendezvous Day. This is a perfect fit for our mutual goal of promoting the sciences and de-mystifying science for the general public. It also doesn't hurt that it is loads of fun and is really exciting for the young as well as the young-at-heart.

Science Rendezvous started out

by Leigh Cummings

in 2008 as a co-operative program between the University of Toronto, Ryerson University, York University and the University of Ontario Institute of Technology. As of 2019, Science Rendezvous has grown to include 40 of Canada's top research institutions and over 85 community partnerships

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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 \$81.00 per year (\$47.00 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.

2019 Vancouver Centre Officers

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Past President Suzanna Nagy
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Honourary President 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>

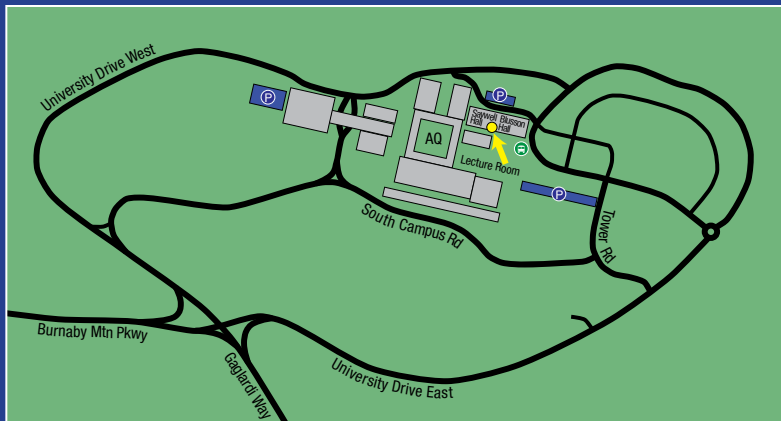


@RASCvancouver

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Map to Meeting Site



Our July meeting is in room SWH10041 of Saywell Hall, about halfway down the main corridor as indicated by the arrow on the map. The June meeting is in AQ3149, located in the east concourse of the AQ (across from the cafeteria).

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

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across 30 cities. In British Columbia alone we have SFU, University of British Columbia and Kwantlen Polytechnic University all participating, offering the public access to their laboratories, demonstrations, lecture halls and on SFU's Burnaby campus, the added bonus of the Trottier Observatory and Science Courtyard.

I often get asked, "Why do you think that it is so important for everyone in our society to have at least a basic understanding of how scientists do science?"

It is through science that we know what we know today, and how we will find the answers to the challenges facing us tomorrow. Our daily lives are molded by the technologies of our time. We have these technologies because of either a scientific discovery, or because an experimental scientist had to develop a technology to help prove or disprove a theory. An example of this is the computer chip that enabled the communication industry

to develop cellular phone technology. The chip was first created to assist astronomers in their search for the evaporation of micro black holes (these were considered a possible side effect of the big bang). It just happened to be the answer to the radio noise problem that the communication industry had been trying to solve for quite some time. As is often the way in science, the astronomers never found proof of an evaporating micro black hole, but thanks to the chip, you can now phone your friends while "on the go" to tell them the news.

It has become fashionable to discredit the work of scientists if the answers they give us are not what we want to hear. In this age of social media and internet blog sites it seems everyone can voice their opinion and expect their opinion to be respected. Although I respect the rights of people to have opinions and the freedom of speech to voice them, I do not think that every opinion should be weighed equally. If you have a leaky pipe

in your home, I think most would agree a plumber's opinion will outweigh an electrician's opinion even though both trades have very qualified people. Even when working with pipes, you have plumbers, pipe fitters, gas fitters and refrigeration technicians. All have a general knowledge of how to put pipes together but each has a far greater knowledge of their respective specialty. Having said that, any tradesman will agree that it takes co-operation between the disciplines to properly build a project.

The same holds true in Science. When you read an article that criticizes a scientific finding, check first if a researcher is cited. Then check the credentials of that researcher to find out how to weigh the opinions given. If they are giving opinions outside of their specialty then you have to downgrade the weight you assign to it. If an article gives no reference to a particular study or science publication with a vigorous peer review process, then be very skeptical. It is important to under-

stand that the peer review process is in place to assure that the paper follows the scientific method. To pass peer review, a paper has to outline what experiment or observations will either strengthen or negate the proposed answer. We also have to remember that, like the trades, no one discipline of science stands alone. Scientists have to consult and use the knowledge of other disciplines and fields of science to strengthen their theories. When discoveries within one field of science support the theory of another field of science, then more weight has to be given to the theory.

Scientists themselves do not want their findings to be blindly accepted. In fact, they expect other scientists to challenge their work. This is how science works to bring about new ideas and understandings, with built-in methods of refining and, if need be, weeding out incorrect ideas. Only after an idea stands up to challenges is it considered an advancement. Most scien-

tific theories are continually challenged as new technologies and observations present themselves. Albert Einstein's general theory of relativity is still challenged to this day and has stood up so far. It took over 100 years for us to develop the technologies to look for gravity waves that were predicted by Einstein. Most physicists today think the theory of relativity is correct but not quite complete. Work continues in an effort to close the gap between quantum mechanics and relativity.

Let me get back to the fun that we will have on Astronomy Day/ Science Rendezvous Day. I know I am looking forward to a scoop of the Chemistry Departments liquid nitrogen ice cream. Talk about instant food! Also, we can test our game show skills at the Super Science Game Show or take part in hands-on science activities and magic card tricks. For those who want to learn more about astronomy and what and how to find

what is in the night sky, we will be providing talks by our Observation Chair, Robert Conrad, and Education Co-Chair, Andrew Krysa. If you want to learn the latest on the search for exoplanets and extra-terrestrial life, take in the talk by Stanley Greenspoon. If the Moon is your fascination, then please attend Ted Stroman's talk on the creation of the Moon and lunar geology. Also for the younger (or young-at-heart), do not forget to get your picture taken in a real NASA survival suit. You can also take a turn at our Solar System Toss. Please also drop by our table of the Jim Bernath collection. Jim collected many very interesting items over his lifetime and we are lucky enough to have acquired some wonderful items for you to view.

All this is free and I only wish I will have more time to take it all in. Please enjoy your day so much you don't even realize you're learning.

★

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. 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-on-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

May

11 – Astronomy Day at SFU

June

13 - 16 – RASC General Assembly in Toronto

July

27 - Aug. 4 – Mt. Kobau Star Party

August

24 - 31 – Merritt Star Quest

October

18 - 20, 25-27 – Manning Park Dark Sky Festival

December

12 – AGM



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display and ever since, Jim's participation became an annual regular fixture at Astronomy Day.

Pomponia Martinez writes:

“I was sad to hear news of Jim Bernath's passing and it brought to mind his kind, quiet spirit and generosity through his volunteer time with the RASC Vancouver Centre.

As then RASC Vancouver President, I recall meeting with Jim early in 2007 to discuss whether he could volunteer some time for us at the upcoming Astronomy Day in May. Not only did Jim agree to volunteer his time, but he would also create a display of his

many space-related curiosities. He had all kinds of interesting artifacts from space missions, a computer-controlled microscope to view the fine layers of a sliver of moon

rock, asteroid fragments, and freeze-dried ice-cream, all while dressed in a very official-

looking silver spacesuit. We were always on a shoestring budget, so in addition to a very modest honorarium for gas, he agreed his only need would be a cake slice. Of course, he said this jokingly, unknowing that I would actually bake a cake for the occasion. So, a slice of cake (he loved the corner piece with frosting) along with a bowl of chili on Astronomy Day, became our annual tradition for many years thereafter.

Adults and especially kids buzzed around his display tables and loved to hear him explain all of the details of





Day event was Jim's last time with us. His fragile health precluded him from bringing the last few pieces of his displays to the event. Instead, I set him up in an area directly next to our tables for the Jim Bernath Collection and Jim spent the entire afternoon giving away autographed posters of space and the space shuttle with a line-up of children waiting to meet him. He was a rockstar and it was a great send off for him because sadly, shortly after the event, Jim was admitted to long-term care and passed away a few months later.

In conclusion, I offer you Pomponia Martinez' concluding words as I couldn't have said it better:

“His warm charm, wit, and his love of all things astronomical will be missed. Thank you Jim for your generous service on Earth.” *

missions and memorabilia. We were very grateful for his colourful addition to our Astronomy Day activities.”

When I took over the role of Event Coordinator for International Astronomy Day, it became my pleasure to work closely with Jim. As his displays were always “hands-on,” Jim was the highlight and quite frankly, it wouldn't have been Astronomy Day without Jim Bernath's displays. For children to be able to touch a rocket, a meteorite, or have a slice of NASA dehydrated ice cream was such a bonus to our events.

Over the past four years, with his health failing, Jim knew his time with us was nearing its end. He and I talked many times of my personal wish that RASC Vancouver would be allowed to carry on his legacy. So slowly, with funding from RASC Vancouver, I began

to acquire pieces of Jim's displays and created RASC Vancouver's Jim Bernath Collection which has now become an integral part of our outreach programming.

2018's International Astronomy



Recipients of the Society's 1981 awards following the presentation at the annual banquet were (left to right): Peter Jedicke, London; Jack Newton and George Ball, Victoria; David Levy, Kingston; Cathy Drake, Toronto, Jim Bernath, Vancouver; Craig McCaw, Vancouver; Harlan Creighton, Toronto.

#Flarewell Iridium

by Ken Jackson

People all over the world have marvelled at Iridium Flares since the launch of the Iridium satellites in 1997. But the era of Iridium flares is about to end as there are likely only a few more weeks until the last of the original Iridium satellites are decommissioned. Only two of the original satellites are still orbiting and likely to produce flares. Next to the Sun and the Moon, Iridium flares are one of the brightest phenomena in the night sky. If you haven't seen one then this may be your last chance.

The Iridium project was originally conceived as fleet of 77 satellites that would provide continuous cover over the whole Earth for satellite phone communication. The name "Iridium" was chosen because 77 is the atomic number of the element Iridium. In the end, it was a bit of a misnomer as the Iridium fleet was made up of 66 operational satellites along with several spares. Each of the satellites was equipped with three antennas with large reflecting surfaces; in certain conditions they reflect sunlight directly to the Earth, generating an unmistakable bright flare

lasting from 5 to 20 seconds. These "Iridium Flares" can be seen by the naked eye at night,



Carl Mansso, IRIDIUM 54 at -8.4 magnitude , April 13th, 2019 over Gothenburg, Sweden

even in the city with significant light pollution. There are even reports of these flares being seen in daylight.

Iridium flares range in brightness from magnitude 1 (as bright as the star Antares or Deneb) to -8.4 (dozens of times brighter than Venus).

One of most appealing aspects of the flares is that they are predictable because the orbit and attitude of the satellites is precisely controlled. Flares are

very location specific so you need to know your precise location (latitude and longitude) to get a good prediction—if you are a few kilometres off then the flare might not appear at the predicted time. The Heavens-Above website (<https://www.heavens-above.com/>) makes it easy to get predictions for your location. You will need to select your location at the top-right of the screen but signing-up for a free account lets you create a list of common locations. Then go back to the home page and select "Iridium Flares" in the satellites section to get a list of the flares predicted for the next 10 days. The free Heavens-Above mobile app on the Apple App Store or Google Play Store make

it even easier as it can use your phone's GPS to determine your current location.

Follow these steps for the best chance of seeing a flare:

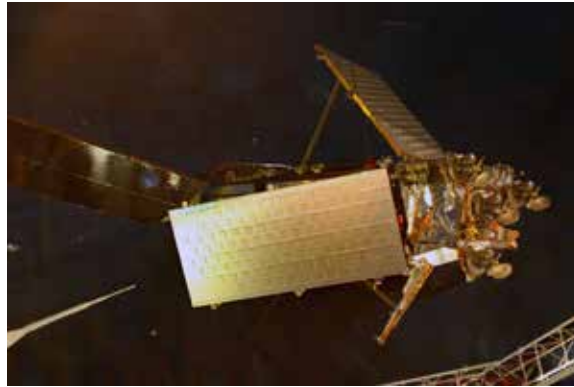
1. Use the Heavens-Above website or app to input your location and determine the times for Iridium Flares in your area over the next 10 days.
2. Double-check the prediction shortly before observing, as Flare forecasts

can change.

- Go outside at least a couple of minutes prior to the predicted time on the correct date. If the sky is not clear, you won't be able to see the Flare, unfortunately.
- Look in the direction of the Flare forecast and watch for a least a few minutes after the predicted time.
- If you see a flare, share your observation on social media with the #flarewell hashtag.

- 60 by the US: 5 per launch on Delta II rockets
- 23 by Russia: 7 per launch

of 27,000 km/h; they orbit the Earth every 100 minutes. The low-earth orbit means that less power is required for sat phones to connect to the satellites compared with geosynchronous satellites that orbit at an altitude of 35,785 km.



An original Iridium Block 1 satellite, with its large reflecting antennae, donated by Motorola to the National Air and Space Museum

Each satellite can talk to four of its neighbours: two in the same orbit ahead of and behind it, and two in adjacent orbits to the left and right. Communications can be routed from a sat phone to a satellite, between several satellites, and finally back down to the ground.

Be forewarned that it is getting harder for Heavens-Above to make accurate and up-to-date predictions as the original satellites are decommissioned. For example, a flare from Iridium 45 is predicted in the screenshot but the process of de-orbiting Iridium 45 began on March 28th, 2019 so this prediction may no longer be accurate and it might not be visible.

- 12 by China: 2 per launch using a Proton-Ks and 2 per launch with a Rokot/Briz-KM
- 12 by China: 2 per launch on the Chang Zheng 2C-III/SD

The system was not a commercial success in the market.



The Heavens Above Android App display of a Iridium Flare prediction for my home in Coquitlam on April 20th, 2019

An Interesting History

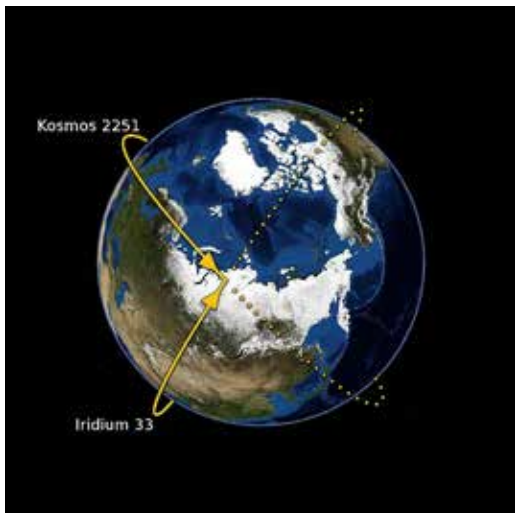
The first Iridium Block 1 satellites were launched in 1997 and world-wide coverage was completed in 2002. It was a multinational effort with launches by three nations:

The satellites are in low-earth polar orbits at an operational altitude of 781 km and a speed

Insufficient market demand existed for the product priced at \$1300 for a sat phone plus \$7 per minute of usage. The original Iridium company went bankrupt, the largest bankruptcy in US history at the time. A new corporation emerged to operate the satellites offering communication services to a niche market of customers (journalists, explorers, military) who required services in areas not covered by traditional geosynchronous satellites.

Iridium 33 was involved in

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Hypervelocity collision of Iridium 33 and the Russian satellite Kosmos 2251 in 2009

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the first hypersonic collision between two satellites when an out-of-control Russian satellite, Kosmos-2251, crashed into it in 2009. The impact velocity was 42,000 km/h, completely obliterating both spacecraft and creating approximately 1,000 pieces of debris larger than 10 centimetres.

The End of an Era

Iridium Communication Inc. started replacing the original fleet of “Block 1” satellites in 2017 and as of Feb 6th, 2019, all communications have been switched over to the new Iridium NEXT satellites. The original Block 1 satellites are being deorbited and taking their Iridium Flares with them. The new Iridium NEXT satellites do not have the same antenna structure as the original and

unfortunately will not produce flares.

There were a total of 95 Block 1 satellites launched. Visit <http://www.rod.sladen.org.uk/iridium.htm> for up-to-date status but here is how things looked as of April 19th, 2019:

Just 2 satellites remain in orbit as spares: Iridium 97, Iridium 61. These might remain in orbit as spares until all the NEXT

2. April 7th: Iridium 58 decayed on 07 April 2019.

3. April 1st: Iridium 64 decayed on 01 April 2019.

To see some great photos of the last flares, visit CatchTheIridium.com (<https://catchtheirdium.com/>). That site also has a good section on how to take your own photos of flares. Tributes from fans are also at the site <https://www.iridium.com/flarewell/> and on Twitter using the #flarewell hashtag.

So look up a flare prediction for your location, have a go at seeing one of the last flares, and say #flarewell. ★

satellites are in their final positions.

- 63 satellites have been deorbited.
- 25 satellites can no longer be controlled.
- 3 satellites failed to reach operational orbit
- 2 satellites were deorbited in 2001 and 2003

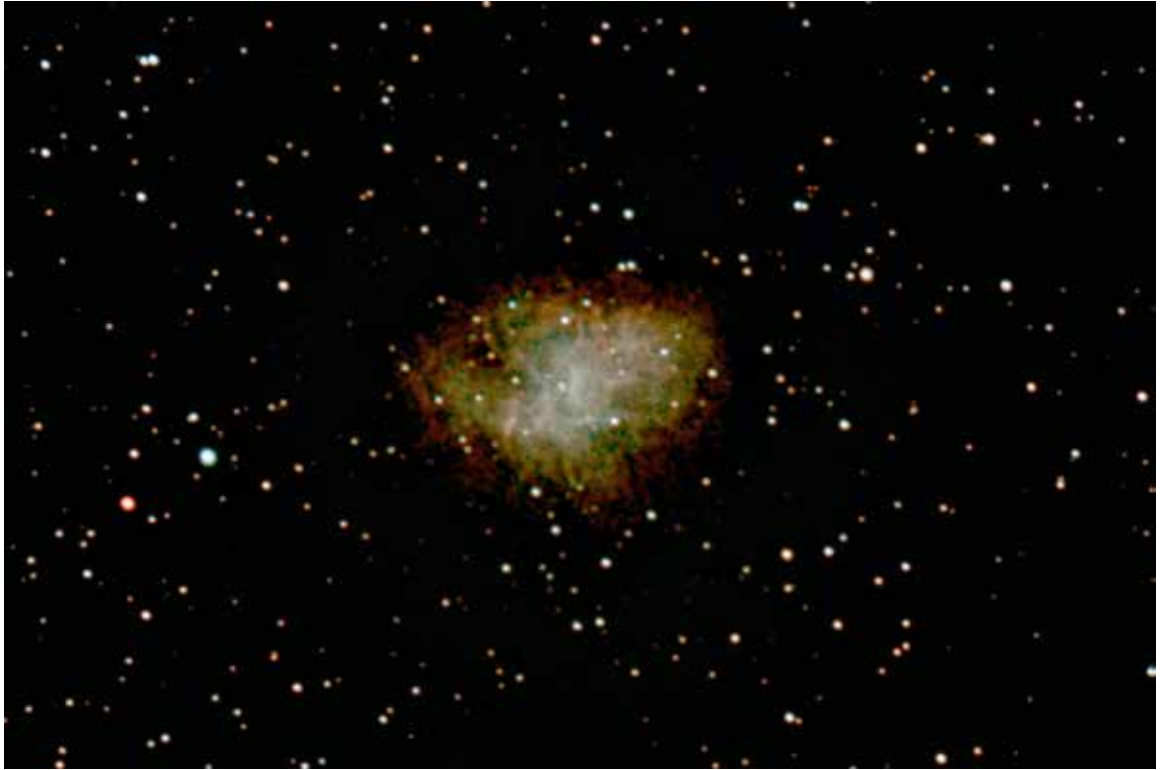
Three Block 1 satellites were deorbited or decayed as recently as last month:

1. April 16th: The process of deorbiting Iridium 54 started.



Iridium 53 Flare over Alamut Castle by Babak Tafreshi, Italy, Sept 28th, 2006

Members' Gallery



M1 - The Crab Nebula

by Ken Jackson

The Crab Nebula is a supernova remnant in the constellation of Taurus. Imaged with a Celestron EdgeHD 8, Nikon D5100, and IDAS LP2 filter. Feb 9th, 2019, Coquitlam, BC. Exposure 60x120 sec at ISO 1600 guided with PHD2. Processed with Pixinsight and the Gimp.



M42 - The Orion Nebula by Phil Lobo

The Orion Nebula, also known as Messier 42, is a site of active star formation. Located within the sword of the constellation of Orion the hunter, it can be seen in binoculars or small telescopes. The Orion Nebula is 1300 light years away and spans 24 light years across and is one of the larger nearby nebulae. It is illuminated by a group of four massive stars called the Trapezium, which can be seen as individual stars in modest-sized amateur telescopes. (74 x 30sec exposures, Canon 1000D, 200mm f/3.9 Newtonian)