



## CANADIAN AERONAUTICS AND SPACE INSTITUTE

# CASI TORONTO FLYER

MARCH 2019, Volume 26 #4

### Toronto Branch Membership Newsletter

**THE FLYER WILL BE PUBLISHED ON A BI-MONTHLY BASIS UNTIL A NEW EDITOR VOLUNTEERS**

## NEWSLETTER LINKS

Click on the links below to move to other sections of the Newsletter

[Local News](#)  
[Industry News](#)  
[Academic News](#)  
[Museum News](#)

## UPCOMING CASI EVENTS

Our next CASI Toronto Branch meeting will take place on **March 21<sup>st</sup>** at UTIAS. **Jim Martin**, of Strangford Aviation Consulting Services, will talk about **The Development, Flight Test and Certification of the Canadair CL-600 Challenger**.

Watch our [Facebook](#) page for information about CASI Toronto Branch meetings.

**THERE IS A \$5 CHARGE FOR NON-MEMBERS**

## CONTACT US

Get in touch with CASI Toronto Branch Executive with questions, comments or suggestions: [casitorontobranch@gmail.com](mailto:casitorontobranch@gmail.com) or on [Facebook](#) ("CASI Toronto").

Contact information for specific Executive members and additional event information is also available on the [CASI website](#).

Our current Executives are:

*Chairman*  
Chris Hayball  
*Vice Chair & Flyer Editor*  
Gillian Clinton  
*Councillor*  
Alex Tsoulis  
*Treasurer*  
Bhavik Mody  
*Education Chair*  
Amir Masoud Tahvilian  
*Secretary*  
Fatemeh Mousavilar

## SPREAD THE WORD

Help us to publicize our Toronto Branch meetings. Share your meeting notice with friends and colleagues, and post them around your school or workplace.

## YOUR NEWSLETTER

The CASI Toronto Flyer brings you local aerospace news. Suggestions and/or contributions are always welcome. If you've been to an interesting lecture or want to see coverage of an aerospace business in southern Ontario, let us know.

Contact the Editor at:  
[casitorontobranch@gmail.com](mailto:casitorontobranch@gmail.com)

## CASI AERO

Canada's leading aeronautics conference  La principale conférence en aéronautique au Canada

# AERO 19

Aerodynamics  
Aerospace Manufacturing Technologies  
Aerospace Structures & Materials  
Aircraft Design & Development  
Flight Test & Flight Operations  
Human Factors & Training  
Propulsion

**May 14-16 mai**

Sheraton Laval Montréal, QC  [www.casi.ca](http://www.casi.ca)  
[aero@casi.ca](mailto:aero@casi.ca)

Click for [more information](#).

## CASI ASTRO

Space for business  L'espace pour les affaires

# ASTRO 2019

Advanced Space Technologies  
Collaboration for Technology Road-mapping and Development  
Commercial Missions  
Commercial Space Exploration  
Competitions & Student Programs  
Downstream Market and Applications  
Earth Observation and Remote Sensing  
Partnerships Among Industry, Academia and Government  
and much more!

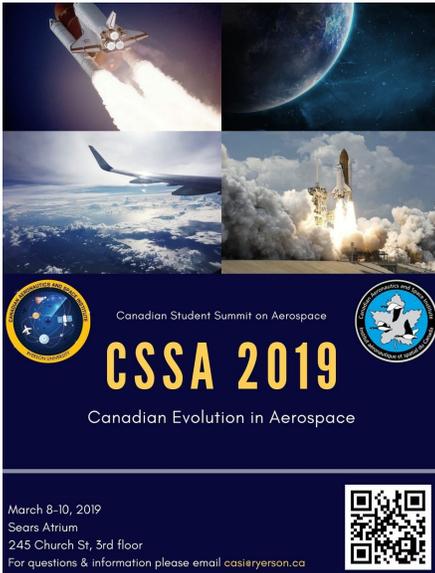
**June 17-19 juin**

Sheraton Laval Montréal, QC  <https://casi.ca>  
[astro@casi.ca](mailto:astro@casi.ca)

Click for [more information](#).

## LOCAL NEWS

### Upcoming Events



### Canadian Student Summit on Aerospace

**March 8-10, 2019**

Ryerson University, Sears Atrium,  
245 Church Street (3rd Floor)

#### Invited Speakers:

- Martin Hebert | Canadian Space Agency
- Phillip Arthurs | Downsview Aerospace Innovation and Research
- Maj. Christopher Bryan | Department of National Defense
- Emily Gleeson | Ryerson University Ph.D. Candidate
- Robert Corcoran | MDA Corporation
- Eric Choi | Magellan Aerospace
- Lauren Reid | UTIAS, Airbus Graduate Program

[Information and registration.](#)



Aerospace in Ontario is a series of networking events in Toronto for aerospace industry collaboration, idea exchange and policy discussion.

### Wednesday, March 13, 2019

Two-hour networking event with a focus on industry and academic members coming together to shape the future of the aerospace industry in Ontario.

#### Agenda:

6:30 - 6:45

Context Setting - Aerospace Society

6:45 - 7:15

Keynote Speech: Future of Aeronautics - Dr. Ian Fejtek

7:15 - 8:00

Panel Discussion - Invited Industry and Academic Guests

8:00 - 8:30 Networking

[Registration and Information](#)



### CAHS Toronto Chapter

When: Saturday, April 6, 2019

Time: 1:00 PM

Location: Canadian Forces College, 215 Yonge Blvd. at Wilson Avenue, Toronto (Lt.-Gen Guy Simonds Auditorium)

*All aviation enthusiasts are welcome!*

More information is available at: [www.cahs.ca/chapters/toronto](http://www.cahs.ca/chapters/toronto)

### Beyond Horizons CWIA 2019 Conference

June 19-22, Ottawa



The **2019 Canadian Women in Aviation Conference** is shaping up to be an exciting event with many speakers already confirmed. The conference opening keynote speaker is Dee Brasseur, one of the first two female RCAF CF-18 fighter pilots in the world, along with Jane Foster.

Karen McCrimmon, Member of Parliament for Kanata-Carleton, will be the gala keynote speaker.

She was the first female Navigator in the RCAF, and the first woman to command a CF Air Force Squadron: 429 Transport Squadron in Trenton, Ontario. Currently, Karen is Parliamentary Secretary to the Minister of Public Safety and Emergency Preparedness.

Ashley Barker, Search and Rescue Technician, was one of two women among the eight graduates this year from the Canadian Forces School of Search and Rescue, CFB Comox. The Air Force Para-Rescue specialists are responsible for saving lives of Canadians caught in a variety of situations over land and sea. Since she was young, Ashley had a passion for adventure and medicine and now she is in a position to render medical care to casualties.

Elizabeth Cameron, Vice President, Labour Relations, NAV Canada, will be giving a seminar on negotiating for women. She is responsible for developing labour relations strategies and mandates for collective bargaining.

Bill Tibbo, a corporate clinical consultant and disaster management specialist, will also be giving a seminar on critical incident stress management. His unique approach to crisis response emphasizes the human element of leadership and guides organizations to put people first.

Earlybird registration, including student rates, is available until April 1. Click [here](#) for further details on [conference registration and accommodations](#).

*Many thanks to Victor Ujimoto, Ph.D, Professor Emeritus at the University of Guelph for this notice.*

## Recent Events

### Evening with an Asteroid

**TORONTO** – January 25 – 2019 here on Earth began with the sample return mission OSIRIS-REx successfully entering orbit around the asteroid Bennu. Canada has been instrumental in this mission, supplying the OSIRIS-REx Laser Altimeter (OLA) which is the instrument that will provide the 3D map of Bennu over the next 19 months.

On January 25th, a panel was held at the Royal Ontario Museum to discuss the progress so far of OSIRIS-REx, and how the next phase of sample collection will proceed. The four panelists were senior mission scientist at the Canadian Space Agency Dr. Tim Haltigin, Canadian space policy advocate and advisor Kate Howells, the ROM's Curator of Mineralogy Dr. Kim Tait, and lead scientist for the mission's laser altimeter Dr. Mike Daly of York University. Moderating the panel was Discovery Channel Daily Planet host Dr. Dan Riskin.

With the breadth of knowledge onstage, the discussion spanned from the origins of the mission, the on-orbit operation of the spacecraft, the science potential and outcomes, and the long term impact this mission has for Canadian science and space exploration.

In summarizing the long term value for Canada in these types of missions, Dr. Tim Haltigin said "For me, this isn't about the science

we'll be doing in 2023 and 2024 when we do our initial characterization and understanding; it's about what will we be asking 30, 40, 50 years from now...We have people who haven't yet been born who will be working on these samples."

*Max King is a current Master's student in Aerospace Engineering at the University of Toronto, specializing in microsatellite engineering. He is actively involved in scientific outreach, and provides public talks and workshops to bring his passion of space exploration to an ever wider audience.*

*[william.king@mail.utoronto.ca](mailto:william.king@mail.utoronto.ca)*

If you missed the panel discussion last week at the Royal Ontario Museum (ROM) in Toronto about the OSIRIS-REx mission, [you can watch it at YouTube](#).

**Editor's Note: If you attend an interesting lecture or conference, share your thoughts with the CASI membership.**

## **INDUSTRY NEWS**



### **AirStart Partners with Dowty Propellers for an Exclusive Repair and Overhaul Agreement for Q400 Propellers and Propeller Accessories**

**TORONTO – February 14, 2019 –** AirStart has partnered with Dowty Propellers for rotatable parts services on R408 propeller systems that equip Bombardier Q400 regional airliners.

This three-year exclusive agreement brings together the expertise of Dowty Propellers as the R408 propeller system OEM (original equipment manufacturer) and the resources of AirStart – including the company's established inventory of Q400 airliner parts, with exchange, lease and purchase options.

AirStart's support covers major elements of the R408 propeller system: blades, spinner, hub, pitch control unit, overspeed governor and brush blocks. Based in Canada, the company's global customer base includes operators in key emerging airline markets, with the Dowty Propellers agreement expected to generate a multi-million-dollar business volume.

"We're partnering with a company that has a strong reputation in rotatable parts, as well as excellent Q400 operator relationships and end-to-end global logistics," said Oliver Towers, the President of Dowty Propellers.

AirStart maintains the world's largest inventory of Q400 propeller blades, which is positioned at the company's multiple locations around the world for customers operating in some 50 countries.

"Working with Dowty Propellers ensures we provide customers with the best service and quality," Robert Wills, AirStart's owner and founder, explained. "Our agreement includes guaranteed turnaround times and pricing, along with customized work scopes for better availability."

Dowty Propellers' R408 propeller system has six all-composite blades and is installed on the twin-engine Q400's Pratt & Whitney Canada PW150A turboprop powerplants. It incorporates a fail-safe electronic control system, precise speed selection and synchrophasing accuracy.

# **BOMBARDIER**

## **Bombardier's Award-winning Global 7500 Business Jet Certified by European Aviation Safety Agency**

**TORONTO – February 7, 2019 –** Industry's largest and longest range business jet, the Global 7500 aircraft is in a class of its own and entered into service in 2018

Bombardier is proud to announce that the industry flagship business jet, the Global 7500 aircraft, has received European Aviation Safety Agency (EASA) certification, validating the requirement for the aircraft's operation in Europe.

"We've transformed business aviation with the Global 7500 jet," said Michel Ouellette, Senior Vice President, Program Management and Engineering, Bombardier Business Aircraft. "With the longest range in the industry, the aircraft can connect more international cities nonstop, opening many destinations to our customers."

The Global 7500 business jet earned its type certification from Transport Canada in September 2018, followed by the U.S. Federal Aviation Administration (FAA) in November 2018, both within only 24 months after the first flight of FTV1. The aircraft entered service in December 2018.

The Global 7500 aircraft has demonstrated its ability to fly further than any other business jet by expanding its advertised range

to 7,700 nautical miles, a full 300 nautical miles further than initial commitments. Not only does the Global 7500 aircraft provide more range than any other competitor, it can do so from the most difficult locations around the world: the Global 7500 jet exceeded takeoff and landing performance commitments, allowing for exceptional capability from Europe's most desirable and challenging destinations such as Sion and St. Moritz, Switzerland.

These achievements have enabled the Global 7500 aircraft to push the boundaries of business travel by resetting the bar for long-haul missions in the industry. The Global 7500 aircraft is the only business jet that connects New York to Hong Kong and Singapore to San Francisco nonstop, flying eight passengers with standard NBAA IFR fuel reserves.

The Global 7500 aircraft offers not only its signature smooth ride, but also an elevated cabin experience, with spaciousness that is unique among business jets, and its award-winning interior featuring a full-size kitchen and four true living spaces. The Global 7500 aircraft also debuts Bombardier's patented Nuage seat, which was meticulously designed for maximum comfort and will be exclusive to the new Global family of aircraft.



**exactEarth's Revolutionary  
Global Real-Time Maritime  
Tracking and Information  
System Now Fully-Deployed**

**CAMBRIDGE, ON – February 14, 2019** – exactEarth Ltd., a leading provider of Satellite AIS ("S-AIS") data services, announces that the final six payloads for its second-generation constellation, exactView RT, are now operational, which completes the roll-out of world's first global, real-time Satellite-AIS service. This revolutionary capability is expected to enable a wide variety of new service capabilities for the global maritime community and to contribute strongly over the next 15 years or more to the improvement of maritime safety, commerce, navigation, environmental management, and security.

exactView RT consists of 58 operational payloads and seven orbital spares that were designed and built by Harris Corporation ("Harris") and that are hosted onboard the Iridium NEXT constellation of satellites, which is owned and operated by Iridium Communications Inc. ("Iridium"). The Iridium NEXT satellites were deployed over a series of eight successful launches completed in under two years and are the result of Iridium's approximately \$3 billion investment to replace its original satellite system.

exactView RT's advanced maritime payloads cover the entire maritime VHF radio band and leverage the unique cross-linked architecture of the Iridium NEXT satellite constellation to deliver AIS and other vessel-based VHF data services from any vessel, anywhere on the globe, relaying that data securely to customers in real-time. exactView RT tracks a population of more than 500,000 unique vessels worldwide and generates Average Global Revisit rates and Average Latency rates of less than one minute.

"On behalf of exactEarth, I want to congratulate the teams at Iridium and Harris for their remarkable execution and overall achievement in such a short period of time," said Peter Mabson, CEO of exactEarth. "Iridium NEXT is without question among the world's most technologically sophisticated constellations and we are thrilled that exactView RT will be part of this advanced, reliable and flexible platform for the next 15 years or more."

Mr. Mabson continued: "With its key performance capabilities of real-time data delivery, superior vessel detection, rapid update rate, longevity and continuous improvement, we believe that exactView RT provides us with a measurable and sustainable competitive advantage. We think this type of high-end service will be ideal for both commercial and government customers concerned with issues such as homeland security, search and rescue, intelligent weather routing, commodity tracking, and down the road, 'Smartships' and

eNavigation. As exactView RT makes its way into the market with the ability to provide reliable accurate pin-point vessel data instantly from anywhere in the world at any time of the day, we believe the market interest and demand will continue to grow."



**Maxar Technologies' MDA supports FIRST Robotics Canada with \$50,000 Gold-Level Sponsorship**

**BRAMPTON, ON – February 25, 2019** – MDA, a Maxar Technologies company, today announced that it has partnered with FIRST Robotics Canada as a gold sponsor of the robotics competition "Destination: Deep Space." In an epic space adventure of innovation with a build time of only six weeks, high school students collaborate in teams to engineer and program robots to compete across Canada. The competitions combine the excitement of a championship sporting event with the practical application of science, technology, engineering, and math (STEM) with mentorship from industry experts.

"MDA is an acknowledged world leader in space robotics, satellite communications, Earth observation and space science, with five decades of expertise that includes some of Canada's most innovative accomplishments," said

Mike Greenley, group president of MDA. "This is exciting to be partnering in this truly impressive organization. Connecting the future leaders in technology with hands-on experience and real-time fun is a great way to spark interest in space and STEM studies."

Each year, students in the FIRST program are faced with a focused challenge connected to relevant real-world topics, and this year, space is the chosen theme. Space touches the lives of Canadians 20-30 times a day, from weather predictions, to using an ATM, to checking a map on a smartphone, to downloading movies, to ground and air traffic management. Space applications will be even more pervasive in the future, as autonomous cars, smart cities and advanced autonomous AI-enabled robotics mature.

"FIRST Canada is thrilled to partner with MDA, Canada's leading space company," says Mark Breadner, president of FIRST Canada. "Students are inspired by the innovations at MDA and can use the expertise and experience of the MDA team when imagining and building their projects this season. It's absolutely critical to have these kids and youth thinking forward to the future of space discovery to become positive leaders in space advancement and STEM fields."

MDA has a long and successful history as a trusted supplier of robotics and communications subsystems for the ISS. The Mobile Servicing System on the ISS is comprised of Canadarm2, the Special Purpose Dexterous

Manipulator known as "Dextre" and the Mobile Base System. MDA built these innovative robotic systems that perform a variety of operations including resupply, maintenance and servicing tasks vital to the ongoing operations of the ISS. MDA also designed and built the Space Shuttle robotic arms, known as Canadarm, which wrapped up 30 years of successful operations when they were retired along with the Space Shuttle program after completing 90 missions.

Canada currently has the opportunity to leverage this proven industrial base to provide next generation AI-based robotics to the next space station, the Lunar Gateway. This type of program is expected to create thousands of high-quality space jobs within Canada over the next two decades.

"MDA feels strongly in the need to support the next-generation space workforce and ensure our best and brightest have opportunities to work in a revitalized Canadian space sector. That is why this opportunity to support FIRST Robotics Canada is so meaningful to us," added Greenley.

## ACADEMIC NEWS



### 2019 CASI Scholarships

CASI is currently accepting applications for both the Elvie L. Smith Scholarship and the Charles Luttmann Scholarship.

#### Application Deadline: May 1, 2019

For full details on the criteria for each Scholarship as well as nomination forms, see the [CASI website](#).



### OAC Scholarships for Aerospace Studies

The Ontario Aerospace Council is pleased to be able to offer FOUR scholarships for the 2019-2020 Academic Year for students going into or currently enrolled in an aerospace studies program at a post-secondary institution (college or university) in Ontario. The value of each scholarship is \$2,500.00 CAD.

#### Application Deadline: May 3, 2019

For full details on the criteria for each Scholarship as well as nomination forms, see the [OAC](#)

[website](#).

## CENTENNIAL COLLEGE

### The Planes of Centennial Take to the Skies

#### TORONTO – January 8, 2019 –

Ever been stuck in traffic, and wish you could just fly over it? When it came time for Centennial College to assemble its fleet of airplanes at the new Centre for Aerospace and Aviation at Downsview Campus, that's just what we did.

See the [video](#)!

Our new Downsview facility opened for classes in January, ready to admit 400 new students who will be trained to become the next generation of aerospace professionals. One of the cornerstones of the aviation education you can get at the Downsview Campus is the hands-on time you spend with real airplanes. With Downsview getting ready to open, it was time to move the precious cargo carefully by truck, since Ashtonbee Campus does not have a runway.

At the same time, the School of Transportation arranged for some newer aircraft to join the fleet, planes that it acquired from sources across North America. If they were to transport them across the border, they'd have to be taken apart and transported on trucks, and once an airplane is taken apart and reassembled, it's never the same. It turns out that the shortest distance between two points is a straight line, so the best

way to get them to Downsview was simply to fly them in, which is just what we did on December 10. Eight planes in total landed at Buttonville Airport just north of Toronto, and then took to the air a second time to arrive at their new home by landing on the runway at Downsview, which is operated by our good friends at Bombardier Aerospace. Among the aircraft that flew in to join Centennial's expanded fleet are a Cessna Citation II executive jet, a Cessna 425 twin-engine turboprop, two Piper Seneca II and four Cessna 172 single-engine light aircraft.

These airplanes make up the practical component of the programs offered at Downsview Campus, which include Aviation Technician programs offered through the School of Transportation, and Aerospace Manufacturing Engineering Technology offered through our School of Engineering Technology and Applied Science. All of these programs feature top-tier instructors who teach you how to work on components like airframes, engines, electrical and hydraulic systems, avionics equipment and instruments. And because of the hands-on time you get with these airplanes, the programs at Downsview will simulate the workplace you'll start your career in. We took these airplanes to the skies, and we can take your career there, too!

*By Anthony Geremia*

## Battle of Robots at Georgian College March 16 and 17

BARRIE, ON – January 10, 2019 – The robots are coming back to Georgian’s Barrie Campus Athletic Centre on March 16 and 17. The FIRST Robotics Competition at Georgian College promises an epic adventure of innovation that includes 26 robots, built and programmed by teams of high school students, that combines the excitement of a championship sporting event with the practical application of science, technology, engineering, and math (STEM). This year, three teams from Simcoe County are competing.

“We love hosting this event because we believe it’s crucial to support the next generation of scientists, engineers, technologists and changemakers,” says MaryLynn West-Moynes, President and CEO of Georgian College. “We’re thrilled that several teams are returning to our campus for this third annual competition.”

FIRST (For Inspiration and Recognition of Science and Technology), an international organization, recently announced the theme, parameters and goals for the 2019 robotics season. “FIRST Robotics Canada has been so impressed by the event at Georgian College,” says President of FIRST Robotics Canada, Mark Breadner. “We can’t wait for the community to come together again to celebrate this year’s robotics

game, DESTINATION: DEEP SPACE. It’s going to be an incredible showcase of STEM skills in action.”

With the theme and rules now set, teams only have two months to develop custom, 120-pound robots to complete prescribed tasks. They will design, build, and test their machines using a wide variety of skills like CNC machining, CAD, math, programming and welding. They will also raise funds through community outreach and design a team brand. It’s as close to real-world engineering as a student can get.



*A group of students working on building robots.*

In addition to getting points for achieving competition goals, judges will recognize teamwork, engineering excellence, and entrepreneurial spirit in an awards ceremony on March 17.

Georgian’s event is one of 10 competitions taking place across Ontario this year. Award-winning teams from these events will move on to provincial championships in April at the Paramount Fine Foods Centre in Mississauga to fight for a spot at the FRC World Championship.

While at Georgian, teams will be invited to explore the Barrie Campus’ state-of-the-art robotics,

electrical and computer labs, as well as the new Peter B. Moore Advanced Technology Centre. They will also make good use of machine shops, where the robots will undergo any pre- and post-battle repairs.

More than 1,000 people – students, competitors, coaches, industry leaders, and supporters – will attend the event.



## Reaching New Heights at Aerospace Research Hub

TORONTO – January 17, 2019 – Imagine what air travel might look like in 20 years: sitting back against a seat that senses where you need more support and adjusts accordingly, looking up at an LED screen and seeing the stars above, the sounds of crying babies and the roaring engine becoming imperceptible, thanks to next-level noise control.



*Aerospace engineering professor Fengfeng (Jeff) Xi in the airline cabin: investigating ways to improve comfort for passengers. Photograph by Sandy Nicholson.*

Ryerson researchers and students – from aerospace engineers to interior designers to architects – are already working to make the next-generation air flight a reality. Their research got a major boost this past summer with the donation of a 40-foot airline cabin from Bombardier, now being housed at the Downsview Aerospace Hub in northern Toronto. The gift is further supported by a multimillion dollar grant from Bombardier and investments from government organizations and the private sector.

“More and more, airlines are trying to compete by improving the travel experience,” says Fengfeng (Jeff) Xi, a Ryerson aerospace engineering professor and the lead on the cabin project. “When you look at traveller comfort, you have two main issues. One is the body’s sensations and the other one is state of mind, how you react to what’s happening around you.”

By partnering with a range of Ryerson experts in interior design, architecture, psychology, aerospace engineering, and human factor research, the research collaboration aims to improve both physical and psychological comfort in flying. This allows the group to answer interdisciplinary questions, such as what qualities of light reduce stress? And how much head room is needed to provide a feeling of calm?

The cabin research will build on Ryerson’s completed airplane design projects. For the last two years, thanks to support from a Collaborative Research and

Design grant from the Natural Sciences and Engineering Research Council of Canada, funding from Bombardier, and partnerships with researchers at the University of Toronto and Queen’s University, Xi and a team of Ryerson researchers have designed and built an interactive smart seat, window and lighting module.

The seat has sensors that detect where pressure needs to be increased or decreased to provide ergonomic support. A series of connected air pockets then inflate and deflate accordingly. Speakers positioned on either side of the headrest emit sound waves that oppose the incoming frequencies of engine noise and cancel it out. The smart window can adjust the tinting and glare, depending on whether the passenger indicates they would like to read, sleep or watch a movie.

In addition to testing the smart seat and window module in the cabin, Ryerson researchers will also be looking at ways to improve the overall cabin. Interdisciplinary teams are exploring the idea of overhead LED screens that could project the night sky above and seats that can collapse down when more storage space is necessary. Xi expects the research project will take five years to complete. Ontario’s Ministry of Research and Innovation is funding the purchase of equipment and technology for inside the cabin.

Jonathan Hack, manager of advanced interiors and systems for the Strategic Technologies Group at Bombardier, says that the

company decided to donate to Ryerson due to the “great working relationship” that had already been established.

“Any time you have an idea for a new project or initiative, Ryerson is willing to help you,” he says.

Hack has high hopes for the research collaboration, which continues thanks to a recent \$1 million contribution from Bombardier to Ryerson and U of T towards work at the Downsview Research Hub.

“We’re looking at everything from advances in cabin air quality to advancing new and more lightweight materials,” he says.

Paul Walsh, an aerospace engineering professor who has been instrumental to the Downsview Research Hub as well as the Bombardier partnership, says the cabin donation allows researchers to go beyond computer modelling to simulate real-world experiments. “We can confirm how air is moving through the cabin, and how particulate matter is disseminated,” he explains. “And we can do the same for sound and heat.” While the experiments sound high-level, they can result in direct benefits to air quality and passenger comfort.

As passengers push back against the move toward compact seating arrangements, Walsh says that airlines are looking for ways to maximize the feeling of openness. “If you make it feel like it’s a bigger cabin, you can mitigate the effects of the small cabin size,” he says.

*By Wendy Glauser, Journalism '05*



## Novel U of T Course Trains Future Air Accident Investigators

**TORONTO – February 7, 2019 –**

The wreckage of a small private plane rests among debris scattered inside the MarsDome at the University of Toronto Institute for Aerospace Studies (UTIAS).



The staged crash site – complete with scripted witness accounts and a wreckage trail – is at the centre of a new graduate course on air accident investigations.

The course, believed to be the first of its kind in Canada, gives graduate students in U of T's Faculty of Applied Science & Engineering a rare opportunity to physically examine and determine the potential causes of a plane crash.

"It's like detective work: why did this crash happen? And can we figure it out based on the evidence that we collect?" says Craig Steeves, a UTIAS professor and the course's co-ordinator.

There were 240 aviation accidents worldwide involving

Canadian-registered aircraft in 2017, according to the Transportation Safety Board's (TSB) annual statistics. That's 10 more than the previous year. It's hoped that teaching the methods, processes and technologies involved in an air accident investigation in Canada will help improve safety.

Steeves initially developed the course concept more than three years ago, but AER 1604 didn't come to fruition until he met Ewan Tasker, an experienced pilot, air traffic controller and federal aircraft accident investigator.

"I think it will be great to finally have this type of training available in Canada," says Tasker, who is now teaching the course.

"I think the lessons learned, specifically understanding underlying factors, apply not only to investigating plane crashes but translate well into many other disciplines."

The plane wreckage was donated to the institute last year as an educational tool.

"Seeing, in person, what is likely to appear at a crash site is much more valuable to our students than just examining photographs," says Steeves. "Just getting the sense of the physical weight of pieces of the wreckage that have broken off, the size and the bulk – this information is all so important."

By the end of the course, students will write an air accident investigation report based on information given in class, as well as the information they collected at the crash site.

The course also addresses an educational need for the TSB. "When the TSB hires people, they often have to send them to take courses in the U.S. – that means Canadian students end up learning a lot of American regulations," explains Steeves. "Then when they come back here, they have to be retrained on Canadian regulations."

Steeves plans to stage a different crash scenario each year. Future versions will be informed by the students' experience with the first simulation.

"We're a month into our first time teaching it, and I'm so pleased that it's finally happened after three years," he says.

## U of T Researchers to Design Microsatellites for Arctic Monitoring

**TORONTO – February 1, 2019 –**

Researchers from the University of Toronto will develop three microsatellites to help support next-generation situational awareness in Canada's North.



*An aerial photograph over Nunavut, taken en route to Canadian Forces Station Alert from a CC-177 Globemaster aircraft on June 10, 2016 (photo by Belinda Groves, Task Force Imagery Technician courtesy of Department of National Defence)*

The project, named Gray Jay Pathfinder, was announced today at the University of Toronto Institute of Aerospace Studies, or UTIAS, by local members of Parliament Michael Levitt and Ali Ehsassi.

Partners include UTIAS's Space Flight Laboratory, headed by Associate Professor Robert Zee, the Department of National Defence and Canadian Armed Forces, A.U.G. Signals Ltd. and Space Strategies Consulting Ltd.

"Increased trade and activity in the Arctic will create greater demand for the specialized services of the Canadian Armed Forces, including search and rescue, emergency response and environmental monitoring," said Levitt. "Today's contract will stimulate Canadian industry and academia in key technology areas.

"We are proud and excited to invest in this promising research."

Zee and his research team will be receiving \$15 million in funding for the project, and will be drawing on more than 20 years of successful microsatellite development for customers and end-users around the world. Among their 21 operational satellites are CanX-4 and CanX-5, which in 2014 demonstrated formation flying with sub-metre relative position control.

"The Gray Jay Pathfinder project represents a significant opportunity for us to leverage our past successes and use our leading-edge technologies to support the needs of Canadian defence in the 21st century," said Zee.

"It will open the door to greater opportunities to serve Canadian interests as well as enhance global competitiveness and foster new international collaboration while providing elite training opportunities for graduate students."

The space flight laboratory will take the lead on designing the satellites, while the industry partners will develop the algorithms required to process the signals obtained and conduct a needs and utility assessment analysis of the approach to Far North surveillance.

Gray Jay Pathfinder falls within the larger All Domain Situational Awareness Science and Technology Program launched by the federal government in 2015. The program supports the development of innovative solutions for enhanced domain awareness of air, maritime surface and sub-surface approaches to Canada, particularly in the Arctic.



### **Three Professors Chosen for Canadian Space Agency Program, Awarded \$600K in Funding**

**TORONTO – January 17, 2019 –** The Canadian Space Agency's (CSA) Flights and Fieldwork for the Advancement of Science and Technology (FAST) funding

initiative supports space research in Canadian post-secondary institutions.

Three professors from the Department of Earth & Space Science & Engineering from the Lassonde School of Engineering at York University have been successfully chosen for the program.

The awarded funding totals \$600,000, enabling them to test their developed technologies in the unique atmospheric environment of space.

### **Project: Reflected Global Navigation Satellite System (GNSS) Signals**

\$399,630 over three years

Sunil Bisnath is the Principal Investigator on the project, working with Professors Regina Lee and Franz Newland and a group of graduate students.

Professor Bisnath and his team have developed an instrument that can receive weak reflected Global Navigation Satellite System (GNSS) signals to detect soil moisture content. If successful, this low-cost, widely available determination of soil moisture would be significant for users, including climate scientists and policy-makers. The FAST program enables the improvement and testing of this instrument and its data analysis for a future satellite mission.

"Like any engineer, we want to see the research translated into a product or technology that will benefit its users. This 3-year grant gives us the opportunity to fine tune our ideas, expand them and

test them to prove the approach will work,” says professor Bisnath.

**Project: Mars Atmospheric Panoramic Camera and Laser Experiment (MAPLE)**

\$100,000 over three years

John Moores is the Principal Investigator working with Christina Smith, Science Principal Investigator and a team of graduate students, Charissa Campbell, Brittney Cooper and Giang Nguyen.

Professor Moores and his team are developing a small instrument called the Mars Atmospheric Panoramic Camera and Laser Experiment (MAPLE) to be used at Mars for investigation of the Martian atmosphere. Currently, cameras used in Mars missions are not laser-panoramic. With MAPLE, Professor Moores and colleagues can examine the vertical distribution of dust and ice aerosols, to better understand the dynamics of the Martian environment and better prepare for human exploration.

The FAST program enables camera testing in locations like the High Arctic, where Mars-like particles can be found. The camera will be operated remotely from York University.

Of the opportunity, Science Principal Investigator and Postdoctoral Fellow, Christina Smith says, “We want to prove the concept. This grant allows us to pursue this prototype as far as we possibly can and cement relationships with the local industry.”

**Project: In-flight Assessment of the Spatial Heterodyne Spectroscopy (SHS) Instrument**

\$100,000 over three years

Gordon Shepherd is the Principal Investigator on the project, which began with the development of an optical technique called Spatial Heterodyne Spectroscopy (SHS), led by Research Associate Brian Solheim at York University. This attracted the attention of Martin Kaufmann of the Jülich Institute of Energy and Climate Research in Germany, who sent graduate student Michael Deiml to York University to work with Solheim on the design of an SHS to measure temperature in the upper atmosphere.

The SHS was then built in Germany and with the help of Jinjun Shan at York University, the team identified a Chinese satellite mission willing to fly this instrument. Professor Shepherd is thus part of a mission that will test an SHS instrument in space. The FAST program supports the Canadian participation in this international program.

Through the program, Professor Shepherd and his team will conduct in-flight assessments of the SHS instrument for the measurement of upper atmospheric temperature from 80 to 120 km above the Earth’s surface. This enhanced knowledge will provide unique new information on waves in temperature, caused by sources near the Earth’s surface, influencing our understanding of the coupling of atmospheric regions and the

changes arising from solar variations and climate change.

Professor Shepherd credits Lassonde’s administrative support as being integral to securing this opportunity with the CSA.

“Ideally, I’d like to see the instrument perform perfectly and I’d like to see great data that we can spend some years analyzing, learning more about the atmosphere. The CSA grant has given us this chance.”

For more information on Flights and Fieldwork for the Advancement of Science and Technology (FAST) [visit the website.](#)

## MUSEUM NEWS

### CANADIAN WARPLANE HERITAGE



[www.warplane.com](http://www.warplane.com)



### Virtual Reality Experience - BBC 1943 Berlin Blitz

Until August 31, 2019

9 am – 5 pm daily

It was one of the most ambitious and dangerous reports made during World War II. In September 1943, BBC war correspondent Wynford Vaughan-Thomas boarded Lancaster 'F for Freddie' with his recording engineer and a microphone. Their destination: Berlin.

The BBC has created this masterfully animated Virtual Reality Experience using Vaughan-Thomas' original recording, which vividly captures the danger of the bombing raid. This unique cinematic experience transports visitors inside the bomber as the crew endures

endless flak and a night fighter attack in their journey to the heart of Nazi-occupied Europe.

Presented in immersive Virtual Reality, this powerful experience is the closest that one can get to truly experiencing the bravery demonstrated by Bomber Command, the median age of which was only 22 years old. As described by Vaughan-Thomas upon his return, it was "the most beautifully horrible sight I've ever seen."

This exhibit is available for those aged 13 and up. [Click here](#) for more information.

### NATIONAL AIR FORCE MUSEUM OF CANADA



[airforcemuseum.ca](http://airforcemuseum.ca)



### Space to Spoon

Space to Spoon demonstrates how space technology benefits Canadian farmers and sustainable

agriculture. It also highlights the Canadian Space Agency's Earth observation satellite, RADARSAT-2, and its cutting-edge successor, RADARSAT Constellation.

Space to Spoon is a hands-on experience, with stunning graphics and interactive elements for visitors of all ages. The science, technology, and innovation that transform satellite images into agricultural applications are showcased in a way that encourages informal science learning among school groups as well as general audiences.

In addition to the modules that make up the Space to Spoon exhibit, the National Air Force Museum has secured several other artifacts on loan, including an INMARSAT Sera Saturn B Satellite Phone from the 1990s and Col. Chris Hadfield's uniform, to connect to the RCAF's role in space

On display now until April 28<sup>th</sup>.

*NOTE: Your Editor saw this exhibit when it was on display at the Peel Art Gallery, Museum & Archives last year. Worth the trip to Trenton!*

### CANADIAN AIR AND SPACE CONSERVANCY

[formerly Canadian Air & Space Museum]

[www.casmuseum.org](http://www.casmuseum.org)

*Nothing new to report.*

THE WATERLOO REGIONAL  
MUSEUM  
KITCHENER, ONTARIO



**Journey to Space**

[Journey to Space](#) takes visitors as close to being in space as one can get from Earth. This exhibit is an incredible and unforgettable hands-on and climb-aboard adventure for all ages.

Experience what it is like to be on board the International Space Station and try your hand at some of the feats of engineering that support the astronauts who live there. Journey to Space will give you a glimpse of the challenges and triumphs of space exploration. Discover what is possible and what awaits in orbit and beyond.

On display until April 28, 2019

**LOCAL CASI**  
**CORPORATE**  
**PARTNERS**



**BOMBARDIER**



RYERSON  
UNIVERSITY

