CANADIAN AERONAUTICS AND SPACE INSTITUTE

CASI TORONTO FLYER

MARCH 2017, Volume 24 #6

Toronto Branch Membership Newsletter

NEWSLETTER LINKS

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

UPCOMING CASI EVENTS

Keep an eye on social media for information about CASI Toronto Branch meetings and the Annual Dinner meeting later this spring.

AERO 2017

Canada's North: Roles and Opportunities for Aerospace

AERO 2017 will take place at the Sheraton Toronto Airport Hotel and Conference Centre from **May 16-18**, 2017. More information is available at the website.

CONTACT US

Contact information for Branch Executive members as well as additional event information is available on the CASI website (casi.ca/toronto), via our email: casitorontobranch@gmail.com or on Facebook ("CASI Toronto").

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, Gillian Clinton, of Clinton Research, at:
gillian@clintonresearch.ca
or
casitorontobranch@gmail.com

LOCAL EVENTS

There is lots going on in the GTA this month - check out these four events!

CANADIAN AVIATION HISTORICAL SOCIETY: TORONTO CHAPTER

Speaker: Dave Rohrer, President & CEO, Canadian Warplane Heritage Museum

Topic: **2014 UK Lancaster Bomber Tour**

Saturday, March 4, 1:00 p.m.

Where: Canadian Forces College, 215 Yonge Blvd. (@ Wilson Ave.)

Additional information is available at the Toronto Aviation History website.

ASCENSION 2017

Beyond Earth

SEDS Canada' flagship event, Canada's National Space Conference for Students, is taking place on **March 3 - 5**, 2017. It is hosted this year by the University of Toronto Aerospace Team (UTAT) at the Bahen Centre for Information Technology, 40 St. George St., Toronto. Click for more information.

CASI CANADIAN STUDENT SUMMIT ON AEROSPACE (CSSA)

The CSSA aims to connect students networking across the aerospace sector through a three-day program. The conference includes seminars by speakers and panellists from within Canada's aeronautics and space sectors as well as tours at Magellan Aerospace and MHI Canada Aerospace, Inc. (MHICA).

This year the CSSA will be hosted in Toronto by Ryerson University on **March 10 - 12**, 2017.

More information is available on their Facebook page.

MORE EVENTS ON THE NEXT PAGE!

BRAMPTON FLIGHT CENTRE

Free Flights for Females!

Empowering More Women to Fly!

It is widely recognized that female pilots only comprise about 6% of all Commercial Pilots. For this reason, the Brampton Flight Centre is participating in the *Women in Aviation Fly it Forward Challenge* and providing free first flight experiences to females.

March 12: 10:00 - 4:00

Our goal is to encourage girls and women to consider aviation as a hobby or a career and improve gender balance in the industry. The Brampton Flight Centre (BFC) invites all girls and females who have never flown in a small aircraft before to **Take Flight!** The flights and ground school are FREE!

- 20 minute flight over the Caledon hills (3 per aircraft depending on weight).
- 30 minute introductory ground school, covering the highlights of a career in aviation and the steps to get there.
- Light refreshments

Fill in the form to reserve your flight.

Women of Aviation WORLDWIDE WEEK

INDUSTRY NEWS

BOMBARDIER
the evolution of mobility

Government of Canada and Bombardier Announce Investment to Strengthen Leadership in Aerospace

TORONTO – February 7, 2017 – The Government of Canada is committed to keeping Canada at the forefront of global leadership in the aerospace sector. The aerospace industry is one of the most innovative industries in Canada, and it provides over 211,000 quality jobs for Canadians and $28 billion annually in GDP to Canada's economy.

That is why the Government of Canada announced that it will provide $372.5 million in repayable contributions to Bombardier Inc. This funding will be provided over four years and will support thousands of good middle-class jobs, strengthen the long-term competitiveness of Bombardier and help to build the aircraft of the future.

Through its collaboration with Bombardier, the Government of Canada is investing in thousands of Canadians and hundreds of suppliers across the country. As the nation's largest aerospace company, Bombardier supports thousands of jobs in design, engineering and manufacturing through its nation-wide supply chain of companies.

This initiative by the Government of Canada will fund research and development for the new Global 7000 business jet and ongoing activities related to the development of the company's C Series aircraft.

The Government of Canada has a long-standing relationship with Bombardier, Canada's biggest private sector investor in research and development activities. These activities strengthen the skills and knowledge of Canadians working in the aerospace sector, and they lead to new manufacturing platforms that position Canadians working in the sector for the jobs of tomorrow. The resulting benefits enable Canada to maintain a competitive position in the global supply chain that forms the aerospace sector.

"This contribution from the Government of Canada will secure the highly skilled, well-paying jobs for middle-class Canadians who work in the aerospace sector. It will also ensure that Canada has a strong, stable and competitive aerospace industry, which is a major driver of economic activity and innovation across the country. Bombardier plays a vital role, both as an anchor employer and an innovation leader. The Government of Canada is proud to invest in research and development activities that secure Canadian jobs, while enabling Bombardier to grow as a globally competitive company for years to come."

– The Honourable Navdeep Bains, Minister of Innovation, Science and Economic Development

"We welcome the continuing partnership with the Canadian government. The repayable contributions announced today will help to ensure that Canada remains at the centre of Bombardier's research and development activities, which are focused on developing the most efficient, reliable and environmentally friendly aircraft in the world. While we compete globally, we are proud of our Canadian home, our heritage and

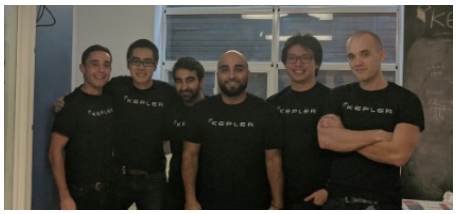
our position as one of Canada's leading high-technology manufacturers and employers."

– Alain Bellemare, CEO, Bombardier Inc.

Quick Facts

- Aerospace leads all manufacturing industries in research and development. It accounts for nearly one-third of all research and development activity in Canada's manufacturing sector, which translates to $28 billion of economic activity every year. Canada's aerospace sector employs, directly and indirectly, 211,000 people across the country.
- Aerospace companies are Canada's leading exporters in terms of trade intensity at twice that of the manufacturing average. Close to 80 percent of aerospace manufacturing was exported in 2015.
- The repayable contribution to the Global 7000 jet will be made through the Strategic Aerospace and Defence Initiative (SADI). This program supports specific research and development activities that help aerospace and defence companies develop new technologies.
- Another portion of this investment will be made through the government's existing contribution agreements with Bombardier. This contribution will support ongoing activities related to the development of the company's C Series aircraft. The C Series is an example of Canadian innovation and clean technology that is the future of the aerospace industry.
- In May 2005, Canada first announced that it would support the C Series with a $350-million repayable contribution.
- On October 11, 2016, the government announced an investment of up to $54 million to support a Bombardier-led consortium under the Technology Demonstration Program. The consortium will develop state-of-the-art electric systems and advanced aerodynamic systems that will make the aircraft of the future more energy efficient, reliable and quiet.

Keplar Communications Contracts for First Launch



Nick Spina, Stephen Lau, Mina Mitry, Mark Michael, Wen Cheng Chong and Jeffrey Osborne of Keplar Communications

TORONTO – February 20, 2017 – Toronto, Ontario based, Kepler Communications has contracted Amsterdam based Innovative Space Logistics to launch their first nano-satellite, using an Indian polar satellite launch vehicle (PSLV), from the Satish Dhawan Space Centre, in November 2017.

As outlined in the February 16th, 2017 Kepler press release, "Kepler Contracts Innovative Space Logistics for Inaugural Mission" the mission will serve as a technology demonstration of Kepler's Ku-band software defined radio (SDR) and high gain antenna.

Kepler plans to use the technology as the backbone for a proposed constellation of "up to 140" low-Earth nano-satellites, placed in a variety of orbits for use as low cost satellite data re-transmitters. As outlined in the November 20th, 2016 post, " SpaceX, Telesat & Kepler Just Three of the Dozen Satellite Constellations Currently on the FCC Table," the company plans on targeting the fast growing machine-to-machine communications market currently growing up around "internet of things" applications and not the conventional terrestrial telecommunications market.

One hard to reach place where Kepler expects demand is in Canada's far north, particularly satellite-dependent Nunavut. The company was co-founded by Samer Bishay, who also owns both Iristel, a Montreal based provider of voice over internet protocol services, and Ice Wireless, a Canadian mobile network operator and telecommunications company that provides 3G/4G mobility services, mobile broadband internet, and fixed line telephone in the territories of Yukon, the Northwest Territories and Nunavut.

Bishay "absolutely" plans to use the Kepler nano-satellites to improve wireless and internet service in the north, according to the article. "What we're providing is the data pipe basically ... with satellite connectivity it helps remote communities where infrastructure like fibre would be very expensive to deploy."

According to Kepler CEO Mina Mitry, "in the most basic sense, we're putting up cell phone towers in space that can pick up signals from on the ground and from assets in space."

The initial micro-satellite will serve as a "proof-of-concept" and additional micro-satellites will be added to the constellation as required to service commercial demand.

With thanks to Chuck Black and his Commercial Space Blog

MAGELLAN AEROSPACE

Magellan Aerospace Awarded Engine Maintenance Contract for CF-188 F404

TORONTO – Friday, 3 February 2017 – Magellan Aerospace announced today a contract award from Public Services and Procurement Canada ("PSPC") for engine repair and overhaul ("R&O") and fleet management services on the F404 engine that powers Canada's fleet of CF-188 Hornet aircraft. The contract commenced in January 2017 and work will be carried out until the terms expire at the end of March 2021. A preliminary funding amount of CDN$45M has been approved to launch the multi-year agreement. The contract includes options to extend the duration of the agreement beyond 2021, based on performance. Magellan will service the F404 engines at its facility in Mississauga, Ontario and at Royal Canadian Air Force ("RCAF") bases located in Bagotville, Quebec and Cold Lake, Alberta.

Under the terms of the contract, Magellan will provide R&O services, engineering and field support services, technical and publication management services, and supply chain management services for the F404-GE-400 engines and CF-18A/B secondary power systems.

"Magellan Aerospace is an approved source for F404 and J85 engine repair and has been the RCAF's choice for F404 engine R&O service for 35 years. We are pleased to continue this relationship with Canada's air force, which demonstrates confidence in Magellan's world class technical experience and value in terms of competitive pricing", said Mr. Phil Underwood, President and Chief Executive Officer of Magellan Aerospace.

In addition to supporting Canada's CF-188 F404 fleet, Magellan is a proven supplier and Centre of Excellence, in the worldwide F404 engine R&O support market. There are approximately 4,000 F404 engines currently in service in 15 countries around the world.

ACADEMIC NEWS

Apparently students are all busy studying and not much news-worthy has happened at most of the local universities recently!

UNIVERSITY OF TORONTO

U of T Alumni Make Shortlist to Become Canada's Next Astronauts

TORONTO – February 2, 2017 – Five on the list are U of T engineering alumni; others include a marine geophysicist, a Canadian Armed Forces official and severe weather researcher with Environment and Climate Change Canada.

Aaron Persad is one of 11 U of T alumni named to the Canadian Space Agency's shortlist of candidates to become Canada's next two astronauts.

Aaron Persad shows off a small sample of water he took on a microgravity simulation test flight in November 2016 (photo courtesy Aaron Persad).

"I felt excited, honoured and a bit surprised since I knew I was competing with very highly qualified colleagues," said Persad. "While space is big, the space community is small, and I am

delighted to see that several colleagues are also in the CSA shortlist."

A postdoctoral researcher currently working in the lab of Mechanical and Industrial Engineering Professor David Sinton, Persad is one of 72 people from across Canada under consideration for two upcoming astronaut roles with the Canadian Space Agency (CSA).

He's one of five U of T Engineering alumni to make the shortlist. Other Faculty of Applied Science & Engineering alumni on the list are:

- Jesse Koovik Eyer
- Francis James Frenzel
- Cordell Grant
- Najmus Ibrahim

Other U of T alumni on the shortlist include:

- Brendan Craig Dickson
- Michael Koehle
- Catherine Marchetti
- Zen Mariani
- Adam Sirek
- Eleanor Willoughby

Any alumnus or alumna picked for the program would be following in the footsteps of such U of T astronauts as alumna Julie Payette and U of T Misissauga alumna Roberta Bondar, who took the crest of Erindale College, as U of T MIssissauga used to be known, into space with her as the first Canadian woman astronaut.

Persad's dream of going to space began at the age of seven and his pursuit of it accelerated at U of T Engineering. During his undergraduate studies, he completed his Professional Experience Year internship at the CSA, including a flight in a Falcon-20 jet where he got experience the sensation of free-fall for the first time.

"It felt fantastic. I remember my legs had the tendency to float up toward my chest. I had to consciously keep them down," said Persad.

Persad's PhD research, supervised by Professor Emeritus Charles Ward, focused on solving a decades-old mystery about the behaviour of water in microgravity, specifically the shape it takes within a closed container. The seemingly simple question has important implications for life-support systems in space.

The project suffered a major setback when a SpaceX rocket meant to carry his experimental apparatus into orbit exploded in the summer of 2015. Undeterred, Persad created a new apparatus in time for the next launch in the summer of 2016. Last week, NASA astronaut Robert S. Kimbrough performed the experiment aboard the International Space Station.

Persad is standing by for the data downlink, which will include videos and high-resolution images of the microgravity experiment.

Outside of his research, Persad has been recognized for his teaching excellence and has led a number of educational initiatives, including a company that delivers robotics technology education to young children.

This is Persad's second attempt to become an astronaut, having applied during CSA's previous round of recruitment in 2008, when he was a master's student at U of T Engineering. Since then, Persad has greatly enhanced his technical expertise and aggressively pursued astronautics training through the non-profit organizations Astronauts4Hire and Project PoSSUM.

"I used my previous evaluation as a checklist to prepare for a future call. For example, I was asked questions like 'Do you have piloting experience?' or 'Have you ever taught a post-graduate engineering course?'" said Persad. "For the last eight years, I've been working hard to turn every 'no' into a 'yes.'"

A final decision from the current round is expected by June 2017.

YORK UNIVERSITÉ UNIVERSITY

Up and Away: York Professor's Stratospheric Balloon Takes Flight

TORONTO – February 28, 2017 – York space engineering Professor Jinjun Shan will be heading to Alice Springs, Australia in April to deploy a modified 2-D Fabry-Pérot Spectrometer on a stratospheric balloon flight mission. The mission is the second for Shan.

Last fall, Shan and his team achieved a global first when they successfully flew their 2-D Fabry-Pérot Spectrometer on a stratospheric balloon during a 10-hour mission that saw the balloon and its scientific payload reach an altitude of 34 kilometres. The flight took place in Kiruna, Sweden, lifting Shan's 2-D imaging Fabry-Pérot spectrometer aloft. The spectrometer, which was jointly developed by Shan's team at York University and MPB Communications Inc., was created to obtain very high spectral resolution measurements. In essence, it views sunlight that is

absorbed and scattered by the atmosphere and reflected by the Earth's surface.

The York University-Canadian Space Agency (CSA) team with FPS instrument. From left, Prof. Jinjun Shan (York University), Steeve Montminy (CSA), Ryan Orszulik (University of Magdeburg, Germany), Chris Sioris (York University), Mohammed Kagalwala (York University), Mike Voutsogiannakis (York University), Yuan Ren (York University), and Philippe Vincent (CSA)

"The measurements provide information on aerosols, surface pressure and surface albedo," said Shan, who is Professor of Space Engineering in the Department of Earth and Space Science and Engineering (ESSE) in the Lassonde School of Engineering at York University. Shan is the principal investigator of the project, which is funded by the Canadian Space Agency (CSA), under its Flights for the Advancement of Science & Technology (FAST) program in 2014.

Professor Gordon Shepherd and Chris Sioris (PhD '01) also from ESSE, are co-investigators on the project. Also contributing to the project development of instrumentation are a number of science and engineering researchers, including ESSE students.

The balloon takes flight from the Esrange Space Center near Kiruna, Sweden

For its first flight, Shan said the stratospheric balloon took off few minutes before 7am local time (about 1am EDT) on Saturday, Sept. 3at the Esrange Space Center, near Kiruna, Sweden. It landed around 2:15pm in Northern Finland, and the instrument was successfully recovered before 8pm. "The success of the flight was a first," said a jubilant Shan.

Analysis of the observation data is ongoing and the second flight will contribute greatly to the understanding of aerosols, surface pressure and surface albedo, said Shan. He noted that during the eight-hour flight, key technologies of Fabry-Pérot spectrometer were successfully demonstrated and validated, leading to the second flight in April. It is anticipated, said Shan, that the technologies can now be readily be implemented on a future satellite mission.

And while the flight and the successful retrieval of observation data were exciting, one of the most memorable and life-changing moments for Shan was having a front row view of the Northern Lights, which, as if to celebrate the success of his project, decided to put on an early and magnificent appearance.

MUSEUM & LOCAL NEWS

TORONTO INTERNATIONAL AEROSPACE

(*formerly* Canadian Air & Space Museum)

www.casmuseum.org

NATIONAL AIR FORCE MUSEUM OF CANADA

NATIONAL AIR FORCE MUSEUM OF CANADA
MUSÉE NATIONAL DE LA FORCE AÉRIENNE DU CANADA

airforcemuseum.ca

Fall & Winter Hours
(October - April)
Wednesday - Sunday: 10 - 5

CANADIAN WARPLANE HERITAGE MUSEUM

CANADIAN WARPLANE HERITAGE

www.warplane.com

The museum is CLOSED February 28 - March 7 inclusive. The Gift Shop will remain open. The Café is only open to airside customers.

CASI CORPORATE PARTNERS (local)

BOMBARDIER
the evolution of mobility

MAGELLAN
AEROSPACE CORPORATION

MDA™

Ontario Centres of Excellence
Where Next Happens

Pratt & Whitney Canada
A United Technologies Company

RYERSON UNIVERSITY

TDM TECHNICAL SERVICES

UTIAS