



Canadian Aeronautics and Space Institute Institut aérospatial et spatial du Canada

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***** FOR IMMEDIATE RELEASE *****

December 17, 2021

CANADIAN AERONAUTICS AND SPACE INSTITUTE ANNOUNCES 2021 SENIOR AWARD HONOUREES

With the endorsement of the Council of the Canadian Aeronautics and Space Institute, CASI President Dr. Harry Kowal is pleased to announce the honourees of the 2021 CASI Senior Awards.

The Senior Awards and the recipients are:

1. The Trans-Canada (McKee) Trophy
Canadian Forces Aerospace Engineering Test Establishment
2. CASI McCurdy Award
Professor Hugh H.-T. Liu, University of Toronto Institute for Aerospace Studies
3. CASI C.D. Howe Award
Professor David W. Zingg, University of Toronto Institute for Aerospace Studies
4. CASI Alouette Award
Mr. Richard Boudreault, CEO, Dymedso

The criteria for each of the Senior Awards discerned in 2021 and summaries of the accomplishments of the honourees are found below.

Presentation of the Awards will be made via internet events due to COVID-19 pandemic restrictions on in-person gatherings.

For more information, please contact the headquarters of the Canadian Aeronautics and Space Institute at (613) 591-8787.

. . . details on the following pages . . .



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The Trans-Canada (McKee) Trophy

The Trans-Canada Trophy, generally known as the McKee Trophy, is the oldest aviation award in Canada. It was established in 1927 by Captain J. Dalzell McKee. In 1926 McKee, of Pittsburgh, Penn. accompanied by Squadron Leader Earl Godfrey of the RCAF, flew from Montreal to Vancouver in a Douglas MO-2B seaplane. McKee was so impressed by the services provided by the RCAF and the Ontario Provincial Air Service that he established an endowment by means of which the greatly coveted McKee Trophy is awarded to the Canadian whose achievements were most outstanding in promoting aviation in Canada.

The Trophy was deeded to the Crown in the person of the Minister of National Defence - in the days when the Department of National Defence controlled all flying, military and civil. It was retired in 1964 and reinstated in 1966, and in 1971 administration of the Trophy was transferred to the Canadian Aeronautics and Space Institute. From 1964 until its move to Canada's Aviation Hall of Fame in 1983, the Trophy was on display at the National Museum of Science and Technology in Ottawa.

The Trophy is awarded for outstanding achievement in the field of air operations. The achievement for which the Trophy is awarded may be a single brilliant exploit within the past year, or a sustained high-level performance in recent years; pioneering of new areas of air operations and advancement of the use of aviation shall receive consideration over achievements serving no useful end. Qualifications as aircrew shall be a prior claim to consideration. The recipient shall have been a Canadian citizen at the time of the achievement.

Aerospace Engineering Test Establishment

AETE is a sustainable and sovereign engineering test and evaluation (ET&E) capability that supports continuing airworthiness enhancements, modifications to extend the life of Royal Canadian Air Force (RCAF) aircraft, and advanced integration of new complex systems that require the development and design of new test and evaluation techniques to characterize performance and operation of the systems under test. AETE maintains a diverse complement of 22 test pilots, flight test engineers, and flight test navigators executing evaluation programs alongside about 89 other personnel who provide specialist supporting functions in data acquisition, instrumentation manufacture, data analysis, and air operations support. AETE celebrated its 50th anniversary in 2017.



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AETE has recorded numerous notable achievements over the past decade:

In 2013, initiated the Engineering Flight Test Rationalization (EFTR) that made ET&E services more robust, responsive and scalable to meet Strong, Secure, Engaged: Canada's Defence Policy for at least the next 15 to 20 years. AETE has developed and maintained strategic partnerships with DND/CAF units as well as the National Research Council Flight Research Laboratory and both Transport Canada Aircraft Services Directorate and National Aircraft Certification to fulfill its mandate. Goals realised include reduced operating cost and re-investment of aircraft and trained maintenance personnel back to the RCAF, reductions in greenhouse gas emissions and re-invigoration of flight test excellence and collaboration within the NCR aerospace hub.

In 2013, carried out Night Vision Imaging System compatibility testing on the legacy CC130H Hercules with the use of specialized hangar installations and instrumentation. The retrofit of interior and exterior lights to permit night-aided operations greatly augmented the CC130H search & rescue operational capability.

In 2014, confirmed the ability of the CC150 Polaris Multi-Role Tanker Transport (an Airbus A310 variant) to permit general navigation in the extreme Polar Regions, which greatly increased the reach of RCAF aircraft into the Northern Domestic Airspace.

In 2015, conducted flight testing to investigate repetitive premature deterioration and failure of the centre engine on a CH149 Cormorant. Testing led to the detection of unusual vibrations in the centre engine mount support structure, indicating undetected damage. Subsequent repair eliminated the unusual vibrations, prevented further engine problems and returned a valuable life-saving aircraft to service.

In 2017, provided initial support to the Interim Fighter Capability Project (IFCP) office, and executed flight testing on short timelines once the first Australian F/A-18 were received in the winter of 2019. Timely and effective flight testing allowed to declare Initial Operational Capability (IOC) with a NORAD capability in June 2020, receiving an ADM(Mat) Merit Award.

In 2018, conducted First of Class Flight Trials of CH148 Cyclone Maritime Helicopter operating limit testing aboard the latest Royal Canadian Navy vessels. Ship Helicopter Operating Limit testing is a marquis capability. Almost 60 years ago, Canada was the first to operate 'big helicopters on small ships' and AETE continues to lead on innovative flight test techniques and further sophisticate this unique envelope expansion.



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In 2020, in response to the Global Pandemic and in direct support of RCAF pursuit of safe aeromedical evacuation capabilities, conducted developmental and engineering flight test on Aircrew face-masks and a range of rapidly acquired bio-containment projects.

AETE has continued to execute research and development programs such as:

Evaluation of symbology systems as part of a technology demonstration program to improve aircraft operations in degraded visual environments. In 2014 this work received the Technical Corporation Program Award from the Five-Eyes community and was presented at the 2014 Society of Experimental Test Pilots Annual Symposium.

Demonstration of a conceptual maritime helicopter precision approach system that provides lateral, vertical, and closure rate guidance based on deviations from a defined ideal path to safely recover an helicopter to a ship in instrument meteorological conditions, overwater at low altitudes, in remote areas with no alternate landing sites.

Over the past decade, AETE has continued to be at the forefront of aeronautical progress providing innovative techniques to evaluate and field new platforms and systems and executing experimental programs to integrate emerging technologies that increase the safety and effectiveness of the RCAF. *[adapted from the nomination by BGen Nancy Tremblay]*

The CASI McCurdy Award

The McCurdy Award was introduced in 1954 by the Institute of Aircraft Technicians, one of the aeronautical groups that amalgamated to form the Canadian Aeronautics and Space Institute. The award commemorates the many engineering and other contributions made by John A.D. McCurdy during the first stages of the development of an aviation industry in North America.

The award is presented for outstanding achievement in the science and creative aspects of engineering relating to aeronautics and space research. The achievement must constitute the most significant contribution made in recent years toward the advancement of science and technology in aeronautics and space exploration, and must be worthy of special recognition. The contribution may be administrative in nature, but it must be directly related to science and technology, and have been sustained over a number of years at an imaginative and creative level above that which would normally be considered a competent and successful performance. The recipient shall have been a Canadian citizen at the time the contribution was made.



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Professor Hugh H.-T. Liu

Dr. Hugh Liu has been a professor at the University of Toronto's Institute for Aerospace Studies (UTIAS) since 2000. He currently also serves as the Director of the Centre for Aerial Robotics Research and Education (CARRE), an interdisciplinary and cross-disciplinary centre based in the university's Faculty of Applied Science & Engineering, with partners in several departments and at other institutions.

Professor Liu has made significant and sustained contributions toward the advancement of research and development in aeronautical engineering in the field of aircraft systems dynamics and control. He has also made numerous contributions in technology transfer, engineering education, and service to the profession.

Dr. Liu is an internationally known researcher in flight systems and control. He has made seminal contributions in developing novel flight control solutions to innovative aerial systems and emerging aviation applications. Among his specific contributions, he was one of the first to develop an integrated aircraft design and control strategy for highly flexible aircraft, and further developed a resilient flight control when a flexible aircraft becomes vulnerable for structural damage. His work in this area was an important influence on the latest large aspect-ratio (leading to flexibility), high-altitude and long-endurance (HALE) aircraft design. As such, he established a comprehensive fault detection algorithm and fault tolerant control treatment for aircraft suffering from faults or failure. He is widely recognized as a technical expert on this subject, and was invited to consult for Airbus (2017).

Hugh Liu is one of the pioneers working on formation flight. His research on motion synchronization enabled multiple aircraft fly in formation followed by precision control to engage close formation flight. Formation flight is considered as one potentially viable solution to reduce fuel consumption, under the influence of development for environmentally friendly (green) aviation initiatives. He later received a U.S. patent (7,680,547) and a Canadian patent (2,549,817) to recognize his technical invention.

Professor Liu has authored a book entitled *Formation Control of Autonomous Vehicle Systems'* (Wiley, 2018) that has been adopted as the textbook of graduate level courses at several institutions internationally.

Professor Liu's recent research focuses on intelligent flight control development to push the envelope of flight autonomy in various nascent aviation applications using



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unmanned aerial systems (UAS). His work includes wildfire monitoring, freshwater toxic algae growth detection, and drone delivery to name a few. These applications are not only widely recognized, but have a significant beneficial impact on society. He often provides expert advice on regulatory issues, participating as Canada's representative regarding the International Standardisation Organization establishment of Unmanned Aerial Systems standards.

In addition to his research and development accomplishments, Hugh Liu also has made significant contributions to technology transfer and commercialization. He founded Arrowonics Technologies Ltd. that develops automated drone systems. To recognize his contributions, he was named 2015 'Inventor of the Year' by the University of Toronto.

Professor Liu's scientific and creative achievements in aircraft flight systems and control have substantially advanced the state of the art. His research contributions in intelligent flight control systems over the past 20 years make him one of the world's leading researchers in this field. In recognition of his accomplishments in the professional societies with which he is affiliated, he has been named a fellow of the Engineering Institute of Canada, the Canadian Society of Mechanical Engineers, an associate fellow of the Canadian Aeronautics and Space Institute and an associate fellow of the American Institute of Aeronautics and Astronautics. He also serves on the editorial boards of CASI's *Canadian Aeronautics and Space Journal (CASJ)* and AIAA's *Journal of Guidance, Control, and Dynamics*. Hugh Liu has made a variety of contributions to the life of CASI, including serving as general chair of the CASI AERO 2017 conference.

Hugh Liu's collaborations with Canadian aerospace companies including Bombardier Aerospace, Honeywell Aerospace, Safran Aerospace have resulted in the registration of several patents. Since 2015 he has served as Director of the University of Toronto's Centre for Aerial Robotics Research and Education (CARRE) that brings together expertise related to aeronautical science and engineering and robotics to transform the emerging field of unmanned aerial systems research and development. Under his leadership, CARRE has become a well-known Canadian research centre that is internationally recognized, making significant contributions to the Canadian aerospace sector.

Through his wide-ranging accomplishments in research and education, Professor Liu has made important and sustained contributions to the advancement of aeronautics and space research. *[adapted from the nomination by Dr. Meyer Nahon]*



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The CASI C.D. Howe Award

In 1966 CASI introduced the C.D. Howe Award in honour of The Right Honourable C.D. Howe. The Award is presented for achievements in the fields of planning and policy making, and overall leadership in Canadian aeronautics and space activities.

The achievement for which the award is given shall be of permanent significance, and its benefits to aeronautics and space activities in Canada shall have been unquestionably established. To this end, the recipient shall have sustained an outstanding personal performance in these fields for at least ten years and it shall be reasonably certain that the merits of his achievements will be unassailable in the light of history. The recipient shall have been a Canadian citizen and resident during the time the contribution was made.

Professor David Walter Zingg

Prof. David Zingg currently holds the position of Distinguished Professor of Computational Aerodynamics and Sustainable Aviation at the University of Toronto Institute for Aerospace Studies (UTIAS). He has been an influential figure in Canadian aerospace for over two decades, playing a leadership role in virtually all national initiatives related to research and development.

Dr. Zingg is a founding co-chair of the Downsview Aerospace Innovation and Research Consortium (DAIR) which is planning and advocating for an important aerospace hub to be located at Downsview Park in Toronto. The consortium includes all major industry and academic stakeholders in the greater Toronto area and has the support of all three levels of government. He also served on the DAIR Board of Directors and has been one of the driving forces behind the initiative.

His role has been particularly important in the context of environmentally sustainable aviation where he has spearheaded numerous noteworthy initiatives. For example, when the federal government required expertise for the Canadian Transportation Act Review it turned to Dr. Zingg, who prepared a thorough report entitled Actions to Reduce the Climate Change Impact of the Aviation Sector in 2015. More recently, Prof. Zingg has been nominated by Transport Canada for the International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEP) Panel for the Integrated Independent Expert Technology Goals Assessment and Review for Engines and Aircraft.



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Prof. Zingg is the Founder and Director of the Centre for Research in Sustainable Aviation (CRSA). Among the many important initiatives associated with the CRSA, one of the most successful has been the International Workshop on Aviation and Climate Change held at UTIAS, which brings together leading experts in the field from all over the world every two years and has now been held five times.

David Zingg has served on the Steering Committee of the Canadian Aviation Environmental Technology Roadmap since 2010. He has also played virtually every role possible in the successful Green Aviation Research and Development Network (GARDN), including as a member of Board of Directors, member of the Executive Committee, and finally Chair of the Scientific Committee. As an educator, researcher, and leader Prof. Zingg has tirelessly promoted green aviation, giving numerous presentations to audiences of all kinds.

Prof. Zingg has been a key voice of aerospace academia in its dialogue with industry and government for the past two decades, ensuring that the academic perspective is not forgotten as the Canadian aerospace R&D ecosystem evolves and that the Canadian aerospace sector can benefit from Canadian aerospace research at universities to the fullest possible extent. [*adapted from the nomination by Dr. Chris Damaren*]

The CASI Alouette Award

CASI created the Alouette Award to recognize an outstanding contribution to advancement in Canadian space technology, application, science or engineering. The CASI Alouette Award may be presented to an individual, to a group, an organization or group of organizations, as appropriate to the nature of the contribution.

The terms are:

- a) The trophy shall be awarded annually for an outstanding achievement in the field of astronautics as defined by the CASI By-Laws.
- b) The achievement may be either a single outstanding contribution or, in the case of an individual nominee, a sustained high level of performance resulting in several advances in space.
- c) The contribution on which the award is based must be recognized as a Canadian-led space endeavour or as a significant Canadian contribution to an international program.
- d) Preference shall be given to contributions that lead to new benefits for mankind.
- e) The recipient shall have been a Canadian citizen at the time the contribution was made.



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Mr. Richard Boudreault

Richard Boudreault is a physicist, an aerospace engineer and a repeat entrepreneur. He is one of the early pioneers of the Canadian space sector, having been involved in many if not most Canadian programs since the late 70's. He has been involved in creating space educational programs and courses both in Canada and internationally and has been a key contributor to the federal government on space policy. He has contributed directly and significantly to the creation of a sustainable and durable space industry in Canada.

Richard graduated in physics from the University of Montreal (1979) and completed a Master's Degree in Aerospace Engineering at Cornell University (USA), working with illustrious astrophysicist Carl Sagan and Nobel Prize laureate Hans Bethe.

His professional career started at CAE Electronics, writing real-time software codes for flight simulators and space exploration systems. From 1984 to 1989 he worked as Chief Scientist at Canadian Astronautics Ltd. (CAL) where he developed technologies (sensors, antennas, etc.) that were flown on spacecraft by ESA and NASA. In parallel he founded the Aerospace Engineering Program at the University of Sherbrooke (1984) and co-founded the Space Specialty Program at Saint-Jean Military College (1989).

After CAL, he joined Oerlikon Aerospace (1989-1992) as Director of Space Programs where he led research and development activities on the Dextre robot for the International Space Station. He founded the Centre des Technologies Aérospatiales in 1993, a R&D and technology transfer institute located in St-Hubert, Quebec, and was instrumental in the creation of the CIRUS program (Consortium for Industrial Research in the Use of Space) at Memorial University in Newfoundland.

Richard Boudreault conducted many projects for the Canadian Space Agency. He wrote the first Moon-Mars strategy, and produced the first study that led to the Radarsat mission. He also was a key contributor to Cospas-Sarsat, an international humanitarian search and rescue system that uses satellites to detect and locate emergency beacons carried by ships, aircraft, or individuals. Its availability has resulted in thousands of lives being saved in remote locations.

Amongst his many accomplishments in Canadian space technologies, Richard:

- Developed low-gravity, high-sphericity micro-encapsulation of beta cell islets. This method is being pursued on by the NASA as a promising candidate technology for treating diabetes.



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- Developed the Hartmann optical test procedure and instrumentation for the Mount Megantic observatory telescope. The Hartmann test was later adapted and used on the Canada-France-Hawaii Telescope in Hawaii.
- Trained Canadian Astronauts Program office flight personnel on the use of microgravity hardware on the ground and onboard the KC-135 parabolic low-gravity aircraft in Houston, Texas.
- Conceived, developed and tested a float zone furnace for operations on the KC-135 and on the International Space Station shuttle mid-deck.
- Planned and analysed strategies for Canadian participation in future space programs, including the Space Exploration Initiative (SEI).
- Prepared space policy documents for the Canadian Space Agency and the European Space Agency on Moon-Mars exploration and space robotics issues.

Richard Boudreault was the commentator for the space flights of Canada's first astronaut, Dr. Marc Garneau, on the CBC and Radio-Canada television networks. He has also been interviewed several times for television programs like "The Journal " (CBC) and "Le Point" (Radio-Canada), and for publications such as "Space Business News", "Space News" and "Aviation Week & Space Technology".

His current activities include serving as a Visiting Scholar at McGill University, as professor at École Polytechnique Montréal and as adjunct professor at the University of Waterloo, and as CEO of Dymedso, a company that specializes in medical treatment devices for SARS, the severe acute respiratory syndrome.

Richard Boudreault has received many awards and recognitions for his distinguished career in science and engineering. He has been elected Fellow of the Royal Society of Canada, the Canadian Aeronautics and Space Institute, the Royal Canadian Geographical Society, the Institute of Physics (UK), and the Canadian Academy of Engineering. In 2018 he received the George E. Pake Prize of the American Physical Society. He also received the Queen Elizabeth II Diamond Jubilee Medal for distinguished service to Canada and, in 2016, was presented with the Canadian Association of Physicists and National Optics Institute Medal for Outstanding Achievements in Applied Photonics. In 2019, the Government of the French Republic decorated him as a Knight of the Order of Academic Palms. *[adapted from nominations by Dr. Robert Boily and Mr. Marc Donato]*