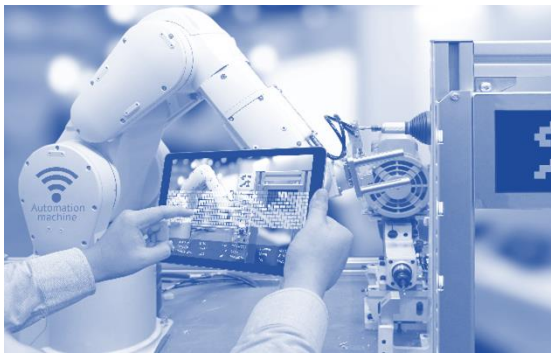
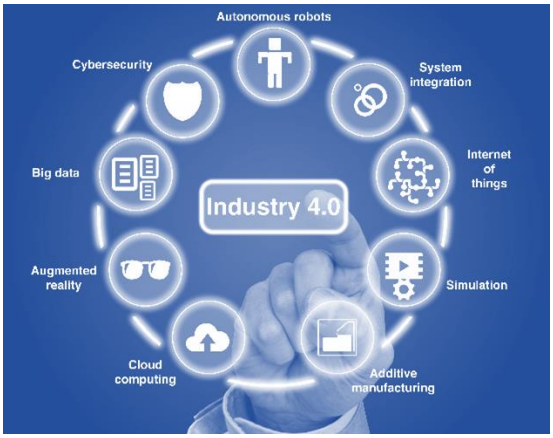


Aerospace Sustainable Technologies to Address Industry 4.0 Challenges



GLOBAL AEROSPACE SUMMIT

MONTRÉAL 2018

MAY 10-11 2018

Centre technologique en aérospatiale

Presented by

Conférence des chefs de gouvernement des Régions partenaires

INSTITUTS AÉROSPATIAUX DE MONTRÉAL | MONTREAL AEROSPACE INSTITUTES

CTA CENTRE TECHNOLOGIQUE EN AÉROSPATIALE — CÉGEP ÉDOUARD-MONTPETIT

ÉNA ÉCOLE NATIONALE D'AÉROTECHNIQUE — UN CAMPUS DU CÉGEP ÉDOUARD-MONTPETIT

Under the leadership of

AÉROÉTS Engineering for Aerospace 4.0

ÉTS Engineering for Industry

WELCOME

Dear attendees of the Global Aerospace Summit Montreal 2018,
Dear RLS Network Members,

The term “Industry 4.0” represents the fourth revolution in the manufacturing industry, which is currently underway. It heralds a new enterprise where humans, computers, machines and products collaborate digitally and communicate seamlessly through integrated and optimized processes across the total product value stream. Across the world, aerospace companies are striving towards increasing use of Big-Data-driven quality control, robot-assisted production, self-driven logistics, production-line simulation, smart supply networks, predictive maintenance, service-driven manufacturing, self-organizing production and additive manufacturing of complex parts. This shift towards the democratization of technology presents novel opportunities for a more sustainable aerospace industry, but it also presents major challenges for enterprises and the need for new skills in tomorrow’s workforce.

In June 2017, scientists and experts from the partner regions united in the ‘Regional Leaders’ Summit’ (RLS) network came together at the Munich Aerospace Summer Summit to present on technical innovations and the current status of their countries’ research in aerospace. This event, organized by the Munich Aerospace cluster, brought together speakers and graduate students from the RLS partner regions: Bavaria (Germany), São Paulo (Brazil), Shandong (China), Upper Austria, Georgia (United States), the Western Cape (South Africa) and Québec (Canada).

This year, we gather in Montreal, Québec, Canada to discuss the sustainable technology developments that will be central to this “Fourth industrial revolution”, as well as how educational institutions can respond to the skills required of future aerospace engineers.

We hope that the Global Aerospace Summit presents you with novel ideas and a chance to exchange with peers from different educational institutions and companies about how we all can best respond to the challenges and opportunities of Aerospace 4.0.

Your host,

Dr. Hany Moustapha, Ph.D.
Fellow ASME, CAE, CASI and CSME
Professor and Director, Aerospace Programs (AÉROÉTS)
École de technologie supérieure (ÉTS), Université du Québec Network
Pratt & Whitney Canada Senior Research Fellow

About the Regional Leader’s Summit (RLS)

The RLS is a regional response to the challenges of 21st century globalization. It is a high-level forum comprising 7 regional governments, which together represent approximately 177 million people across five continents. Between the partner regions, more than 600 projects have been implemented on a bilateral and multiregional level.

Under the principle "policy for generations", the RLS is working on political perspectives and strategies for a sustainable development of society, economy and the environment. Since 2002, the heads of government for these regions have been holding a biennial political summit to offer an opportunity for political dialogue. Scientific projects are currently underway in the areas of Renewable Energy, Small Satellites, Digitalization and Aerospace.

The RLS-Aerospace Network recognizes that aerospace is a key economic driver and a research priority in the RLS regions. This field is extremely competitive and continuous innovation is required to remain operational under increasing financial and environmental constraints. Qualification of the workforce has proven to be of crucial importance and different teaching approaches exist in the RLS group. There is a strong understanding among the RLS partners that sharing this regional expertise in teaching aerospace can lead to enhanced teaching and training programs that will benefit all RLS regions.

PROGRAM - THURSDAY, MAY 10TH 2018

TIME	TOPIC	SPEAKER
9:00-9:30	**Participant registration**	
9:30-9:45	**Welcome Addresses**	Mr. Pascal Désilets, Director, Centre technologique en aérospatiale (CTA), St-Hubert, Quebec, Canada Dr. Hany Moustapha, Professor and Director, AÉROÉTS, École de technologie supérieure, Montreal, Quebec, Canada
9:45-10:30	**An Introduction to Aerospace 4.0™: Towards a More Intelligent and Digitalized Enterprise**	Dr. Hany Moustapha, Professor and Director, AÉROÉTS, École de technologie supérieure, Montreal, Quebec, Canada
10:30-10:45	**Coffee Break & Networking**	
10:45-11:30	**Integrating aspects of advanced manufacturing methods in Aerospace component and structures design methods – approaches and results**	Dr. Horst Baier, Professor emeritus from TU Munich, Aerospace Department / Lightweight Structures, and Member of the Executive Board, Munich Aerospace, Munich, Germany
11:30-12:15	**Advances in Structural Dynamics and Potential Aerospace Applications**	Dr. Domingos A. Rade, Professor, Aeronautics Institute of Technology, São José dos Campos, Brazil
12:15-13:30	**Lunch and Networking**	
13:30-14:15	**Product Lifecycle Management (PLM)**	Paul Bousquet, Business Project Manager for Product Lifecycle Management (PLM), Siemens Energy, Montreal, Quebec, Canada
14:15-15:00	**Hybrid Electric Propulsion for Transport Aircraft: Potentials and Limitations**	Dr. Mirko Hornung, Executive Director Research & Technology, Bauhaus Luftfahrt e.V., Taufkirchen, Germany
15:00-15:15	**Coffee Break & Networking**	
15:15-16:00	**Application of Unmanned Demonstrators for Technology Evaluation**	Dr. Mirko Hornung, Head of the Institute of Aircraft Design, Technical University Munich, Munich, Germany

PROGRAM - FRIDAY, MAY 11TH 2018

TIME	TOPIC	SPEAKER
8:45-9:00	**Participant registration**	
9:00-10:00	**Panel Discussion** **Future Engineering Skills Needed for Industry 4.0** Moderated by Dr. Hany Moustapha, École de technologie supérieure, Montréal, Québec, Canada	**Panelists:** Dr. Horst Baier, TU Munich / Munich Aerospace, Munich, Germany Dr. Yaoyao Fiona Zhao, McGill University, Montreal, Canada Dr. Domingos A. Rade, Aeronautics Institute of Technology, São José dos Campos, Brazil
10:00-10:45	**High fidelity simulations and reduced order modeling of airframe aeroacoustics**	Dr. William Roberto Wolf, Assistant Professor, University of Campinas, Unicamp, Brazil
10:45-11:00	**Coffee Break and Networking**	
11:00-11:45	**Explore the design potential of additive manufacturing technology: its implications on sustainability and Industry 4.0**	Dr. Yaoyao Fiona Zhao, Associate Professor and head of the Additive Design and Manufacturing Laboratory (ADML) at the Department of Mechanical Engineering in McGill University, Montreal, Canada
11:45-12:15	**Activities of Munich Aerospace and a pragmatic approach for E-learning based teaching**	Dr. Horst Baier, Professor emeritus from TU Munich, Aerospace Department / Lightweight Structures, and Member of the Executive Board, Munich Aerospace, Munich, Germany
12:15-12:30	**Closing Remarks**	Dr. Hany Moustapha, Professor and Director, AÉROÉTS, École de technologie supérieure, Montréal, Québec, Canada
12:30-13:30	**Lunch and Networking**	**RLS Coordinators Working Lunch** (by invitation only – Room F160)
13:30-14:45	**Visit of École nationale d'aérotechnique (ÉNA)**	
14:45-15:00	**Coffee Break & Networking**	
15:00-16:15	**Visit of Centre technologique en aérospatiale (CTA)**	

GUEST SPEAKERS

Dr. Hany Moustapha

Fellow ASME, CAE, CASI and CSME
Professor and Director, Aerospace Programs (AÉROÉTS)
École de technologie supérieure (ÉTS), Université du Québec Network
Pratt & Whitney Canada Senior Research Fellow

Hany Moustapha holds a B.Sc. from Cairo University (1970), an M.Eng and a Ph.D. from McMaster University, Canada (1978). With Pratt & Whitney Canada (P&WC) from 1978 to 2010, he was Senior Manager of Technology, Collaboration and Technical Training Programs from 1999 to 2009. He was named Pratt & Whitney Canada Senior Research Fellow in 2011. He joined ÉTS in 2010 as Professor in the Department of Mechanical Engineering and Director of AÉROÉTS.

Dr. Moustapha is a Fellow of the American Society of Mechanical Engineers (ASME), the Canadian Academy of Engineers (CAE), the Canadian Aeronautics and Space Institute (CASI) and the Canadian Society of Mechanical Engineers (CSME)

Dr. Moustapha is the Canadian industry and academic member of NATO's Aviation Technology since 2000. He is Adjunct Professor at Carleton University (Canada), Rzeszow University (Poland) and Cairo University (Egypt), as well as a Distinguished Visiting Professor at Embry-Riddle Aeronautical University (U.S.A.). He is the President of the Ambassador Club of the Montréal Congress Center. Dr. Moustapha is the founder and cofounder of the Montreal Aerospace Institute (MAI, 2001), the Consortium for Research and Innovation in Aerospace in Québec (CRIAQ, 2002), the Aero Montreal Cluster (2005), the Green Aviation Research and Development Network (GARDN, 2007), AÉROÉTS (2010) and Aerospace 4.0™, an integrated research and training program at ÉTS (2016). He is the author and co-author of over 100 publications and two books on gas turbines and the recipient of over 30 national and international awards.

Dr. Horst Baier

Professor emeritus
Aerospace Department / Lightweight Structures
TU Munich
Member of the Executive Board
Munich Aerospace, Munich, Germany

Dr. Baier holds a Master degree (Dipl.-Ing.) in Mechanical Engineering and a Ph.D. from TU Darmstadt, with his thesis being on Multicriteria Mathematical Design Optimization. He conducted research activities in Finite Element Methods and Mathematical Design Optimization at TU Darmstadt from 1972 to 1977. From 1977 to 1997, he worked for the Aerospace Company Dornier (now Airbus Defence and Space) in Friedrichshafen where he was Chief Engineer for Mechanical Systems. From 1997 to 2016, he was a Professor at Technical University Munich (TUM), Germany, in the Aerospace Department and Faculty of Mechanical Engineering. He served as head of the Chair of Lightweight Structures.

His research and teaching expertise focuses on structures, dynamics, fiber composites, smart and adaptive systems, simulation and testing. He has led several academic and combined industry-university projects. He formally retired in 2016 but he is still active in different teaching and research activities. He has been a visiting Professor at Beijing Institute of Technology since 2008 and has taught courses in Materials and Structures for the Aerospace Master Course of TUM Asia in Singapore since 2009. In 2017, he became a Member of the executive board of Munich Aerospace.

Dr. Domingos A. Rade

Professor
Aeronautics Institute of Technology
São José dos Campos, Brazil

Domingos A. Rade holds a Mechanical Engineering degree (Federal University of Uberlândia-UFU, Brazil, 1984), a Master of Science in Aeronautical Engineering (Aeronautics Institute of Technology - ITA, Brazil, 1987), and Doctorate in Sciences for the Engineer (University of Bourgogne Franche-Comté, France, 1994). He as been Associate Professor and Full Professor at the Federal University of Uberlândia (1985-2015) and is currently Professor at the Aeronautics Institute of Technology.

He has served as invited professor at the University of Bourgogne Franche-Comté, National Institute of Applied Sciences of Rouen and National Engineering School of Mans, both in France. He has held the following administrative positions at UFU: head of the Physics Department, Coordinator of the undergraduate course of Aeronautical Engineering, and Director of the School of Mechanical Engineering. At ITA he is currently the head of the Department of Mechanical Design. He has been the vice-coordinator of the National Institute of Science and Technology of Smart Structures in Engineering (2009-2014) and member and coordinator of the Advising Board of Engineering and Architecture of the Minas Gerais Research Foundation - FAPEMIG (2008-2012). He is currently member of the Advising Board of Mechanical, Aerospace, Naval and Oceanic Engineering of the Brazilian Council for Research, Technology and Innovation – CNPq.

His teaching and research activities are devoted to structural dynamics and vibrations, with emphasis on inverse problems, vibration control, probabilistic structural mechanics, smart materials and structures, and fluid-structure interaction. He has co-authored 46 refereed journal papers, 6 book chapters and 1 textbook. He has advised 26 master dissertations and 16 doctorate theses.

GUEST SPEAKERS

Mr. Paul Bousquet

Business Project Manager for Product Lifecycle Management (PLM)
Siemens Energy, Montreal, Quebec, Canada

As part of the Siemen's team, Mr. Bousquet is responsible for deployment of the end-to-end PLM Team Centre at the Montreal office. His focus is on digitalization and transforming the business with an objective aimed at improving how the company works, while remaining innovative and competitive in the ever-changing global market.

A Concordia University graduate, Paul has been with Rolls Royce and thereafter Siemens, for almost 10 years. He expanded his professional knowledge in 2015 by obtaining his Lean Six Sigma Blackbelt. Paul is a member of the Québec Order of Engineers (OIQ).

Dr. Mirko Hornung

Executive Director Research & Technology
Bauhaus Luftfahrt e.V., Taufkirchen, Germany
Acting Lead Research Focus Area "Systems and Aircraft Technologies"

Prof. Dr.-Ing. Mirko Hornung has been Executive Director Research and Technology at Bauhaus Luftfahrt since January 2010. At the same time. he was promoted to Professor of the Institute of Aircraft Design at the Technical University of Munich. From 2003 to 2009, he held several executive positions at the Military Air Systems branch of EADS Deutschland GmbH. Most recently, he worked as Senior Manager System Concept Design. In January 2003, after a five-year experience as a researcher at the Institute for Aeronautics at the University of the German Federal Armed Forces in Munich, Mirko Hornung received his PhD on the "Design of an Airbreathing Upper Stage and Overall Optimisation of a Trans-Atmospheric Space Transportation System" with honours.

Mirko Hornung holds further relevant positions in the aeronautical research sector (a.o.): Since September 2013 Mirko Hornung has been member of the Transport Advisory Group of the European Commission. Since January 2012 he has been a member of the Presidium of the "German Society for Aeronautics and Astronautics e.V. (DGLR)". He has been also founding member of the "Aviation Initiative for Renewable Energy in Germany e.V. (aireg)" since June 2011. Since July 2010 he has been member of the General Assembly and member of the "Ludwig Bölkow Campus" Coordinating Council of Munich Aerospace e.V.

Dr. William Roberto Wolf

Assistant Professor
University of Campinas
Unicamp, Brazil

William Wolf received his BSc. in Mechanical Engineering at University of Sao Paulo, Brazil, in 2003 followed by his MSc. in Electronic and Computer Engineering from the Technological Institute of Aeronautics, Brazil, in 2006. In 2011, he received his PhD in Aeronautics and Astronautics Engineering at Stanford University. From 2011 to 2013, he worked as a Research Associate in the Institute of Aeronautics and Space in Brazil. He is currently an Assistant Professor at University of Campinas, Unicamp, Brazil, where he leads the Aeronautical Sciences Laboratory in the School of Mechanical Engineering.

His research interests include the application of high-performance computing to problems involving turbulent flows, unsteady aerodynamics and aeroacoustics. His research group also works on the development of reduced order models for unsteady flow problems and flow control.

Dr. Yaoyao Fiona Zhao

Associate Professor
Head of the Additive Design and Manufacturing Laboratory (ADML)
Department of Mechanical Engineering
McGil University, Montreal, Quebec, Canada

Dr. Zhao's research expertise lies in the general field of design and manufacturing including the exploration of new design methods, manufacturing informatics, sustainable product development and intelligent manufacturing.

Her team is leading the research in Design for Additive Manufacturing with the development of new design methods to achieve multifunctionalities, less part count, better performance and better sustainability performance.

VISITS

École nationale d'aérotechnique (ÉNA)

ÉNA is affiliated with Cégep Édouard-Montpetit, one of the biggest colleges in Quebec. The school can accommodate approximately 1 300 students a year for regular full-time programs and several hundred technicians in continuing education. Its programs in aeronautical technology are recognized by Transport Canada.

It is a leader in terms of technical training in aerospace technology in North America. It is located near Montreal in the St-Hubert airport zone, close to many aeronautical businesses.

ÉNA has five hangars and a fleet of 35 aircraft, 25 airplanes and 10 helicopters. It is equipped with modern installations that include over 30 laboratories and specialized workshops.

Centre technologique en aérospatiale (CTA)

Created in 1993, CTA is a college technology transfer centre affiliated with Cégep Édouard-Montpetit and located on the campus of ÉNA. Its mission is to support the aerospace industry to make it more competitive. Each year, with a budget of 4.5M$, the CTA participates in more than 200 projects.

CTA's industrial activities have been expanding rapidly thanks to its team of more than 60 specialists. The Centre is known for its complementarity with the different research and technology transfer programs available in the aeronautical sector.

This nonprofit organization is incorporated in accordance with Part III of the *Loi des compagnies du Québec* and is managed by a Board of Administrators.

CTA possesses a wide range of high-tech equipment in Avionics, Composites, Non Destructive Testing, Metrology, In-Flight Operations, Manufacturing of Metals, and Automation.

PRACTICAL INFORMATION

How to register

Online registration will be open from March 23rd 2018 until the event capacity is reached.

Registration is **free** for graduate students, researchers and professors.

Inclusions:

- Lectures on May 10th and 11th
- Coffee breaks and Networking lunches on both days
- Visits of ÉNA and CTA. Participants will be split into 2 groups with alternate visits in the afternoon.

CLICK HERE TO ACCESS ONLINE REGISTRATION

Summit Location

The Global Aerospace Summit will take place at Centre technologique en aérospatiale (CTA), located on the South Shore of Montreal on the campus of École nationale d'aérotechnique (ÉNA).

Centre technologique en aérospatiale
5555, place de la Savane
Saint-Hubert, Québec, Canada J3Y 8Y9

Parking is available at a cost of 5$ per day (cash payment only).

Shuttle from downtown Montreal

Participants coming from Montreal may take a shuttle bus provided by the Summit organizing committee.

Shuttle bus departure will be at 8:30 A.M. on May 10th and 11th, from École de technologie supérieure (ÉTS), 1100, rue Notre-Dame ouest, Montreal, Québec, H3C 1K3. Another shuttle will be available CTA at the end of both days to return participants to ÉTS.