



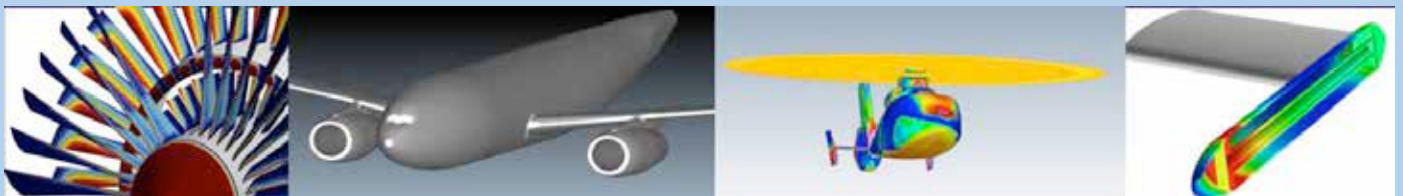
18th INTERNATIONAL ICING COURSE

Simulation Methods (CbA) for the In-flight Icing
Certification of Aircraft, Rotorcraft and Jet Engines

Montreal, Canada
Tuesday May 26 to Friday May 29, 2020

By instructors who have teamed up on engineering projects,
have certified aircraft and have published scientifically together!

Prof. Wagdi HABASHI, Director CFD Lab-McGill University and President CERTIF-ICE
Dr. Alberto PUEYO, Icing Lead, Bombardier Aerospace
With the participation of ANSYS-Canada



Participate in this best-in-class international icing course!

Come and See Icing Certification-by-Analysis Tools in Practice

For an aircraft, rotorcraft or jet engine to obtain a type design certification, it must be demonstrated that it can sustain safe flight into known or inadvertent icing conditions. The icing certification process involves CFD (Computational Fluid Dynamics) analyses, wind and icing tunnel testing (EFD: Experimental Fluid Dynamics), all considered “simulation”, and final demonstration of compliance through Flight Testing in Natural Icing (FFD: Flight Fluid Dynamics).

Modern 3D CFD-Icing methods such as FENSAP-ICE, working as a direct extension of CFD-Aero technologies, have become an indispensable, if not a primary tool, in the certification process. They are rapidly replacing 2D and 2.5D methods (airfoils don’t fly; aircraft do). They enable analyzing the aircraft (fuselage, wing, engines, nacelles, cockpit windows, sensors, probes, etc.) as a system and not as an assemblage of isolated components. Such an integrated CFD-EFD-FFD provides a cost-effective aid-to-design-and-to-certification, when made part of a well-structured compliance plan. CbA (Certification-by-Analysis) being a current “hot” subject; this course puts it into real practice, providing efficient tools and showing examples of actual use.

The course will show how modern 3D icing codes are based on highly validated physical models (Scientific VVV) as opposed to simply calibration against icing tunnels. The course will also show how Reduced Order Models can make fully-3D calculations inexpensive and enable identification of aerodynamic and thermodynamic critical points in an automated structured way and not a heuristic one. By inclusion of icing requirements at the aerodynamic design stage, a more comprehensive exploration of the combined aerodynamics/icing envelopes, optimized ice protection system design, and focused/reduced wind tunnels, icing tunnels and flight tests. The end result is a faster design, faster testing, faster natural icing campaign and a safer product that is easier to certify.

This course is structured to be of equal interest to aerodynamicists, icing, environmental systems and flight simulation engineers, regulators and Designated Engineering Representatives. Detailed knowledge of CFD is not necessary.

The lectures cover the major aspects of in-flight icing simulation, ice protection systems, handling quality issues. The instructors bring an amalgam of knowledge, as scientists who have produced codes in current use and engineers with certification experience, along with cost-effective simulation methods widely used internationally for certification of aircraft for flight into known icing.

Course and Accommodations Information

The course will be held from May 26 to May 29, 2020 at the well-situated downtown [Hotel La Citadelle](#), 410 Sherbrooke Street West, Montreal H3A 1B3. Rooms at [La Citadelle](#) are \$139 CAD (approx. \$105 USD, 95 €, 80 GBP, 730 RMB) + taxes, per night, single or double occupancy.

Registration Fees:

1 person:	\$1500 USD
2 persons from same organization:	\$1400 USD each
3+ persons from same organization:	\$1300 USD each

Fees Include:

- 4-day course
- Course notes (>1000 pages, in color)
- Coffee breaks
- Social event



Completing the registration form is only a placeholder. Registration is considered only when full payment is received. The course will close after the first 20 registrations. Registration fees are due at the latest 4 weeks before course starts. Cancellations are at a 5% service fee, up to 4 weeks before the course date. No cancellations accepted after that date.

Join a Prestigious Community of Participants

Attended by more than 87 organizations from 20 countries

Agency for Defense Development (Korea)
Agusta Westland (Italy)
ANSYS, Inc. (USA, Canada, Germany, Turkey)
Airbus (France, Germany, Spain, U.K.)
Austrian Institute of Technology (Austria)
Aviadvigatel OJSC (Russia)
Aviation Partners (USA)
AVIC Commercial Engine Company (China)
Barcelona Supercomputing Center (Spain)
BELL (USA, Canada)
Beihang University (China)
Beijing Vision Strategy Technology Ltd. (China)
Boeing (USA)
Bombardier Aerospace (Canada)
CAE Inc. (Canada)
Central Institute of Aviation Motors (Russia)
China Helicopter (China)
COMAC Flight Test Center (China)
Commercial Aircraft Company of China - COMAC (China)
Daher Socata (France)
Dassault Aviation (France)
DLR (Germany)
Dornier Seawings (Germany)
DRD Technology (USA)
Dowty Propellers (U.K.)
EDR & Medeso (Sweden)
EADS (Germany)
Eurocopter (France)
Evektor (Czech Republic)
First Aircraft Institute - AVIC (China)
General Atomics Aeronautical Systems (USA)
General Atomics (USA)
General Electric (USA)
Goodrich (USA)
Gyeongsang National University (Korea)
Hamilton Sundstrand - UTC (USA)
Harbin Aircraft Industry Group - AVIC (China)
Honda Aircraft Engine R&D Center (Japan)
Hurel-Hispano (France)
Industria de Turbo Propulsores - ITP (Spain)
Instituto Nacional de Técnica Aeroespacial (Spain)
Korean Aerospace Industries (Korea)
Aerospace Research Institute (Korea)
Korean Air (Korea)
McGill University (Canada)
Liebherr (France)
Lockheed Martin Aerospace Corp. (USA)
Luleå University of Technology (Sweden)
Meteo France (France)
Mitsubishi Heavy Industries (Japan)
Military Technical College (Egypt)
Ministry of Defence U.K. (U.K.)
Nanjing U. of Aeronautics & Astronautics (China)

Narvik University College (Norway)
National Research Council (Canada)
National Transportation Safety Board (USA)
Northrop Grumman (USA)
ONERA (France)
Pall Aerospace (U.K.)
Pilatus (Switzerland)
Pratt & Whitney (Canada)
QinetiQ (U.K.)
Rolls-Royce (U.K.)
Russian Helicopters (Russia)
SAAB Aerosystems (Sweden)
Sabena Technics (France)
Seoul National University (South Korea)
Shanghai Aircraft Design & Research Institute (China)
Shenyang Aero Engine Research Institute (China)
SNECMA Moteurs (France)
SONACA (Belgium)
Transitiels Technologies (France)
Transport Canada (Canada)
TUPOLEV (Russia)
Turkish Aerospace Industries (Turkey)
ULTRA Electronics (U.K.)
Università di Trento (Italy)
UTC Aerospace Systems (USA)
Vattenfall (Norway)
Vestas Tech R&D (Denmark)
Williams International (USA)

Attended by certification agencies

Federal Aviation Administration - FAA (USA)
European Aerospace Safety Association - EASA (Germany)
Transport Canada Civil Aviation - TCCA (Canada)
Civil Aviation Administration of China - CAAC (China)
Interstate Aviation Committee - MAK (Russia)
Swiss Federal Office of Civil Aviation - (Switzerland) Korea
Certification Agency - (Korea)

Course held for 17 years in 8 countries, over 3 continents

Montreal, Quebec, Canada, 2019
Montreal, Quebec, Canada, 2018
Montreal, Quebec, Canada, 2017
Montreal, Quebec, Canada, 2016
Barcelona Supercomputer Center, Barcelona, Spain, 2014
Fort Worth, Texas, USA, 2013
École Centrale de Lyon, Lyon, France, 2012
COMAC-SADRI-CAAC, Shanghai, China, 2011
Gyeongsang National University, Jinju, Korea, 2010 University
of Nevada Las Vegas, Las Vegas, USA, 2009 Universidad de
Sevilla, Sevilla, Spain, 2007
Barcelona Supercomputer Center, Barcelona, Spain, 2006
European Aviation Safety Agency, Köln, Germany, 2005, 2015
McGill University, Montreal, Canada, 2004
The University of Cambridge, Cambridge, U.K., 2003
Florida International University, Miami, USA, 2002
Universitat Politècnica de Catalunya, Barcelona, Spain, 2002

Course Agenda

	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8:30 am - 9:30 am	Lecture 1 Fundamentals of In-flight Icing (Prof. Wagdi HABASHI)	Lecture 6 CFD for Anti-icing & De-icing (Prof. Wagdi HABASHI)	Lecture 11 Operating in Known-icing: Aerodynamic Impact, 1 (Dr. Alberto PUEYO)	Lecture 16 Simulation Methods Used in the Certification of Aircraft, 1 (Dr. Alberto PUEYO)
9:30 am - 10:30 am	Lecture 2 CFD for In-flight Icing, 1 (Prof. Wagdi HABASHI)	Lecture 7 CFD for SLD and Ice Crystals (Dr. Cristhian ALIAGA)	Lecture 12 Operating in Known-icing: Aerodynamic Impact, 2 (Dr. Alberto PUEYO)	Lecture 17 Simulation Methods Used in the Certification of Aircraft, 2 (Dr. Alberto PUEYO)
10:30 am - 11:00 am	BREAK	BREAK	BREAK	BREAK
11:00 am - 12:00 pm	Lecture 3 CFD for In-flight Icing, 2 (Prof. Wagdi HABASHI)	Lecture 8 Detectors, Probes, Sensors (Dr. Alberto PUEYO)	Lecture 13 Operating in Known-icing: Aerodynamic Impact, 3 (Dr. Alberto PUEYO)	Lecture 18 CFD Scientific VVV (Prof. Wagdi HABASHI)
12:00 pm - 1:00 pm	Lecture 4 Ice Protection Systems, 1 (Dr. Alberto PUEYO)	Lecture 9 An Intro to Certification Rules (Dr. Alberto PUEYO)	Lecture 14 CFD for Jet Engines (Dr. Isik OZCER)	Lecture 19 Reduced Order Modeling: The Road to CQbA (Prof. Wagdi HABASHI)
1:00 pm - 2:30 pm	LUNCH BREAK	LUNCH BREAK	LUNCH BREAK	LUNCH BREAK
2:30 pm - 4:00 pm	Tutorial 1 CFD-Aero + CFD-Icing in 3D (Mr. Cristhian ALIAGA)	Tutorial 2 Water Impact in 3D (Mr. Cristhian ALIAGA)	Tutorial 3 Ice Accretion in 3D (Mr. Cristhian ALIAGA)	Tutorial 4 Anti-Icing and De-Icing in 3D (Mr. Cristhian ALIAGA)
4:00 pm - 4:30 pm	BREAK	BREAK	BREAK	BREAK/CERTIFICATES/GROUP PHOTO
4:30 pm - 5:30 pm	Lecture 5 Ice Protection Systems, 2 (Dr. Alberto PUEYO)	Lecture 10 Hybrid Simulation: CFD + Icing Tunnel (Dr. Alberto PUEYO)	Lecture 15 CFD for Helicopters (Prof. Wagdi HABASHI)	Lecture 20 Open Discussion Instructors - Attendees
6:00 pm - 9:00 pm		RECEPTION AND DINNER McGill University Faculty Club		

Comments from Participants:

".....Presentations are excellent!"

".....Thank you for a great course!"

".....Excellent speakers!"

".....The speakers were knowledgeable."

".....Material is clear and comprehensive."

".....Amazing to see the validated 3D certification tools, when some people are still using 2D."

".....Cost reasonable with respect to other courses."

".....Response regarding registration and logistics was prompt!"

"Electronically Fillable" Registration Form

International Icing Course, Montreal, Canada

May 26-29, 2020

Title: ☐ Prof. ☐ Dr. ☐ Mr. ☐ Mrs.

Date: _____

First Name: _____ Family Name: _____

Organization / Company: _____

Division / Dept: _____

Mailing Address: _____

City: _____ ZIP / Postal Code: _____

State / Province: _____ Country: _____

Phone: _____ Fax: _____

E-mail: _____

Signature: _____

Registration Fee: includes course material, coffee breaks and social event.

1 person:	\$1500 USD
2 persons from the same organisation:	\$1400 USD each
3+ persons from the same organization:	\$1300 USD each

Please Note 3 easy ways of Payment and Credit Card Payments only through EVENTBRITE.

Payment: By credit card, go to [EVENTBRITE.CA](https://www.eventbrite.ca) and enter our Course Title or please contact jenny@certifice.com

Payment: By check to the CERTIF-ICE address below, or by bank transfer in US\$ to:

National Bank of Canada, 500, Place D'Armes, Montreal, QC Canada H2Y 2W3
Swift Number: BNDCCAMMINT - Account: 0006-14601-00804-65

I need an invitation letter for Visa application (please attach passport photo page information)

Please mail this form to:

CERTIF-ICE Inc.

2385 Chemin du Bord-du-Lac-Lakeshore
Dorval, QC Canada H9S 2G7