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TECHNOLOGIES INT.

SHORT COURSE

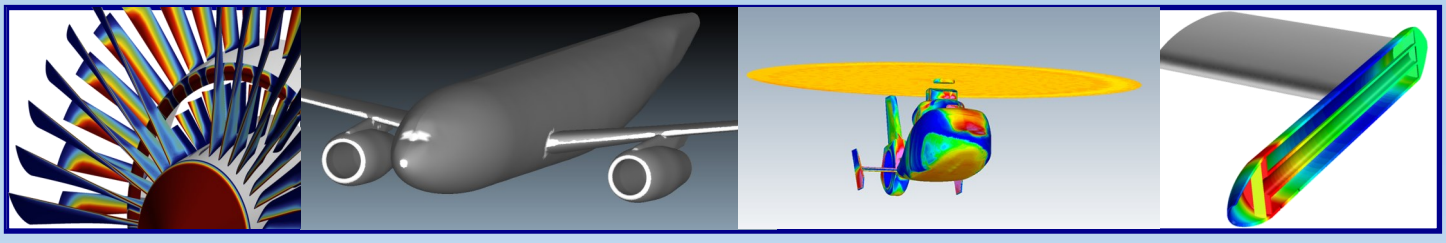
Simulation Methods Used for the In-flight Icing Certification of Aircraft, Rotorcraft and Jet Engines

Barcelona, Spain, December 9 – 12, 2014

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

By instructors who have teamed up on certification projects and published scientifically together !

Dr. Alberto PUEYO, Icing Aerodynamics Lead, Bombardier Aerospace
Mr. John P. DOW, Sr., DER, Former FAA Senior Icing Specialist
Prof. Wagdi G. HABASHI, Director CFD Lab McGill University & President NTI
Dr. Guillaume HOUZEAUX, Team Leader, Computer Applications in Science & Engineering, BSC
Mr. Cristhian ALIAGA, Director Consulting NTI



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

Come and meet the who's-who of the aerospace industry !

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. OEMs thus embark on complex icing certification campaigns that involve Computational Fluid Dynamics (CFD), wind and icing tunnel testing (Experimental Fluid Dynamics – EFD), prior to final demonstration of compliance through Natural Icing Flight Testing (Flight Fluid Dynamics – FFD).

Modern 3D CFD-Icing methods, working as a direct extension of current 3D CFD-Aero technologies, have become an indispensable, if not a primary tool, in the certification process. Using "realistic" 3D icing simulations, based on modern highly validated models, allows the inclusion of icing requirements at the aerodynamic design stage, a more comprehensive exploration of the combined aircraft/icing envelopes, optimized ice protection system design, and targeted/focused/reduced wind and icing tunnels and flight tests. The end result is a safer product that is faster to certificate.

The course illustrates the state-of-the-art of 3D CFD applications in icing simulations and links theory to application by demonstrating how an integrated CFD + EFD + FFD approach provides a cost-effective aid-to-design-and-to-certification, when made part of a well-planned compliance plan.

The 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 essential. The lectures cover the major aspects of in-flight icing simulation, ice protection system equipment, handling quality issues, as well as current (APP C) and upcoming (APP D & O) icing certification regulations.

The instructors bring an amalgam of knowledge, as scientists who have produced codes in current use and practicing engineers with experience in cost-effective methods for the certification of aircraft for flight into known icing conditions.

Attendees will be provided with a very large and detailed set of notes, refreshed annually with the latest technological advances. The number of attendees may be limited, so come and meet the who's-who of the aerospace industry.

Course Location, Conditions and Accommodations

The course will be held at the Barcelona Supercomputing Center, Carrer de Jordi Girona, 29, 08034 Barcelona, Spain, from December 9th to December 12th, 2014. Trainees are invited to bring their own laptops on which tutorial software will be installed. The tutorials will be run on your own PC.

Registration is 1 650 € and includes :

⇒ 4-day course
⇒ Training material (about 1000 pages, in color)
⇒ Coffee breaks and lunches
⇒ Social event

For a list of hotels nearby the BSC or downtown Barcelona,
please contact sales@newmerical.com for more details.

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Bombardier (Canada)

Beihang University (China)

China Flight Test Establishment (China)

China Helicopter R&D Institute (China)

Commercial Aircraft Company of China (China)

Dassault (France)

DLR (Germany)

Dowty Propellers (U.K.)

Embraer (Brazil)

Enginsoft (Italy)

EADS (Germany, Spain)

First Aircraft Institute (China)

Goodrich (USA)

Gyeongsang National University (Korea)

Hamilton Sundstrand (USA)

Harbin Aircraft (China)

Honda Jet (Japan)

Hurel-Hispano (France)

Industria de Turbo Propulsores-ITP (Spain)

Instituto Nacional de Técnica Aeroespacial (Spain)

Korea Aerospace Research Institute (Korea)

Intertechnique (France)

Korea Aerospace Industries (Korea)

Korean Air (Korea)

Liebherr Aerospace (France)

Lockheed Martin (USA)

Meteo France (France)

Mitsubishi Heavy Industries (Japan)

Narvik University College (Norway)

Northrop Grumman (USA)

Nanjing U. of Aeronautics & Astronautics (China)

ONERA (France)

Pall Aerospace (U.K.)

Paulstra (France)

Pilatus (Switzerland)

QinetiQ (U.K.)

Rolls-Royce (U.K.)

RUAG (Switzerland)

SAAB Aerosystems (Sweden)

SEAT (Spain)

Shanghai Aircraft Design & Research Institute (China)

Shenyang Aero Engine Research Institute (China)

SNECMA Moteurs (France)

SONACA (Belgium)

Tongji University (China)

Transitiels Technologies (France)

Turkish Aerospace Industries (Turkey)

ULTRA Electronics (U.K.)

Attended by certification agencies...

Korea Certification Agency - ADD (Korea)

China Agency for Aircraft Certification - CAAC (China)

European Aerospace Safety Association - EASA (Germany)

Federal Aviation Administration - FAA (USA)

Interstate Aviation Committee - MAK (Russia)

Transport Canada Civil Aviation - TCCA (Canada)

Course held for 12 years in 8 countries

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 (EASA), Köln, Germany, 2005

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

PRELIMINARY AGENDA

	TUESDAY 9	WEDNESDAY 10	THURSDAY 11	FRIDAY 12
8.30 am - 9.30 am	*Lecture 1* **Fundamentals of In-flight Icing** (Prof. Wagdi HABASHI)	*Lecture 6* **CFD Methods for Anti-icing and De-icing** (Mr. Cristhian ALIAGA)	*Lecture 11* **The Certification Process (III)** (Mr. John DOW)	*Lecture 16* **Simulation Methods Used in the Certification of Jet Engines** (Mr. John DOW)
9.30 am - 10.30 am	*Lecture 2* **CFD Methods for In-flight Icing** (Dr. Guillaume HOUZEAUX)	*Lecture 7* **CFD Methods for SLD and Ice Crystals** (Prof. Wagdi HABASHI)	*Lecture 12* **A Hybrid Simulation Approach: CFD + Icing Tunnel** (Dr. Alberto PUEYO)	*Lecture 17* **Simulation Methods Used in the Certification of Helicopters** (Mr. John DOW)
10.30 am - 11.00 am	**BREAK**	**BREAK**	**BREAK**	**BREAK**
11.00 am - 12.00 pm	*Lecture 3* **In-flight Icing Simulation** (Prof. Wagdi HABASHI)	*Lecture 8* **Ice Detectors, Probes and Sensors** (Dr. Alberto PUEYO)	*Lecture 13* **Operating in Known-icing: Handling Qualities (I)** (Dr. Alberto PUEYO)	*Lecture 18* **Simulation Methods Used in the Certification of Aircraft (I)** (Dr. Alberto PUEYO)
12.00 pm - 1.00 pm	*Lecture 4* **Ice Protection Systems (I)** (Dr. Alberto PUEYO)	*Lecture 9* **The Certification Process (I)** (Mr. John DOW)	*Lecture 14* **Operating in Known-icing: Handling Qualities (II)** (Dr. Alberto PUEYO)	*Lecture 19* **Simulation Methods Used in the Certification of Aircraft (II)** (Dr. Alberto PUEYO)
1.00 pm - 2.00 pm	**COURSE LUNCH**	**COURSE LUNCH**	**COURSE LUNCH**	**COURSE LUNCH**
2.00 pm - 3.30 pm	*Tutorial 1* **CFD-Aero** (Mr. Cristhian ALIAGA)	*Tutorial 2* **Impingement** (Mr. Cristhian ALIAGA)	*Tutorial 3* **Ice Accretion** (Mr. Cristhian ALIAGA)	*Tutorial 4* **Anti-Icing and De-Icing** (Mr. Cristhian ALIAGA)
3.30 pm - 4.00 pm	**BREAK**	**BREAK**	**BREAK**	**BREAK**
4.00 pm - 5.00 pm	*Lecture 5* **Ice Protection Systems (II)** (Dr. Alberto PUEYO)	*Lecture 10* **The Certification Process (II)** (Mr. John DOW)	*Lecture 15* **Operating in Known-icing: Handling Qualities (III)** (Dr. Alberto PUEYO)	*Lecture 20* **Current and Future Developments** (Prof. Wagdi HABASHI)
			GROUP PHOTO	**CERTIFICATES**
7.00 pm - 10.00 pm			**SOCIAL EVENT**	

Registration Form - Icing Course 2014 - Barcelona, Spain

December 9 – 12, 2014

Title: ○ Prof. ○ Dr. ○ Mr. ○ Mrs. Date: _____

First Name:_____Family Name: _____

Organization / Company: _____

Division / Department:_____

Mailing Address: _____

_____

City: _____ZIP / Postal Code:_____

State / Province:_____Country: _____

Phone: _____Fax: _____

E-mail: _____

Signature: _____

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

1 650 €

Payment: *By check to the NTI address below, or by bank transfer in €* to:

National Bank of Canada, 955 Boul. de Maisonneuve West, Montreal, QC, Canada H3A 1M4
Swift Number: BNDCCAMMINT - Account: 00610951-00235-64

○ I need an invitation letter for Visa application

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