

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:09 PM

Tuesday, June 20

### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): Ice Crystals - Research & Development

Session Code ICE100

Room Grand Klimt 1 Session 1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aviation

Chairperson - Paolo Vanacore, GE Aerospace; Philippe Villedieu, ONERA

Time	Paper No.	Title
1:00 p.m.	2023-01-1377	NRC's ICE-MACR 2018-2023: What Has Been Learned So Far  Martin Neuteboom, National Research Council Canada; Christopher Dumont, Federal Aviation Administration; Jeanne Mason, Consultant for the FAA; Jennifer Chalmers, National Research Council Canada; Philip Chow, Consultant for the FAA
1:30 p.m.	2023-01-1397	Ice Crystal Environment - Modular Axial Compressor Rig: Comparisons of Ice Accretion for 1 and 2 Stages of Compression  Jeanne Mason, Consultant for the FAA; Martin Neuteboom, Jennifer Chalmers, National Research Council Canada; Christopher Dumont, Federal Aviation Administration; Philip Chow, Consultant for the FAA
2:00 p.m.	2023-01-1395	Pitot Probe and Total Air Temperature (TAT) Probe Ice Crystal Icing Impact to Aircraft Operation and Methods to Improve Probe Performance  Robert Sable, Collins Aerospace
2:30 p.m.	ORAL ONLY	Ice Crystal Consortium: Current Research and Future Plans  Melissa Bravin, Boeing Co.; Gilles Aouizerate, Safran AE

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

Tuesday, June 20

### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): Ice Crystals - Applied Simulations

Session Code ICE100

Room Grand Klimt 1 Session 3:30 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aviation

Chairperson - Gilles Aouizerate, SAFRAN Aircraft Engines; Melissa Bravin, Boeing Co.

Time	Paper No.	Title
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# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:10 PM

Time	Paper No.	Title
3:30 p.m.	2023-01-1388	Ice Crystal Accretion Tool (ICAT) capabilities on heated NACA0012 Airfoil  Somasree Roychowdhury, Rajani Poornima, Vilas Bokade, Steffen Jebauer, Paolo Vanacore, GE Aerospace; Yasir A. Malik, Technische Universität Braunschweig
4:00 p.m.	2023-01-1404	Simulating Local Concentration Factor Sensitivities for Ice Crystal Icing Using LEWICE3D  Adam Malone, Boeing Co.

## Tuesday, June 20

### Welcome and Keynote Address

Session Code ICE001

Room Grand Klimt 2 & 3

Session

8:00 a.m.

Time	Paper No.	Title
	ORAL ONLY	Keynote Address: Bill Kunik, Collins - Collins Aerospace Perspective on Designing and Certifying Systems for Operations in Icing and Rain Environments  I will describe the current state of Collins Aerospace product portfolio that are designed for operations in icing environments. I will also provide a view toward Collins' current and future test facility capabilities and computational methodologies to aid in designing and certifying for icing environment operations. The presentation will conclude with a perspective on Collins Aerospace support for industry engagement on icing research and regulations.  Bill Kunik, Collins Aerospace
	ORAL ONLY	Keynote Address: Icing Challenges for Current and Future Propulsion Systems, Rory Clarkson, Rolls Royce : There are two strands of change which are causing aircraft engine manufacturers to focus much effort on meeting icing certification requirements: the certification regulations are becoming more exacting and challenging to meet; the move to propulsion systems that incorporate novel technologies as aviation heads towards its contribution to a world of net zero carbon. This talk discusses some of the challenges from both strands engine original equipment manufacturers face, and what needs to be done to address them. Specifically it will touch on, for example, the difficulties of reproducing flight conditions, especially high altitude conditions, in a ground based test facility, and the implications for designing and certifying the next generation of very high by-pass ratio turbofans and hybrid propulsion systems.  Rory Clarkson, MBE, BEng PhD, CEng, FIMechE Engineering Associate, Fellow-Engine Environmental Protection, Rolls Royce

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## Technical Session Schedule

As of June 26, 2023 19:40:10 PM

Time	Paper No.	Title
	ORAL ONLY	Keynote Address: David Leopold, Senior Aerodynamics Certification Engineer, Archer An introduction to Archer Aviation and perspectives on urban air mobility certification. Dave Leopold, Archer Aviation
	ORAL ONLY	Welcome & Introduction to Research and Innovation in the Austrian Aviation Sector  Overview of research and innovation in the Austrian aviation sector – How does Austria contribute to the green and digital transformation of the aviation system? (Strategy for Research, Technology and Innovation for Austrian Aviation 2040+); Vision and objectives for the Austrian icing community (Icing Strategy for the Austrian Aviation Sector 2030+); Austrian key icing initiatives, competencies + facilities  Margit Mischkulnig, Head of Dept. Space Aviation, Austrian Federal Ministry
	23ICE-0559	Leonore Gewessler, Federal Minister for Climate Action - Video Introduction  Leonore Gewessler Federal Minister for Climate Action, Austrian Federal Ministry

## Tuesday, June 20

### High Lift Common Research Model (CRM-HL) Icing Collaboration Workshop

Session Code ICE007

Room Grand Klimt 2 & 3

Session

10:00 a.m.

This workshop seeks to discuss the state of icing within the High Lift Common Research Model (CRM-HL) Ecosystem, including ongoing and future work to advance the accurate prediction of ice shapes and their effects on airplane performance and handling qualities. The CRM-HL configuration is a powerful platform upon which a database of aerodynamic effects due ice will be used to inform improvements to computational methods. A number of CRM-HL wind tunnel models are being prepared for dry air testing with artificial ice shapes, including the NASA 5.2% Semi-Span, NASA 2.7% Full-Span and Boeing 6% Full-Span models. This workshop will summarize the ice shapes that have been developed, planned testing, progress on regulatory engagement, and provide an opportunity for interested parties to openly discuss future development plans. Learn more about the Participants

Presenters - Kolleen Hood, The Boeing Company

## Tuesday, June 20

### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): Aerodynamic Impact of Icing

Session Code ICE100

Room Grand Klimt 2 & 3

Session

1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aviation

Chairperson - Olivier Blesbois, Airbus Operations, Ltd.; Rami Slim, Boeing Co.

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

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Time	Paper No.	Title
1:00 p.m.	2023-01-1483	Large-Eddy Simulation of a NACA23012 Airfoil under Clean and Iced Conditions  Brett Bornhoft, Stanford University; Suhas Jain, Konrad Goc, CTR, Stanford University; Sanjeeb Bose, Cadence Design Systems Inc.; Parviz Moin, CTR, Stanford University
1:30 p.m.	2023-01-1402	Numerical Study of Iced Swept-Wing Performance Degradation using RANS  Isik Ozcer, ANSYS Inc.; Alberto Pueyo, Bombardier; Florian Menter, Sabrina Hafid, ANSYS Inc.; Hong Yang, Bombardier
2:00 p.m.	2023-01-1385	The Effect of Large Droplet and Spanwise Ridge Ice Accretion on the Aerodynamic Performance of Swept Wings  Brian Woodard, Michael Bragg, University of Illinois at Urbana-Champaign; Timothy G. Smith, Federal Aviation Administration
2:30 p.m.	2023-01-1371	IMPACT: Numerical Study of Aerodynamics of an Iced Forward-Swept Tail with Leading Edge Extension  James Page, Austrian Institute of Technology GmbH; Isik Ozcer, ANSYS Inc.; Alessandro Zanon, Michele De Gennaro, Austrian Institute of Technology GmbH

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

## Tuesday, June 20

### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): Applied Numerical Simulations

Session Code ICE100

Room Grand Klimt 2 & 3

Session

3:30 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aviation

Chairperson - Isik Ozcer, ANSYS Inc.; Emmanuel Radenac, ONERA

Time	Paper No.	Title
3:30 p.m.	2023-01-1370	Experimental and Numerical Ice Accretion Shapes on a Pitot Probe Model  Peter Forsyth, Krzysztof Szilder, National Research Council Canada
4:00 p.m.	2023-01-1390	A Comparison of Multiphase Flow CFD Methods for Simulating Liquid Water Concentration at Air Data Probe Fuselage Stations  Sathish Thangavel, Aaron Cusher, Collins Aerospace
4:30 p.m.	2023-01-1376	Impingement Analysis on Nacelle Inlet, Multibody Airfoil, and Swept Tail Cases under SLD Conditions  Guilherme Da Silva, Diogo Pio, Caio Rafael, Pedro Villela, Sabrina Rezende, Jayme Teixeira Da Silva, Aerothermal Solutions and Software Distributor, LLC

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

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Tuesday, June 20

### Icing Simulation: Drop Trajectory and Collection Efficiency Simulation, Part 1

Session Code ICE700

Room Park Suite 1 Session 10:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Andy Broeren, Nasa Glenn Research Center; Alberto Guardone, Politecnico di Milano

Chairperson - Boris Aguilar, Emmanuel Radenac, ONERA

Time	Paper No.	Title
10:00 a.m.	2023-01-1470	Extending the Impingement Capabilities of a Cartesian Solver towards Super-Cooled Large Droplets (SLD) Francesco Capizzano, Italian Aerospace Research Center; Donato de Rosa, CIRA Scpa
10:30 a.m.	2023-01-1459	Modelling the Secondary Impingement of Supercooled Large Droplets in an Eulerian Environment Pietro Catalano, CIRA Scpa; Benedetto Mele, Flowlab S.a.S.
11:00 a.m.	2023-01-1458	3D Immersed Boundary Methods for the Calculations of Droplet Trajectories towards Icing Application Pablo Elices Paz, Emmanuel Radenac, Stéphanie Péron, Ghislain Blanchard, ONERA; Eric Laurendeau, Polytechnique Montreal; Philippe Villedieu, ONERA
11:30 p.m.	2023-01-1469	Predicting the Collection Efficiency on a Generic Rotor Blade with a Three-Dimensional Eulerian Particle Solver Philipp Buchen, Denis Sotomayor-Zakharov, Inken Knop, Technische Universität Braunschweig

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

Tuesday, June 20

### Environmental Icing Meteorology, SLD, and Ice Crystals: Icing Meteorology - Diagnostic and Forecast Systems

Session Code ICE800

Room Park Suite 1 Session 1:00 p.m.

Supercooled Large Drops (SLD), Ice Crystals, and Snow

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Carsten Schwarz, German Aerospace Center DLR; Ben Bernstein, Leading Edge Atmospheric

Chairperson - Julie Haggerty, NCAR; Scott Landolt, UCAR

Time	Paper No.	Title
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# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

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Time	Paper No.	Title
9:30 a.m.		BREAK
1:00 p.m.	ORAL ONLY	<p>Latest Developments in Terminal Area Icing by the FAA Terminal Area Icing Weather Information for NextGen (TAIWIN) Project</p> <p>Stephanie DiVito, Federal Aviation Administration; Scott Landolt, National Center for Atmospheric Research; Ben Bernstein, Leading Edge Atmospheric; Andrew Gaydos, National Center for Atmospheric Research; Steve Green, Flight Operations Research; Joe Bracken, AvMet Applications Inc.; Mengistu wolde, Leonid Nichman, National Research Council Canada; Sonia Alvidrez, Federal Aviation Administration; Courtney Maciejewski, Basic Commerce and Industries Inc</p>
1:30 p.m.	ORAL ONLY	<p>A Description and Evaluation of the Terminal Area Icing Weather Information for NextGen (TAIWIN) Capability's High-resolution and Terminal-Area Categorical Icing Fields</p> <p>Ben Bernstein, Leading Edge Atmospheric; Darcy Jacobson, Scott Landolt, National Center for Atmospheric Research; Stephanie DiVito, Federal Aviation Administration; Andrew Gaydos, Joshua Lave, Mei Xu, National Center for Atmospheric Research; Justin Lentz, National Center For Atmosphere Research; Spencer Faber, Scott Ellis, National Center for Atmospheric Research; Alexei Korolev, Ivan Heckman, Environment and Climate Change Canada; mengistu wolde, Leonid Nichman, National Research Council Canada</p>
2:00 p.m.	ORAL ONLY	<p>Terminal Area Icing Research Advances Utilizing ICICLE Flight Campaign Data</p> <p>Scott Landolt, National Center for Atmospheric Research; Stephanie DiVito, Federal Aviation Administration; Ben Bernstein, Leading Edge Atmospheric; Darcy Jacobson, Joshua Lave, Mei Xu, Andrew Gaydos, National Center for Atmospheric Research; Justin Lentz, National Center For Atmosphere Research; mengistu wolde, National Research Council Canada; Alexei Korolev, Environment Canada; Leonid Nichman, National Research Council Canada; Ivan Heckman, Environment and Climate Change Canada</p>
2:30 p.m.	2023-01-1487	<p>Significant Updates for the Current Icing Product (CIP) and Forecast Icing Product (FIP) Following the 2019 In-Cloud ICing and Large-drop Experiment (ICICLE)</p> <p>Allyson Rugg, National Center for Atmosphere Research; Julie Haggerty, Daniel Adriaansen, David Serke, Scott Ellis, National Center for Atmospheric Research</p>
3:00 p.m.		BREAK

Planned by Deicing Conference Committee / Aerospace Advisory Group

Tuesday, June 20

Environmental Icing Meteorology, SLD, and Ice Crystals: High Ice Water Content - Physics, Diagnostic and Forecast Techniques

Session Code ICE800

Room Park Suite 1

Session

3:30 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Ben Bernstein, Leading Edge Atmospheric; Galdemir Botura, Collins Aerospace; Carsten Schwarz, DLR German Aerospace Center

Chairperson - Stephanie DiVito, Federal Aviation Administration; Thomas Ratvasky, NASA John Glenn Research Center

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Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	Summary and Preliminary Findings from the 2022 NASA/FAA High Ice Water Content and Aerosols Flight Campaign  Thomas Ratvasky, NASA Glenn Research Center; J. Walter Strapp, Met Analytics Inc; Masataka Murakami, Nagoya University; Narihiro Orikasa, Meteorological Research Institute; Lyle Lilie, Science Engineering Associates Inc; Kristopher Bedka, NASA Langley Research Center; Aaron Bansemer, National Center for Atmospheric Research; Ben Bernstein, Leading Edge Atmospheric; Ru-Ching Chen, NASA Glenn Research Center; Steven Harrah, Fred Proctor, Joshua DiGangi, NASA Langley Research Center; John Fisher, Christopher Dumont, Stephanie DiVito, Federal Aviation Administration
4:00 p.m.	ORAL ONLY	A Conceptual Model of High Ice Water Content Environments in Tropical Mesoscale Convective Systems  Alexei Korolev, Zhipeng Qu, Jason Milbrandt, Ivan Heckman, Environment and Climate Change Canada; Mengistu Wolde, Cuong Nguen, National Research Council Canada
4:30 p.m.	2023-01-1495	A Simple Prototype to Forecast High Ice Water Content Using TAT Anomalies as Training Data  Frank Kalinka, Deutscher Wetterdienst; Max Butter, Deutsche Lufthansa AG; Tina Jurkat, Elena De La Torre Castro, Christiane Voigt, German Aerospace Center

## Tuesday, June 20

### Icing Measurement Techniques and Test Facilities: Snow and Ice Environments

Session Code ICE200

Room Park Suite 7

Session 10:00 a.m.

Simulation of snow and ice crystal environments.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Catherine Clark, National Research Council Canada; Judith Van Zante, NASA Glenn Research Center

Chairperson - Catherine Clark, National Research Council Canada

Time	Paper No.	Title
10:00 a.m.	2023-01-1418	Comparison of Freeze-Out versus Grind-Out Ice Crystals for Generating Ice Accretion Using the ICE-MACR  Martin Neuteboom, National Research Council Canada; Eric Fleurent-Wilson, Transport Canada; Jennifer Chalmers, National Research Council Canada
10:30 a.m.	ORAL ONLY	Development of Snow Test Capabilities at National Research Council of Canada (NRC)  Dan Fuleki, Nick Doiron, Jennifer Chalmers, National Research Council Canada; Philip Hagerman
11:00 a.m.	2023-01-1407	Experimental Simulation of Natural-Like Snow Conditions in the Rail Tec Arsenal (RTA) Icing Wind Tunnel  Wolfgang Breituß, Hermann Ferschitz, Rail Tec Arsenal GmbH; Alfons Schwarzenboeck, CNRS; Romy Heller, DLR German Aerospace Center; Hugo Pervier, Cranfield University; Regis Dupuy, Louis Jaffaux, Université Clermont

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:11 PM

Time	Paper No.	Title
		Auvergne; Alexis Berne, EPFL
11:30 a.m.	ORAL ONLY	The NCAR/FAA New Generation Artificial Snow Generation System: A Redesigned System for Testing Aircraft Deicing and Anti-Icing Fluids Justin Lentz, National Center For Atmosphere Research; Scott Landolt, National Center for Atmospheric Research; Warren Underwood, Charles Enders, Federal Aviation Administration

Planned by Deicing Conference Committee / Aerospace Advisory Group

Tuesday, June 20

### Icing Measurement Techniques and Test Facilities: Adhesion Diagnostics

Session Code ICE200

Room Park Suite 7 Session 1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Catherine Clark, National Research Council Canada; Judith Van Zante, NASA Glenn Research Center

Chairperson - David Orchard, National Research Council Canada

Time	Paper No.	Title
1:00 p.m.	2023-01-1426	Development of a New Ice Crystal Icing Shear Adhesion Rotary Test Rig and Method Dan Fuleki, Philip Hagerman, National Research Council Canada
1:30 p.m.	2023-01-1417	Aluminum Sample Characterization on the NRC AIWT Ice Adhesion Spin Rig Catherine Clark, National Research Council Canada
2:00 p.m.	2023-01-1410	Impact Ice Microstructure Segmentation Using Transfer Learned Model Ru-Ching Chen, Joshua Stuckner, NASA Glenn Research Center; Christopher Giuffre, Hx5, LLC
2:30 p.m.	2023-01-1412	Passive Ice Protection Systems Lab Scale Testing Methodology Paloma García, Julio Mora, Francisco Carreño, National Institute of Aerospace; Francisco Redondo, Airbus Defence and Space; Rafael Rodriguez, Pedro Rivero, Adrian Vicente, Public University of Navarre; Carolina Acosta, AIMPLAS Plastics Technology Centre; Silvia Larumbe, Bantec Group; Ángel Medrano, Cristina Lecumberri, Asociación de la Industria Navarra

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

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Tuesday, June 20

### Icing Measurement Techniques and Test Facilities: Rotor Test Rigs

Session Code ICE200

Room Park Suite 7 Session 3:30 p.m.

Rotary test rigs

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Catherine Clark, National Research Council Canada; Judith Van Zante, NASA Glenn Research Center

Chairperson - Catherine Clark, National Research Council Canada

Time	Paper No.	Title
3:30 p.m.	2023-01-1420	Development of an Icing Test Facility for Rotors and Propellers of Remotely Piloted Aircraft Systems (RPAS) David Orchard, National Research Council Canada
4:00 p.m.	2023-01-1416	Development of a Test Rig for the Assessment of Remotely Piloted Aircraft Systems (RPAS) in Icing David Orchard, National Research Council Canada
4:30 p.m.	ORAL ONLY	Development of a New Rotor- Propeller Test Rig for Tests under Icing Situation Florian Knöbl, RTA; Michele Schirru PhD, RTA Rail Tec Arsenal

Tuesday, June 20

### Icing of Structures and Vehicles on the Ground: Extreme Weather Conditions at Various Applications

Session Code ICE500

Room Park Suite 8 Session 10:00 a.m.

(wind turbines, rail, power lines, cables, heating pavement, and more)

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Hermann Ferschitz, RTA; Giuseppe Mingione, CIRA Scpa

Chairperson - Gabriel Haller

Time	Paper No.	Title
9:30 a.m.		BREAK
10:00 a.m.	2023-01-1438	Development of an Ensemble-Based Forecasting Tool of Hazardous Icing Conditions for German Transmission System Operators

# International Conference on Icing of Aircraft, Engines, and Structures

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Time	Paper No.	Title
10:30 a.m.	2023-01-1437	Benedikt März, Vanessa Fundel, Frank Kalinka, Markus Schultze, Deutscher Wetterdienst; Jürg Schmidli, Goethe University Monitoring Melting Ice Formations in Aircraft Fuel Tank by Acoustic Emission
11:00 a.m.	ORAL ONLY	Helge Pfeiffer, Katholieke Universiteit Leuven; Johan Reynaert, Brussels Airlines; David Seveno, KU Leuven; Pieter-Jan Jordaens, Ozlem Ceyhan, SIRRIS; Martine Wevers, KU Leuven Snow-Free Camera Lenses for Modern and Autonomous Vehicles Hossein Sojoudi, University Of Toledo
11:30 a.m.	ORAL ONLY	Ice, Snow, Fog or Rain: All Types of Precipitation for Testing Structures and Vehicles in a Climatic Wind Tunnel Gregor Richter
3:00 p.m.		BREAK

Planned by Deicing Conference Committee / Aerospace Advisory Group

Tuesday, June 20

### Icing Simulation: Drop Trajectory and Collection Efficiency Simulation, Part 2

Session Code ICE700

Room Park Suite 8

Session 1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Andy Broeren, Nasa Glenn Research Center; Alberto Guardone, Politecnico di Milano

Chairperson - Francesco Capizzano, Italian Aerospace Research Center; Alessandro Donizetti, Politecnico di Milano

Time	Paper No.	Title
1:00 p.m.	2023-01-1478	Icing Simulation Results Using Lagrangian Particle Tracking in Ansys Fluent Icing Guillaume Moula, Isik Ozcer, ANSYS Inc.
1:30 p.m.	2023-01-1473	Investigation of Water Impingement on Aero-Components by Lagrangian and Eulerian Approach Ihan Görgülü, Roketsan AS; Serkan Özgen, Middle East Technical University
2:00 p.m.	2023-01-1476	Computational Icing Analysis on NASA's SIDRM Geometry to Investigate Collection Efficiency Eric Stewart, Naval Air Warfare Center Aircraft Division; Tadas Bartkus, Ohio Aerospace Institute

# International Conference on Icing of Aircraft, Engines, and Structures

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Time	Paper No.	Title
2:30 p.m.	2023-01-1466	Large-Eddy Simulation of Droplet Impingement Using a Lagrangian Particle Model  Suhas Jain, Brett Bornhoft, Stanford University; Sanjeeb Bose, Cadence Design Systems Inc.; Parviz Moin, Stanford University

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

Tuesday, June 20

### Icing Simulation: Multi-Layer / Multi-time Step Simulation

Session Code ICE700

Room Park Suite 8

Session

3:30 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Andy Broeren, Nasa Glenn Research Center; Alberto Guardone, Politecnico di Milano

Chairperson - Andrea Rausa, POLITECNICO DI MILANO; Ian Roberts, AeroTex UK LLP

Time	Paper No.	Title
3:30 p.m.	2023-01-1467	A Three-Dimensional Level-Set Front Tracking Technique for Automatic Multi-Step Simulations of In-Flight Ice Accretion  Alessandro Donizetti, Andrea Rausa, Tommaso Bellosta, Barbara Re, Alberto Guardone, Politecnico di Milano
4:00 p.m.	2023-01-1474	Advancements in CHAMPS for Multi-Layer Ice Accretion on Aircraft  Maxime Blanchet, Simon Bourgault-Côté, Eric Laurendeau, Polytechnique Montréal
4:30 p.m.	2023-01-1484	Multi-step Ice Accretion by Immersed Boundaries  Donato de Rosa, Francesco Capizzano, Davide Cinquegrana, Italian Aerospace Research Centre

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

Tuesday, June 20

### Ice Sensors: Ice Sensing I

Session Code ICE300

Room Park Suite 9

Session

10:00 a.m.

ice detection, future methods for detecting ice locally and in flight including SENS4ICE program

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Vince LoPresto, Collins Aerospace; Richard Moser, AeroTex GmbH

Chairperson - Vince LoPresto, Collins Aerospace

# International Conference on Icing of Aircraft, Engines, and Structures

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As of June 26, 2023 19:40:11 PM

Time	Paper No.	Title
9:30 a.m.		BREAK
10:00 a.m.	2023-01-1432	Planar Microwave Sensor for Localized Ice and Snow Sensing  Aaryaman Shah, Omid Niksan, Mohammad H. Zarifi, University of British Columbia
10:30 a.m.	2023-01-1429	Icing Environment Comparisons for the Distinct Parts of Jet Aircraft  Omer Akbal, Erdem Ayan, Canibek Murat, Turkish Aerospace Industries Inc.; Serkan Ozgen, Middle East Technical University
11:00 a.m.	ORAL ONLY	Ice Detection Technologies and Aircraft Certification Regarding Super Cooled Large Droplets  Stephane LE GARREC, Safran Aerosystems
11:30 a.m.	ORAL ONLY	ED-103B Changes from Rev A, Rationale, and Practical Application  Vince LoPresto, Collins Aerospace; Richard Moser, AeroTex GmbH

Planned by Deicing Conference Committee / Aerospace Advisory Group

Tuesday, June 20

### Ice Sensors: Ice Sensing II

Session Code ICE300

Room Park Suite 9

Session 1:00 p.m.

ice detection, future methods for detecting ice locally and in flight including SENS4ICE program

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Vince LoPresto, Collins Aerospace; Richard Moser, Aerotex GmbH

Chairperson - Ian Roberts, AeroTex UK LLP

Time	Paper No.	Title
1:00 p.m.	2023-01-1431	Airborne Platform for Ice-Accretion and Coatings Tests with Ultrasonic Readings (PICTUR)  Leonid Nichman, Dan Fuleki, Naiheng Song, Ali Benmeddour, Mengistu Wolde, David Orchard, National Research Council Canada; Edgar Matida, Carleton University; Kenny Bala, Zhigang Sun, Natalia Bliankinshtein, Keyvan Ranjbar, National Research Council Canada; Stephanie DiVito, Federal Aviation Administration
1:30 p.m.	2023-01-1430	Liquid Water Detection Algorithm for the Magnetostrictive Ice Detector  Darren Jackson, Kaare Anderson, Weston Heuer, Collins Aerospace

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:11 PM

Time	Paper No.	Title
2:00 p.m.	2023-01-1427	Optical Ice Detector Lite: Initial Flight Test Results  Mark Ray, Kaare Anderson, Kent Ramthun, Collins Aerospace
2:30 p.m.	2023-01-1428	Optical Ice Detector: Measurement Comparison to Research Probes  Kaare Anderson, Mark Ray, Darren Jackson, Collins Aerospace

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

### Tuesday, June 20

#### Surface Modification & Low Ice Adhesion (Surface) and Icing Physics: Droplets and Icing

Session Code ICE600

Room Park Suite 9 Session 3:30 p.m.

aerodynamics, roughness, ice adhesion tests and methods, ice shedding and runback

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; JOSE Palacios, Pennsylvania State University; Nadine Rehfeld, Fraunhofer IFAM

Chairperson - Hirotaka Sakaue, Univ. of Notre Dame

Time	Paper No.	Title
9:30 a.m.		BREAK
3:00 p.m.		BREAK
3:30 p.m.	2023-01-1454	A Phase Field Model for Simulating the Freezing of Supercooled Liquid Droplets  Lucy Brown, Suhas Jain, Parviz Moin, Center for Turbulence Research
4:00 p.m.	ORAL ONLY	Drop Dynamics Simulation of Early Stage of SLD Icing: Drop Impact, Wall Propagation and Solidification  Ilia Roisman, Mingyue Ding, Jeanette Hussong, Technische Universität Darmstadt
4:30 p.m.	<del>2023-01-1445</del> ORAL ONLY	Investigation on the Water Droplet Splashing Threshold on a Moving Surface with Different Surface Properties  Masafumi Yamazaki, University of Notre Dame; Cristhian Aliaga, Habibollah Fouladi, Guillaume Moula, ANSYS Inc; Joseph Gonzales, University of Notre Dame; Hirotaka Sakaue, Univ of Notre Dame

Planned by Deicing Conference Committee / Aerospace Advisory Group

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:11 PM

Wednesday, June 21

### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): Ice Protection Systems - Nanotubes Technology

Session Code ICE100

Room Grand Klimt 1 Session 8:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aviation

Chairperson - Mariachiara Gallia, POLITECNICO DI MILANO; Maxime Henno, SONACA sa

Time	Paper No.	Title
8:00 a.m.	ORAL ONLY	Incorporation of Carbon Nanotube Heaters in Thermoplastic Leading Edges  Steven Kestler, Jin Hu, Brandon Hein, Nathaniel Ching, Galdemir Botura, Collins Aerospace
8:30 a.m.	2023-01-1375	Integration and Testing of HeatCoat Carbon-Nanotube Ice Protection System on an Unmanned Aerial Vehicle  Kevin Yugulis, David Chase, Brian Kenney, Battelle Memorial Institute
9:00 a.m.	2023-01-1398	Carbon Nanotube (CNT) Based Electrothermal Ice Protection System Flight Tests  Brandon Hein, Galdemir Botura, Matthew Hamman, Casey Slane, Collins Aerospace

Wednesday, June 21

### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): Ice Protection Systems - Electrothermal

Session Code ICE100

Room Grand Klimt 1 Session 10:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aviation

Chairperson - Andrew Taylor, Collins Aerospace; Kevin Yugulis, Battelle Memorial Institute

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	Overview of an Electro-Thermal Deicing System Integrated into a Composite Leading Edge Structure - Technological Solution, Test Results and Associated Numerical Predictions  Maxime Henno, SONACA
10:30 a.m.	2023-01-1392	Novel Framework for the Robust Optimization of the Heat Flux Distribution for an Electro-Thermal Ice Protection System and Airfoil Performance Analysis

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:12 PM

Time	Paper No.	Title
11:00 a.m.	2023-01-1396	<p>Mariachiara Gallia, Alberto Guardone, Politecnico di Milano; Pietro Marco Congedo, Inria, CMAP, Ecole Polytechnique, IPP</p> <p>Comparison of Numerical Simulations with Experimental Data for an Electrothermal Ice Protection System in Appendix O Conditions</p> <p>Wolfgang Breituß, Richard Moser, AeroTex GmbH; Wolfgang Hassler, FH Joanneum GmbH; Hermann Ferschitz, Rail Tec Arsenal GmbH; Thomas Neubauer, Reinhard Puffing, Austrian Institute for Icing Sciences; Stefan Diebald, Advanced Thermal Technologies GmbH; Simon Schweighart, FH Joanneum GmbH</p>
11:30 a.m.	2023-01-1394	<p>Development and Demonstration of a Low Power Electrothermal Wing Ice Protection System for Regional Aircraft</p> <p>Richard Moser, AeroTex UK, LLP; Ian Roberts, AeroTex UK LLP; Bernd Plassnegger, Helmut Kuehnelt, Austrian Institute of Technology GmbH; Max Anich, Villingen GmbH; Giuseppina Giusy Nugnes, Leonardo S.p.A.</p>

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

### Wednesday, June 21

#### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): Ice Protection Systems - Electro-Mechanical

Session Code ICE100

Room Grand Klimt 1 Session 1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aviation

Chairperson - Charlene Hu, Steven Kestler, Collins Aerospace

Time	Paper No.	Title
1:00 p.m.	2023-01-1389	<p>Electro-Mechanical Resonant Ice Protection Systems: Numerical Prediction and Experimental Verification of the De-icing of a NACA 0024 Airfoil</p> <p>Valerian Palanque, Jason Pothin, ISAE SUPAERO; Marc Budinger, ICA, Université de Toulouse; Valérie Pommier-Budinger, ISAE-SUPAERO, Université de Toulouse; Ahmed Yaich, ICA, Université de Toulouse</p>
1:30 p.m.	2023-01-1401	<p>Electromechanical De-icing of Rectangular Aluminum Plates with Forced Vibration Generated with an Amplified Piezoelectric Actuator</p> <p>Christian Bolzmacher, Université Paris-Saclay, CEA LIST; Edouard Leroy, CEA LIST</p>
2:00 p.m.	ORAL ONLY	<p>New Electromechanical Resonant Ice Protection System for Regional Aircraft</p> <p>Amandine Andre Ing, ATR; Marc Budinger, INSA Toulouse; Alessandro Sgueglia, ATR; Aroua Fourati, PYTHEAS Technology; Valérie POMMIER-BUDINGER, ISAE-Supaero; Thibault Peix, ATR; Simon Clement, PYTHEAS Technology</p>
2:30 p.m.	2023-01-1403	<p>Development of a Robust Surface Ply for Pneumatic Deicers</p> <p>Andrew Taylor, Casey Slane, Jin Hu, Galdemir Botura, Collins Aerospace</p>

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:12 PM

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

### Wednesday, June 21

#### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): Ice Protection Systems - Fluid Based & Other Technologies

Session Code ICE100

Room Grand Klimt 1 Session 3:30 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aviation

Chairperson - Amandine Andre Ing, ATR; Eric Villeneuve, UQAC

Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	A Fluid-Based sUAS Propeller Ice Protection System  Robert Brock Harden, CAV Systems, Ltd.
4:00 p.m.	ORAL ONLY	Development and Application of a Fluid-Based Nacelle Ice Protection System  Koji Shimoi, CAV Systems, Ltd.
4:30 p.m.	ORAL ONLY	A Summary of the APT70 Drone Rotor Icing Investigation Perform in Cold Room  Eric Villeneuve, AMIL

### Wednesday, June 21

#### Horizon 2020: EU Collaborative Research & Innovation at CINEA: Safer Aviation in Icing Conditions

Session Code ICE002

Room Grand Klimt 2 & 3 Session 8:00 a.m.

CINEA (European Climate, Infrastructure and Environment Executive Agency) is an executive agency of the European Commission. It implements Green Deal programmes such as Connecting Europe Facility, Innovation Fund and Horizon 2020 / Horizon Europe. This includes Transport Research and Innovation, such as low-TRL Aviation and Aviation Safety collaborative projects. Outstanding aviation projects are MUSIC-haic, SENS4ICE and ICE GENESIS, which have advanced icing knowledge, testing and systems thanks to 22 million € EU grants. Results from these projects are presented during this SAE Icing conference.

Time	Paper No.	Title
8:00 a.m.	ORAL ONLY	Development of Test and Numerical Capabilities within ICE GENESIS for Snow and Liquid Water  Main achievement within the ICE GENESIS European research project. Snow activities focus on the development and validation of test and numerical capabilities to de-risk engine integration. Liquid capabilities have a strong emphasis on Supercooled Large Droplets (SLD) with experimental facilities upgrade and modelling improvements, as well as numerical capabilities development.

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:12 PM

Time	Paper No.	Title
		Olivier Blesbois, Airbus Operations, Ltd.; Fabien Dezitter, Airbus Helicopters
8:30 a.m.	2023-01-1496	<p><b>SENS4ICE EU Project Preliminary Results</b></p> <p>The EU project SENS4ICE (GA no 824253) addresses reliable detection and discrimination of supercooled large droplets (SLD) icing conditions. These conditions are considered as particularly safety-relevant and have been included in airplane certification specifications. The SENS4ICE project comprises technology development, icing wind tunnel upgrading/testing and flight testing. A novel hybrid approach for icing detection combines direct sensing (atmospheric conditions / ice accretion) with indirect techniques based on changing aircraft characteristics. The first part of the project was devoted to the development and maturation of icing detection technologies, with a focus on Appendix O (of 14 CFR Part 25 and CS-25) icing conditions. Furthermore, several icing wind tunnel facilities have improved capabilities to represent Appendix O conditions. Icing wind tunnel testing (including Appendix O) of several icing detection sensors developed in the SENS4ICE project concluded the first part of the project. The main goal of the second part of the project is flight testing of icing technologies in natural icing conditions including Appendix O.</p> <p>Carsten Schwarz, German Aerospace Center</p>
9:00 a.m.	ORAL ONLY	<p><b>Overview of MUSIC-haic Project Main Achievements</b></p> <p>MUSIC-haic is a European research project of the H2020 framework program dealing with the experimental study and modeling of ice crystal accretion phenomena in aircraft engines and probes as well as the development and validation of 3D numerical simulation tools. The project lasted from September 2018 to February 2023. The presentation will provide a synthesis of the main results obtained, lessons learned and open perspectives for future research.</p> <p>Philippe Villedieu, ONERA</p>

## Wednesday, June 21

### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): Nacelle, Inlet & Engine Icing

Session Code ICE100

Room Grand Klimt 2 & 3

Session 10:00 a.m.

including future aircraft icing solutions, icing challenges of new configurations (UAM, UAS, hybrid/electric propulsion)

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aerospace

Chairperson - Roger Aubert, Bell Flight

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:12 PM

Time	Paper No.	Title
9:30 a.m.		BREAK
10:00 a.m.	2023-01-1399	Icing Physics Studies Using the 3D SIDRM Test Article: Aerodynamic and Supercooled Liquid Icing Analysis Tadas Bartkus, Ohio Aerospace Institute; Sam Lee, HX5, LLC; Eric Stewart, Naval Air Warfare Center Aircraft Division
10:30 a.m.	2023-01-1373	Snow Effects on the NGCTR Nacelle for Relevant Certification Conditions Nina Kool, ADSE BV; Edwin Van der Weide, University of Twente; Ferdinand Spek, ADSE BV; Harmen van der Ven, Stefan van 't Hoff, Royal Netherlands Aerospace Centre (NLR)
11:00 a.m.	2023-01-1374	Ice Protection System Design for the Next Generation Civil Tiltrotor Engine Intake Damiano Tormen, Alessandro Zanon, Michele De Gennaro, Austrian Institute of Technology GmbH
11:30 a.m.	2023-01-1381	Icing Qualification Wind Tunnel Test of Helicopter Engine with Inlet Barrier Filter Air Intake Stefan van 't Hoff, Karel Lammers, NLR Netherlands Aerospace Center; Joo Hyun Jung, Hyung Sik Kim, Korea Aerospace Industries, Ltd.; Sandy Ressejac, Safran Helicopter Engines

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also Planned by Deicing Conference Committee / Aerospace Advisory Group

### Wednesday, June 21

#### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): Ice Accretion in Swept Wings

Session Code ICE100

Room Grand Klimt 2 & 3

Session 1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aviation

Chairperson - Alberto Pueyo, Bombardier Aviation

Time	Paper No.	Title
1:00 p.m.	2023-01-1382	Additional Large-Drop Ice Accretion Test Results for a Large Scale Swept Wing Section from January 2022 Andy Broeren, NASA Glenn Research Center; Sam Lee, HX5, LLC; Jen-Ching Tsao, Ohio Aerospace Institute
1:30 p.m.	2023-01-1386	Experimental Investigation of a CRM65 Wingtip Mockup under Appendix C and Appendix O Icing Conditions Reinhard Puffing, Thomas Neubauer, FH Joanneum GmbH; Richard Moser, Aerotex GmbH; Wolfgang Hassler, Simon Schweighart, FH Joanneum GmbH; Hermann Ferschitz, Rail Tec Arsenal; Stefan Diebald, Advanced Thermal Technologies GmbH; Wolfgang Breiffuss, Aerotex GmbH; David Kozomara, Austrian Institute for Icing Sciences

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:12 PM

Time	Paper No.	Title
2:00 p.m.	2023-01-1387	Additional Comparison of Ice Shapes on Full-Chord and Truncated Swept Wing Models from January 2022 Sam Lee, HX5, LLC; Andy Broeren, NASA Glenn Research Center
2:30 p.m.	ORAL ONLY	Simulated Ice Shapes on the High Lift Common Research Model Using LEWICE3D and GlennICE Christopher Porter, Andy Broeren, Thomas Ozoroski, Nasa Glenn Research Center; Kolleen Hood, Adam Malone, Cris Bosetti, Boeing Co

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

## Wednesday, June 21

### Special Session with Airbus and McGill University

Session Code ICE008

Room Grand Klimt 2 & 3

Session

3:30 p.m.

Time	Paper No.	Title
	ORAL ONLY	Icing Challenges on Sustainable Commercial Aircraft Concepts  The Aviation Industry has committed to net-zero carbon emissions in global civil operation by 2050. To achieve this goal the next generation of commercial aircraft will need to incorporate new technologies to further increase their energy efficiency and to make use of new energy sources. This will result in the need to evolve to aircraft configurations that deviate to a certain extent from the current already highly optimized standard. Industry is actively exploring these concepts while developing the technology bricks that would enable them like higher aspect ratio wings, new propulsion platforms, more electric systems, use of SAF and LH2 fuel, etc . This talk will review the impact of icing requirements on the sizing, design, certification and operations of these future concepts. It will also present the Airbus view on the progress required in the icing technologies, i.e. simulation tools, testing facilities, ice protection systems, as well as the operational and regulatory aspects.  Luis Ruiz
	ORAL ONLY	Reduced Order Modeling: An Integrated Approach to Certification by Analysis  The lecture demonstrates how Reduced Order Modeling (ROM) enables OEMs to provide suppliers and contractors with advanced "3D CFD simulators" yielding "complete aircraft information" in less than a minute, without the latter maintaining CFD software, hardware, or expertise. ROM is the enabler for all tiers to work at the same technological level and facilitate Certification by Analysis. ROM has clear applications to the 3 fluid dynamics phases of the in-flight icing certification: CFD (computational), EFD (experimental), and FFD (flight).

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:12 PM

Time	Paper No.	Title
		Wagdi G. Habashi, McGill Univ.

### Wednesday, June 21

#### Environmental Icing Meteorology, SLD, and Ice Crystals: SENS4ICE Ice Detection Technologies, Part 1

Session Code ICE800

Room Park Suite 1 Session 10:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Ben Bernstein, Leading Edge Atmospheric; Galdemir Botura, Collins Aerospace; Carsten Schwarz, DLR German Aerospace Center

Chairperson - Alberto Pueyo, Bombardier Aviation; Luiz Vieira, Embraer SA

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	Hybrid Ice Detection System Development and Validation  Annagrazia Orazzo, Bruno THILLAYS, Safran AEROSYSTEMS
10:30 a.m.	2023-01-1493	Design and Testing of an Indirect Ice Detection Methodology  Christoph Deiler, Falk Sachs, DLR - German Aerospace Center
11:00 a.m.	2023-01-1490	Development and Validation Testing of the Collins Ice Differentiator System in App C and App O Icing Conditions  Matthew Hamman, El Hassan Ridouane, Giancarlo Gelao, Rohan Chabukswar, Galdemir Botura, Collins Aerospace
11:30 a.m.	2023-01-1488	Development of the Atmospheric Icing Patch (AIP) under the SENS4ICE Programme  Ian Roberts, Roger Gent, Colin Hatch, Richard Moser, AeroTex UK

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

### Wednesday, June 21

#### Environmental Icing Meteorology, SLD, and Ice Crystals: SENS4ICE Ice Detection Technologies, Part 2

Session Code ICE800

Room Park Suite 1 Session 1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Ben Bernstein, Leading Edge Atmospheric; Galdemir Botura, Collins Aerospace; Carsten Schwarz, DLR German Aerospace Center

Chairperson - Christoph Deiler, DLR German Aerospace Center; Dennis Regnier, Federal Aviation Administration

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:13 PM

Time	Paper No.	Title
1:00 p.m.	ORAL ONLY	Icing Condition Optical Sensor  Vladimir Hamada, Honeywell International SRO; Lee Wienkes, Honeywell Aerospace; Pavel Badin, David Svarcer, Honeywell International SRO
1:30 p.m.	ORAL ONLY	In-Flight Icing Condition Detection using an On-Board Sensor Measuring the Aircraft Electrostatic Potential  Rafael Sousa Martins, Aurélie Bouchard, Magalie Buguet, Patrice Blanchet, Philippe Lalande, ONERA
2:00 p.m.	ORAL ONLY	Wind Tunnel and Flight Testing of a Lamb Wave Based Ice Accretion Sensor  Martin Pohl, Research & Development Institute
2:30 p.m.	ORAL ONLY	INTA Fiber Optic Detector  Miguel Gonzalez del Val, Instituto Nacional de Tecnica Aeroespaci; Malte Frovel, INTA

## Wednesday, June 21

### Icing Simulation: Surrogate Models and Uncertainty Quantification

Session Code ICE700

Room Park Suite 7 Session 8:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Andy Broeren, Nasa Glenn Research Center; Alberto Guardone, Politecnico di Milano

Chairperson - Philipp Buchen, TU Braunschweig; Liam Parker, University of Oxford

Time	Paper No.	Title
8:00 a.m.	2023-01-1480	In Flight Ice Shape Prediction with Data Fit Surrogate Models  Omer Akbal, Erdem Ayan, Turkish Aerospace Industries Inc.; Canibek Murat, Turkish Aerospace Industries Inc; Serkan Ozgen, Middle East Technical University
8:30 a.m.	2023-01-1465	Implementation of the DADI Method into the Droplet Equation for Efficient Aircraft Icing Simulation  Younghyo Kim, Yoonpyo Hong, Soonho Shon, Kwanjung Yee, Seoul National University
9:00 a.m.	2023-01-1472	Reduced-Order modeling of Icing CFD data for Uncertainty Quantification of Icing Wind tunnel Experiments  Yu-Eop Kang, Kwanjung Yee, Seoul National University

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:13 PM

Wednesday, June 21

### Icing Measurement Techniques and Test Facilities: Cloud Characterization, Part 1

Session Code ICE200

Room Park Suite 7 Session 10:00 a.m.

Icing cloud characterization: Particle sizing and liquid water content probes, including in supercooled large drop (SLD) conditions

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Catherine Clark, National Research Council Canada; Judith Van Zante, NASA Glenn Research Center

Chairperson - Judith Van Zante, NASA Glenn Research Center

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	Overview of PSD Cloud Probe Measurements to Characterize Appendix O FZDZ and FZRA Conditions in IWT Facilities During ICE GENESIS  Romy Heller, DLR German Aerospace Center; Wolfgang Breitfuß, Aerotex GmbH; Biagio Esposito, CIRA Scpa; Valerian Hahn, Christiane Voigt, DLR German Aerospace Center
10:30 a.m.	ORAL ONLY	Comparisons of the Performance of Particle Probes in Wind Tunnel SLD Conditions: SPEC 2D-S, DMT CDP, Malvern Spraytech-200, Artium PI-PTV, Artium PDI-FPDR  Alexei Korolev, Environment and Climate Change Canada; David Orchard, National Research Council Canada; Emily Timko, Jacobs Technology Inc; Ivan Heckman, Environment and Climate Change Canada; Judith Van Zante, NASA; William Bachalo, Artium Technologies Inc
11:00 a.m.	2023-01-1415	A New 1D2D Optical Array Particle Imaging Probe for Airborne and Ground Simulation Cloud Measurements  Lyle Lilie, Daniel Bouley, Chris Sivo, Science Engineering Associates Inc.; Biagio Esposito, CIRA Scpa; Aaron Bansemer, National Center for Atmospheric Research; Romy Heller, DLR German Aerospace Center; J. Walter Strapp, Met Analytics Inc.
11:30 a.m.	2023-01-1421	High Resolution Cloud Particle Imaging Incorporating State-of-the-Art Digital Cameras with Pulsed LED Illumination  William Don Bachalo, Julien Manin, Gregory Payne, Michael Fidrich, Khalid Ibrahim, Artium Technologies Inc.

Wednesday, June 21

### Icing Measurement Techniques and Test Facilities: Cloud Characterization, Part 2

Session Code ICE200

Room Park Suite 7 Session 1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Catherine Clark, National Research Council Canada; Judith Van Zante, NASA Glenn Research Center

Chairperson - Wolfgang Breitfuss, Aerotex GmbH; Judith Van Zante, NASA Glenn Research Center

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:13 PM

Time	Paper No.	Title
1:00 p.m.	2023-01-1424	Liquid Water Content Instrumentation Study at the NRC AIWT  Catherine Clark, David Orchard, National Research Council Canada
1:30 p.m.	2023-01-1423	Comparability of Hot-Wire Estimates of Liquid Water Content in SLD Conditions  Biagio M. Esposito, CIRA Scpa; David Orchard, National Research Council Canada; Johannes Lucke, Deutsches Zentrum fur Luft und Raumfahrt; Leonid Nichman, Natalia Bliankinshtein, National Research Council Canada; Lyle Lilie, Science Engineering Associates Inc; Pietro Catalano, Francesco D'Aniello, CIRA Scpa; J. Walter Strapp, Met Analytics Inc.
2:00 p.m.	ORAL ONLY	Analysis of Supercooled Large Drop Velocity Measurement in the NASA Icing Research Tunnel  Jen-Ching Tsao, Ohio Aerospace Institute; Mario Vargas, NASA Glenn Research Center; Eric Stewart, NAWCAD; Zaid Sabri, Eric Insana, NASA John Glenn Research Center; Emily Timko, Jacobs Technology Inc; Gregory payne, Artium Technologies Inc
2:30 p.m.	2023-01-1409	Phase Doppler Interferometry for Efficient Cloud Drop Size Distribution, Number Density, and LWC Measurements  William Don Bachalo, Gregory Payne, Khalid Ibrahim, Michael Fidrich, Artium Technologies Inc.

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

### Wednesday, June 21

#### Icing Measurement Techniques and Test Facilities: Icing Wind Tunnel Operations

Session Code ICE200

Room Park Suite 7

Session 3:30 p.m.

Considerations for icing wind tunnel operations

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Catherine Clark, National Research Council Canada; Judith Van Zante, NASA Glenn Research Center

Chairperson - Wolfgang Breitfuss, Aerotex GmbH

Time	Paper No.	Title
3:30 p.m.	2023-01-1413	Statistical Process Control and Analysis on the Water Content Measurements in NASA Glenn's Icing Research Tunnel  Emily Timko, Jacobs Technology Inc.; Laura King-Steen, HX5, LLC; Eric Insana, NASA Glenn Research Center
4:00 p.m.	2023-01-1425	Development of an Altitude Evaporation Model for Icing Tunnel Control  Craig Davison, National Research Council Canada

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:13 PM

Time	Paper No.	Title
4:30 p.m.	2023-01-1406	Investigation of the Influence of Aero-Thermal Non-equilibrium Conditions of an SLD Cloud on Airfoil Icing  Venkateshwar Reddy Bora, Technische Universität Braunschweig; Mariachiara Gallia, Politecnico di Milano; Inken Knop, Technische Universität Braunschweig; Alberto Guardone, Politecnico di Milano

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

### Wednesday, June 21

#### Icing of Structures and Vehicles on the Ground: Runway Icing

Session Code ICE500

Room Park Suite 8 Session ALL DAY

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Hermann Ferschitz, RTA; Giuseppe Mingione, CIRA Scpa

Chairperson - Ingeborg Bednar, RTA

Time	Paper No.	Title
8:00 a.m.	ORAL ONLY	Survey of the Standards and Research Regarding Runway Winter Maintenance Using Runway De-icing Products: Current Works, Needs and Opportunities  Jean-Denis Brassard, Gelareh Momen, UQAC/AMIL
8:30 a.m.	2023-01-1441	Effect of Variable Melting Temperature on the Enthalpy Model for Runway Deicing  Aida Maroufkhani, École de Technologie Supérieure; Claire Charpentier, Anti-Icing Materials International Laboratory; Francois Morency, École de Technologie Supérieure; Gelareh Momen, Anti-Icing Materials International Laboratory
9:00 a.m.	ORAL ONLY	Smart Low Interfacial Toughness Coating for Large-Scale De-Icing without Interface Melting  Zahra Azimi Dijvejin, PhD student, UBC, Kelowna, Canada

### Wednesday, June 21

#### Icing Simulation: Ice Accretion Simulation: New Schemes and Methodologies

Session Code ICE700

Room Park Suite 8 Session 10:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Andy Broeren, Nasa Glenn Research Center; Alberto Guardone, Politecnico di Milano

Chairperson - Eric Galloway, Hx5 LLC; Isik Ozcer, ANSYS Inc.

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:13 PM

Time	Paper No.	Title
10:00 a.m.	2023-01-1457	Demonstration of Initial GlennICE Relative Frame Capability: Axial-Flow Propeller  David Rigby, HX5, LLC.; Paul von Hardenberg, NASA Glenn Research Center
10:30 a.m.	2023-01-1482	Scalability of GlennICE in a Parallel Environment  Zaid Sabri, Christopher Porter, NASA Glenn Research Center
11:00 a.m.	2023-01-1461	A CIRA 3D Ice Accretion Code for Multiple Cloud Conditions Simulations  Davide Cinquegrana, Francesco D'Aniello, Donato de Rosa, Antonio Carozza, Pietro Catalano, Giuseppe Mingione, CIRA Scpa
11:30 a.m.	2023-01-1479	Multi-Physics Simulations of Ice Shedding from Wind Turbines  Andrea Rausa, Francesco Caccia, Alberto Guardone, Politecnico di Milano

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

## Wednesday, June 21

### Icing Simulation: Ice Crystals and Snow

Session Code ICE700

Room Park Suite 8

Session 1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Andy Broeren, Nasa Glenn Research Center; Alberto Guardone, Politecnico di Milano

Chairperson - Curtis A. Flack, Nasa Glenn Research Center; Martin Neuteboom, National Research Council Canada

Time	Paper No.	Title
1:00 p.m.	2023-01-1481	A Three-Layer Model for Ice Crystal Icing in Aircraft Engines  Yue Zhang, ANSYS Inc.; Karthik Narayanasamy, Honeywell Aerospace; Wolfgang Sandel, PADT Inc.; Shezad Nilamdeen, Isik Ozcer, ANSYS Inc.
1:30 p.m.	2023-01-1475	Modelling and Simulation of Mixed Phase Ice Crystal Icing in Three-Dimensions  Liam Parker, Matthew McGilvray, David Gillespie, University of Oxford
2:00 p.m.	ORAL ONLY	Development of Snow Numerical Capability within ICE GENESIS  Boris Aguilar, ONERA; Fabien Dezitter, Airbus Helicopters; Pierre Trontin, CNRS, Univ Lyon 1; Quentin Duchayne, ONERA; Kilian Köbschall, TU Darmstadt; Philippe Villedieu, Olivier rouzaud, ONERA

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:14 PM

Wednesday, June 21

### Surface Modification & Low Ice Adhesion (Surface) and Icing Physics: Roughness and Icing

Session Code ICE600

Room Park Suite 9 Session 8:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; JOSE Palacios, Pennsylvania State University; Nadine Rehfeld, Fraunhofer IFAM

Chairperson - Nadine Rehfeld, Fraunhofer IFAM

Time	Paper No.	Title
8:00 a.m.	2023-01-1449	Data-driven Roughness Estimation for Glaze Ice Accretion Simulation  Kevin Ignatowicz, François Morency, École de Technologie Supérieure; Héloïse Beaugendre, INRIA, CNRS, Bordeaux INP, IMB
8:30 a.m.	ORAL ONLY	Surface Roughness Model for Simulating Ice Shape Based on Initial Ice Accretion Conditions  Hansol Lee, Seoul National University; Seung-in Min, Technical University of Denmark; Yonghwan Kim, Seoul National University; Chankyu Son, Cheongju University; Kwanjung Yee, Seoul National University
9:00 a.m.	2023-01-1446	Could Superhydrophobic Surfaces be a Realistic Solution for Running-Wet Areas?  Julio Mora, Paloma García, Francisco Carreño, National Institute of Aerospace; Laura Montes, Carmen López-Santos, Victor Rico, Ana Borrás, CSIC; Francisco Redondo, Airbus Defence and Space; Agustín R. González-Elípe, CSIC; Alina Agüero, National Institute of Aerospace

Wednesday, June 21

### Surface Modification & Low Ice Adhesion (Surface) and Icing Physics: Materials and Surfaces for Ice Protection

Session Code ICE600

Room Park Suite 9 Session 10:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; JOSE Palacios, Pennsylvania State University; Nadine Rehfeld, Fraunhofer IFAM

Chairperson - Emily Asenath-Smith, US Army Corps of Engineers

Time	Paper No.	Title
10:00 a.m.	ORAL ONLY	Fabrication and Characterization of Different Type of Pu-Based Icephobic Coatings for Rotorcraft Application
10:30 a.m.	2023-01-1455	Durable Icephobic and Erosion Resistant Coatings Based on Quasicrystals  Qimeng Yang, Ali Dolatabadi, Kevin Golovin, University of Toronto

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:14 PM

Time	Paper No.	Title
11:00 a.m.	ORAL ONLY	Robust Anti-Icing Surfaces Based on Buckling Metallic Plates  Kamran Alasvand Zarasvand, University of Toronto

### Wednesday, June 21

#### Surface Modification & Low Ice Adhesion (Surface) and Icing Physics: Test Methods for Icephobics

Session Code ICE600

Room Park Suite 9 Session 1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; JOSE Palacios, Pennsylvania State University; Nadine Rehfeld, Fraunhofer IFAM

Chairperson - Jean-Denis Brassard, Universite Du Quebec à Chicoutimi - AMIL

Time	Paper No.	Title
1:00 p.m.	2023-01-1444	Impact Ice Adhesion at NASA Glenn: Current Experimental Methods and Supporting Measurements  Christopher Giuffre, Hx5, LLC; Ru-Ching Chen, NASA Glenn Research Center
1:30 p.m.	2023-01-1451	Dynamic and Static Test Methods: Quantifying the Shear Strength at the Interface of Iced Substrates  Luca Stendardo, Università di Milano-Bicocca; Giulia Gastaldo, ISAE-SUPAERO, Université de Toulouse; Marc Budinger, ICA, Université de Toulouse; Carlo Antonini, Università di Milano-Bicocca; Valérie Pommier-Budinger, ISAE-SUPAERO, Université de Toulouse; Anny Catalina Ospina Patiño, Università di Milano-Bicocca
2:00 p.m.	2023-01-1443	Experimental Evaluation of Icephobic Coatings on a UAV Propeller Operated in an Icing Wind Tunnel  Derek Harvey, Eric Villeneuve, Anti-Icing Materials International Laboratory; Christophe Volat, University of Quebec at Chicoutimi; Mathieu Beland, Maxime Lapalme, Bell Textron Canada Ltd.
2:30 p.m.	2023-01-1447	Low-Adhesion Surface Evaluation on an Airfoil in the NRC AIWT  Catherine Clark, National Research Council Canada; Anne-Marie Kietzig, McGill University; Kevin Golovin, University of Toronto; Naiheng Song, National Research Council Canada

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:14 PM

Wednesday, June 21

### Surface Modification & Low Ice Adhesion (Surface) and Icing Physics: The SURFICE Project

Session Code ICE600

Room Park Suite 9 Session 3:30 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; JOSE Palacios, Pennsylvania State University; Nadine Rehfeld, Fraunhofer IFAM

Chairperson - Nadine Rehfeld, Fraunhofer IFAM

Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	<p>SURFICE - Smart Surface Design for Efficient Ice Protection and Control</p> <p>Carlo Antonini, Luca Stendardo, Anny Catalina Ospina Patiño, Irene Tagliaro, University of Milano-Bicocca; Mingyue Ding, Ali Raza Shaikh, Iliia Roisman, Technische Universität Darmstadt; Simrandeep Bahal, Manish Tiwari, University College London; Gabriel Hernández Rodríguez, Anna Maria Coclite, Graz University of Technology; Miisa Tavaststjerna, Santiago Garcia, Delft University Of Technology; Andrea Maslov, Navid Mostofi Sarkari, David Seveno, KU Leuven; Giulia Gastaldo, Valérie POMMIER-BUDINGER, ISAE Supaero; Alexandros Atzemoglou, Niccolò Bartalucci, Stefan Zürcher, Samuele Tosatti, SuSoS AG; Mark Tibbitt, ETH Zurich; Pau Riera, Ian Roberts, AeroTex UK LLP; Theodoros Dimitriadis, Tanmoy Maitra, Olivier Schlenkhoff-Hus, FT Technologies (UK) Ltd; Elmar Bonaccorso, Airbus</p>
4:00 p.m.	ORAL ONLY	<p>Gradient Polymer Coatings Deposited via Initiated Chemical Vapor Deposition (iCVD) for Anti-icing Applications</p> <p>Gabriel Hernández Rodríguez, Graz University of Technology; Carlo Antonini, Luca Stendardo, University of Milano-Bicocca</p>
4:30 p.m.	ORAL ONLY	<p>Controlling Frost Formation on Aircraft Coatings Using Chemical Micro-Patterning</p> <p>Miisa Tavaststjerna, Santiago Garcia, Delft University Of Technology</p>

Thursday, June 22

### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): UAVs - Ice Accretion Effects on UAV Propellers

Session Code ICE100

Room Grand Klimt 1 Session 8:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aviation

Chairperson - Richard Moser, Aerotex GmbH; Paul von Hardenberg, NASA Glenn Research Center

Time	Paper No.	Title
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# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:14 PM

Time	Paper No.	Title
8:00 a.m.	2023-01-1378	Identification of an Electric UAV Propulsion System in Icing Conditions  Bogdan Løw-Hansen, Nicolas C. Müller, Erlend M. Coates, Tor Arne Johansen, Richard Hann, Norwegian University of Science and Technology
8:30 a.m.	2023-01-1383	UAV Icing: 3D Simulations of Propeller Icing Effects and Anti-Icing Heat Loads  Nicolas Carlo Müller, Richard Hann, Norwegian University of Science and Technology

## Thursday, June 22

### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): UAVs - Operations in Icing Conditions

Session Code ICE100

Room Grand Klimt 1 Session 10:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aviation

Chairperson - Tariq Ahmad, Lilium eAircraft GmbH; Richard Lewis, Airbus SAS

Time	Paper No.	Title
10:00 a.m.	2023-01-1384	UAV Icing: Numerical Simulation of Icing Effects on Wing and Empennage  Markus Lindner, Joachim Wallisch, Richard Hann, Norwegian University of Science and Technology
10:30 a.m.	2023-01-1400	UAV Icing: Intercycle Ice Effects on Aerodynamic Performance  Joachim Wallisch, Richard Hann, Norwegian University of Science and Tech., UBIQ Aerospace
11:00 a.m.	ORAL ONLY	UAV and UAM Icing Climate Study for North Europe and Metropolitan Areas in USA  Richard Hann, Norwegian University of Science and Tech.; Ben Bernstein, Leading Edge Atmospheric; Kasper Borup; Kim Sorensen, Ubiq Aerospace AS
11:30 a.m.	2023-01-1379	UAV Icing: Icing Cases for Validation of Path Planning Method  Michael Cheung, Richard Hann, Tor Johansen, Norwegian University of Science and Technology

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:15 PM

Thursday, June 22

### Aircraft & Engine Inflight Icing and Advanced Air Mobility (AAM): UAVs - Experimental Investigation of Rotors and Wings

Session Code ICE100

Room Grand Klimt 1 Session 1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Roberto Marrano, Pratt & Whitney Canada; Alberto Pueyo, Bombardier Aviation

Chairperson - Dave Dischinger, Honeywell Intl. Inc.; Dennis Regnier, Federal Aviation Administration

Time	Paper No.	Title
1:00 p.m.	2023-01-1380	Experimental Investigation of UAS Rotors and Ice Protection Systems in Appendix C Icing Conditions  David Kozomara, Jakob Amon, Austrian Institute for Icing Sciences; Reinhard Puffing, Thomas Neubauer, Simon Schweighart, FH Joanneum GmbH; Stefan Diebald, Advanced Thermal Technologies GmbH; Andreas Rapf, Rail Tec Arsenal; Richard Moser, Wolfgang Breidfuss, Aerotex GmbH
1:30 p.m.	2023-01-1391	UAM Icing: Ice Accretion Experiments and CFD Icing Simulations on Rotors for eVTOL Unmanned Aircraft  Henidya Heramarwan, University of Stuttgart; Nicolas Müller, Richard Hann, Norwegian University of Science and Technology; Thorsten Lutz, University of Stuttgart
2:00 p.m.	2023-01-1372	UAV Icing: Experimental Validation Data for Predicting ice Shapes at Low Reynolds Numbers  Richard Hann, Nicolas Müller, Markus Lindner, Joachim Wallisch, Norwegian University of Science and Technology

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

Thursday, June 22

### Special Session with NASA and Boeing

Session Code ICE006

Room Grand Klimt 2 & 3 Session 8:00 a.m.

Time	Paper No.	Title
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# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:15 PM

Time	Paper No.	Title
8:00 a.m.	ORAL ONLY	<p>NASA Icing Overview 2023</p> <p>This presentation describes the NASA icing research portfolio as of 2023 and includes overviews of NASA icing test facilities and computational tools. In addition, high-level summaries of NASA's current icing research activities are described for the following areas: (1) Transonic Truss Brace Wing, (2) High Lift Common Research Model, (3) Advanced Air Mobility, (4) Characterization of Low Ice Adhesion Materials, (5) High Ice Water Content Flight Research, (6) Engine Ice Accretion using the Simulated Inter-compressor Duct Research Model, and (7) Efficient Quiet Integrated Propulsor. Finally, the presentation describes collaboration and partnership opportunities with NASA.</p> <p>Peter M. Struk, Nasa Glenn Research Center</p>
8:30 a.m.	ORAL ONLY	<p>Icing Certification Landscape from a Manufacturer's Perspective</p> <p>Cris Bosetti, Boeing Co.</p>
9:00 a.m.	ORAL ONLY	<p>777X Folding Wing Tip Cold Weather Operations</p> <p>The 777X features a folding wingtip device to facilitate operation into more airports worldwide while providing efficiency gains of the larger wingspan in flight. Procedures for 777X operation allow for de/anti-ice treatment to occur in either the extended (horizontal) or folded (vertical) orientation. It is recognized that use of thickened anti-icing fluids on a vertical surface may have different characteristics than a horizontal surface. Boeing will share how it has considered the impacts of possible contamination on the FWT during initial certification to inform appropriate procedures and limitations in the operation and service manuals.</p> <p>John Macomber, Boeing Co.</p>

## Thursday, June 22

### Icing Regulations & Requirements

Session Code ICE400

Room Grand Klimt 2 & 3

Session 10:00 a.m.

(systems and operation of systems included)

Organizers - Philip Alldridge, Lockheed Martin Corp.; Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Dennis Regnier, Federal Aviation Administration

Chairperson - Dennis Regnier, Federal Aviation Administration; Dustin Weimer, CAV Systems, Ltd.

Time	Paper No.	Title
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# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:15 PM

Time	Paper No.	Title
9:30 a.m.		BREAK
10:00 a.m.	2023-01-1434	3 Inch Ice Shapes, AB Initio  Dave Leopold, Adam Malone, Cris Bosetti, John Macomber, Rami Slim, Boeing Co.
10:30 a.m.	2023-01-1433	Minimum Operational Performance Standards for Weather Radar Ice Crystal Detection Function  Jan Lukas, Honeywell Aerospace; Rockee Zhang, University of Oklahoma; Mariusz Starzec, Garmin International; Jeff Finley, Venkata Sishtla, Divesh Laxhi, Collins Aerospace; Dawn Gidner, Honeywell Aerospace (retired); Jean-Baptiste Berthier, Airbus
11:00 a.m.	2023-01-1435	An Analytical Method for Prediction of High Altitude Total Water Exposure for In-Service Long Range Aircraft  Jerome Sanford, Melissa Bravin, Matthew Clarkson, Edward Natsui, Boeing Company
3:00 p.m.		BREAK

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also Planned by Deicing Conference Committee / Aerospace Advisory Group

### Thursday, June 22

#### AIAA Ice Prediction Workshop Primer

Session Code ICE005

Room Grand Klimt 2 & 3

Session 1:00 p.m.

- Ice Prediction Workshop—Background and Motivation
- Summary of IPW-1
- IPW-2 Test Cases
- IPW-2 Results Comparisons

Presenters - Maxime Blanchet, Ecole Polytechnique Montreal; Andy Broeren, NASA Glenn Research Center; Eric Laurendeau, Polytechnique Montreal

### Thursday, June 22

#### Closing and Keynote Address

Session Code ICE003

Room Grand Klimt 2 & 3

Session 3:30 p.m.

Time	Paper No.	Title
3:00 p.m.		BREAK

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:15 PM

Time	Paper No.	Title
	ORAL ONLY	<p>Keynote Address: Aircraft Icing - EASA Update Part 1 Esther Garcia, EASA</p> <p>This presentation addresses the EASA safety plan, the current identified Icing hazards and the actions taken by the agency to tackle the main icing risks. It will provide as well the EASA perspective on the current challenges on icing certification, including the latest regulatory framework and guidance material developed for New air Mobility, such as UAS, Electric/hybrid engines and VTOL.</p> <p>Esther Garcia, EASA</p>
	ORAL ONLY	<p>Keynote Address: Aircraft Icing - EASA Update Part 2, Emmanuel Cayrol, EASA</p> <p>This 2nd part will provide the latest update on the rulemaking activities by describing the outcomes of the recent tasks and by giving an overview of the future activities. Icing research and technologies will be also addressed in this part and EASA will share their views on R&amp;T needs to tackle the challenges of the future.</p> <p>Emmanuel Cayrol, European Union Aviation Safety Agency</p>
	ORAL ONLY	<p>Aircraft Icing Certification – Past. Present and Future</p> <p>This presentation will discuss the effectiveness of the latest aircraft icing certification standards. The FAA approach to icing certification of new and novel technologies, such as unmanned aircraft, autonomous aircraft, electric engines and powered lift aircraft will also be presented. Finally, the presentation will address research and other needs to improve icing certification standards and the safety of the existing fleet in icing conditions.</p> <p>Paul Pellicano, Federal Aviation Administration</p>
	ORAL ONLY	<p>FAA ARAC Ice Crystal Icing Update, Philip Haberlen, FAA</p> <p>The FAA will discuss the current status of the ARAC ICI's work. Mr. Haberlen will provide a brief background about ice crystal icing events prior to forming the ARAC. He will also discuss some of the ARAC's tasks, including proposed changes to the 14 CFR, part 33, Appendix D environmental envelopes, joint probability research, and requirements for air data probe icing.</p> <p>Philip Haberlen, Federal Aviation Administration</p>

Thursday, June 22

### Environmental Icing Meteorology, SLD, and Ice Crystals: Aircraft Ground Icing Operations & SENS4ICE Icing Wind Tunnel Testing

Session Code ICE800

Room Park Suite 1

Session

8:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Ben Bernstein, Leading Edge Atmospheric; Galdemir Botura, Collins Aerospace; Carsten Schwarz, DLR German Aerospace Center

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:15 PM

Chairperson - Ben Bernstein, Leading Edge Atmospheric; David Orchard, National Research Council Canada

Time	Paper No.	Title
8:00 a.m.	ORAL ONLY	The Impacts of Erroneous Mixed Phase Precipitation Observations on Aircraft Ground Icing Operations  Scott Landolt, Darcy Jacobson, National Center for Atmospheric Research; Stephanie DiVito, Federal Aviation Administration; Andrew Gaydos, Spencer Faber, National Center for Atmospheric Research; Warren Underwood, Charles Enders, Federal Aviation Administration
8:30 a.m.	ORAL ONLY	Icing Wind Tunnel Testing for App C and App O Icing Conditions  Matthew Hamman, Collins Aerospace; Venkateshwar Bora; David Orchard, National Research Council Canada; Johannes Lucke, Deutsches Zentrum für Luft und Raumfahrt; EL HASSAN RIDOUANE, Collins Aerospace; Tina Jurkat, German Aerospace Center DLR

## Thursday, June 22

### Environmental Icing Meteorology, SLD, and Ice Crystals: SENS4ICE Atmospheric Physics and Meteorology

Session Code ICE800

Room Park Suite 1 Session 10:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Ben Bernstein, Leading Edge Atmospheric; Galdemir Botura, Collins Aerospace; Carsten Schwarz, DLR German Aerospace Center

Chairperson - Ben Bernstein, Leading Edge Atmospheric; Tina Jurkat, German Aerospace Center DLR

Time	Paper No.	Title
10:00 a.m.	2023-01-1491	Overview of Cloud Microphysical Measurements during the SENS4ICE Airborne Test Campaigns: Contrasting Icing Frequencies from Climatological Data to First Results from Airborne Observations  Tina Jurkat-Witschas, Johannes Lucke, Carsten Schwarz, Christoph Deiler, Falk Sachs, Simon Kirschler, Deniz Menekay, Christiane Voigt, German Aerospace Center; Ben Bernstein, Leading Edge Atmospheric; Olivier Jaron, Météo France; Frank Kalinka, Deutscher Wetterdienst; Alessandra Zollo, Italian Aerospace Research Center; Lyle Lillie, Science Engineering Associates Inc.; Johanna Mayer, Germany Aerospace Center; Christian Page, Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique; Benoit Vié, Météo France; Aurelien Bourdon, CNRS SAFIRE, CNES; Rogerio Pereira Lima, Luiz Vieira, Embraer
10:30 a.m.	ORAL ONLY	Overview on the Meteorological Conditions During the SENS4ICE Airborne Test Campaigns  Olivier Jaron, CNRM, Météo-France; Ben Bernstein, Leading Edge Atmospheric; Tina Jurkat, German Aerospace Center DLR; Johannes Lucke, Deutsches Zentrum für Luft und Raumfahrt; Benoit Vié, CNRM, Météo-France; Carsten Schwarz, German Aerospace Center DLR; Alessandra Zollo, Italian Aerospace Research Center; Frank Kalinka, Deutscher Wetterdienst; Johanna Mayer, German Aerospace Center DLR; Aurelien Bourdon, SAFIRE; Benedikt Maerz, Jan Niklas Bogner, Ulrike Oertel, Paul Hennig, Anika Tschunt, Marcus Bauer, Berthold Lescher, Deutscher Wetterdienst; Sarah Puginier, Vincent Bourdette, Gaetan Naud, Alexandre Floutard, Météo-France

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:15 PM

Time	Paper No.	Title
11:00 a.m.	2023-01-1485	Characterization of Atmospheric Icing Conditions during the HALO-(AC) <sup>3</sup> Campaign with the Nevzorov Probe and the Backscatter Cloud Probe with Polarization Detection  Johannes Reinhard Lucke, Deutsches Zentrum für Luft und Raumfahrt; Tina Jurkat, German Aerospace Center; Darrel Baumgardner, Droplet Measurement Technologies; Frank Kalinka, Deutscher Wetterdienst; Manuel Moser, Elena De La Torre Castro, Christiane Voigt, German Aerospace Center
11:30 a.m.	2023-01-1489	A Tool for Remote Detection and Nowcasting of In-Flight Icing Using Satellite Data  Alessandra Lucia Zollo, Edoardo Bucchignani, Italian Aerospace Research Center

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

### Thursday, June 22

#### Environmental Icing Meteorology, SLD, and Ice Crystals: ICE GENESIS - Snow Physics, Measurements and Assessments

Session Code ICE800

Room Park Suite 1

Session

1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Ben Bernstein, Leading Edge Atmospheric; Galdemir Botura, Collins Aerospace; Carsten Schwarz, DLR German Aerospace Center

Chairperson - Dan Fuleki, National Research Council Canada

Time	Paper No.	Title
1:00 p.m.	ORAL ONLY	ICE GENESIS: Synergetic Aircraft, Ground-Based, Remote Sensing and In-Situ Measurements of Snowfall Microphysical Properties  Anne-Claire billault-Roux, Jacopo grazioli, EPFL; Julien Delanoe, Susana jorquera, Alfons Schwarzenboeck, Louis JAFFEUX, Pierre Coutris, Guy febvre, CNRS; Alexis Berne, EPFL; Fabien Dezitter, Airbus Helicopters
1:30 p.m.	2023-01-1492	Snow Particle Characterization. Part A: Statistics of Microphysical Properties of Snow Crystal Populations from Recent Observations Performed during the ICE GENESIS Project  Louis Jaffeux, Alfons Schwarzenboeck, Pierre Coutris, CNRS; Guy Febvre, University of Clermont Auvergne; Fabien Dezitter, Boris Aguilar, Airbus; Anne-claire billault-Roux, Jacopo Grazioli, Alexis Berne, EPFL; Kilian Köbschall, Technische Universität Darmstadt; Susana Jorquera, Julien Delanoe, CNRS
2:00 p.m.	2023-01-1486	Snow Particle Characterization. Part B: Morphology Dependent Study of Snow Crystal 3D Properties Using a Convolutional Neural Network (CNN)  Louis JAFFEUX, OPGC/LaMP; Pierre Coutris, Alfons Schwarzenboeck, CNRS; Fabien Dezitter, Airbus
2:30 p.m.	2023-01-1494	Assessing Mixed-Phase Conditions during the ICE GENESIS Snow Measurement Campaign  Pierre Coutris, Guy Febvre, Louis Jaffeux, Alfons Schwarzenboeck, LaMP, CNRS/UCA; Fabien Dezitter, Airbus; Anne-Claire Billault-Roux, Jacopo Grazioli, Alexis Berne, LTE, EPFL; Susana Jorquera, Julien Delanoe, LATMOS,

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:16 PM

Time	Paper No.	Title CNRS/UVSQ
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The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

### Thursday, June 22

#### Special Session: Student Poster Session

Session Code ICE011

Room Park Suite 7

Session 8:00 a.m.

### Thursday, June 22

#### Icing Measurement Techniques and Test Facilities: Ice Accretion Measurements

Session Code ICE200

Room Park Suite 7

Session 10:00 a.m.

Characterization of ice shape accretions and an SLD Impact study

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Catherine Clark, National Research Council Canada; Judith Van Zante, NASA Glenn Research Center

Chairperson - Biagio M. Esposito, CIRA Scpa

Time	Paper No.	Title
10:00 a.m.	2023-01-1408	Influence of Realistic Aircraft Conditions on Accretion of Supercooled Large Droplet  Baptiste Dejean, Thomas Alary, Quentin Duchayne, Pierre Berthoumieu, ONERA
10:30 a.m.	2023-01-1411	Detailed Study of Photogrammetry Technique as a Valid Ice Accretion Measurement Method  Anadika Paul Baghel, Denis Sotomayor-Zakharov, Inken Knop, Technische Universität Braunschweig; Hans-Peter Ortwein, Leichtwerk AG
11:00 a.m.	ORAL ONLY	Determination of 3D Shapes and Local Densities of Ice Accumulations Using a Computed Tomography Imaging Method  Andreas Tramposch, Reinhard Puffing, Thomas Neubauer, Simon Schweighart, Wolfgang Hassler, FH Joanneum GmbH
11:30 a.m.	2023-01-1414	Time Resolved 3D Scanning of Ice Geometries in a Large Climatic Wind Tunnel  Thomas Neubauer, FH Joanneum GmbH; David Kozomara, Austrian Institute for Icing Sciences; Reinhard Puffing, Luca Teufel, FH Joanneum GmbH

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:16 PM

Thursday, June 22

### Icing Measurement Techniques and Test Facilities: Misc. Topics

Session Code ICE200

Room Park Suite 7 Session 1:00 p.m.

Collection of unique topics in measurement technologies and facilities

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Catherine Clark, National Research Council Canada; Judith Van Zante, NASA Glenn Research Center

Chairperson - Craig Davison, National Research Council Canada

Time	Paper No.	Title
1:00 p.m.	2023-01-1405	Simulation of Drop Collection with Non-Uniform Cloud Distributions for Collection Efficiency Sensor Validation Stephen McClain, Shakib Ahmed, Baylor University
1:30 p.m.	2023-01-1419	Engine Cascade Rig Design Tests and Results in App C Conditions Hugo Pervier, Cranfield University; Clément Vénuat, Safran Aircraft Engines; Thomas Neubauer, Austrian Institute for Icing Sciences
2:00 p.m.	2023-01-1422	Optical Temperature Sensor for Thermodynamic Measurement of Icing Dynamics Joseph Gonzales, Masafumi Yamazaki, Hirotaka Sakaue, University of Notre Dame
2:30 p.m.	ORAL ONLY	Different uses of the ONERA's Icing Wind Tunnel in the TRICEPS Project Baptiste Dejean, Pierre Berthoumieu, Lokman Bennani, David Delsart, Paul-Quentin Elias, Emmanuel Radenac, Johann Rannou, Rafael Sousa Martins, ONERA

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

Thursday, June 22

### Icing Simulation: Ice Accretion Model Development and Validation, Part 1

Session Code ICE700

Room Park Suite 8 Session 8:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Andy Broeren, Nasa Glenn Research Center; Alberto Guardone, Politecnico di Milano

Chairperson - Julien Cliquet, Airbus; Eric Laurendeau, Polytechnique Montreal

Time	Paper No.	Title
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# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:16 PM

Time	Paper No.	Title
8:00 a.m.	2023-01-1463	A Comprehensive Numerical Model for Numerical Simulation of Ice Accretion and Electro-Thermal Ice Protection System in Anti-icing and De-icing Mode, with an Ice Shedding Analysis  Mariachiara Gallia, Andrea Rausa, Alessandro Martuffo, Alberto Guardone, Politecnico di Milano
8:30 a.m.	2023-01-1468	Roughness Parameter Optimization of the McClain Model in GlennICE  William Wright, David Rigby, HX5 LLC; Thomas Ozoroski, NASA John Glenn Research Center
9:00 a.m.	2023-01-1440	Numerical Investigation of Pressure Tube Anti-Icing Heat Transfer  Sathish Thangavel, Shivanshu Bajpai, Collins Aerospace

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

Thursday, June 22

### Icing Simulation: Ice Accretion Model Development and Validation, Part 2

Session Code ICE700

Room Park Suite 8

Session 10:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Andy Broeren, Nasa Glenn Research Center; Alberto Guardone, Politecnico di Milano

Chairperson - Mariachiara Gallia, POLITECNICO DI MILANO; William Wright, Hx5 LLC

Time	Paper No.	Title
10:00 a.m.	2023-01-1477	Numerical Simulation of In-flight Icing by Water Droplets with Elevated Temperature  Wolfgang Hassler, FH Joanneum GmbH; Wolfgang Breituß, AeroTex GmbH; Andreas Rapf, RTA Rail Tec Arsenal; Arno Fallast, FH Joanneum GmbH; Richard Moser, AeroTex GmbH; Andreas Tramposch, FH Joanneum GmbH; Hermann Ferschitz, RTA Rail Tec Arsenal; Reinhard Puffing, Thomas Neubauer, FH Joanneum GmbH
10:30 a.m.	2023-01-1464	Introduction of an Online Ice Accretion Database  Thomas Neubauer, Reinhard Puffing, Austrian Institute for Icing Sciences
11:00 a.m.	ORAL ONLY	IGLOO3D Simulations of the 2nd Ice Prediction Workshop Test-Cases  Emmanuel Radenac, Adèle Veilleux, Quentin Duchayne, ONERA
11:30 a.m.	2023-01-1460	Icing Simulation Framework: A Predictive Approach from Nucleation to Runback  Miad Yazdani, Raytheon Technologies; Charlene Hu, Collins Aerospace; Malcolm MacDonald, Raytheon Technologies

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:16 PM

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00710, and also

### Thursday, June 22

#### Icing of Structures and Vehicles on the Ground: Ground Icing Tests

Session Code ICE500

Room Park Suite 8 Session 1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; Giuseppe Mingione, CIRA Scpa; Hermann Ferschitz, RTA

Chairperson - Giuseppe Mingione, Giuseppe Mingione, CIRA Scpa

Time	Paper No.	Title
1:00 p.m.	2023-01-1439	Design, Characterization and Initial Testing of a Vertical Stabilizer Common Research Model for Aircraft Ground Icing Testing Catherine Clark, National Research Council Canada; Marco Ruggi, APS Aviation Inc.
1:30 p.m.	ORAL ONLY	Vertical Stabilizer Common Research Model Aircraft Ground Icing Test Results Winter 2023 Catherine Clark, National Research Council Canada; Marco Ruggi, APS Aviation Inc
2:00 p.m.	2023-01-1442	Cold Soaked Fuel Frost Roughness Evolution on a Simulated Integrated Fuel Tank with Aluminum Skins Stephen McClain, Dennis O'Neal, Nicholas Forslund, Salah Uddin Ahmed, Baylor University
2:30 p.m.	ORAL ONLY	Anti-Icing Fluid Aerodynamic Evaluation - an OEM Experience Paulo Santos, Embraer S/A

### Thursday, June 22

#### Surface Modification & Low Ice Adhesion (Surface) and Icing Physics: Ice Shedding Modelling

Session Code ICE600

Room Park Suite 9 Session 8:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; JOSE Palacios, Pennsylvania State University; Nadine Rehfeld, Fraunhofer IFAM

Chairperson - Ian Roberts, AeroTex UK LLP

Time	Paper No.	Title
8:00 a.m.	2023-01-1453	Development of an Ice Shedding Model for Icing Simulation on Rotor Blades Tatsuya Baba, Koji Fukudome, Makoto Yamamoto, Tokyo University of Science; Takuya Mizuno, Masaya Suzuki, Japan Aerospace Exploration

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:16 PM

Time	Paper No.	Title Agency
8:30 a.m.	ORAL ONLY	Ice Shedding on Rotating Fan Blade using Phase-Field Fracture Approach and Cohesive Zone Model Dorian Nezzar, Johann Rannou, Philippe Villedieu, Lokman Bennani, ONERA; Morgan Balland, Clément Vénuat, SAFRAN Aircraft Engines

### Thursday, June 22

#### Surface Modification & Low Ice Adhesion (Surface) and Icing Physics: Surfaces and Ice Adhesion

Session Code ICE600

Room Park Suite 9 Session 10:00 a.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; JOSE Palacios, Pennsylvania State University; Nadine Rehfeld, Fraunhofer IFAM

Chairperson - Ian Roberts, AeroTex UK LLP

Time	Paper No.	Title
10:00 a.m.	2023-01-1456	A Complementary Framework to Predict Ice Adhesion Failure Pau Riera, Jason Raphaël Pothin, Valérie Pommier-Budinger, ISAE Supaero; Marc Budinger, Institut Clement Ader, INSA; Ian Roberts, Aerotex UK; Frédéric Lachaud, ISAE Supaero
10:30 a.m.	ORAL ONLY	Collins Aerospace Surface Modification Treatment & Low Ice Adhesion Coatings Katherine Urena Pimentel, Galdemir Botura, Jin Hu, Collins Aerospace
11:00 a.m.	2023-01-1452	Effect of Surface Modification on the Hybrid Ice Protection Systems Performances Filomena Piscitelli, Salvatore Ameduri, Ruggero Volponi, Lorenzo Pellone, Felice De Nicola, Antonio Concilio, Floriana Albano, Gianpaolo Elia, Lorenzo Notarnicola, Italian Aerospace Research Center

### Thursday, June 22

#### Modification & Low Ice Adhesion (Surface) and Icing Physics: Icing Physics

Session Code ICE600

Room Park Suite 9 Session 1:00 p.m.

Organizers - Stephan Bansmer, Coldsense Technologies GmbH; Galdemir Botura, Collins Aerospace; JOSE Palacios, Pennsylvania State University; Nadine Rehfeld, Fraunhofer IFAM

Chairperson - Norbert Karpen, Aeomiq GmbH

# International Conference on Icing of Aircraft, Engines, and Structures

## Technical Session Schedule

As of June 26, 2023 19:40:16 PM

Time	Paper No.	Title
1:00 p.m.	ORAL ONLY	Comparison of the Physical Phenomena of Icing in Snow Conditions and Ice Crystal Icing Kilian Köbschall, Louis Reitter, Ilia Roisman, Cameron Tropea, Jeanette Hussong, Technische Universität Darmstadt
1:30 p.m.	2023-01-1448	Numerical Heat Transfer Simulations for Laser-Scanned Ice Shapes Ioan Feier, U.S. Air Force Academy
2:00 p.m.	ORAL ONLY	Ice Crystal Sticking Efficiency at High Mach Numbers Mac Whalen, Collins Aerospace

## Friday, June 23

### AIAA Ice Prediction Workshop

Session Code ICE004

Room Grand Klimt 2 & 3

Session

ALL DAY

Please download the Event at a Glance for the complete schedule:

[https://www.sae.org/binaries/content/assets/cm/content/attend/2023/icing/icing\\_event\\_at\\_a\\_glance\\_10\\_28\\_22.pdf](https://www.sae.org/binaries/content/assets/cm/content/attend/2023/icing/icing_event_at_a_glance_10_28_22.pdf)

Time	Paper No.	Title
9:30 a.m.		BREAK

## Friday, June 23

### Manufacturers Icing Certification Group (MICG) Meeting

Session Code ICE009

Room Park Suite 7

Session

10:00 a.m.