

3rd Ice Prediction Workshop: Welcome and Introduction

Andy Broeren, Éric Laurendeau

NASA Glenn Research Center; Polytechnique Montréal – on behalf of the IPW3 Organizing Committee

Presented 21 September 2026

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3rd Ice Prediction Workshop Welcome and Introduction

Organizing Committee

Sponsored by the AIAA Atmospheric and Space Environments Technical Committee

AIAA IPW-3

On-line Only

21-24 September 2026

Outline

- Housekeeping Items
- Motivation and Background
- IPW-3 Objectives and Technical Focus Groups
- Organizing Committee Members
- Acknowledgements
- Workshop Agenda

Housekeeping Items

- Microphones should be muted unless you are a speaker/presenter.
- Cameras should be OFF. Camera is optional for presenters if there are no bandwidth problems.
- Please use the chat or raise hand to ask questions. The session chairs should monitor this. Please unmute and speak if further explanation or clarification is needed.
- We will try to follow the agenda as closely as possible as people may leave and re-join. Special guidance for participant presentations.
- ASE TC Information: <https://www.aiaa.org/get-involved/committees-groups/technical-committees> Look under Aerospace Sciences Group
- Ice Prediction Workshop: www.icepredictionworkshop.com

Motivation and Background

Motivation

- Assess the current capabilities of 3D icing simulation tools.
- Bring together code developers and user communities.
- Identify areas that need additional research and development.
- Identify icing simulation best practices that can be documented in industry consensus standards.

Background

- 1st Ice Prediction Workshop, on-line only, 26-29 July 2021
- 2nd Ice Prediction Workshop, in-person only, 22-23 June 2023

IPW-1 Summary

- Featured 8 baseline test cases and 8 optional cases
 - Included: 2D geometry, multi-element airfoil, axisymmetric inlet, swept wing and large drop cases.
- Main objective was to baseline tool capability for a range of icing problems.
- Outstanding participation
 - 79 registered attendees (11 countries, 4 continents)
 - 21 presentations from academia, research centers and commercial companies
 - 19 participants submitted data for comparison
- Workshop was followed up by 10 technical papers presented at the AIAA Aviation Forum in June 2022.

IPW-2 Summary

- In-person workshop in conjunction with SAE International Icing Conference, Vienna.
- Featured 9 different icing cases on 3 different geometries
 - Included: CRM65 Midspan Hybrid Model; CRM65 Inboard Model and RG-15 Small Wing.
- Main objective was to focus on 3D icing simulation capability for both large swept wings and low-speed straight wing.
- Outstanding participation
 - 75-100 attendees from many different countries
 - 15 presentations from academia, research centers and commercial companies
 - 15 participants submitted data for comparison
- Workshop was followed up by 12 technical papers presented at the AIAA Aviation Forum in July 2024.

IPW-3 Objectives

- Bring together scientists and the user communities to share knowledge and information towards a common understanding of best practices for icing modeling and simulation.
- Assess the current capabilities of 3D computational icing simulation tools through a systematic verification and validation workflow building on IPW-1 and IPW-2 lessons learned.
- Establish and apply capabilities for comparison of ice shape results from code-to-code and code-to-experiment.
- Define best practices for using computational icing simulation tools and comparison of ice shape results.
- Identify areas that need additional research and development.

IPW-3 Technical Focus Groups

Technical Focus Group 1: 3D Ice Shape Comparison

- Focused on the characterization and comparison of three-dimensional ice shapes.
- Outcomes will be incorporated into the development of SAE ARP5903 through the AC-9C Icing Technology Committee.

Technical Focus Group 2: Verification and Validation

- Focused on improving comparisons between computational icing codes and experimental results.
- Rigorous verification study quantifying the effects of grid resolution and drop distribution discretization on water collection, ice mass and ice shape for NACA 0012 airfoil and ONERA M6 wing.

TFG-2 will utilize the outcomes of TFG-1 to enhance comparisons and evaluate comparator metrics.

IPW-3 Organizing Committee

IPW-3 Co-chairs

- Andy Broeren, NASA Glenn Research Center
- Éric Laurendeau, Ecole Polytechnique Montreal

Technical Focus Group 1: 3D Ice Shape Comparison

- Alberto Pueyo, Bombardier

Technical Focus Group 2: Verification and Validation

- Thomas Ozoroski, NASA Glenn Research Center

IPW-3 Organizing Committee

Adam Malone	Boeing
Alberto Della-Noce	Airbus
Alessandro Donizetti	Politecnico di Milano
Christopher Porter	NASA Glenn
Cris Bosetti	FAA
Delattre Coralie	ATR
Emmanuel Radenac	ONERA
Eric Stewart	NAWCAD
Ezgi Oztekin	FAA
Ifrah Mussa	Kingstson University London
Isik Ozcer	Synopsis
Julien Cliquet	Airbus

Karim Mohamad Zayni	Ecole Polytechnique, Montreal
Karthik Narayanasamy	Honeywell
Mariachara Gallia	TU Braunschweig
Mateusz Pawlucki	Collins Aerospace
Maxime Blanchet	Ecole Polytechnique, Montreal
Peter Forsyth	NRC Canada
Richard Hann	Norwegian Univ. of Science and Technology
Richard Moser	Aerotex
Sam Lee	HX5, LLC at NASA Glenn
William Wright	HX5, LLC at NASA Glenn
Wolfgang Breitfuss	Aerotex

Acknowledgements

- Many volunteers on the organizing committee dedicated countless hours to preparing the test cases, developing meshes, manipulating CAD geometry, collecting experimental data, post-processing data, comparison plots, website hosting, etc., etc.
- Tecplot for providing access to software for post processing.
- AIAA for hosting the workshop, managing registration, providing completion certificates, etc.

Agenda—Monday and Tuesday

DAY 1 Monday, September 21, 2026	
START – END	SESSION
9:00 – 9:30 AM	Ice Prediction Workshop – Welcome, Background, and Motivation Andy Broeren – NASA Glenn; Éric Laurendeau – Polytechnique Montréal
9:30 – 10:15 AM	TFG-1 Overview and Outcomes Alberto Pueyo – Bombardier
10:15 – 11:00 AM	Ice Shape Comparison Study and Survey Alessandro Donizetti – Politecnico Milano; Ariane Vieira – AeroTex GmbH;
11:00 – 11:30 AM	BREAK
11:30 AM – 12:00 PM	TFG-2 Test Case Descriptions and Motivation Thomas Ozoroski – NASA Glenn
12:00 – 12:45 PM	Code-to-Code Comparisons — Case 1: 21-inch NACA 0012 Karim Zayni – Polytechnique Montréal
12:45 – 1:00 PM	<ul style="list-style-type: none"> • End of Day Discussions and Wrap-Up Andy Broeren – NASA Glenn; Éric Laurendeau – Polytechnique Montréal

DAY 2

Tuesday, September 22, 2026

START – END	SESSION	
9:00 – 10:00 AM	Code-to-Code Comparisons — Case 2: In-Flight ONERA M6 Karim Zayni – Polytechnique Montréal	
10:00 – 10:30 AM	TFG-1 Ice Shape Comparison Metric Analysis Applied to TFG-2 Ariane Vieira – AeroTex GmbH; Alessandro Donizetti – Politecnico Milano	
10:30 – 11:00 AM	Analysis and Discussion of TFG-2 V&V Exercise Thomas Ozoroski – NASA	
11:00 – 11:30 AM	BREAK	
PRESENTER SESSION 1 SESSION CHAIR: IFRAH MUSSA – KINGSTON UNIVERSITY		
START – END	ORGANIZATION & PRESENTER	SOFTWARE
11:30 – 11:55 AM	National Institute for Aviation Research Harsh Shah	FENSAP-ICE
11:55 AM – 12:20 PM	Collins Aerospace Mateusz Pawlucky	FENSAP-ICE
12:20 – 1:00 PM	<ul style="list-style-type: none"> • End of Day Discussions and Wrap-Up Andy Broeren – NASA Glenn; Éric Laurendeau – Polytechnique Montréal	

Agenda—Wednesday and Thursday

DAY 3 Wednesday, September 23, 2026		
START – END	ORGANIZATION & PRESENTER	SOFTWARE
PRESENTER SESSION 2 SESSION CHAIR: JULIEN CLIQUET – AIRBUS		
9:00 – 9:25 AM	Synopsys Isik Ozcer	Fluent Icing
9:25 – 9:50 AM	The Boeing Company Soroush Yazdani	GlennICE
9:50 – 10:15 AM	NASA Glenn Research Center Thomas Ozoroski	GlennICE
10:15 – 10:40 AM	Airbus Commercial Aircraft Alberto Della Noce	IGLOO3D
10:40 – 11:05 AM	BREAK	
PRESENTER SESSION 3 SESSION CHAIR: MARIACHIARA GALLIA – TU BRAUNSCHWEIG		
11:05 – 11:30 AM	ONERA Emmanuel Radenac	IGLOO3D
11:30 – 11:55 AM	Sikorsky, A Lockheed Martin Company Kim Jeewoong	STAR-CCM+
11:55 – 12:20 AM	École Polytechnique Montréal Karim Zayni	CHAMPS
12:20 – 1:00 PM	<ul style="list-style-type: none">• End of Day Discussions and Wrap-Up Andy Broeren – NASA Glenn; Éric Laurendeau – Polytechnique Montréal	

DAY 4 Thursday, September 24, 2026		
START – END	ORGANIZATION & PRESENTER	SOFTWARE
PRESENTER SESSION 4 SESSION CHAIR: EMMANUEL RADENAC – ONERA		
9:00 – 9:25 AM	Bombardier Guy Fortin	DRAGONICE
9:25 – 9:50 AM	CIRA Francesco Capizzano	SIMBA-ICE
9:50 – 10:15 AM	AeroTex GmbH Ariane Vieira	IHB3D
10:15 – 11:00 AM	<ul style="list-style-type: none"> • End of Workshop Wrap-up and Discussion Andy Broeren – NASA Glenn; Éric Laurendeau – Polytechnique Montréal 	
11:00 – 11:30 AM	BREAK	
11:30 – 12:15 PM	<ul style="list-style-type: none"> • Post IPW3 Way Forward Andy Broeren – NASA Glenn; Éric Laurendeau – Polytechnique Montréal 	

Participant Presentation Guidelines

- We plan to follow the schedule since people may leave and rejoin.
- However, we do want to give each presenter the full 25 minutes. In the case of minor technical problems will run a few minutes behind schedule.
- If a presentation is longer than 25 minutes, we will interrupt so we can respect the time and move on to the next presenter.
- If a presentation is shorter than 25 minutes, we will have time for more discussion rather than start the next presentation too early.
- We do have buffer time at the end to come back to the presenters and have more discussions.

SAE International Icing Conference 2027

Dedicated Technical Session(s) on IPW-3

- Eric Laurendeau and Andy Broeren will organize dedicated technical session(s) for IPW-3 at the SAE International Icing Conference in Montreal, 21-25 June 2027.
- <https://www.sae.org/events/icing>
- We encourage our IPW-3 presenters for TFG-1 and TFG-2 to submit an abstract and write a paper to further document their results.
- The abstract deadline is October 1, however, Andy Broeren has obtained permission to extend this deadline specifically (and only) for IWP-3 related content.
- To request an extension please send an email to Andy Broeren (abroeren@nasa.gov) and Eric Laurendeau (eric.laurendeau@polymtl.ca) with:
 - proposed title of the paper
 - authors and affiliations.
 - contact information for corresponding author

Thank You