

ICE GENESIS

Creating the next generation of 3D simulation means for icing

Type of action: Research and Innovation Action

Call identifier: H2020-MG-2018-SingleStage

Topic: MG-2-5-2018 Innovative technologies for improving aviation safety and certification in icing conditions

Deliverable D2.2

Initial communication kit with information about project structure and goals

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Lead beneficiary of this deliverable:	5# ARTTIC
Due date of deliverable: 30/06/2019	Actual submission date: 30/09/2019
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Project funded by the European Commission within the H2020 Programme (2014-2020)		
Type		
R	Document, report excluding the periodic and final reports	
DEM	Demonstrator, pilot, prototype	
DEC	Websites, patents filing, press & media actions, videos, etc.	
OTHER	Software, technical diagram, etc.	x
ETHICS	Ethics requirement	
ORDP	Open Research Data Pilot	
Dissemination level		
PU	PUBLIC, fully open, no embargo e.g. web	x
PU*	PUBLIC after embargo of 12 months	
RE	RESTRICTED, only for certain members of the consortium (including the Commission Services): specify here which consortium members have access to the document	
CO	CONFIDENTIAL, only for members of the consortium (including the Commission Services)	
CO+IGAB	CONFIDENTIAL, only for members of the consortium (including the Commission Services) and for the ICE GENESIS Advisory Board	

Revision History

V #	Date	Description / Reason of change	Author
R0.1	21/05/2019	Creation of the document	J. Elleouet (ARTTIC)
R0.2	27/06/2019	Addition of Public presentation PPT	J. Elleouet (ARTTIC)
R1.0	30/09/2019	Finalization of the document with Poster and Flyer	J. Elleouet (ARTTIC)

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1 Glossary

Abbreviation / Acronym	Description/meaning
EC	European Commission
EU	European Union
DoA	Description of Action (Annex 1 of the Grant Agreement)
GA	Grant Agreement
GDPR	General Data Protection Regulation
WP	Work packages

2 Executive Summary

The ICE GENESIS Communication Kit is part of the Dissemination and Communication strategy of the project. Consequently, its design, realisation and updates have been assigned to WP2 – Dissemination and Exploitation led by ARTTIC.

New materials will be generated along the course of the project upon request for the several dissemination events to come.

3 Introduction

The present document describes the project communication kit (D2.2) which consists of a PowerPoint presentation, and a project flyer which explains the scope, objectives and expected results of the project.

The images used for the first issue of the flyer and poster will be updated throughout the project to include as many nonconfidential images from the project as possible.

4 Objective and Target Audience

4.1 Objectives

The primary ICE GENESIS dissemination & communication objectives are, whilst ensuring adequate IP protection of partners results, to:

- Inform partner internal stakeholders (i.e. future users of the icing numerical and test capabilities as well as decision makers such as aircraft, rotorcraft, engine or probe product managers) of the project's existence, planned activities, results and expected benefits.
- Inform stakeholders from the Europe aeronautical sector on the progress made with regard to the understanding of SLD and Snow physics and development of numerical tools and test facilities.
- Increase awareness within the international scientific & research community on a) further understanding of associated icing physical phenomena, b) modelling and simulation results obtained, and c) improvements made to experimental resources and techniques.

These materials will help to promote the ICE GENESIS project at any dissemination activities planned by the partners.

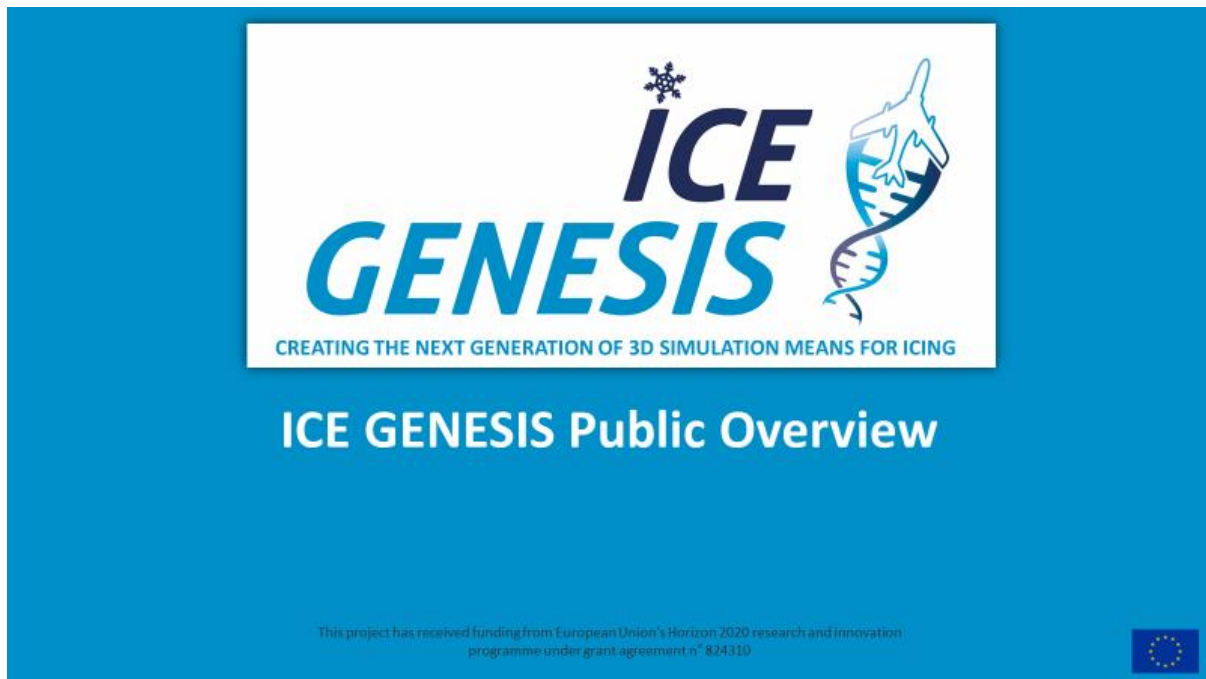
4.2 Target Audience

The ICE GENESIS public website is targeting a wide range of audiences, such as:

- Funding authorities, including the EC
- The general public
- The scientific/technical community
- Policy makers
- Aeronautics industry
- Industrial partners not involved in the project
- Press representatives/journalists

5 Initial Communication Kit

5.1 Public Presentation



ICE GENESIS Project Overview

Creating the next generation of 3D simulation means for icing

- January 2019 – December 2022
- Coordinator : AIRBUS OPERATION SAS
- Budget
 - Max EU Contribution: €11 964 300
 - Total Estimated Project costs: €21 984 549,50
- Project effort in Person-months ~ 1858



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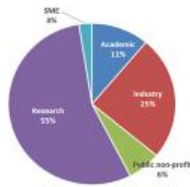


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ICE GENESIS international collaboration and cooperation

- InCo – international cooperation flagship: Aviation International Cooperation Flagship "Safer and Greener Aviation in a Smaller World"



- 36 project parties
- 10 countries
- 26 EU/ 10 non-EU (Russia, Japan, Canada)

- Coordination with EU icing projects SENS4ICE and MUSIC-haic
- 3 Public Workshop planned in Dec. 2020, Dec. 2021 and Dec 2022

- Advisory Board (12 members)
 - Aviation certification authorities (EASA, FAA)
 - Manufacturing (PIAGGIO, DAHER, Airbus D&S, EMBRAER, SAFRAN Helicopter Engines, SAFRAN Nacelles)
 - Research Institute (CSTB)
 - A/C Systems & Equipment & Models Manufacturer (ADSE, AEROTEX)
 - Governmental / Research Agencies (NASA)



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ICE GENESIS Consortium partners

- | | | | |
|--|--|---|--|
| | 1. AIRBUS OPERATION SAS | 11. MINISTERE DE LA DEFENSE | |
| | 2. AUSTRIAN INSTITUTE FOR ICING SCIENCES | 12. DEUTSCHES ZENTRUM FUER LUFT-UND RAUMFAHRT EV | |
| | 3. AIRBUS HELICOPTER | 13. GENERAL ELECTRIC DEUTSCHLAND HOLDING GMBH | |
| | 4. AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH | 14. IAG INDUSTRIE AUTOMATISIERUNGS GMBH | |
| | 5. ARTIC | 15. LEONARDO - SOCIETA PER AZIONI | |
| | 6. ATR AIRCRAFT | 16. OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES | |
| | 7. CENTRO ITALIANO RICERCHE AEROSPAZIALI SCPA | 17. POLITECNICO DI MILANO | |
| | 8. CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS | 18. ROLLS-ROYCE PLC | |
| | 9. CRANFIELD UNIVERSITY | 19. RTA RAIL TEC ARSENAL FAHRZEUGVERSUCHSANLAGE GMBH | |
| | 10. DASSAULT AVIATION | 20. SAFRAN AIRCRAFT ENGINES | |



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ICE GENESIS Consortium partners

	21. SOCIETE NATIONALE DE CONSTRUCTION AEROSPATIALE SONACA SA	29. MOSCOW INSTITUTE OF PHYSICS AND TECHNOLOGY (STATE UNIVERSITY) DEUTSCHES ZENTRUM FUER LUFT -UND RAUMFAHRT EV	
	22. LIEBHERR AEROSPACE TOULOUSE SAS	30. CENTRAL AEROLOGICAL OBSERVATORY	
	23. TECHNISCHE UNIVERSITAET BRAUNSCHWEIG	31. CORPORATION DE L ECOLE POLYTECHNIQUE DE MONTREAL	
	24. TECHNISCHE UNIVERSITAT DARMSTADT	32. BOMBARDIER INC.	
	25. ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE	33. TOKYO UNIVERSITY OF SCIENCE FOUNDATION	
	26. RAINBOWVISION	34. UEC-AVIDVIGA TEL JSC	
	27. FEDERAL STATE UNITARY ENTERPRISE THE CENTRAL AEROHYDRODYNAMIC INSTITUTE NAMED AFTER PROF. N.E. ZHUKOVSKY	35. MIL MOSCOW HELICOPTER PLANT, JSC	
	28. FEDERALNOE GOSUDARSTVENNOE UNITARNOE PREDPRIYATIE CENTRALNII INSTITUTAVIACIONOGO MOTOROSTROENIYA IMENI PI BARANOVA	36* NATIONAL RESEARCH COUNCIL CANADA (* collaboration agreement with AIRBUS Op. SAS)	

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ICE GENESIS Scope and Positioning

Top level objective

The top level objective of the ICE GENESIS project is to provide the European aeronautical industry with a validated new generation of

3D icing engineering tools (numerical simulation and test capabilities)

addressing **App C, App O and Snow** conditions, for safe, efficient and cost effective design and certification of future aircraft and rotorcraft.

ICE GENESIS Scope and Positioning

- **Obj#1:** Improve and validate existing **3D numerical tools** to predict ice accretion in App C, App O and Snow conditions.
- **Obj#2:** Upgrade and calibrate **icing wind tunnels** to allow reproduction of:
 - **Supercooled Large Droplets (SLD) in FZDZ (Freezing drizzle) conditions.**
 - **Snow icing conditions.**
 - Additionally, to assess the potential of current icing wind tunnels to represent SLD in FZRA (Freezing rain) conditions.
- **Obj#3:** Build a **large scale experimental database** on representative 3D configurations to be used as a solid reference (“ground truth”) for future numerical tools validation.



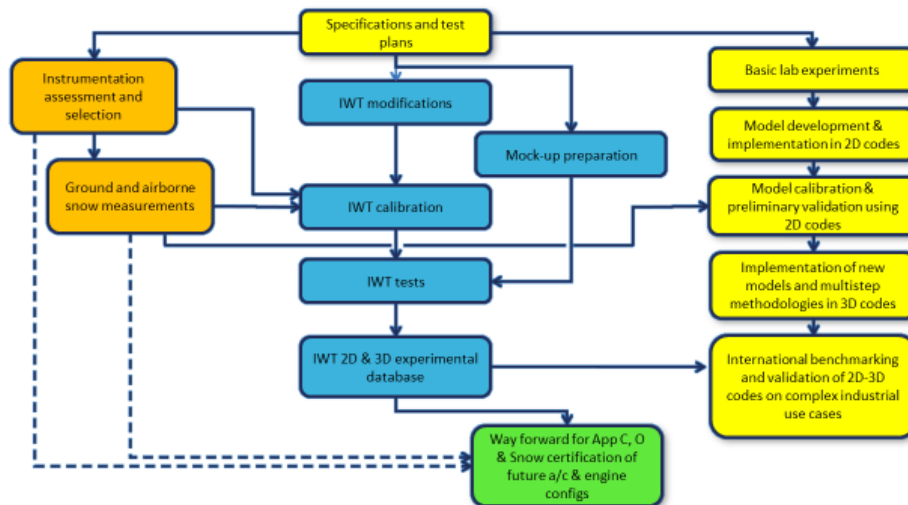
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ICE GENESIS Methodology



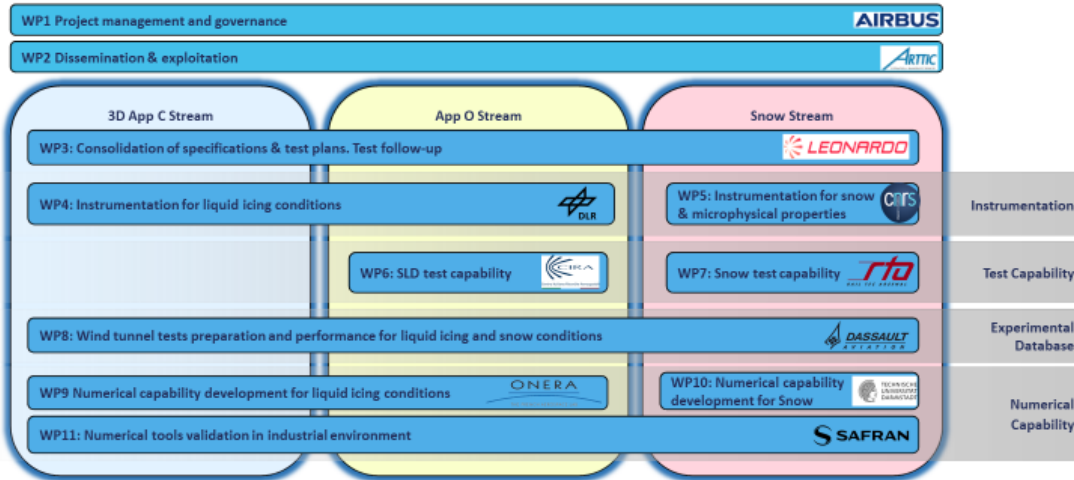
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ICE GENESIS Organisation



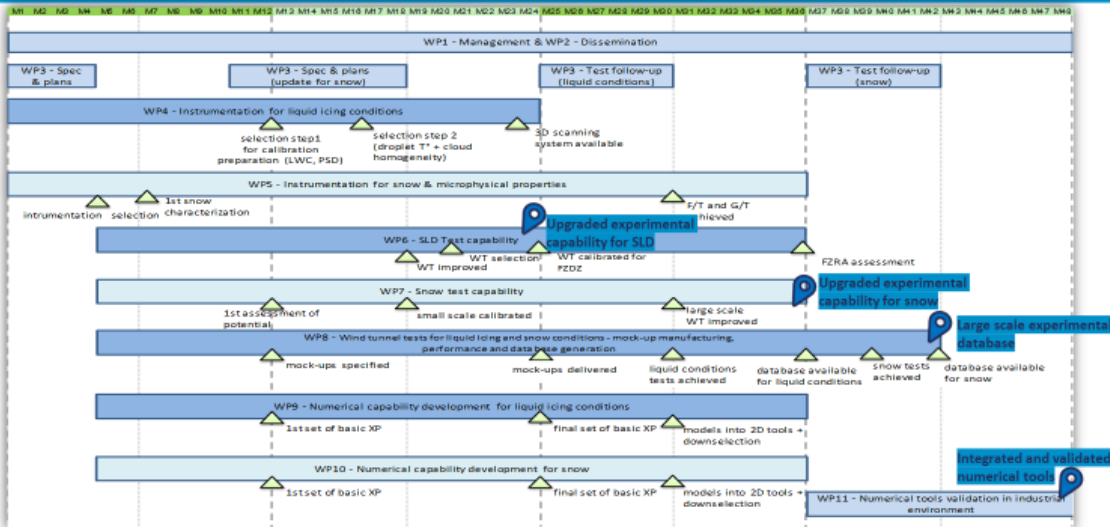
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ICE GENESIS Simplified Gantt



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ICE GENESIS Targeted Results

- A TRL approach will be followed to monitor the project progress, ensuring a direct transfer of capabilities to industry.

Simulation means	Starting point	Targeted TRL for end of ICE GENESIS
IWT for Appendix O conditions	TRL2*	TRL5
IWT for Snow conditions	TRL1/2	TRL4
3D numerical tools for Appendix C conditions	TRL2/3**	TRL5
3D numerical tools for Appendix O conditions	TRL2	TRL5
3D numerical tools for Snow conditions	TRL1/2	TRL5

* considering reproduction of full App O FZDZ envelope

** considering ability to reproduce representative 3D shapes for long icing conditions period



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ICE GENESIS Expected Impact



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5.2 Flyer

ICE GENESIS TARGETED RESULTS

A TRL approach will be followed to monitor the project progress, ensuring a direct transfer of capabilities to industry.

Simulation means	Starting point	Targeted TRL for end of ICE GENESIS
IWT for Appendix O conditions	TRL2*	TRL5
IWT for Snow conditions	TRL1/2	TRL4
3D numerical tools for Appendix C conditions	TRL2/3**	TRL5
3D numerical tools for Appendix C conditions	TRL2	TRL5
3D numerical tools for Snow conditions	TRL1/2	TRL5

* considering reproduction of full App O FZDZ envelope
** considering ability to reproduce representative 3D shapes for long icing conditions period

ICE GENESIS EXPECTED IMPACT

- Larger exploration of design and de-risking against late redesign
- Maintaining competitiveness for European engine manufacturers
- Increasing testing capabilities within Europe
- Contributing to Standardization
- Increase scientific excellence and strengthen international research collaboration with Russia, Canada and Japan
- Strengthen European leadership on icing tools
- Cross-fertilisation to other sectors

The ICE GENESIS consortium brings together 36 partners from 10 countries (France, Austria, Italy, UK, Germany, Belgium, Switzerland, Russia, Canada and Japan). Led by AIRBUS, it has started in January 2019 for a duration of 48 Months.

www.ice-genesis.eu

CREATING THE NEXT GENERATION OF 3D SIMULATION MEANS FOR ICING

www.ice-genesis.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 824310.

ICE GENESIS OBJECTIVES


The top-level objective of the ICE GENESIS project is to provide the European aeronautical industry with a validated new generation of 3D icing engineering tools (numerical simulation and test capabilities) addressing App C, App O and Snow conditions, for safe, efficient and cost-effective design and certification of future aircraft and rotorcraft.

1. Improve and validate existing 3D numerical tools to predict ice accretion in App C, App O and Snow conditions.
2. Upgrade and calibrate icing wind tunnels to allow reproduction of:
 - Supercooled Large Droplets (SLD) in FZDZ (Freezing drizzle) conditions
 - Snow Icing conditions
3. Build a large-scale experimental database on representative 3D configurations to be used as a solid reference ("ground truth") for future numerical tools validation.


The diagram shows 11 Work Packages (WPs) organized into three streams: 3D App C Stream, App O Stream, and Snow Stream. WPs are color-coded by category: Project Management (blue), Instrumentation (green), Test Capability (orange), Experimental Database (purple), and Numerical Capability (red).

- WP 1:** Project Management and governance (Airbus)
- WP 2:** Dissemination & exploitation (Airbus)
- WP 3:** Consolidation of specifications & test plans. Test follow-up (Lufthansa)
- WP 4:** Instrumentation for liquid icing conditions (Airbus)
- WP 5:** Instrumentation for snow & microphysical properties (Airbus)
- WP 6:** SLD test capability (Airbus)
- WP 7:** Snow test capability (Airbus)
- WP 8:** Wind tunnel tests preparation and performance for liquid icing and snow conditions (Airbus)
- WP 9:** Numerical capability development for liquid icing conditions (Airbus)
- WP 10:** Numerical capability development for snow (Airbus)
- WP 11:** Numerical tools validation in industrial environment (Airbus)

5.3 Poster



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 824310.




ICE GENESIS


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ICE GENESIS Objectives

Provide the European aeronautical industry with a validated new generation of 3D icing engineering tools (numerical simulation and test capabilities) addressing App C, App O and Snow condition, for safe, efficient and cost-effective design and certification of future aircraft and rotorcraft.




Improve and validate existing 3D numerical tools to predict ice accretion in App C, App O and Snow conditions.












Upgrade and calibrate icing wind tunnels to allow reproduction of:

- Supercooled Large Droplets (SLD) in FZDZ (Freezing drizzle) conditions
- Snow icing conditions



Build a large-scale experimental database on representative 3D configurations to be used as a solid reference ("ground truth") for future numerical tools validation.

	3D App C Stream	App O Stream	Snow Stream
WP 1	Project Management and governance		
WP 2	Dissemination & exploitation		
WP 3	Consolidation of specifications & test plans. Test follow-up		
Instrumentation			
WP 4	Instrumentation for liquid icing conditions		WP 5: Instrumentation for snow & microphysical properties
Test Capability			
		WP 6: SLD test capability	WP 7: Snow test capability
Experimental Database			
WP 8	Wind tunnel test preparation and performance for liquid icing and snow conditions		
Numerical Capability			
WP 9	Numerical capability development for liquid icing conditions		
		WP 10: Numerical capability development for snow	
WP 11	Numerical tools validation in industrial environment		



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6 Conclusions

The ICE GENESIS Communication Kit has been finalized in September with the 33 existing partners and the 3 to be integrated (AVI, MMHP and NRC) by the end of the Year 2019.

If any amendment occurs, the Communication Kit will be automatically updated.

Moreover, this is an initial kit with very general information on the ICE GENESIS Project. ARTTIC will develop new materials along the course of the project upon request.

This Kit will be an important means to disseminate information about the project and to attract all relevant stakeholders.