

PROJECT

MUSIC-haic

3D MULTidisciplinary tools for the Simulation of In-flight iCing due to High Altitude Ice Crystals

Funding: European (Horizon 2020)

Duration: Sep 2018 - Aug 2022

Status: Ongoing

Total project cost: €5,164,123

EU contribution: €4,806,623



[CORDIS RCN : 215991](#)

Background & policy context:

Icing is a major hazard for aviation safety. In the last decades an additional risk has been identified when flying in clouds with high concentrations of ice-crystals where ice accretion may occur on warm parts of the engine core, resulting in engine incidents such as loss of engine thrust, strong vibrations, blade damage, or even the inability to restart engines. Performing physical engine tests in icing wind tunnels is extremely challenging, expensive and currently limited to partial tests for engine components.

The need for the European aeronautics industry to use numerical simulation tools able to accurately predict ICI (Ice Crystal Icing) is therefore urgent and paramount, especially regarding the development of the new generation engines (UHBR, CROR, ATP) which are expected to be even more sensitive to the ICI threat than current in-service engines and for which comparative analysis methods will not be applicable any more.

Objectives:

MUSIC-HAIC will complete the development of ICI models, implement them in existing industrial 3D multi-disciplinary tools, and perform extensive validation of the new ICI numerical capability through comparison of numerical results with both academic and industrial experimental data.

The resulting capability will allow the replacement of physical tests by cheaper virtual tests, which would be easier to configure and run permitting substantial gains in development costs and allowing more design choices to be explored and de-risked.

Most importantly, MUSIC-haic will provide the aeronautical sector with the confidence to move away from a step-by-step incremental evolution of engine design to a more radical breakthrough approach, because the ability to simulate the behaviour of ICI on these designs with a high degree of confidence will be available. This will reinforce the competitiveness of the European aircraft and engine manufacturers. MUSIC-haic will also enhance the expertise of the scientific and research community on ICI.

Parent Programmes:

[H2020-EU.3.4. - Horizon 2020: Smart, Green and Integrated Transport](#)

Institute type: Public institution

Institute name: European Commission

Funding type: Public (EU)

Other programmes: MG-1.3-2017 Maintaining industrial leadership in aeronautics

Lead Organisation:

Office National D' Etudes Et De Recherches Aérospatiales

Address:

29, avenue de la Division Leclerc
BP72 CHÂTILLON CEDEX
France

Organisation Website:

<http://www.onera.fr>

EU Contribution: €957,143

Partner Organisations:**Safran Aircraft Engines****Address:**

2 Bvd Du General Martial-Valin
75724 Paris
France

Organisation Website:

<http://www.safran-aircraft-engines.com>

EU Contribution: €240,938

Airbus Operations Sas**Address:**

ROUTE DE BAYONNE 316
31060 TOULOUSE
France

Organisation Website:

<http://www.airbus.com>

EU Contribution: €188,371

Airbus Defence And Space Gmbh**Address:**

Ludwig-Boelkow-Allee 1
85521 Ottobrunn
Germany

Organisation Website:

<http://www.airbus-group.com>

EU Contribution: €345,930

Technische Universitaet Braunschweig**Address:**

Pockelsstrasse
38106 Braunschweig
Germany

Organisation Website:

<http://www.tu-braunschweig.de>

EU Contribution: €621,000

Dassault Aviation**Address:**

9, Rond-Point des Champs-Élysées - Marcel Dassault

75008 PARIS
France

Organisation Website:

<http://www.dassault-aviation.com>

EU Contribution: €260,849

Federal State Unitary Enterprise Aerohydrodynamic Institute

Address:

1, Zhykovsky str.
ZHUKOVSKY, MOSCOW REG
140180
Russia

Organisation Website:

<http://www.tsagi.ru>

EU Contribution: €0

Arttic

Address:

58A rue du Dessous des Berges
75013 PARIS
France

Organisation Website:

<http://www.arttic.com>

EU Contribution: €286,365

Centro Italiano Ricerche Aerospaziali Scpa

Address:

Via Maiorise s/n
81043 CAPUA (CE)
Italy

Organisation Website:

<http://www.cira.it>

EU Contribution: €645,000

Technische Universitat Darmstadt

Address:

KAROLINENPLATZ 5
64289 DARMSTADT
Germany

Organisation Website:

<http://www.tu-darmstadt.de>

EU Contribution: €613,500

Rolls Royce Plc

Address:

65 Buckingham gate
LONDON
SW1E 6AT
United Kingdom

Organisation Website:

<http://www.rolls-royce.com>

EU Contribution: €224,736

General Electric Deutschland Holding Gmbh**Address:**

BLEICHSTRASSE 64-66
60313 FRANKFURT AM MAIN
Germany

EU Contribution: €291,040

Andheo**Address:**

29 AVENUE DE LA DIVISION LECLERC ONERA CENTRE DE CHATILLON
92320 CHATILLON
France

EU Contribution: €131,751

Technologies:

Aircraft design and manufacturing
Aircraft icing certification

Development phase: Research/Invention

STRIA Roadmaps: Vehicle design and manufacturing

Transport mode: Air transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Safety/Security

Geo-spatial type: Other