

PROJECT

CIRRUS

Core noise Reduction foR Uhbr engines

Funding: European (Horizon 2020)

Duration: Jul 2020 - Dec 2023

Status: Ongoing

Total project cost: €3,627,325

EU contribution: €2,731,878



Call for proposal: H2020-CS2-CFP10-2019-01

[CORDIS RCN : 229413](#)

Objectives:

The propulsion of the majority of commercial aircraft relies on turbofan engines. The current trend for future turbofan engines is towards even higher bypass ratios. These Ultra-High Bypass Ratio (UHBR) engines have large fans rotating at relatively low speeds. As a consequence of the lower speed, the fuel consumption can be reduced. Another consequence is that the engine noise signature is modified. While jet noise and fan noise will be reduced, core noise will become more significant.

In this context, the CIRRUS project aims to validate advanced low noise concepts, by developing both advanced numerical and experimental tools, to reduce the core noise of future UHBR 2030+ turbofan engines.

The overall goals of CIRRUS are to:

- Improve numerical methods to predict the noise source mechanisms and the acoustic core noise radiation,
- Improve experimental methods to measure the contribution of core noise on real engines,
- Develop, test and integration of new generations of noise reduction acoustic liners made of Ceramic Matrix Composites (CMC),
- Investigate on future UHBR 2030+ architectures the influence on the core noise sources by comparing various configurations of turbines by reducing the number of stages.

The first stream of the project is dedicated to the improvement of the core noise prediction tools with the implementation of an industrial LES/CAA workflow. A second stream is focused on experimental activities with the development of post-processing methodologies to identify the core noise contribution. The third stream of the project is focused on low noise concepts. CMC liner concepts will be investigated and tested. Finally, the relevant low noise concepts will be evaluated on a full scale UHBR and a core noise experimental data base will be created by conducting acoustic test campaigns on realistic engines. A comparison between measurements and simulation results will be performed to qualify the numerical means up to TRL6.

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)

Lead Organisation:

Vibratec

Address:

28 Chemin Du Petit Bois
69131 Ecully

France

EU Contribution: €886,778

Partner Organisations:

Pieter Sijtsma Advanced Aeroacoustics Bv

Address:

PRINSES MARGRIETLAAN 13
8091 AV WEZEP
Netherlands

EU Contribution: €130,375

Msc Software Belgium

Address:

Rue Emile Francqui 1 Axis Park
1435 Mont Saint Guibert
Belgium

Organisation Website:

<http://www.fft.be>

EU Contribution: €453,775

Centre Europeen De Recherche Et De Formation Avancee En Calcul Scientifique

Address:

Avenue Gaspard Coriolis 42
31057 Toulouse
France

Organisation Website:

<http://www.cerfacs.fr>

EU Contribution: €618,450

Université Du Maine - Laboratoire D'acoustique

Address:

Avenue Olivier Messiaen
72085 LE MANS
France

Organisation Website:

<http://laum.univ-lemans.fr>

EU Contribution: €642,500

Technologies:

Aircraft propulsion
Optimum turbofan engine
design

Development phase: Demonstration/prototyping/Pilot Production

STRIA Roadmaps: Vehicle design and manufacturing

Transport mode: Air transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Environmental/Emissions aspects

Geo-spatial type: Other