PROJECT

CATANA

Composite AeroelasTics ANd Aeroacoustics

Funding: European (Horizon 2020)

Duration: Sep 2019 - Dec 2023

Status: Ongoing

Total project cost: €2,449,860

EU contribution: €2,449,860

Call for proposal: H2020-CS2-CFP09-2018-02

CORDIS RCN : 224257

Objectives:

There is increasing evidence that today's turbojet technology is limited by instabilities arising from non-linear coupling between aerodynamic, aeroelastic and aeroacoustic phenomena. These multi-physical processes are going to become even more important in future architectures, which utilize Ultra-High-Bypass Ratio and lightweight composite fan designs to reduce greenhouse gas emissions and noise. However, enormous knowledge gaps currently exist concerning these processes and the resulting stability boundaries.

To fill these gaps, and to promote the development of efficient and quiet concepts, a comprehensive research programme will be carried out in Project CATANA. The programme will provide an open-test-case fan stage and employ unprecedented instrumentation to perform extensive investigations into the nature of multi-physical instabilities. The carbon-fibre fan stage is currently being developed at Ecole Centrale de Lyon and will be aerodynamically and structurally representative of near future low-speed fans.

Multi-physical experiments are planned which allow transient investigations with synchronous measurements of aerodynamic, structure-dynamic and acoustic phenomena.

The research concept combines complementary measurement systems and enables the detection of interactive mechanisms where individual systems are insufficient.

To improve the coherence of the aeroelastic results, a study on structural mistuning and intake geometry will be carried out to understand and quantify the sensitivity of occurring instability mechanisms. The database will be completed by a detailed structural analysis of the stage providing modal characteristics of the rotor blades, including structural damping under rotation.

The participating laboratories of Ecole Centrale de Lyon and the Von Karman Institute for Fluid Dynamics have the experience to challenge the demanding research initiative with the ambition to provide a reference benchmark for the European research community.

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: JTI-CS2-2018-CFP09-THT-05 Advanced High Bypass Ratio Low-Speed Composite Fan Design and Validation

Lead Organisation:

Ecole Centrale De Lyon

Address:

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69134 ECULLY
France

Organisation Website:
http://www.ec-lyon.fr

EU Contribution: €2,349,860

Partner Organisations:

Institut Von Karman De Dynamique Des Fluides

Address:
Chaussee De Waterloo 72
1640 Rhode Saint Genese
Belgium

EU Contribution: €100,000

Technologies:

Aircraft propulsion
Optimum turbofan engine design

Development phase: Research/Invention

STRIA Roadmaps: Vehicle design and manufacturing

Transport mode: Air transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Other specified

Geo-spatial type: Other