

PROJECT

CORNET

CORE NOISE ENGINE TECHNOLOGY

Funding: European (Horizon 2020)

Duration: Mar 2016 - Apr 2019

Status: Complete

Total project cost: €997,772

EU contribution: €997,772



Call for proposal: H2020-CS2-CFP01-2014-01

[CORDIS RCN : 200487](#)

Objectives:

Lean burn combustor technologies introduced to reduce NOx emissions are proving to be inherently noisier than conventional combustors, generating broadband noise that can be heard external to the aircraft. Without careful design and optimisation, there is a danger the low emission cores will cause the aircraft engines to exceed the Horizon 2020 noise requirement.

The research in the CORNET proposal is aimed at understanding the flow physics involved in the generation and propagation of core noise in low emission cores. It includes both the 'direct noise' of combustion, pressure waves generated directly by unsteadiness in the rate of combustion, and the 'indirect noise' generated as entropy waves accelerate through the Nozzle Guide Vanes (NGVs) at combustor exit and propagate through turbine blade rows.

Large Eddy Simulations of a combustor with a realistic engine fuel injector operating at representative engine conditions are validated through high-speed optical diagnostics applied to a high-pressure rig. The combustor modelling gives the entropy and acoustic waves incident on the NGVs. The generation of in-direct noise is predicted through unsteady high-resolution computations of the interaction of these entropy and acoustic waves within a high-pressure turbine stage. The new understanding will be captured in an advanced analytical combustion noise prediction tool that can be readily used by industry.

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:

The Chancellor Masters And Scholars Of The University Of Cambridge

Address:

TRINITY LANE THE OLD SCHOOLS
CAMBRIDGE
CB2 1TN
United Kingdom

Organisation Website:

<http://www.cam.ac.uk>

EU Contribution: €519,989

Partner Organisations:

Deutsches Zentrum Fr Luft Und Raumfahrt E.v**Address:**

Linder Hhe
12489 KLN
Germany

Organisation Website:

<http://www.dlr.de>

EU Contribution: €377,784

Technische Universitat Darmstadt**Address:**

KAROLINENPLATZ 5
64289 DARMSTADT
Germany

Organisation Website:

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

EU Contribution: €100,000

Technologies:

Aircraft propulsion
Lean combustion for ultra-high pressure ratio

Development phase: Validation

STRIA Roadmaps: Vehicle design and manufacturing

Transport mode: Air transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Societal/Economic issues

Geo-spatial type: Other