

PROJECT

DALI

Demonstrator for Aircraft heat exchanger Life prediction

Funding: European (Horizon 2020)

Duration: Apr 2019 - Mar 2022

Status: Ongoing

Total project cost: €1,405,281

EU contribution: €1,115,994



Call for proposal: H2020-CS2-CFP08-2018-01

[CORDIS RCN : 221189](#)

Objectives:

DALI aims at validating a virtual testing approach so that design and test loop can be shortened, and tests can be partly replaced, applied on the development of future generation of compact heat exchangers, for the engine innovative bleed system; with higher requirements and thus damage probability. DALI proposes a fully integrated modelling platform where damage laws will be integrated relying on a multiphysics and multilevel modelling approach.

A robust and reliable solution will be implemented based on an improved understanding of specific phenomena occurring during thermo mechanical ageing of heat exchanger in aircraft. The mainstream will enable to reproduce the thermal cycling ageing and its statistical probability by multiphysics simulations, and a set of master datasheets of fatigue curves and damage laws Manufacturing variability (local deformations, initial stress state), and other design variables will be included.

The proposed validation scheme includes a set of details of increasing complexity where the simulation approach and the instrumented physical testing will be compared, and iteratively improved, so that real observations of cracking coming from Aircraft exploitation can be predicted. A representative coupon test plan and an innovative measurement to detect cracks initiation in non-visible areas will be included. The prediction capacity will allow mastering the heat exchanger behaviour and the mean-time-between-failures, MTBF, to tailor the heat exchanger design, including sensitivity analysis for potential optimization.

DALI stands on members' skills and their cross advanced FEM knowledge capacities to enable a seamless technical coordination through the combination of customized experimental validation and advanced simulation so that:

- an accelerated test approach can be implemented for in service life assurance,
- a degradation law that could be used in combination with a simplified and accurate simulations for future CHX precooler sizing.

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-CfP08-LPA-01-52 Thermo-mechanical design validation of compact heat exchanger by thermal cycling life prediction

Lead Organisation:

Epsilon Ingenierie

Address:

RUE TARFAYA BATIMENT B612
31400 TOULOUSE
France

Organisation Website:
<http://www.epsilon-alcen.com>

EU Contribution: €364,963

Partner Organisations:

Lortek S Coop

Address:
Arranomendia Kalea 4 A
20240 Ordizia
Spain

EU Contribution: €470,156

Phi-Meca Engineering

Address:
Centre D'affaire Du Zenit L'arche, Rue De Sarlieve 34
63800 Cournon-D'auvergne
France

EU Contribution: €280,875

Technologies:

Aircraft propulsion
New concepts for heat exchangers

Development phase: Research/Invention

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