PROJECT

TRADE

Turbo electRic Aircraft Design Environment (TRADE)

**Funding:** European (Horizon 2020)  
**Duration:** Sep 2017 - Jun 2020  
**Status:** Complete  
**Total project cost:** €1,500,000  
**EU contribution:** €1,500,000

**Call for proposal:** H2020-CS2-CFP04-2016-02  
CORDIS RCN : 210614

**Objectives:**

The improvement potential in conventional aero engines will be realized over the next decades. While a number of evolutionary improvements remain, the limits to thermal efficiency are becoming visible in terms of material constraints, NOx emissions and engine operability. The propulsive efficiency improvement potential is also small and constrained by transmission losses, nacelle and intake drag, engine weight and, for open-rotors, by noise and integration challenges. If the continuous increase in air travel is to become sustainable (as the ACARE 2020 and Flightpath 2050 goals require) then a revolutionary step change in aircraft technology is required.

Current aircraft/engine conceptual design methodologies are centred on the disciplines of aerodynamics, structures and gas turbine performance. Key aspects of unconventional concepts, such as hybrid electric propulsion, are thus hard to capture within existing design tools.

TRADE proposes the integration of three new aspects into aircraft/engine conceptual design:

1. An advanced structural model to quantify the impact of the installation of heavy equipment on the sizing of the aircraft structure.
2. Refined on-board system models to capture design and performance trades in electric power systems, gas turbines, and thermal management.
3. An operational and mission model to enable flight dynamic analyses and an assessment of handling qualities of diverging aircraft configurations.

All improvements build on extensive model assets of the consortium members.

TRADE also delivers the integration of these new aspects into a conceptual design environment. The environment is suitable for the design of hybrid electric aircraft, and the consortium will apply it for configuration assessment and optimization at sub-system as well as whole-aircraft level.

TRADE fulfils all the topic requirements of JTI-CS2-2016-CFP04-LPA-01-28, and opens the path to a technological breakthrough in the aeronautics community.

**Parent Programmes:**
H2020-EU.3.4. - Horizon 2020: Smart, Green and Integrated Transport

**Institute type:** Public institution  
**Institute name:** European Commission  
**Funding type:** European Commission

**Lead Organisation:**

**Modelon Ab**  
**Address:** Ideon Science Park
Partner Organisations:

Abb Ab
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72183 VASTERAS
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Organisation Website: http://www.abb.com/se
EU Contribution: €0

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EU Contribution: €320,000

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Organisation Website: http://www.mdh.se
EU Contribution: €455,000

Technologies:
Aircraft propulsion
Aircraft engine conceptual design tools

Development phase: Research/Invention

STRIA Roadmaps:
Transport electrification, Vehicle design and manufacturing, Low-emission alternative energy for transport

Transport mode: Air transport
Transport sectors: Passenger transport, Freight transport
Transport policies: Other specified
Geo-spatial type: Other