PROJECT

HASTECS

Hybrid Aircraft; academic reSearch on Thermal and Electrical Components and Systems

Funding: European (Horizon 2020)

Duration: Sep 2016 - Aug 2021

Status: Complete

Total project cost: €1,499,825

EU contribution: €1,499,825

Call for proposal: H2020-CS2-CFP02-2015-01

CORDIS RCN : 205619

Objectives:

The HASTECS project aims at supporting the demonstration of radical aircraft configurations (CS-2/WP1.6) by means of models and tools development that can help the designers in assessing main benefits of architectures and power management of hybrid electric propulsion.

The proposed consortium involves all competencies to face the huge complexity of this process. All academic researchers will gather their expertise to optimize the overall hybrid power chain, starting with electric and thermal components up to system integration by taking into account main environmental constraints.

Assessments will be integrated at the system level and will include design and analysis of main components of the hybrid power chain: electric machines and related cooling, cables, power electronics and related thermal management. This system integration will take into account the main environmental constraints, especially partial discharges due to new high power and ultra-high voltage standards.

The HASTECS project proposes to reach aggressive targets with a strong increase of specific powers for the main components; We especially target to double the specific power of electric machines from 5kW/kg for 2025 to 10kW/kg for 2035 while specific powers of converters would evolve from 15kW/kg for 2025 to 25kW/kg for 2035: this expected gap, when installing 4 inverter–motor drives of 1.5MW, will lead to a weight reduction of 1.8 tons, which will offer a significant fuel burn reduction estimated at 3.5% for a short range (~300nm) flight. Additional fuel burn reduction will be obtained thanks to several technological steps as on “auxiliary sources” (batteries, fuel cells, etc) and by optimizing the overall system sizing integrating the power management. Recent assessments estimate that the reduction of total energy provided by both Gas Turbines and auxiliaries (batteries of fuel cells) of the most promising electric hybrid architecture may go beyond 20% for a 300nm regional flight.

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:

Institut National Polytechnique De Toulouse

Address:
6 allée Emile Monso
BP 34038 TOULOUSE
France

Organisation Website:
http://www.inp-toulouse.fr

EU Contribution: €748,375

Partner Organisations:

Ecole Nationale Superieure De Mecanique Et D'aeronautique

Address:
Clément Ader Avenue 1
86961 FUTUROSCOPE CEDEX
France

Organisation Website:
http://www.ensma.fr

EU Contribution: €422,075

Université Paul Sabatier

Address:
118, route de Narbonne
31062 TOULOUSE
France

Organisation Website:
http://www.ups-tlse.fr

EU Contribution: €329,375

Technologies:

Aircraft propulsion
Hybrid propulsion system components

Development phase: Demonstration/prototyping/Pilot Production

STRIA Roadmaps: Transport electrification, Low-emission alternative energy for transport

Transport mode: Air transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Other specified

Geo-spatial type: Other