ELBASYS

Electrical systems in a CFC fuselage: architecture and design

Elektrische Basissysteme in einem CFK Rumpf: Architektur und Auslegung

Funding: National (Germany)
Duration: Apr 2007 - Dec 2008
Status: Complete with results

Background & policy context:

The “ELBASYS” project is in line with the political objectives for funding (“förderpolitische Ziele des Bundes”) in Germany: It contributes solutions for:

- Environmentally friendly air transportation
- Safety and passenger comfort
- Optimized maintenance and repair
- Efficient airplanes

Objectives:

Referring to the above mentioned political objectives for funding, the main objective of the project is to design energy efficient airplane systems, and to improve the systems flexibility causing less maintenance costs. Further, safety and passenger comfort are important constraints.

In detail, the project focuses on establishing new electronic systems and optimizing existing electronic systems in a CFC fuselage. Hydraulic subsystems (e.g. steering mechanism and landing gear) and pneumatic subsystems (e.g. cabin air supply) are replaced by electronic subsystems in order to reach higher efficiency and flexibility. Furthermore, alternative technologies for energy supply on board are tested: The design and integration of a fuel cell- system are explored.

Methodology:

The ELBASYS project is divided into seven subprojects:

- WP1: Development of an assessment tool for the system and corresponding explorations towards structure. (This subproject focused on cross-sectional matters, whereas WP2 to WP7 each focused on specific matters of technology.
- WP2: Research on air intake for an electronic air conditioning system in the cabin. The research included testing in a wind tunnel.
- WP3: Designing and testing of components for a cooling system without refrigeration.
- WP5.1: Concept (including modelling and validation) of a system for load data collection and load attenuation.
- WP5.2: Research in Application control Management System ACMS and technology for data recording.
- WP6: Integration of actuators
- WP7: Integration of undercarriage systems

Parent Programmes:
LuFo IV - Federal research programme aeronautics LuFo IV

Institute type: Public institution
Institute name: Federal Ministry of Economics and Technology (BMWi)
Funding type: Public (national/regional/local)
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Partners:
Germany:
Airbus Deutschland GmbH; Liebherr-Aerospace Lindenberg GmbH; Forschungszentrum Jülich GmbH;
EADS Deutschland GmbH; DLR e.V. (Braunschweig)

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Key Results:
The ELBASYS project achieved the objectives. The following individual technologies were accomplished:

- Development in studies for aircraft system architecture, model database
- Integration of electronic ECS systems into a CFC fuselage.
- Design and validation of the air intake for an electronic air conditioning system without bleed air in
  the CFC fuselage.
- New cooling systems for electronic components in the fuselage, Optimizing of the coolant,
  Alternative materials for the cooling pipelines.

Findings of the study are published by a final report (German only), which is available online via the
Technical Information Library (TIB) of the Hannover University: [http://edok01.tib.uni-hannover.de/edoks/e01fb09/608447900.pdf](http://edok01.tib.uni-hannover.de/edoks/e01fb09/608447900.pdf)

STRIA Roadmaps: Vehicle design and manufacturing
Transport mode: Air transport
Transport sectors: Passenger transport, Freight transport
Geo-spatial type: Other