DAPHNE Advisory Group (DAG)

The DAPHNE consortium consists of a group of leading technical companies and organisations. But in order to allow a much wider cross-section of the industry to participate in the project goals and results, other industry representatives will be invited to form an external group of advisors to the project. This is known as the DAPHNE Advisory Group (DAG).

The DAG will meet on a bi-annual basis throughout the course of the project. The DAG will be open to any organisation (Industry, Government, SME, public or private) willing to contribute to the project.

For more information, please contact the focal points listed on the back page of this leaflet.

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Standardisation and Dissemination

A big effort will be placed in the project towards Standardisation and Dissemination activities. Project results will be available to the whole industry. This will be accomplished in two ways:

- Participation of project partners in Standardisation bodies (ARINC, ASD-STAN, SAE-ASD, IEC, BSI ACE and others)
- Dissemination activities in Trade Shows, Industry Publications, Workshops, Newsletters, etc.

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Developing Aircraft PHotonic NEtworks

Project Information

DAPHNE is supported by the European Commission under FP7
Theme 7: Transport, Aeronautics

DAPHNE project

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Objectives

DAPHNE is a 3-year FP7 project started in September 2009. The primary objective of DAPHNE is to enable the full exploitation of terrestrial optical networking technology, with its associated performance developments and advantages, in future European aircrafts and systems. The project will adopt key component and network technologies from commercial markets. It will develop and validate future aircraft networks to take European aircraft systems capabilities well beyond current state-of-the-art and be suitable as a platform for future development.

Partners

13 partners representing the whole industry are involved in the project, including airframers, component manufacturers and universities:

- Airbus Operations GmbH
- Vivid Components Ltd.
- EADS Deutschland GmbH
- BAE Systems (Operations) Ltd.
- Westland Helicopters Ltd.
- Galileo Avionica SpA
- Gooch & Housego (Torquay) Ltd.
- D-Lightsys S.A.S.
- SQS Vlaknova Optika A.S.
- INESC Porto
- TU Ilmenau
- Danmarks TU
- GMVIS Skysoft S.A.

Aircraft networks increasing in complexity

Aircraft data networks have increased dramatically in complexity throughout the history of powered flight. Modern networks must support many nodes with a wide range of span lengths, bandwidths and protocols. Existing systems, chiefly based on copper conductors, have evolved to support these ever-increasing demands. These networks have consequently become larger, heavier and more expensive, and this trend is set to continue. A coordinated step change to fibre optics would reduce network size, weight and cost and improve the modularity, flexibility and scalability. Moreover, fibre brings many other advantages including EMI immunity and improved security.

Furthermore, defining networks according to a DAL-based hierarchy, the flexibility of photonics can be harnessed within the constraints of safety certification restrictions.

Application of terrestrial fibre optic technology

Terrestrial telecoms provide a rich source of technology. However, R&D work is required to adapt terrestrial photonics for aircraft networks. Detailed requirements will follow from the baseline studies, but are likely to include: ruggedisation for aircraft environments, compact intra-module connectors, full duplex MM fibre-optic transceivers and single and multiple ribbon fibre break-outs. The range of components studied includes: transmitters, receivers, wavelength multiplexers, power splitters, optical switches and a range of optical fibres and connectors.

Cabin systems have been identified as the most immediate application area. Here, the need for high flexibility (driven by customisation), high bandwidth (driven by information-to-the-seat) and large node count means that the technology and business cases for photonics are compelling.

Nevertheless, foreseen applications also include digital video and imaging, sensor networks and SHM, for both fixed and rotary wing aircrafts (including UAVs).

Model-based engineering and Modularity

In order to exploit all benefits of fibre optics, the network architectures will be optimised with the help of model-based engineering tools, which have proven their advantages for the design of complex systems.

Furthermore, modularity will be a key goal of the designed networks, in order to provide the flexibility, reconfigurability, maintainability and scalability that aircraft systems require. A blade-based module design will be developed, which fulfills the modularity requirements.

DAPHNE will define a scalable, modular infrastructure for aircraft photonic networks, including node and interconnect concepts. Standard avionic boxes (*e.g.* ARINC 600 or 404) were designed for electronics, and are unnecessarily large and heavy for photonics. A new avionic box standard will be promoted.

Finally, extended network functional and environmental testing under aircraft operating conditions will be carried out to verify and validate network performance, including critical system safety tests, with reliability and failure modes.

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