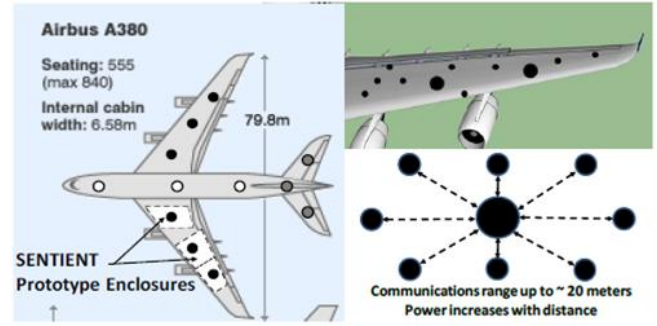


SENTIENT - Sensors to inform and enable wireless networks

Online health monitoring of aircraft structures is in its infancy compared with other condition monitoring applications. Aircraft structural health is currently assured by fail-safe/safe life design, combined with stringent inspections aimed at finding flaws before they propagate to a size such as to compromise structural integrity.

The majority of inspection is performed using well known conventional non-destructive testing (NDT) methods. Strict inspection regimes which employ these NDT methods represent a large percentage of aircraft maintenance costs. Additionally, the increased use of composite materials in aircrafts has resulted in fewer, more complex parts, consolidating previously separate metal parts, thus complicating inspection by giving rise to inaccessible areas.

The inspection of components in inaccessible areas requires additional time-consuming dismantling, inspection and rebuild of the aircraft which adds significant costs to the inspection regime. The aerospace industry is continually investigating opportunities to reduce the costs of these maintenance regimes while achieving the equivalent level of reliability in inspection. Wireless structural health monitoring has been determined by large aerospace OEMs such as Airbus as a technology which could alter the way in which aircraft inspection is undertaken. The employment of such a solution offers significant savings in reduced labour intensive inspection.



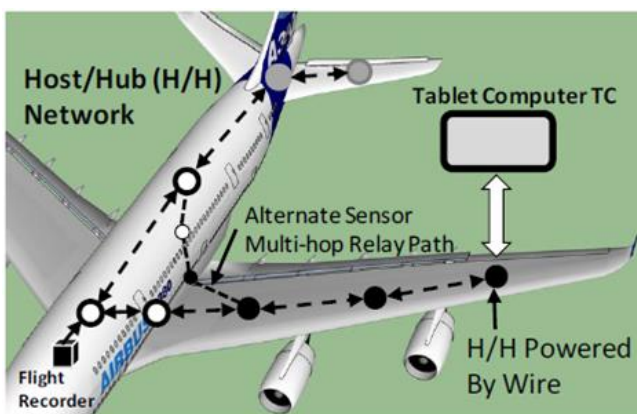
Project Objectives

The collaboration to address the following technical requirements:

- a. Sensor Networks & Communications – Sensor configuration & positioning, data compression algorithms, network design and management to provide resiliency/mitigation against interference in dense multipath environments.
- b. Sensor Data Acquisition & Apps - Acoustic emission techniques for localisation of damage, Multi-site damage localisation, Interface design for Impact detection algorithms for different structures and materials.
- c. Power Management Power trade-off between, sensing, communications and apps - Smart energy-aware activation circuits for interfacing wireless sensing systems to reduce power consumption.
- d. Energy Harvesting - Novel power harvesting ideas which could result in patents.
- e. Visualisation & Profiling – User visualisation of the state of health of a structural enclosure, the conditions to which it has been exposed and in what operational context (landing, taking off, climbing, cruising etc.). Creation of use case profiles/rule base for extracting WSN data.

For further information, please visit the project website at www.sentientproject.co.uk

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