

WiTNESSS - Wireless Sensing for Aerospace

WiTNESSS (Wireless Technologies for Novel Enhancement of Systems and Structures Serviceability) is a collaborative R&D project, led by Conekt, which is researching and de-risking wireless data transmission technology for key testing and structural health monitoring applications in aero engines, helicopters and fixed-wing aircraft.

Current aircraft instrumentation and test systems are linked by heavy and complex wiring harnesses which limit the amount of data which can be collected. Using wireless (radio) technology instead of fixed wiring gives the potential to measure more parameters, save cost & weight and lead to lighter, more efficient future aircraft designs and quicker time-to-market. Wireless technology also enables further cost and time savings through faster installation / removal of test and instrumentation systems.

Although wireless devices are already common in the computer, video game and mobile phone sectors using technologies such as WiFi and Bluetooth, these are not designed to operate reliably in the harsh physical and electromagnetic environment found on an aircraft.

The project is therefore finding solutions to the challenges which currently prevent deployment on aircraft, and through a phased testing and demonstration programme is proving the performance of the new wireless systems developed.

Conekt's cross-sector expertise in sensors, electronic systems, hardware and software places it in an ideal position to lead the WiTNESSS consortium. The other partners are: AgustaWestland, Airbus in the UK, BAE Systems, Bombardier Aerospace, GE Aviation Systems Ltd., HW Communications, QinetiQ, QM Systems, Rolls-Royce and System Level Integration Ltd. The project is part-funded by a £1.6m investment from the UK Technology Strategy Board. The collaboration between large and small companies including aircraft manufacturers, technology developers and component / system suppliers brings together their key skills to maximise the effectiveness of the project.



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Technology demonstrators

A principal aim of the project is to demonstrate how widely-differing end-user requirements – both for test instrumentation and permanent fitment – may be satisfied by a common data-gathering system architecture, thereby maximising design re-use.

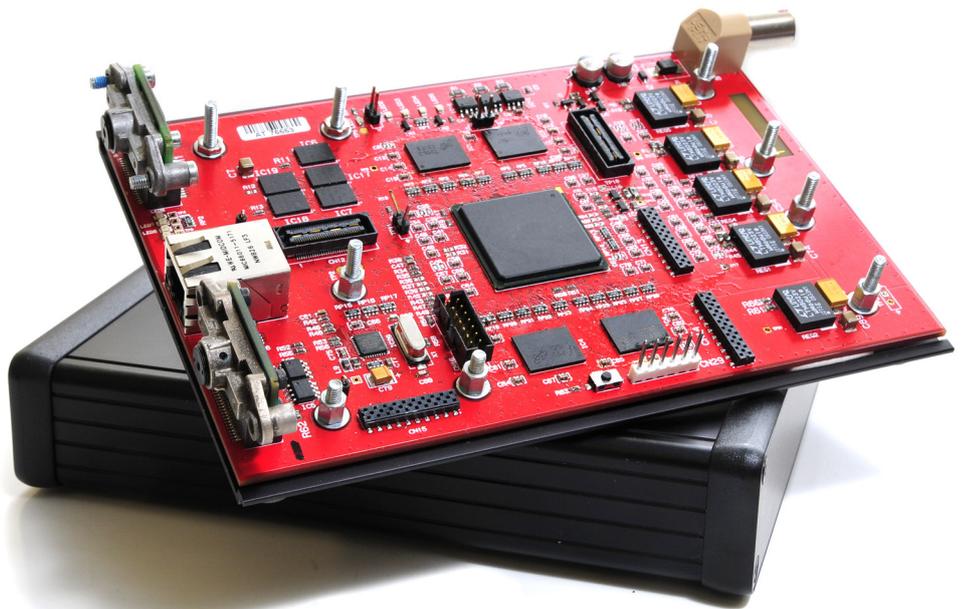
WiTNESSS has three technology demonstration platforms:

- Rotorcraft
- Gas turbine engines
- Composite wing structures

These demonstration platforms cover a range of data rate requirements, as well as examples of different radio transmission paths from fixed and rotating components. They are used to explore the performance of different configurations of wireless systems and to validate theoretical analysis.

As well as leading the overall consortium and the software development activities, Conekt is using its expertise in electronics hardware to supply a robust, flexible, FPGA-based development platform for the wireless sensor nodes. This enables the wireless system to be implemented without being artificially constrained by the node processing performance.

This approach ensures that when future application systems are designed, the hardware and software can be chosen to match exactly the capabilities required, leading to maximum system efficiency and lowest cost.




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