Project – Modelling and detecting Degradation on Aircraft Air Conditioning Systems

Supervisor (Cranfield):
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Duration: 6 months – Full Time (possible extension to 9 months)
Stipend: £3500
Project type: Visiting student project
Reference code: IVHM_ECS_VS_2018_01

Applications are invited for a 6-month project at the Integrated Vehicle Health Management Centre (IVHM Centre) of Cranfield University. The IVHM Centre conducts research on the physics of failure of aircraft components. IVHM uses on-board sensors to obtain data on the condition of components which are then analysed to detect faults and even predict when failures will occur. This information is used to increase the safety of aircraft and improve the management of maintenance operations.

As a core partners of the IVHM Centre, Boeing are interested in developing a monitoring system for Environmental Control Systems (ECS). ECS are used to control the temperature of the cabin as well as to supply cooling for avionics. ECS use ram air and bleeding air from the jet engine's compressor to deliver pressurized air to the cabin and the electronics bay.

The student will study the problem of aging and simultaneous degradation of multiple ECS components and how this affects the ability to detect and isolate faults. The work will focus on the development of diagnostic algorithms for which the student will model the system, establish diagnostic rules, and determine the accuracy of the diagnostic algorithms. Models will be built using Matlab and Simulink as well as some of the tools developed by the IVHM Centre for Boeing. The student will collaborate with team members in the development of diagnostics for Boeing 737 ECS. The project is part of a programme aimed at developing a diagnostic system for ECS capable of detecting and isolating faults on different Boeing aircraft.
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Skills: Mechanical or aerospace engineering background. Matlab/Simulink.

Start Date: Early 2018 (date negotiable)