

5) Aerospace Innovation

For Challenge 5-you are welcome to create your own Aerospace Innovation, teams are not limited to the Turbine Engine Components Diagnostic Systems for the 21st Century problem-shown below:

Turbine Engine Components Diagnostic Systems for the 21st Century

Description: The goal is to develop a diagnostic system or systems that can monitor the health of the turbine engine hot section components and allow prediction of pre-mature failure before any catastrophic events take place. Such components of interest are primarily the rotor disk, combustion liner and turbine blades.

Background:

Safety is the utmost feature that is entrenched in aircraft design and operations. This is making air transport one of the safest travel mode. Substantial efforts by the US government entities such as the FAA, department of defense, NASA and the engine manufacturers have contributed substantially to this result. Nevertheless, pre-mature faults triggering issues must be actively identified and controlled in an effort to maintain an optimum safety standard. This requires the introduction of new range of techniques or systems concepts, products and operational practices bringing significant challenges to aviation safety organizations.

On September 26, 2017 an Air France Airbus A380-800, registration F-HPJE performing flight AF-66 from Paris Charles de Gaulle (France) to Los Angeles, CA (USA), was enroute at FL370 about 200nm southeast of Nuuk (Greenland) when the inlet of the #4 engine (GP7270, outboard right hand) separated from the engine. The crew descended the aircraft to FL310 and diverted to Goose Bay, NL (Canada) for a safe landing about 2 hours later.

This is a pure example of engine failure accidents; the cause is of unknown origin at the moment. Thus, this demonstrates the urgent need for advanced technological systems to pre-prevent and pinpoint the causes of such occurrences.

Researchers, engineers and aviation specialists have contributed substantially to the engine health monitoring practice by identifying and perceiving faults in turbofan engines. For instance, pre-mature cracks and other anomalies related to operational, environmental and materials defects are among the major elements of faults

© 2017 SkyHack that lead to rotor disk failure in the engine. The complexity of detecting these abnormalities necessitates the evolution of novel methods to detect engine component problems.

