Detectability of Malfunction in Turboprop Engine

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Abstract : On the basis of simulation-generated failure states of structural elements of a turboprop engine suitable for the busy-jet class of aircraft, an algorithm for early prediction of damage or reduction in functionality of structural elements of the engine is designed and verified with real data obtained at dynamometric testing facilities of aircraft engines. Based on an expanding database of experimentally determined data from temperature and pressure sensors during the operation of turboprop engines, this strategy is constantly modified with the aim of using the minimum number of sensors to detect an inadmissible or deteriorated operating mode of specific structural elements of an aircraft engine. The assembled algorithm for the early prediction of reduced functionality of the aircraft engine significantly contributes to the safety of air traffic and to a large extent, contributes to the economy of operation with positive effects on the reduction of the energy demand of operation and the elimination of adverse effects on the environment.