

Active Fault Diagnosis and Assessment for Aircraft Health Management



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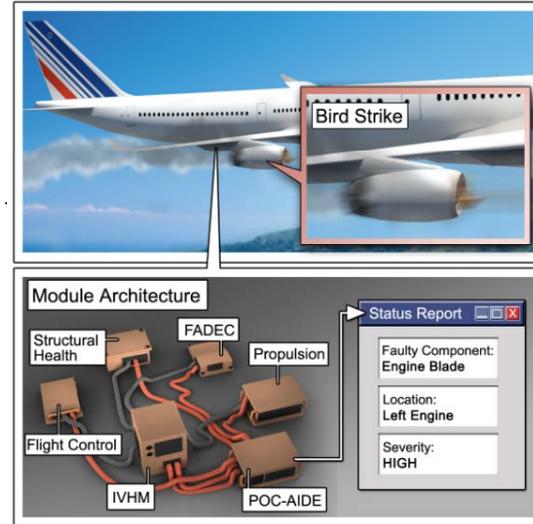
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Identification and Significance of Innovation

A new Active Integrated Diagnosis with Ensembles (AIDE) system, which incorporates active fault diagnosis and context-aware reasoning and severity assessment, is proposed to perform on-line diagnosis on aircraft faults and failures and determine their causal factors, nature and severity. Onboard health management systems are actively queried to reduce the uncertainties in diagnosis. Such a capability is critical to improve the intrinsic safety attributes of legacy and future aircrafts and their operations in the NextGen Air Transportation system.

Estimated TRL (1 – 9) at beginning and end of contract: TRL-1 at beginning and TRL-2 at end.



Technical Objectives and Work Plan

The following technical objectives have been established:

- Design of AIDE system architecture.
- Development of AIDE software components.
- Integration, evaluation, and demonstration of AIDE.
- Definition of the commercial market for the AIDE.

They will be accomplished through the performance of the following tasks.

- *Design AIDE Architecture*
- *Develop Bayesian Network Models, Classifier Ensembles, and Context-Aware Reasoning*
- *Explore Integration and Validation Viability*
- *Integrate, Evaluate, and Demonstrate Feasibility of AIDE Software*
- *Explore Commercial Potential and Product Viability.*

NASA and Non- NASA Applications

AIDE will find its direct applications in the IVHM and other NASA projects in the Aviation Safety Program, and programs and projects within ARMD. Non-NASA commercial applications include vehicle engine diagnosis, mechanical system fatigue analysis for failure prevention in operations, and maintenance equipment reliability and failure predictions. AIDE can be incorporated by General Electric into the next-generation and existing turbine engine blade and disk assessment processes.

Firm Contacts

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NON-PROPRIETARY DATA