The Adaptive Expert System for the Autonomous Detection of Aviation Mishap Leading Indicators

ONR Program Code 35

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At a Glance

What is it?

- The Adaptive Expert System (AES) FNC will provide Naval aviation leadership with an autonomous capability to analyze flight data (1 million+ flight hours/yr) and detect aviation mishap leading indicators in order to reduce the number of human factors related aircraft mishaps through objective intervention.

How does it work?

- AES will develop artificial intelligence algorithms that use neural network and rule-based models for pattern recognition within diverse multidimensional flight datasets.

What will it accomplish?

- Help reduce aviation mishap rates by providing an automated capability for the objective analysis of the myriad flight data collected by Naval aircraft, enabling the identification, trending, and prediction of mishap precursors for which corrective measures can be taken to mitigate risks.

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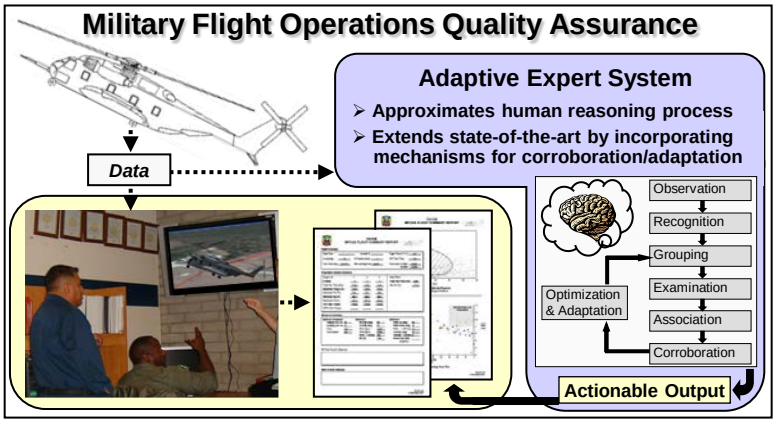
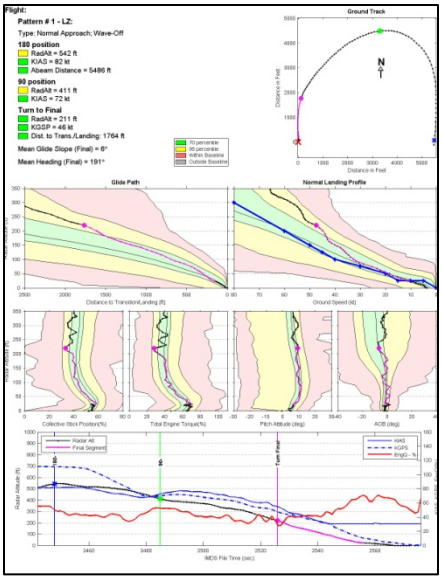
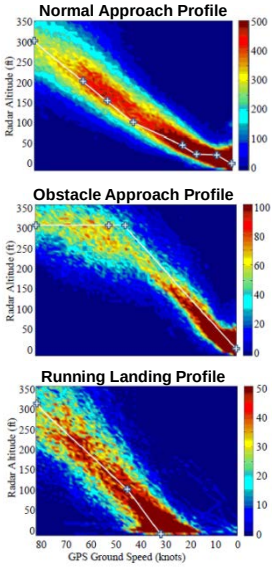


Example AES Functionality:
Automated Landing Detection, Characterization, and Assessment





Manual analyses of the large volume of data from aircraft across the Fleet to effectively detect mishap leading indicators would require an impractical increase in manpower. The Adaptive Expert System (AES) Future Naval Capability (FNC) Product will replicate the human reasoning process with artificial intelligence algorithms that use neural network and/or rule-based models for pattern recognition to identify mishap leading indicators, especially those related to human factors. AES will provide actionable information for risk mitigation to aircrews, squadron leadership, and senior commands, including Commander, Naval Air Forces (CNAF).

Research Challenges and Opportunities:

- Artificial Intelligence/Neural Networks: Extends state-of-the-art by incorporating mechanisms for corroboration/adaptation