



## NASA SBIR 2009 Phase I Solicitation

### A1.10 Detection of Aircraft Anomalies

Lead Center: GRC

Participating Center(s): AFRC, ARC, LaRC

Adverse events that occur in aircraft can lead to potentially serious consequences if they go undetected. This effort is to develop the technologies, tools, and techniques to detect in-flight anomalies from adverse events. This involves the integration of novel sensor and advanced analytical technologies for airframe, propulsion systems, and other subsystems within the aircraft. The emphasis of this work is not on diagnosing the exact nature of the failure but on identifying its presence. Proposals are solicited that address aspects of the following topics:

- Analytical and data-driven technologies required to interpret the sensor data to enable the detection of fault and failure events;
- Methods to differentiate sensor failure from actual system or component failure;
- Characterizing, quantifying, and interpreting multi-sensor outputs; and
- New sensors, sensory materials and sensor systems that improve the detection of an adverse event or permit increased sensory coverage for an adverse event.

Emphasis is on novel methods to detect failures in electrical, electromechanical, electronic, structural, and propulsion systems. Along with these system failures, condition sensors are desired for both the detection of internal engine icing as well as composite aircraft lightning strikes (location and intensity). Where possible, a rigorous mathematical framework should be employed to ensure the detection rates and detection time constants are acceptable according to published baselines as characterized by statistical measures. Understanding and addressing validation issues are critical components of this effort.