



## **NASA SBIR 2011 Phase I Solicitation**

### **A1.14 Detection, Identification, and Mitigation of Sensor Failures**

**Lead Center: LaRC**

**Participating Center(s): AFRC, ARC**

Faults related to aircraft sensing systems have been a major cause of loss-of-control accidents and incidents. For example, an airspeed sensing system fault is suspected of setting into motion a chain of events that resulted in the loss of Air France flight 447 (June 2009); a faulty altimeter is suspected in the stall and crash of Turkish Airline flight 1951 (February 2009); and faulty angle-of-attack sensing is suspected of causing violent uncommanded motion in Qantas Flight 72 (October 2008). Sensor redundancy is essential to ensure safety and reliability of the flight systems; however, redundancy alone may not be sufficient to avoid problems due to common mode failures across redundant sensors (such as suspected Pitot tube icing in all airspeed sensors). Therefore, research is needed to utilize all information available from multiple- possibly diverse- sensors in order to rapidly detect and isolate sensor faults in real time. The research would involve information fusion across multiple sensors, detection of erroneous behavior within a sensor or sensor suite, and mitigation of information loss through algorithmic redundancy and design to estimate the lost information from a failed sensor. The aim of the research would be to develop technology to prevent loss of control due to sensing system faults.