



NASA SBIR 2016 Phase I Solicitation

A3.03 Future Aviation Systems Safety

Lead Center: ARC

Participating Center(s): LaRC

The Aeronautics Research Mission Directorate (ARMD) has concluded the successful Aviation Safety Program (AvSP). The Airspace Operations and Safety Program (AOSP) is succeeding AvSP's significant achievements and stepping up to lead the ARMD research in the area of Real-Time System-Wide Safety Assurance (RSSA). As currently envisioned, ARMD sees its future, safety-related research focused in a forward looking, more comprehensive system-wide direction. ARMD's RSSA will focus on the current and future NAS, towards a gate-to-gate trajectory-based system capability that satisfies a full vision for NextGen and beyond. The ultimate vision for RSSA would enable the delivery of a progression of capabilities that accelerate the detection, prognosis and resolution of system-wide threats. Proposals under this sub-topic are sought, but not limited to, the following areas:

- Identify and characterize (causation, consequence, criticality) safety threats and anomalies that could and should be monitored for by an RSSA system. For each threat/anomaly, identify triggers, precursors, and data needed to analyze/determine if a trigger or precursor has occurred.
- Develop and demonstrate data mining tools and techniques to detect and identify anomalies and precursors to safety threats system-wide.
- Develop and demonstrate tools and techniques to assess and predict safety margins system-wide to assure airspace safety.
- Develop and demonstrate prognostic decision support tools and techniques capable of supporting real-time safety assurance.
- Develop and demonstrate HMI concepts and technologies for alerting and resolution guidance delivery/visualization/execution to ensure timely avoidance or mitigation of predicted safety threats.
- Determine optimal human-machine function allocation for handling emerging safety threats, including threats communication, prioritization, alerting, and mitigation.
- Develop and demonstrate V&V tools and techniques for assuring the safety of air traffic applications during certification and throughout their lifecycles, and techniques for supporting the real-time monitoring of safety requirements during operation.
- Develop and demonstrate products to address technologies, simulation capabilities and procedures for reducing flight risk in areas of attitude and energy aircraft state awareness.