



NASA SBIR 2017 Phase I Solicitation

A3.03 Future Aviation Systems Safety

Lead Center: ARC

Participating Center(s): LaRC

Technology Area: TA15 Aeronautics

The Aeronautics Research Mission Directorate (ARMD) Airspace Operations and Safety Program (AOSP) is leading research in the area of integrated safety monitoring and assurance that detects, predicts and prevents safety problems in real-time. ARMD sees its future, safety-related research focused in a forward looking, more comprehensive system-wide direction and is currently vetting a roadmap for Real-Time System-Wide Safety Assurance (RSSA) strategic activities.

Tools are being sought for use in creating a prototype of a RSSA capability. The ultimate vision for RSSA is the delivery of a progression of capabilities that accelerate the detection, prognosis and resolution of system-wide threats.

Proposals under this subtopic are sought, but not limited to, these areas:

- 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 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.
- Develop and demonstrate decision support tools and automation that will reduce safety risks on the airport surface for normal operations and during severe weather events.
- Develop and demonstrate alerting strategies/protocols/techniques that consider operational context, as well as operator state, traits, and intent.
- Develop methodologies and tools for integrated prevention, mitigation, and recovery plans with information uncertainty and system dynamics in a TBO environment
- Develop and demonstrate strategies for optimal human-machine coordination for real-time hazard mitigation.
- Develop measurement methods and metrics for human-machine team performance and mitigation resolution.
- Develop system-level performance models and metrics that include interdependencies and relationships

among human and machine system elements.