NASA SBIR 2011 Phase I Solicitation

A1.02 Inflight Icing Hazard Mitigation Technology

Lead Center: GRC

NASA is concerned with the prevention of encounters with hazardous in-flight conditions and the mitigation of their effects when they do occur. Under this subtopic, proposals are invited that explore new and dramatically improved technologies related to inflight airframe and engine icing hazards for manned and unmanned vehicles. Technologies of interest should address the detection, measurement, and/or the mitigation of the hazards of flight into supercooled liquid water clouds and flight into regions of high ice crystal density. With these emphases in mind, products and technologies that can be made affordable and capable of retrofit into the current aviation system and aircraft, as well as for use in the future are sought.

Areas of interest include, but are not limited to:

- Non-destructive digitization of ice accretions on wind tunnel wing models. NASA has a need for methods to digitize ice shapes with rough external surfaces and internal voids as can occur with accretions on highly swept wing. Current methods based upon scanning with line-of-sight optical digitization methods have been found inadequate for these ice shapes.
- New instruments are needed utilizing innovative concepts to measure ice-crystal/liquid water mixed phase clouds in ground test facilities and in flight. Cloud properties of interest include: crystal/droplet temperature, material phase, particle size, speed, cloud liquid-water content, ice-water content, air temperature, and humidity. Non-intrusive measurement techniques capable of providing the spatial distribution of these properties across an engine duct with a diameter of at least 3 feet are particularly of interest.
- New instruments or measurement techniques are also needed for the detailed study of the ice accretion process on wing surfaces and internal engine components. Properties of particular interest are heat transfer, accretion extent, and ice density. The measurement of these properties needs to be non-interfering.