NASA SBIR 2008 Phase I Solicitation

A1.09   Robust Flare Planning and Guidance for Unimpaired and Impaired Aircraft

Lead Center: ARC

Participating Center(s): AFRC, LaRC

A primary goal of the NASA Aviation Safety Program is to develop technology for safe aircraft operation under different types of anomalies. These may occur in a variety of forms, including damaged surfaces or failed actuators that can limit the maneuverability and achievable flight envelope of the vehicle. As part of the Aviation Safety Program research, the goal of the Integrated Resilient Aircraft Control (IRAC) Project is to arrive at a set of validated multidisciplinary aircraft control design tools and techniques for enabling safe flight in the presence of adverse conditions. Research on advanced technical approaches includes adaptive flight control for providing stability, flight and maneuvering envelope identification for determining safe operability limits, and emergency flight planning and guidance for achieving a flyable path to an approach for landing.

This SBIR subtopic seeks innovations in providing flare planning and guidance technologies that aid aircraft during the critical phase of landing under damage conditions and weather disturbances such as heavy crosswind or wind shear. The research will develop feasibility studies of different methods for safe landing under these hazardous conditions when the aircraft performance is impaired due to damage and failures. The research will address automatic flare maneuvers of aircraft with a large crab angle and possibly bank angle for a stable trim approach, different flap deployment strategies, high speed approaches, and large trim alpha variations. Differential engine throttle may be used to compensate for large sideslip, as may other novel automatic flare methods for off-nominal landing. The research should also determine when a different approach profile (such as a lateral offset and/or shallower glide-slope) is desired, so that this information could be used by a flight planning system as a target endpoint.