NASA SBIR 2009 Phase I Solicitation

A1.05   Crew Systems Technologies for Improved Aviation Safety

Lead Center: LaRC

NASA seeks highly innovative, crew-centered, technologies to improve aerospace system safety through the development of more effective joint human-automation systems in aviation. This is to be accomplished through increased awareness of operator and crew functional state (both in terms of functional readiness and in situ assessment), and through improved interactions among intelligent agents (human and automated). We seek proposals for the development of advanced technologies that:

- Effectively convey information and aid decision making to enable novel NextGen operational requirements (e.g., 4D trajectory-based operations, visual operations in non-visual meteorological conditions, etc. as described in http://www.faa.gov/about/initiatives/nextgen/media/NGIP_0130.pdf);

- Foster the appropriate use of automation and complex information sources by, for example, conveying constraints on automation reliability and information certainty/timeliness;

- Support effective joint cognitive systems by improving the communication and collaboration among multiple intelligent agents (human and automated, proximal and remote), and provide assessment techniques and metrics for evaluating mixed H/A team performance;

- Characterize the operational status of the human crew members, effectively modulate this state, and/or effectively adapt interfaces and automation in response to functional status (e.g., situationally-aware display reconfiguration, aiding, and multi-modal presentation of information to maximize system performance and minimize information processing bottlenecks);

- Provide methods, metrics, and tools that help to assess the effectiveness of the above-mentioned technologies in human-in-the-loop simulation and/or flight studies.

Proposals should describe novel technologies with high potential to serve the objectives of the Robust Automation/Human Systems element of NASA's Aviation Safety Integrated Intelligent Flight Deck program (http://www.aeronautics.nasa.gov/avsafe/iifd/rahs.htm). Successful Phase 1 proposals should culminate in a final report that specifies, and a Phase 2 proposal that would realize, technology that improves the effectiveness of joint human-automation systems in aviation, or improves the ability to assess effectiveness of such systems.