



NASA SBIR 2009 Phase I Solicitation

X12.01 Crew Autonomy Assessment for Exploration

Lead Center: JSC

The NASA Behavioral Health and Performance Program Element (BHP) identifies and characterizes the behavioral health and performance risks associated with training, living and working in Space, and return to Earth. BHP develops strategies, tools, and technologies to mitigate these risks. Currently, BHP has the need for behavioral health and assessment tools relevant to autonomy during Exploration Missions.

The aim of the current task is to identify the optimal level of autonomy by providing a tool that will objectively and unobtrusively measure both crew autonomy and its relevant outcomes (performance, empowerment, satisfaction, cohesion, etc.). The technologies will be able to provide data for BHP to interpret how changes in crew autonomy during a mission influence the relevant team outcomes that are measured.

Objectives:

- Determine optimal level of autonomy needed for different spaceflight missions or mission phases;
- Design and/or enhance unobtrusive tools that measure crew autonomy and its relevant team outcomes;
- Establish how autonomy levels change within and across missions;
- Interpret how these changes in autonomy influence important team outcomes.

Requirements: The Crew Autonomy Assessment shall:

- Be unobtrusive
- Require minimal crew time or effort
- Detect changes in team (ground and flight crew) autonomy and team outcomes (those that are chosen)

Phase 1 Requirements: Develop Requirements for Crew Autonomy Assessment

- An assessment of current methods through which to monitor/measure autonomy and relevant team outcomes within the DOD and other agencies will be provided;
- An assessment of current technologies that unobtrusively monitor crew autonomy and relevant team outcomes (if any) will also be conducted;
- Recommendations regarding enhancements to current technologies or the development of new technologies will be presented;
- The spaceflight environment (current and future) and models related to autonomy and its relevant team outcomes will be assessed in order to determine the optimal requirements for developing a Crew Autonomy Assessment suitable for NASA human space exploration.

Phase 2 Requirements: Crew Autonomy Assessment Prototype developed based on accurate models and Phase 1 findings.

- Develop prototype hardware;
- Develop manual and troubleshooting guide;
- Evaluate and test the functionality of the prototype device.