



NASA SBIR 2008 Phase I Solicitation

X12.01 Space Human Factors Assessment Tools

Lead Center: JSC

Operations in confined, isolated, and foreign environments can lead to impairments of human performance. This subtopic seeks methods for monitoring, modeling, and predicting human performance in the spaceflight environment for accurate and valid human system integration into vehicle design and operations. In particular, the Space Human Factors Engineering Project within the Human Research Program is interested in obtaining timely and context-specific Human Factors (HF) incident data. Currently, space HF data come from crew debriefs. Such debriefs rely on retrospective recall, which could suffer delays of up to six months. Furthermore, opportunities to discuss HF issues in detail during these debriefs are limited. Consequently, the HRP sees the need to develop an automated human factors incident reporting tool.

Objective: Development of tool that assists the gathering and reporting HF incidents for long-duration space missions.

Requirements: In general, the tool will be used to help detect areas where HF can contribute to mission success, assess the effects of operational and hardware changes, and complement existing HF data sources for operations. Specifically, the tool shall meet the following requirements:

1. The crew shall have easy access to the tool at any time to eliminate the need for the crew to recall information retrospectively.
2. An easy-to-use data gathering protocol with the following functionalities: Allow data to be entered either as text, audio, and/or video inputs,
3. It is desirable for tool to detect a system anomaly automatically and immediately record system status. At a minimum, however, the tool should provide an easily accessible event marker for the crew to mark the context and take a snapshot of the system and operator system status.
4. Provide a user-friendly automated data search engine for extracting meaningful incident information from the raw data. Examples of desirable search schemes include natural language, spatial, temporal searches, etc.

Phase 1 Requirements: The technical merit of the tool will be explored to evaluate feasibility. The Phase 1 report will include results of the evaluation/research/ or development of automated data mining technologies, definition of optimal data gathering protocol(s), and recommendations for optimal hardware/software design. Development of hardware and software algorithms is highly desirable.

Phase 2 Requirements: Development of a working tool prototype, with documentation of functionality and usability evaluation and testing.

