NASA SBIR 2008 Phase I Solicitation

O3.01 Crew Health and Safety Including Medical Operations

Lead Center: JSC

Participating Center(s): ARC, GRC

Determining the probability of certain types of events (such as medical conditions) can be tricky. Often there is not enough space-flight data to make a good determination and so other types of evidence are used such as expert opinion, analog data, controlled studies, etc. Each source of evidence must be documented (e.g., as a publication citation, or as a data pull against some data source along with the query parameters used). The source is also characterized as to its â€œlevel of evidenceâ€ using the Cochrane methodology as documented in the National Guideline Clearinghouse (http://www.guideline.gov/summary/summary.aspx?doc_id4913). There are many methods for combining these evidence pieces. A software system is sought that can be used to collect the evidence (references to evidence sources such as journal publications, population statistics, analog study, etc.) and which facilitates the evidence level assignment (providing a place to record the evidence level and definitions of each level). Furthermore the system should provide a model for combining these evidence sources in a principled manner that characterizes the certainty of the conclusion reached, e.g., a weighted equation where the weights may be adjusted by the users of the system.

Relevance: Evidence of events drives risk assessment. Depending on the risks identified, decisions can be made as to whether to mitigate the risk via pre-flight activities or in-flight capabilities. Such a system supports â€œwhat would happen ifâ€ type reasoning that enables exploration of different mission options.

Challenge Addressed: Capturing the evidence base in one place along with additional categorization (level of evidence, uncertainty, quality of evidence, etc.) is invaluable in preserving decision-making rationale such that the decisions can be revisited if additional evidence/information is added later. Determining where to spend limited resources wisely is supported â€“ e.g., balance funding between development of pre-flight mitigation strategies, in-flight capability development, investigation of knowledge gaps (uncertainties), and risk acceptance decisions.

Research should be conducted to demonstrate technical feasibility during Phase 1 and show a path toward Phase 2 hardware and software demonstration and delivering a demonstration unit or software package for NASA testing at the completion of the Phase 2 contract.Â