

## EXPLORATION MEDICAL SYSTEM DEMONSTRATION PROJECT

D.A. Rubin<sup>1</sup>, S.D. Watkins<sup>2</sup>

<sup>1</sup>Wyle Science, Technology, and Engineering Group, Houston, Texas; <sup>2</sup>Universities Space Research Association, Houston, Texas.

### BACKGROUND

Exploration class missions will present significant new challenges and hazards to the health of the astronauts. Regardless of the intended destination, beyond low Earth orbit a greater degree of crew autonomy will be required to diagnose medical conditions, develop treatment plans, and implement procedures due to limited communications with ground-based personnel.

### SCOPE

The Exploration Medical System Demonstration (EMSD) project will act as a test bed on the International Space Station (ISS) to demonstrate to crew and ground personnel that an end-to-end medical system can assist clinician and non-clinician crew members in optimizing medical care delivery and data management during an exploration mission. Challenges facing exploration mission medical care include limited resources, inability to evacuate to Earth during many mission phases, and potential rendering of medical care by non-clinicians. This system demonstrates the integration of medical devices and informatics tools for managing evidence and decision making and can be designed to assist crewmembers in nominal, non-emergent situations and in emergent situations when they may be suffering from performance decrements due to environmental, physiological or other factors.

### PROJECT OBJECTIVES

The objectives of the EMSD project are to:

- a. Reduce or eliminate the time required of an on-orbit crew and ground personnel to access, transfer, and manipulate medical data.
- b. Demonstrate that the on-orbit crew has the ability to access medical data/information via an intuitive and crew-friendly solution to aid in the treatment of a medical condition.
- c. Develop a common data management framework that can be ubiquitously used to automate repetitive data collection, management, and communications tasks for all activities pertaining to crew health and life sciences.
- d. Ensure crew access to medical data during periods of restricted ground communication.
- e. Develop a common data management framework that allows for scalability, extensibility, and interoperability of data sources and data users.
- f. Lower total cost of ownership for development and sustainment of peripheral hardware and software that use EMSD for data management.
- g. Provide a better standard of healthcare for crew members through reductions in the time required by crew and ground personnel to provide medical treatment and the number of crew errors experienced during treatment.