Exploration Medical System Demonstration Project

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BACKGROUND AND PROBLEM DEFINITION

A near-Earth asteroid (NEA) mission will present significant new challenges including hazards to crew health created by exploring a beyond low earth orbit destination, traversing the terrain of asteroid surfaces, and the effects of variable gravity environments. Limited communications with ground-based personnel for diagnosis and consultation of medical events require increased crew autonomy when diagnosing conditions, creating treatment plans, and executing procedures.

SCOPE AND APPROACH

The Exploration Medical System Demonstration (EMSD) project will be a test bed on the International Space Station to show an end-to-end medical system assisting the crew medical officers in optimizing medical care delivery and medical data management during a mission. NEA medical care challenges include resource and resupply constraints limiting the extent to which medical conditions can be treated, inability to evacuate to Earth during many mission phases, and rendering of medical care by a non-clinician. The system demonstrates the integration of medical technologies and medical informatics tools for managing evidence and decision making. The end-to-end EMSD will include the following items at different levels of integration: middleware software, assisted medical procedures, consumables tracking, in-flight integrated medical model, electronic medical records, dry electrodes, flexible ultrasound, and video conferencing.

PROJECT OBJECTIVES

The objectives of the EMSD project are to:

a) Reduce and possibly eliminate the time required for a crewmember and ground personnel to manage medical data from one application to another.
b) Demonstrate crewmember's ability to access medical data/information via a software solution to assist/aid in the treatment of a medical condition.
c) Develop a common data management architecture that can be ubiquitously used to automate repetitive data collection, management, and communications tasks for all crew health and life sciences activities.
d) Develop a common data management architecture that allows for scalability, extensibility, and interoperability of data sources and data users.
e) Lower total cost of ownership for development and sustainment of peripheral hardware and software that use EMSD for data management.
f) Provide enhanced crew health via the reduction in crew errors, crew time, and ground time.