

MEDICAL DATA ARCHITECTURE PROJECT CAPABILITIES AND DESIGN

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ABSTRACT

Mission constraints will challenge the delivery of medical care on a long-term, deep space exploration mission. This type of mission will be restricted in the availability of medical knowledge, skills, procedures and resources to prevent, diagnose, and treat in-flight medical events. Challenges to providing medical care are anticipated, including resource and resupply constraints, delayed communications and no ability for medical evacuation. The Medical Data Architecture (MDA) project will enable medical care capability in this constrained environment.

The first version of the system, called “Test Bed 1,” includes capabilities for automated data collection, data storage and data retrieval to provide information to the Crew Medical Officer (CMO). Test Bed 1 seeks to establish a data architecture foundation and develop a scalable data management system through modular design and standardized interfaces. In addition, it will demonstrate to stakeholders the potential for an improved, automated, flow of data to and from the medical system over the current methods employed on the International Space Station (ISS). It integrates a set of external devices, software and processes, and a Subjective, Objective, Assessment, and Plan (SOAP) note commonly used by clinicians. Medical data like electrocardiogram plots, heart rate, skin temperature, respiration rate, medications taken, and more are collected from devices and stored in the Electronic Medical Records (EMR) system, and reported to crew and clinician. Devices integrated include the Astroskin biosensor vest and IMED CARDIAX electrocardiogram (ECG) device with INEED MD ECG Glove, and the NASA-developed Medical Dose Tracker application.

The system is designed to be operated as a standalone system, and can be deployed in a variety of environments, from a laptop to a data center. The system is primarily composed of open-source software tools, and is designed to be modular, so new capabilities can be added. The software components and integration methods will be discussed.