



Medical Data Architecture (MDA) Project Status

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ExMC Risk and Gap



Human Research Program

ExMC Element Risk

Risk of Adverse Health Outcomes & Decrements in Performance due to Inflight Medical Conditions

MDA Need

ExMC Gap Med07: We do not have the capability to comprehensively process medical-relevant information to support medical operations during exploration missions.

MDA Goal

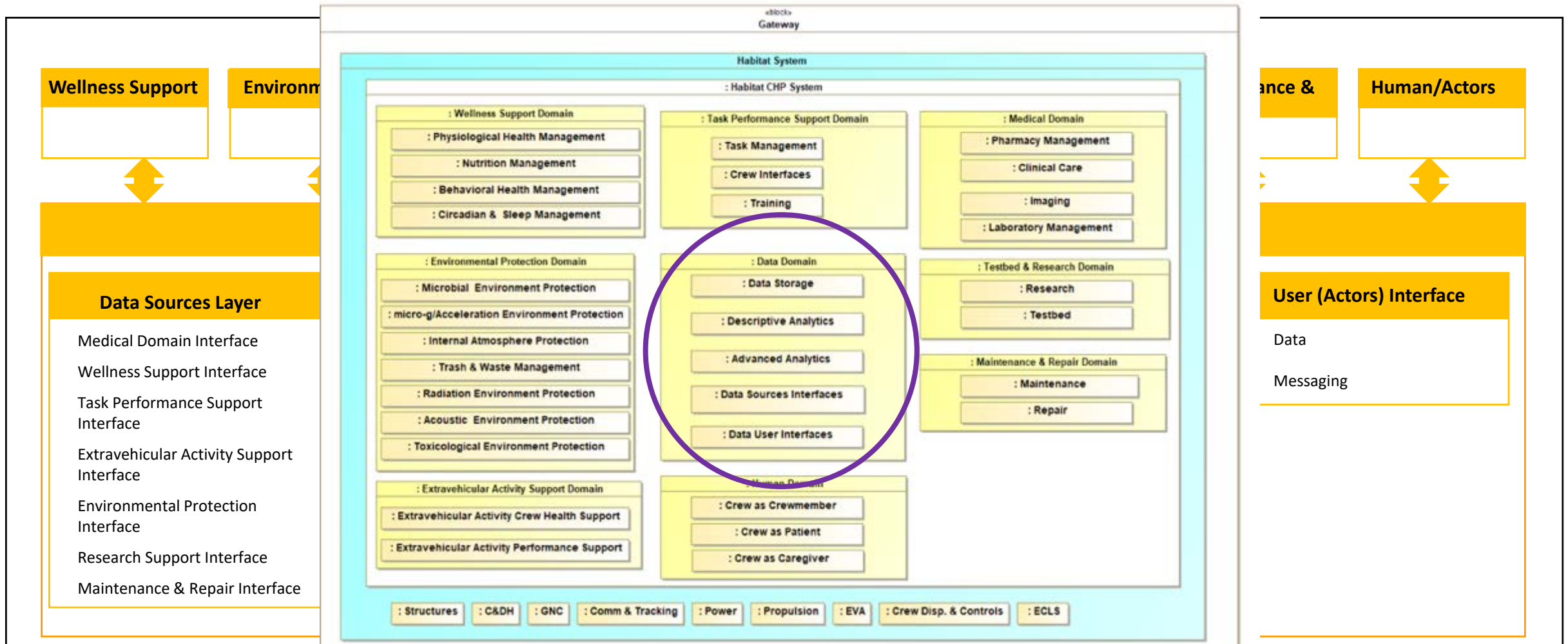
The MDA project will develop capabilities that support autonomous data collection, and necessary functionality and challenges in executing a self-contained medical system that approaches crew health care delivery without assistance from ground support.



Data System – Central to the Crew Health and Performance (CHP) System



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MDA Project Objectives



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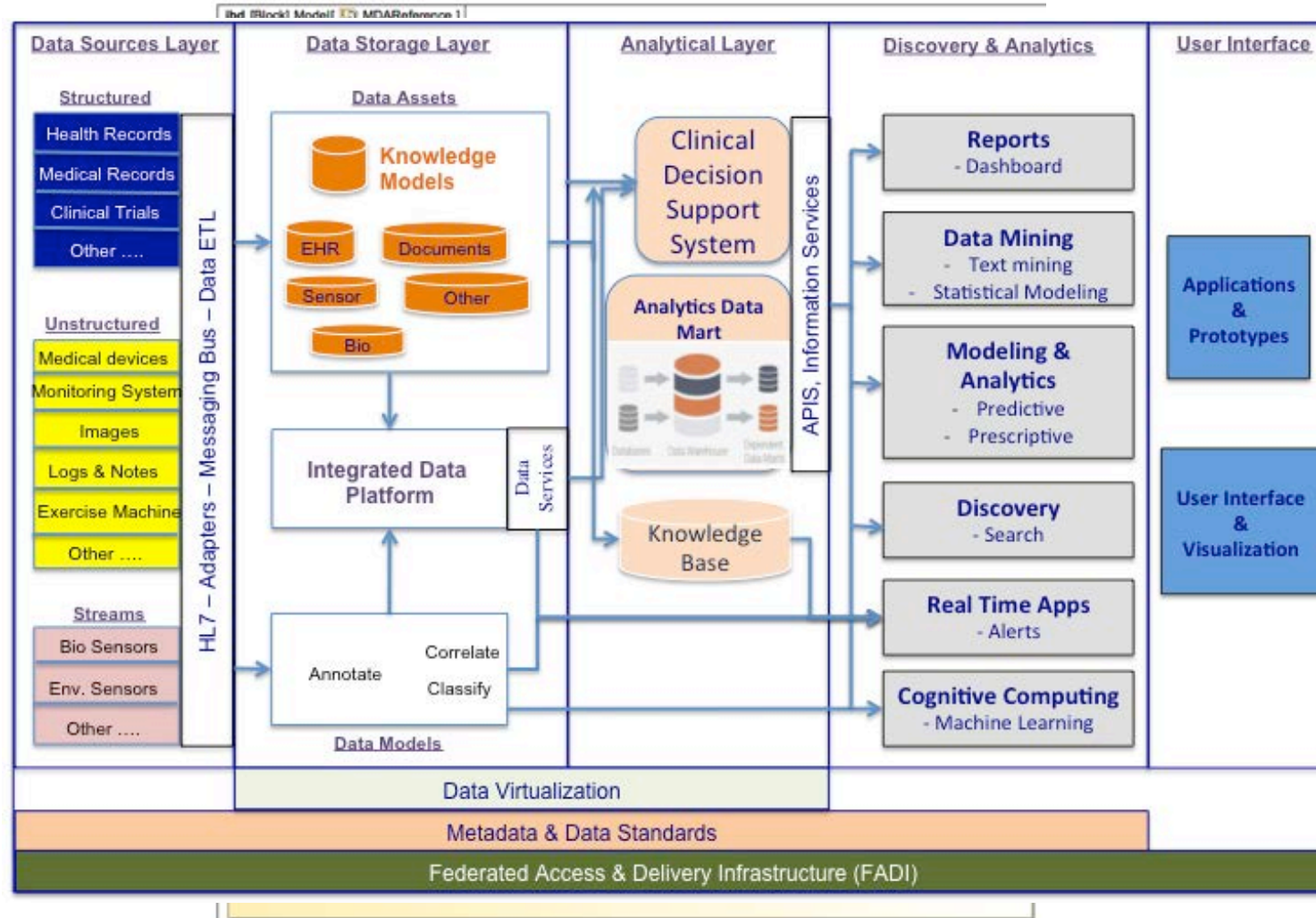
The core focus of the Medical Data Architecture prototype developments is to inform ExMC Systems Requirements definition through

- Technical design and implementation
- Analysis and trade studies
- Systems engineering



MDA Reference Architecture

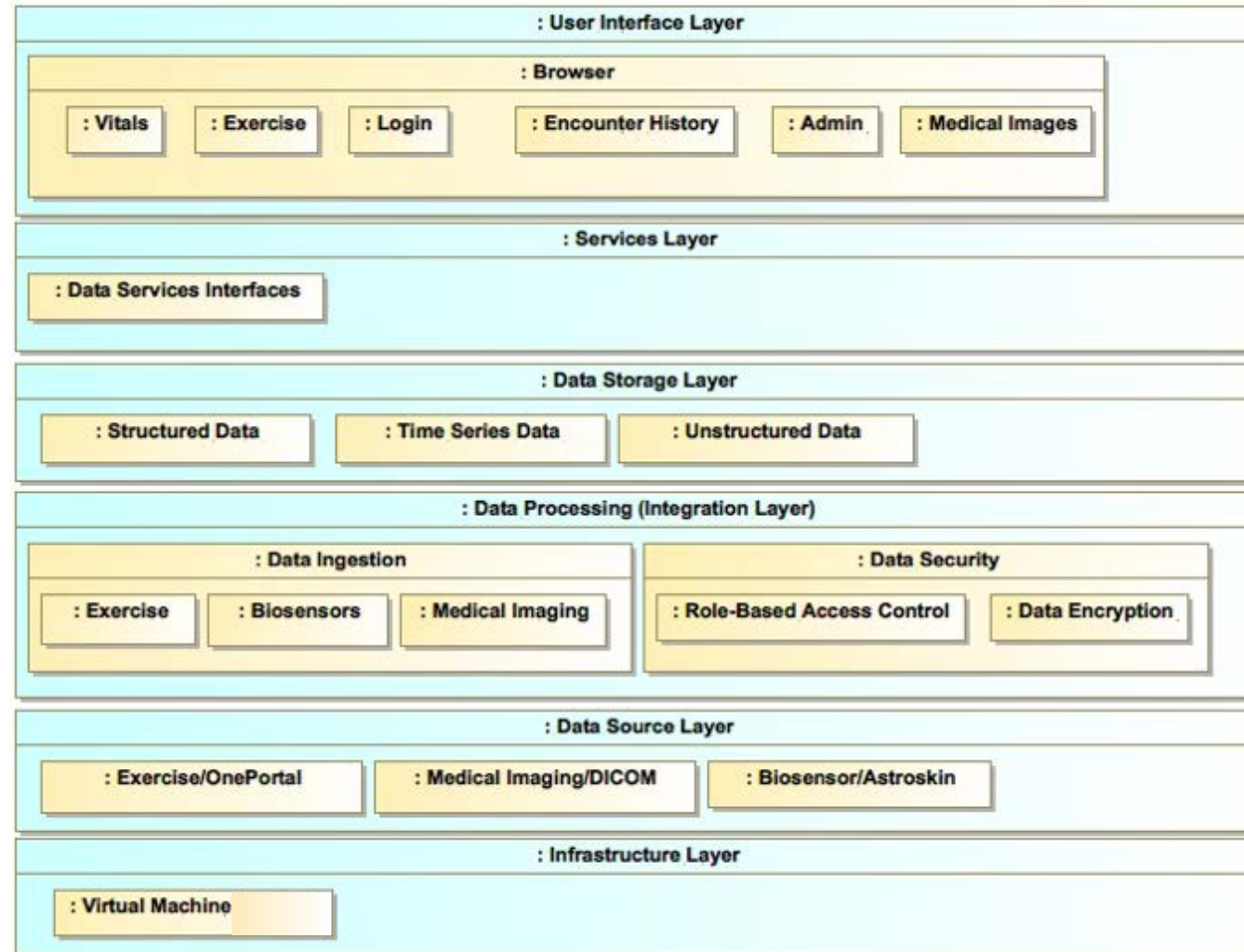
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MDA Test Bed 2 Architecture

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Medical Data Architecture

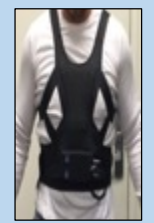
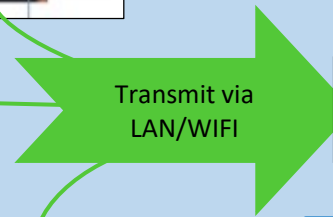


Medical Data Architecture 1.0 – Automated Data Management

- Enhance Medical Record
 - Automated capture and storage of vitals
 - ECG waveform retrieval
 - Customized templates for clinical notes and patient information
- Biosensor Integration
 - Astroskin, CARDIAX



© Canadian Space Agency



NimbleHeart dry electrode harness



iMed CARDIAX

MDA Objectives

- Establish a robust data architecture that informs requirements
 - Deep Space Gateway/Transit
 - Interfaces with Devices/Systems
 - Delivers Access to Data and Analyses

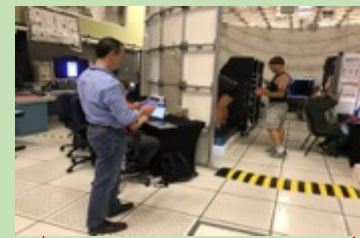
Medical Data Architecture 2.0 – Secure Data Management

- Exercise OnePortal integration
- Ultrasound image integration

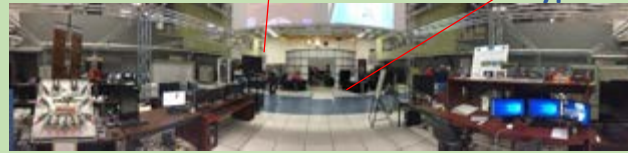


Analog Testing

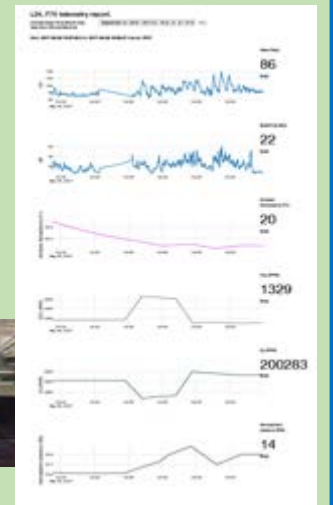
- Hab Testing



Habitat Prototype



Integrated Power Avionics and Software (IPAS) Facility





iPAS Demonstration and Habitat Testing



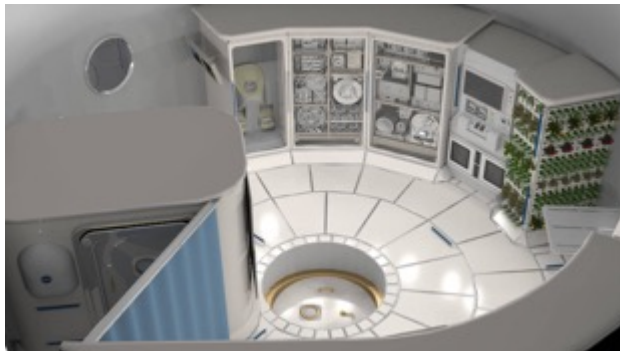
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Objectives

- Exercise file transfer from One Portal software into the MDA system and display medically-relevant exercise data
- Ultrasound file transfer from ultrasound device into the MDA system and display DICOM formatted images from the ultrasound file
- Synchronize the data between the MDA flight system and the mirrored MDA ground system
- FY 19: Deploy same configuration in habitat assessments.



Integrated, Power, Avionics and Software Test at NASA JSC



Conceptual Deep Space Habitats

<https://www.nasa.gov/deep-space-habitation/overview>

<https://www.nasa.gov/press-release/nasa-selects-six-companies-to-develop-prototypes-concepts-for-deep-space-habitats>



MDA Software Demo



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FY19 Approach for MDA



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MDA Test Bed 3 Approach

- Build of Test Bed 1 and 2 prototypes
- Wireless data streams from the Canadian Space Agency (CSA) On-Astronaut Wireless Sensor System
- Integration with the Flexible Ultrasound System
- Analytics layer and plug-in support
 - CSA Data Processing and Analysis plug-in integration
 - Autonomous Medical Operations integration: Image Analysis
- Further integration with the vehicle environment through iPAS and core Flight Executive system
 - Core Flight Software app

