



Exploration Medical Capability (ExMC) Program

Needs of NASA Relevant to Program

- The Exploration Program objectives will present significant new challenges relative to crew health care capabilities including hazards created by the terrain of lunar or planetary surfaces which may be difficult to traverse during exploration, the effects of variable transient gravity environments, and limited communications with ground-based personnel for diagnosis and consultation
- Medical requirements and technologies to ensure the safety and success of Exploration missions must be defined and developed
- Data and information must be cataloged to drive the medical research and development program through analysis of the trade-offs between medical care capabilities and system constraints such as mass, power, volume and training

Project Goals and/or Major Objectives

- Develop and validate requirements for reliable, efficient, and robust medical systems and treatments for space exploration to maximize crew performance for mission objectives

Basic Scope

- Provide enabling technologies and techniques to support medical operations requirements for Exploration to include: Medical Grade Water Generation, Closed Loop Oxygen Concentrator & Delivery System, Inflight Laboratory Analysis, Assisted Procedures Techniques, Wireless Sensors (O₂ concentration, BP, HR, EKG, temperature) and Data Systems, Inflight Suction Capability, and Diagnostic Imaging
- Use directed research (intramural/extramural investigators), hardware characterizations, training studies, and market surveys to meet project objectives
- Use ISS as an evaluation platform for next generation hardware testing of monitoring, diagnosis, and/or treatment techniques

Basic Scientific Research Plans

- JSC will lead an inter-Center and inter-institutional approach for development of systems and treatments for space exploration
- ExMC will develop hardware and capabilities to meet medical requirements as defined by the Levels of Care and Operating Bands/Fitness for Duty Standards
- Selected hardware systems will be developed and life cycle tested to ensure hardware reliability and/or maintainability

Connection to NSBRI Researchers

- Participation by NSBRI team members in hardware definition, trade studies, and technology development
- Project currently partnered with the NSBRI Smart Medical Systems and Technology Development Teams to provide support of medical technology development efforts

Anticipated Deliverables

- Effective and reliable on-orbit hardware requirements and technologies that meet medical, vehicle, and habitat constraints and use minimal vehicle and crew resources
- Validated medical model to quantify medical risks and impacts based on resource footprint

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