

Implementing the Vision

2nd Space Exploration Conference



Human Research Program

Research and Technologies in Support of
Space Exploration

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Human Research Program Overview



- Program goals:
 - Research necessary to understand and reduce spaceflight human health and performance risks in support of exploration
 - Enable development of human spaceflight medical and human performance standards
 - Develop and validate technologies that serve to reduce medical risks associated with human spaceflight

Human Research Program Overview (cont)

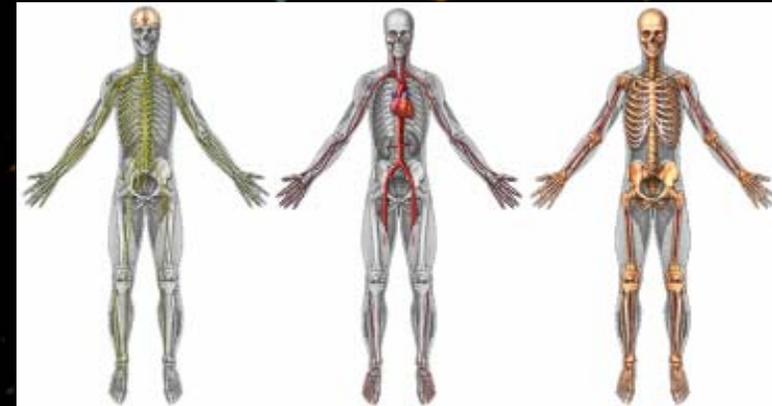
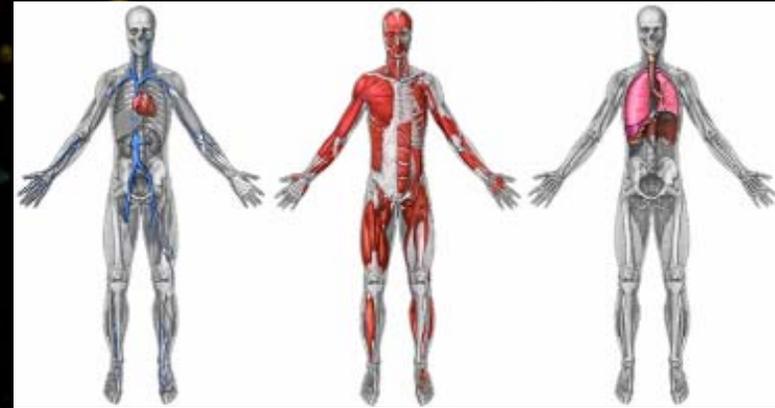


- Program investment areas reflect priorities established through research and operations experience over the last 40+ years
 - Space Radiation
 - ISS Research (ISS Medical Project)
 - Human Health Countermeasures
 - Exploration Medical Capability
 - Human Factors and Habitability
 - Behavioral Health and Performance
 - National Space Biomedical Research Institute (multi-disciplinary)

Research & Technology for Lunar Missions



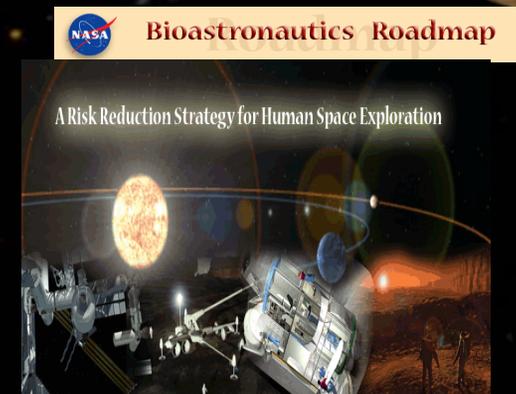
- Biological Effects of Space Radiation
- Health Effects of Lunar Dust Exposure
- Reliable and effective Exercise Countermeasures
- Optimum EVA/Human System Interface
- Physiological Response to 1/6th g
- Appropriate Medical levels of care
- Behavior and Performance
 - Avoiding sleep and fatigue problems
- Reduced mass and volume Food System



Human Health and Performance Risk Management Approach



- Space Flight Human System Standards
 - Standards implement health and medical policy
 - Based on the best available information and evaluated against the space flight environment
 - Reflect operational experience
- Deliverables
 - Desirable solutions to that reduce/manage the risks to human exploration



Many human health and performance risk reductions will come from system design choices!

Example: HRP Support of EVA Project



Risks to Human Health

- Decompression sickness
- Injury to joints and appendages

Risks to Human Performance

- Diminished work efficiency
- Fatigue
- Biomechanical efficiency



Human Research Program investments :

- Metabolic rate and thermal control
- Biomechanical efficiency
- Hydration and caloric needs
- Biomedical sensor technology

*Desired Outcome:
New EVA suit and systems
that meet mission
requirements
and maintain crew health*

Summary



- The ESMD/Human Research Program continues the NASA investments in life sciences research to allow management of spaceflight human health and performance risks
 - Focused on specific mission needs
 - Maximizing return on International Space Station (ISS)
- Our evidence based approach to human health and performance risk management relies on a strong and effective Human Research Program