A stylized space-themed illustration. On the left, a white and orange rocket is launching from a white launch pad. The background is dark blue with a white moon, a red planet (Mars), and several yellow stars. A white comet is visible in the upper left, and a red comet is in the upper right. The bottom left corner features a blue, cloud-like shape.

# NASA Spaceflight Human-System Standard Maintenance: An Evolving Strategy to Keep NASA Agency-Level Standards Current Through Partnerships with the Scientific Community

2024 Human Research Program

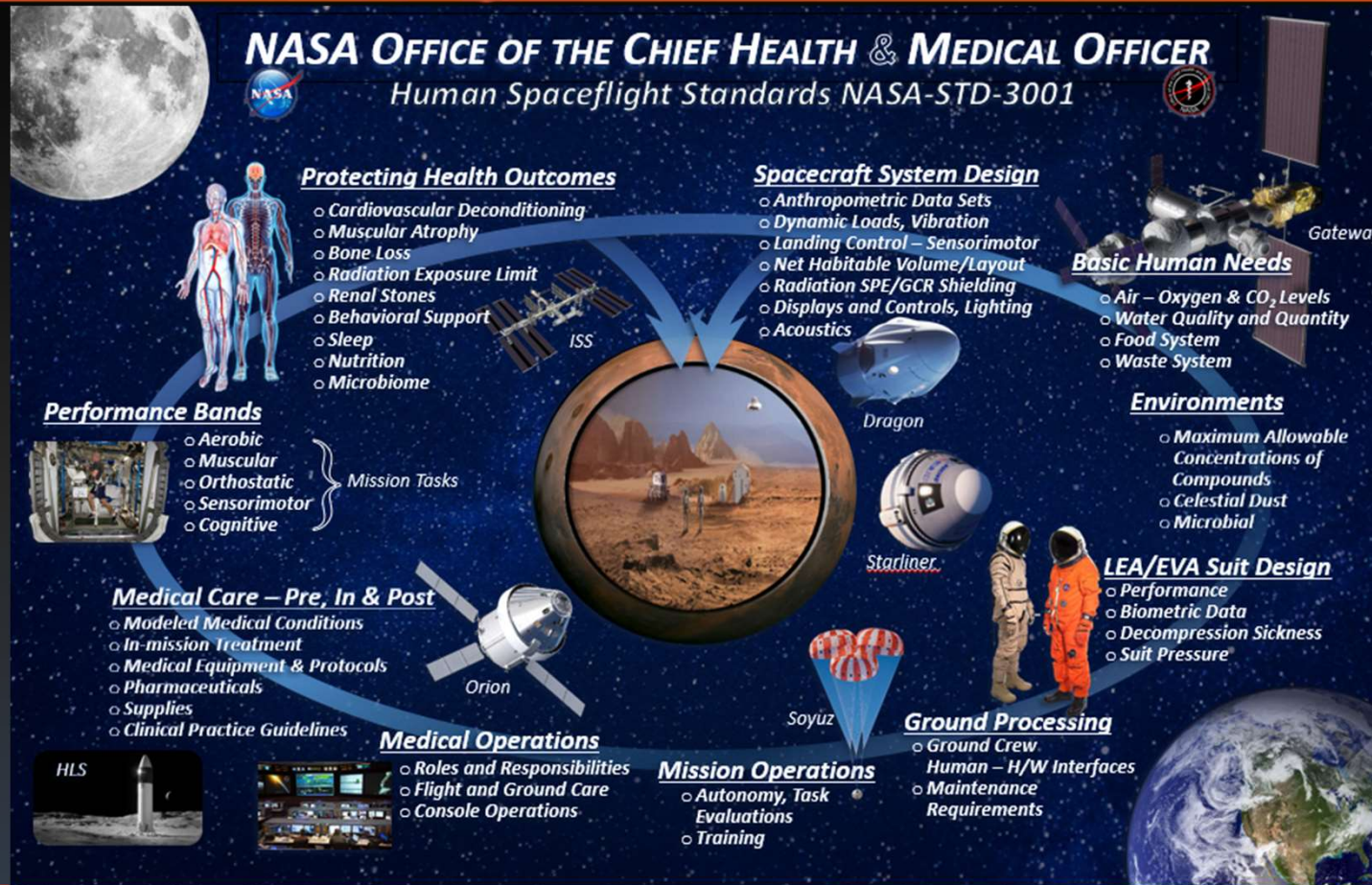
Investigators' Workshop

Imene Mechkene

Kim Lowe

# NASA OFFICE OF THE CHIEF HEALTH & MEDICAL OFFICER

## Human Spaceflight Standards NASA-STD-3001



# OCHMO Standards Website

## Human Spaceflight and Aviation Standards

### Technical Briefs

- Human Physiology and Behavioral Health
- Vehicle Design
- Medical Care
- Mishaps

<https://www.nasa.gov/ochmo/health-operations-and-oversight/hsa-standards/>

### Explore Standards



#### Technical Briefs

Specialized content that relates to human spaceflight and vehicle design.

Explore Technical Briefs



1 MIN READ

#### Human Spaceflight and Aviation Standards

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#### Chief Health and Medical Officer's Spaceflight Mishap Investigation Flight Surgeon Handbook

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#### Vehicle Acceleration Limits Library

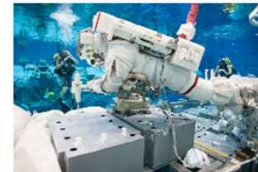
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#### Decompression Sickness (DCS) Prebreathe Reference Library

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# Process

Gap in Knowledge Identified

Pre-Coordination and Priority Assessment

Knowledge Gathering and SME Engagement

Working Group Effort

Refinement of Language and Document Updates





# Types of Activities and Required Data to Update Standards and Enable Programs

- *Hydrogen Sulfide (H<sub>2</sub>S) Exposure Limits*
- Exploration Atmospheres and Prebreathe Testing\*
- Crew Survivability Analysis
- Food Equipment and Production Regulations
- Physical Characteristics and Capabilities Data Sets
- *Immune and Hematology*
- Suited CO<sub>2</sub> Washout Testing\*
- Acceleration and Dynamic Loads
- Venous Thromboembolism (VTE)
- Medical Kits and Supportive Clinical Practice Guidelines
- Crew Recovery
- Crew Mortality and Death on Orbit
- AR/VR guidelines & Human and Robotic Teaming





# Hydrogen Sulfide (H<sub>2</sub>S) Exposure Limits

- Lunar surface volatiles and habitable space accumulation
- Development for Spacecraft Maximum Allowable Concentrations (SMACs) for H<sub>2</sub>S for durations of exposure for spaceflight (1-hour, 24-hours, 7-days, 30-days, 180-days, and 1000-days\*)
- Passive dosimetry technology should be considered for long-term monitoring at these low concentrations





# Immune

- Latent virus reactivation monitoring, especially during deep space missions
- Skin swabs (as needed) for in-flight analysis to assist with diagnosis of any unexpected dermatitis events
- Routine monitoring (as needed) to assist in diagnosing infectious disease



Questions?

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