



## HUMAN HEALTH AND PERFORMANCE

Exploring Space | Enhancing Life

# Human Systems Requirements & Verification Plans

Our unique human spaceflight expertise and capabilities have armed us with the knowledge of what is required to safely, successfully, and effectively design for, test, verify, and operate human missions successfully over the past 50 years. Understanding the importance of human systems requirements, and how to verify them, is key to successful operations and mission.

### World Renowned Skills and Unique Capabilities

The Johnson Space Center, a world leader in human spaceflight, possesses unique knowledge, skills, and capabilities that can be applied to solving human health and performance challenges here on earth—particularly those related to operating in extreme and harsh environments.

NASA expertise is available in the area of Human Systems Requirements development and verification of those requirements. Delineating what is truly important and necessary for humans to succeed in a harsh environments and determining the effectiveness of the design solution are skills NASA has been applied to many programs.



### NASA Human System Standards

NASA has developed over years of experience a set of Spaceflight Human System Standards, which minimize health and performance risks for flight crew in human space flight programs while maximizing performance. They establish requirements for providing a healthy and safe environment for crewmembers as well as the medical capabilities necessary to support crewmembers during all phases of space flight. Requirements are established to optimize crew health and performance, thus contributing to overall mission success, and to prevent negative long-term health consequences related to space flight.

NASA expertise is available to assist in the translation of the standards to the specific application of project or program. The standards are applied according to the defined reference mission and may be tailorable depending on the specifics of the mission and goals.

Johnson Space Center

Human Systems Requirements Development, Verification and Validation including expertise, skills, and knowledge are available to support development of the final product to ensure that it meets the NASA Human System Standards, provides a healthy and safe environment for crewmembers and minimizes health and performance risks for flight crew in human space flight programs.



### Verification of Human System Requirements

Verification is proving the end product conforms to its requirements. This includes scoping and planning the verification efforts, analyzing the outcomes of verification (including identifying anomalies and establishing recommended corrective actions), and preparing a product verification report providing the evidence of product conformance with the applicable requirements.

NASA has a vast experience base of verifying human system requirements and NASA expertise is available to aid in selecting the most cost-effective and effective methodologies for verification of the requirements.

### Product Validation

Confirms that a verified end product satisfies the stakeholder expectations for its intended use when placed in its intended environment and ensures that any anomalies discovered during validation are appropriately resolved prior to product transition to operation phase.

This includes preparing to conduct product validation, performing the product validation, analyzing the results of validation (including identifying anomalies and establishing recommended corrective actions), and preparing a product validation report providing the evidence of product conformance with the stakeholder expectations baseline.

NASA expertise is available to assist in this phase of the lifecycle to ensure compliance with the NASA Human System Standards, minimal risk for the crew, and maximum opportunity for mission success.



For the benefit of all