IAF SPACE EXPLORATION SYMPOSIUM (A3)
Space Exploration Overview (1)

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NASA'S MOON TO MARS ARCHITECTURE UPDATES

Abstract

NASA has evolved its architecture development approach from a capabilities-driven framework to an objectives-based strategy. Driven by the agency's Moon to Mars Objectives—which were developed with thousands of contributions from individuals, companies, academic institutions, international space agencies, and our very own workforce—this strategy first establishes what NASA and its partners want to accomplish at the Moon and Mars, then develops the architecture to meet those objectives.

Throughout 2022, NASA developed a suite of blueprint Moon to Mars Objectives in categories spanning multidisciplinary science, transportation and habitation, lunar and Martian infrastructure, and operations. Through multiple channels, the agency collected written inputs from across the world and hosted a domestic and an international workshop to refine these objectives. The results led to a refined set of 63 objectives and a new domain: recurring tenets, which were developed to capture common themes that are broadly applicable across the objectives and limit repetition in the objectives.

In parallel, NASA's Architecture Development Office worked through its 2022 Strategic Analysis Cycle, which included architectural studies and trade space assessments for human missions to the Moon and Mars. While this was not the first architecture Strategic Analysis Cycle, it was the first in which the architecture teams would trace their analysis to the Moon to Mars objectives, culminating in the first Architecture Concept Review (ACR).

NASA plans to conduct yearly Architecture Concept Reviews to ensure its exploration plans remain on track with the Moon to Mars Objectives, maturing technologies, and national priorities. This paper will focus on the objectives-based architecture development approach, the annual Architecture Concept Review format and process, and will highlight results, products, and future work plans stemming from the 2022 Architecture Concept Review.