Paper ID: 78898
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IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Governmental Human Spaceflight Programmes (Overview) (1)

Author: Mr. James (Jim) Free
National Aeronautics and Space Administration (NASA), United States

KEYNOTE: IMPLEMENTING AN INCLUSIVE DEEP SPACE ECOSYSTEM

Abstract

NASA's Moon to Mars exploration strategy is a multi-faceted effort to use the Moon as a proving ground in preparation for sending humans to Mars, all along putting scientific discovery at the forefront. The activities to support this strategy, led by NASA's Exploration Systems Development Mission Directorate (ESDMD), involve a series of progressive steps, from testing our deep space transportation systems, the Space Launch System rocket and Orion spacecraft, to building the first space station in lunar orbit, known as the Gateway, to deploying robotic and human landers to the Moon and Mars. NASA's Moon to Mars initiative will enable humanity to understand the solar system and its habitability better while inspiring the next generation of space exploration and discovery.

On the heels of the successful Artemis I mission, ESDMD is developing the systems necessary and plotting a course for future missions to achieve the objectives set by NASA's Moon to Mars exploration strategy. While ESDMD is focused on building these systems, the directorate carries the mantle of long-term planning and, over the past year, has implemented an architecture concept review process. This process distills the objectives and goals into characteristics and needs from which use cases, functions, elements, and requirements are derived. From there, the directorate implements new programs and establishes partnerships to build the elements that will achieve these functions, as well as designs missions to put the elements into use. As the architecture advances, ESDMD and its partners, including other NASA Mission Directorates, international space agencies, industry organizations, and academic institutions, will develop the technologies and capabilities needed to achieve the objectives. This collaboration will be instrumental to build a long-term presence beyond low-Earth orbit for scientific discovery and will be an invaluable asset in expanding humanity's exploration of the solar system.

This paper will elaborate on ESDMD's role in executing NASA's Moon to Mars exploration strategy through iterative architecture development and the implementing programs charged with building the elements. Readers will gain insight into NASA's internal management and collaborative efforts to create a cadence of exploration missions to the Moon and inform future exploration of farther away destinations, including Mars.