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NASA'S SPACE EXPLORATION PLANNING: THE ASTEROID MISSION AND THE STEP-WISE
PATH TO MARS

Abstract

Within the U.S. space policy framework, NASA continues to advance its space exploration programs and plans to remain a world leader and valuable partner in space exploration. NASA's programs reflect the importance of human space exploration in the U.S. by focusing on the foundational capabilities and technologies which will ensure government investments continue to drive innovation and enable exciting missions as part of a step-wise path to Mars. NASA is focusing on developing these initial capabilities while collaboratively working with international partners to define a technically feasible and programmatically implementable strategy for deep space exploration. This paper will summarize this work and how NASA's approach to capability development enables a step-wise path to human exploration of Mars, with missions along the way providing the opportunity to infuse new technologies, advance capabilities, learn to manage the risks of operations in deep space while using the presence of the crew to explore, discover and inspire.

NASA is laying the groundwork for the partnerships necessary to explore beyond low-Earth orbit (LEO). The heavy lift launcher Space Launch System (SLS) and the Orion crew vehicle are the first foundational capabilities under development. Orion and SLS will enable near-term missions in the lunar vicinity, demonstrating capabilities and operations concepts for managing the risks of exploration missions further away from the relative safety of LEO. These missions also enable exploration of a near-Earth asteroid and the Moon, allowing the presence of the crew to engage the public in ways that increase the value to people on Earth. International and public-private partnerships will enable these early missions and ensure that human space exploration proceeds in a sustainable manner.

This paper will include a summary of NASA's work to formulate a mission to redirect an asteroid to a stable orbit in the lunar vicinity allowing astronauts to explore. It will describe how this mission fits into the long term international context described in the Global Exploration Roadmap, released by space agencies participating in the International Space Exploration Coordination Group (August 2013). NASA welcomed the contribution of the January 2014 International Space Exploration Forum. The meeting of government representatives demonstrated the importance of international partnerships in exploring space and welcomed the work of space agencies on the Global Exploration Roadmap.