

HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Governmental Human Spaceflight Programs (Overview) (1)

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ASTEROID REDIRECT MISSION

Abstract

This paper will present the current status of NASA's Asteroid Redirect Mission, currently in mission formulation Phase A and working toward entering Phase B. The Asteroid Redirect Mission (ARM) is part of NASA's plan to advance the new technologies and spaceflight experience needed for human missions to the Martian system in the 2030s.

The ARM is an early mission in the Proving Ground — the space near Earth that extends just beyond the moon where we can take risks and solve problems outside Earth's protective magnetosphere. The ARM will be the first-ever mission to visit a near-Earth asteroid, collect a multi-ton boulder from its surface, and then place the asteroidal material into a stable orbit around the moon. Once there, astronauts will explore the boulder and return to Earth with samples in the 2020s, marking significant advancement in human exploration.

In 2015, NASA issued a membership call to create a Formulation Assessment and Support Team (FAST) to provide input during the requirements definition phase of the robotic portion of ARM. The work of the FAST is now completed. A summary of the findings and application to mission formulation will be presented in this paper.

NASA also completed acquisition strategy process for the robotic mission of ARM to leverage commercially available U.S. industry capabilities to reduce costs and cost risk. The Jet Propulsion Laboratory (JPL) proceeded with a two-phase acquisition strategy for the spacecraft bus. Four companies were selected to conduct design studies for the solar-electric-propulsion-based spacecraft for ARRM.

The acquisition strategy for the ARRM spacecraft ARRM managers and technical personnel are preparing for NASA's Key Decision Point-B, or KDP-B. At KDP-B, NASA will confirm the robotic mission's preliminary system-level requirements and operational concepts. It will cover baseline project requirements, budgets, and schedules across the NASA field centers for the next phase of development for the ARRM.

NASA plans after KDP-B include issuing a membership call for a multidisciplinary ARM Investigation Team which will collaboratively define and support investigations in science, planetary defense, asteroidal resources and in-situ resource utilization (ISRU), and capability and technology demonstrations. NASA is also planning to seek contributed payloads and investigations for ARRM. This paper will provide NASA's latest update on the status of the ARM, including progress and plans.