

A MESSAGE FROM THE PROJECT MANAGER

Long-duration habitation, surface systems and human life support systems will evolve through NASA's capability-driven approach to exploration, but even the most sophisticated designs must include ISRU components when possible. These research and technology development areas will focus on technologies necessary to extract consumables (O₂, H₂O, N₂, He, etc.) for human life-support system replenishment. The technologies can also be used to mine source materials for in-situ fabrication, repair technologies, and source materials (composites, etc.) such as radiation shielding for shelters. Mission capabilities and return on investment multiply when human consumables and spacecraft propellant can be harvested from extraterrestrial environments. As we embark on deep-space missions with weeks or months long travel times, ISRU becomes increasingly important because resupply missions are expensive and exclusively relying on them may put crews at risk.

Each year fifty university-level teams design and build robots to dig in the simulated basaltic regolith to find alternative practices of harnessing resources from off-world exploration sites. Since its inception RMC has hosted over 300 different robots and 3,000 students from across the U.S. including Alaska, Hawaii and the Commonwealth of Puerto Rico.

The terms "mining robot", "robot", "robots", "mining bot", "bot" & "bots" shall be used interchangeably in this document. For more information, visit the NASA Robotic Mining Competition on the Web at <http://www.nasa.gov/nasarm> and follow the NASA Robotic Mining Competition on Facebook and Twitter.

The Robotic Mining Competition supports the requirements as outlined in the NASA Education Implementation Plan 2015-2017(E3) Jan 2016 as follows:

- NASA Strategic Objective 2.4 Advance the Nation's STEM education and workforce pipeline by working collaboratively with other agencies to engage students, teachers, and faculty in NASA's missions and unique assets.
- NASA Education Performance Goals 2.4.4 and Annual Performance Indicator ED-16-4.
- CoSTEM Strategic Plan by enhancing the STEM experience of Undergraduate Students and Build and Use Evidence-Based Approaches.

The Competition meets or exceed the requirements set for the by the Accreditation Board for Engineering and Technology (ABET). ABET accreditation sets the global standard for programs in applied science, computing, engineering, and engineering technology (<http://www.abet.org>).

The Robotic Mining Competition requirements provides access to resources and experiences available nowhere else on earth that have practical on and off-world applications for the students and their teams.

**Good for NASA, Good for America
Good for All of US**