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ACCELERATING LUNAR RESOURCE UTILIZATION: THE DYNETICS HUMAN LANDING SYSTEM

Abstract

NASA's bold vision for human space exploration embodied in the Artemis Program has demonstrated broad and increasing support around the world. Artemis aims to return humans to the Moon to advance science, master technologies associated with lunar resource utilization, and prepare for future human missions to Mars. As NASA leads space-faring nations to the Moon and further into space, the ability to utilize lunar resources will play an important role. Lunar resources will strengthen a growing lunar economy, widely viewed as an important step for sustainable Mars missions.

The Dynetics Human Landing System (DHLS), a key element of the Artemis architecture, will drive significant advancements in the technologies needed to utilize lunar resources. DHLS will be fueled in cislunar space to execute its mission. With refueling, it can conduct additional flights to the lunar surface. Initially, liquid oxygen and liquid natural gas (LOX/LNG) will be delivered from Earth, directly to the lander in lunar orbit. Soon thereafter, a depot will be established in cislunar space. Cryogenic propellant storage and transfer technologies demonstrated on a large scale are necessary to enable the use of cryogenic propellants produced on the lunar surface. Dynetics will work with partners in this area to ensure that standards and capabilities are developed to serve the DHLS, other Artemis elements, Mars missions, and commercial capabilities.

The ability to receive propellants, water, and other resources on and around the Moon will enable capability providers to offer reusable systems at a lower price. Doing so will strengthen the lunar economy and enable many innovative ventures to succeed. Lunar resources will also enable new mission classes with existing capabilities. Dynetics and the DHLS team will establish capabilities and demonstrate technologies that accelerate the effort to use lunar resources for the benefit of all stakeholders.