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Human Exploration of the Moon and Cislunar Space (1)

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SUSTAINABLE LUNAR EXPLORATION

Abstract

NASA plans to land two astronauts on the Moon in 2024. After this initial mission, NASA's lunar exploration strategy will focus on enabling a sustainable human presence and using the Moon to conduct Mars analog missions. Sustainability will be achieved by investing in key technologies such as reducing the logistics that must be supplied from Earth, using lunar resources to produce propellants, demonstrating closed-loop life support systems on ISS, and developing refueling capabilities for reusable lunar landers that can return to the Gateway outpost in lunar orbit. The status of technology development for sustainable lunar and Mars exploration will be discussed.

The Gateway will also advance the sustainability of operations in cislunar space. The Gateway will be used as a staging point for aggregation and checkout of exploration vehicles before the crew embarks on missions to Mars. To reduce mission risk, analog missions on the Moon and the Gateway will validate operational concepts for Mars missions, and test prototype surface habitats, crew mobility systems, and the Mars transit vehicle.

Commercial partnerships will play an important role in achieving sustainability by stimulating a lunar economy and making human exploration missions more affordable. NASA will help companies to develop and deploy the foundational elements of surface infrastructure such as power systems, in-situ resource utilization plants, and cryogenic fluid management facilities. After the surface infrastructure elements are operational, the companies can sell power and propellants to NASA. In the longer term, scientific discovery, human exploration, and commercial economic interests will all drive sustainable human settlement of the Moon.