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FROM DUST TO GAS, LEAP2 TECHNOLOGIES FOR LUNAR SITE DEVELOPMENT AT THE
MARIUS HILLS SKYLIGHT

Abstract

Lunar Ecosystem and Architectural Prototype (LEAP2), is a commercial lunar site development program being developed by an international consortium of aerospace industry organizations investigating technologies for lunar settlement. LEAP2 addresses space architecture research for a specific lunar site identified as the Marius Hills Skylight, believed to be the opening to a lunar lava tube cave useful for eventual human habitation.

The LEAP2 international consortium is loosely organized with industry, academia, and government organizations. LEAP2 example technologies under development include robotic access and sensing technology for scientific measurements, In-situ Resource Utilization (ISRU) technologies such as additive manufacturing for habitat design, regolith simulants research, and manufacturing for planetary construction using polymeric concrete for surface infrastructure. Investigated technologies can be applied to multiple lunar pit crater sites, and much of the proposed technology and protocols could be used almost anywhere for planetary surface systems.

The LEAP2 consortium funds its technology research through individual member's Internal Research and Development (IRAD) budgets. Additionally, collaborative proposals for funding joint technology development are submitted to government agencies of respective member host countries and to other commercial opportunities that may arise. Consortium members also jointly co-author research papers for publication in peer-reviewed journals, conference presentations and symposia. Examples of current LEAP2 technology from a sample of consortium members performing individual and collaborative research are presented.