Return to the Moon (02)
Goals and Status of Future Lunar Missions (2)

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LUNAR EXPLORATION ACTIVITIES WITHIN THE GERMAN NATIONAL SPACE PROGRAM

Abstract

The German Space Strategy and its programmatic implementation by DLR Space Administration emphasize a stepwise approach for space exploration. With the knowledge of living and working in space from Spacelab, MIR and ISS the next step beyond low Earth orbit should be the Moon with robotic means first.

DLR is continuing a feasibility study for a lunar Mobile Payload Element (MPE) which is intended as a German contribution to the ESA Lunar Lander mission or a lunar lander mission foreseen by another international partner. This MPE will be a small robotic rover to demonstrate e.g. its autonomous capabilities for navigation and operations like soil sample collection and delivery to the stationary lunar lander module. Mobility is considered necessary for reaching samples/locations from non-propulsive contaminated zones. In addition a minimum set of scientific instruments (for e.g. sample selection, context documentation) shall also be part of the mobile element.

DLR's strong interest in cooperative missions is furthermore underlined by the Small Lunar Exploration Orbiter (SLEO) concept, for which an assessment study proved the scientific relevance and principal feasibility. SLEO is proposed as a combined communication and exploration orbiter, engineered, built and operated in Germany. In return for the launch and injection into the lunar transfer, SLEO shall support the partner's lunar farside lander mission (e.g. at the South Pole Aitken Basin) with data relay functionality. In a second mission phase a high performance instrument suite will be operated gathering data to answer pressing questions on e.g. the presence of water on the Moon. While the JPL MoonRise Mission was used as reference case, DLR is open for negotiations for a partnership on such future lunar missions.

Besides the ESA LL Mission, the MPE and SLEO, DLR Space Administration is preparing a wider scale of lunar and general exploration technologies within a variety of grants and contracts e.g. for bio-regenerative life-support systems, regenerative fuel cell and energy systems, in-situ resource utilisation, including the combined utilisation of these advanced technologies for the purpose of habitation. Some selected exploration instrument developments/contributions for potential cooperation in context with international exploration missions are in predevelopment, improving the availability of critical technologies and their technology readiness level.

The paper will present the actual status and results of the MPE and SLEO projects as well as achievements for the ongoing exploration-related technology developments in context with DLR Space Adminis-

tration's programmatic orientation with respect to Moon and further exploration activities.