

SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 2 (2B)

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PREPARING FOR LUNAR EXPLORATION

Abstract

With the knowledge of living and working in space from Spacelab, MIR and ISS, agencies are today preparing for the next step of space exploration. The DLR Space Administration supports a stepwise exploration approach with a strong robotic component and the Moon as a first step, underlining the German national space strategy. During the past six years a broad diversity of lunar oriented projects within the national space program has been accomplished together with industry and universities to get prepared for future cooperative exploration missions in European and global partnerships.

A first set of studies was related to landing mission scenarios combined with surface science, in-situ resource utilization (ISRU) and surface mobility. Succeeding projects were more concrete mission or element concepts, e.g. Lunar Exploration Orbiter, Lunar Landing Demonstrator, Small Lunar Exploration Orbiter (SLEO) and the lunar Mobile Payload Element (MPE). The SLEO concept might be continued in the framework of the future ESA Small Missions. The MPE could become a contribution in kind for the ESA Lunar Lander (LL) Mission. These LL activities are continuously and strongly supported by DLR.

Besides the obviously Moon-related studies, DLR has initiated several more generic technology development projects. Areas covered are bio-regenerative life-support systems, regenerative fuel cell and energy systems, ISRU, including the combined utilisation and linkages of these advanced technologies for future robotic and human exploration mission.

DLR's motivation for lunar exploration first is justified by the promising technological, scientific, industrial and political impact. The existing research and industrial capabilities in Germany will become fully effective and game changing technologies will be developed as the LL Mission comprises autonomous soft precision landing, hazard avoidance, guidance, navigation and control, automated operation, robotic mobility and energy management. Pending on a positive decision at the upcoming ESA Conference on Ministerial Level, the LL Mission consolidates the European role in the global exploration scenario as it is described in the ISECG's Global Exploration Roadmap, jointly developed between DLR, ESA and their partner agencies. As precursor mission it contributes to prepare Germany for an important role and strategic partnerships within future robotic and human exploration missions.

DLR Space Administration continues its space exploration efforts in a stepwise technical approach with a strong science case, focusing on the Moon first. The paper will cover scope and context of the work performed the achieved status and the future planning from a DLR point of view.