

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

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PAYLOADS FOR THE ESA LUNAR LANDER MISSION STUDIED BY KAYSER-THREDE

Abstract

Europe is presently preparing a robotic mission to the Earth Moon. The Lunar Lander mission is aiming for a landing near the lunar South Pole in the year 2018.

Different payload studies are currently being performed by the European Industry with ESA, but also with national, funding. Kayser-Threde is leading or is significantly involved in the following payload studies:

1. The “Lunar Dust Environment and Plasma science Package” (L-DEPP) is accommodated on the upper deck of the ESA Lunar Lander vehicle, for investigation of the plasma, charged/levitated dust and electromagnetic environment of the Moon. One objective of the intended investigation focuses on the transfer period between daylight and short darkness periods where great changes in this environment are expected.

2. The “Lunar Dust Analysis Package” (L-DAP) is also accommodated on the lander spacecraft with the objective to determine, at microscopic scale, the mineralogical and elemental composition, the concentration of absorbed volatiles as well as the key physical properties of lunar regolith samples delivered to the package. This is achieved by a combined Raman and LIBS spectrometer, coupled with optical and atomic force microscopy.

3. The “Mobile Payload Element” (MPE) is designed to be a small autonomous innovative sample fetching rover vehicle in the 10 kg class, intended to be a German national contribution to the ESA Lunar Lander mission. Kayser-Threde, as the Phase 0/A industrial prime, has assembled relevant German industrial and institutional competences in space robotics for this study. The novel capability of the MPE is to acquire clearly documented samples from controlled surface as well as subsurface locations and to bring them to the lander for analysis with the volatile seeking instruments L-DAP and L-VRAP. The rover concept has a four-wheeled configuration with active suspension, being a compromise between innovation and mass efficiency. The suspension chosen allows a compact stowage of the MPE on the lander. As operational modes teleoperations from earth and autonomous navigation are foreseen. The MPE Phase 0/A study is finishing in early 2012.