

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

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THE FIRST EUROPEAN LUNAR LANDER AND THE ESA-DLR APPROACH TO ITS
DEVELOPMENT

Abstract

Exploration of the Moon, by both autonomous precursor missions and later with the return of humans, has emerged as a major goal of the world's space powers. International cooperation will be key to ensuring the robustness and sustainability of a future human exploration effort, and is currently pursued as part of the Global Exploration Strategy, in which ESA and many of its member states participate.

In preparation for the European participation to human lunar exploration, which is foreseen to include a Cargo delivery capability as a major element, the European Space Agency (ESA) and the German Space Agency DLR, with a contribution of Portugal, have been pursuing a precursor mission opportunity with the primary objective to demonstrate soft-precision landing with hazard avoidance capabilities on the Moon. Once on the surface this precursor mission will perform measurements and conduct experiments in fields with a strong relevance for later human exploration activities, e.g. investigations on radiation and its effects, and on dust toxicity. As part of ESA's Human Spaceflight programme, and reflecting the clear interests of DLR, mission options have been investigated at Phase A level of this first European lunar lander.

Based on the outcomes of Phase A studies, the elaboration of mission objectives (discussed in a parallel paper) and taking into account agency priorities and technical challenges, a mission baseline has

been established which will be pursued and matured through Phase B1 level activities. This baseline, focusing on a mission intended to land in the lunar South Polar region to capitalise on unique illumination conditions, will be studied in parallel to technology maturation activities pursued in critical fields. A model payload is defined for Phase B1 taking into account the identified objectives, with the inclusion of dedicated resources to accommodate a mobile payload element to demonstrate the application of innovations in this field on the lunar surface.

This paper describes the mission options which have been investigated in the frame of the first European lunar lander, and the way forward through Phase B1. In addition, the approach to overcoming major technical and environmental challenges will be described, including the coordination between ongoing ESA development activities, and those pursued nationally by DLR.