

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

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## SCIENCE AND PAYLOAD ACTIVITIES IN SUPPORT OF THE ESA LUNAR LANDER

**Abstract**

ESA's Human Space Flight directorate is continuing with preparations for its Lunar Lander project. The Lunar Lander is an unmanned precursor mission to future human exploration. It will enable the development of the technologies, capabilities and scientific knowledge that will allow Europe to participate in future international human exploration activities of the Moon and beyond. The primary objective of the mission is to demonstrate soft precision landing with hazard avoidance and once on the surface it provides an opportunity for payload operations and scientific measurements. The scientific objectives and requirements for the mission have been established to address the major unknowns for future exploration activities. The mission has been studied at Phase B1 level with Astrium (Bremen) as the prime contractor, since August 2010. These study activities are ongoing and the status of the mission and the system level activities are reported in detail in a parallel paper.

The scientific topics that have been defined for the mission emphasise a number of key areas: the integrated dusty plasma environment at the surface of the Moon and its effects on systems; lunar dust as a potential hazard to systems and human explorers; potential resources which can be utilised in the future; and radiation as a potential hazard for human activities. Each of these topics is supported by an independent science Topical Team. These Topical Teams continuously review the science requirements and activities of the mission and are investigating the potential for measurements using existing facilities that can support the objectives of exploration preparation and the activities of the Lunar Lander on the surface of the Moon.

In addition a number of payload study activities have been initiated to define candidate payloads for the Lunar Lander mission in advance of a formal announcement of opportunity expected in 2012. As well as detailing the scientific measurements to be made at the surface of the moon, the payload studies will provide preliminary concepts for payloads, identify the major challenges for their development and ensure that the mission study properly accounts for the payload and its interfaces.

We report on the status of these Lunar Lander related science and payload activities and the scientific aspects of the Lunar Lander project.