



## Preliminary Assessment of the Moon-Next Lunar Lander mission

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The Moon NEXT mission studied by ESA through contracts to industry includes a Lunar Lander that deploys several optional payloads close to the Moon's South Pole. These payloads may comprise a Rover and other various experiments directly on the Lander or deposited by the Lander on the lunar surface. Moon-NEXT is an exploration precursor mission. Its payload addresses not only technological enhancement in view of future lunar establishment but also valuable science objectives. It sometimes combines both, as for instance when considering growing bacteria or operating a precursor to lunar radio-astronomy.

The Moon's South Pole area, with its long-illumination crater rims, presents specificities that make this location a good candidate for a future human outpost. Moon NEXT is therefore a key mission for the exploration of the South Pole, the understanding of its environment, the comprehension of the structure of the soil and the mastery of its particularities.

Thales Alenia Space is the leader of one of the consortia that have been awarded a study contract for Moon NEXT. Thales Alenia Space and its partners have assessed the feasibility of the mission. The assessment has covered the mission aspects, the operability of the Lander and the Rover and the sizing of all their subsystems, from structure, thermal control, propulsion to communications, power, data handling and of course guidance Navigation and Control.

This paper summarizes the achievements obtained so far in this assessment phase. After recalling the challenges of the mission, it addresses how a suitable architecture has been selected for the lander, and how the design driving requirements have been addressed. The payload accommodation is discussed, as well as all the constraints and sizing character of payload requirements, whether for a fix payload or for a Rover. The budgets have been consolidated and the required technologies reviewed, paving the way for the following assessment and definition phases.