

SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 3 (2C)

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A FEASIBILITY STUDY ON HUMAN SPACE EXPLORATION AT THE LUNAR SOUTH POLE
A POSSIBLE LUNAR MISSION THREE**Abstract**

Currently, space science research is almost entirely dependent on governmental funding. Lunar Mission One (LM1) proposes a different approach. Intended to launch in 2024 to perform innovative lunar science by drilling down deep into the surface at the lunar South Pole, LM1 will rely entirely on public funding, firstly through crowdfunding and later through sales to the global general public. If this model is successful then LM1 would become the precursor for future lunar science missions.

Where regular space missions could not be accessible for general public, the purpose is to involve people worldwide in all its phases, either by being part of the development, coming up with ideas, or backing the project on Kickstarter. Beyond LM1, there are discussions of subsequent missions as a long-term strategy. The Lunar Mission Two (LM2) will be next, providing a Lunar Sample Return, after which Lunar Mission Three (LM3) will be a human mission to the Lunar South Pole.

The paper describes a possible LM3, which aims to prepare for a permanent human base on the South Pole of the Moon as part of the long-term strategy, dealing with all the technical, political, and financial challenges, with a roadmap as a final result.

Many countries have examined the concept to land humans on the Lunar South Pole, given that this location has regular exposure to sunlight, with eclipse durations of less than 50-70 hours, for applications including solar power, while offering a more stable temperature range and the possibility of water ice. Regoliths at the considered locations such as the Shackleton crater and Mons Malapert are also of great interest for future ISRU requirements. In this paper, different mission planning stages are examined, including launching methods, landing technologies, possible human requirements and the importance of a Lunar base.

In contrary to former researches, the paper covers a multidisciplinary scope. The idea of an international cooperation on the Moon could give more people access to space and requires strong international cooperation.

A final roadmap shows the scheduling of a programme of missions, from the developing phase until the permanent presence of humans on the lunar surface, following the setting of LM1.

Key words: Lunar Mission One, Lunar Mission Three, Moon, mission planning, roadmap