

HUMAN EXPLORATION OF THE SOLAR SYSTEM SYMPOSIUM (A5)  
Human Lunar Exploration (1)

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KEY TECHNOLOGY OF MANNED LUNAR SURFACE LANDING, LIFTOFF AND OPERATING

**Abstract**

In this paper, the concepts study of manned lunar landing and lunar base project are carried out firstly, and lunar base is considered as long-range objective for manned lunar landing project. Secondly, several key technologies which must be solved in manned lunar landing and lunar base project are proposed, such as site selection of lunar landing, energy technology, thermal management, manned environment, landing and liftoff, and lunar surface human-machine cooperation.

Afterwards, for lunar landing and liftoff technology, differences between manned and cargo lunar tasks are analyzed from the view of site selection. And the concept "lunar entering and leaving port" is proposed for various types of constraints between lunar landing site and lunar base site.

For lunar surface human-machine cooperation, a variety of lunar surface operations required in lunar base construction tasks are analyzed, and the lunar surface engineering machinery facilities required in lunar surface operations are presented, including lunar robot, lunar rover, and lunar manipulator. Moreover, a new manned vehicle for lunar surface mobile transport and operation is proposed.

This research can be used for manned lunar landing and lunar base construction in future.