

Return to the Moon (02)
Concepts for Robotic and Human Missions to the Moon (3)

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LUNAR BASE CONSTRUCTION AS THE PRECURSOR MISSION FOR THE MARS
EXPLORATIONS

Abstract

The human Mars Exploration is a goal for the next human deep space exploration. However, the Mars is still far using the existing technologies. It needs more advanced technologies development such as the high efficient propulsion, high speed re-entry, surface mobility, closed ECLSS, radiation protection, and in-situ resource utilization. The lunar base construction is one of the best step toward the Mars exploration in the future because it utilizes most of all technologies above and can demonstrate those as a prototype in similar environment. The paper proposes the concept and scenario for the lunar base construction at the south pole with cost effective approach. The scenario identified the major systems which are the elements of this mission accomplishment. They include the human transportation systems including human rated launch vehicle, crew transport vehicle, orbit transfer vehicle, cargo lander, human lunar lander with ascent module, lunar rover, power systems, communications systems, and in-situ resource utilization. The maximum use of the reusable systems and lunar resources are important for minimizing the logistics from the Earth for the operations cost reduction.