

HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)  
How Can We Best Apply Our Experience to Future Human Missions? (2)

Author: Mr. Mitsutoshi Tsujioka  
Mitsubishi Heavy Industries, Ltd., Japan

Dr. Ko Ogasawara  
Mitsubishi Heavy Industries, Ltd., Japan

Mr. Toyonori Kobayakawa  
Mitsubishi Heavy Industries, Ltd., Japan

Mr. Toshiki Morito  
Japan Aerospace Exploration Agency (JAXA), Japan

Mr. Hiroshi Ueno  
Japan Aerospace Exploration Agency (JAXA), Japan

Mr. Naoki Satoh  
Japan Aerospace Exploration Agency (JAXA), Japan

AN INITIAL STUDY OF ORBITAL TRANSFER VEHICLE IN REFERENCE MISSION SCENARIO  
OF HUMAN LUNAR EXPLORATION WITH MANNED STATION AT EARTH-MOON LIBRATION  
POINT

**Abstract**

International Space Exploration Coordination Group (ISECG) released reference mission scenario ultimately conducting the manned exploration to Mars, which is known as the Global Exploration Roadmap (GER). On the course of attaining the ultimate goal, several preparatory exploration missions might be required. One of the most promising intermediate destinations is Earth-Moon Lagrange Points (EMLs) which have unique characteristic of gravitational equilibrium. Among the 5 EMLs, L2 is considered as the most superior position not only as the staging station for further solar system exploration but also as the base camp for lunar far side exploration.

This paper gives the results of an initial study of Orbital Transfer Vehicle (OTV) in reference mission scenario of Lunar Exploration with an L2 Manned Station. Assuming that SLS and H-X (Japanese next Flagship Launch System) are utilized as Launchers, sizing study of OTV has been conducted with an aim to make the OTV common size with the upper stage of H-X.