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FEASIBILITY STUDY ON THE MISSIONS TO EARTH-MOON LAGRANGE-POINT 2 AND THE
MOON USING THE HTV BASED SPACECRAFT

Abstract

International Space Exploration Coordination Group (ISECG) set the roadmap of Next International Space Exploration in Global Exploration Roadmap (GER). In this roadmap, Deep Space Habitat (DSH) at Earth-Moon Lagrange Point (EML2) and Exploration Test Module (ETM) is planned as a front stage of a future human mission to Near-Earth Asteroid (NEAs), Moon, human mission to Mars which is ultimate goal. The deep space habitat at an Earth-Moon Lagrange point is proposed as an optional pathway for human exploration in the Global Exploration Roadmap. And the Earth-Moon Lagrange point 2 (EML2) is considered as the place where the deep space habitat will be established. Japan has contributed providing a laboratory module, named "Kibo" or "JEM", to the International Space Station (ISS), and the space transportation system called HTV (H-II Transfer Vehicle) which established transportation technology to ISS (International Space Station). It is desirable to improve this platform that carried out technical establishment, to provide as a test module which provided investigation technology for exploration near the ISS on LEO (Low Earth Orbit), and to provide for each country to participate in technical demonstration using this platform. Here, the result of feasibility study as the concept level of the mission scenario and a HTV enhanced system (test module) is introduced. And the contents of the technical demonstration item for exploration which can be offered on this platform are introduced. The effective proposal which leads to development cost reduction, and a contribution are aimed at to the relevant countries which participate in a human space flight for exploration. A focus is the use of assets that currently Japan owns as much as possible to minimize the cost and time of development. Two space bases are supposed to be constructed on the lunar surface and EML2 Halo orbit. One is the lunar base and the other is DSH. We already presented about a feasibility study of the Japanese habitat module and its transportation strategy to the EML2. Also we studied the access to the lunar surface. So in this paper, we present on the access to the lunar surface.