SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT (D3)
Strategies & Architectures as the Framework for Future Building Blocks in Space Exploration and Development (1)

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THE GERMAN FREE FLYER STUDY: A EUROPEAN PERSPECTIVE ON AN INTERNATIONAL INFRASTRUCTURE IN THE EARTH MOON LIBRATION POINT 2

Abstract

Within the last two years, Airbus Defense and Space conducted in cooperation with the German Space Agency DLR a conceptual study on an international, man tended, free flying element for exploration in the vicinity of the Moon. Particular emphasis has been put on the investigation of stakeholders' scientific, technological and institutional needs. Major research areas were defined, which benefit or even require the cis-lunar environment and the presence of humans. This includes research areas such as biological radiation effects, gravitational biology but also technology demonstrations like closed loop life support in a deep space radiation environment as well as teleoperations of assets on the lunar surface. The user needs were prioritized and transferred into system requirements. Based on them, various system concepts were developed and critical technologies identified. Especially, the design implications of radiation protection and generation of artificial gravity were investigated. Furthermore, the logistic requirements to deliver and maintain an infrastructure in EML2 were assessed and a suitable transportation architecture was defined. In particular, the free flying element assumes utilization of NASA's MPCV for crew transport due to the European stake in the vehicles service module development and offers to extend the duration of human missions in the lunar vicinity.

This paper will address research and utilization interests of an infrastructure in EML2 from a German/European perspective. It will further present feasible system concepts and critical technologies. Additionally, the paper will discuss international cooperation aspects and propose possible European contributions.