Paper ID: 70495
student

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Interactive Presentations - IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (IPB)

Author: Mr. Rok Kete
ILEWG "EuroMoonMars", Slovenia

DEVELOPMENT UPDATE ON MODUL INTERPLANETARY TRANSPORT SYSTEM (M-ITS) 2022 CASE STUDY OF CONVERTING LUNAR ORBITAL PLATFORM-GATEWAY (LOP-G) INTO UNIVERSAL TRANSPORT SPACECRAFT (UTS)

Abstract

With the Artemis Program starting another era of manned presence in the Cis-Lunar Space it is time to start considering the future proofing of the program and its elements. Last year's development update of the Modul Interplanetary Transport System (M-ITS) presented the case study on using the M-ITS platform as the base design of the LOP-G. This design addressed the issues of the LOP-G short-term focused design. It solved them by proposing an alternative station design that allows for the permanent crew occupation and compatibility with other Cis-Lunar Space Missions. This year the M-ITS development built on the proposed LOP-G design and studied the options and feasibility of converting the LOP-G in the Universal Transport Spacecraft (UTS). The paper presents changes made to the M-ITS and the Modul Spacecraft since last year. The first part of the paper gives an updated overview of the LOP-G design based on the M-ITS platform. Since last year's update modifications were made to the station's design increasing the structural integrity of the station, adding additional docking ports and allowing accommodation of the multiple large spacecraft in parallel to each other. The most notable feature added to the LOP-G's design is a conversion of one of the Free Flying Module (FFM) into the Assembly and Refueling Module (ARM) for the Human and Cargo Landing Systems (HLS, CLS), LOP-G Resupply Spacecraft and other spacecraft in Cis-Lunar Space. The updated LOP-G design was used as a base for studying different options of converting the LOP-G into the UTS for Deep Space Missions. Second part of the paper analyses conversion options and provides an overview of the UTS development process. Development process addressed the spacecraft's general design, design of the modules, main systems and spacecraft's compatibility with proposed mission profiles and spacecraft for the Manned Mars, Main Asteroid Belt and NEO Asteroid Missions. In addition the development process included the development of the conversion architecture and mission profiles for the M-ITS Deep Space Missions. UTS is designed as a fully reusable deep space transport spacecraft. It can support manned and unmanned. Its design incorporates the LOP-G design and elements in mostly unchanged forms. The spacecraft benefits from the modular, configurable and scalable architecture. The UTS design is also future proofed. UTS can be integrated or reused in the future missions without compromising the mission objectives, outputs and costs while remaining compatible with the future spacecraft and space infrastructure.