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PROPOSAL OF VEHICLES FOR THE TRANSPORT OF CARGO BETWEEN THE MOON AND MARS

Abstract

Within the context of the Artemis Accords, a joint student team from Politecnico di Torino, ISAE-SUPAERO, and the University of Leicester carried out an analysis focusing on the topic of the human exploration of Mars. The goal was to thoroughly analyze the current state of art with regards to the available and projected technologies which will be used in the creation of a human settlement on the Moon Surface (MoS) and adapt them to a martian application. This was done by researching different areas which cover the equipment necessary for the aid of human presence on the Moon, such as human habitats, communication networks, in-situ manufacturing, and land vehicles. The team also defined a strategy for the transportation of the equipment from the MoS to the Surface of Mars (MaS). This paper presents the results of said analysis by first defining the different segments of the transportation process - MoS to Low Lunar Orbit (LLO), interplanetary travel, and Low Martian Orbit (LMO) to MaS - and highlighting their respective challenges. Based on these conditions, different approaches are studied and a suitable option is identified through rigorous trade-off studies. The design of the proposed solution for each one of the transport phases is described and the complete logistic chain is presented along with the expected operations.