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A MISSION DESIGN FOR LUNAR ORBITAL MODULE DELIVERY AND IT'S USE TO SUPPORT "EARTH-MOON" TRANSPORTATION.

Abstract

From the design perspective of the "Earth-Moon" transportation there are two ways to fulfill the required lunar surface mission duration: a) to increase crew transportation vehicle (CTV) capabilities – longer autonomous flight, and/or b) to provide a support infrastructure to park the CTV for a required duration, as we do on ISS today. There are possible considerations, however, if we talk about month or more on the lunar surface, the support infrastructure is the only reasonable option.

If we design a lunar orbital module (SM) to support the "Earth-Moon" transportation, there are several technical options to choose from, for each stage of the mission. These options impact the module configuration and allow us to define and select it's design parameters with optimization of a certain objective function.

The paper presents an approach for SM mission design, functional requirements definition and selection of the module's design parameters.

The approach is based on transportation efficiency (Et) definition and comparison for different design reference mission (DRM) options, both for module delivery (launch vehicles, number of launches, upper stage for trans-lunar injection, and etc.) and it's use to support lunar surface missions (CTV composition and functional requirements, Lunar lander mission scheme and functional requirements).