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TRAJECTORY DESIGN FOR PHOBOS & STUDY PROPOSITION OF GEODETIC FRAMEWORK
FOR AN AUTOMATED MECHANICAL TRANSITORY BASE-CAMP ON PHOBOS

Abstract

The technical paper focuses on the study of optimal interplanetary transfer trajectory to Phobos from Earth following precision landing and temporary settlement for Human crew to validate the human exploration approach towards Mars. The most favorable mission plan is to set up a transitory sustainable outpost at Phobos which can provide wayfarers a chance to look at the Martian framework and get used to another spot of the nearby planetary system before humans attempt to settle on Mars. Phobos proximity allows Mars to remotely control robotic rovers and landers in near real-time, without the minutes long time delay inherent in sending instructions from Earth. Phobos is ideal for testing technologies on Mars, mapping and extracting geoinformation closely about Mars, and temporary settlement before the planning for Human settlement on Mars. The primary objective of this research is to determine transfer techniques from Earth to Phobos followed by a framework for an impermanent base camp on Phobos which would work as a logistical hub where interplanetary spacecrafts doing the long haul between Earth & Mars or during preliminary SEP can exchange cargos, passengers & propellants with surface to orbit shuttles powered by conventional chemical propellants. The secondary objective is the concept of operations for an advanced automated mechanical transitory base camp assembly which covers numerous aspects as per the settlement architecture e.g., infrastructure, regenerative environmental control System, In-situ resource utilization, life sciences provision safety strategies and its countermeasures. These objectives will enhance the overall system for future exploration on Phobos & Mars.