

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Interactive Presentations (IP)

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A STANDARD SPACE TRANSPORTATION AND INFRASTRUCTURAL SYSTEM FOR AN
AFFORDABLE THREE STEPS PATH TO MARS MANNED MISSIONS

Abstract

Recently , with the availability of heavy launchers such as the Falcon heavy from Space X and the SLS from NASA it will be possible to send ambitious manned missions out of LEO due to its higher payload capacity. In order to optimize its utilization and obtain the maximum results at affordable conditions we may require a transportation system composed of few standard components that can be reutilized while simplifying all operations in a cruiser/cycler-feeder system allowing affordable costs for outer space manned missions. Such components for the transportation system can be summarized as : 1-The Cruiser (to be positioned in a cycling trajectory, Moon, Mars etc) -Service module (with SEP capabilities) -Standard container system (including Hab module) -Node modules (for expansion possibilities) -Telescoping spikes and ring modules (for future 1 G capability) 2-The Feeder (to connect the cruiser with ground or space stations) -Ground lander (Mars , Moon , Phobos etc) with container delivery -Space transfer module (cruiser to space station etc) 3-An Earth return capsule, from those that will be available from private companies or from NASA (Orion) The infrastructural system in space will be composed by the same modules as the cruiser while on the ground by: -Inflatable and 3d printed basic module (for HAB, lab, agricultural and manufacturing functions) –A connector system , equipped with hydroponics cultivation – An airlock and rover vehicle shelter unit With a sequential launches and reutilization of this system we can obtain immediate and affordable results such as : -Venus and Mars manned flyby (2021 window opportunity with Falcon Heavy launcher utilizing on board 3d printing for Hab module) – Phobos manned way station (with SLS launcher) and unmanned Mars preliminary lander (separate SLS launch) -Martian manned mission with support from the Phobos station (SLS launcher) The above will be briefly described in this paper , including 3d printing utilization for the station and outpost construction in Phobos and Mars