

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Going To and Beyond the Earth-Moon System: Human Missions to Mars, Libration Points and NEO's
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AN EARTH-MARS CRUISER BASED ON BUZZ ALDRIN CYCLER FOR FUTURE MARTIAN BASE

Abstract

The Crew Transportation System is an important part of the future Martian Base. To keep the Mars exploration sustainable, the crew transportation procedure must be reliable and affordable. The long duration of Earth-Mars orbit transfer rises many challenge to this requirement. To make journey more safe and reliable, spacecraft for this orbit transfer should have many redundancy measures, it also should have regenerative life support system, and even surgery equipment for unpredictable disease of astronauts. Therefore, this spacecraft would have the scale of a space station. However, it is not an economic way to launch a large scale spacecraft to Mars for every expedition team. The cruiser based on a Buzz Aldrin Earth-Mars cycler trajectory encounters Earth and Mars on a regular basis. So the transportation missions can be carried out by this kind of cruiser. The manned spacecraft is launched from the Earth to rendezvous and docking with the cycler cruiser, and then flies to the Mars with the cycler cruiser. With this design, the cruiser can have comprehensive support equipment for the crew but does not need to change its velocity in each cycle. In this paper, the feasibility in engineering of the Mars cycler cruiser is investigated. And the differences between the cycler cruiser and other means of transportation to Mars are considered. The function, composition and main specifications are introduced. The cycler cruiser is presented by using large-scale struss structure and nuclear propulsion system, which will be an economic and reliable infrastructure of the Earth-Mars Crew Transportation System.