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Author: Mrs. Alejandra Michelle Peñaloza Flores
Tecnológico de Estudios Superiores de Ecatepec, Mexico, mich29pe@gmail.com

ERGONOMIC PERSPECTIVE OF JET BRIDGE IMPLEMENTATION IN MANNED MARS ROVERS.

Abstract

Research on ergonomics in space should be a topic of major relevance in space exploration and, mostly, be considered for future missions. This is because constantly new problems of human factors arise, as the human being is not physiologically adapted to living conditions outside planet Earth. However, required tools can be crafted in order to match the desired characteristics and capabilities an astronaut must meet. Hence, the Human-Machine-Environment system elements are optimized. Taking into account that navigation on Mars is still under study, there is a need to devise new ergonomic systems to be implemented on Manned Mars Rovers, so that both human errors and fatigue can be significantly reduced, as well as missions can be more efficient.

This paper proposes the implementation, from an ergonomic perspective, of a transfer system from either the platform, ship or base where the astronauts are installed, to the Manned Rover. The system is composed of a hermetically, sealed, retractable jet bridge that allows astronauts to transfer quickly, safely and efficiently by only wearing a single suit for intravehicular activities (IVA Suit). These kind of suits are lighter and easier to wear.

The proposed work will improve both walking and maneuverability procedures, as descending to the Martian surface will not be necessary at all. Derived from the aforementioned, astronauts will no longer have to wear an EMU or EVA suit; The main drawbacks of wearing these suits are that they have a great weight, and the astronaut requires assistance to put them on. Because it is not necessary to transport the EMU, the load the rover must carry is reduced. Therefore, energy is saved and the space inside the vehicle is optimized.

Keywords: Ergonomics, jet bridge, rover, human factors, space suit.