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A COMPUTER-AIDED MODEL OF HUMAN FACTORS FOR MID-TERM AND LONG-TERM SPACE MISSIONS

Abstract

Physiological concerns are the biggest challenges to permanent presence of humans in the hostile environment of space. Human factors drastically affect the performance of the crew during midterm and long-term missions to outer space. From the standpoint of human capabilities, living and working in microgravity for long durations make astronauts face new situations for which there is insufficient knowledge. In addition to microgravity, the isolated nature of closed space habitats and interplanetary spaceships leads to challenges in habitability, workload and human performance. Thus, predicting a suitable set of requirements, and recognizing the critical level of impacts on human body is crucial to astronauts' health and efficiency. Since human physiology as well as plants' and animals' follow physics laws, they can be integrated into mathematical models and finally incorporated into a computational computer algorithm in order to predict the human performance in complex dynamic environments. This paper presents an effort that has been done in this regard which is the first of its kind. The program receives the mission data such as environmental conditions, mission duration, life-support system, and crew number, and evaluates the human performance accordingly. It gives a good estimate as to how humans would perform in actual similar situations.