

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Interactive Presentations (IP)

Author: Prof. Chunhui Wang
China Astronaut Research and Training Center, China

Prof. ShanGuang Chen
Astronaut Center of China, China

Prof. Liu Yuqing
Astronaut Center of China, China

Mr. Shoupeng Huang
China Astronaut Training and Research Center, China

Mr. Yu Tian
Astronaut Center of China, China

AMSS: A PLATFORM FOR ASTRONAUT'S PERFORMANCE MODELING AND SIMULATION

Abstract

Astronaut's capabilities to successfully complete specific tasks during missions is of vital importance for spaceflight. While in spaceflight, astronauts are exposed to numerous stressors, such as microgravity, confinement and radiation, all of which may impair human capabilities. So it is crucial to get a better understanding of astronauts' capabilities and to better predict their task performance during long-term spaceflights. Computer models can be used to learn from and even predict human performance, which can enhance early evaluation of system designs, and reduce the time cycle and costs of system development. To support modeling and simulation of astronaut's performance in specific physical and cognitive tasks during spaceflight, we established the Astronaut Modeling and Simulation System (AMSS), which is the first integrated modeling and simulation platform for human-system integration design faced to long-duration manned space missions in China. A three-level model architecture has been proposed, which consists of the human characteristic models, the behavioral models (cognitive and biomechanical) and the performance evaluation models. The multiple models are integrated in AMSS. The ability to visualize the virtual environment of space vehicle, the virtual astronaut, the operator's performance and task processes makes AMSS a more user-friendly platform. Models in AMSS has been preliminarily validated by experimental data. AMSS has been used to perform the quantitative evaluation of the human-machine interface designs of China's space lab and the on-going space station missions, and will be applied to the human-system integration design in China's future space missions.