

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)

Human and Robotic Partnerships in Exploration - Joint session of the IAF Human Spaceflight and IAF
Exploration Symposia (6-A5.3)

Author: Mr. CHAO ZHU

China Academy of Space Technology (CAST), China, 644814726@qq.com

DESIGN AND IMPLEMENTATION OF HUMAN-MACHINE SYSTEM FOR SPACE STATION
MANIPULATOR

Abstract

Recently, the relationship between human and robot has always been the focus of attention. Humans have the advantages of leadership, teamwork, creativity, and robots have the advantages of ultra-fast speed, ultra-high accuracy and quantitative ability. How to combine human and robot to work efficiently is the focus of many scholars. In the extravehicular activity, people can not only operate the space manipulator, but also efficiently complete the operation with the support of the space manipulator. Therefore, Human-Machine system of the space manipulator is of great significance to astronaut's EVA and Human-Machine cooperative operation inside and outside the cabin. In this paper, the Human-Machine system of the International Space Station Manipulator is investigated firstly. Combined with the collaborative operation requirements of the Human-Machine system for China Space Station Manipulator, the full-cycle Human-Machine system design system is established, which is "management-design-verification", then, combined with Human-Machine system elements, project planning, Human-Machine function allocation and other management elements, the design of Human-Machine system, display and control circuit, console, and security is carried out. Finally, the full-factor and full process verification of the Human-Machine system is planned and carried out from three aspects: simulation verification, display and control verification, and on-orbit verification. And the results show that the design of the Human-Machine system is reasonable, which can be applied to the astronaut EVA mission to ensure its safety and efficiency subsequently.