

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Interactive Presentations - IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (IP)

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## AN INTELLIGENT WEARABLE SYSTEM FOR SPACESUIT BASED ON EVA

**Abstract**

Extra-Vehicular Activity(EVA) is one of the three key technologies for the development of manned space. With the rapid development of manned space technologies, the EVA has gradually changed from experimental technologies to practical applications such as in-orbit maintenance and recovery, space research and experiments and so on. EVA tasks have the characteristics of high complexity and difficulty, such as extra-vessel maintenance, space test, space walks, new equipment transfer, installation and replacement, load operation, etc. To improve the work efficiency during EVA, an intelligent spacesuit system is a response to be needed. In this paper, a novel intelligent wearable system of spacesuit is proposed, which can support astronaut more useful information and assistant astronauts to complete the tasks quickly and accurately. Firstly, this system first uses an eye tracker to get the astronauts eye movements and compute the gaze point of astronauts, Secondly, it uses camera acquire the image of astronaut is gaze at. Thirdly, it sends these image to data processing center to analyze. Fourthly, it displays the related information of the scene where the astronaut is gazing at. In the same time, get the life supporting system information through building the body domain networks. Some intelligent algorithm can be integrated in this system to accomplish different functions. An automatic object detection algorithm is employed to detect the objects which astronauts wants to know more information about it. And an intelligent data mining algorithm is introduced to analyzing the data from the EVAs. And an intelligent information pushing algorithm is integrated into this system to display the most needed information in time. And an intelligent body domain network controlling and monitoring algorithm is used to manage the life supporting system. These intelligent algorithms can be combined into the wearable spacesuit to finish different duties autonomously. This intelligent wearable spacesuit will significantly improve the intelligence level of spacesuit and the work efficiency during EVA.

Keywords: Extra-Vehicular Activity; Intelligent Wearable System; Spacesuit