

HUMAN EXPLORATION OF THE SOLAR SYSTEM SYMPOSIUM (A5)

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APPLICATION OF ADVANCED ROBOTICS FOR THE EXPLORATION OF OUTER SPACE
OBJECTS BY THE EXAMPLE OF ROBOTICS FOR LUNAR RESEARCH. USE OF
ANTHROPOMORPHIC ROBOTS FOR THE FURTHER EXPLORATION OF NEAR-EARTH SPACE
AND FOR THE TASKS OF LUNAR AND MARS EXP

Abstract

Technologies that improve the efficiency of space flight, decrease the operation cost, increase the service life and reliability, improve the astronaut safety are under active development today. This paper presents basic key technologies in the field of robotics, telerobotics and autonomous systems for space exploration. Robotic tools for basic flight operations to the ISS are illustrated. Videos and photos of work operations experimental development using antropomorphic robotics system will be shown. The inescapable fact is that performing operations, based on the natural human movements and the performance of small and precise manipulation is vital in the space. Thus, anthropomorphic robotic systems are of great interest in solving long-term tasks in the space industry. The use of android robots for further development of the near-Earth space, the Moon and Mars are considered in this paper. The second generation of Russian Space anthropomorphic robot - SAR-401 is presented. Tests conducted in Y.A. Gagarin CTC in 2013 have confirmed the ability of performing most of the typical flight operations. The system of visualization providing the operator with the sense of presence" in the robot operational zone is described. The question of the software and hardware complex appliance of operator workstation for controlling the SAR-401 and the scenario emulation of its operation with the use of anthropomorphic robot and the environment 3D-model is also analyzed in this paper.