

A Six-Axis Manipulator in Onboard Equipment Testing on the Russian Orbital Station

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Abstract. The article is dedicated to the issues of adapting the robotic facilities of the Russian Orbital Station to the tasks of additional testing of spacecraft onboard equipment in outer space. The existing technologies of robots implemented on the orbital station are analyzed. In order to move the unified modules with the onboard equipment being tested within the framework of the additional in-situ tests on the Russian Orbital Station, it is proposed that a tandem of the robotic arm of the orbital station and a six-axis manipulator be utilized. The latter is designed in accordance with the technology of numerically controlled machines. Such a tandem will ensure the required positioning accuracy during the connection of the modules carrying the equipment being tested. This approach will minimize the participation of cosmonauts in extravehicular activities during tests, eventually leading to its complete exclusion. This is a first step towards the automation of production processes carried out in space. The proposed method has the potential to serve as a basis for the development of the design, technology, and its subsequent testing on the Russian Orbital Station.

Keywords: space station robotic arm, six-axis manipulator, onboard equipment, Russian Orbital Station (ROS), in-situ testing

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