

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Utilization & Exploitation of Human Spaceflight Systems (3)

Author: Dr. Igor V. Sorokin

S.P. Korolev Rocket and Space Corporation Energia, Russian Federation, igor.v.sorokin@gmail.com

Mr. Victor Konoshenko

Russian Federation, vpk31@yandex.ru

Mr. Alexander Markov

S.P. Korolev Rocket and Space Corporation Energia, Russian Federation, Alexander.V.Markov@rsce.ru

Mr. Nikolay Sevastyanov

S.P. Korolev Rocket and Space Corporation Energia, Russian Federation, irina.agapova@rsce.ru

ENGINEERING FACILITIES AND TOOLS ABOARD THE ISS RUSSIAN SEGMENT OVER
TESTING OF KEY EXPLORATION TECHNOLOGIES

Abstract

In accordance with Principles of national policy of Russian Federation in the area of space activity until 2030 and beyond one of the most important Russia's tasks in space is the Moon exploration. Obviously, the International Space Station can and must serve as a platform for development and in-flight testing of key technologies, which are required for the task solution. For this purpose a complex of engineering facilities and special tools aboard Russian Segment of the International Space Station (ISS RS) is designed and used. A key feature of the ISS RS's construction and utilization process is a consecutive application of the exchangeable payloads method on the segment's modules, directed towards efficient utilization of research facilities installed on board. The method is based on a concept of the multipurpose workstations, integrated both in the pressurized compartments, and also on the external surface of the modules. Advanced multipurpose workstations, supporting frames of different design, "base points" of the European robotic arm, workstations equipped with magnetomechanical anchors/locks and handrail clamps for small external payloads are used on the external surface of the station. Simple and convenient racks for payloads (after their assembly in orbit) equipped with roll-out shelves-modules and frames-arches, a complete set of electrical/information interfaces, along with multipurpose gloveboxes, incubators for lower and higher temperatures, vibration-isolating platforms, also are used in pressurized compartments of the ISS RS modules. Almost all of them have already been tested in flight, but wide application of the workstations, racks, facilities, and tools will start aboard Multipurpose Laboratory Module (MLM) Nauka (Science in English), which is targeted for the station in the near future. The next Scientific-Power Module that should also become a part of the ISS RS after MLM, will be equipped with the enhanced MLM-type workstations. This paper describes and analyses capabilities of engineering facilities and tools to support payloads use, their maintenance and testing aboard the ISS RS, which can contribute to execution of the future exploration program.