

HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)
Astronauts: Those Who Make it Happen (5)

Author: Mr. Mikhail Tyurin

S.P. Korolev Rocket and Space Corporation Energia, Russian Federation, Mikhail.Tyurin@rsce.ru

Dr. Alexander Alexandrov

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

Dr. Oleg Tsygankov

S.P. Korolev Rocket and Space Corporation Energia, Russian Federation, Oleg.Tsygankov@rsce.ru

EVA TOOLS FOR THE ISS AND INTERPLANETARY MISSIONS

Abstract

45 years passed since the first space walk performed by Alexey Leonov in 1965 (Voskhod-2 mission). Since then the design of the space suits and their life support systems have been constantly upgraded and reliability and service life have increased. The tasks performed by the astronauts and cosmonauts during extravehicular activity (EVA) became more complicated. The EVA duration increased and sometimes it lasts up to 8 hours. The demand of the EVAs became most prominent during the International Space Station (ISS) assembly. By March 2010 on the ISS 140 space walks (843 hrs in total) were made using ISS RS and USOS technical means. The peculiarity of the ISS is that different types of space suits are used for EVAs performed from different segments. That is why the airlocks and timelines significantly differ. Nevertheless the American and Russian tools used during EVA activities are adapted to both types of space suits. The EVA activities vary from the replacement of the equipment on the external surface of the station up to the installation of large structures and multi-ton modules with the help of robotic arms and complex repair and maintenance. The paper gives examples of unique work done by the spacecraft's and space station's crews in open space; presents specially designed tools and application procedures; proposes methods for their upgrade and design of new EVA tools to be used in the interplanetary missions.