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ROAD TO JEMRMS GROUND CONTROL

Abstract

JEMRMS was assembled to JEM Pressurized Module (JPM) and launched on Flight STS-124 1J in 2008. It has been used for several operations, such as handling H-II Transfer Vehicle (HTV) Exposed Palette (EP) or Exposed Payloads. These operations have often been conducted in proximity to various complex external features on JEM Exposed Facility (JEF).

JAXA Robotics Operations Team, KIBOTT (KIbo roBOTics Team), has brought various JEMRMS operations by crew such as initial deployment from the JEM Pressurized Module (JPM) in the Flight STS-124 1J, payload transfer in the Flight STS-127 2J/A, HTV1 and HTV2 to a successful conclusion working around a variety of challenges. On the other hand, it has been recently becoming a problem that there are not onboard crew time sufficiently for the ISS system and science operations. Thus KIBOTT begun consideration of JEMRMS ground control demonstration program in 2010 which consists of four demonstrations to reduce the crew time for robotics operations and make an effective use of them for other ISS operations.

In the end, KIBOTT has successfully completed three JEMRMS ground control demonstrations including maneuvers in auto mode increasing maneuver distance and rate gradually, emergency stop functionality during the coarse rate maneuver and contact operations in the proximity etc. in December, 2011. Also they are currently preparing for the next real time operations (demonstration 4) applying the element operational technology proven through the previous three demonstrations. JEMRMS will be ground controlled in the demonstration 4 to transfer an unoccupied EP to hand it off to the Space Station Remote Manipulator System (SSRMS) for insertion to the HTV3 during the flight HTV3 this summer.

Here we present the results of the above JEMRMS ground control demonstration program and technical challenges of the JEMRMS operations since the JEMRMS initial deployment to the JEMRMS ground control demonstrations.