

SPACE OPERATIONS SYMPOSIUM (B6)
Mission Operations, Validation, Simulation and Training (3)

Author: Ms. Lyndsey Poynter
MDA Robotics & Automation, Canada, lyndsey.poynter@mdacorporation.com

Mr. Cris Chirtu
MDA Space Missions, Canada, cris.chirtu@mdacorporation.com
Ms. Laurie Metcalfe
Canadian Space Agency, Canada, laurie.metcalfe@canada.ca

ROBOTIC LOGISTICS AND MAINTENANCE ON THE INTERNATIONAL SPACE STATION AND
ENABLING DEXTEROUS SERVICING

Abstract

Canadarm2 and Dextre, Canada's robotic contribution to the International Space Station (ISS), continue to expand their support of logistics and maintenance on the ISS and prepare for future on-orbit servicing missions. In 2015/2016, in addition to its regular tasks of SpaceX Dragon trunk unloading and payload maneuvering, Dextre added several skills to its "handyperson" tool belt including the Robotic Refueling Mission (RRM) Phase 2 tasks, Main Bus Switching Unit (MBSU) Demonstration, inspection tasks and assisting EVA.

The RRM is an ongoing NASA Goddard Space Flight Center (GSFC) experiment which has successfully demonstrated the primary aspects of robotically servicing the fuel and cryo systems of an emulated unprepared satellite in the zero-g environment of the ISS, as presented in previous papers (IAC-12A53-B364x16033 and IAC-13,B3,4-B6.5,6x19945). The second phase of RRM operations was executed in October 2015 and January 2016 and required delicate force control and precision from Dextre. Successful demonstration of Dextre's ability to maneuver a Battery Box style On-orbit Replaceable Unit (ORU), as well as to stretch its capabilities in inspection and assisting Extra Vehicular Activities (EVA) in 2016, continue to show Dextre's contributions to the ISS by reducing crew time and EVA exposure.

This paper will present the results and findings of Dextre's on-orbit robotic operations performed in this period, as well as provide a look at how these capabilities will enhance future ISS maintenance and dexterous servicing.