HUMAN SPACE ENDEAVOURS SYMPOSIUM (B3)
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MSS/RUSSIAN MINI RESEARCH MODULE 1 INTEGRATION ON THE ISS

Abstract

The International Space Station (ISS) is a research facility currently being assembled in low earth orbit as a joint project among space agencies of the United States (NASA), Russia (RSA), Japan (JAXA), Canada (CSA) and ten European nations (ESA). This unprecedented international cooperative effort has involved careful and painstaking planning to ensure that the respective agencies' elements are ultimately integrated safely and effectively on orbit. The Mobile Servicing System (MSS), Canada's robotic systems contribution to the ISS program, has functioned as the workhorse in the ISS assembly and integration over the past 8 years. One element not originally intended to be handled by the MSS during space station assembly was the Russian built Mini Research Module 1 (MRM1). However more recently, changing priorities, and changing ISS configuration as well as the schedule time constraints for return to full scientific research with a 6-man crew have led to Canada being called upon to use its Space Station Remote Manipulator System (SSRMS) to install the MRM1 on the ISS.

Since the MRM1 was originally designed to be docked to the ISS via a Russian Progress Propulsive segment, the integration using the MSS faces unique and complex challenges not only in extending the boundaries of what the MSS has done, but also in planning and preparation within a very tight schedule constraint. This paper will describe the accomplishments made this past year towards the integration of the MRM1 using the MSS, with a focus on the pre-mission planning and mission analysis work that have been done in preparation for an April 2010 launch and installation. This paper will also highlight the distinctive steps taken in verifying that the robotic operation can be executed safely, from the initial concept of operations phase to the detailed modeling of the MRM1 docking mechanism.