SPACE OPERATIONS SYMPOSIUM (B6)
Sustainable Utilization of the ISS Beyond 2015 - Joint Session of the Human Space Endeavors and Space Operations Symposia (6.-B3.4)

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INTERNATIONAL SPACE STATION AS A PLATFORM FOR EXPLORATION BEYOND LOW EARTH ORBIT

Abstract

The International Space Station (ISS) has established a new model for the achievement of the most difficult engineering goals in space: international collaboration at the program level with competition at the level of technology. This strategic shift in management approach provides long term program stability while still allowing for the flexible evolution of technology needs and capabilities. Both commercial and government sponsored technology developments are well supported in this management model. ISS also provides a physical platform for development and demonstration of the systems needed for missions beyond low earth orbit. These new systems at the leading edge of technology require operational exercise in the unforgiving environment of space before they can be trusted for long duration missions. Systems and resources needed for expeditions can be aggregated and thoroughly tested at ISS before departure thus providing wide operational flexibility and the best assurance of mission success. We will describe representative mission profiles showing how ISS can support exploration missions to the Moon, Mars, asteroids and other potential destinations. Example missions would include humans to lunar surface and return, and humans to Mars orbit as well as Mars surface and return. ISS benefits include providing a work site and crew for aggregation of missions that involve more than one launch, a parking place for reusable vehicles, potential to add on a propellant depot, and a return point for reusable vehicles that aero-capture upon return to Earth.