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HUMAN EXPLORATION OF THE SOLAR SYSTEM SYMPOSIUM (A5)
Human Exploration of the Moon and Cislunar Space (1)

Author: Mr. Matthew Duggan
The Boeing Company, United States, matthew.b.duggan@boeing.com

# INTERNATIONAL INTER-OPERABILITY STANDARDS FOR A CIS-LUNAR OUTPOST

**Abstract**

The next steps in future human space exploration, such as an Earth-Moon Libration Point 2 (EML-2) or lunar Distant Retrograde Orbit (DRO) outpost, will involve the cooperative effort of multiple space agencies and industry partners. International cooperation is a critical enabler for future success and the International Space Station (ISS) has already demonstrated successful management of a large multi-national technical endeavour. The collaborative design, construction and operation of ISS program has demonstrated the value and efficiency of a combined approach and offers a valuable roadmap for future efforts. A key factor of this combined approach for ISS is the development of cooperative standards for joint assembly and operations. With the extension of human spaceflight from Low Earth Orbit (LEO) to trans-lunar space and beyond, an even greater level of system functional inter-operability is required due to the increasing isolation of the outpost and the lowered operational response time from Earth-based operators.

Applying functional analysis and determining joint standards early in the systems engineering and design processes is critical in ensuring that the vehicle can execute the required mission within operating constraints. This paper examines and describes the technical standards developed during the ISS program. The relative impact and success of the standards are examined and assessed for applicability to future space exploration. Based on these results and considering a goal of a trans-lunar outpost, additional functional and performance driving requirements and standards are proposed and discussed. Systems allocations of the standards are presented and assessed in the context of a trans-lunar outpost and the implications for systems design, including the advantages of joint-use systems, are examined.