Lunar Habitat: Minimum Functionality to Outpost Capable

Dallas G. Bienhoff[1]
The Boeing Company, Arlington, VA, 22202-4203

Russell F. Graves[2] and Greg J. Gentry[3]
The Boeing Company, Houston, Texas, 77058-3607

A minimum functionality and the resultant deployable lunar habitat concepts along with potential growth paths that support Outpost operations are defined. A minimum functionality habitation element contains only those functions necessary to support human lunar surface exploration and required safety features but does not protect for contingency situations. The minimum set of habitat functions is defined along with the process used for their identification and rationale for inclusion or exclusion. Subsystems and performance requirements to support a 28-day mission with and without a 30-day contingency are described. Subsystem options and solutions are discussed as well as the selection trade process. The NASA Constellation Lunar Surface Systems Project Office Scenario 4.0.0 manifest through FY2024 and lunar surface system concept descriptions provided the mission context. This paper summarizes the Boeing study team effort for NASA Exploration Systems Mission Directorate Lunar Surface Systems Project Office under the Lunar Surface Systems Concept Studies Broad Agency Announcement (NNJ08ZBT002) and updated mass estimates from post-contract analyses.

[1] Manager, Advanced Space Exploration, 1215 S. Clark St./MC 793C-G042, AIAA Senior Member.
[2] Meteoroid/Debris Protection Subsystem and Analysis Lead, ISS Structural Integrity, 13100 Space Center Boulevard/HB2-10, non-member.
[3] ISS ECLSS Technical Lead, Thermal and Environmental Control Systems Operations, 13100 Space Center Boulevard/HB2-40, non-member.