

HUMAN EXPLORATION OF THE MOON AND MARS SYMPOSIUM (A5)
 Long Term Scenarios for Human Lunar Presence (2)

Author: Dr. William Carey
 European Space Agency (ESA), The Netherlands, william.carey@esa.int

Mr. Chris Culbert
 National Aeronautics and Space Administration (NASA), United States, christopher.j.culbert@nasa.gov

Dr. Jennifer Rhatigan
 National Aeronautics and Space Administration (NASA), Johnson Space Center, United States,
 jennifer.l.rhatigan@nasa.gov

Mr. William cirillo
 United States, william.m.cirillo@nasa.gov

Mrs. Kandyce Goodliff
 National Aeronautics and Space Administration (NASA)/Langley Research Center, United States,
 kandyce.e.goodliff@nasa.gov

Mr. Chel Stromgren
 National Aeronautics and Space Administration (NASA)/Langley Research Center, United States,
 chel.stromgren@saic.com

COMPARATIVE CAMPAIGN ASSESSMENTS IN THE ISECG REFERENCE ARCHITECTURE FOR
 HUMAN LUNAR EXPLORATION

Abstract

Building upon the “Global Exploration Strategy (GES): The Framework for Coordination” document (published in 2007 and signed by 14 international space agencies) the International Space Exploration Coordination Group (ISECG) have, over the last two years, developed a Reference Architecture for Human Lunar Exploration, through a sub-group of the ISECG – the International Architecture Working Group (IAWG). This reference architecture was constructed to meet a defined set of common goals (15 in total) agreed to by the participating agencies, together with specific set of strategic guidelines, which included aspects such as a balance of objectives, extended mobility, etc. The resulting “preferred” campaign was then compared to two campaigns based on different strategic approaches. The focus of this paper will be on describing the methodology and results of the assessment of the preferred campaign against these other two campaigns.

A campaign is defined as “a series of coordinated missions that represent a unique strategy for satisfying a set of goals and objectives over a given timeframe”, i.e. how the Moon is actually explored within a specific period. In putting together the preferred campaign, three distinct mission scenarios were taken into account, sortie (i.e. Apollo-like, short-term surface stay), polar outpost (a permanent infrastructure at one of the lunar poles) and extended-stay (a scenario somewhere between sortie and outpost).

The methodology utilized to compare the “preferred” campaign against the other two campaigns, consisted of a combination of quantitative “metrics” together with a number of qualitative considerations. A pair-wise comparison was then undertaken for the three campaign options under consideration. The primary objective of this process being to identify a campaign which would best achieve a technical and programmatic balance amongst the exploration objectives associated with the 15 common goals.

The preferred campaign consists of five distinct phases; lunar precursor, system deployment, polar relocatability, non-polar relocatability and long duration. The sequencing and relative durations of these

phases allows the experience gained in-situ on the lunar surface during the early phases to influence the later phases in a timely manner.

The results of this comparative assessment will also be detailed to demonstrate that the preferred campaign selected to represent the ISECG Reference Architecture for Human Lunar Exploration best met the set of common goals, and provides a robust and flexible exploration strategy for the Moon.