

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Radiation Effects and Risks in Human Space Missions (4)

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RADIATION SHIELDING STRATEGIES FOR LUNAR MINIMAL FUNCTIONALITY HABITATION
ELEMENT

Abstract

The paper is based on study conducted by Sasakawa International Center for Space Architecture (SICSA) in September 2008 – February 2009. SICSA had been awarded key roles in helping two aerospace company teams plan living and work accommodations for early lunar surface missions. SICSA had major conceptual design responsibilities on teams headed by Boeing and ILC Dover which were separately selected out of more than 20 competing proposals for two out of three total NASA study contracts. Major study priorities were to determine minimum habitat requirements essential to keep crews alive and safe from harm during the first month-long missions, and then expand these accommodations as operations, facilities and amenities are extended. The paper discusses important points of radiation protection options with a special emphasis upon comparative mass implications for several proposed habitat configurations concepts. These comparisons are correlated with shielding surface area rather than actual mass estimates due to current data uncertainties regarding a number of issues: unresolved questions concerning how much radiation protection will be mandated, what mitigation strategies will be selected, what types and thicknesses of materials will be used, and how much of the total allowable module mass can be allocated for this purpose.