HUMAN EXPLORATION OF THE MOON AND MARS SYMPOSIUM (A5)
Joint Session on the Role of Humans, Machines and Intelligent systems in the Future of Space Endeavours
(2.-B3.6)

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HUMAN/AUTOMATION TRADE METHODOLOGY FOR THE MOON, MARS AND BEYOND

Abstract

A consistent trade methodology can be created to characterize operations model alternatives for crewed exploration missions. For example, a trade-space with the objective of maximizing Crew Exploration Vehicle independence would have as an 'input' the category of analysis/decision to be made, and when the analysis/decision is required. For example, does the decision relate to crew activity planning or life support, and will it be made during trans-Earth injection, cruise, or lunar descent? Different kinds of decision analysis of the trade-space between human and automated decisions will occur at different points in a mission's profile. The necessary objectives at a given point in time during a mission will call for different kinds of response with respect to where and how 'automation' is expected to help provide an accurate, safe, and timely response. In this paper, a consistent methodology for assessing the trades between human and automated decisions on-board will be presented and various examples discussed.