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HUMAN/AUTOMATION TRADE METHODOLOGY FOR CREWED EXPLORATIONS

Abstract

A consistent trade methodology can be created to characterize operations model alternatives for crewed exploration missions. A trade-space that is organized around the objective of maximizing Multi-Purpose Crewed Vehicle (MPCV) and potential ISS independence would have as 'input' the classification of the category of analysis to be conducted or decision to be made, and a commitment of when in the mission profile the analysis or decision is required. For example, does the decision have to do with crew activity planning or life support? Is the mission phase 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 computers and 'automation' are 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 (ISS and a MPCV NEO mission) will be discussed.