66th International Astronautical Congress 2015

SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT (D3)
Space Technology and System Management Practices and Tools (4)

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COMBINING SYSTEM DYNAMICS WITH TRADESPACE EXPLORATION TO EXPLORE FUTURE SPACE ARCHITECTURES

Abstract

Future space architectures will most likely be around for a long time. To make the best choices for long lived architectures, it is important to take into account technical, economic and policy issues as well how they evolve over time. Tradespace exploration has been used to make good technical choices (choices near the Pareto front). Attempts have been made to evolve tradespaces over time with epoch-era analysis and metrics have been defined which account for the most robust architectures over time. These have been shown to include some of the "illities" (e.g flexibility) in the architectures. However, such analysis does not properly account for economic and policy issues. System Dynamics as a methodology can account for these important feedback effects. In this research, we are attempting to combine the two methodologies so as to properly model the development of complex space architectures. The methodology will be shown and applied to the development of a low earth orbit data relay system and a system for doing in space servicing in earth orbit.