System of Systems Engineering Collaborators Information Exchange (SoSECIE)

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System of Systems Architecture Feasibility Analysis to Support Tradespace Exploration

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The exploration of a system of systems (SoS) tradespace is made much more efficient and effective with a method to first automatically screen a large number of SoS designs for feasibility. This is because not every combination of constituent systems is capable of forming a viable SoS, much less form a SoS that exhibits the desired emergent behavior(s). The SoS Architecture Feasibility Assessment Model (SoS-AFAM) assesses the feasibility of the physical communications, process, and organizational architectures of a SoS. The model applies algorithms based on the minimum requirements for viability relevant to all SoS such as connectivity and completeness. We present a case study to demonstrate how the algorithm can greatly prune the SoS tradespace of infeasible SoS design points, which can increase the efficiency of design exploration.

Biography

MAJ Stephen Gillespie is an Army officer, currently assigned as an instructor in the U.S. Military Academy Department of Systems Engineering. His research interests include model-based systems engineering and system-of-systems engineering. This work is a result of his graduate school research. Prior military experience include service as an infantry offficer in the 173rd Airborne Brigade and 4th Infantry Division, to include two deployments to Afghanistan and one to Iraq. He earned a Ph.D. in Systems Engineering from the Naval Postgraduate School and a M.A. and B.A. in Mathematics from Boston University.