System of Systems Engineering Collaborators Information Exchange (SoSECIE)

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Systems of Systems Engineering Technical Approaches as Applied to Mission Engineering

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The U.S. Department of Defense (DoD) is placing increased emphasis on mission engineering, the deliberate planning, analyzing, organizing, and integrating of current and emerging operational and system capabilities to achieve desired warfighting mission effects. The DoD Components are already implementing mission engineering in areas of critical interest such as ballistic missile defense and naval mission areas They implement mission integration management – the coordination of all the programmatic elements – to match funding, schedules, technical improvements, resources (technical staff, development and test infrastructure, models and simulations, etc.) across the relevant mission and supporting systems to develop, test, and field a phased set of mission capabilities. One element of mission engineering and management is the engineering of relevant systems of systems (SoS).

This presentation outlines the key activities involved in mission engineering and describes opportunities to apply SoS engineering technical approaches to provide the engineering base for mission integration and management. In particular, mission engineering often emphasizes the definition of the key activities to execute the mission in the form of mission threads or kill/effects chains and assessing gaps in mission performance. Less attention has been paid to the patterns of mission activities and the engineering required to identify and assess alternatives to address the gaps and engineer the SoS to implement the preferred approach. Drawing on work within the MITRE systems engineering technical center's model-based engineering center, this presentation will discuss approaches to developing, representing, and evaluating SoS architectures using model-based methods, and evaluating SoS configurations to address the functional needs of the mission to provide a set of approaches to support mission engineering.

Biography

Dr. Judith Dahmann is a principal senior scientist in the MITRE Corporation Center for the MITRE Systems Engineering Technical Center and the Capability Action Team leader for SoS. Dr. Dahmann is currently the MITRE project leader for the DoD Office of the Deputy Assistant Secretary of Defense for Systems Engineering, and she is the MITRE task lead for a set of SoS technology development projects at the Defense Advanced Research Projects Agency (DARPA). Dr. Dahmann holds a Bachelor's Degree from Chatham College in Pittsburgh, PA with a year as a special student at Dartmouth College, a Master's Degree from The University of Chicago and a Doctorate from Johns Hopkins University.