# System of Systems Engineering Collaborators Information Exchange (SoSECIE)

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**Implementing Mission Engineering: Mission Engineering Playbook**

***Presenter: Judith Dahmann***

#### Abstract

DoD has expanded focus beyond systems to address the application of SE approaches to ‘missions’. This presentation provides an implementation perspective on mission engineering (ME) based on an evolving ‘ME playbook’ which highlights key mission engineering drivers, activities and products.

The US Department of Defense (DoD) has increasingly expanded their focus beyond systems to address the application of systems engineering approaches to ‘missions’. Mission engineering is defined in the Defense Acquisition Guidebook as: “the deliberate planning, analyzing, organizing, and integrating of current and emerging operational and system capabilities to achieve desired operational mission effects”. This presentation provides an implementation perspective on mission engineering based on an evolving ‘mission engineering playbook’ which highlights key mission engineering drivers, activities and products. Mission engineering can be motivated by different factors. Under some situations mission engineering can be initiated as a proactive approach to the recognition of the primary importance of mission or enterprise outcomes addressing the ‘health’ of the ‘end-to-end mission’ to identify gaps, issues or opportunities to maintain or enhance mission outcomes. This may then lead to reactive mission engineering which is typically triggered by issues or gaps identified in mission performance or an element supporting the mission identifying the sources of mission gaps or issues and assesses solution options and tradeoffs. Finally, the impetus for mission engineering may be opportunistic, responding to a new technology or other change which offers potential mission advantages. Despite the motivation, there is a set of basic activities which typify mission engineering implementation. This presentation reviews these activities from team formation and planning, to creating a representation of the mission context and the current capabilities as a baseline for assessing impact of changes on mission outcomes, addressing risk through including prototyping and experimentation. The presentation also highlights opportunities to support mission engineering through model-based digital engineering.

#### Biographies

Dr. Judith Dahmann is a principal senior scientist in the MITRE Corporation Center for the MITRE Systems Enginering Technical Center and the capability lead for Systems of Systems (SoS). Dr. Dahmann is the MITRE project leader for SE Technical Support activities in OUSD R&E supporting mission engineering (ME) activities and t application of digital engineering to ME. She was the technical lead for development of the DoD guide for systems engineering of systems of systems (SoS) and is currently the project lead for ISO 21839, a final draft international standard on SoS Considerations Throughout the System Life Cycle’. Dr. Dahmann is also the task lead for a set of Defense Advanced Research Projects Agency (DARPA) SoS programs investigating advanced technology approaches to complex SoS challenges. Dr. Dahmann is an INCOSE Fellow and the cochair of the INCOSE Systems of Systems Working Group and the DoD liaison and co-chair of the NDIA SE Division SoS Committee.