



## OFFICE OF THE DEPUTY ASSISTANT SECRETARY OF DEFENSE SYSTEMS ENGINEERING

### System of Systems Engineering Collaborators Information Exchange (SoSECIE)

August 25, 2015  
11:00 a.m. to Noon Eastern Time

#### A Practitioner's Approach Using Model Based Systems Engineering (MBSE) in Systems of Systems

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#### **Abstract**

Recognizing the value of systems engineering (SE) as a key enabler of successful systems acquisition, and the growing importance of systems interdependencies affecting the ability for mission success of highly complex development systems, the Deputy Under Secretary of Defense for Acquisition and Technology developed the [2008] "Systems Engineering Guide for Systems of Systems." While this guide provides excellent insight into the Systems of Systems (SoS) environment, as well as core SoS SE elements, the process to apply them in a DoD acquisition environment is not included. The Missile Defense Agency (MDA) has initiated an Enterprise Engineering and Management process to face the challenges associated with architecting the highly complex Ballistic Missile Defense System (BMDS) Modeling & Simulation (M&S) at the SoS level. Because it's not atypical for constituent component developers to read the same need statement and interpret what is needed on opposite sides of an interface differently, severe integration and event execution issues can result. MDA is using Model Based Systems Engineering (MBSE) methods and the Systems Modeling Language (SysML) to remedy SoS misunderstandings prior to development. The purpose of this presentation is provide a description of the MDA system of system acquisition process from receipt of M&S needs through to development of individual requirements for the constituent systems by leveraging the power of MBSE practices. In addition, the discussion will include how the process facilitates collaboration amongst the system constituents and other stakeholders to create a shared common understanding and agreement for the efforts required for success of the SoS mission. Included in the discussion of the proposed acquisition process will be conceptual modeling, architecture development and design reviews. The nature of DoD missions and the simulations that describe them are becoming more complex with increasing interdependence among the systems involved. This presentation intends to provide the practitioner with systems engineer processes that will result in avoidance of the unintended consequences impacting mission success.

#### **Biography**

Mr. Richard Deakins is currently the Lead Systems Engineer for Missile Defense Agency's Digital Assessment M&S program and lead of the Enterprise Engineering M&S initiative. He has over thirteen years of experience in virtual and constructive simulation development. Mr. Deakins received a B.S. in Computer Science.

Mr. Doug Parsons is currently the Lead Software Architect for Missile Defense Agency's Objective Simulation Framework (OSF) program and a key contributor to the Enterprise Engineering M&S initiative. He has over nineteen years of experience in virtual and constructive engineering simulation development. Mr. Parsons received a B.S. in Mechanical Engineering, a M.S. in Systems Management and a M.S. in Industrial Engineering.