



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

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

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11:00 a.m. to Noon Eastern Time**

**An Artificial Environment for Exploring
Systems Engineering Effectiveness**

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Abstract

The Demonstration and Analysis Tool for Adaptive Systems Engineering Management (DATASEM) is an evolving software simulation framework for experimenting with new and existing systems engineering (SE) management, governance, and technical methods to achieve more effective use of systems engineering, development and acquisition resources.

Successfully applying systems engineering to evolving complex systems and systems of systems is challenged by the ineffectiveness of many traditional management and governance approaches. The current systems development environment includes:

- Rapid change in threats, capability needs and priorities, and technology/solution concepts and availability
- Multiple powerful stakeholders with inconsistent win conditions
- Legacy or component systems and platforms that are evolving independently with heterogeneous governance systems
- Overall capability enhancement via continuous, interdependent software development

It is difficult to schedule as well as efficiently apply resources to ongoing development and operation tasks in such an uncertain environment. Timely and coherent communication and decision making are critical success factors - but often difficult to achieve. This is particularly true in systems of systems evolution. New ways of coordinating, valuing, and performing work across complex development environments are needed.

Organizational structures and governance approaches have a particularly significant impact on productivity in complex environments; however, changing them can incur significant costs with uncertain benefits. This SERC research project provides a modeling environment to experiment with more effective application of SE and development resources to build different aspects of the system.

When operational, DATASEM can inform organizations contemplating changes by letting them experiment with different ways of coordinating heterogeneous organization and governance across independent organizations. Managers, practitioners and researchers will be able to identify, develop, investigate and validate new governance and management approaches with sufficient rigor to encourage adoption. Where appropriate, DATASEM can demonstrate to stakeholders the expected benefits of adaptive governance mechanisms within their existing organization.

This presentation will provide a review of the research concepts, the status of the development, and opportunities for attendees to participate in the project.

Biography

Professor Turner's research applies agile and lean techniques (such as value- and flow-based scheduling) to evolving systems and systems of systems to enable earlier value delivery and improved visibility and coordination across organizations and disciplines. His broad research interests include: using immersive simulated environments to accelerate experience accumulation, improving interactivity in web-based instruction, and employing spiral, risk-driven methods to system development and acquisition.

He has over forty years of industry, government, and academic experience in systems, software and acquisition engineering. His book with Barry Boehm, *Balancing Agility and Discipline*, has been called a classic in software engineering literature. He is coauthor of three other books and numerous articles in scientific journals. He was a member of the core author team for the PMI/IEEE Software Extension to the Guide to the PMBOK, selected as a Fellow of the Lean Systems Society, and currently serves on several technical editorial boards and steering committees.

Professor Turner is an IEEE-Computer Society Golden Core award recipient and a Senior Member of IEEE. He received his B.A. in mathematics from Huntingdon College, M.S. in computer science from the University of Louisiana-Lafayette, and D.Sc. in engineering management from the George Washington University.