6th Annual SERC
Sponsor Research Review

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Deputy Assistant Secretary of Defense for Systems Engineering

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DASD, Systems Engineering Mission

Systems Engineering focuses on engineering excellence – the creative application of scientific principles:

– To design, develop, construct, and operate complex systems
– To forecast their behavior under specific operating conditions
– To deliver their intended function while addressing economic efficiency, environmental stewardship, and safety of life and property

**DASD(SE) Mission: Develop and grow the Systems Engineering capability of the Department of Defense – through engineering policy, continuous engagement with component Systems Engineering organizations, and through substantive technical engagement throughout the acquisition life cycle with major and selected acquisition programs**

A Robust Systems Engineering Capability Across the Department Requires Attention to Policy, Practice, and People
DASD(SE) Key Responsibilities

• **Program Engagement**
  – Serve as principal engineering advisor to the SECDEF and USD(AT&L) in support of critical acquisition decisions
  – Provide continuous engineering oversight and mentoring of Major DoD Programs to identify, assess, and mitigate engineering risk; focus on helping ensure program success
  – Serve as approval authority for Systems Engineering Plans for all Major DoD Programs
  – Certify completeness of Preliminary Design Reviews and Critical Design Reviews for all Major DoD Programs

• **Policy and Guidance**
  – Develop engineering, manufacturing, reliability, program protection, and modeling and simulation policy and guidance for the DoD
  – Serve as Defense Standardization Executive – approve military standards and coordinate DoD engagement on non-military standards

• **Technical Workforce Development**
  – Provide functional leadership for the Non-Construction (Engineering) and the Acquisition (ENG and PQM) workforce

• **Engineering Research and Development**
  – Sponsor the DoD Systems Engineering Research Center (SERC) University Affiliated Research Center (UARC)
  – Sponsor the MITRE National Security Engineering Center (NSEC) Federally Funded Research and Development Center (FFRDC)

Reference: DoDI 5134.16, Deputy Assistant Secretary of Defense for Systems Engineering
# What Drives Complexity in Defense Systems?

<table>
<thead>
<tr>
<th>Contributors</th>
<th>Complicated By</th>
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<tbody>
<tr>
<td>Operations</td>
<td>Assuring current mission performance while maintaining ability to support predicted and unknown future operational needs</td>
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<tr>
<td>Fiscal Realities</td>
<td>Reduced forces, reduced budgets; ensuring affordability as part of the systems tradespace</td>
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<tr>
<td>Software</td>
<td>Critical dependence on software; sheer amount of code; can we develop, integrate, maintain and assure our software?</td>
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<tr>
<td>Systems of Systems</td>
<td>Integration of multiple systems to achieve mission effects which may or may not be their primary design requirement</td>
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<tr>
<td>Security</td>
<td>The threat has unprecedented access to our technical data - - and can capitalize on this</td>
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How Does Complexity Drive SE?

Critical attributes of DoD Systems Engineering

• Flexible designs that adapt and are resilient to unknown missions and threats
• Ability to quantify cost and affordability attributes of the design trade space
• Systems of Systems, and Enterprise contexts driving requirements from multiple stakeholders
• Responsive, and able to balance agility with rigorous analysis and data
• Safeguarding critical information while designing for interoperability and global markets
• Applied across significantly diverse domains

Balancing these attributes is challenging to SE, drives the state of the practice, and stresses critical workforce capacity
Engineered Resilient Systems

Science and technology to increase engineering productivity to address changing threats and missions.
Managing Challenges of Complexity

• Lay solid foundations…create opportunities

• Envision multiple futures…enable flexible choices

• Design and build systems with focus on lifecycle cost

• Protect our critical defense “intellectual property”

• Strengthen the workforce's capacity to lead and implement critical engineering practices
Defense Innovation Initiative (DII)

Secretary of Defense Chuck Hagel’s November 15, 2014 memo, “The Defense Innovation Initiative” directs:

“A new long-range research and development planning program will identify, develop, and field breakthrough technologies and systems that sustain and advance the capability of U.S. military power.”

LRRDP Organization

LRRDP Study Structure

Request For Information
Solicits Inputs from Industry, Academia, Associations and General Public
(Reinforced by Public Affairs Outreach)

Working Groups will support deliberations with fact finding from RFI inputs and invited speakers

Integration Group will leverage DSB to provide feedback on interim LRRDP products

- Steering Group
  - USD(AT&L), J8, ASD(R&E), ASD(A), D, DARPA

- Integration Working Group
  - DASD(SE), D, SCO, J8 Representative & Working Group Leads

- Scenarios and Implications
  - DASD(SE), USD(P)

- Space Technology Working Group
- Undersea Technology Working Group
- Air Dominance & Strike Technology Working Group
- Air and Missile Defense Technology Working Group
- Technology-Driven Working Group

Government-only study addresses FACA rules
Identify high-payoff enabling technology investments that could:

- Provide an opportunity to shape key future US materiel investments
- Offer opportunities to shape the trajectory of future competition for technical superiority, and
- Will focus on technology that can be moved into development programs within the next five years.

http://www.defenseinnovationmarketplace.mil/LRRDP.html
Systems Engineering: Critical to Defense Acquisition

Defense Innovation Marketplace
http://www.defenseinnovationmarketplace.mil

DASD, Systems Engineering
http://www.acq.osd.mil/se