OSD Systems Engineering Status and Goals

Nicholas M. Torelli
Director, Mission Assurance
Office of the Deputy Assistant Secretary of Defense for Systems Engineering

NDIA Systems Engineering Division Meeting
June 19, 2013
Better Buying Power 2.0
A Guide to Help You Think

Achieve Affordable Programs
• Mandate affordability as a requirement
• Institute a system of investment planning to derive affordability caps
• Enforce affordability caps

Control Costs Throughout the Product Lifecycle
• Implement “should cost” based management
• Eliminate redundancy within warfighter portfolios
• Institute a system to measure the cost performance of programs and institutions and to assess the effectiveness of acquisition policies
• Build stronger partnerships with the requirements community to control costs
• Increase the incorporation of defense exportability features in initial designs

Incentivize Productivity and Innovation in Industry and Government
• Align profitability more tightly with Department goals
• Employ appropriate contract types
• Increase use of Fixed Price Incentive contracts in Low Rate Initial Production
• Better define value in “best value” competitions
• Only use LPTA when able to clearly define Technical Acceptability
• Institute a superior supplier incentive program
• Increase effective use of Performance-based Logistics
• Reduce backlog of DCAA Audits without compromising effectiveness
• Expand programs to leverage industry’s IR&D

Promote Effective Competition
• Emphasize competition strategies and creating and maintaining competitive environments
• Enforce open system architectures and effectively manage technical data rights
• Increase small business roles and opportunities
• Use the Technology Development phase for true risk reduction

Improve Tradecraft in Acquisition of Services
• Assign senior managers for acquisition of services
• Adopt uniform services market segmentation
• Improve requirements definition/prevent requirements creep
• Increase small business participation, including through more effective use of market research
• Strengthen contract management outside the normal acquisition chain – installations, etc.
• Expand use of requirements review boards and tripwires

Improve the Professionalism of the Total Acquisition Workforce
• Establish higher standards for key leadership positions
• Establish stronger professional qualification requirements for all acquisition specialties
• Increase the recognition of excellence in acquisition management
• Continue to increase the cost consciousness of the acquisition workforce – change the culture

For additional information on Better Buying Power 2.0: http://bbp.dau.mil/
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, People and Practice**
Providing technical support and systems engineering leadership and oversight to USD(AT&L) in support of planned and ongoing acquisition programs

DASD, Systems Engineering
Stephen Welby
Principal Deputy Kristen Baldwin

Systems Analysis
Kristen Baldwin (Acting)
Addressing Emerging Challenges on the Frontiers of Systems Engineering
Analysis of Complex Systems/Systems of Systems
Program Protection/Acquisition Cyber Security
University, FFRDC and Industry Engineering and Research Modeling and Simulation

Major Program Support
James Thompson
Supporting USD(AT&L) Decisions with Independent Engineering Expertise
Engineering Assessment / Mentoring of Major Defense Programs
Program Support Reviews
OIPT / DAB / ITAB Support
Systems Engineering Plans
Systemic Root Cause Analysis

Mission Assurance
Nicholas Torelli
Leading Systems Engineering Practice in DoD and Industry
Systems Engineering Policy & Guidance
Development Planning/Early SE
Specialty Engineering (System Safety, Reliability and Maintainability Engineering, Quality, Manufacturing, Producibility, Human Systems Integration)
Counterfeit Prevention
Technical Workforce Development Standardization
SE Annual Report to Congress

- FY 2012 SE Annual Report delivered to Congress
- Detailed review of DASD(SE) accomplishments in FY12
- Review of Service progress and plans implementing key pieces of WSARA to improve SE capabilities
- Detailed program by program assessments for 40+ MDAPs

GAO Report 13-103 Findings
DASD(SE) Performance

- Completed the development of systems engineering and development planning policy, guidance and performance measures
- Regularly completing MDAP document review and approval and program monitoring and assessments
- Led working group efforts to support Service initiatives to address systemic reliability issues in UAS and rotary wing portfolios
- Led workforce development initiatives to attract and retain a qualified SE workforce and support KLP implementation
- Positively impacted the requirements development and technical and reliability planning for:
  - Joint Lightweight Tactical Vehicle
  - Ground Combat Vehicle
  - Joint Strike Fighter
  - Remote Mine-hunting System
  - Gray Eagle and Global Hawk

Top Level FY13 DASD(SE) Goals

- Continue excellence in SE support to programs and acquisition decisions
- Improve consistent program protection plan (PPP) engagement with programs resulting in successful vulnerability mitigation strategies
- Advocate for and ensure SE workforce capacity and capability
- Provide depth to acquisition policy and processes with SE guidance, practices, and continuous learning opportunities
- Advance the state of engineering to meet challenges and enable DoD goals
- Maintain quality of technical insight in resource constrained environment
FY13 DASD(SE) Objectives

- Engineering Program Support
- Program Protection
- Engineering Workforce
- Engineering Policy and Guidance
- Technical Standards
• Improve guidance to fully reflect current policy and DASD(SE) initiatives:
  – Joint Capabilities Integration and Development System (JCIDS) (Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01H)
  – Process changes as a result of Better Buying Power
  – Systemic root cause analyses findings
  – Department-wide best practice; avoiding Service and domain-specific implementations

• Improve currency, consistency, usability, and readability—less theory, more utility

• Emphasize the role of Systems Engineering in providing balanced solutions (managing cost, schedule and risk) that deliver needed capability to the war fighter

• Make Chapter 4 an effective tool for the Program Manager and the Systems Engineering Practitioner
4.1 Introduction
   - Systems Engineering Definition
   - Why it’s important

4.2 Systems Engineering Activities in the Life Cycle
   - Description of Technical Maturity Points
   - By-phase description of key technical activities
   - Technical Reviews and Audits

4.3 Systems Engineering Processes
   - Description of technical and technical management processes
   - Design Considerations (include Specialty Engineering)

Web Version: https://acc.dau.mil/dag4
New DAG Chapter 4
Major Content Changes

- Focused on target audience: Program Managers and Systems Engineering practitioners
- Consolidated and strengthened Systems Engineering Plan (SEP) Outline content in 4.1.2
- Added new content:
  - 4.1.3 Systems Level Considerations (includes Software)
  - 4.1.5 Certifications
  - 4.1.6 Systems Engineering Role in Contracting
  - 4.3.19 Sustainability Analysis
- Added detailed SE technical reviews and audits information (4.2.8-4.2.17)
- Enhanced Design Considerations section 4.3.18:
  - Streamlined Parts Management and Standardization
  - Added new subsections: Anti-Counterfeiting; Intelligence; Operational Energy; and Packaging, Handling, Storage, and Transportation (PHS&T)
  - Added guidance for Producibility (under Producibility, Quality, and Manufacturing Readiness)
- Removed/reduced topics covered in other DAG chapters
  - Earned Value Management and Integrated Baseline Reviews (IBR) content removed, both found in Chapter 11 Program Management
  - Test and Evaluation content reduced, found in Chapter 9 Test & Evaluation
- Removed phase-specific systems engineering ‘V’s
Proposed DoD 5000.02 Update

• Decrease emphasis on “rules” and increase emphasis on process intent and thoughtful program planning

• Provide program structures and procedures tailored to the dominant characteristics of the product being acquired and to unique program circumstances, e.g., risk and urgency

• Added key decision points between Milestone A and Milestone B

• Institutionalize changes to statute and policy since the last issuance of DoD Instruction 5000.02
DoD Counterfeit Prevention Policy
(DoDI 4140.67)

Purpose:
• Establishes policy
• Assigns responsibilities
• Provides definitions

It is DoD Policy to:
• Employ a risk-based approach
• Apply early prevention and detection procedures
• Document all occurrences in GIDEP
• Notify criminal investigative organizations
• Seek restitution when confirmed
• Provide education and training

Counterfeit Materiel Defined as:
“An item that is an unauthorized copy or substitute that has been identified, marked, or altered by a source other than the item’s legally authorized source and has been misrepresented to be an authorized item of the legally authorized source.”

Responsibilities:

ASD(L&MR):
• Principal point of contact for anti-counterfeit improvements

ASD(R&E):
• Risk-based procedures to identify critical materiel
• Quality assurance policy
• Supplier qualification criteria
• GIDEP management

DPAP
• Procurement policies

DoD Components
• Identify critical materiel
• Procure from suppliers meeting appropriate criteria
• Conduct materiel testing
• Report in GIDEP

Proposed Acquisition Rule Changes

- **DFARS case (2012-D055) “Detection and Avoidance of Counterfeit Electronic Parts”**
  - Implements provisions of both FY12 NDAA §818 and FY13 NDAA §833
  - Anticipate publication as a proposed rule in 2013

- **FAR case (2013-002) “Expanded Reporting of Non-conforming Items”**
  - Increases and improves the reporting of non-conforming items (including suspected and confirmed counterfeit) into the GIDEP
  - Anticipate publication as a proposed rule in 2013

- **FAR case (2012-032), “Higher Level Contract Quality Requirements”**
  - Provides for increased contract quality standards
  - Anticipate publication as a proposed rule in 2013
Growing Great Engineers

• **Depth**
  – Extensive expertise and experiences in one or more engineering disciplines and in one or more product domains

• **Breadth**
  – Awareness of and appreciation for other functional areas
  – Understanding of system lifecycle and processes
  – Knowledge of other engineering disciplines and how they integrate into a system solution
  – Knowledge of product domains

• **Leadership**
  – Ability to motivate and inspire individuals and teams
  – Comfort in dealing with complexity
  – Focus on underpinning decisions with data
  – Capability to make tough technical decisions
DoD SPRDE Workforce: Age Demographics

FY2007 Mean Age: 43.6 years

Source: AT&L Defense Acquisition Workforce Data Mart
SPRDE – Systems Planning, Research, Development and Engineering
DoD SPRDE Workforce: Age Demographics

FY2007 Mean Age: 43.6 years
FY2008 Mean Age: 43.4 years

Source: AT&L Defense Acquisition Workforce Data Mart
SPRDE – Systems Planning, Research, Development and Engineering
DoD SPRDE Workforce: Age Demographics

Source: AT&L Defense Acquisition Workforce Data Mart
SPRDE – Systems Planning, Research, Development and Engineering

FY2007 Mean Age: 43.6 years
FY2008 Mean Age: 43.4 years
FY2009 Mean Age: 43.0 years
DoD SPRDE Workforce: Age Demographics

FY2007 Mean Age: 43.6 years
FY2008 Mean Age: 43.4 years
FY2009 Mean Age: 43.0 years
FY2010 Mean Age: 42.7 years

Source: AT&L Defense Acquisition Workforce Data Mart
SPRDE – Systems Planning, Research, Development and Engineering
DoD SPRDE Workforce: Age Demographics

FY2007 Mean Age: 43.6 years
FY2008 Mean Age: 43.4 years
FY2009 Mean Age: 43.0 years
FY2010 Mean Age: 42.7 years
FY2011 Mean Age: 42.9 years

Source: AT&L Defense Acquisition Workforce Data Mart
SPRDE – Systems Planning, Research, Development and Engineering
DoD SPRDE Workforce: Age Demographics

Source: AT&L Defense Acquisition Workforce Data Mart
SPRDE – Systems Planning, Research, Development and Engineering
Engineering (Non-Construction) Functional Community by Occupational Series & Component
Total = 74,923

Notes:
1. 0840, 0854, 0855 designated “Mission Critical Occupations (MCOs)”
2. Does not include 0801A Acquisition Program Management Function

Source: DCPDS, June 30, 2012
Mission Critical Occupations: Age by Occupational Series

0840 - NUCLEAR ENGINEERING

High number of young Engineers

0854 - COMPUTER ENGINEERING

0855 - ELECTRONICS ENGINEERING

Source: DCPDS via DRS, June 30, 2012
0855 – Electronics Engineer
Career Level by Years of Service

Do these Career Level 3s have industry experience?

Data Source: CMIS data as of June 30 pulled on 9/18/2012
Population: Appropriated Fund excluding employees in SES like pay plans
Engineering Challenges

Source: AT&L Acquisition Workforce DataMart
Key Leadership Position Initiative

• Directed by Sec 820 of PL 109-364 that requires “properly qualified” individuals in key positions on major defense acquisition programs

• Further implementation in USD(AT&L)’s 25 Aug 2010 memo, Government Performance of Critical Acquisition Functions
  – Identifies Program Lead Systems Engineer as a mandatory Key Leadership Position for all MDAP/MAIS programs (Acquisition Categories I and IA) when the function is required based on the phase or type of acquisition program

• Working with SPRDE FIPT on updating Systems Engineering competencies and determining Key Leadership Position characteristics

F IPT – Functional IPT
KLP – Key Leadership Position
SPRDE – Systems Planning, Research, Development and Engineering
Summary

- FY13, FY14 and beyond: shaped by budget uncertainty
- Criticality of our Systems Engineering mission has grown
  - Our work will be even more essential in facing budget challenges
- We are making an impact
  - Strong support for System Engineering mission across the Department
- Dedicated, professional and committed SE staff
- Focused on working smarter, as a more tightly integrated team across OSD and the Services
  - Continue to make a difference for the warfighter and the taxpayer
Systems Engineering: Critical to Acquisition Success

Innovation, Speed, and Agility
http://www.acq.osd.mil/se