9th Annual NDIA
Systems Engineering Conference
2006

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Dir, Systems of Systems Management

Dir, Systems and Software Engineering

Dir, Portfolio Systems Acquisition

Defense Acquisition University

Defense Procurement and Acquisition Policy

Industrial Programs

Small Business Programs

Defense Contract Management Agency

Flatter, Leaner, Empowered!
State of Systems Engineering
Director, Systems & Software Engineering

Director, Systems & Software Engineering
Mark Schaeffer SES

Deputy Director
Enterprise Development
Bob Skalamera SES

Deputy Director
Developmental Test & Evaluation
Chris DiPetto SES

Deputy Director
Software Engineering & System Assurance
Mark Schaeffer (Acting) SES

Deputy Director
Assessments & Support
Dave Castellano SES

CORE COMPETENCIES
- SE Policy
- SE Guidance
- SE in Defense Acquisition Guidebook
- Technical Planning
- Risk Management
- Reliability & Maintainability
- Contracting for SE
- SoS SE Guide
- SE Education and Training
- DAU SE Curriculum
- SPRDE Certification Rqmt
- Corrosion
- R-TOC
- Value Engineering

CORE COMPETENCIES
- DT&E Policy
- DT&E Guidance
- T&E in Defense Acquisition Guidebook
- TEMP Development Process
- DT&E Education and Training
- DAU DT&E Curriculum
- DT&E Certification Rqmt
- Joint Testing, Capabilities & Infrastructure
- Targets Oversight
- Acq Modeling & Simulation
- Energy
- DSOC/Acq Tech Task Force

CORE COMPETENCIES
- SWE and SA Policy
- SWE and SA Guidance
- SoS, SA Guides
- SWE and SA Education and Training
- DAU SW Acq Curriculum
- Continuous Learning Modules for SWE, SoS, SA
- Software Engineering
- Acquisition Support
- Software Engineering Institute (SEI)
- Process Improvement
- CMMI Sponsor
- DoD/National Software Investment Strategy

CORE COMPETENCIES
- Support of ACAT I and Other Special Interest Programs (MDAP, MAIS)
- Assessment Methodology (Program Support Reviews - PSRs)
- T&E Oversight and Assessment of Operational Test Readiness (AOTR)
- Systems Engineering and Developmental Test Planning and Support
- Lean/6-Sigma Training/Cert

Acquisition program excellence through sound systems and software engineering
Vision for Systems Engineering and Software

- Competencies Improved
- Delivered Product Suite
  - Courseware
  - Policy/Guidance
  - Program Support methods
- Elevated Stature
- Raised Awareness
- Positive Influence

- World class leadership
- Broaden to Software Engineering, System Assurance, Complex Systems-of-Systems
- Responsive and agile, proactive to changing customer needs
- Focused technical assistance, guidance, and workforce education and training

. . . the Technical Foundation that Enables Acquisition Excellence
Systems and Software Engineering
Mission Statement

➢ Shape acquisition solutions and promote early technical planning

➢ Promote the application of sound systems and software engineering, developmental test and evaluation, and related technical disciplines across the Department's acquisition community and programs

➢ Raise awareness of the importance of effective systems engineering and drive the state-of-the-practice into program planning and execution

➢ Establish policy, guidance, education and training in collaboration with academia, industry, and government communities

➢ Provide technical insight to program managers and leadership to support decision making

Evolving System Engineering Challenges
Systems Engineering Revitalization Framework

Driving Technical Excellence into Programs!
Systems Engineering Policy

- Policy Memorandum (February 2004) and Policy Addendum (October 2004)
  - Programs shall apply robust SE approach and develop a SE plan
  - Each PEO shall have a lead or chief systems engineer
  - Event-driven technical reviews with entry criteria and independent SMEs unless waived by MDA
  - OSD shall review program SEPs for ACAT ID and IAM programs
  - Defense Systems shall establish a SE Forum

- DoDD 5000.2 Update
  - Reflect “fact-of-life” policy changes

No new policies in 2006
Systems Engineering Guidance

- Published Defense Acquisition Guidebook
- Published DoD Guide for Achieving Reliability, Availability, and Maintainability
- Published Integrated Master Plan and Integrated Master Schedule Preparation and Use Guide
- Published Systems Engineering Plan Preparation Guide
- Published Risk Management Guide for DoD Acquisition
- Upcoming:
  - Update Defense Acquisition Guidebook
  - Publish Contracting for SE Guide

Continues to be refined
Systems Engineering
Education, Training, & Outreach

- Updating formal training across key career fields:
  SE, Acquisition Program Management, Contract Management, Finance, Logistics
  - New introductory course SYS101 now online
  - New intermediate course SYS202 online next week, classroom SYS203 available Oct 07
  - New advanced SYS302 course available Jan 07
- Developing continuous learning, on-line courses:
  - In development: Corrosion Prevention and Control, Modular Open Systems Approach, Trade Studies
- Established new, strengthened certification requirements for systems engineers
  - New SPRDE career path provides for broader experience and training for selected positions
- Engaging universities:
  Stevens Institute of Technology, University of Southern California, Stanford, Southern Methodist, George Mason, Service Academies and Naval Postgraduate School, AFIT/CSE

Portfolio refreshed and growing
Program Support Reviews provide insight into a program’s technical execution focusing on:

- SE as envisioned in program’s technical planning
- T&E as captured in verification and validation strategy
- Risk management—integrated, effective and resourced
- Milestone exit criteria as captured in Acquisition Decision Memo
- Acquisition strategy as captured in Acquisition Strategy Report

Independent, cross-functional view aimed at providing risk-reduction recommendations

Yielding systemic insights
Top 10 Emerging Systemic Issues

1. Management
   • IPT roles, responsibilities, authority, poor communication
   • Inexperienced staff, lack of technical expertise

2. Requirements
   • Creep/stability
   • Tangible, measurable, testable

3. Systems Engineering
   • Lack of a rigorous approach, technical expertise
   • Process compliance

4. Staffing
   • Inadequate Government program office staff

5. Reliability
   • Ambitious growth curves, unrealistic requirements
   • Inadequate “test time” for statistical calculations

6. Acquisition Strategy
   • Competing budget priorities, schedule-driven
   • Contracting issues, poor technical assumptions

7. Schedule
   • Realism, compression

8. Test Planning
   • Breadth, depth, resources

9. Software
   • Architecture, design/development discipline
   • Staffing/skill levels, organizational competency (process)

10. Maintainability/Logistics
    • Sustainment costs not fully considered (short-sighted)
    • Supportability considerations traded

Major contributors to poor program performance
Challenges Remain

- Implementing a DoD vision and strategy for software
- NDIA Top 5 SE Issues/Top 7 Software Issues/SW Summit recommendations
- Component and Industry adoption and effective implementation of sound SE practices as early as possible in the system life cycle
- SE Working Integrated Product Teams (SE WIPTs)
- Retention and development of technical acumen in an aging and shrinking acquisition workforce
- Meeting all requests for technical support to programs
- SE support to Acquisition Initiatives stemming from the QDR
- Continue to evolve “high visibility” initiatives:
  - Energy
  - CMMI
  - DSOC
  - System-of-Systems
  - Modeling & Simulation
  - System Assurance
Commodity fuel costs are significant, but only the tip of the iceberg

- It costs the Army about 16 times as much to deliver fuel as to purchase it.

Investments in end-use efficiency at spear tip cascade down supply pyramid

Energy Security IPT recommendations approved by DAWG

- Platform Fuel Efficiency – revise policy to incorporate delivered cost of fuel in acquisition decisions
  - 3 pilot programs being considered
- Assured Fuels (testing, certification, industry incentives)
- Accelerate Facilities Initiatives
DUSD (A&T) directed OSD-led effort to develop and publish System-of-Systems (SoS) Systems Engineering guide

- 6-month effort addressing areas of agreement across community
- Initial focus on SoS with stated requirements and organizations responsible for execution
- Addresses DAG technical process and considerations for technical management across system life cycle
  - Focused on systems engineering challenges characteristics of SoS and suggested approaches
- Audience: Program Managers and Lead/Chief Engineers for SoS acquisition programs, legacy systems, and constituent programs

Draft of initial version of guide is out for review
CMMI: New Release and Next Steps

Issues:
- Integrity of CMMI appraisals
- Misperception and misuse of the CMMI by acquirers

Actions:
- Implemented changes to the CMMI v1.2 product suite to ensure:
  - Integrity of appraisals
  - Quality of the product suite
  - Education of acquirers
  - Opportunities for streamlining where appropriate
- Developing a CMMI model for Acquirer process improvement
  - Partnership with General Motors
  - Stakeholders cross DoD, Govt Agencies and Industry
- Writing a CMMI guidebook
  - Help acquirers understand what CMMI is and is not
- Conducting study of actual process implementation post-Level 5
Defense Safety Oversight Council
Joint Weapons Safety

Issue:

• For USSOCOM to field joint systems involving weapons, ammunition, and/or explosives, safety certifications and/or releases must be obtained from multiple system safety boards with differing processes, procedures, and certification criteria

Solution

• Working with the Service Safety Boards, SOCOM and OSD developed a “Joint Weapons Safety Review” process to address SOCOM issue
• “Joint Weapons Safety Review Guide for USSOCOM” developed and is in use; SOCOM regulation expected Jan 07
• OSD looking to expand process across DoD

The process changed without forfeiting the integrity of safety!
Defense Safety Oversight Council
Unmanned System Safety

➢ Issue

• FCS Board of Directors raised issue of whether or not proper procedures & processes in place to ensure weaponized unmanned systems safety in the joint battle space

➢ Solution

• Working across OSD, Services, and other agencies: war fighters, technical experts, acquisition staffs

• Developed Unmanned System Safety Guide for DoD Acquisition; available and in use

• Formalizing options for implementation: DAG, training courses, encouraging inclusion in commercial standards

Safety is no accident!
System Assurance

Issues:

- Vulnerability of our systems to malicious tampering or access
- Numerous assurance, protection and safety initiatives that are not aligned

Actions:

- Developing a comprehensive System Assurance strategy
- Promoting nationwide collaboration
- Identifying standards activities to address system vulnerabilities
- Developing a Handbook for Engineering System Assurance
  - Guidance for PMs and Engineers on how Systems Engineering practice can be applied to mitigate system vulnerability to malicious control/tampering
Software Engineering and System Assurance (SSA)

- Support Acquisition Success
  - Ensure effective and efficient software solutions across the acquisition spectrum of systems, SoS and capability portfolios
- Improve the State-of-the-Practice of Software Engineering
  - Advocate and lead software initiatives to improve the state-of-the-practices through transition of tools, techniques, etc.
- Lead the DoD and National Software Investment Strategy
  - Implement at Department and National levels, a strategic plan for meeting Defense software requirements
- Implement Global Outreach and Leadership
  - Enable the US and global industrial base capability to meet Department software needs, in an assured and responsive manner

Be a World-Class Leader in Software Engineering!