Developmental Test & Evaluation
Policy Vectors

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T&E Policy

Developmental Test & Evaluation
OUSD(AT&L)/Systems & Software Engineering
Outline

DEVELOPMENTAL T&E

- Intro to OSD DT&E
- DT&E Mission, Roles and Functions
- DT&E Priorities
Common Threads Through Breached Programs

- Nine key failures visible in current Nunn-McCurdy breaches:
  - Change in doctrine, driving quantity or mission changes
  - Requirements problems (unrealistic, not stable, creep, etc.)
  - Lack of a robust baseline
  - Inadequate SE / T&E, risk management, and or FMECA
  - Inadequate staffing / experience / oversight levels
  - Poor reliability
  - Acquisition reform
  - Schedule / cost realism (concurrency, estimation, etc.)
  - Contract (warranty, price curves, TSMR, etc.)
Top 10 Emerging Systemic Issues

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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**
**Early Lifecycle Planning**

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- Early lifecycle involvement of Systems Engineering to:
  - Inform evaluation of alternatives with technical insights
  - Ensure solutions balance requirements with technical feasibility
  - Ensure solutions can be validated and verified
  - Use Modeling & Simulation to help refine warfighter concept of operations/system requirements, evaluate design alternatives, and identify potential technology/human interface constraints

- Appropriate resourcing (personnel/funding) required

- Include in requirements, specifications, and contracts

*Sustainment must be included up front and early*
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T&E in Support of Systems Engineering

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Early T&E involvement

User Requirements & Concept of Operations

System Requirements & Architecture

Component Design

Procure, Fabricate, & Assemble Parts

Design

Feedback

System Demonstration & Validation

Component Integration & Test

System Integration & Test

T&E in Support of Systems Engineering

OT&E Validation

DT&E Verification
Where am I in OSD?

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- Secretary of Defense
  - USD(AT&L)
    - D, OT&E
    - DUSD(A&T)
    - TRMC
  - others
- D, SSE
- DD, DT&E
- others
Our Mission

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• Lead office within the DoD for all matters pertaining to developmental test and evaluation
  – Develops OSD policy concerning DT&E
  – OSD advocate for testers concerning DT&E
  – Responsible for education/training of the T&E acquisition workforce
• Office of primary responsibility for DoD Energy acquisition policy
  – Emerging area of emphasis on new weapon system development
• Lead office for acquisition M&S and System Safety
The Direction We are Heading

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- Revitalizing DT&E
  - Department initiative to place more emphasis on government DT&E during system development
- Integrated Test policy
  - Standardizing definitions and execution guidance throughout the Services and OSD
- Testing in a Joint Environment
  - Several ongoing initiatives (JTEM, L-V-C, DMO, etc)
The Need to Revitalize DT&E

- Too many acquisition programs not operationally effective or suitable
  - Several reasons postulated as cause – reduction in governmental DT&E?
- Policy has languished concerning governmental involvement during system development
- DT data typically not relevant to the evaluation of a system’s operational readiness
  - Scope is concentrated on more technical parameters
- DT focused on single system development
  - Needs wider emphasis on system of system and/or system employment in a joint context
A New Vector for DT&E

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• Support Faster Fielding of Improved Capabilities
• Reduce Risk of Immature Technology in Systems Development
• Revitalize T&E Workforce Education
• Promote Joint T&E in Live-Virtual-Constructive Environments
• Provide Effective Acquisition Policy and Practices for DT&E
Support Faster Fielding of Improved Capabilities

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Objective: Develop T&E policy, practices, and procedures to support Departmental efforts in shortening the time to field capabilities

- Issues:
  - Not pass-fail; but based on capabilities and limitations
  - Integrate T&E strategy - CT, DT, OT
  - Incorporate operational context in DT
  - Collect once, and use data often – Integrated Testing
  - Ensure testable requirements are in EoA / CD
  - Ensure T&E requirements are in SOWs and RFPs
  - Ensure T&E documents consistent with and support:
    - Systems Engineering Plan (SEP)
    - Acquisition Strategy (AS)
    - Capability Documents (ICD, CDD, and CPD)
Objective:
- Add Technology Maturity focus into the Systems Engineering and DT&E processes to:
  - Reduce technical, cost, and schedule risk
  - Increase the rigor of SE
  - Plan for alternatives in the event of TM difficulty
  - Verify TRLs during DT&E

Scope
- Leverage existing acquisition review structure
- Use existing DDR&E Technology Readiness Assessment (TRA) methodology
Reduce Risk of Immature Technology in Systems Development

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**Issues:**

- Studies find that immature technology is a primary source of cost and schedule risk
  - GAO -- DAPA
  - QDR -- SSE/AS Program Support Reviews
- “Programs that started development with immature technologies experienced an average acquisition unit cost increase of nearly 21 percent” (GAO-05-301, March 2005)
- FY06, PL 109-163, Section 801 requires USD(AT&L) certification, before Milestone B, that “the technology in the program has been demonstrated in a relevant environment”
  - Above wording equates to Technology Readiness Level (TRL) 6
Technology vs. Technical Maturity

Technology Maturity is a component- or subsystem-level issue
Increased TM emphasis in OSD Oversight

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- Program Support Review (PSR)
  - ID Critical Technology components/sub-systems?
  - Current TRLs known?
  - ID Mature alternative components/sub-systems?
  - TRL monitoring, Alternative decision date?
- Assessment of Operational Test Readiness (AOTR)
  - TM verification results
  - DT&E performance results
  - IOT&E predictive analysis/M&S
Objective: Ensure the T&E acquisition workforce is of sufficient size and adequately trained to perform the T&E tasks required in today’s and tomorrow’s product/system acquisition process

Issues:
- Continue to ensure current & relevant education, experience, training requirements
- Track new DAU course releases
- Identify the T&E education requirements for SoS and FoS
- Champion the development of new CLMs - such as “M&S for T&E”
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DT&E Acquisition Education & Training

**Promote Joint T&E in Live-Virtual-Constructive Environments**

Objective: Define the role of DT&E in the joint T&E arena and partner with DOT&E, Joint Staff, and Components in defining and developing the necessary polices, practices, and procedures for the conduct of efficient and effective joint T&E

Issues:

- Establishing L-V-C standards
- Defining LVC environment functional requirements
- Identify capabilities & limitations of LVC architectures
- Map capabilities & limitations to requirements
- Compare middleware, business models, standards management, alternatives
- Create roadmap, and socialize it widely
- Define business processes
- Establish a Transition Plan to include: who pays, legacy implementation, etc.
Testing in a Joint Mission Environment

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- Upcoming changes in OSD policy will likely:
  - Require testing in a joint environment for capabilities-based acquisitions
  - Establish governance on the use of the joint mission infrastructure
  - Enable smaller programs to participate and contribute to the joint environment
  - Increase demonstration venues for systems earlier in acquisition cycle
Provide Effective Acquisition Policy and Practices for DT&E

Objective: Develop and socialize the necessary changes to DT&E policy, practices, and procedures to support the overall AT&L acquisition lifecycle management framework and process.

Issues:
- More involvement in the Evaluation of Alternatives and Concept Decision
- Involvement in Capabilities design & SoS T&E
- Develop a format for T&E Strategy (TES)
- Reinforce Integrated T&E approach in TES / TEMP
- Enforce linkage of T&E and SE planning documents
- Incorporate Industry best practices
- Incorporate DT&E standards for:
  - Early involvement (requirements definition in Concept Refinement)
  - Increased operational perspective, operator involvement
  - System sustainment issues
  - Open processes and data availability
  - M&S part of T&E strategy; live test data used to improve M&S
2007 NDIA SE/DT&E Committee Focus

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• Three Focus Teams:
  – Earlier contractor and tester involvement
  – Integrated DT/OT and DT operational relevance (combined)
  – Suitability
• Recommend policy changes
  – Input to FY2008 DoD 5000 update
New Approaches to Acquisition:

- Emphasis on evolutionary acquisition
- Joint capabilities focus
- Net Centricity
- System-of-Systems
- Testing in a joint mission environment

Need a revitalized DT&E capability to be a productive team member