War Fighting Technologies: Enhance – Advance - Modernize:
- Technological/Acquisition Advances Enabling a More Responsive IT/Cyber Acquisition Environment

Dr. Kenneth E. Nidiffer
Director of Strategic Plans for Government Programs
nidiffer@sei.cmu.edu
703.908.1117
Overview

• Perspective
• The Problem Space
• The Solution Space (Pre-Decisional)
• What Success Looks Like
Perspective: Cyber Landscape

Includes all:
• System of Systems
• Architecture
• Services
• Networked Hardware/Platforms
• People who digitally connect to cyberspace

What are the opportunities?

Transportation Infrastructure  +  Healthcare Infrastructure  +  Banking & Financial Infrastructure  +  Energy & Utilities Infrastructure  +  Communications Infrastructure

Source: SEI
Problem Space: Improving Efficiency and Effectiveness in IT/Cyber Acquisitions in DoD

Source: Director, Command and Control, Programs & Policy (OSD) - Pre-Decisional
Problem Space: Current DoD IT Environment

Source: Director, Command and Control, Programs & Policy (OSD) – Pre-Decisional
Problem Space: DoD IT Acquisition Cycle-Time - 32 MAIS*

Cycle–Time Driven by Processes Developed to Counter a Cold War Adversary In Industrial Age Society

*Source: Defense Science Board Report, March 2009
Problem Space: Generic Acquisition Process

- Program-based
- Personnel Rotation – about every 3 years
- Technology Changes about every 2 years

Source: Defense Science Board Report, March 2009
### Problem Space: No Milestone “D” – No Way to Re-Invest Replacement Savings Upfront

<table>
<thead>
<tr>
<th>Year</th>
<th>Proportion of software maintenance costs</th>
<th>Definition</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>&gt;90%</td>
<td>Software cost devoted to system maintenance &amp; evolution / total software costs</td>
<td>Erlikh (2000)</td>
</tr>
<tr>
<td>1993</td>
<td>75%</td>
<td>Software maintenance / information system budget (in Fortune 1000 companies)</td>
<td>Eastwood (1993)</td>
</tr>
<tr>
<td>1990</td>
<td>&gt;90%</td>
<td>Software cost devoted to system maintenance &amp; evolution / total software costs</td>
<td>Moad (1990)</td>
</tr>
<tr>
<td>1990</td>
<td>60-70%</td>
<td>Software maintenance / total management information systems (MIS) operating budgets</td>
<td>Huff (1990)</td>
</tr>
<tr>
<td>1988</td>
<td>60-70%</td>
<td>Software maintenance / total management information systems (MIS) operating budgets</td>
<td>Port (1988)</td>
</tr>
<tr>
<td>1984</td>
<td>65-75%</td>
<td>Effort spent on software maintenance / total available software engineering effort.</td>
<td>McKee (1984)</td>
</tr>
<tr>
<td>1981</td>
<td>&gt;50%</td>
<td>Staff time spent on maintenance / total time (in 487 organizations)</td>
<td>Lientz &amp; Swanson (1981)</td>
</tr>
<tr>
<td>1979</td>
<td>67%</td>
<td>Maintenance costs / total software costs</td>
<td>Zelkowitz et al. (1979)</td>
</tr>
</tbody>
</table>
Problem Space: Four Key Challenges to our Technical Base

- **Shift in Technical Talent Base**
  - DoD
  - Commercial
  - Time

- **Global Access to Technology**
  - Foreign
  - Tech Areas

- **Increasing Pace of Innovation**
  - Time
  - Technical Talent
  - Foreign

Source: DDR&E
Problem Space: Technological Rate of Adoption - the Cyber Domain is Hotly Contested

Sophistication of Available Tools

Increased GIG Complexity & Dependence equates to lower entry barriers and potential for increased number of malicious actors

Defensive measures are outpaced by the well resourced sophisticated threat...
Problem Space: An Effective Process for Major Defense Systems – But Not Very Agile for IT Systems

Source: Defense Acquisition University
Problem Space: Alignment of Three Major DoD Decision Support Systems

Planning, Programming, Budgeting & Execution (PPBE)

Joint Capabilities Integration & Development System (JCIDS)

Defense Acquisition System

Effective Interaction Essential for Success

Source: Defense Acquisition University
Problem Space: Software-Reliant Acquisitions Can Be Difficult to Manage

According to Fred Brooks* software projects are difficult because of accidental and essential difficulties

- **Accidental difficulties** are caused by the current state of our understanding
  - of methods, tools, and techniques
  - of the underlying technology base

- **Essential difficulties** are caused by the inherent nature of software
  - invisibility - lack of physical properties
  - conformity
  - changeability
  - complexity

* Source: *The Mythical Man-Month* by Fred Brooks, Addison Wesley, 1995
## Solution Space: Issues Are Well Known and Are Being Addressed

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Defense acquisition process structured for weapon systems; ill-suited for information technology</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Systems take too long to deliver; inconsistent with technology cycle</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Too document intensive, time consuming, and process bound to respond effectively to end-user needs</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Oversight process not aligned with rapid acquisitions (favors large programs, high-level oversight)</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
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<tr>
<td>Lack of accountability by personnel in the oversight process</td>
<td></td>
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<tr>
<td>Complexity inherent in aligning three major Departmental processes - Requirements, Resourcing and Acquisition</td>
<td>✔</td>
<td></td>
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<tr>
<td>Funding process inconsistent with pace of evolving mission requirements</td>
<td>✔</td>
<td>✔</td>
<td></td>
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<tr>
<td>Current metrics (financial, acquisition process) don't work well in measuring IT success</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Lack of meaningful trades between performance, cost, and date-to-field</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Overly detailed requirements that are inconsistent with pace of technology change and need for rapid delivery</td>
<td>✔</td>
<td>✔</td>
<td></td>
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<tr>
<td>Inability to prioritize requirements effectively</td>
<td>✔</td>
<td>✔</td>
<td></td>
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<tr>
<td>Testing is integrated too late and serially</td>
<td>✔</td>
<td>✔</td>
<td></td>
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<tr>
<td>Cyber-security is inadequately managed during the acquisition process</td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Lack sufficient numbers of individuals with proven records of acquisition success</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Significant cultural impediments to change</td>
<td>✔</td>
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</table>

Source: Director, Command and Control, Programs & Policy (OSD) – Pre-Decisional

Sec 804: NEW IT ACQUISITION PROCESS REQUIRED

“The Secretary of Defense shall develop and implement a new acquisition process for information technology systems
• Be based on the recommendations in Chapter 6 of the March 2009 report of the DSB Task Force on DoD and Procedures for the Acquisition of Information Technology
• Be designed to include—
  (A) early and continual involvement of the user;
  (B) multiple, rapidly executed increments or releases of capability;
  (C) early, successive prototyping to support an evolutionary approach;
  (D) a modular, open-systems approach

Sec 933: STRATEGY FOR ACQUISITION/OVERSIGHT OF DoD CYBER WARFARE CAPABILITIES

“The Secretary of Defense, in consultation with the Secretaries of the military departments, shall develop a strategy to provide for the rapid acquisition of tools, applications, and other capabilities for cyber warfare for the United States Cyber Command and the cyber operations components of the military departments”

(1) An orderly process for determining and approving operational requirements
(2) A well-defined, repeatable, transparent, and disciplined process for developing capabilities to meet such requirements, in accordance with the information technology acquisition process developed pursuant to section 804 of the 2010 NDAA”

Source: Director, Command and Control, Programs & Policy (OSD) – Pre-Decisional
Solution Space: Section 804 - IT Acquisition Reform Goals

Objectives

- Guiding Principles in Report to Congress
  - Deliver Early and Often – Be responsive to the users needs
  - Incremental and Iterative Development and Testing
  - Rationalized Requirements – Balance user needs with constraints
  - Flexible/Tailored Processes – Customize to IT category
  - Knowledgeable and Experience IT Workforce – Understands IT uniqueness
- Provide a simplified, tailorable approach for delivering IT capability that:
  - Favors mature technology (OTS), emphasizes the Enterprise and eliminates redundancy

Reform Tenets

- An actively managed portfolio-based construct used to plan, resource, and manage capability delivery and execution
- Tailored acquisition process with an emphasis on short duration projects that deliver incremental capability
- Capability-based requirements process that reflect user needs with “rationalized” constraints
- Greater funding flexibility for portfolio-aligned information capabilities
- Portfolio-based oversight and management of the IT Enterprise using well-defined Enterprise Architectures

Source: Director, Command and Control, Programs & Policy (OSD) – Pre-Decisional
Solution Space: IT Reforms in Progress

OSD/AT&L
New IT Acquisition Framework for DODI 5000.02 Update

Joint Staff
New JCIDS Manual Streamlining MAIS/IT Requirements

DOT&E/DDT&E
Streamlining and integrating T&E for IT development

DoD CIO
IT Reform for Agile, Secure, Efficient, and Effective DoD IT

DCMO
Business Capability Lifecycle (BCL)

Source: Director, Command and Control, Programs & Policy (OSD) – Pre-Decisional
Solution Space: Section 804 Improvement Acquisition Concepts

Source: Director, Command and Control, Programs & Policy (OSD) – Pre-Decisional
Solution Space: Systems Engineering - Key Upfront Discipline

70-75% of Cost Decisions Made Prior to Milestone A Impact 72% of Total Life Cycle Costs

Source: DDR&E
What Success Looks Like: Enabled Agile Capability Delivery

Source: Director, Command and Control, Programs & Policy (OSD) – Pre-Decisional
## What Success Looks Like: Alignment with DoD’s Better Buying Power

<table>
<thead>
<tr>
<th>Better Buying Power Tenets</th>
<th>Agile Capability Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target Affordability and Control Cost Growth</strong></td>
<td>• Agile Capability Delivery provides timely delivery of effective and efficient capabilities</td>
</tr>
<tr>
<td>• Mandate affordability as requirement</td>
<td>• Releases are cost and schedule constrained</td>
</tr>
<tr>
<td>• Set shorter program timelines and manage to them</td>
<td>• Emphasis on affordability and short program timelines</td>
</tr>
<tr>
<td><strong>Incentivize Productivity and Innovation in Industry</strong></td>
<td>• Cost and schedule constrained development cycles permit the frequent use of Fixed Price type contracts</td>
</tr>
<tr>
<td>• Increase the use of FPIF contract type</td>
<td>• Flexible requirements refinement process allows the frequent integration of current technologies</td>
</tr>
<tr>
<td>• Reinvigorate industry’s independent research and development and protect the defense technology base</td>
<td></td>
</tr>
<tr>
<td><strong>Promote Real Competition</strong></td>
<td>• Smaller increments provides opportunities for frequent competition and greater small business participation</td>
</tr>
<tr>
<td>• Present a competitive strategy at each program milestone</td>
<td>• Agile Capability Delivery encourages the use of open systems architectures</td>
</tr>
<tr>
<td>• Require open system architecture</td>
<td></td>
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<tr>
<td>• Increase dynamic small business role in defense marketplace competition</td>
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<tr>
<td><strong>Improve Tradecraft in Services Acquisition</strong></td>
<td></td>
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<tr>
<td>• Address causes of poor tradecraft in services acquisition</td>
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<tr>
<td><strong>Reduce Non-Productive Processes and Bureaucracy</strong></td>
<td>• Reduces non-productive processes and bureaucracy</td>
</tr>
<tr>
<td>• Reduce the number of OSD-level reviews</td>
<td>• Streamlines test and certification processes for faster deliveries</td>
</tr>
<tr>
<td>• Eliminate low-value-added statutory processes</td>
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</tr>
</tbody>
</table>

Source: Director, Command and Control, Programs & Policy (OSD) – Pre-Decisional
What Success Looks Like

- **Reduced costs for data centers and applications**
- **Improved interoperability for better coordination and collaboration**
- **Improved user satisfaction and mission success**
- **Faster, more responsive capability deliveries to Warfighters**
- **Improved security to reduce cyber threats**
- **Faster adoption of commercial IT breakthroughs**

Source: Director, Command and Control, Programs & Policy (OSD) – Pre-Decisional
Questions?
Contact Information

Dr. Kenneth E. Nidiffer, Director of Strategic Plans for Government Programs

Software Engineering Institute, Carnegie Mellon University
Office: +1 703-908-1117
Fax: +1 703-908-9317
Email: Nidiffer@sei.cmu.edu
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