Best Practices: Portfolio Management

Presentation by
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U.S. Government Accountability Office

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Presentation Outline

- The Bigger Picture
- Conditions & Outcomes
- Some Causes for Poor Outcomes
- Best Practices Concept
- The Difference
- DOD’s Efforts to Change
- The Future
The Bigger Picture: U.S. Fiscal Pressures Will Affect DOD’s Acquisition Funding

Source: GAO’s August 2007 analysis.

Notes: AMT exemption amount is retained at the 2006 level through 2017 and expiring tax provisions are extended. After 2017, revenue as a share of GDP returns to its historical level of 18.3 percent of GDP plus expected revenues from deferred taxes, i.e. taxes on withdrawals from retirement accounts. Medicare spending is based on the Trustees April 2007 projections adjusted for the Centers for Medicare and Medicaid Services alternative assumption that physician payments are not reduced as specified under current law.
Investment Levels Are Highest in Two Decades

Fiscal year 2008 dollars in billions

- 10-year period $1.8 trillion
- Research, development, test and evaluation, and procurement funding

Conditions: DOD Has Increased Its Commitment In Major Defense Acquisitions Programs

Fiscal Year 2008 Dollars in Billions

FY 2000 Portfolio FY 2005 Portfolio FY 2008 Portfolio

-$790 B $1.5 T $1.6 T

$0 $1,000 $1,500 $2,000

Outstanding Expended
DOD Cost Outcomes Are Not Improving

- Change in Total Acquisition Costs From First Estimates
- Change in RDT&E Costs From First Estimates
- Share of programs with 25 percent cost growth

FY 2000 Portfolio  FY 2005 Portfolio  FY 2007 Portfolio
Delivery of Operational Capabilities Continues to Be Late

- Average schedule delay in delivering initial capabilities:
  - FY 2000 Portfolio
  - FY 2005 Portfolio
  - FY 2007 Portfolio

- Status of FY 2007 Portfolio:
  - Programs on time: 33%
  - Programs 1 to 24 months late: 38%
  - Programs 25 to 48 months late: 15%
  - Programs more than 48 months late: 14%
Causes: Additional Factors Influence DOD’s Ability to Manage Programs and Improve Outcomes

- Requirements Process
  - ... promise high performance

- Budgeting Process
  - ... promise low resource demands

- Acquisition Process
  - ... move forward, get knowledge later
Stable Requirements Needed For Improved Outcomes

- Without requirements that have been thoroughly analyzed for feasibility, development costs are impossible to estimate and likely to grow.

- Among 46 programs, we surveyed, 63 percent indicated that requirements changed in some way.

Average RDT&E Cost Growth For 46 Programs

Source: GAO analysis of DOD data.
Programs Enter System Development Without Mature Technologies

Percent of Programs Achieving Technology Maturity At Key Junctures

- Most programs did not achieve technology maturity at start
- No noticeable improvement over since 2005
- Forty-six percent of technologies (164 out of 356) immature state
- Cost growth for programs with immature technologies was 44 percent higher
- Many programs still maturing technologies into production

Source: GAO analysis of DOD data.
No Evidence of Widespread Adoption of Knowledge-based Acquisition Process

- DOD’s acquisition practices necessary to ensure effective implementation of knowledge-based process are not always followed despite policies and guidance to contrary.

<table>
<thead>
<tr>
<th>Key junctures</th>
<th>Development start</th>
<th>Design review</th>
<th>Production start</th>
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<tbody>
<tr>
<td>Knowledge point 1</td>
<td>Mature all critical technologies</td>
<td>Achieve knowledge point 1 on time and complete 90 percent of engineering drawings</td>
<td>Achieve knowledge points 1 and 2 on time, and have all critical processes under statistical control</td>
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<tr>
<td>Best practices</td>
<td></td>
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<tr>
<td>DOD outcomes</td>
<td>12 percent of programs</td>
<td>4 percent of programs</td>
<td>0 percent of programs</td>
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Source: GAO presentation of DOD data.
Commercial Best Practices Concept

Critical Support and Accountability Factors

Senior leadership
- Develop long-term vision and investment strategy
- Train, mentor program manager
- Develop business case, assign to program manager
- Empower program manager
- Support program manager
- Hold accountable

CONCEPT DEVELOPMENT
- Gap between resources and requirements is closed

PROGRAM START
- Knowledge-based process is followed; information on cost, schedule, design, and production maturity is demanded throughout

DESIGN

PRODUCTION

Strategic support

Tactical support

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Figure 2: Portfolio Management Approach to Product Investments

- Market opportunities identified and defined
- Initial ideas screened and prioritized
- Development of product ideas
- Review gates at each phase (Phase 1, Phase 2, Phase 3)
- Product portfolio at the end of development phases

Sources: Analysis and presentation of commercial best practices.
Range of cost estimating uncertainty

<table>
<thead>
<tr>
<th>Phase</th>
<th>M-Gates</th>
<th>Purpose / Primary Effort</th>
<th>Cost / Budget Estimate Tolerances</th>
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<tr>
<td>0</td>
<td>M15 - M13</td>
<td>Business Case Development</td>
<td>+75% to -25% (ROM Est.)</td>
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<tr>
<td>1</td>
<td>M12 – M10</td>
<td>Requirements and Planning</td>
<td>+25% to -10% (Budgetary Est.)</td>
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<tr>
<td>2</td>
<td>M9 – M7</td>
<td>Project Definition</td>
<td>+10% to -5% (Definitive Est.)</td>
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### Why the Difference?

#### Key Differences in Definition of Success and Resulting Behaviors

<table>
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<tr>
<th>Commercial Companies</th>
<th>DOD</th>
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<tr>
<td><strong>Success</strong></td>
<td></td>
</tr>
<tr>
<td>Sale to customer</td>
<td>Attracting funds</td>
</tr>
<tr>
<td><strong>Means to success</strong></td>
<td></td>
</tr>
<tr>
<td>Strategic planning/prioritizing</td>
<td>Competition for funds</td>
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<tr>
<td>Realism and candor</td>
<td>Optimism and unknowns</td>
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<tr>
<td>Early testing</td>
<td>Late testing</td>
</tr>
<tr>
<td>Early red lights, green lights based on demonstration</td>
<td>Early green lights; late red lights</td>
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<tr>
<td>Collaboration and trust</td>
<td>Oversight and distrust</td>
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<tr>
<td>Senior leaders are program advocates; corporate research departments are technology developers; program manager is executor</td>
<td>Program manager is often the advocate, technology developer, and executor.</td>
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<td>Single program manager is accountable for delivery</td>
<td>Multiple program managers are accountable for continuation</td>
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Recent DOD Efforts to Improve Acquisition Outcomes

- Concept decision reviews
- Time-defined acquisitions
- Configuration steering boards
- Early system prototyping
- Award fee and incentive changes
- New strategy for program managers
Integrated Portfolio Management Approach Needed For Weapons Investment

• DOD largely continues to define warfighter needs and make investment decisions on service by service basis.

• Budgets allocated largely based on historical percentages vice DOD-wide strategic assessments and likely future constraints.

• DOD’s approach has contributed to duplication in programs and equipment that does not operate effectively together.

• DOD also assesses warfighting needs and their funding implications under separate decision-making processes.

• DOD’s approach impedes ability to prioritize needs so that it pursues only the ones most important but also ones it can afford.
Solid, Executable Business Case Needed For Programs

• DOD often sets optimistic requirements that requires new and unproven technologies that can not be met within available resources.

• While DOD’s acquisition policy is informed with systems engineering rules, the absence of disciplined and timely practices leads to uninformed requirements.

• When early requirements analysis is not adequately performed to ensure DOD needs can be met within resources, increased costs risk to government can occur.

• Based on information from 43 programs, our analysis shows that nearly 60 percent had to reset their business case at least once.
Systems Engineering Provides Evidence that Product Can Be Developed Within Resources

• Business case should provide evidence:
  (1) Warfighter needs are valid and can be met with chosen concept, and
  (2) The chosen concept can be development and produced within resources-technologies, funding, design knowledge, and time.

• Early systems engineering enables a developer to identify and resolve gaps between resource and requirements before product development begins.

![Diagram of systems engineering process]

- Requirements Analysis: Definition of customer wants including planned use, operating environment, and performance characteristics.
- Functional Analysis and Allocation: Decomposition of the requirements into a set of specific functions that the system must perform.
- Design Synthesis: Identification of the technical and design solutions needed to meet the required functions.
- Product Design

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What Needs to Be Done

• establishing an enterprise-wide portfolio management approach to making weapon systems investments;
• constraining individual program requirements by working within available resources and by leveraging systems engineering;
• enabling science and technology organizations to shoulder the technology burden;
• establishing sound, executable business cases for each individual weapon program investment;
• establishing and enforcing controls to ensure that appropriate knowledge is captured and used at critical junctures before moving programs forward and investing more money;
• ensuring that the workforce is capable of managing resources and requirements trades, program oversight, and knowledge-based acquisition strategies; and
• holding program managers and decision-makers accountable for investment decisions and program outcomes.