Improving the Effectiveness of Program Managers

Systems and Software Technology Conference
Salt Lake City, Utah
May 3, 2006

Presented by GAO’s Acquisition and Sourcing Management Team
Planned investments in DOD weapons systems
- $700 billion in 2001
- $1.4 trillion in 2006

Cost of development exceeding estimates by 30-40%

Fewer quantities purchased than anticipated

Longer development schedules needed
### Our Best Practices Work

<table>
<thead>
<tr>
<th>Leading companies we’ve visited</th>
<th>Companies’ best practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorola</td>
<td>Disciplined software and management processes</td>
</tr>
<tr>
<td>Caterpillar</td>
<td>Prototype testing to improve reliability</td>
</tr>
<tr>
<td>Toyota</td>
<td>Program management practices to encourage collaboration</td>
</tr>
<tr>
<td>FedEx</td>
<td>Requirements that specify reliability and total ownership costs</td>
</tr>
<tr>
<td>NCR Teradata</td>
<td>Collection of metrics data to improve software reliability</td>
</tr>
<tr>
<td>Boeing</td>
<td>Technology readiness levels and design maturity</td>
</tr>
<tr>
<td>Hughes Space and Communications</td>
<td>Statistical control over production processes</td>
</tr>
</tbody>
</table>
### Best Practices’ Knowledge Points

Knowledge is gained at key development points during product development

<table>
<thead>
<tr>
<th>Knowledge point 1</th>
<th>Match is made between customer’s wants and resources (i.e. technology, design, time, and funding)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>* Critical technologies should have reached Technology Readiness Level 7 or higher</td>
</tr>
<tr>
<td>Knowledge point 2</td>
<td>Product’s design demonstrates ability to meet performance requirements</td>
</tr>
<tr>
<td></td>
<td>* High percent of design drawings released to manufacturing</td>
</tr>
<tr>
<td>Knowledge point 3</td>
<td>Product can be manufactured within cost, schedule, and quality targets and is reliable</td>
</tr>
<tr>
<td></td>
<td>* High percent of production processes under statistical process controls and achieving Cpk of 1.33</td>
</tr>
</tbody>
</table>
Our Recent Report

- Best Practices: Better Support of Weapon System Program Managers Needed to Improve Outcomes (GAO-06-110) and Survey of Weapon System Program Managers (GAO-06-112SP)

- How does DOD support its program managers, and how does it hold them accountable for program outcomes?
- How do leading companies support their program managers, and hold them accountable for program outcomes?
- What can DOD do to better position its program managers for successful outcomes?
Our Report’s Methodology

- Case studies of leading companies
  - Motorola, Siemens Medical Group, Toyota Avalon, Wells Fargo, and Moulson-Coors Inc.

- Literature reviews

- Focus groups
  - 5 locations, 28 program managers

- Survey
  - Category 1 and 2 program managers

- Interviews
Success Factors for Program Managers

- Critical support and accountability factors
- Investment strategy
- Business case
- Knowledge-based product development
- Accountability/rewards
- Other success factors
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
- Hold accountable
- Support program manager

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

Tactical support

Program manager
Investment Strategy

- Consistent with company strategic vision
  - Corporate leadership accountable
- Forecast market needs
  - Economic trends, market position, technologies
- Long-term and short-term planning
  - Project selection and prioritization make trade-offs that fit within corporate goals
Business Case

- Match resources and requirements using systems engineering
  - evolutionary product development
  - achievable requirements
    - short cycle times
  - estimate time, money, technologies, people
  - program manager assigned for development duration

- Goal—close gap between customer wants and available resources before committing to development
Knowledge-Based Product Development

- Gated process that builds knowledge over time
  - Program manager accountable for execution
  - Frequent reviews, decision point meetings with program manager and senior level managers
  - Management decisions based on data submitted by program manager
    - metrics, such as earned value, percentage of design drawings completed, process controls under statistical control, tests completed
  - Development progress assessed against goals
    - Program managers encouraged to share bad news
Accountability/Rewards

- Sustained leadership
  - empower—ensure program managers have authority to make decisions based on quantifiable data
  - unwavering commitment to trusted program managers
  - encourage collaboration and communication

- Program manager
  - develop product knowledge
  - meet cost, schedule, performance goals
  - communicate problems and risk
  - implement risk mitigation strategies

- Tenure
- Rewards
Other Success Factors

- Disciplined, standard processes
- Lessons learned
  - identify what worked well and what didn’t
- Training/mentoring
- Teamwork
DOD Practices

- DOD program manager environment
- DOD layers of oversight
- Investment strategy
- Business case
- Knowledge-based product development
- Accountability/rewards
- Incentives
- Formal vs. informal authority
- Obstacles
- Authority
DOD Program Manager Environment

DOD Practices

Senior leadership

No short- or long-term investment strategy

Evolutionary development adopted in policy, but programs still pursue significant capability leaps

No accountability: programs are allowed to incur significant delays and cost increases and to be continually rebaselined

Sporadic support from senior leadership

Less strategic support

CONCEPT DEVELOPMENT

PROGRAM START

DESIGN

PRODUCTION

Less tactical support

Policy encourages gaps between resources and requirements to be closed, but programs often move forward with unstable requirements and technology

Knowledge-based process is encouraged but not followed; DOD lacks management controls to enforce process; program managers incentivized to suppress bad news

Program manager does not stay through execution
Oversight Layers

DOD

Includes Secretary; Deputy Under Secretary; Under Secretary for Acquisition Technology & Logistics; Comptroller; Assistant Secretary for Command, Control Communication and Intelligence; Director, Operational Test & Evaluation; Assistant Secretary (Intelligence Oversight; Inspector General; Joint Chiefs of Staff

OSD agencies


Military service

Top OSD officials

Includes Secretary, Under Secretary, Comptroller, Acquisition Executive, Operating Command Executive

External oversight

Includes White House (OMB), Congress, Government Accountability Office

Program manager

DOD Practices

Best practices

Includes CEO, COO, CFO, Chief Engineer, and sometimes project office

Top executive

Program manager

U.S. GAO
Investment Strategy

- Overarching investment strategy with senior leader commitment is missing
  - long-term vision, but no defined strategy
  - leadership—many layers
  - short- and long-term investment prioritization is lacking and trade-offs among programs are not made

- DOD starts more programs than it can afford
  - programs compete for funding
## Business Case

<table>
<thead>
<tr>
<th>DOD policies</th>
<th>DOD practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Match requirements to resources</td>
<td>Requirements are rarely stable or matched to resources</td>
</tr>
<tr>
<td>Divide development into evolutionary blocks</td>
<td>Revolutionary development is the norm</td>
</tr>
<tr>
<td>Use mature technologies</td>
<td>Technologies are not mature</td>
</tr>
<tr>
<td>Provide full funding</td>
<td>Unwavering leadership and funding commitment not provided</td>
</tr>
</tbody>
</table>
Knowledge-Based Product Development

- **Policy**
  - encourages quantifiable data at milestone decision points

- **Practice**
  - data either ignored or not collected
    - percent of design drawings completed less used
    - percent of production processes under statistical controls not required
Low levels of knowledge predict increases in cost:

<table>
<thead>
<tr>
<th>Program</th>
<th>Percent increase in R&amp;D</th>
<th>Percent of critical technologies mature</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATIRCMS</td>
<td>5.6</td>
<td>50% (3 of 6)</td>
</tr>
<tr>
<td>C-5 RERP</td>
<td>2.1</td>
<td>100% (11 of 11)</td>
</tr>
<tr>
<td>DD(X) Destroyer</td>
<td>417.3</td>
<td>25% (3 of 12)</td>
</tr>
<tr>
<td>Future Combat System</td>
<td>50.8</td>
<td>32% (17 of 52)</td>
</tr>
<tr>
<td>Joint Strike Fighter</td>
<td>30.1</td>
<td>25% (2 of 8)</td>
</tr>
</tbody>
</table>
Knowledge-based development processes used to a great extent:

<table>
<thead>
<tr>
<th>Processes</th>
<th>Program managers</th>
<th>Program executive officers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology readiness levels</td>
<td>32%</td>
<td>23%</td>
</tr>
<tr>
<td>Design drawings complete</td>
<td>32%</td>
<td>11%</td>
</tr>
<tr>
<td>Statistical control of production processes</td>
<td>26%</td>
<td>14%</td>
</tr>
</tbody>
</table>
Accountability/Rewards

- **Policy**
  - Program managers accountable for cost, schedule and performance
  - Rewards—intrinsic

- **Practice—Accountability difficult to enforce**
  - Program managers lack authority over requirements and key resources, such as funding and personnel.
  - Program managers have limited tenure
  - Practice lies more in maintaining priority of program than in managing for outcomes

*Program managers: “We can’t be held accountable for what we don’t control”*
## Formal vs. Informal Authority

<table>
<thead>
<tr>
<th>Task</th>
<th>% formal authority</th>
<th>% informal influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements</td>
<td>10</td>
<td>82</td>
</tr>
<tr>
<td>Changes to requirements</td>
<td>13</td>
<td>85</td>
</tr>
<tr>
<td>Technology development</td>
<td>42</td>
<td>45</td>
</tr>
<tr>
<td>Approved program baseline</td>
<td>72</td>
<td>22</td>
</tr>
<tr>
<td>Testing requirements</td>
<td>48</td>
<td>49</td>
</tr>
<tr>
<td>Request for proposal</td>
<td>85</td>
<td>11</td>
</tr>
<tr>
<td>Contractor selection</td>
<td>48</td>
<td>33</td>
</tr>
</tbody>
</table>
Obstacles to Successful Program Management

Number of responses

<table>
<thead>
<tr>
<th>Obstacle</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding instability</td>
<td>60</td>
</tr>
<tr>
<td>Requirements instability</td>
<td>15</td>
</tr>
<tr>
<td>Staffing</td>
<td>10</td>
</tr>
<tr>
<td>Oversight</td>
<td>10</td>
</tr>
</tbody>
</table>
DOD Practices

Additional Authority Wanted

- Funding
- Decision making
- Staff changes
- Overall
- Test
Conclusions

- DOD needs
  - a better foundation for program managers and more steadfast support for them once it commits to programs
  - a long-term investment strategy that can mitigate risks by separating long-term wants from needs
  - a business case for new projects that assures they fit into overall priorities and have adequate resources in terms of time, money and technology

If DOD implements these things it will have gone a long way to removing incentives for negative behaviors that have plagued many DOD projects.
Recommendations

- Develop a long-term and short-term investment strategy
- Senior leaders commit to a business case for each major weapon development by Milestone B
- Develop and implement a process to instill and sustain accountability for successful program outcomes
Defense Acquisition Performance Assessment
- December 2005—correct government induced instability

Quadrennial Defense Review
- February 2006—reform business processes

Whether these efforts will result in improved outcomes depends on implementation and discipline.
Q&A