National Defense Industry Association (NDIA)
Conference and Expo
San Diego, California

Keynote Address
The Case for DoD Systems Engineering

Mr. John Landon
Deputy to the ASD(NII) for C3ISR and IT Acquisition
Office of the Secretary of Defense

October 25th, 2005
Agenda

• Investment Funding Trends & Challenges
• Program Trends & Challenges
• Role of Systems Engineering in meeting these challenges
Investment Trends & Challenges

• Federal Budget Deficit Pressures
• Discretionary vs. Non-Discretionary Spending
• Trends in Defense Topline
• Projected Investment Challenges
Federal Expenditures and the Budget Deficit

Source: FY 2006 President’s Budget
Recent Federal Budget Surplus/Deficit Projections

Source: FY 2006 President’s Budget, CBO’s Budget Outlook, OMB’s Mid-Session Review, and White House Press Release
Federal Spending by Category as a Percentage of GDP
FY 1962 - FY 2009

Source: FY 2005 President’s Budget
Department of Defense Budget Authority by Appropriation
FY 1945 – FY 2009 (Constant FY05 $)

Source: FY 2005 DoD Greenbook
Total DoD Topline
FY 2006 President’s Budget

Approximately 5% Real Growth
Programmed FY06-11

$B

Procurement
RDT&E
O&M
Military Pay
Other

FY05 FY06 FY07 FY08 FY09 FY10 FY11

Fiscal Year

FY06-11 Investment Averages 36% of Topline
FY06-11 O&M Averages 35% of Topline
FY06-11 Military Pay Averages 25% of Topline
PB06 Top 10 Investment Programs

FY06-11 Cumulative Total = $231B
Approximately 23% of total investment consumed by Top 10 Programs
Conclusion

- Federal Budget seeks Equilibrium

- Mandatory Payments are Growing
  .....But Federal Topline remains at 20% GDP

- DoD Investment remains fairly stable
DoD Program Trends & Challenges

- Frequent Program Rebaselining
- Increasing Cycle Time
- Increasing Cost
- Loss of “Buying Power”
DOD Programs Frequently Rebaseline

- GAO found that 49 of the 81 major defense programs (60 percent) reporting in 2003, rebaselined more than once during the life of the program.
- Programs with largest number of rebaselinings:

<table>
<thead>
<tr>
<th>Program</th>
<th>Year of Program Start</th>
<th>Latest Rebaseline</th>
<th>Number of Rebaselinings</th>
</tr>
</thead>
<tbody>
<tr>
<td>F/A-22</td>
<td>1992</td>
<td>April 2004</td>
<td>14</td>
</tr>
<tr>
<td>DDG 51</td>
<td>1988</td>
<td>August 2002</td>
<td>11</td>
</tr>
<tr>
<td>SM-2 Block V</td>
<td>1993</td>
<td>August 1999</td>
<td>11</td>
</tr>
<tr>
<td>SSN-21</td>
<td>1988</td>
<td>April 2000</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: GAO Report 05-182, Defense Acquisition, March 2005
**GAO Analysis of 26 DoD Acquisition Programs**

**Cost and Cycle Time Growth for 26 Selected DoD Weapons Systems**

<table>
<thead>
<tr>
<th>FY05 $ Billions</th>
<th>First Full Estimate</th>
<th>Latest Full Estimate</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cost</td>
<td>$479.6</td>
<td>$548.9</td>
<td>14.5</td>
</tr>
<tr>
<td>RDT&amp;E Cost</td>
<td>$102.0</td>
<td>$144.7</td>
<td>41.9</td>
</tr>
<tr>
<td>Simple Average Cycle Time</td>
<td>94.9 Months</td>
<td>114.7 Months</td>
<td>20.8</td>
</tr>
<tr>
<td>Weighted Average Cycle Time</td>
<td>146.6 Months</td>
<td>175.3 Months</td>
<td>19.6</td>
</tr>
</tbody>
</table>

### 26 Programs Assessed:
AESA, AEHF, APKWS, C-5 AMP, C-5 RERP, CH-47F, CEC, E-2 AHE, EA-18G, Excalibur, EFV, ERGM, F/A-22, FCS, Global Hawk, JASSM, JSOW, JSF, JTRS Cluster 1, Land Warrior, NPOESS, Tomahawk, SDB, V-22, WIN-T, and WGS

**Weighted Average Cycle Time:** weighted estimate of average acquisition cycle time for the 26 programs based on total program costs for first and latest estimates.

**Source:** GAO Report 05-301, Assessments of Selected Major Weapons Systems, March 2005
OSD CAIG Study January 2003
Cost Growth Summary

Source: OSD Cost Analysis Improvement Group (CAIG) Study: Cost Growth of Major Systems
Total Cost Growth by Fiscal Year

Source: OSD Cost Analysis Improvement Group (CAIG) Study: Cost Growth of Major Systems

Have we been doing better?
Total Cost Growth by Program Size

Source: OSD Cost Analysis Improvement Group (CAIG) Study: Cost Growth of Major Systems

Larger Programs appear to do better! But they’re under more pressure!
Cumulative Effect of R&D Cost Growth on Developing Weapon Systems

FY '05: $89.95 billion total

FY 1998 plan for completing development of 8 programs

Additional investment needed under FY 2005 plan for completing the 8 programs

Source: GAO Analysis of SAR data (12/31/96 and 12/31/03) on the 8 weapon systems among the highest R&D budget requests for FY 2003.

Note: All dollars are in constant FY 2005 dollars.
Importance of Systems Engineering
Causes of Program Cost and Schedule Growth

- Technology Maturity
- Design Stability
- Production Readiness
- Funding Stability
- Workforce Experience
- Requirements Stability
- Contractor Performance
- Parts Reliability
- Supporting System Readiness
- Configuration Control
The System Engineering Process Adds Value

- The Systems Engineering process is crucial to DoD Acquisition Programs for meeting challenges “head-on”
  - Competition for Resources
  - Increasing Cycle Time
  - Cost Growth
  - *Restoring our “Buying Power”*

- By providing technical rigor via a *disciplined and proven* process that helps us:
  - *Avoid those “mistakes”* that drive cost/schedule growth
  - *Inform “decisions”* that contribute to cost/schedule growth
• “Provide a context within which I can make decisions about individual programs.”

• “Achieve credibility and effectiveness in the acquisition and logistics support processes.”

• “Help drive good systems engineering practices back into the way we do business.”

Mr. Michael Wynne
February 2004
Summary

• While Investment Funding is projected to grow, historic trends suggest that it actually might be reduced

• Programs are taking longer and costing more
  – Completing for Available Funds
  – Reducing the Department’s Flexibility
  – Reducing the Number of New Initiatives
  – Reducing our Buying Power

• Systems Engineering is a major tool for mitigating these effects
  – Restoring Technical Rigor to Programs
  – Avoiding Mistakes and Informing Decisions that affect Programs
  – Tracking Progress from Planning to Execution

Services, Agencies, and Industry must take ownership of SE and institutionalize it