



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

**Keynote Address**  
*The Case for DoD Systems Engineering*

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**Office of the Secretary of Defense**

**October 25<sup>th</sup>, 2005**



# Agenda

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

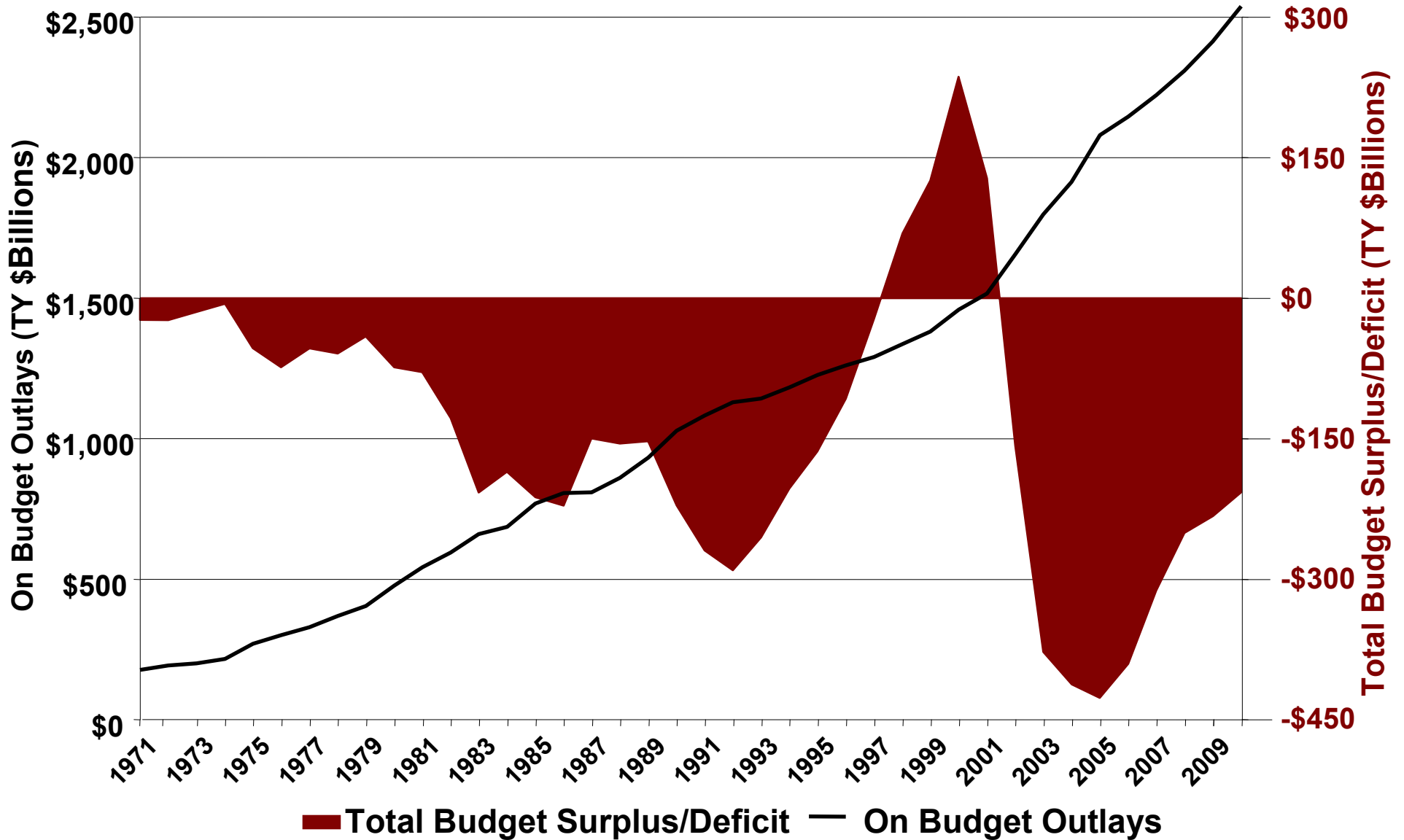


# Investment Trends & Challenges

- **Federal Budget Deficit Pressures**
- **Discretionary vs. Non-Discretionary Spending**
- **Trends in Defense Topline**
- **Projected Investment Challenges**



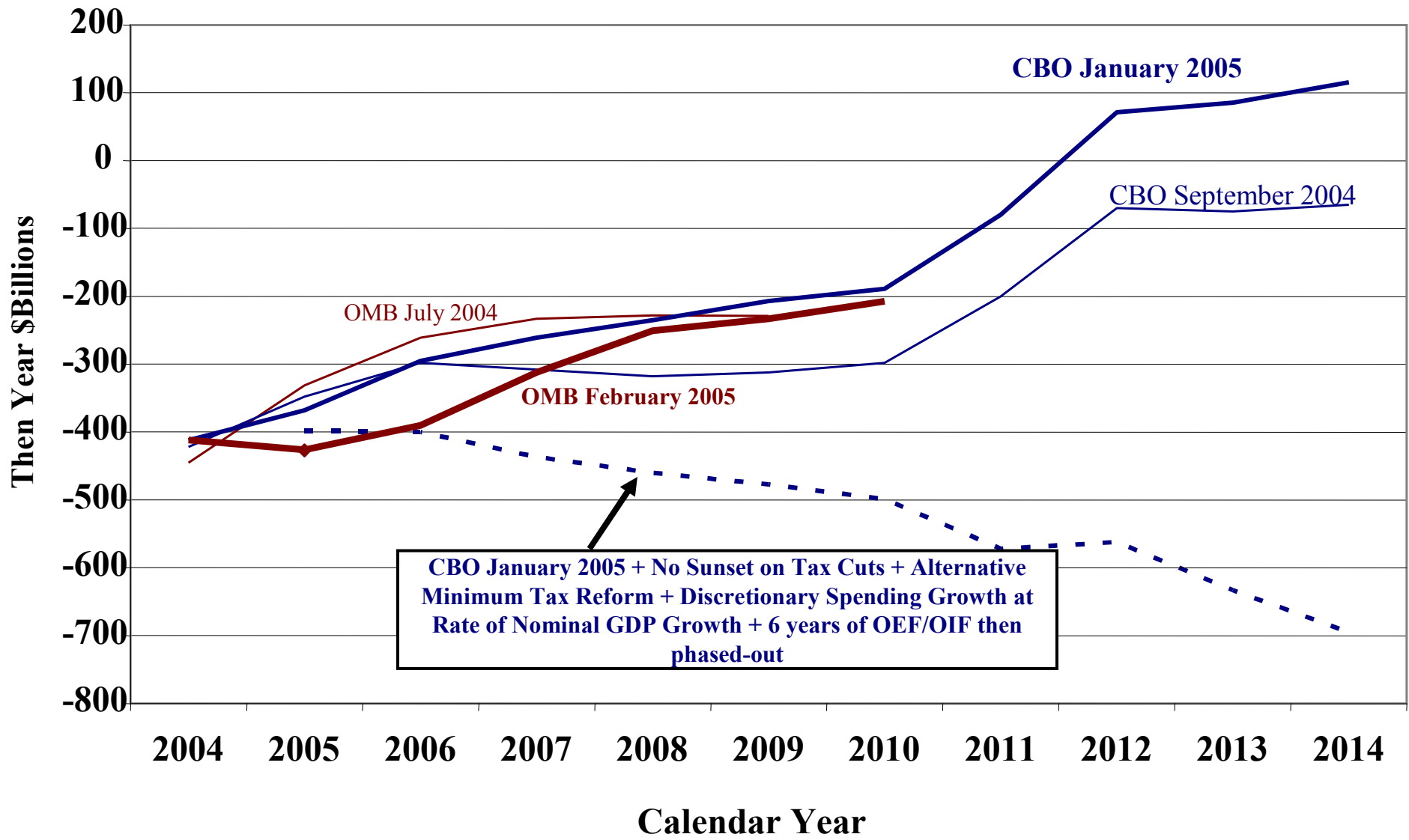
# Federal Expenditures and the Budget Deficit



Source: FY 2006 President's Budget



# Recent Federal Budget Surplus/Deficit Projections

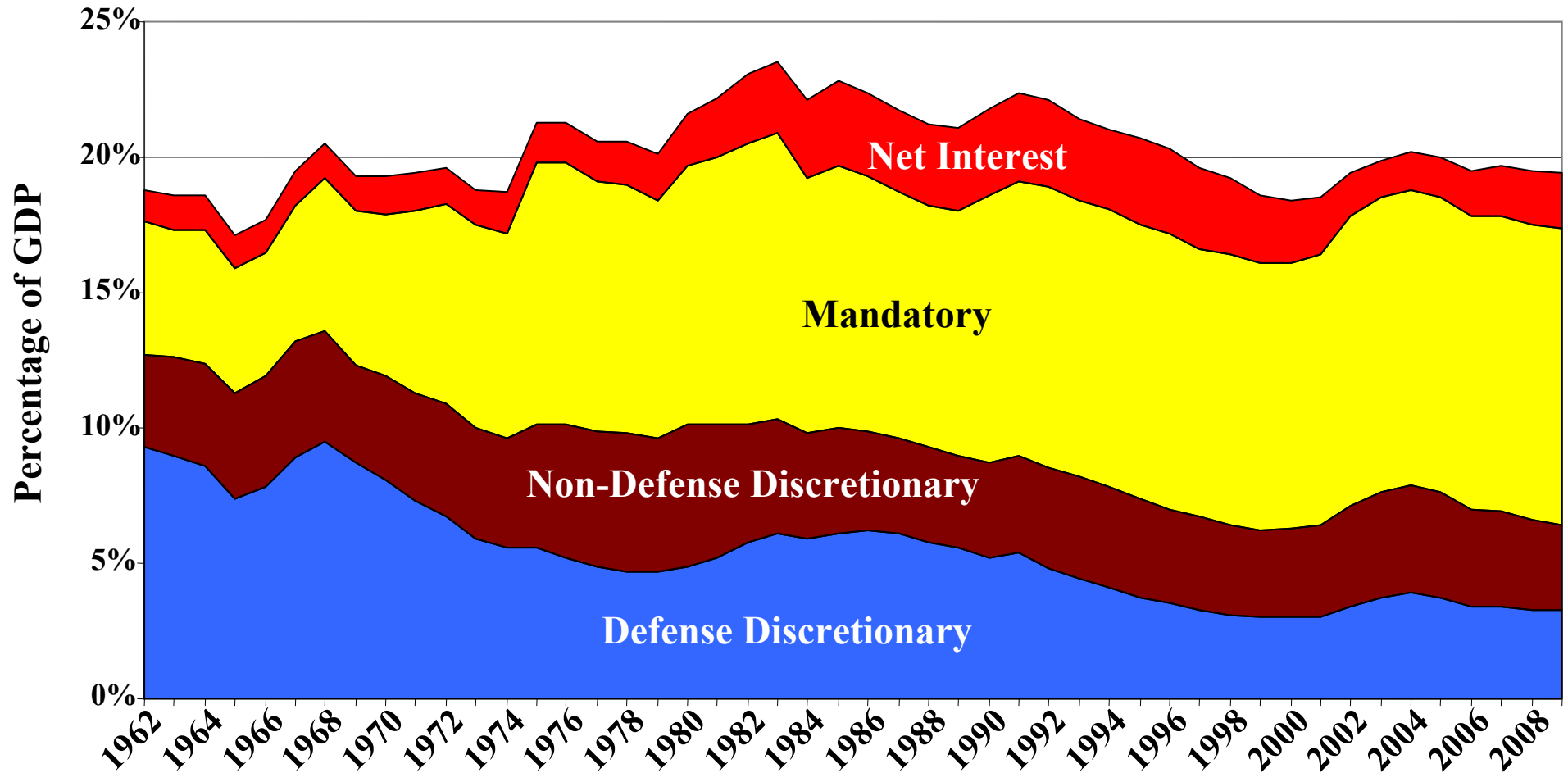


Source: FY 2006 President's Budget, CBO's Budget Outlook, OMB's Mid-Session Review, and White House Press Release



# Federal Spending by Category as a Percentage of GDP

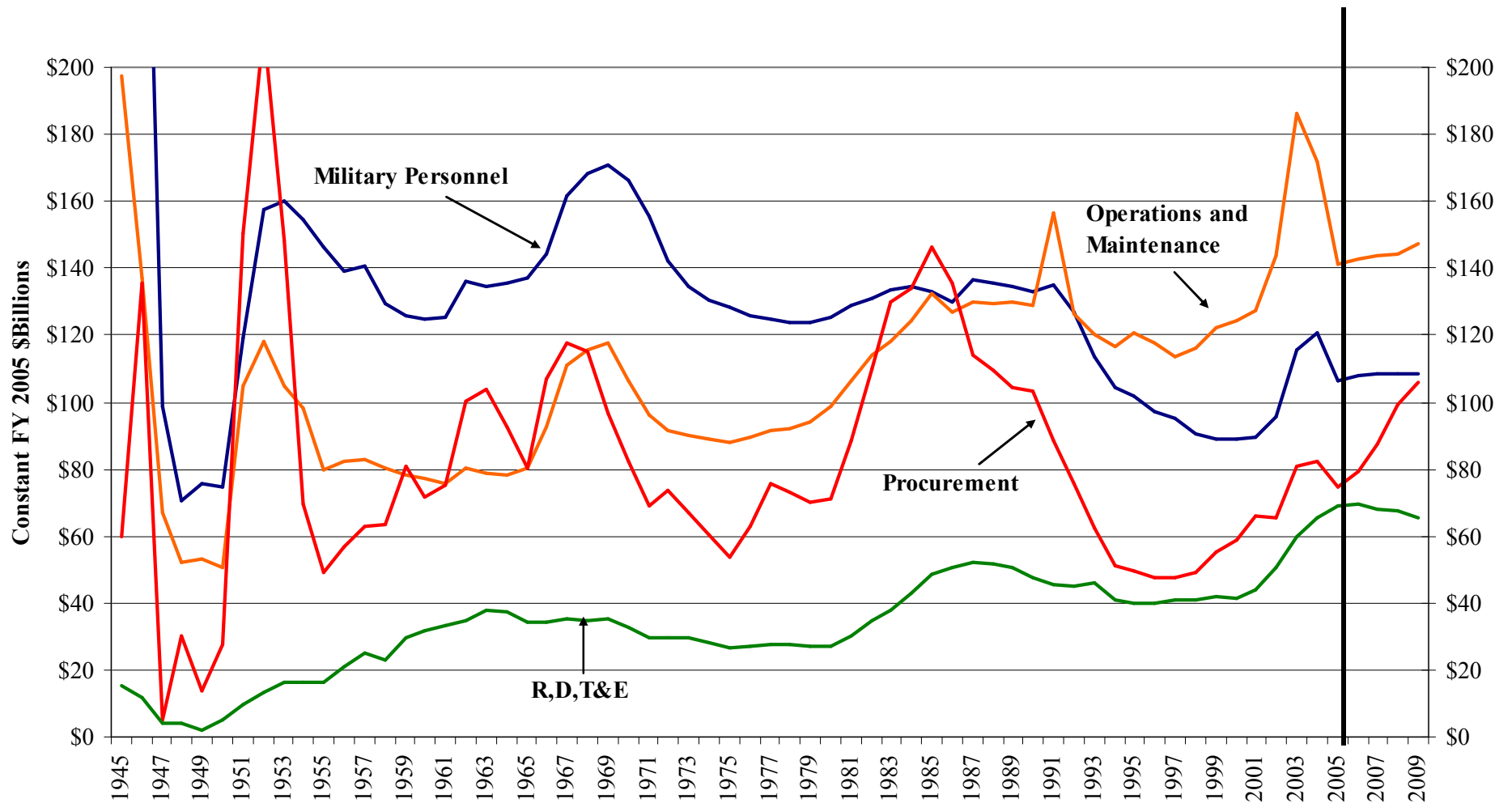
FY 1962 - FY 2009



Source: FY 2005 President's Budget



# Department of Defense Budget Authority by Appropriation FY 1945 – FY 2009 (Constant FY05 \$)

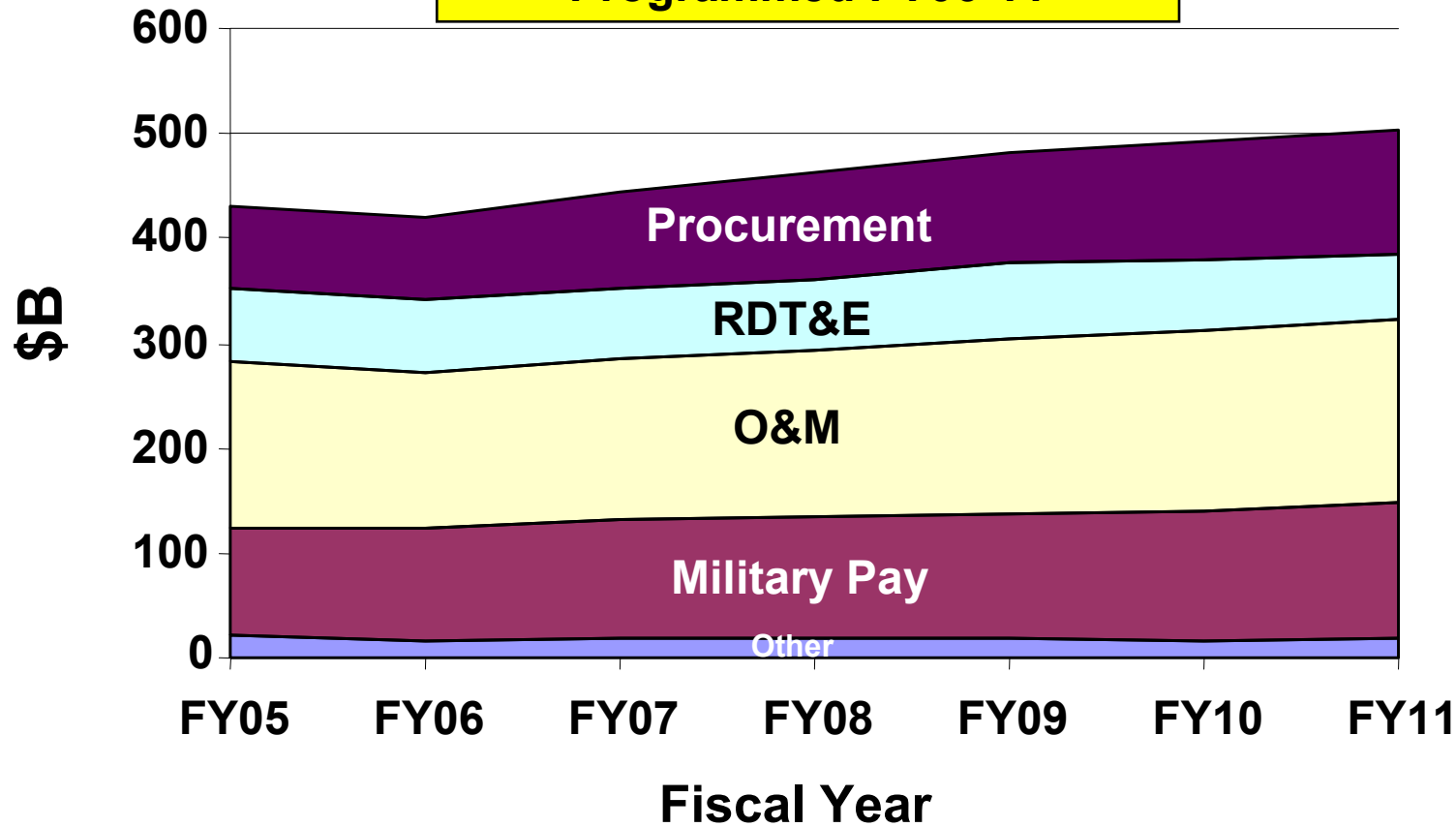


Source: FY 2005 DoD Greenbook



# Total DoD Topline FY 2006 President's Budget

Approximately 5% Real Growth  
Programmed FY06-11

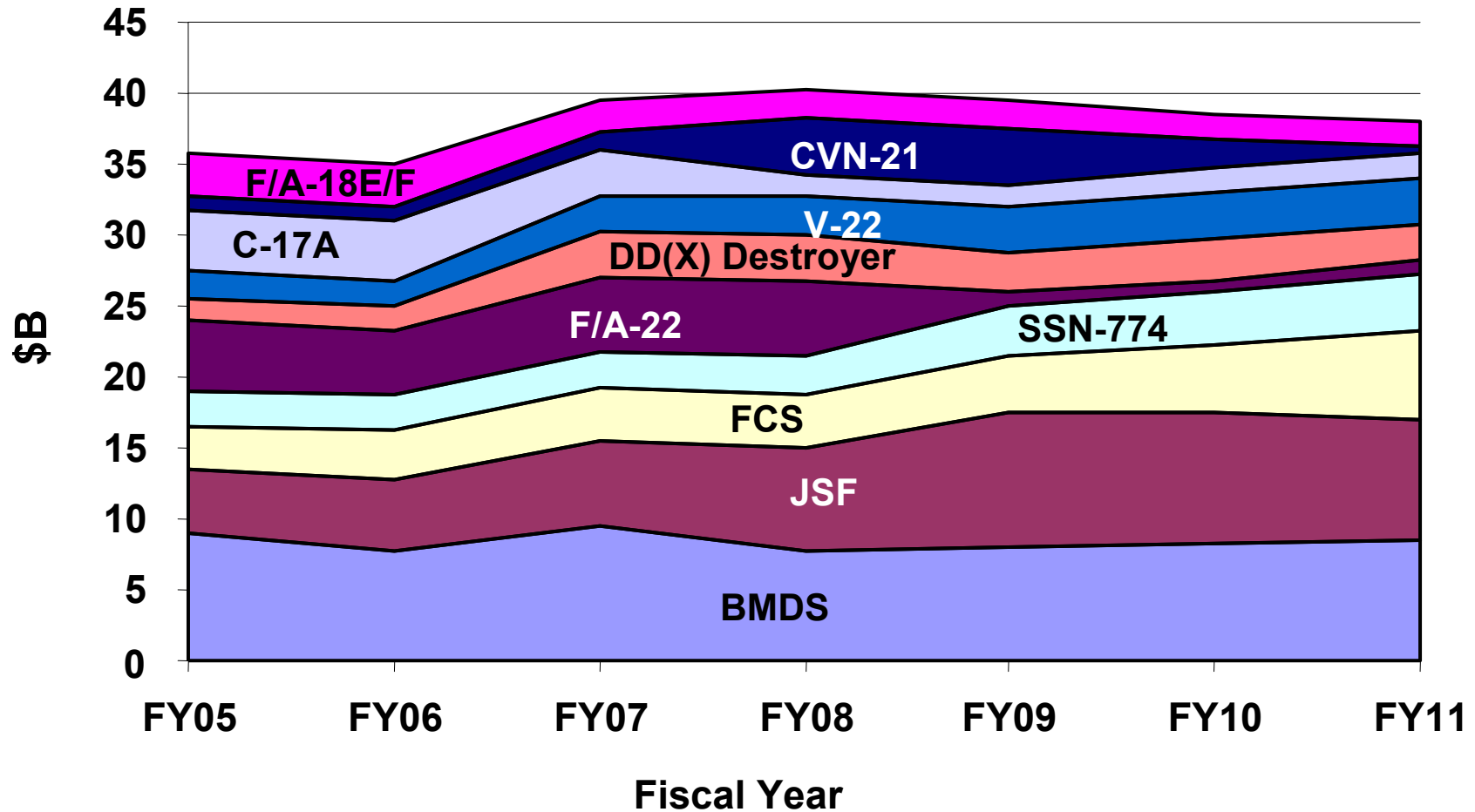


***FY06-11 Investment Averages 36% of Topline***  
***FY06-11 O&M Averages 35% of Topline***  
***FY06-11 Military Pay Averages 25% of Topline***





# 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 rebaselining:

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

Source: GAO Report 05-182, Defense Acquisition, March 2005

Based on Analysis of DOD SAR Data



# GAO Analysis of 26 DoD Acquisition Programs

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

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

**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

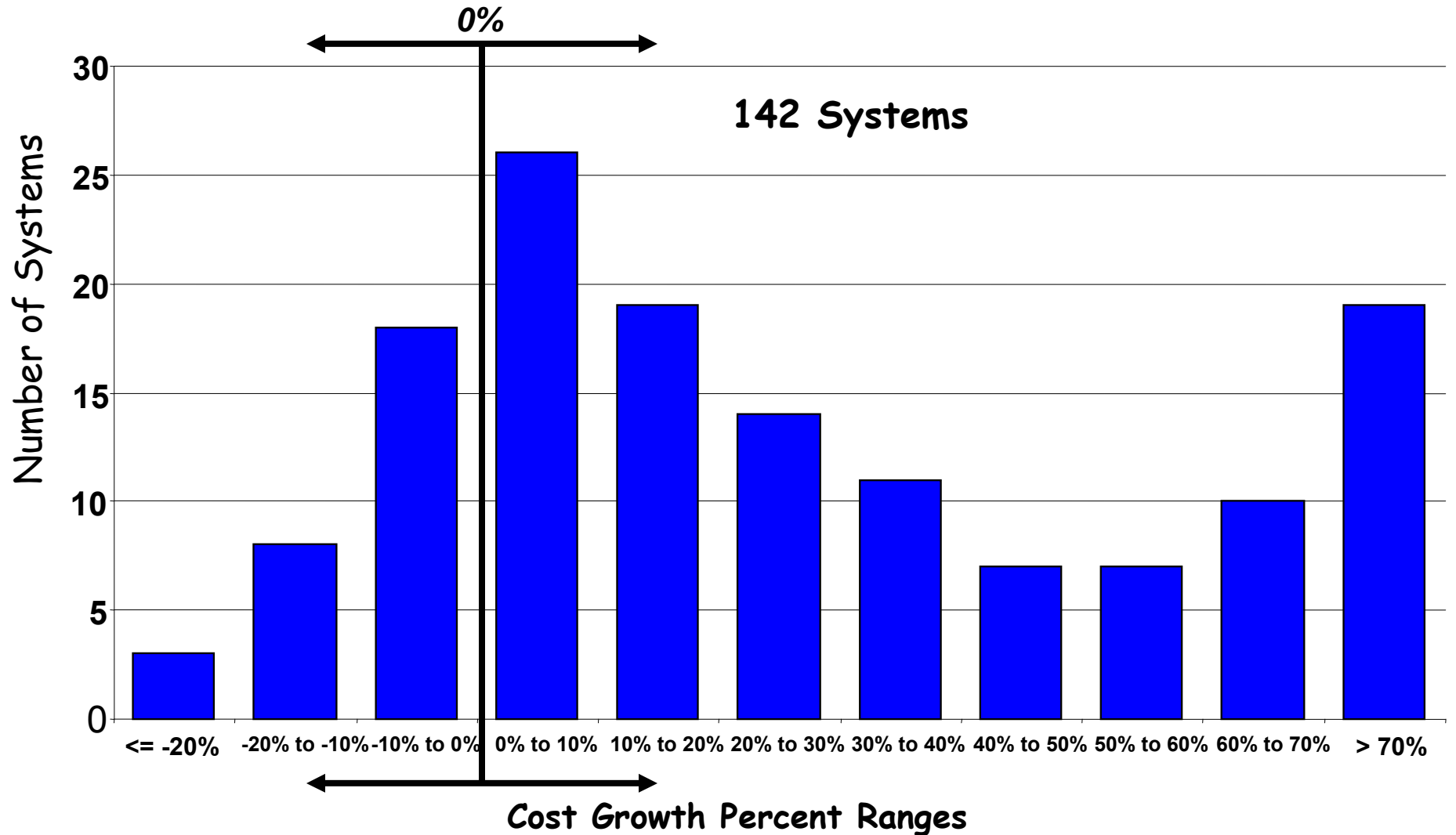
**Weighted Average Cycle Time:** weighted estimate of average acquisition cycle time for the 26 programs based on total program costs for first and latest estimates.

**Source:** GAO Report 05-301, Assessments of Selected Major Weapons Systems, March 2005



# OSD CAIG Study January 2003 Cost Growth Summary

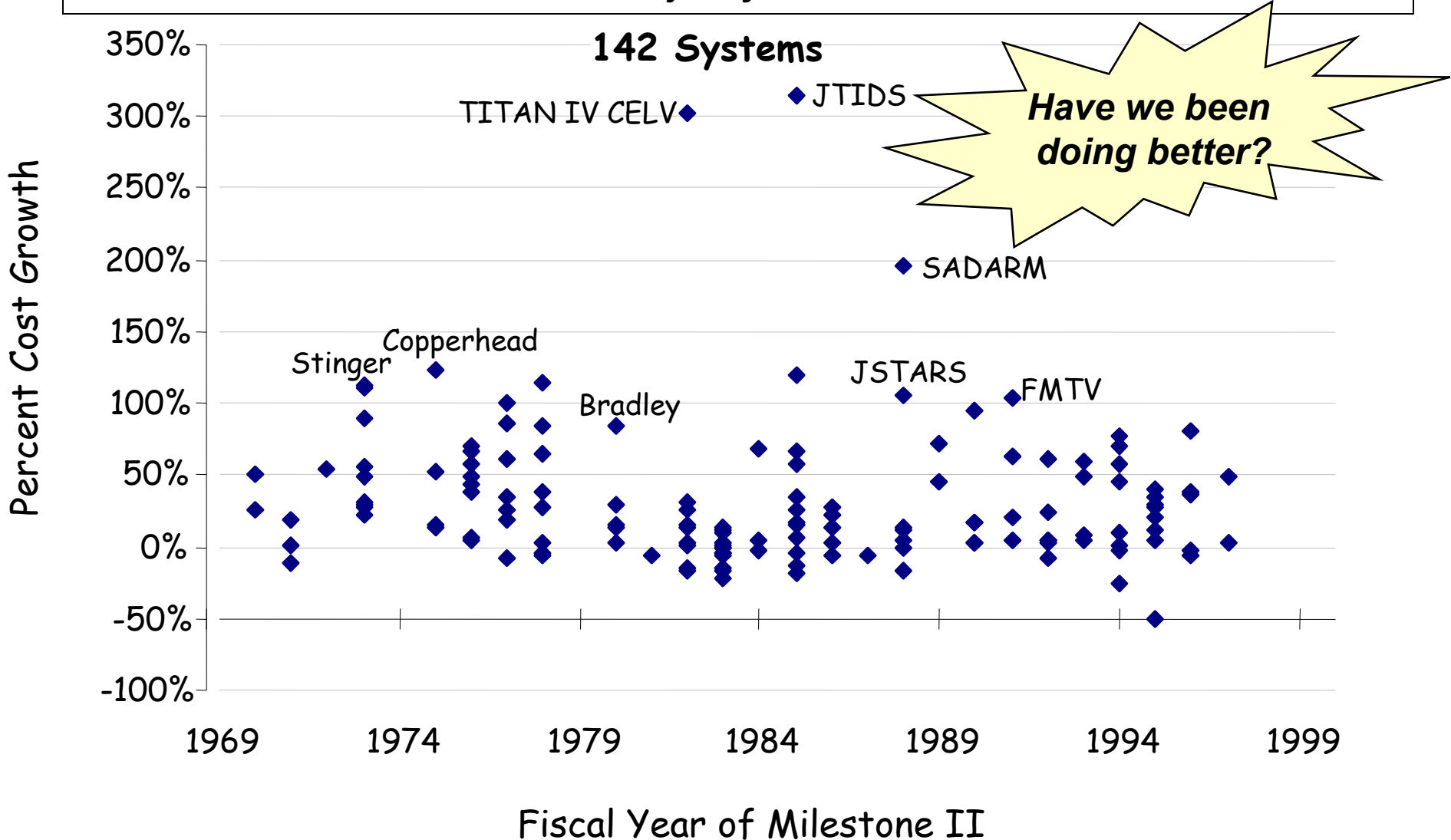
Source: OSD Cost Analysis Improvement Group (CAIG) Study: Cost Growth of Major Systems





# Total Cost Growth by Fiscal Year

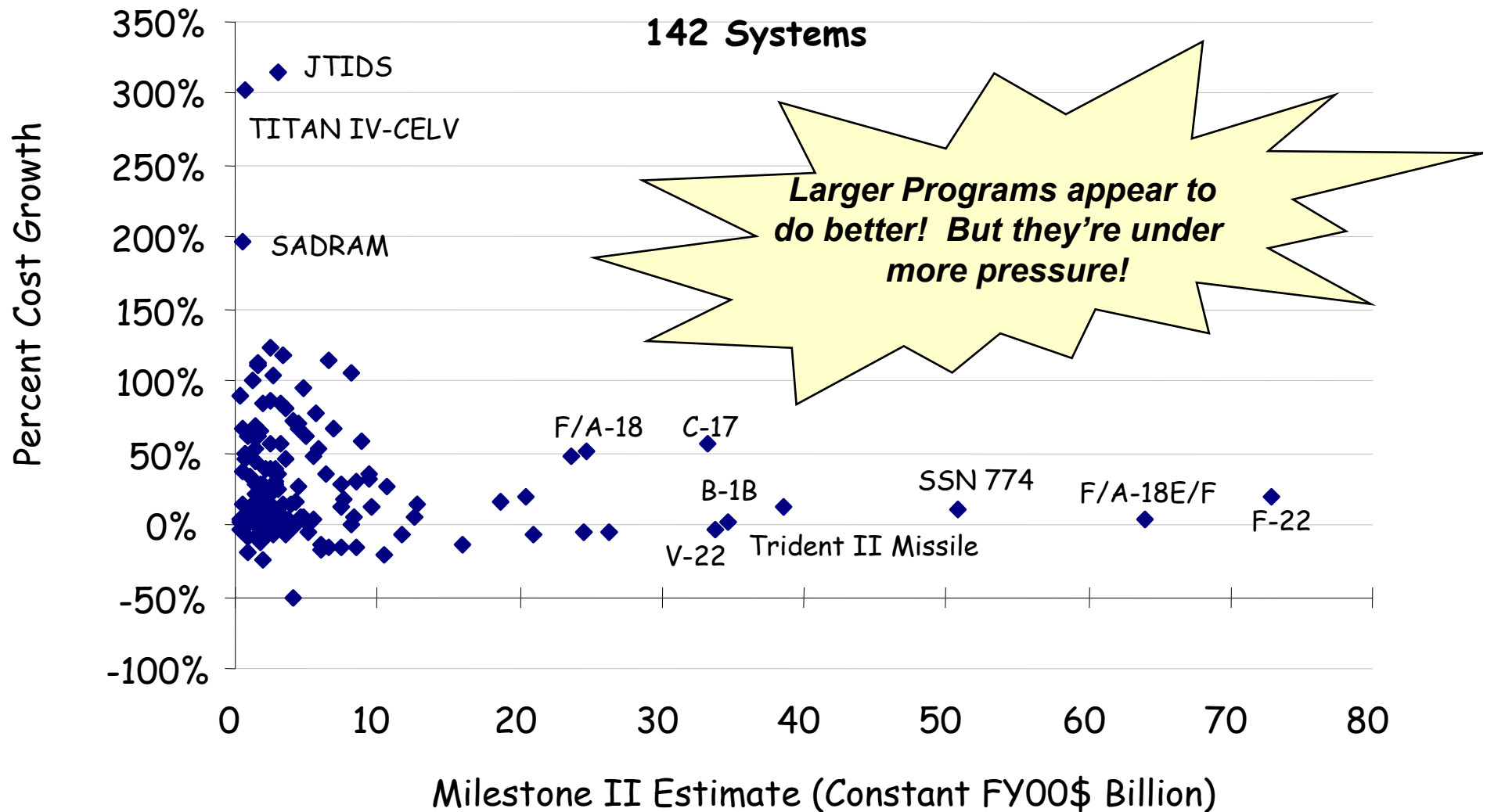
**Source:** OSD Cost Analysis Improvement Group (CAIG) Study: Cost Growth of Major Systems





# Total Cost Growth by Program Size

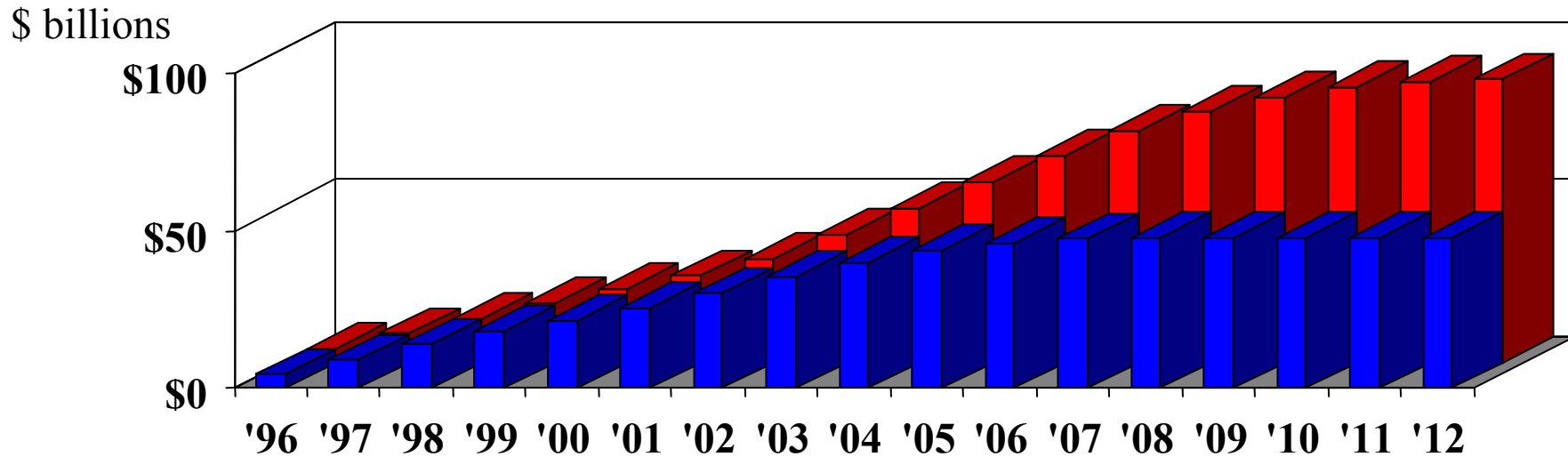
**Source:** OSD Cost Analysis Improvement Group (CAIG) Study: Cost Growth of Major Systems







# Cumulative Effect of R&D Cost Growth on Developing Weapon Systems<sup>1</sup>

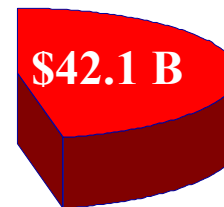


**8 Programs:** JSF, Comanche, SBIRS-H, F/A-22, V-22, EFV, DDG-51, SSN-774

■ FY 1998 Plan ■ FY 2005 Plan

**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.



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# 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



## The Defense Acquisition Executive's Imperatives

- **“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***