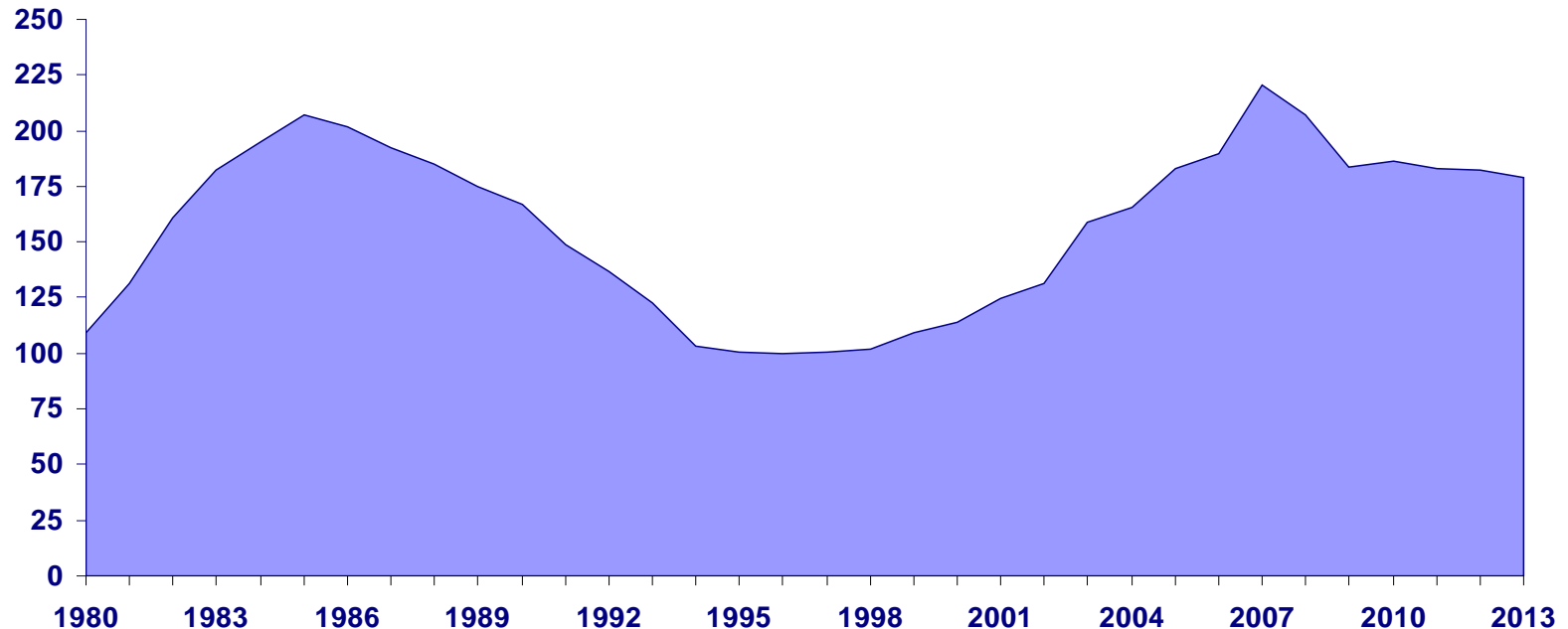

DOD's Weapon System Portfolio: Are Results Getting Any Better?

**Presentation by:
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Acquisition & Sourcing Management Team
U.S. Government Accountability Office**

**NDIA 12th Annual Systems Engineering Conference
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San Diego, CA**

Big Picture: DOD Investment Remains High, Most Likely Unsustainable

Fiscal year 2009
dollars in billions

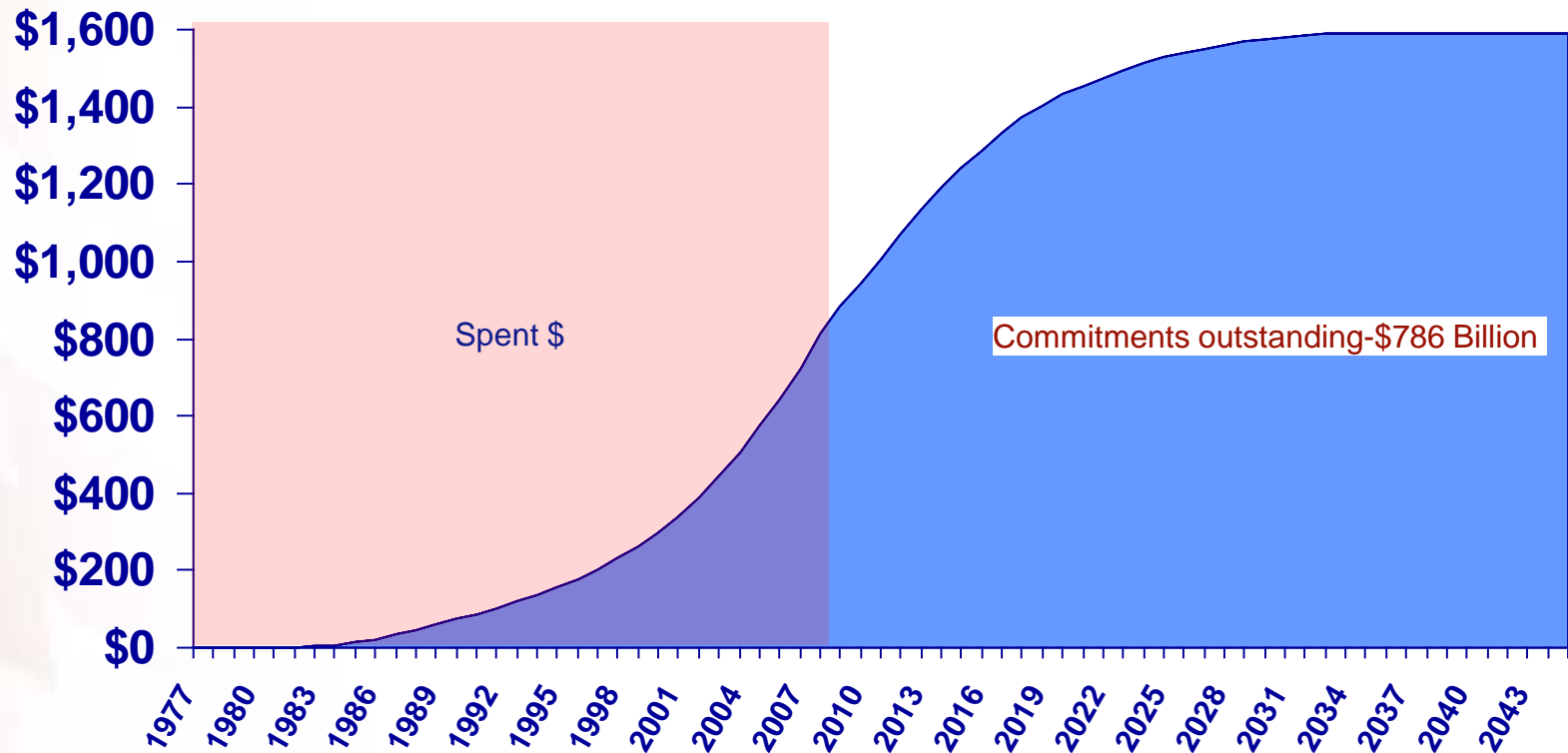


Research, Development, Test and Evaluation and Procurement Funding

Source: GAO analysis of National Defense Budget Estimates for the Fiscal Year 2009 Budget.

Committed and Planned Spending on Current Portfolio of 96 Programs

Billions of FY 2009 dollars



Objectives of the Annual Assessment of Major Weapon System Programs

- **Provide a cost/schedule snapshot of DOD's 2008 portfolio** of major weapon system programs and a comparison to portfolios at two other points in time – 1 year ago and 5 years ago
- **Provide observations** about the portfolio's balance, performance of newer programs, and ability to deliver to the warfighter on time
- **Analyze outcomes and knowledge attained at key junctures** in the acquisition process for a subset of the 47 programs primarily still in development
- **Gather data on other factors** that might impact program stability and outcomes such as: cost estimating, requirement setting, software management, and program office staffing
- **Provide an update** on DOD acquisition policy changes

DOD Acquisition Outcomes

Outcomes Reported in GAO's Most Recent Annual Assessment of Major Weapon System Programs

Snapshot: Cost and Schedule Growth for the 2008 Portfolio of 96 Programs

Performance of DOD's Major Defense Acquisition Program Portfolio

Portfolio status	Fiscal year 2003	Fiscal year 2007	Fiscal year 2008
Number of programs	77	95	96
Total planned commitments	\$1.2 trillion	\$1.6 trillion	\$1.6 trillion
Commitments outstanding	\$724 billion	\$875 billion	\$786 billion
Change to total RDT&E costs from first estimate	37 percent	40 percent	42 percent
Change in total acquisition cost from first estimate	19 percent	26 percent	25 percent
Estimated total acquisition cost growth	\$183 billion	\$301 billion	\$296 billion
Share of programs with 25 percent or more increase in program acquisition unit cost	41 percent	44 percent	42 percent
Average delay in delivering initial capabilities	18 months	21 months	22 months

Observation: Top 10 Programs Continue to Strain DOD's Buying Power

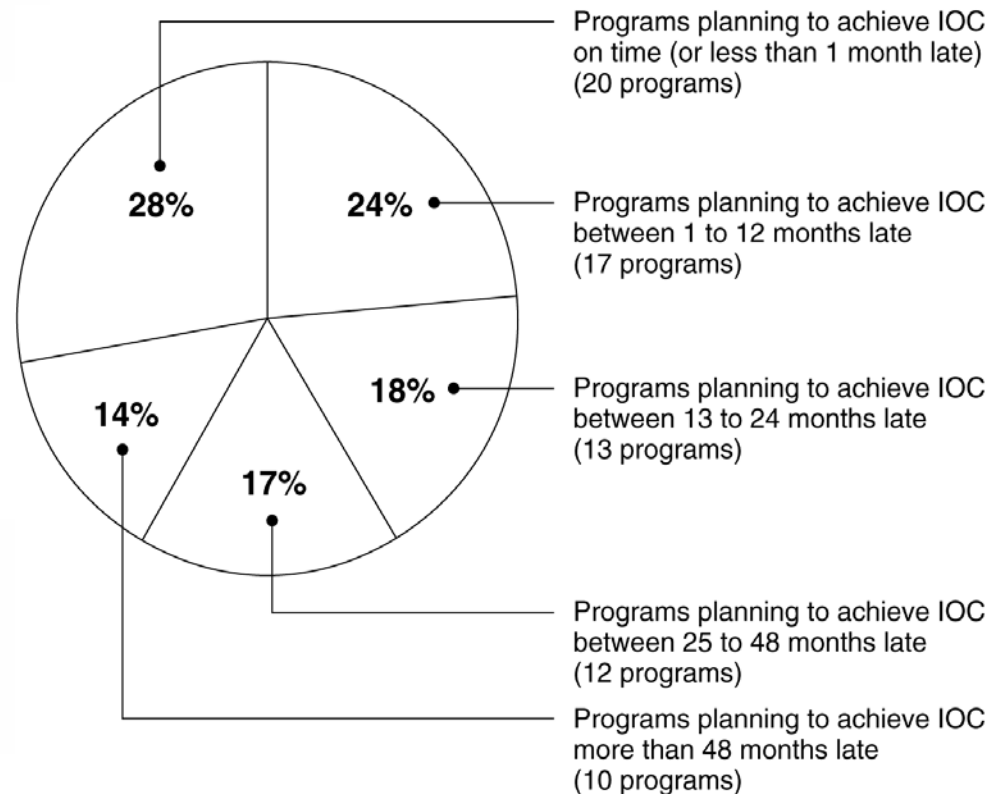
- 10 of the department's largest programs, commanding about 50% of the acquisition dollars in the portfolio, have experienced significant cost growth and quantity reductions:
 - Development costs have grown by 32%
 - Total program costs have grown by 12%
 - Overall quantities have been reduced by 32%
 - 7 have acquisition unit costs of greater than 40%

Observation: Top 10 Programs Continue to Strain DOD's Buying Power Elsewhere

Program	Total cost (fiscal year 2009 dollars in millions)		Total quantity		Acquisition unit cost
	First full estimate	Current estimate	First full estimate	Current estimate	Percentage change
Joint Strike Fighter	206,410	244,772	2,866	2,456	38
Future Combat System	89,776	129,731	15	15	45
Virginia Class Submarine	58,378	81,556	30	30	40
F-22A Raptor	88,134	73,723	648	184	195
C-17 Globemaster III	51,733	73,571	210	190	57
V-22	38,726	55,544	913	458	186
F/A-18E/F Super Hornet	78,925	51,787	1,000	493	33
Trident II Missile	49,939	49,614	845	561	50
CVN 21 Nuclear Aircraft Class Carrier	34,360	29,914	3	3	-13
P-8A Poseidon (MMA)	29,974	29,622	115	113	1

Observation: Promised Capabilities Continue to Be Delivered Late

Schedule Delays for DOD's 2008 Program Portfolio



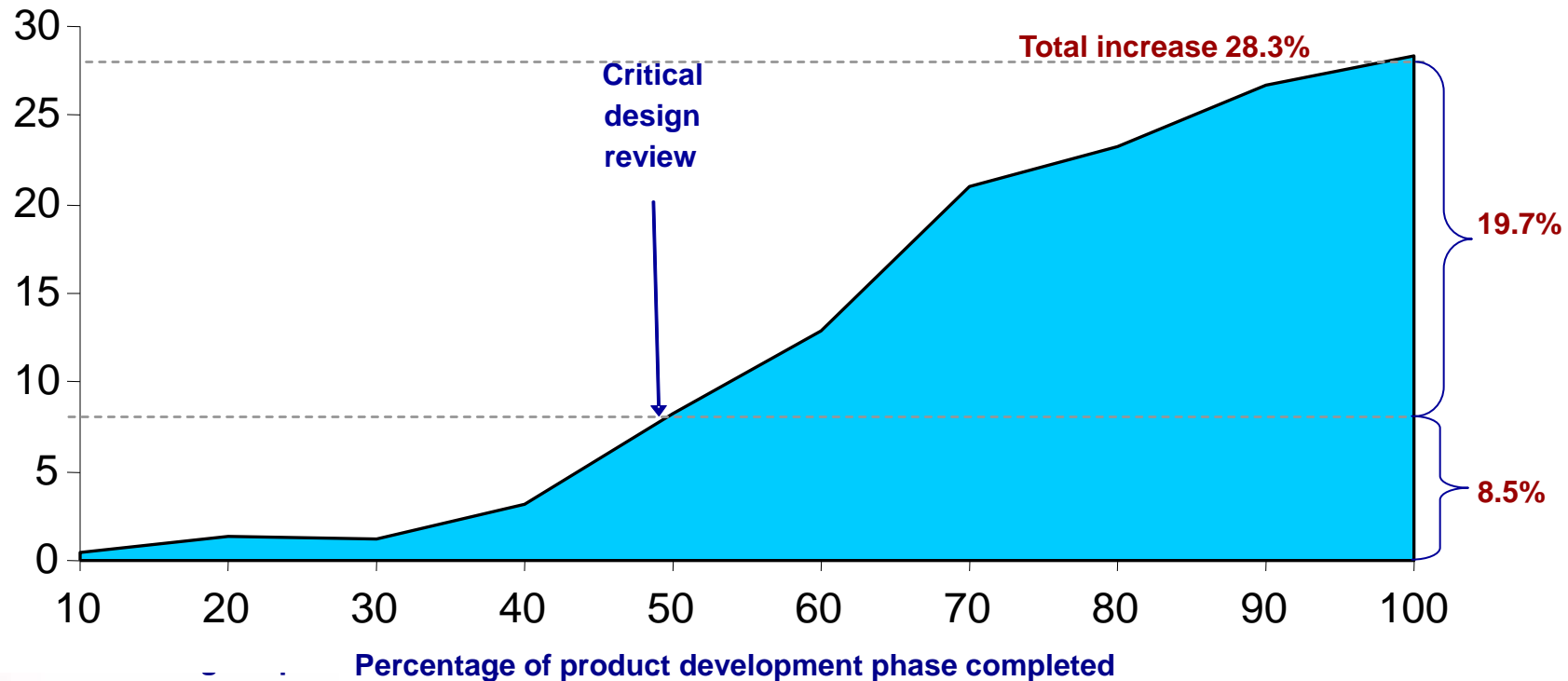
Observation: New Programs Are Performing Better at This Time

Changes in Program Cost and Schedule by Age of Program Fiscal Year 2008 Portfolio

Age of Program	Change in total RDT&E costs from first estimate	Change in total acquisition cost from first estimate	Average change in quantities	Average number of months late	Number of programs
15 or more years since development start	47 percent	19 percent	-39 percent	37 months	10
10 to 14 years since development start	73 percent	53 percent	52 percent	26 months	17
5 to 9 years since development start	37 percent	31 percent	9 percent	22 months	25
Less than 5 years since development start	12 percent	11 percent	1 percent	5 months	28

Caveat: Historically, Largest Percentage of RDT&E Cost Growth Occurs After CDR

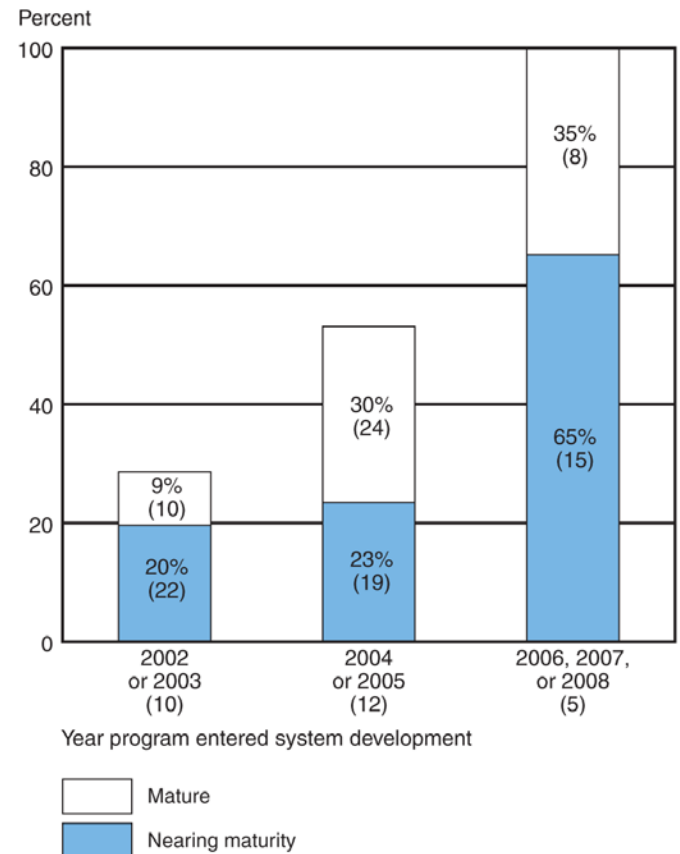
Percentage of RDT&E cost increase over development estimate



Note: Does not add due to rounding.
Source: GAO-06-391

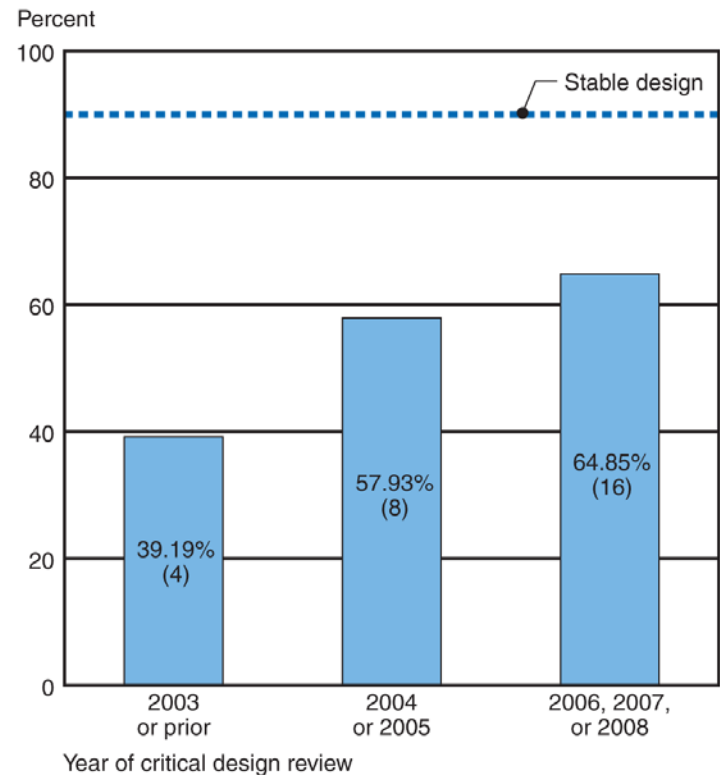
Knowledge Analysis: Newer Programs Are Starting with Higher TRLs

- Since 2003, there has been a significant increase in the percentage of critical technologies at least nearing maturity (demonstrated in a relevant environment) prior to development start.
- In the last 3 years, all 5 programs entering system development had their critical technologies demonstrated in at least a relevant environment, in accordance with the DOD and statutory criteria.



Knowledge Analysis: Programs Report More Design Drawings Complete at CDR

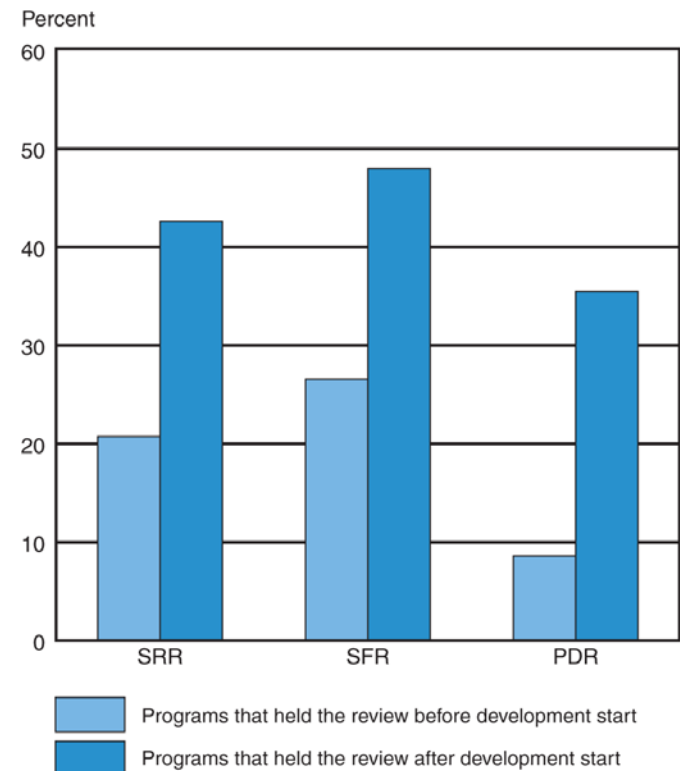
- Since 2003, the average percentage of design drawings releasable for programs at the critical design has steadily increased.
- However, designs, on average, are still far from stable and concurrent technology development increases risk of subsequent design changes and rework.



Knowledge Analysis: Programs Conducting Early Systems Engineering Have Better Outcomes

- Early systems engineering, ideally before a program enters development, is critical to ensuring that requirements can be met with available resources.
- Programs that conducted key systems engineering events prior to development start have experienced lower cost growth on average and often have shorter delays in achieving initial operational capability.

Average RDT&E Cost Growth by Timing of Key Systems Engineering Reviews



Other Factors We Found That May Influence Program Outcomes

- Inadequate staffing
- Lack of independent cost estimates
- Software growth
- Changes in key system requirements

Initiatives for Change & Future Challenges

Recent Legislative and Policy Changes Have Potential to Significantly Improve Outcomes

Areas of Agreement Between DOD and GAO Concerning Problem Sources

- Acquisition problems have their roots in the requirements and funding processes
- Programs are initiated with poor foundations and inadequate knowledge for developing realistic cost estimates
- Programs move forward with artificially low cost estimates, optimistic schedules and assumptions, immature technologies and designs, and fluid requirements
- Imbalance between needs and the resources available to meet them contributes to budget and program instability
- Changing or excessive requirements cause cost growth

Recent Changes Should Result in More Knowledge (Less Risk) Upfront

- Certifications at Milestones A and B
- Director of Cost Assessment and Program Evaluation
- Materiel Development Decision required for all programs
- Configuration Steering Boards established
- Preference for incremental development
- Preference for holding PDR before start of SDD
- Competitive prototyping prior to Milestone B
- Capability Portfolio Managers

Several Areas of Continuing Concern

- Responsibility, authority, and accountability still stove-piped
- DOD policy still does not require “time certain” development
- DOD policy still allows for concurrent technology and product development and production
- Post-CDR assessment still not a milestone decision
- Controls not in place to ensure accountability and adherence to intent of new policy

Concluding Remarks

- The administration's acquisition policy initiatives are aimed at the proper target -- the front-end of the process and the systems engineering that is required there
- There is growing consensus that the root causes of poor outcomes lie in misunderstood requirements, unreliable estimates, and unmanageable development times
- The Congress' reform legislation also targets the appropriate troublemakers – lack of systems engineering expertise, lack of accountability and independence among key players
- What's doable on paper is not always doable in reality – the people involved in this enterprise, all of them, must be willing to change the way we develop and deliver weapon systems

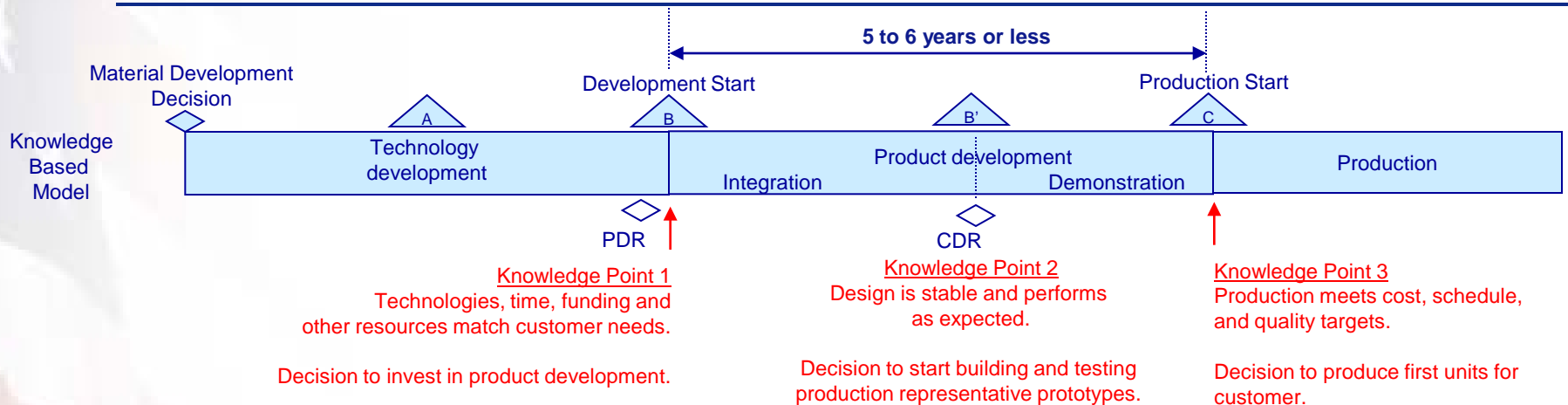
Questions?

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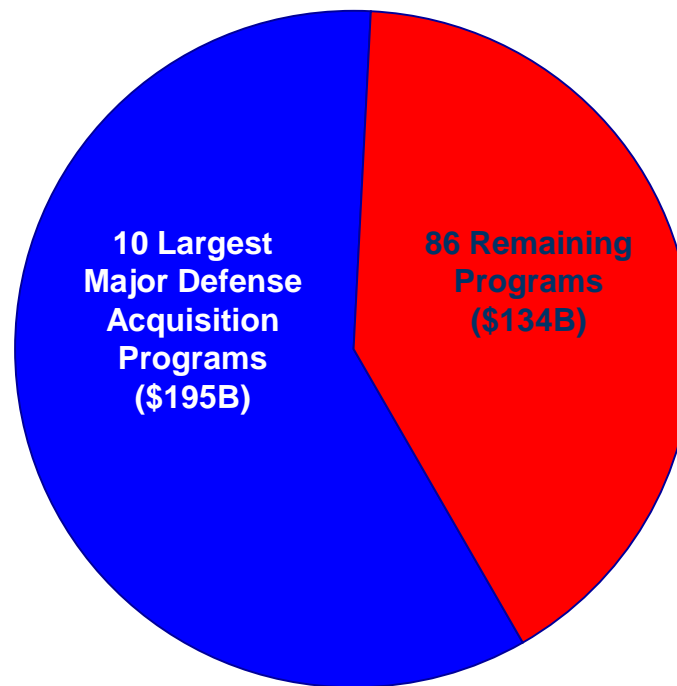
Cheryl Andrew, andrewc@gao.gov

Knowledge-Based Acquisition Model Focuses on Retiring Risks by Key Decision Points



- Model provides framework for incremental, time certain (development constrained to 5 to 6 years or less), and knowledge-based approach to weapon system acquisitions.
- Success requires structured, disciplined application and adherence to model.
- Knowledge points align with key investment inflection points.
- Controls are in place for decisions makers to measure progress against specific criteria and ensure managers capture key knowledge before moving to next phase.

Observation: Top 10 Programs Continue to Strain DOD's Buying Power Elsewhere



RDT&E and Procurement Funding 2009-2013 (FY09 Dollars)