

Appendix D

Defense Acquisition Performance Assessment Project Report

A Baseline Literature Review

Monitor Government Venture Services, LLC





Executive Summary

- Despite frequent reform attempts, with some isolated successes, the overall performance of the acquisition system has not improved significantly over the last 20 years.
- The analysis of problems, and the recommendations to solve those problems, tend to address specific aspects of the system, or aim to improve isolated processes or problems.
- Viewed as a whole, past acquisition reforms are a “cobbled together” mass of solutions, some at odds with each other, that do not form either a concerted or coherent strategy despite the good intentions of the competent individuals and groups that recommended them.
- Most importantly, metrics for evaluating the success of the entire system are absent; there is no meaningful way to measure success or failure, and thus the system is saddled with a reputation of never realizing meaningful reform.
- The analysis of the literature reviewed indicates that unless the DoD correctly identifies and addresses the root systemic impediments to true reform, meaningful sustained performance improvements will remain [stay] out of reach.
- Further, analysis of the literature reveals that what is lacking most is a disciplined analytical foundation both to identify systemic impediments and to support the formulation of solutions. This requires an understanding of both the structure of the organization and the individual behaviors underlying the acquisition system.



- **Mandate from Secretary England**
- Study objectives
- Outline of Monitor process
- Analysis of literature
- Characterizing the current environment
- Analysis of reform initiatives
- Findings, Conclusions and Recommendations
- Alternative approach – Identifying true impediments to reform
- Bibliography and Case Studies



Mandate from Deputy Secretary England and Supporting Information

Mandate for Current Acquisition Performance Assessment Effort

- Issued by Acting Deputy Secretary of Defense England, 7 June 2005

“... I am authorizing an integrated acquisition assessment to consider every aspect of acquisition, including requirements, organization, legal foundations ...decision methodology, oversight, checks and balances — every aspect...”

The output... will be a recommended acquisition structure and processes with clear alignment of responsibility, authority and accountability.

Simplicity is desirable... restructuring acquisition is critical and essential.”

– Exerpts from Secretary England’s 7 June 2005 Memo

Principles for Action on Reform

- DoD is fighting a Global War on terror and must acquire equipment, systems and services to win in a timely manner — there are no other alternatives
- DoD cannot waste resources that are growing more scarce
- DoD must get more efficiency from existing and future acquisition programs, demanding ethical behavior and process integrity
- Congress has made acquisition improvement a priority; DOD must take action
- It is DoD’s responsibility and obligation to improve the acquisition system and seek enabling legislation where necessary



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Monitor's Role

- Acting Deputy Secretary England challenged the entire DoD when, on 7 June 2005, he authorized the Defense Acquisition Performance Assessment (DAPA) Project with compelling urgency.
- Monitor, a strategy advisory firm and merchant bank (with close ties to the Harvard Business School), was engaged to support the DAPA Team and to conduct a baseline review of the literature related to acquisition reform since the Packard Commission and the Goldwater-Nichols legislation. Monitor has provided support both to OSD and USAF leadership over the past several years on broad issues including acquisition strategy, technology exploitation, industry structure, and venture capital partnering.
- There have been many prior attempts to improve the acquisition system. Therefore, the premise of the Monitor effort was that any new attempts at “reform” should be based on a thorough understanding of how the system has evolved to its current state during the past 20 years; this specifically included an evaluation of what reforms had been attempted and the degree of improvement that may have resulted.
- Monitor, therefore, undertook a baseline literature review that identified the past reform attempts as well as reports/studies that offered opinions and commentary regarding results achieved. This study presents the literature review and analysis, findings and conclusions derived both from the body of literature and from an assessment of prior reform initiatives, along with some recommendations for the future.



Some motivations supporting the current mandate

In an environment of increasing criticism and ever-increasing demands on the acquisition system, true meaningful change must trump past reform efforts in new and novel ways. Diagnosing a path to such change requires an unprecedented look at what ails the system most

Increasing Criticism and Demands

“We have assessed weapon acquisitions as a high-risk area since 1990. Although U.S. weapons are the best in the world ... It is not unusual for [cost and schedule estimates] to be off by 20% to 50%. ... when costs and schedules increase ... value for the warfighter—as well as the value of the [discretionary] investment dollar—is reduced.”¹

“If these mega systems are managed with traditional margins of error, the financial consequences can be dire, especially in light of a constrained discretionary budget.”¹

Combined with a Persistent History of Unsatisfying Reforms

“Perhaps the most important lesson that emerges ... is that rather than being something that will someday be ‘finished’ in the DoD, AR is perhaps better viewed as something that will always be a work in progress[!]”²

“...an extremely complex system requiring many inputs from many organizations with many people who can say ‘no’ but few who can say ‘yes.’ This diffusion of authority enables those who master the system to gain power.”³

Calls for Identifying the True Key Impediments to Change

“...after years of failing to control cost overruns, the most powerful officials at the Pentagon are becoming increasingly alarmed that the machinery for building weapons is breaking down under its own weight.”⁴

“Something’s wrong with the system”

–Secretary of Defense Donald H. Rumsfeld

Sources: ¹ “Defense Acquisitions: Assessments of Selected Major Weapon Programs”, GAO GAO-05-301, March 2005; ² Hanks, Christopher H., Axelband, Elliot I., et. al., *Reexamining Military Acquisition Reform: Are We There Yet?*, RAND, 2005; ³ “Management Oversight in Acquisition Organizations”, Defense Science Board, March 2005; ⁴ Weiner, Tim, “Arms Fiascoes Lead to Alarm Inside Pentagon”, New York Times, June 8, 2005



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Summary of Monitor Process

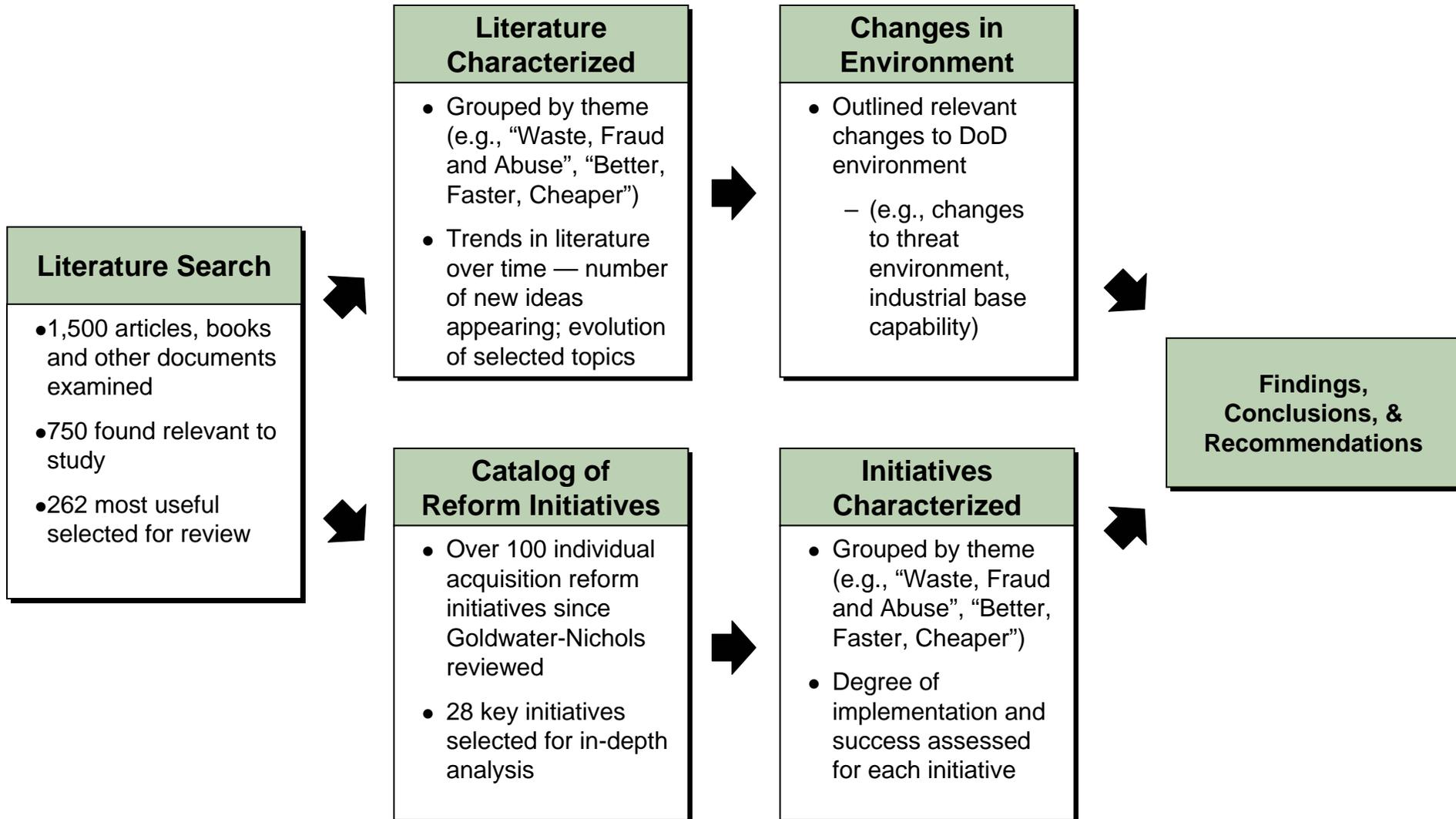




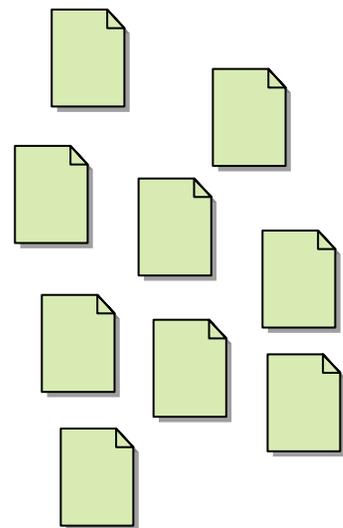
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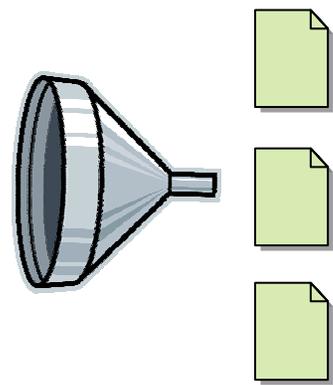
Process for sorting and prioritizing literature

① ~750 Acquisition Reform Publications



- Identified approximately 750 out of 1,500 articles and books relevant to acquisition reform and DAPA published in 1986 or thereafter

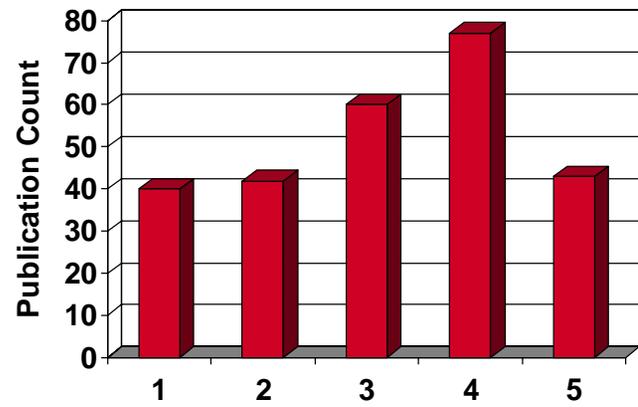
② Pre-Screening Eliminated Almost 70% of Publications



- Narrowed to 262 relevant publications based on analyst pre-screening



③ Rated by Relevance



Low ← Relevance → High

- All pre screened publications were reviewed by analysts and rated for relevance to DAPA
- 120 documents with specific recommendations and problems were used for literature analysis



④ Temporal Acquisition Reform Map

	Year		
	1986	...	2005
Recommendation Area	2	...	2
Specific Recommendations	1	...	2
Problem Area	3	...	1

- 118 unique recommendations and problems were grouped into 26 common areas and ordered chronologically for analysis
- A handful of specific recommendations appear in multiple areas



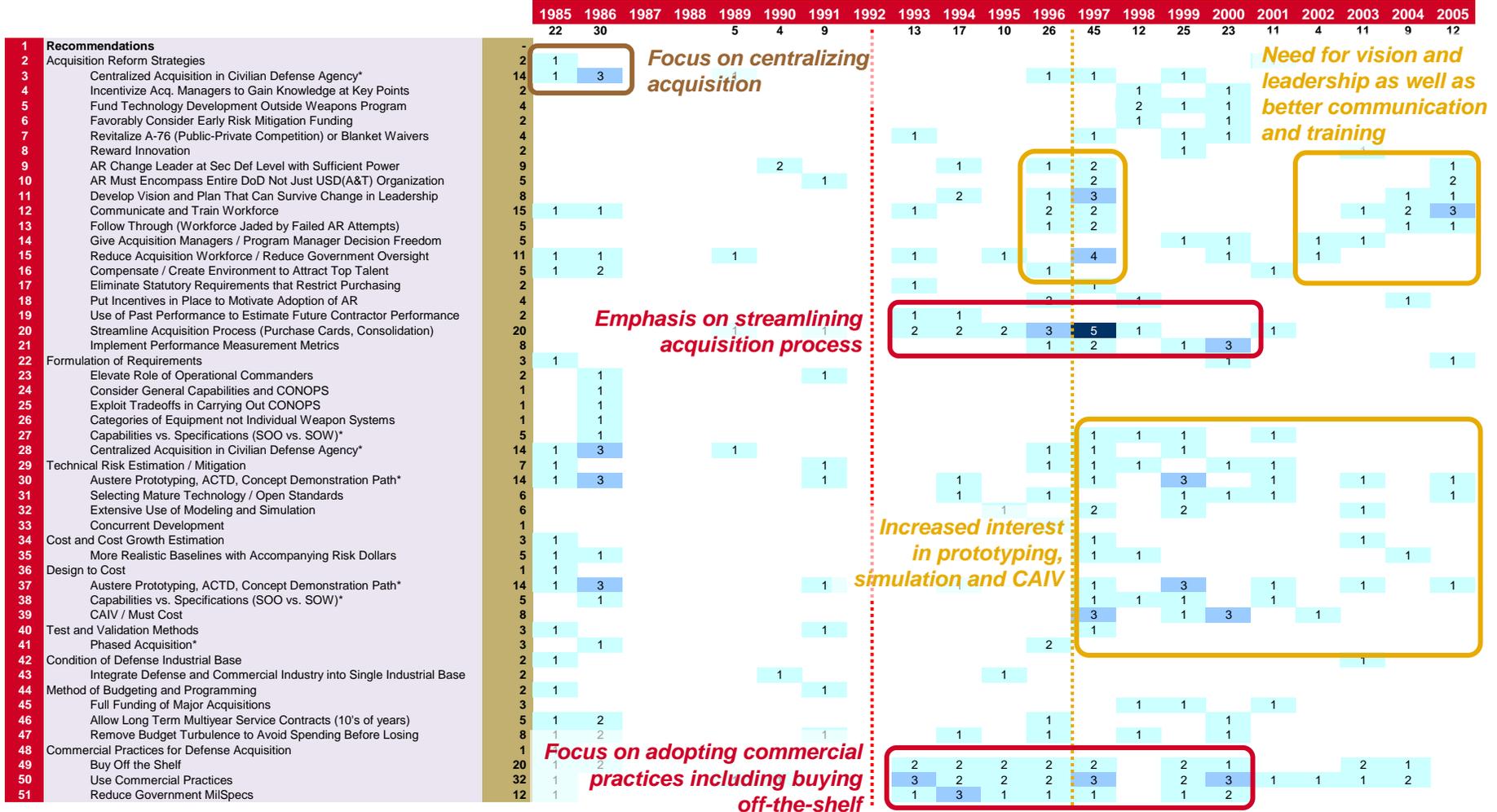
Mapping the Literature

- As noted on the previous chart, the approach used in this study started with the evaluation of 262 relevant documents; of these, 120 documents (rated 4 or 5 in relevance) were identified as being particularly important to this study. These 120 documents contained 118 unique sets of recommendations and problems/critiques.
- These 118 recommendations and problems/critiques were grouped into 26 categories of focus:
 - 18 of these related to recommendations
 - 8 related to problems/critiques
- There were a total of 618 references in the 120 key documents that could be mapped against these 26 categories
 - 459 references dealt with recommendations found in the literature
 - The next two charts identify the key themes of the recommendations
 - 159 references dealt with problems/critiques
 - The third chart following identifies the key themes of the problems/critiques
- In addition, there were three distinct schools of thought regarding acquisition reform that surfaced. The recommendations and problems/critiques are mapped against these as well as shown on the next three charts



Literature grouped by theme Recommendations (1 of 2)

Literature can be broadly grouped into three distinct categories of thought:
1) Fraud, Waste and Abuse 2) Better, Faster, Cheaper and 3) Flexible and Responsive



Focus on centralizing acquisition

Need for vision and leadership as well as better communication and training

Emphasis on streamlining acquisition process

Increased interest in prototyping, simulation and CAIV

Focus on adopting commercial practices including buying off-the-shelf

Fraud, Waste & Abuse (mid-'80s)

Better, Faster, Cheaper ('93-'00)

Flexible and Responsive ('97-'05)

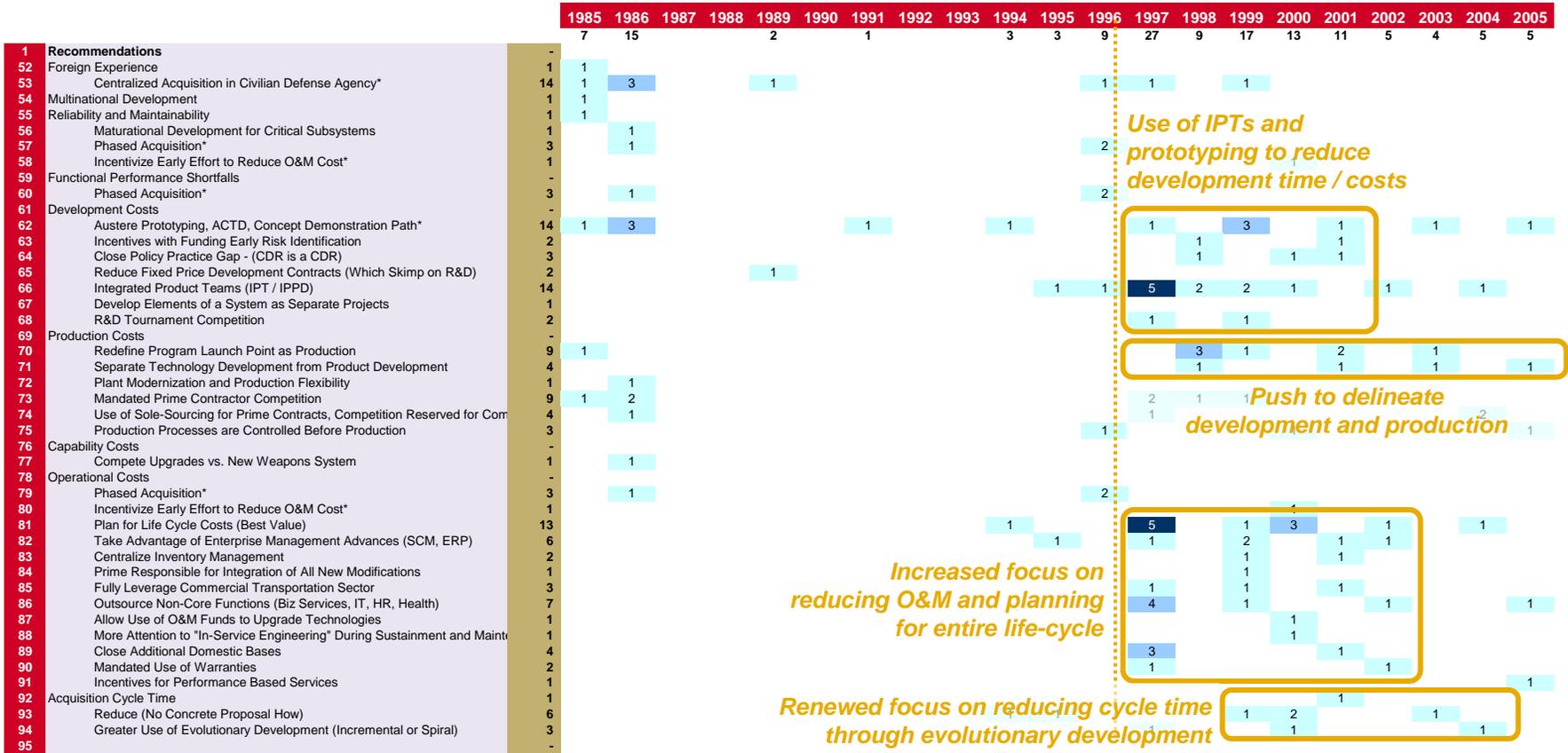
Note: *Recommendation Repeated Multiple Times



Literature grouped by theme

Recommendations (2 of 2)

While prior “Better, Faster, Cheaper” recommendations such as adoption of commercial practices and acquisition process streamlining tended to address all phases of development, “Flexible and Responsive” recommendations are largely development cycle specific; recommendations include reducing development time / costs, delineating production vs. development and focus on O&M reductions



Use of IPTs and prototyping to reduce development time / costs

Push to delineate development and production

Increased focus on reducing O&M and planning for entire life-cycle

Renewed focus on reducing cycle time through evolutionary development

Fraud, Waste & Abuse (mid-'80s)

Better, Faster, Cheaper ('93-'00)

Flexible and Responsive ('97-'05)

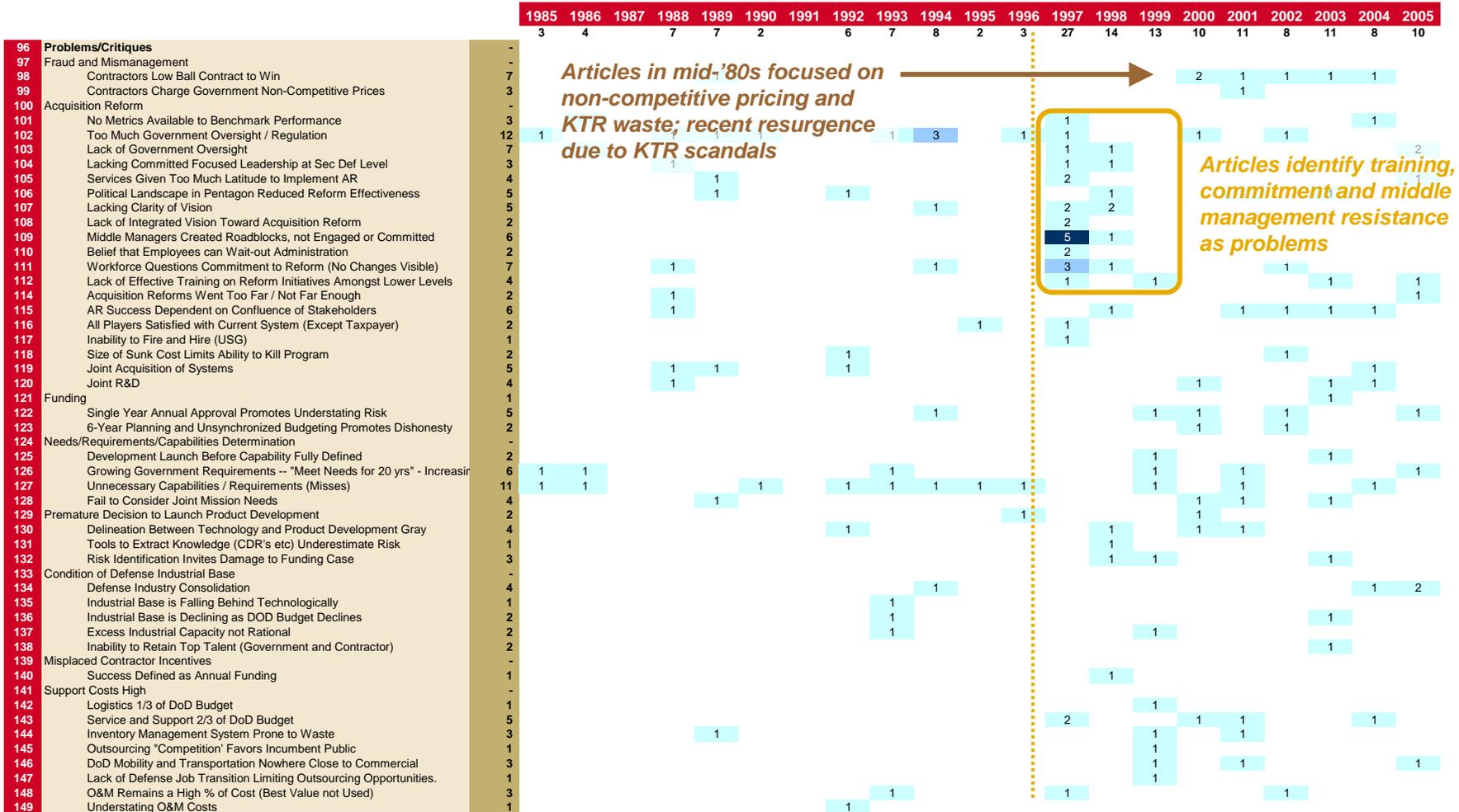
Note: *Recommendation Repeated Multiple Times



Literature grouped by theme

Problems / Critiques

Additionally, “Flexible and Responsive” literature tends to highlight implementation challenges of prior AR initiatives including lack of vision and leadership, middle management resistance, and commitment to reform



Fraud, Waste & Abuse (mid-'80s)

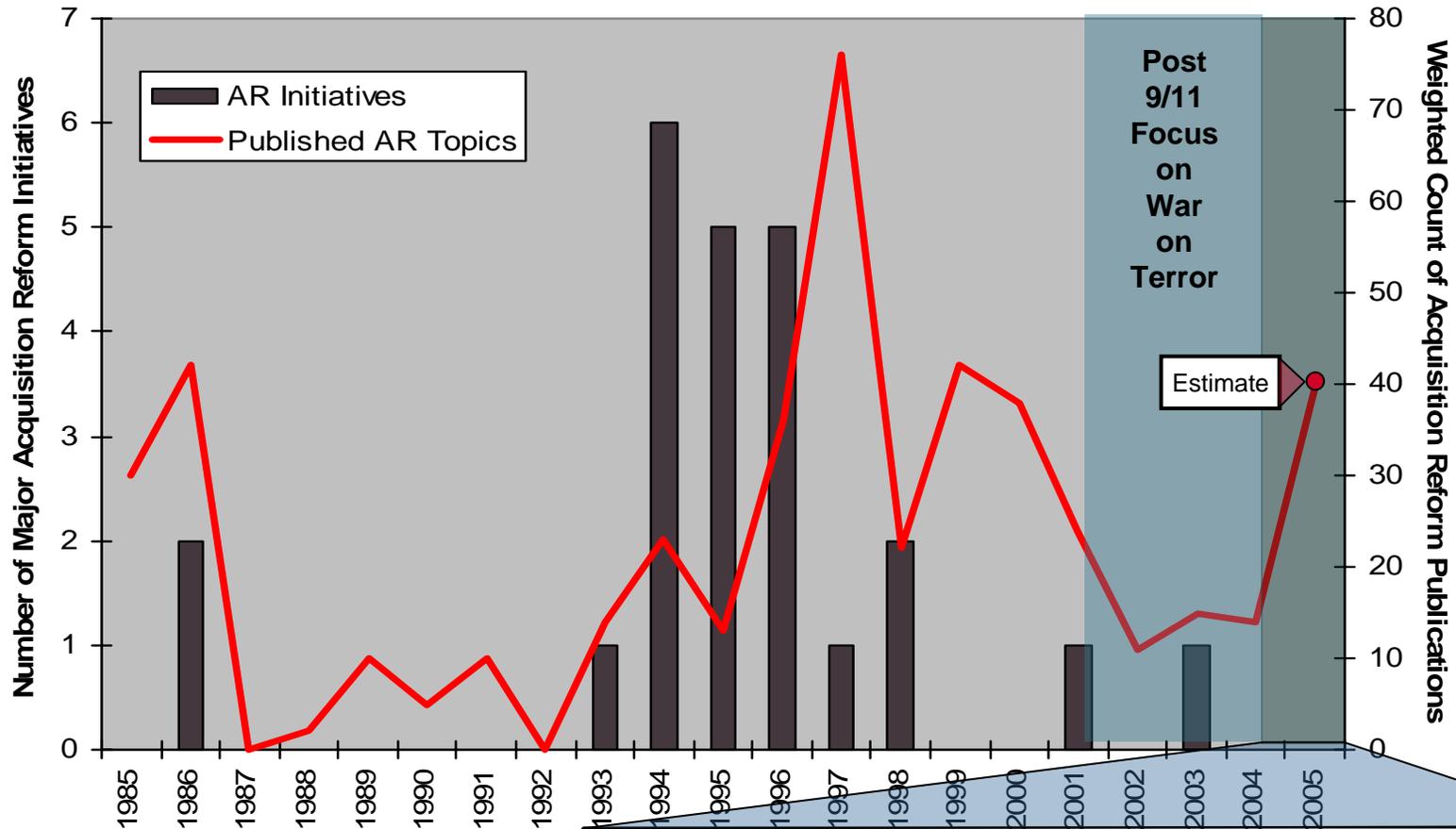
Better, Faster, Cheaper ('93-'00)

Flexible and Responsive ('97-'05)



Acquisition Reform Publications Overview

The weighted count of acquisition reform publications tends to track with the introduction of new acquisition reform (AR) initiatives. Following a decrease in the post 9/11 era, our 2005 weighted count estimates show a dramatic increase not triggered by the introduction of new acquisition reform initiatives*



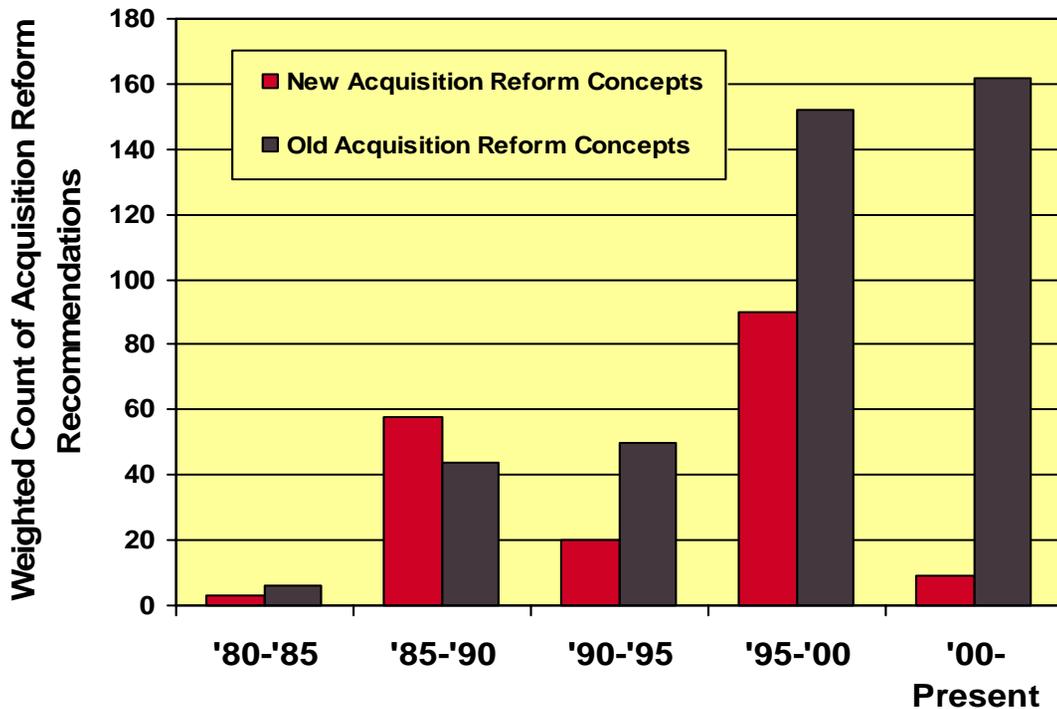
Note: *A publication's weighted count is equal to the sum of the distinct recommendations and the distinct problems presented in the publication as a proxy of "depth" of article

Recent Increases in the weighted count of Publications Focused on Acquisition Reform Indicates Renewed Public Interest



New Acquisition Reform Concepts

In recent years, the weighted count of new acquisition reform concepts discussed in the literature has been dwarfed by the weighted count of old reform concepts*



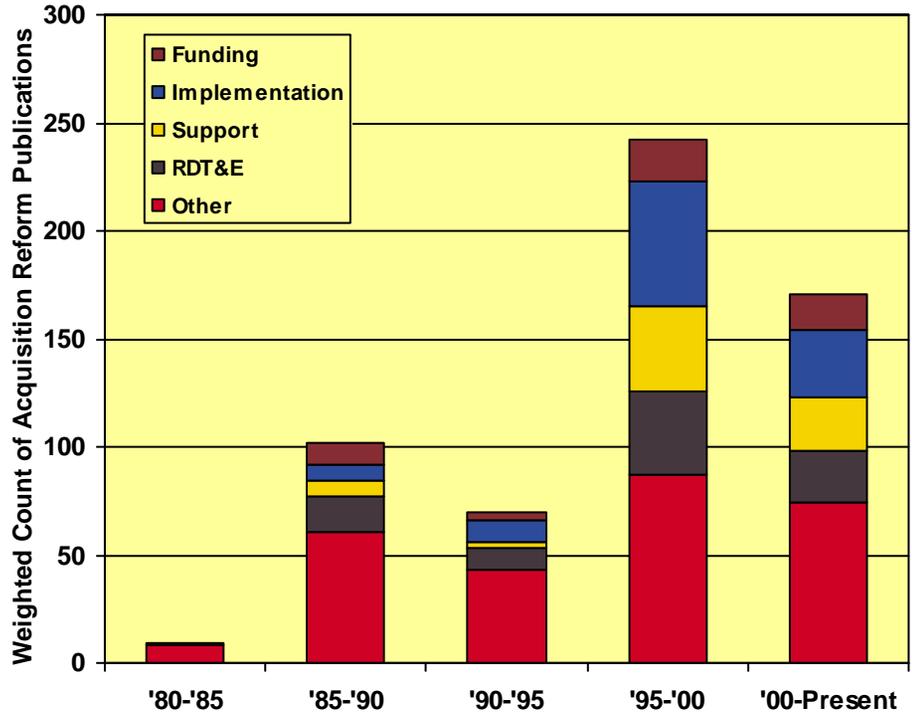
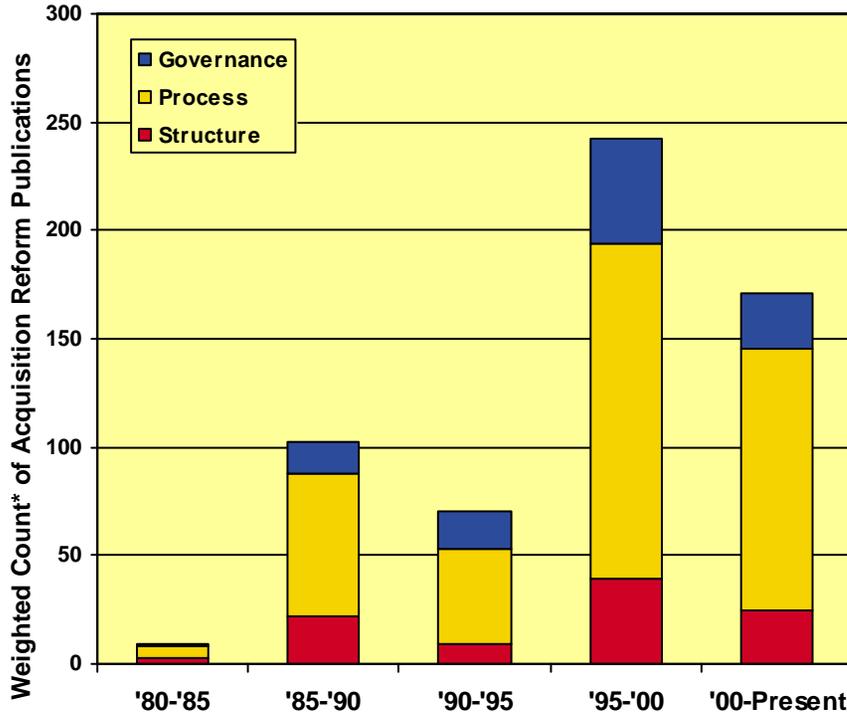
- Throughout the '80s, the number of new acquisition reform concepts was on par with the number of old reform concepts discussed in the literature
- Since 1990, old acquisition reform concepts have dominated the literature
- Over the last five years there have been almost no new acquisition reform concepts discussed in the literature
- The reduction in the number of new acquisition reform concepts presented in the literature is indicative of the change in focus from the acquisition reforms themselves to the implementation of the acquisition reforms

Note: *A publication's weighted count is equal to the sum of the distinct recommendations and the distinct problems presented in the publication as a proxy of "depth" of article



Acquisition Reform Publications: High Level Categories

Over the last two decades, articles on Process have dominated articles on Governance and Structure by a 2 to 1 ratio. Over the last decade, articles on Service and Support and Reform Implementation have made up roughly one third of all articles published



- The ratio of articles discussing Governance, Process, and Structure has remained relatively stable since 1985
- Process articles account for roughly 70% of all articles

- Over the last decade there has been a significant increase in articles discussing support and service cost growth and acquisition reform implementation

Note: *A publication's weighted count is equal to the sum of the distinct recommendations and the distinct problems presented in the publication as a proxy of "depth" of article



USG Structure and Governance in the Existing Literature

- Some of the most important pieces of the DoD acquisition system lie outside of DoD's total control. Among the other USG components, Congress, OMB and the GAO have a major influence on DoD's ability to execute its responsibilities.
- The vast majority of literature on acquisition reform is written from an “inside the gates” perspective – often by authors or researchers associated with DoD and the current acquisition system. These studies focus on making recommendations that can be acted on by DoD. Thus, issues of USG-wide structure and governance in particular are less commonly treated than discussions of internal DoD process.
- As a consequence, some of the most important considerations for meaningful acquisition reform are not well represented in the existing literature:
 - The obvious influence of Congressional funding power is an exception, referred to by many authors. However, the influence of OMB, for example, is not.

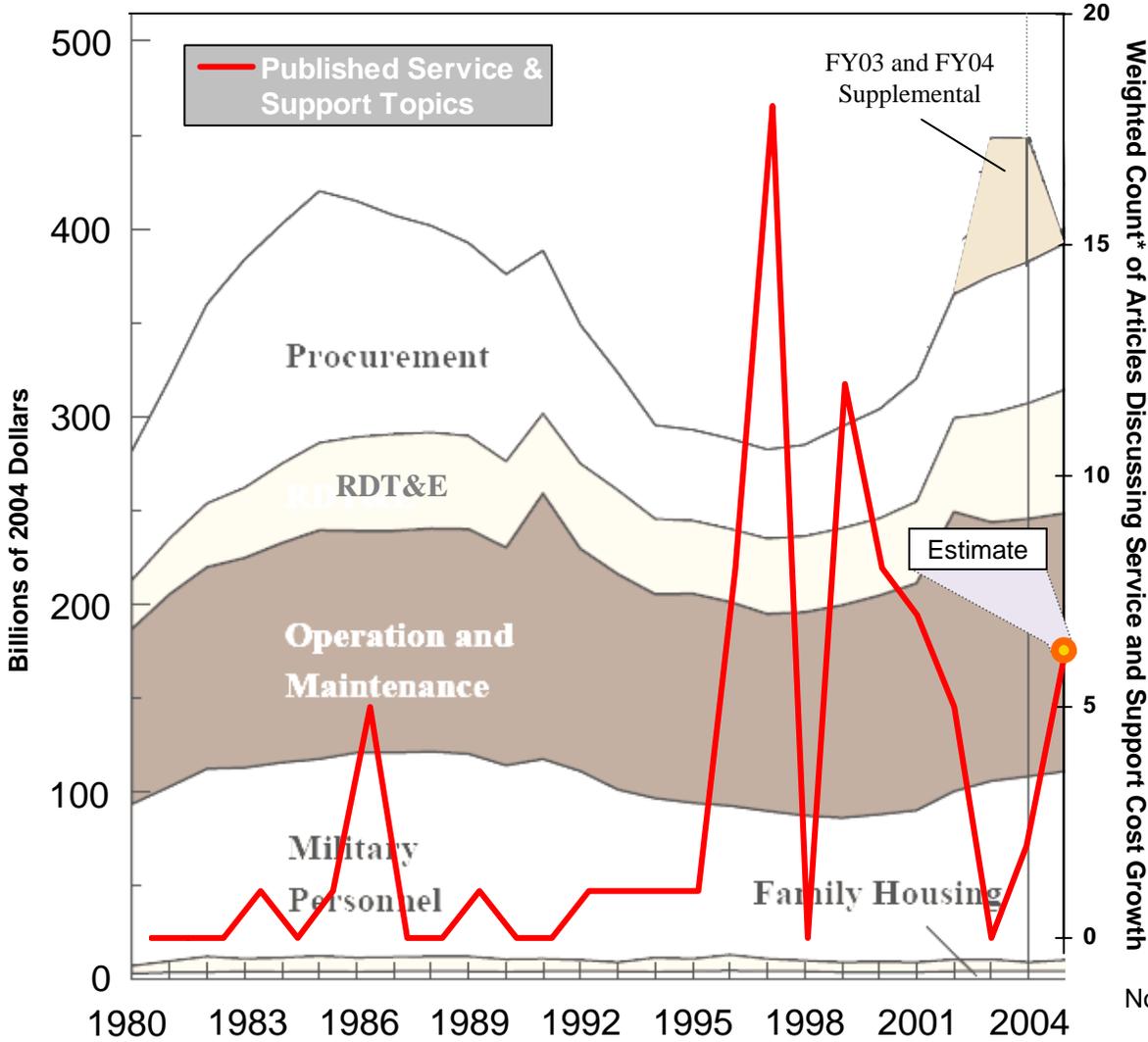


A comprehensive understanding of the acquisition system needs to incorporate key stakeholders outside of DoD that are not well-covered in the literature



Increase in Publications Calling for Reduced Service and Support

After the Cold War, service and support (O&M and Military Personnel) spending did not decrease at the same rate as procurement spending; a number of articles were published calling for reduction in service and support



- The end of the Cold War brought with it expectations of a “Peace Dividend” resulting in reduced DoD expenditures
- The government followed suit reducing procurement spending by 59% between FY 1987 and FY 1997
- Service and Support spending, however, remained roughly equivalent over that time period resulting in a higher % of support related spend
- As a result, a number of articles were published noting the DoD’s high support and infrastructure costs suggesting change
- Most Cited Recommendations Include:
 - Lifecycle Cost (“Best Value”)
 - Increased use of Outsourcing
 - Increased use of Enterprise Management Advances (SCM, ERP)
 - Additional Domestic Base closings

Note: *A publication’s weighted count is a proxy of the “depth” of the article

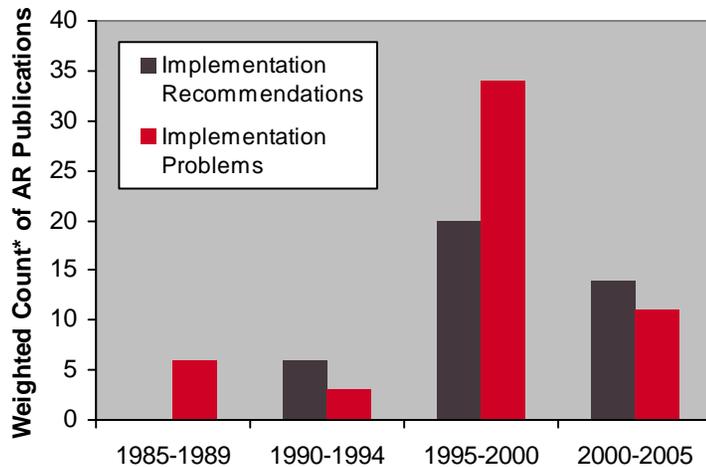


Implementation of Acquisition Reform

As the perception grew that Acquisition Reform was failing, there were more articles written focused on what went wrong with the implementation process and how to fix it

Chronology of Publications Discussing the Implementation Success of Acquisition Reform

Specific Recommendations of and Problems with the Implementation of Acquisition Reform



Recommendations
AR Change Leader at Sec Def Level with Sufficient Power
AR Must Encompass Entire DoD Not Just USD(A&T) Organization
Develop Vision and Plan That Can Survive Change in Leadership
Follow Through (Workforce Jaded by Failed AR Attempts)
Give Acquisition Managers / Program Manager Decision Freedom
Put Incentives in Place to Motivate Adoption of AR
Implement Performance Measurement Metrics
Problems/Critiques
No Metrics Available to Benchmark Performance
Lacking Committed Focused Leadership at Sec Def Level
Services Given Too Much Latitude to Implement AR
Political Landscape in Pentagon Reduced Reform Effectiveness
Lacking Clarity of Vision
Lack of Integrated Vision Toward Acquisition Reform
Middle Managers Created Roadblocks, not Engaged or Committed
Belief that Employees can Wait-out Administration
Workforce Questions Commitment to Reform (No Changes Visible)
Lack of Effective Training on Reform Initiatives Amongst Lower Levels
Reform Initiatives and Employee Incentives/Performance Metrics not Aligned
AR Success Dependent on Confluence of Stakeholders
All Players Satisfied with Current System (Except Taxpayer)

Note: *A publication's weighted count is a proxy of the "depth" of the article

- Few articles described problems and gave recommendations with respect to the implementation of AR between 1985 and 1994
- A decade after Goldwater-Nichols, the topic of how to successfully implement acquisition reform had become a popular topic

- Most Cited Recommendations/Problems
- 1 – Lack of leadership at the Sec Def level
 - 2 – Lack of vision and plan that can survive leadership changes
 - 3 – Workforce questions commitment to reform
 - 4 – Lack of clear metrics to benchmark performance



Summary Characterization of Literature

- Acquisition reform has not been limited by a lack of ideas; a massive body of literature exists that deals with many different aspects of acquisition reform.
 - Many of the same recommendations have been repeated for decades with little modification.
- It is easy to discern differing interests and ideas over time – for example, the majority of studies focused on reform implementation in the mid-1990s, then transitioned to a focus on O&M costs in the late '90s.
- Three primary themes emerged from the literature review process that characterized the thrust of the commentary on defense acquisitions, reflecting different approaches to framing the debate on reform over time:
 - Fraud, Waste and Abuse (through the late 1980s)
 - Faster, Better, Cheaper (early-to-mid 1990s)
 - Responsiveness and Flexibility (late 1990s through the present)
- There is a general consensus among researchers who have studied the implementation of acquisition reform on two broad conclusions:
 - First, that reform to date has not substantially improved the overall performance of the acquisition system
 - Second, that the political leadership has rarely been able to implement significant reform due to resistance to these ideas from some of the existing stakeholders



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Snapshot of Today's Situation

Massively Accelerated Cost Growth

- Currently, over 80 new major weapon systems are under development, with a combined cost growth of \$300B and total acquisition cost of nearly \$1.5T¹
- Most recent GAO study of 26 major acquisition programs indicates 42% RDT&E cost growth, 50% average program unit cost growth, and 20% average program schedule increase to nearly 15 years²
- GAO asserts that the top five programs have increased in cost during the past four years from \$281B to \$521B²

System-Wide Improvement Elusive Despite Many Attempts

- The trend is not abating — estimates of cost growth and development time of these same five programs grew 14.3% and 5.5%, respectively, in the past year alone²
- After more than 20 years of numerous attempts to improve the acquisition system, the perception is that no reforms have addressed systemic weaknesses in structure, process and governance of acquisitions

Confidence in System Badly Damaged

- Characterizations of system failure are wide, and many:
 - A “*Conspiracy of Hope*” created by industry must-win mentality and service advocacy for scarce resources
 - “*Program Demagogy*” resulting from valuing sunk costs more than future options
 - Conditions of “*Marginal Survival*” self imposed by stretching out funding to support more and more programs, each at its marginally inefficient rate
 - “*Ever-Escalating Requirements*” resulting from absence of balanced advocacies and adequate constraints

¹ Weiner, Tim, “Army Fiascoes Lead to Alarm Inside Pentagon”, *New York Times*, p.1, June 8, 2005

² *Defense Acquisition: Assessments of Selected Major Weapon Programs*, Government Accountability Office, GAO-05-301, March 2005



Weapon Systems Acquisition in Context

Although similar criticism has dogged the system for many generations, the demands on the system have markedly increased in the last decade

Organizational Demands

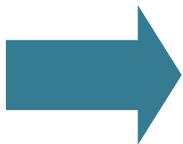
- Structural changes in industry, government and capital markets are changing the “rules” within which the participants of the acquisition system must operate and be successful; the contractor base is exceptionally concentrated

Competing Demands for Resources

- Enduring trends in national and global economies are affecting domestic priorities that impose constraints on availability and predictability of resources, and create heightened tensions between DoD investment priorities

National Security Demands

- Disruptive events have changed the fundamental character of national security challenges, resulting in a new set of security uncertainties which need to be explicitly managed



Failure to adapt to these evolving circumstances have only exacerbated “hidden failures of DoD”¹, manifest in shortcomings of the acquisition system

¹ *Beyond Goldwater-Nichols: Defense Reform for a New Strategic Era, Phase 1 Report*, CSIS, March 2004



Industry and Capital Markets Perspective

How is the Industrial Base Capability Evolving?

Massive shifts in defense business fundamentals lead to some vexing realities

Once Attractive Business Fundamentals Eroding . . .

- Industry attractiveness has declined despite improved operating margins since 1980 (5% to 9%)
 - Industry under-performs relative to its peers—other regulated industries such as Public Utilities and Pharmaceuticals
 - Industry revenue is much less predictable than Public Utilities and as volatile as Pharmaceuticals
 - Although margins have improved, they are not in line with the increased business risk within the industry
- Historical fundamentals have changed:
 - Low market risk —now fewer, larger, programs; increased instability (reprogram or termination)
 - Low business risk — DoD now reluctant to pay for perceived poor performance
 - Low investment risk — excess capacity exists; DoD no longer needs prior capacity levels

Steering Industry to a “New” Business Model . . .

- Large defense firms have reduced risk by buying backlog via aggressive acquisitions, exacerbating revenue volatility for remaining smaller players
- Dramatic consolidation: first horizontal (scale) and now vertical (capturing value)
- Multi-industrials and commercial firms exiting (optimizing firm value by abandoning the less attractive industry)
 - In 2003, 62% of prime contracts went to “pure play” defense companies vs. 29% in 1980
- Industry achieves market expectations by focusing on cash flow return on investment
 - IRAD fell to 1.5% of revenue from 4% in 1980
 - CAPEX declined to 10% of industry cash flow from 60% in 1980

Calling into Question “True Innovation”

- Leads to “must-win” mentality and extreme “optimism” in contract confidence
- Questionable economic motives of contractor business cases are often hidden; they are not always aligned with ROI.
- Monopsony-type market leads to competitive imbalance
- Smaller industrial base capability leads to reduced innovative alternative solutions

Sources: Chao, Pierre A., “State of the Defense Industry: In the Eye of a Perfect Storm”, Presented at SRI 6th Annual Defense and Aerospace Investor and Corporate Development Conference, September 20, 2004; Monitor Analysis



National Priorities Perspective

What Can We Continue to Afford?

“What is necessary to provide for the nation’s security” is increasingly at odds with other priorities

Fundamental Shifts in Defense Burden

- Impaired ability to modernize the nation’s arsenal with the growing “mortgage” on existing development programs and fielded systems
- O&M “death spiral” driving an increasing amount of defense budget
- Steady growth in personnel costs (three-fold increase since 1985 with half the total number of active and reserve personnel today)
- Budget is buying fewer things and limiting ability to fund vital R&D and new programs

Competing with Domestic Demands

- Mandatory spending accounts such as Social Security, Medicare and Medicaid increasingly more expensive
- Other large unfunded private sector obligations (such as unfunded retirement benefits) likely to have significant impact on economy
- Exacerbates the dynamics of setting funding priorities between acquisition programs

Dynamics of Program Advocacy

- Intensifies internal competition for prioritization and funding
- Focuses the decision process around making tradeoffs in a timely manner
- Amplifies undesirable aspects of patterns of behavior in today’s acquisition system

Sources: *The Long-Term Implications of Current Defense Plans*, Congressional Budget Office, January 2003 (February 2004 updates); “The Budget and Economic Outlook: Fiscal Years 2006 to 2015”, Congressional Budget Office, January 2005); Monitor Analysis



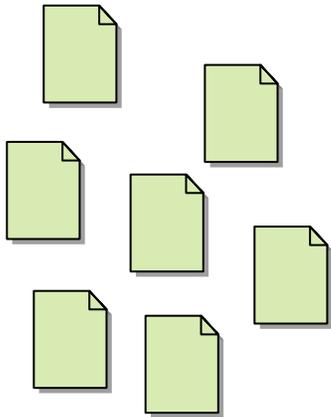
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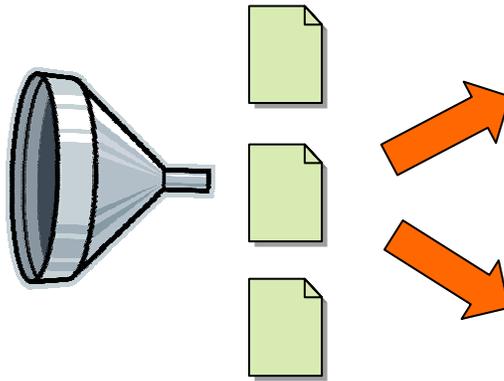
Analysis of Reform Initiatives -- Methodology

Full List of Initiatives



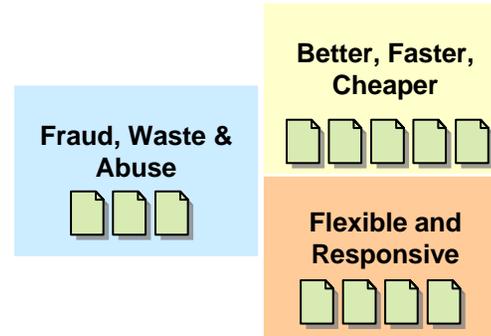
- Constructed database of ~100 initiatives based on comprehensive review of literature

Selected Key Initiatives



- Narrowed to 28 key initiatives based on scope and impact on long-standing issues in Structure, Process and Governance and impact on the speed and cost of weapons systems acquisitions
- Eliminated initiatives focused on Logistics and Payment Systems

Grouped by Theme



- Key initiatives were grouped by theme for chronological analysis
- Some initiatives were linked to multiple themes

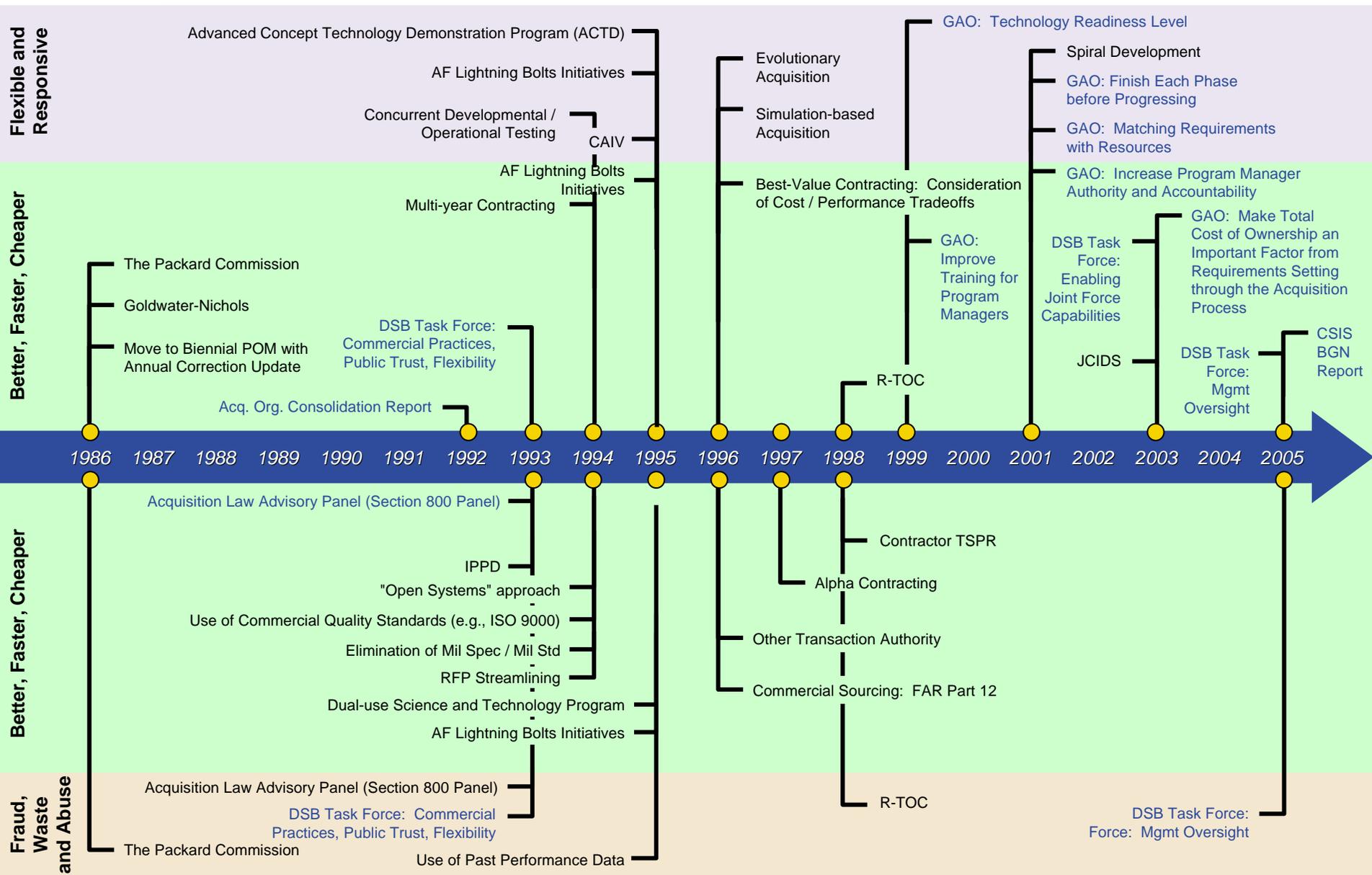
Comparative Analysis by Study Area

	Structure				Process				Governance			
	A	B	C	D	E	F	G	H	I	J	K	L
JCIDS	✓			✓							✓	✓
IPPD			✓			✓	✓			✓	✓	
CAIV							✓					
...												

- Performed comparative analysis of key initiatives to determine how different Study Areas have been addressed



Timeline of Key Initiatives





Descriptions of Key Initiatives

- **Acquisition Law Advisory Panel (Section 800 Panel)**
 - Panel made recommendations for streamlining DoD acquisition laws and increase efficiency and effectiveness.
 - Become the foundation for the Federal Acquisition Streamlining Act (FASA)
- **Advanced Concept Technology Demonstration Program**
 - Aimed to increase the speed at which technologies were field tested, evaluated and used by current operational forces.
 - Each ACTD needed to have a sponsoring user/war fighter organization
- **Air Force Lightning Bolts**
 - Aimed to reduce acquisition cycle time (by as much as 50%), enhance RFP process and streamline processes and management model
 - Created a standing Acquisition Strategy Panel, developed the Single Acquisition Management Plan, reinvented the science and technology process and established a centralized support team
- **Alpha Contracting**
 - Intended to streamline the development of proposals by the early communication between USG/Industry. Intended to shorten the schedule by having USG and industry work together in unison rather than sequentially.
- **Best-Value Contracting: Consideration of Cost / Performance Tradeoffs**
 - Allows flexibility in awarding contracts to recognize best value to DoD based on cost, performance, quality and schedule factors
 - Reduction in critical performance criteria in contracts to allow contractors flexibility and creativity in meeting overall program objectives
- **Biennial POM with Annual Adjustment Update**
 - Aimed to improve performance and make for a more efficient process
 - Moved to biennial budgeting process from the earlier annual process
- **Commercial Sourcing: FAR Part 12**
 - Aimed to increase commercial sourcing and encourage private-public competition.
 - Definition of commercial item and bidding process has undergone multiple iterations (e.g. best value instead of lowest cost)
- **Cost As An Independent Variable (CAIV)**
 - A process that seeks to establish a greater balance between technical, schedule and cost performance. CAIV sets up rules that seek to eliminate the pursuit of technical performance without balancing them against cost objectives.



Descriptions of Key Initiatives

- **Concurrent Development / Operational Testing**

- Reduction of schedule and cost by making the operational testing concurrent with development testing
- Accelerates programs by reducing surprise failures in operational testing that require lengthy redesign and integration efforts

- **Contractor Total System Performance Responsibility (TSPR)**

- Defines the responsibility interface between the USG and the KTR such that USG is responsible for Program Direction, Budgeting, Product & Service Acceptance, Determination of Requirements, Security and Contracts Management. The KTR is responsible for all other functions/tasks

- **Dual-Use Science and Technology Program**

- Aimed to increase collaboration with industry to develop dual use technologies and transfer knowledge gained by prior DARPA-industry joint efforts
- Technologies needed to meet future defense needs and have a reasonable commercial demand to support a minimum production base. Funds provided by the program were matched by the services and the combined amount was to be matched by industry

- **Elimination of Mil Spec / Mil Standards**

- Reduction of the number of government-unique Specifications and Standards maintained by DoD
- Encouraging programs to impose performance requirements, and allowing use of non-military standards and specifications (e.g. AIA, SAE, ASTM, etc.)

- **Evolutionary Acquisition**

- Iterative approach to acquisitions designed around time-phased requirements and block upgrades. Enables early fielding of solutions with steady improvement

- **Goldwater-Nichols: Greater integration of the services and joint planning**

- Aimed to enhance strategic and tactical effectiveness of the combined armed forces
- Promoted joint planning and greater integration between the Army, Navy and Air Force



Descriptions of Key Initiatives

- **Joint Capability Integration and Development System (JCIDS)**
 - The Process That Defines How DoD Determines Requirements. Top-down, integrated, process to identify, assess and prioritize joint military capability needs driven by Chairman of Joint Chiefs, through Joint Requirements Oversight Council (JROC), headed by Vice Chief of Staffs; members are the Service Chiefs
- **Multi-Year Contracting**
 - Facilitates use of multiyear contracts to create more stable long-term relationships between DoD and contractors
 - Broadens existing multi-year contracting provisions to increase the number of programs that can utilize them
- **Integrated Product and Process Development (IPPD)**
 - A management technique that simultaneously integrates all essential activities through the use of multidisciplinary teams to optimize the design, manufacturing and supportability processes
- **“Open Systems” Approach**
 - Making systems modular with open interface standards to allow for multiple sources of components and subsystems, and creating insertion points for new technologies
 - Facilitates access to military systems by commercial suppliers
- **Other Transaction Authority**
 - Allowed DoD to execute certain purchasing agreements outside of FARS/DFARS regulations, and using vehicles other than grants, contracts or cooperative agreements. Originally intended to reduce schedule and cost on certain prototypes and research projects
- **Packard Commission: Recommendation to Create Post of Undersecretary of Defense (Acquisition) and Restructuring of Acquisition Personnel**
 - Aimed to improve general acquisition policy and performance.
 - Created a new position that would be fully focused on acquisitions and bring the right mix of skills and industrial experience needed



Descriptions of Key Initiatives

- **Packard Commission: Army, Navy and AF should each establish Undersecretary Acquisition equivalent and appoint PEOs**
 - Aimed to have a senior person for acquisitions at each of the services
 - Responsible for overseeing all the acquisition efforts of the service
- **Packard Commission: Restructure Joint Requirements and Management Board co-chaired by Undersecretary of Defense (Acquisition) and Vice-Chair of JCS**
 - Aimed to establish the appropriate forum to make critical trade-offs in weapons and systems development decisions.
 - Restructured JRMB to better define weapon development requirements (moved the role over from DSARC) and make early trade-off between cost and performance
- **Reduction in Total Ownership Cost (R-TOC)**
 - Promotes making investment decisions based on through-life system cost, rather than initial acquisition cost, so that short-term savings are not outweighed by higher costs in later phases
 - 10 original R-TOC pilot programs, including B-1, SLAM-ER and AH-64 Apache
- **RFP Streamlining**
 - Goal is to reduce KTR costs and schedule in the preparation of their proposals. Achieved by (a) reducing complexity and size of KTR proposals; and (b) specifying statement of objectives or needs and allow KTR to develop the SOW
- **Simulation-Based Acquisition**
 - Detailed simulations replace prototypes and allow for earlier system engineering decisions and concurrent evaluations
 - Reduces system schedule and cost through use of simulation tools
- **Spiral Development**
 - A process for implementing evolutionary acquisition when the end-state requirements are not known. Promulgated by DoD in 5000.2, issued 2003 as the preferred and default process model for acquisitions
- **Use of Commercial Data and Other Exemptions for Cost or Pricing Data**
 - Shift from cost-based to price-based and value-based systems to allow greater use of commercial suppliers and market
 - Reduces burden of tracking cost data for relatively low value items



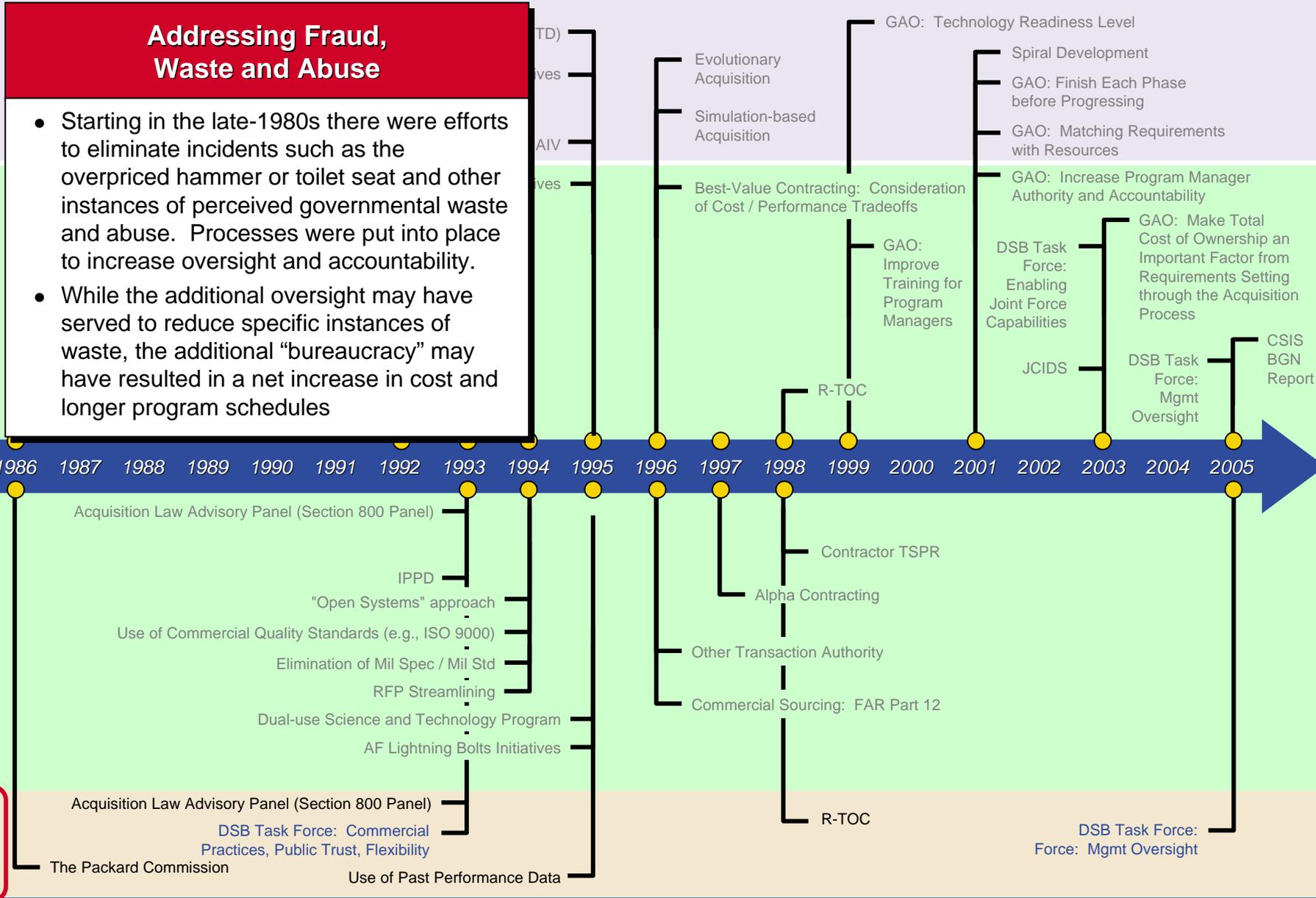
Timeline of Key Initiatives Addressing Fraud, Waste and Abuse

Flexible and Responsive

Better, Faster, Cheaper

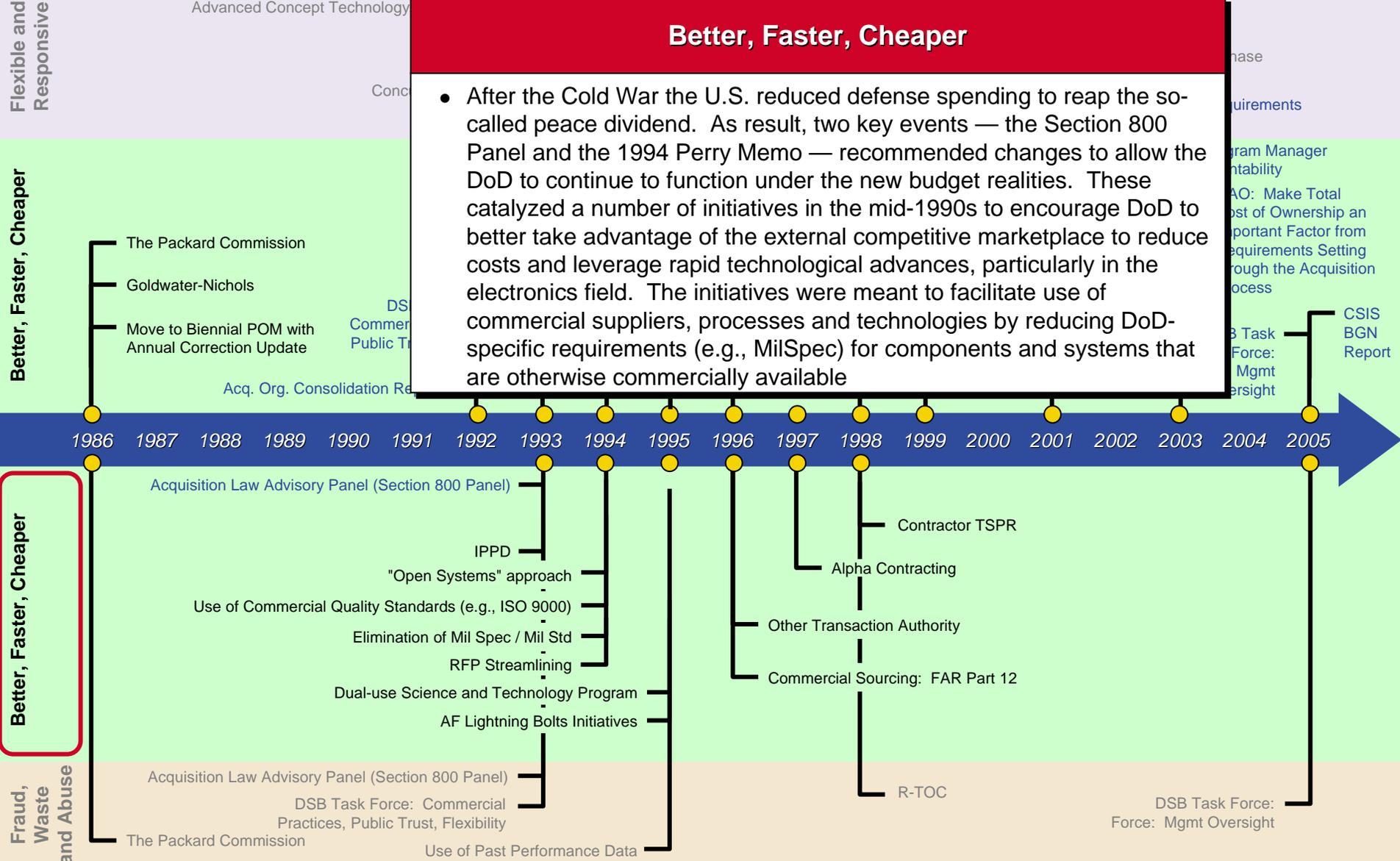
Better, Faster, Cheaper

Fraud, Waste and Abuse



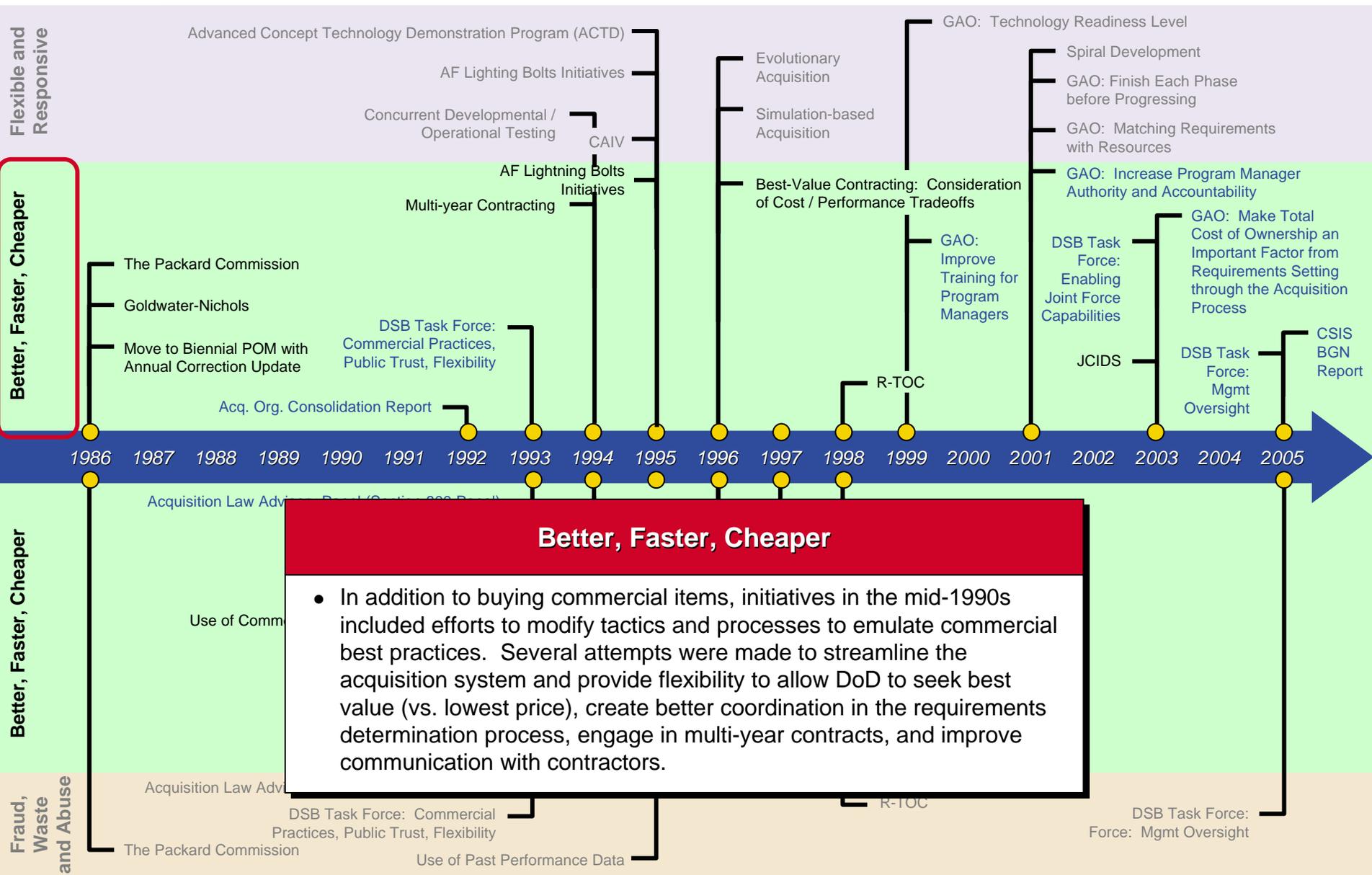


Timeline of Key Initiatives Better, Faster, Cheaper (1 of 2)





Timeline of Key Initiatives Better, Faster, Cheaper (2 of 2)





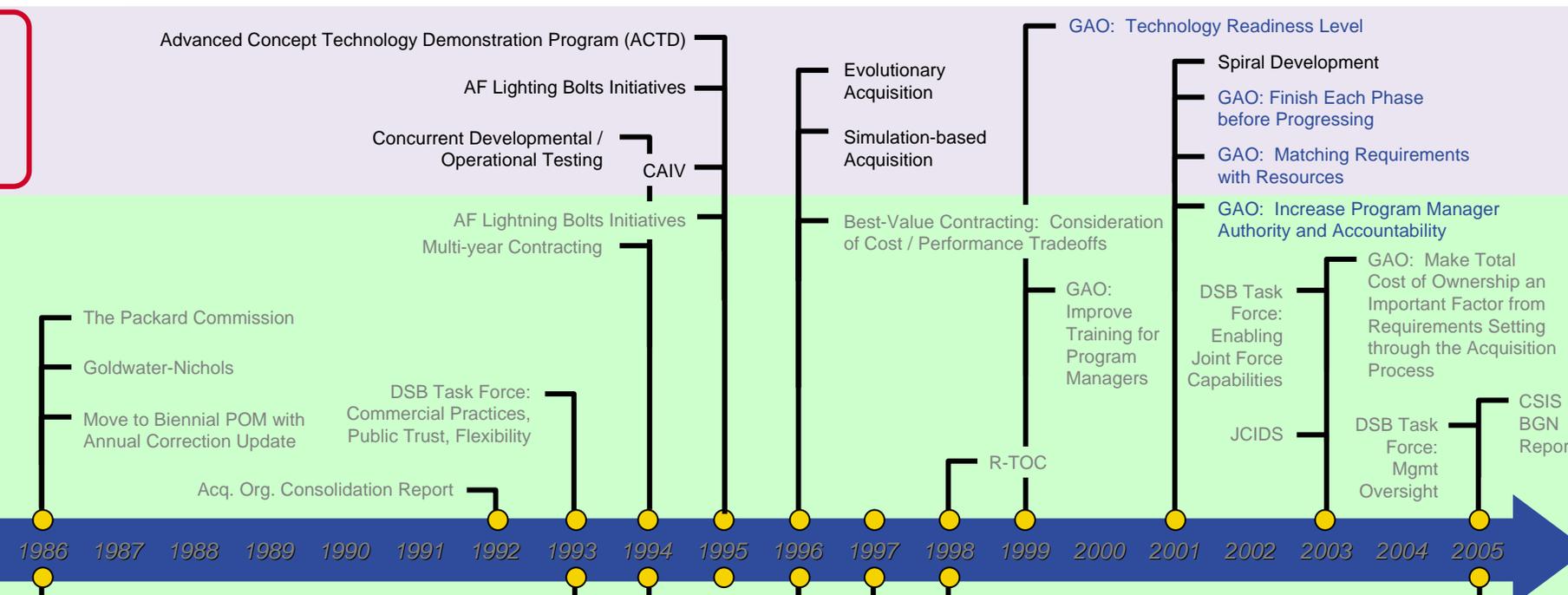
Timeline of Key Initiatives

Flexible and Responsive

Better, Faster, Cheaper

Better, Faster, Cheaper

Fraud, Waste



Flexible and Responsive

- A “Catch-22” had persisted where the Services knew that acquisition programs would last well over a decade, so they had to set high performance requirements to ensure that the system would not be obsolete when fielded. However, these requirements could only be satisfied by using immature technologies that later failed to deliver the required performance levels or delivered them very late with substantial cost overruns.
- Significant complexity and long acquisition cycles required new systems to manage the programmatic risks. Techniques used in the commercial world, such as spiral development, were adapted to DoD’s needs in an attempt to deliver current technologies and systems to the warfighter while minimizing risks associated with immaturity of technologies and other unanticipated events. These new initiatives sought to provide schedule integrity through careful evaluation of technologies and development progress to ensure the use of mature technologies and designs.



PREMISE: Transparency and effective auditing is essential to curbing excess in the acquisition system

Concept

- Effective checks and balances
- Better oversight and accountability
- Improved practices to ensure compliance and enforce ethics

Enabling Conditions for Success

- Transparency in acquisition system
- Effective oversight exercised at all levels
- Clear standards of conduct

Select Initiatives

- Packard Commission
- Acquisition Law Advisory (Section 800) Panel
- Use of past performance data
- DSB task force on Management Oversight in Acquisition Organizations (2005)

Acquisition System Tradeoffs

- Increased oversight and review slows decision making and progress, and eventual deployment of new systems
- The current set of laws, regulations, policies and procedures are so formidable in size and complexity that dealing with them is a daunting process.



PREMISE: Leveraging the commercial market and commercial solutions wherever possible can improve the acquisition system effectiveness

Concept

- Utilizing the commercial market and competition results in lower costs, more efficiency and shorter development cycles
- Emulate commercial best practices for conceiving and developing new products
- Focus on best value solutions

Enabling Conditions for Success

- Effective process to decide which requirements can be met by commercial solutions, and which are unique
- Strategy for preserving defense-oriented industrial base
- Participation in acquisition process by traditionally commercial-only suppliers

Select Initiatives

- Commercial sourcing
- Elimination of Mil Spec / Mil Standards
- Dual-use science and technology program

Acquisition System Tradeoffs

- Some commercial practices are not appropriate for DoD's unique situation; weapons systems must meet threshold requirements.
- Streamlining without careful evaluation and analysis can result in inadequate weapons systems performance



PREMISE: DoD needs to use development approaches that reduce both time and cost and mitigate risk through the ability to adapt to change

Concept

- Evaluate and test early and often to prevent trouble at the end of the program
- Take a whole-systems approach to cost assessment
- Reduce the demands of development cycle so that they are achievable in a manageable timeframe (seeking base hits instead of home run leaps in capability)

Enabling Conditions for Success

- Institutional commitment at all levels to develop and implement acquisition strategy built around risk management
- Political agreements that balance flexible response to circumstances with required oversight

Select Initiatives

- Concurrent developmental / operational testing
- CAIV
- IPPD
- Evolutionary acquisition/Spiral development

Acquisition System Tradeoffs

- Evolutionary acquisition may not work for some requirements (e.g., space satellites)
- Extensive testing and modeling increases planned expenditures
- Can make the support requirements more difficult (e.g., multiple versions to support)



Impact Categories

This study surfaced three aspects of the overall acquisition system — “structure”, “process” and/or “governance” — where a reform initiative could have an impact. We subdivided each of these as shown below, and later mapped the “impact” categories for each of the 28 chosen reform initiatives.

- **STRUCTURE** — This is the organizational structure and the legal framework within which weapon systems are acquired
 - ***DoD Organizational Structure:*** The charters of and relationships between various organizations that have some role in acquisition of weapon systems within DoD
 - ***Legislative and Regulatory Environment:*** The collection of statutes and regulations applicable to the acquisition of weapon systems
 - ***DoD-Industry Relationship:*** The rules that govern the relationship (including decision rights) between DoD and Industry on a weapon system acquisition program
 - ***Acquisition Program Management:*** The empowerment provided the program manager in acquisitions and the relationship of the program manager to other elements of DoD
 - ***Requirements Management:*** All of the events, and the sequence in which they emerge, that make up the establishment of an understandable operational need that will drive the development of capabilities
- **PROCESS** — This is the activity involved in actually acquiring weapon systems, comprising of both the policies that guide these activities as well as the specific procedures and rules for conducting the activities
 - ***Acquisition Strategy Development:*** The decisions associated with and plan of action to acquire a new capability or modernize an old capability for each phase of weapon system development
 - ***Pre-Systems Acquisition Planning:*** The activities and events associated with implementing the Acquisition Strategy starting with Concept Refinement through Technology Development (includes program management, contracting, and technical activities)
 - ***Systems Acquisition Planning:*** The activities and events associated with implementing the Acquisition Strategy starting with System Development through Production and Deployment (includes program management, contracting, and technical activities)
 - ***Job Specification, Training and Certification:*** The specifications, processes and standards used to train and certify program managers and acquisition professionals in DoD
- **GOVERNANCE** — These are the elements of the overall acquisition system that ensure the acquisition activities are being conducted by the organization in an ethical and effective manner towards common objectives
 - ***Oversight and Review:*** System of checks and balances within DoD, and between DoD, Industry and Congress to ensure that acquisition activities are being conducted to achieve overall program objectives in an ethical and compliant manner
 - ***DoD Decision Making:*** The partitioning of decision rights and transfer of specific knowledge within DoD to ensure high quality decisions are made
 - ***Organizational Responsibility, Authority and Accountability:*** The control systems that align and enforce responsibility, authority and accountability at the individual and organizational levels within DoD



Mapping of Selected Acquisition Reform Initiatives (1986–1994)

Impact Area	1986					1992	1993	1994					
	<i>Packard Commission: Creation of UnderSec Def (Acquisition)</i>	<i>Packard Commission: Army, Navy & AF should each est. UnderSec acq. Equivalent & appoint PEOs</i>	<i>Packard Commission: JRMBS decides affordability & make-buy</i>	<i>Move to Biennial POM with Alternate Year Adjustment</i>	<i>Goldwater-Nichols: Recommended greater integration of the services and joint planning</i>	<i>Acquisition Organization Consolidation Report</i>	<i>IPPD</i>	<i>Elimination of Mil Spec / Mil Std</i>	<i>Multi-Year Contracting¹</i>	<i>Use of Commercial Quality Standards (e.g., ISO 9000)¹</i>	<i>Open Systems approach</i>	<i>Concurrent Developmental / Operational Testing</i>	<i>RFP Streamlining¹</i>
DoD Organizational Structure	■ ●	■ ●	■ ●	●	■ ●	□ ●	●	●	●	●	●	●	●
Legislative and Regulatory Environment	●	●	●	■ ●	●	●	●	■ ●	■ ●	■ ●	●	●	●
DoD — Industry Relationship	●	●	●	●	●	●	■ ●	●	●	●	●	●	●
Acquisition Program Management	●	●	●	■ ●	●	●	●	●	●	●	●	●	●
Requirements Management	●	●	●	●	■ ●	□ ●	●	●	●	●	●	●	●
Acquisition Strategy Development	●	●	■ ●	■ ●	●	●	●	■ ●	■ ●	■ ●	■ ●	●	■ ●
Pre-Systems Acquisition Planning	●	●	●	●	●	●	■ ●	●	■ ●	●	●	●	●
Systems Acquisition Planning	●	●	●	●	●	●	■ ●	●	■ ●	●	●	■ ●	●
Job Specification, Training and Certification	■ ●	■ ●	●	●	●	●	●	●	●	●	●	●	●
Oversight and Review	■ ●	■ ●	●	●	●	□ ●	■ ●	●	●	●	●	●	●
DoD Decision Making	■ ●	■ ●	●	●	■ ●	□ ●	■ ●	●	●	●	●	■ ●	●
Organizational Responsibility, Authority & Accountability	■ ●	■ ●	■ ●	●	■ ●	□ ●	●	●	●	●	●	●	●

Structure ↑ ↓
Process ↑ ↓
Governance ↑ ↓

¹ Part of FASA 94 (Federal Acquisition Streamlining Act)



Mapping of Selected Acquisition Reform Initiatives (1995–present)

← 1995 → ← 1996 → ← 1997 → ← 1998 → ← 2001 → ← 2003 →

Impact Area	Initiatives															
	Advanced Concept Technology Demonstration Program (ACTD)	Use of Past Performance Data ¹	AF Lighting Bolts Initiatives	Dual-use Science and Technology Program	CAIV	Evolutionary Acquisition (5000.1)	Commercial Sourcing: FAR Part 12	Best-Value Contracting: Consideration of Cost / Performance Tradeoffs	Simulation-based acquisition	Other Transaction Authority	Alpha Contracting	R-TOC	Contractor TSPR / LSI	Spiral Development (5000.2)	JCIDS	
DoD Organizational Structure	.	.	■	■	
Legislative and Regulatory Environment	■	.	.	■	
DoD — Industry Relationship	■	.	.	■	■	■	.	■	.	.	
Acquisition Program Management	
Requirements Management	■	■	.	.	■	■	■	
Acquisition Strategy Development	■	■	■	■	■	■	■	■	■	■	■	.	■	■	.	
Pre-Systems Acquisition Planning	■	.	■	.	■	■	■	■	■	■	.	■	■	■	■	
Systems Acquisition Planning	■	■	■	■	■	.	■	■	■	■	■	
Job Specification, Training and Certification	.	.	■	
Oversight and Review	.	.	■	.	.	.	■	.	.	■	.	.	■	.	.	
DoD Decision Making	■	.	■	■	.	.	.	■	■	■	
Organizational Responsibility, Authority & Accountability	■	■	.	■	

- Not addressed
- Not Implemented
- Partially Implemented
- Fully Implemented
- Unsuccessful
- Largely unsuccessful
- Partially successful
- Largely successful
- Successful

Structure ↑ ↓ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓

Process ↑ ↓ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓

Governance ↑ ↓ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓ ↑ ↓

¹ Part of Federal Acquisition Reform Act (FARA)



Table of Contents

- Mandate from Secretary England
- Study objectives
- Outline of Monitor process
- Analysis of literature
- Characterizing the current environment
- Analysis of reform initiatives
- **Findings, Conclusions and Recommendations**
- Alternative approach – Identifying true impediments to reform
- Bibliography and Case Studies



All of the Monitor findings were identified as a result of the literature review process:

- Directly based on specific information contained in the literature
- Indirectly based on, or derived from, information gained during the literature review

Only those documents rated as a 4 or 5 in importance were used to develop findings (rating scale was 1 through 5, with 5 being highly relevant and applicable)



Process Steps

1. Perform literature review
2. Grade documents for importance and relevance
3. Identify inclusive list of potential findings from documents rated as 4 or 5.
4. Develop an initial “condensed” list of potential findings.
5. Identify the specific literature documents that refer to each of the above initial list of findings.
6. Eliminate those items that had a limited number of literature “hits” and any that focused on minor issues.



Summary of Findings

- 1. Despite many reform efforts and initiatives, and despite continuing to deliver “best in the world” capabilities to the warfighter, the acquisition system continues to under-perform relative to expectations.**
- 2. The overall acquisition system is slow & cumbersome (starting with threat assessment & requirements planning through the establishment of full operational capability).**
- 3. Effective acquisition reform requires an effective implementation plan with clear goals and metrics for success.**
- 4. Efforts to reform a system in an organization as large and complex as DoD must understand and address the root systemic causes of organizational and individual behaviors in order to be successful.**
- 5. A more disciplined and conservative management of requirements and technology risk is required.**
- 6. Lack of budget stability has a significant negative impact on program execution.**
- 7. DoD must carefully manage the quality of the acquisition workforce, from the most senior political appointee to the most junior member, through its hiring, retention and training processes.**
- 8. The changes in the defense industrial base are every bit as dramatic as the changes in the national security environment; DoD’s acquisition strategy and planning must take this into account if it is to preserve its industrial base.**



1. Despite many reform efforts and initiatives, and despite continuing to deliver “best in the world” capabilities to the warfighter, the acquisition system continues to under-perform relative to expectations.

- There continue to be frequent major cost overruns
- There continue to be frequent and significant schedule slips
- Unit production costs of new systems are substantially higher than their prior generation counterparts (the differential is substantially greater than the impact of reduced production quantities and inflation).
- O&M costs are rising as a percent of the total DoD budget; procurement accounts are being used to fund this growth.

The net effect was summed up by the GAO in its March 2005 report “Assessment of Major Weapons Programs”:

Although U.S. weapons are the best in the world, the programs to acquire them often take significantly longer and cost significantly more money than promised and often deliver fewer quantities and other capabilities than planned. It is not unusual for estimates of time and money to be off by 20 to 50 percent ... just 4 years ago, the top five weapon systems cost about \$281 billion; today, in the same base year dollars, the top five weapon systems cost about \$521 billion. If these megasystems are managed with traditional margins of error, the financial consequences can be dire, especially in light of a constrained discretionary budget.



2. The overall acquisition system is slow and cumbersome – from the identification of the need for a system until it is fielded, and the complexity is made more so by the large body of laws, regulations (FAR, DFAR etc.) policies and procedures. A major consequence is that the time to field new weapons systems does not keep up with changing threats and improving technology.

The current state of the system has been described by the Defense Science Board as “an extremely complex system requiring many inputs from many organizations with many people who can say ‘no’ but very few who can say ‘yes’ “.

One contributing factor is the existence of excess staffs within DoD resulting from a lack of clarity with respect to roles & responsibilities. This results in a longer, more costly, acquisition process.

Similar assessments were at the root of the Federal Acquisition Streamlining Act and the Federal Acquisition Reform Act. However, continuing problems with meeting schedule goals, combined with an accelerated rate of innovation in commercial technology, have exacerbated the problem. A 2000 RAND report notes:

“Our current force-modernization strategy and associated weapon system acquisition procedures were developed in a relatively stable era of known threats and supported a steady and systematic upgrading of a large force structure. In the future, the composition of potential belligerent forces and their weapons are likely to be varied, and some can be expected to appear with relatively short notice. This puts new demands on the timeliness of response by the acquisition process when called upon to deliver new kinds of systems to counter those new challenges.” (Lorell et al, 2000)



3. Effective acquisition reform requires an effective implementation plan with clear goals and metrics for success.

DoD must make its objectives explicit and create ways for decision makers to assess progress. One study focused on acquisition reform in DoD argues:

“The organization needs a vision and a plan that the workforce can understand and believe in. A plan is absolutely essential, especially when change is carried out in an environment that experiences constant changes in leadership. ... Leaders need to use the right metrics to monitor the change and ensure that the changes being implemented are having the desired effect on the organization.” (Beck et al, 1997)

There also needs to be sufficient continuity of senior leadership to ensure that implementation actually takes place.



4. Efforts to reform a system in an organization as large and complex as DoD must understand and address the root systemic causes of organizational and individual behaviors to be successful.

- The behavior of the participants must be addressed in order to achieve lasting and meaningful acquisition system reform.
- The acquisition system produces optimistic program cost estimates/budgets.
- Conscious underbid (price-to-win driven) and over-promise of programs by industry creates the potential for future overruns.
- Program Offices are driven to keep early stage programs alive; they tend to maintain an overly optimistic view of the achievability of technical, cost and schedule goals.
- Pressures to define programs within "affordability" constraints result in down-playing risks during the early part of SDD (they do not surface until later time periods)

As the GAO noted in 1992:

"The pressures of competing for the funds to launch and sustain a weapon system program create incentives for starting programs too early; over-promising performance capabilities; and understating expected costs, schedules, and risks associated with developing and producing the weapon."

GAO's 2005 report on space systems acquisition reached similar conclusions, noting:

"[DoD officials] told us that DoD starts more programs than it can afford and rarely prioritizes them for funding purposes. Such an approach has cascading effects—from creating negative behaviors associated with competing for funds, to increasing technology challenges, to creating unanticipated and disruptive funding shifts, to stretching out schedules in order to accommodate the whole portfolio of space programs. Our previous reports have found these pressures are long-standing and common to weapon acquisitions, not just space systems."



5. A more disciplined and conservative management of requirements and technology risk is required:

- The required technology is frequently not ready too support program needs. There may not enough R&D/technology projects in process.
- Technology risks are treated with too much optimism. There are pressures that drive the actions to introduce them prematurely.
- Requirements creep is a major cost and schedule driver.
- More emphasis should be placed on meeting mission performance requirements than the detailed technical specifications (e.g., increased emphasis on SOO compliance rather than meeting the detailed specifications)

“Because the requirements process has tended to focus on achieving very ambitious technical objectives, DoD program managers have often found themselves developing systems while simultaneously having to develop the technologies that will make the systems work. The F-22, for example, was heavily dependent on fly-by-wire technology, which, at the time the system began its development, was not mature. The inevitable result has been lengthy development cycles.” (Ferrara and Sylvester, Winter 2003)

- However, a review of acquisition history suggests that improved outcomes are possible:

“Establishing and limiting one’s self to a manageable set of technologies and capabilities does allow for quicker fielding of operational capability once the development work begins. It also has been demonstrated over the years that it is possible to establish new requirements which can be addressed through new technologies at the appropriate point in time.” (Scofield, 2004)



6. Lack of budget stability has a major negative impact on program execution.

While Congressional control and oversight of defense acquisition spending is a necessary part of our nation's separation of powers, the way in which Congress currently exercises those powers has a significant, negative, impact on program stability.

- Programs get "re-programmed" frequently with respect to available funding
- The increased use of multi-year funding would result in greater program stability
- Expanded use of program "baselining" (e.g., early agreement by all stakeholders) will also improve the overall acquisition process

As Reeves describes,

“Congress routinely significantly adjusts the Department of Defense budget requests, adding or changing a substantial number of line item requests. The defense acquisition process itself is overseen by 29 Congressional committees and 55 subcommittees. In 1993, the Pentagon responded to 120,000 written requests for information from Congress, 60,000 phone calls from Capitol Hill, and provided 1300 witness to 450 Congressional hearings, Norman Augustine, CEO of Lockheed- Martin, notes, ‘the average R&D program is voted on by Congress alone an average of 18 times a year in its 8-year life – a total of 144 opportunities to change something.’” (Reeves, 1996)



7. DoD must carefully manage the quality of the acquisition workforce, from the most senior political appointee to the most junior member, through its hiring, retention and training processes.

- Vacancies and short tenure of DoD civilian executives are significant impediments to an effective acquisition process.
- Successful implementation of new acquisition reform initiatives requires a more robust planning and training process (a consequence is that staffs exercise increased influence).
- Improvements to the effectiveness of the acquisition process is dependent on DoD's ability to acquire and retain talented people for longer periods of time.

RAND argues in its most recent study of acquisition reform:

Many of the most experienced people in the acquisition workforce both in the Army and across DoD, will become eligible for their federal retirement in the next several years. When those experienced people begin to leave, many of their junior colleagues, very few of whom will have been in the workforce long enough to have their own first-hand experience of how acquisition worked before AR in the 1990s, will find it increasingly difficult to obtain wise counsel on where, when, and how to apply (or not apply) AR methods in their programs. As a result, the educational challenges associated with AR are not only very much still present today, but they will increase in the future, as the acquisition system loses significant portions of its experienced human capital and the “corporate memory” that goes with it. (Hanks et al, 2005)



8. The changes in the defense industrial base are every bit as dramatic as the changes in the security environment and DoD's acquisition strategy and planning must take this into account if it is to preserve its industrial base:

- The number of competitors in the DoD industrial base has declined substantially; this reduces the competitive forces and options available for future programs
- DoD policies and procedures impede access to emerging good commercial innovations and technology; (becoming a DoD supplier is a complex, long and costly process)

In a survey of the regulatory cost premium associated with defense contracting, Coopers & Lybrand conclude:

“it is clear that the DoD regulatory cost premium is considerable and should be reduced to the extent possible while maintaining adequate accountability of public expenditures ... this transformation must begin soon to ensure that the industrial base remains viable and responsive to the nation's national security requirements.”
(Coopers & Lybrand, 1994)



Basis for Conclusions and Recommendations

The conclusions and recommendations were based on the findings coupled with the collective insights gained as a result of the review and study of the literature past 20 years.



Conclusions

The following high level conclusions were based on an evaluation of the findings as a whole:

- Most past reforms have focused on process changes; relatively little attention has been given to evaluating DoD as an institution to determine what motivates people and organizations to behave as they do versus what past reformers might have intended. It is suggested that rationalizing/solving the institutional issues could yield vastly more dividends than any set of individual specific reform recommendations.
- The overall acquisition system is highly inter-related (e.g., effective reforms involve the “Big A” --- Requirements, Acquisition and Budgeting).
 - Focusing on problems within one leg, in isolation, often results in unintended consequences in one or both of the other legs.
 - The executives that operate within each leg of the Big “A” process may not be aware of, or concerned about, the impact they have on the other legs.
- The issues found in the literature recur over and over in past reform panel reports; this suggests that:
 - There may not be a sufficiently robust management audit process that tracks for compliance, unintended consequences, or underlying impediments.
 - A way must be found to bring senior civilian leadership on board more quickly, and retain them longer, in order to sustain the implementation process..



Our evaluation of past history, as reflected in the literature review, suggests that individually focused recommendations are unlikely to be very highly successful without an examination of underlying impediments, such as:

- The strong tendency of individuals and organizations to behave in a manner consistent with their perceived best interests rather than other mandates.
- Unintended consequences on the other “Big A” processes.
- The lack of continuous presence and commitment of senior civilian leadership to sustain the implementation process.

Nevertheless, there is evidence that some actions are worth considering by the DAPA Team along with other sources of information (e.g., subject matter expert testimony, interviews, etc.).

The following charts provide specific recommendations with respect to specific problems that were identified in the literature review and analysis. Each problem statement is accompanied by one or more recommendations; each problem statement also references one or more of the eight findings, defined earlier, to which it is linked.



Specific Recommendations

Problem Statement: The use of immature technologies creates cost overruns and schedule slips

Referenced Findings: # 5

Recommendations:

1. Steps must be taken to eliminate the reliance of immature technologies at the start of SDD:
 - a. Substantially increase the science and technology budget and institute a more robust set of technology development programs that include all key subsystems applicable all major weapons systems.
 - b. Change current weighted guidelines for fee determination to allow for a substantial increase in the fee applicable to technology development. Also change the fee applicable to IRAD to provide further incentives to contractors.

Discussion:

This issue comes up repeatedly; logic would suggest that it's easily fixed, yet it continues to come up!

This is one of the situations that suggests that there are institutional behavior issues that cause this problem (and others) to persist.

Rationale To Support recommendations:

Recommendation #1 could lead to multiple improvements:

- Create a technology capability incubator available to specific programs to access for ready solutions when a requirement is established for a new/replacement program.
- The pursuit of technology development outside of a program environment will cost a lot less than the current approach (after a few years of this start-up process).
- One indirect outcome of such a program may be to increase the technical talent pool within both industry and the USG. This might allow USG to reverse the decreasing U.S. presence in worldwide emerging technologies.

Recommendation #2 represents one element of a larger need to change the basis on which industry earns fee.

- The current approach for fee determination is largely centered on a risk formula tied to cost; since cost-plus technology contracts have a low financial risk they currently allow only minimal fees. Effectively, DoD asks industry to apply their most talented people to pursue work that has negligible financial returns. Given that the U.S. defense strategy largely depends on our technical superiority, we should provide substantial incentives for superior technical advancements.
- Award fee contracts offer powerful incentives on fee for excellent performance, but have not been very effective. The award criteria used in the past need to be evaluated to determine if they provide the effective behavioral incentives.



Specific Recommendations

Problem Statement: Reduced industry competitors for key mission platforms

Referenced Findings: # 8

Recommendations:

1. Reverse the current focus on single multi-mission weapons system platforms; return to a more simple mission requirement for individual platforms (that would result in added new programs).

Discussion:

There are two primary root causes for the reduced level of competition:

- Industry-driven consolidation
- Lack of sufficient new programs to keep multiple prime contractors in business

The industry-driven consolidation cannot easily be reversed and would not cure the lack of programs.

In part, this results from the adoption of a policy that seeks very broad capabilities to be compressed into a single multi-mission platform. The rationale for this policy appears to be that it will be less expensive to field and operate a single system rather than multiple systems.

Rationale To Support recommendations:

- The current paucity of competitors represents an unintended consequence. The benefits of maintaining effective competition has been proven over time.
- Focusing on a more narrow set of missions, and associated technical requirements should reduce the complexity of the SDD phase; this would reduce the development cost and schedule and lead to an earlier production at lower unit cost.
- Maintaining a more robust industrial base may be a sufficiently worthy end state that overcomes the value of the cost differential.



Specific Recommendations

Problem Statement:

Policy of spiral development has not been fully implemented; continued establishment of program objectives that achieve the ultimate weapons systems capabilities in the first production block leads to increased cost and schedule.

Referenced Findings: # 1, 5

Recommendations:

1. Formally re-emphasize the policy that requires the use of spiral development as the normal approach for award of SDD contracts (rather than the exception);
2. Establish a more robust internal audit process so that there is a higher degree of compliance with established acquisition policy.

Discussion:

It appears that spiral development was not, but should have been applied to the F-22 and F-35 program.

Rationale To Support recommendations:

- DoD created this policy to directly address the need for shorter development cycles directly.
- Spiral development allows the program to proceed quickly even if it is later determined that some added performance should be pursued at a later date. This should enhance the program office's ability to set initial performance requirements to be consistent with fully developed/mature technology
- The F-16 is an example of how successful spiral development works and that it can lead to an early introduction of initial capabilities phased, while allowing for future increasingly greater level of performance.



Specific Recommendations

Problem Statement: The acquisition system is anchored to a vast, complex, set of laws, regulations, policies and procedures that is difficult to administer and leads to a substantial loss of overall productivity and effectiveness

Referenced Findings: # 2

Recommendations:

1. Establish a working group under USD/AT&L to recommend revised legislation, regulations and policies that reduce the volume and complexity of required dogma while improving the effective oversight and insight required within DoD and by Congress. The initial/summary findings, conclusions and recommendations should be provided to SecDef and Congress within 6 months. The scope of these effort should include changes that improve program stability.

Discussion:

Senior leadership in DoD and Congress often urge the acquisition workforce to pursue better, faster and less costly ways of doing things. However, these same people generally come to the conclusion that workforce performance is more likely to be judged by their adherence to “the rules” that specify what and how things are to be done:

- Thousands of pages of FAR and similar regulations.
- An equivalent volume of DoD procedures that what and how they must do things.
- A vast set of specific laws passed by congress.

In the end, most people in the workforce conclude that:

- Their careers are better served by following the written rules (even when vague or illogical) rather than pursuing innovative ideas (risk averse).
- If they do not understand written laws/regulations/policy/procedures, their best course of action is to stay within what they consider to be the known safe boundaries of behavior (e.g., take no action, pass it on to higher levels, or disapprove anything that they are not certain about)

Rationale To Support recommendations:

- The Packard commission recommended that Congress consolidate current acquisition-related legislation into a new single set of rules.
- The 1992 Acquisition Law Advisory Panel (Streamlining Defense Acquisition Laws) published a set of chapters comprising approximately 1800 pages that describe the complexity of the system and made numerous recommendations to eliminate or change the laws and regulations.
- Many of the instances of “abuse” that tend to lead to the perceived need for added “rules” can be traced to senior management failures to properly “supervise” their employees. One of the root causes is vacant positions and the relatively short tenure of these civilian executives.



Specific Recommendations

Problem Statement: The overall acquisition system is cumbersome and complex; there are too many steps, too many people and it takes too long.

Referenced Findings: # 2

Recommendations:

1. Establish a permanent continuous process improvement program (PIP) that is initially focused on identifying the high level process decision and workflow of the entire acquisition process.
2. Charter a broad-based group of senior DoD management to transform the decision and work flow process to reduce the number of steps, the number of people involved, and the amount of time required to perform all of the assigned acquisition responsibilities. This task would include the re-evaluation of roles and responsibilities for all entities within DoD that impact the acquisition process.
3. Establish a longer term program that evaluates and improves the individual processes used within DoD on a continuous cyclical basis.

Discussion:

- There are currently no management tools in place to measure the effectiveness of the acquisition process.
- We can look to the approaches taken by industry “world-class” companies. All of these companies use some form of “continuous process improvement” to achieve and maintain a state of “best industry practices”.
- One common tool (within the overall process) that leads to process improvements is to simplify them. This often involves reducing the number of steps and the number of people that are involved. The identification of potential simplifications often requires the creation of a process flow diagram that depicts what happens in the current process. This becomes the basis for an evaluation to determine the steps that can be changed or eliminated to create a shorter simpler approach.
- In order to effectively eliminate people being involved in a process, you often need to change the charter (roles and responsibilities) of the organization’s.
- To achieve the best results, this process should also include the interfaces between DoD and Congress and OMB.

Rationale To Support recommendations:

- Process improvement programs have been used effectively by industry for many years.
- The approaches involved apply to large organizations as well as small ones.



Specific Recommendations

Problem Statement: Lack of sufficient program stability

Referenced Findings: # 1, 5, 6

Recommendations:

1. Establish a formal specifically defined program validation process (e.g., sometimes called “baselining”) that gains concurrence among all stakeholders of technical, schedule and funding requirements, prior to entering SDD; this validation process should result in obtaining full funding.

Discussion:

Program instability is often cited as a significant problem in the acquisition system that impacts the ability of many programs to achieve their goals. The above validation (e.g., “baselining”) process would require an additional review of all important aspects of the program (technical, schedule and cost) requirements.

- The technical objectives need to be set correctly at the start of SDD and maintained without change unless there are changes in the threat scenario. The technical objectives must not require the use of unproven technologies.
- The estimated cost need to be established when there is sufficient knowledge of the requirements to be able to predict costs based on a reasonable confidence level; these costs should be validated by CAIG. The estimated costs must include appropriate contingencies based on a risk assessment.
- The funding should be consistent with the above cost estimate and cover the entire SDD and Production phases of the program. This funding pool must be immune to reprogramming requirements.
- The key DoD and industry executives must be “locked-in” for a sufficient time period (usually at least three to four years).

Rationale To Support recommendations:

- Program instability can usually be traced to some shortfall in the planning and development process prior to the authorization of SDD; the cure is to establish a more formal validation process that must be completed prior to authorization of SDD.



Specific Recommendations

Problem Statement: There is a management shortfall within DoD; it has a number of dimensions that includes excessive senior civilian management position vacancies and insufficient in-job tenure by senior military officers.

Referenced Findings: # 4 & 7

Recommendations:

1. In conjunction with Congress, as/where required, affect greater continuity and accountability of civilian executive; reduce vacancies and extend their tenure.
2. Re-align the career path requirements for senior officers to permit their retention in senior acquisition roles without damaging their career potential growth.
 - a. Provide greater flexibility to retain key executives in specific assignments based on the best interests of the program and overall USG.
 - b. Ensure that all key position are filled with personnel who have the required degree of expertise.
 - c. Ensure that personnel filling key acquisitions positions are well trained to give them the tools required to be effective.

Discussion:

1. The existence of substantial civilian executive vacancies has become a serious impediment to management continuity and accountability.
2. With respect the military personnel industry uses a different set of policies and practices in the alignment of individual's personal goals with that of the organization. :
 - a. In the early stages of a career, personnel will have to make career decisions so that they move through different functional organizations in order to acquire the expertise required to achieve their long term goals.
 - b. Promotions and compensation increases can be achieved with or without making an organizational change. Time in position is partially dependent on what's best for the employee and what's best for the company.
 - c. Executive level movements in industry seldom result in the assignment of an executive in a position where they have minimal established capabilities.
 - d. DoD appears to have rules for "optimum career progression" that result in a short term assignments and relatively unprepared people occupying key roles.

Rationale To Support recommendations:

- It is illogical to assume that excellent acquisition performance can be achieved without the continued presence of seasoned, trained and qualified management.



Specific Recommendations

Problem Statement:

1. There continue to be frequent major cost overruns
2. There continue to be frequent and significant schedule slips
3. The acquisition system produces optimistic program cost estimates/budgets
4. Requirements creep is a major cost and schedule driver

Referenced Findings: # 1, 4, 5 & 6

Recommendations:

1. The solicitation, proposal preparation, and proposal evaluation process should be changed to improve the realism of proposals; a few specific examples are as follows:
 - a. There need to be formal DoD/Industry review of the KPPs and the detailed specifications to remove any ambiguities and determine if all stated requirements are necessary to achieve the operational objectives.
 - b. The Section M evaluation criteria should be changed to substantially decrease the weighting of cost.
 - c. Cost estimates should reflect a 80%/20% confidence level.
 - d. There should be a formal DoD/Industry review of the inherent technology required to meet the technical requirements. Failure of the contractor to demonstrate full maturity must result in a determination of the contractor being “unawardable”.
 - e. The criteria of past performance should be redefined to require **specifically relevant** past experience.

Discussion:

1. The best approaches to cure the incidence of bad consequences is to attack them at the earliest time in the process.
2. While the proposed recommendations represent the last practical time to attack these issues, nevertheless, adding realism to the solicitation, proposal development, and proposal evaluation process can provide some improvement.

Rationale To Support Recommendations:

- The current procedures/processes used have resulted in contract awards that were doomed to failure from the beginning of SDD.
- In some cases the current proposal evaluation process has resulted in the award to the less qualified contractor.



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- Bibliography and Case Studies



The Need to Look Further

Reform breakthrough has been persistently elusive

The source of our inability to effect meaningful, enduring change is likely a systemic, underlying problem

- The defense acquisition system is perhaps the world's largest and most complex "business" enterprise, ranging from the identification of needs, definition of requirements, the development of new systems, and the planning and funding of those efforts.
- As has been demonstrated by the literature review, the topic of acquisition reform has been addressed seriously and nearly continuously for at least the past two decades, including 6 presidential and congressional commissions mandated in the last 25 years.
- Many of the observations and concerns raised today are similar to those addressed by previous panels: while our system provides the US military with the best defense capability in the world, the system is too slow, expensive, inefficient and cumbersome.
- Despite frequent reform attempts, each resulting in limited improvement, the overall performance of the acquisition system has not improved significantly over the last 20 years.
- The current reward structure is perceived by organizations and individuals as being at odds with policy guidance. Thus, the pattern of behaviors that currently characterize the acquisition system may be a much greater influential on outcomes than any single initiative, set of processes or regulations.



Identifying the True Impediments to Reform will require a New Approach

Defining a desired outcome creates a path to break the logjam

Navigating the path successfully requires the right system of behaviors

- System-level observations and findings from the current study indicates that the majority of prior reform efforts have largely addressed isolated issues and/or were focused on process, structural or regulatory-based solutions
- Furthermore, there are no commonly accepted metrics for the performance of the acquisition system to which DoD can manage
- Analytically, breaking the logjam may require that DoD work backwards, or reverse engineer a desired end state, and identify the pattern of behaviors that must exist for the acquisition system to achieve specific measurable desired outcomes that reflect “reform success”
- The highly interdependent acquisition processes, conducted by numerous organizations, with multiple interfaces over the long-cycle of weapon systems development, obscures the identification of the true impediments to reform
- Carefully analyzing the structure of behaviors in the acquisition system today, and the pattern of behaviors necessary to achieve a desired outcome, will allow DoD to diagnose the true underlying impediments, and also indicate a path to a genuine solution
- Only then can DoD begin to understand what organizational strategy (structure, governance, processes, decision rights, competencies and knowledge systems) will bring about the desired change



Systems Perspective on Acquisition Reform leads us to a New Approach

An analytical foundation is required to reform the acquisition system with predictable and lasting outcomes.

PRIOR STUDY APPROACHES

Delphic Approach

- Intuitive and inductive reasoning as to root causes of issues and challenges of acquisition system
- Based on in-depth interviews and panel discussions with experts across the stakeholders
- Recommendations typically address symptoms instead of the underlying structure of behaviors
- Typically used by think tanks such as RAND, CSIS, et. al.

Comparative Approach

- Assess performance on quantitative metrics (e.g., cost growth and schedule delays) and formulate root cause hypotheses based on comparison to other standards
- Hypotheses are rarely tested with fidelity
- Typically used by oversight and audit organizations such as GAO, CBO, et. al.

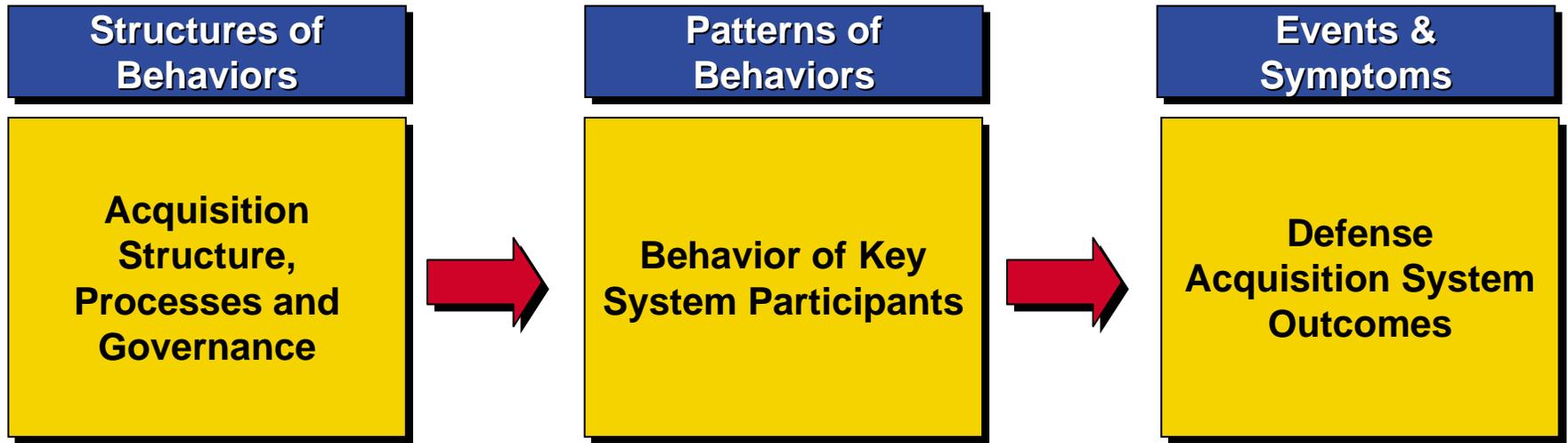
NEW APPROACH

- Analytical Systems Approach and Framework to define and reverse engineer a desired end-state based on discipline of systems dynamics
- Maps underlying structure of behaviors as causal relationships and patterns
- Develops insight into levers needed to effect change and manage uncertainties
- Allows DoD to test hypotheses, predict outcomes of actions, and identify unintended consequences and barriers to adoption
- Recommendations address the root causes of poor performance and barriers to change, enabling DoD to take actions for enduring and meaningful change
- Provides the analytical foundation for designing and implementing a comprehensive organizational strategy for the defense acquisition system



Diagnosing Impediments in the Acquisition System

Diagnosing the systemic causes of events and symptoms requires working backwards to causative factors and relationships.



Example

- Competitive dynamics and internal DoD advocacies result in inflexible fixed price development contract with McDonnell Douglas (KTR)
- Congressional interests stretch out funding, creating a four year gap between program award and optimum funding rate
- A-12 program cancellation impairs KTR's financial health

- McDonnell Douglas is consistently behind schedule and over budget
- Congress significantly cuts production volume driving deeper wedge between KTR and DoD

- C-17 program runs significantly over budget: total program cost of first 40 aircraft is estimated to be in excess of \$500M* each

Source: 'The Phoenix Rises' Acquisition Review Quarterly, Fall 1997
Note: *A concerted cost reduction drive by DoD resulted in the 'fly-away cost' of the aircraft being reduced to \$172M



System Dynamics is a recognized and validated business analysis tool for solving complex problems characterized by many interrelated variables and relationships

History & Objectives

- Based on the fundamentals of computer modeling; in the early 1960s Professor Jay Forrester of MIT began to posit that complex problems had many interrelated, non-linear relationships among variables – far more than any human mind could interpret effectively
- By breaking down a complex system and examining the relationships between variables -- both qualitative and quantitative -- insights about changing behaviors to arrive at an improved outcome could be identified
- Today, System Dynamics is used in many forms – from sophisticated computer modeling to schematic maps -- to analyze complex systems and pinpoint where behaviors can best be modified to improve the success of or correct imbalances in a system
- System Dynamics is a combination of mathematical modeling and systems engineering, often with organizational and other behavioral sciences

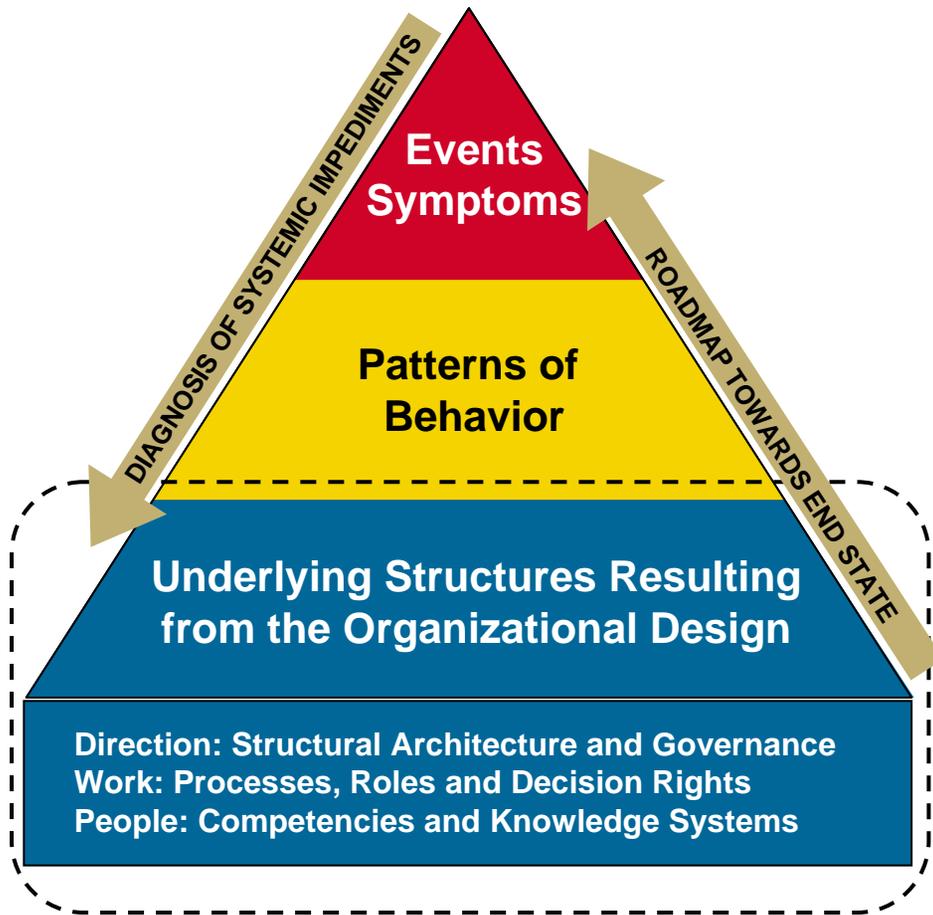
Applications

- System Dynamics is well suited to understand complex systems that have many interrelated variables, ranging from natural systems such as the environment, sociological systems, and managerial systems, in both the public and private sectors
- A System Dynamics approach helps pinpoint the *unintended consequences* of behaviors and actions in systems, and therefore identify a means to influence the behavior or action to a more desirable outcome
- Examples of System Dynamics applications are varied and include: flight simulation, shipbuilding industry economics, environmental damage, business economics, public health modeling, national economies, public sector policies, government policies and organizations
- The UK Ministry of Defense has recently commissioned a systems dynamic assessment of its procurement system



Systems Dynamics Methodology

Looks beyond isolated events and their causes; starts to look at a problem as a system made up of interacting parts within the framework of organizational design



	Description	Weapon Acquisition System Example
Events/ Symptoms	Observation of a variable's change: a problem or event i.e. reduction in revenues in year ... caused by another single variable i.e. reduction in sales-force effectiveness	Irrelevant programs continue to be funded long after they should be terminated Many programs exceed initial cost baselines by nearly 50% and experience schedule delays of 20%
Patterns of Behavior	Investigate the behavior over time of more than one variable... i.e. price increases, timelines continually lengthen, etc.	Advocacies make cancelling any program difficult and increases the cost of programs over time Industry 'must-win' mentality drives excessive optimism through system
Structure of Behavior	Make explicit the underlying system structures that cause the behaviors and symptoms	Competing and inconsistent priorities for funding amongst participants and lack of incentives/disincentives for decision-making towards common objectives
Design Elements of Organizational Strategy		

* Note: often referred to as Causal Loop Diagrams or 'Systems Thinking'



The Utility of Systems Dynamics Maps

1

Graphic representations
...

2

... of exact causal relationships ...

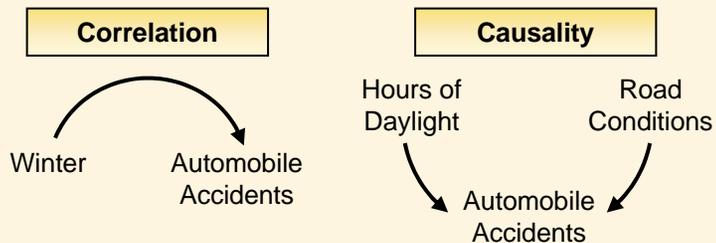
3

... between all relevant factors
...

4

... that drive outcomes

Distinction between causality and correlation

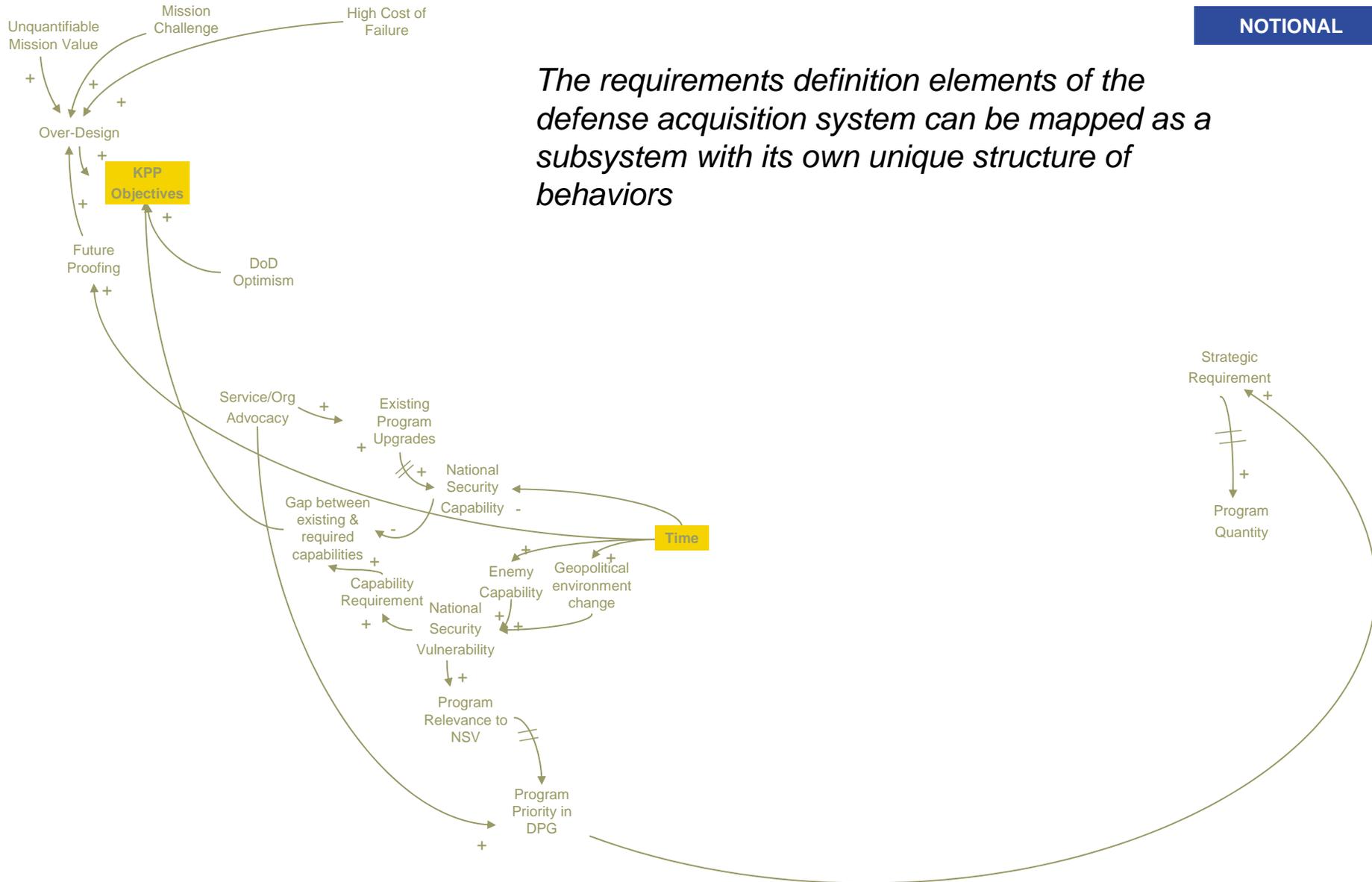


The acquisition system includes **political pressures, resource limitations, behavioral, timing** and other variables



Defense Acquisition: Systems Dynamics Level 1: DoD Requirements Definition

NOTIONAL

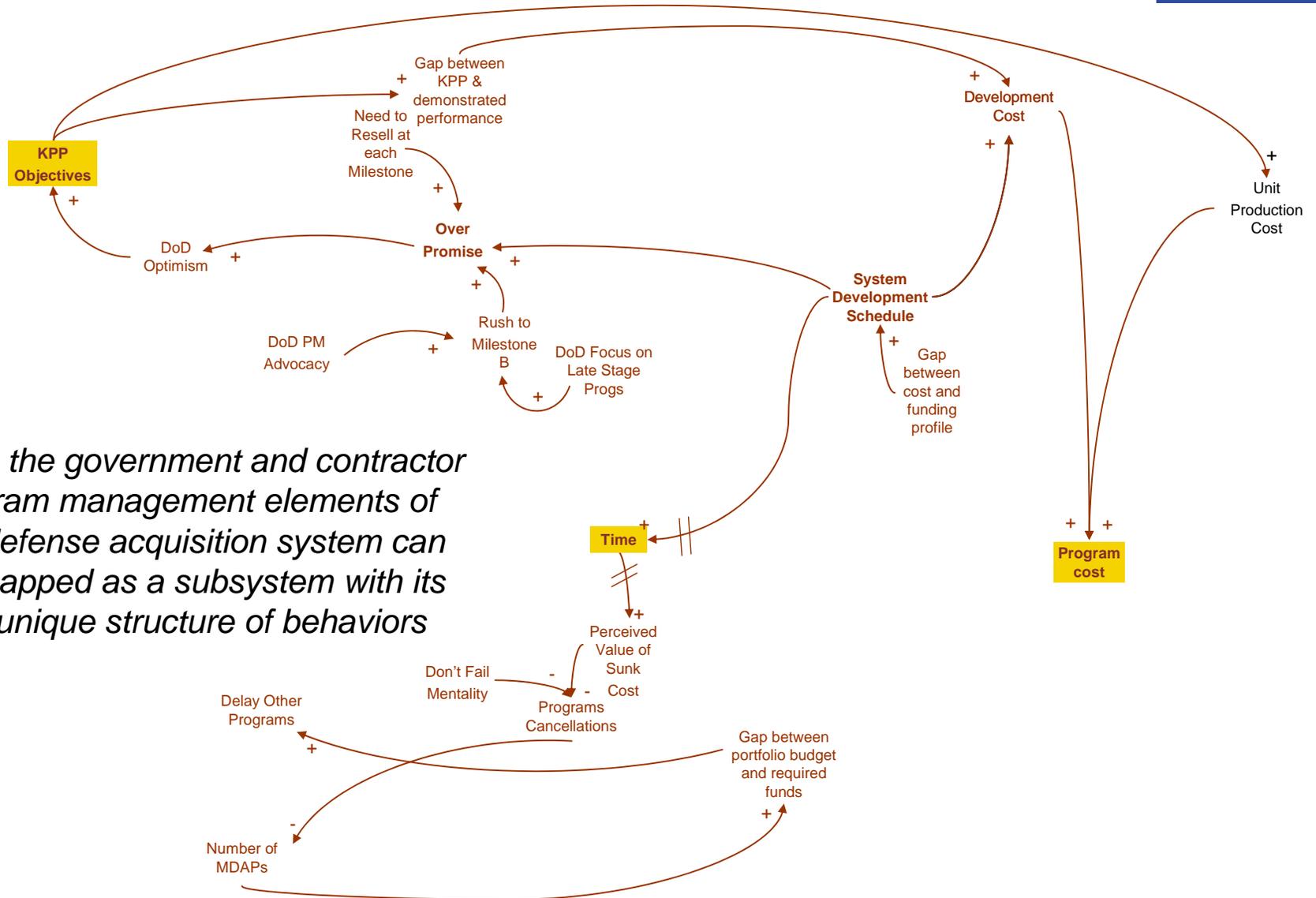


The requirements definition elements of the defense acquisition system can be mapped as a subsystem with its own unique structure of behaviors



Defense Acquisition: Systems Dynamics Level 1: Program Management

NOTIONAL

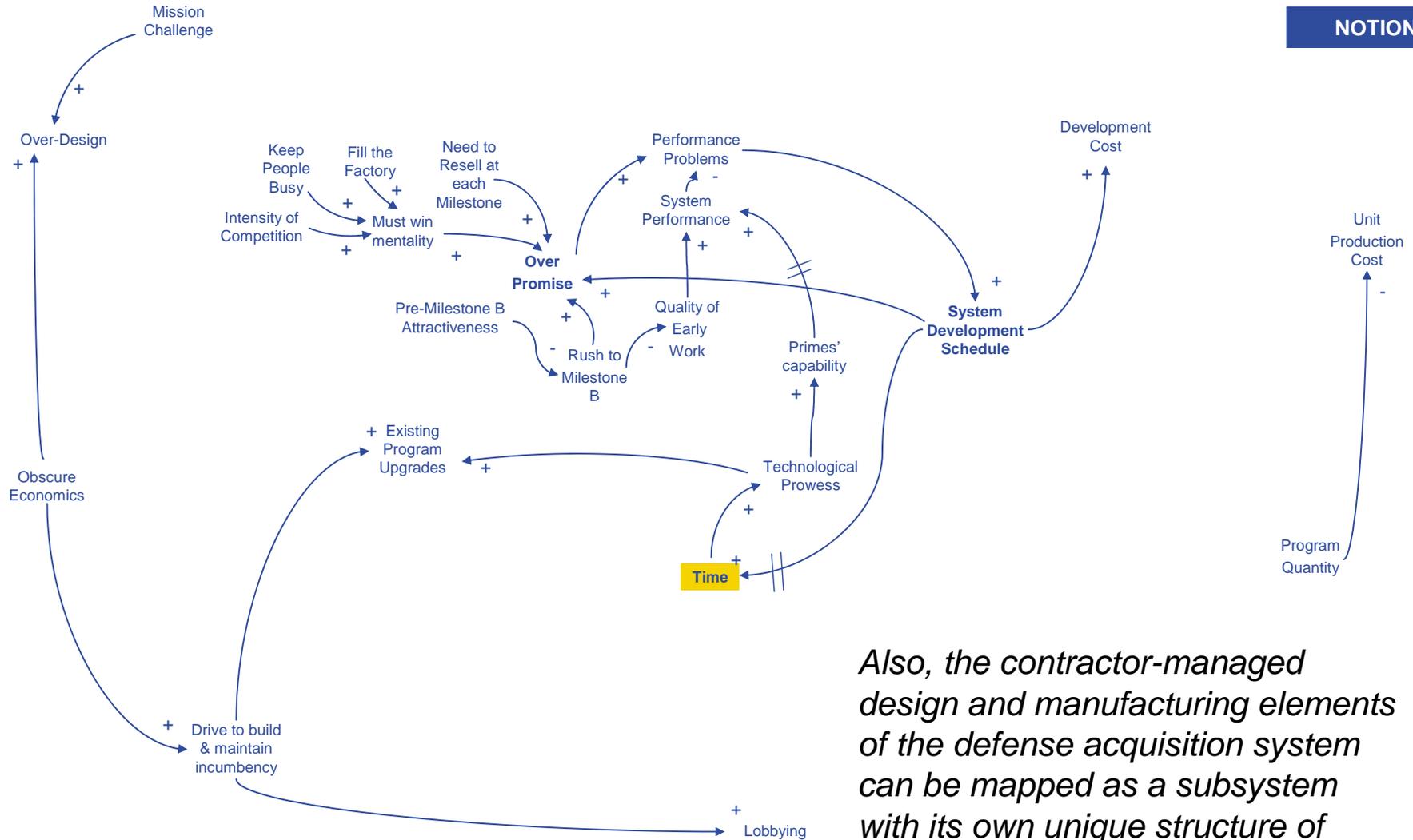


Also, the government and contractor program management elements of the defense acquisition system can be mapped as a subsystem with its own unique structure of behaviors



Defense Acquisition: Systems Dynamics Level 1: Design and Manufacture

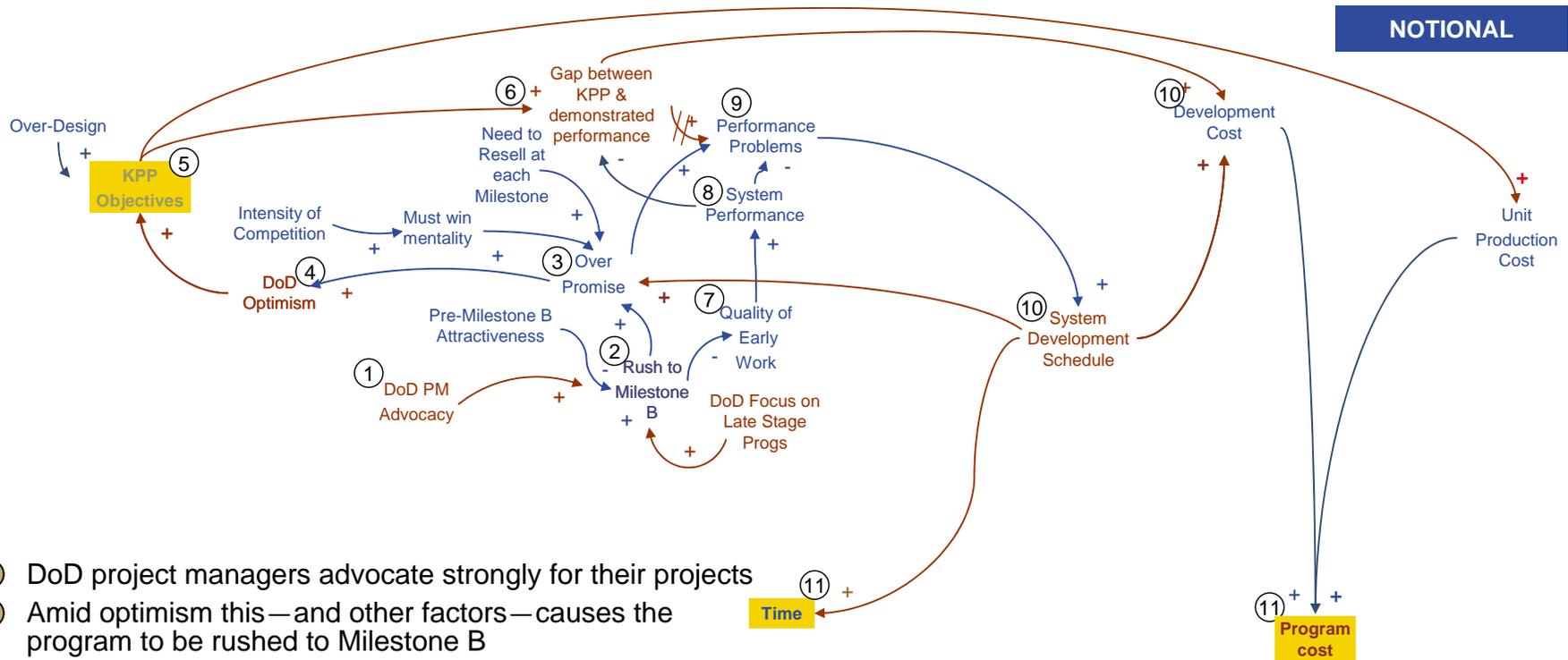
NOTIONAL



Also, the contractor-managed design and manufacturing elements of the defense acquisition system can be mapped as a subsystem with its own unique structure of behaviors



Systems Dynamics can help explain the “Conspiracy of Hope” in today’s Acquisition Environment



- ① DoD project managers advocate strongly for their projects
- ② Amid optimism this—and other factors—causes the program to be rushed to Milestone B
- ③ KTRs over-promise to DoD, including the use of immature technologies, driven by the need to push the program forward
- ④ In turn, this generates optimism within DoD about the program
- ⑤ Consequently, KPPs are set or kept at unrealistic levels
- ⑥ This increases the gap between KPPs and demonstrated performance
- ⑦ The drive to push the program forward, especially with the use of immature technology, ignores issues when they can be best addressed (early) and leads to cost, performance and schedule impacts when they are harder to address (at the back end)

- ⑧ This impacts system performance
- ⑨ This results in cost and schedule problems in the KTR’s system
- ⑩ The KTR spends development monies to solve the problems and the system development schedule gets stretched out, further increasing development costs
- ⑪ This results in higher program costs and schedule overruns

- Requirement Definition
- Program Management
- Design and Manufacturing
- Funding



The Role of Systems Dynamics in the Roadmap

Systems Dynamics should play a key role in the development of DoD's roadmap for acquisition reform

Allows us to Understand Existing Behaviors

- Systems Dynamics can help explain the current characterizations of failure that are commonly observed in the system today
- Furthermore, it sheds light on why many of the acquisition reform initiatives of the past twenty years, while diligently pursued, have not resulted in meaningful and lasting improvements

Allows us to Identify Levers and Constraints

- Systems Dynamics provides a robust analytical foundation identifying levers that can be activated to effect meaningful and enduring change
 - Intrinsic levers such as control systems (e.g., performance measurement and incentives)
 - Self-imposed rules through policy and directives (e.g., tenure in key program positions)
 - Exogenous constraints through legislation that bound the system's behavior (e.g., maximum length of a development phase)

And Design Successful Reform Initiatives

- Systems Dynamics will allow DoD to test the potential consequences, both intended and unintended of specific reform initiatives
- This provides DoD with the capability to develop an organizational strategy, formulate policy initiatives, and recommend needed legislation to achieve successful acquisition reform.

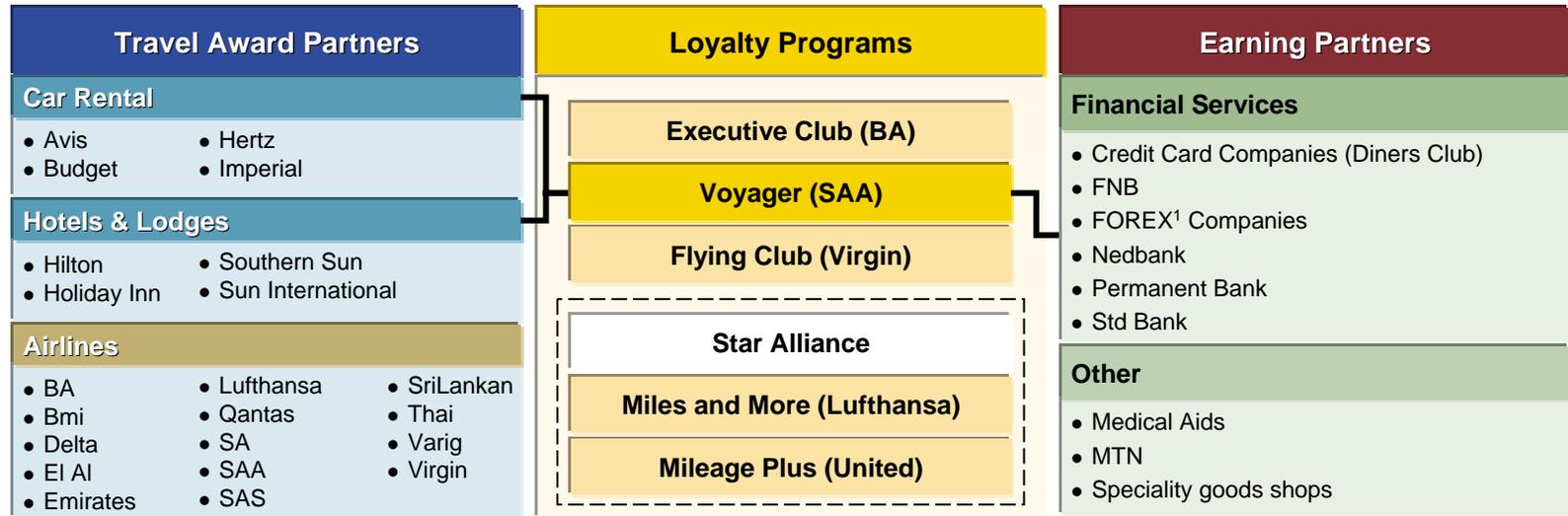


Airline Frequent Flyer Program



Airline loyalty programs have complex relationships involving multiple partners with different roles and benefits

How should airlines optimize their frequent flyer programs to provide the maximum benefit over the long term, and how should competitive and cooperative dynamics be taken into account?



	Travel Partners	Loyalty Program	Earning Partners
Competitive Dynamics	<ul style="list-style-type: none"> Competition for customers amongst services providers of same service (airline to airline) Synergies across service providers of complementary services (airline, car and hotel) 	Competition as 'miles currency consolidators' for: <ul style="list-style-type: none"> Admin time Wallet space Reward attractiveness Attainability 	Competing for frequent use of service as opposed to attracting new customers
Participating Benefit to partner	<ul style="list-style-type: none"> New customers Frequent use of services by same repeat customers 	Broaden of membership base through participation in other airline alliances	Frequent use of service by existing customers (e.g. increased use of credit card)
Participating Benefit to customer	<ul style="list-style-type: none"> Discounted tickets Upgrades Free tickets 	Accumulation of earnings across multiple service providers	<ul style="list-style-type: none"> Incremental earning of miles which are not redeemable from the earning partner but from travel partners Additional miles earning partners

¹ Foreign Exchange

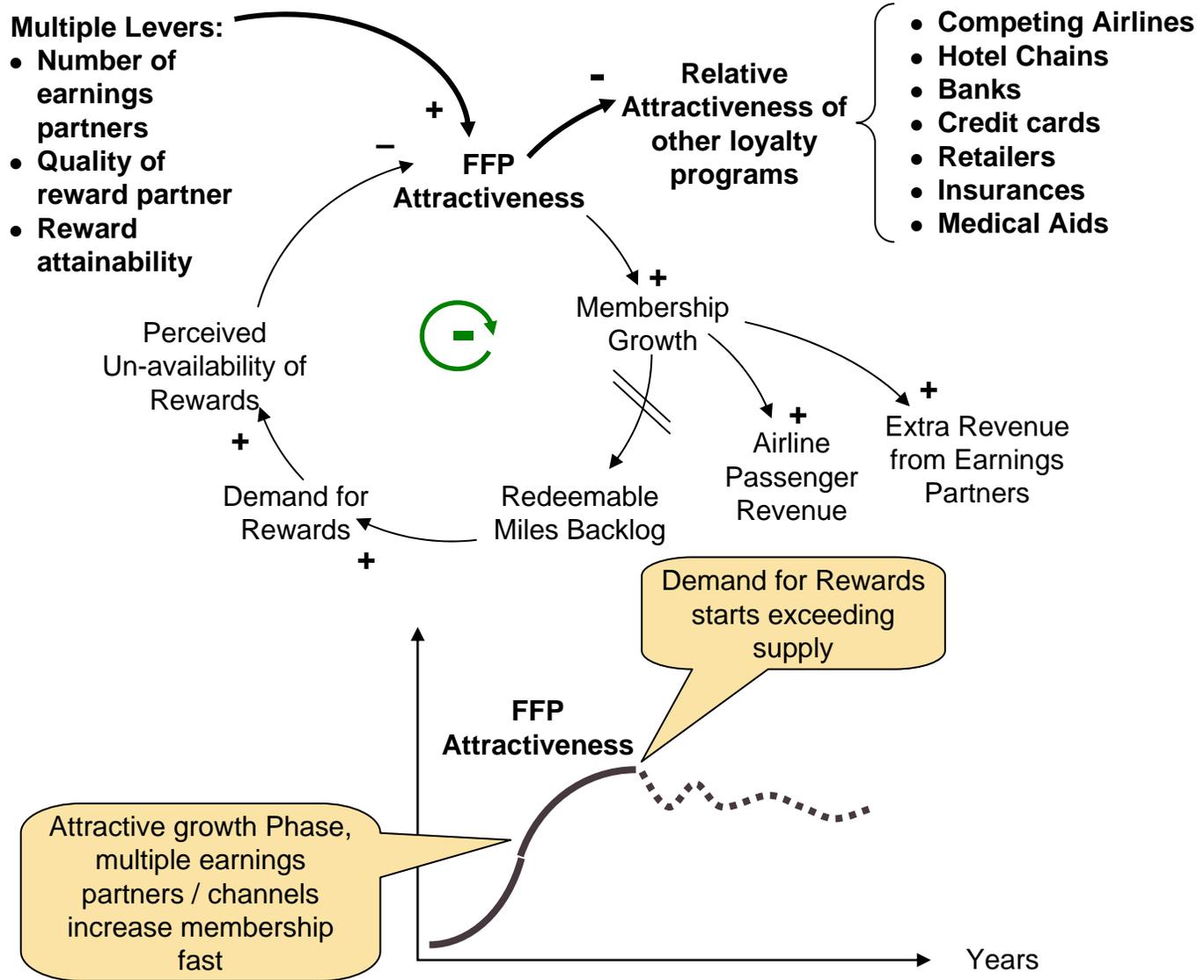


An Example of a Systems Dynamics Map: Growing a FFP against other available loyalty programs seems attractive

- In the initial growth phase of a frequent flyer program (FFP) the attractiveness can easily be enhanced through multiple reward and earnings partners making it more attractive than others available to consumers
- Membership will grow and contribute to the airlines revenue through loyalty and earnings partner contribution
- Over time however the growing membership base will accumulate redeemable miles towards awards
- At some point in time demand for miles will outstrip limited supply of free seats / rewards
- The perceived un-availability of rewards will in turn reduce the FFP attractiveness

Multiple Levers:

- Number of earnings partners
- Quality of reward partner
- Reward attainability

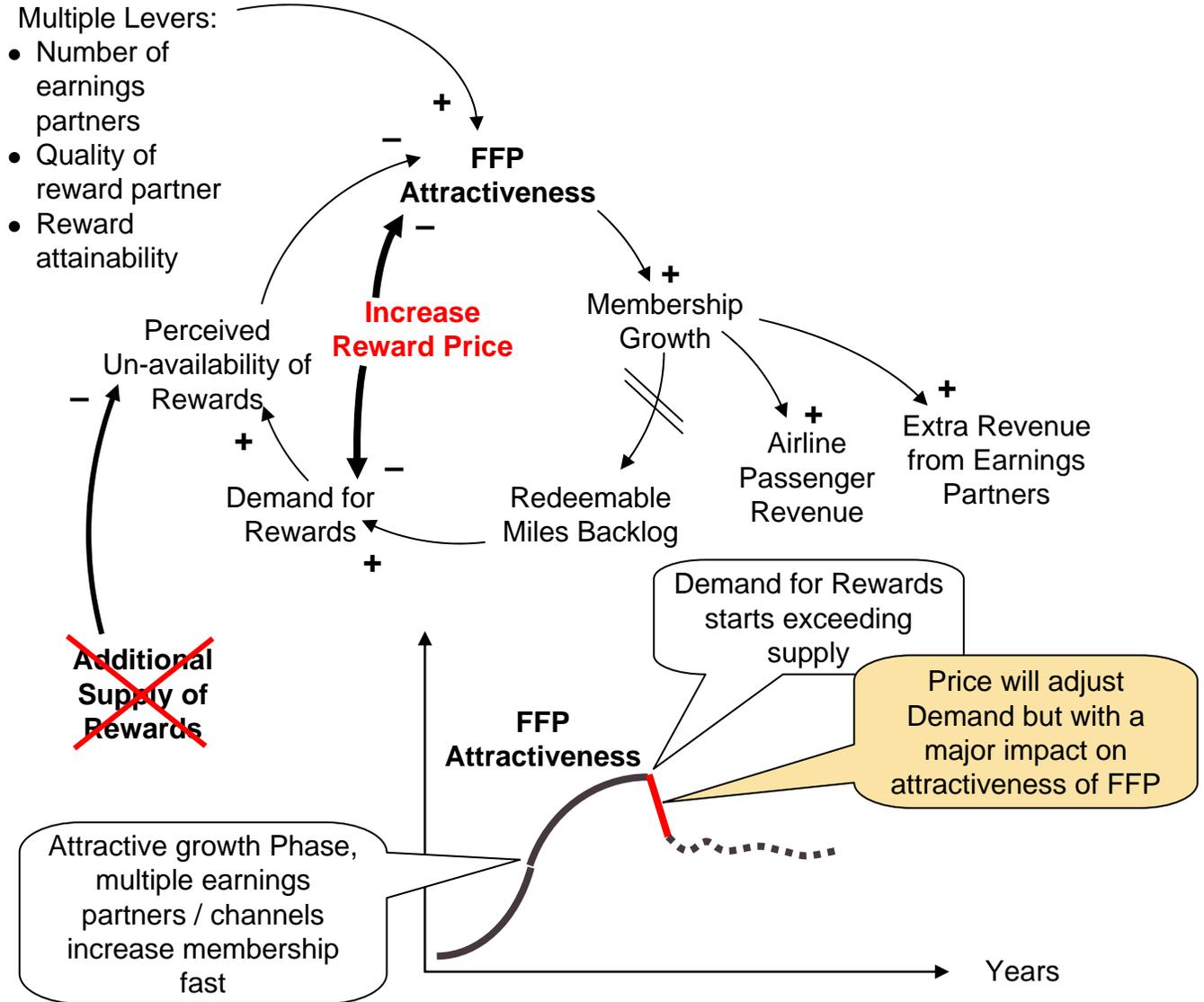


Source: Monitor Company Group, LP



An Example of a Systems Dynamics Map; there is a balancing force limiting the programs' attractiveness

- At this point in time the airline has only two intervention points:
 - Increase supply of rewards / free flights - which is hugely unprofitable and reduces airline capacity for paying passengers
 - Increase the reward price (number of miles required for a reward), which has a serious impact on the programs attractiveness
- Actually both interventions will affect the airlines profitability - only the second will do so with a time lag and with less degrees of control by the airline - as shown on the next page

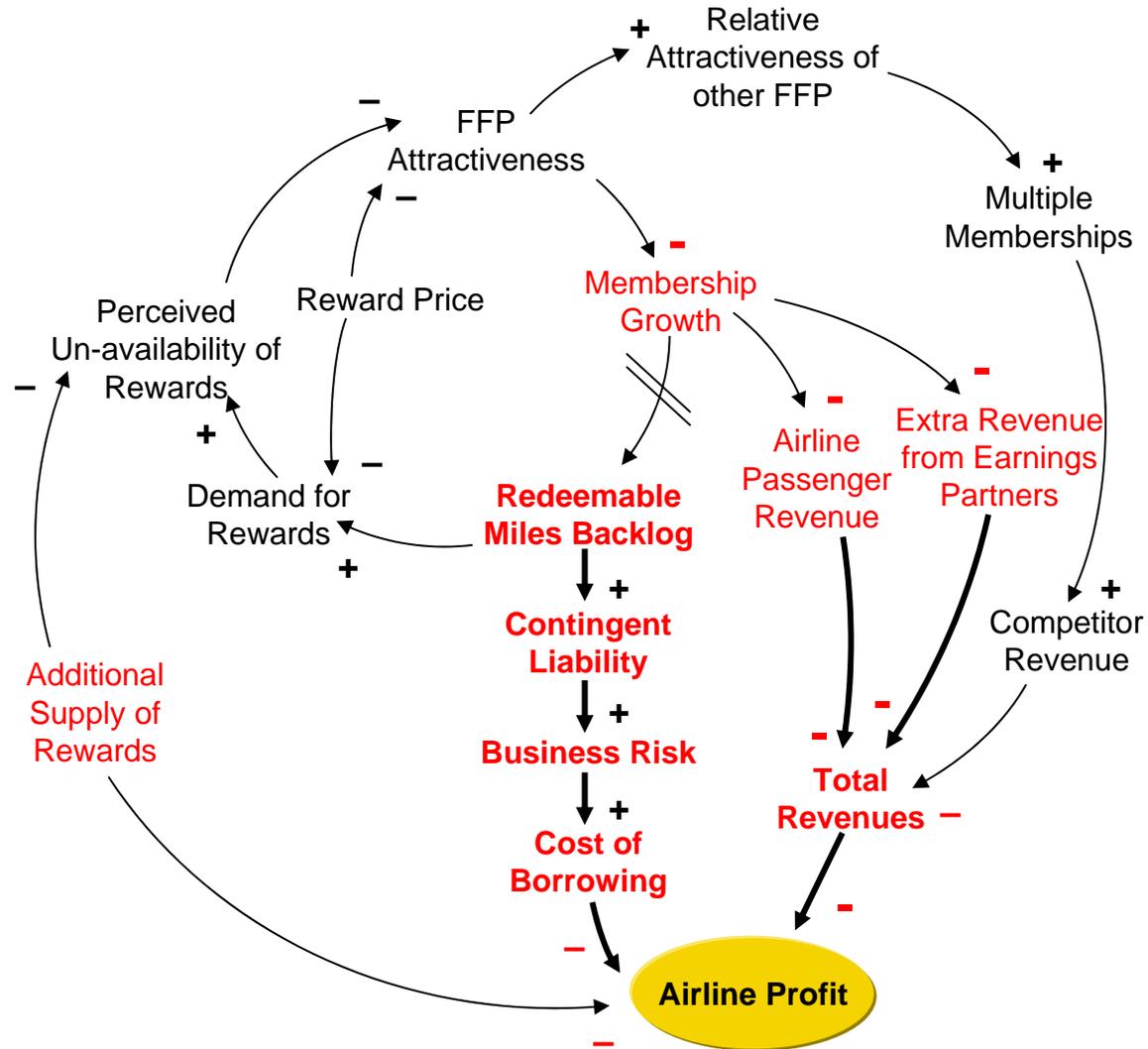


Source: Monitor Company Group, LP



An Example of a Systems Dynamics Map: Consequently this will also lead to a reduction in the airlines' bottom line

- The redeemable miles backlog will not disappear through the price increase, it will just stop growing as members will defect to other airlines. This creates a contingent liability, increasing cost of borrowing and potentially decreasing share-price.
- Loss of revenue from FFP partners and actual airline revenue with no apparent reduction in costs will lead to deterioration of profits
- This could be further worsened by the cost of supplying additional rewards (touched upon earlier)





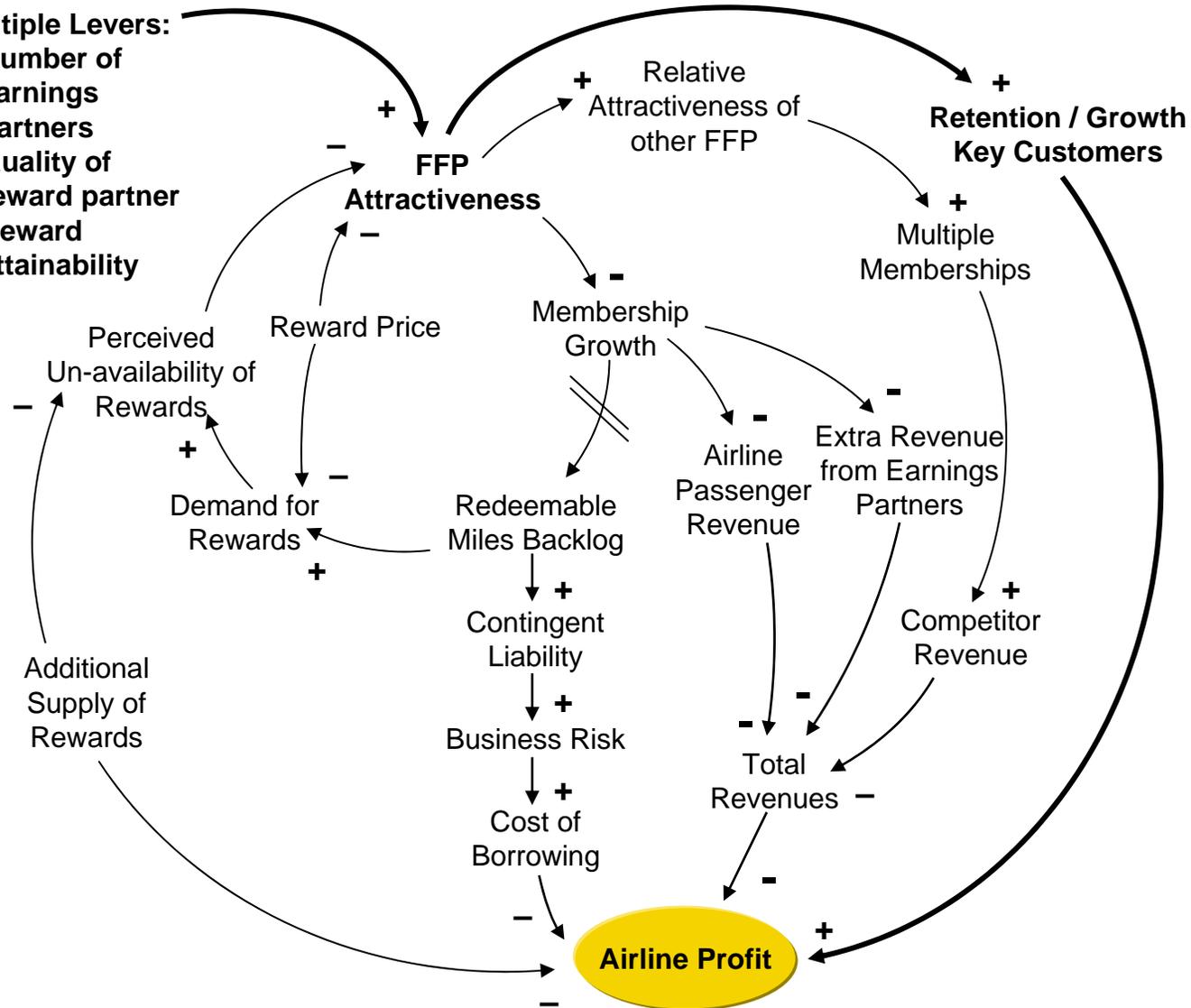
An Example of a Systems Dynamics Map: A solution to prevent this cycle could be to go 'back to basics'

... award only your key airline customers for their loyalty

- Instead of optimizing the FFP for overall attractiveness in the market against other loyalty programs, they should consider reshaping it to be attractive only to the 'high value' airline customers
- Membership would not grow disproportionately
- The miles back-log would be manageable
- There would be no perceived non-availability of rewards
- The attractiveness of the program would not grow or shrink out of proportion
- There is no need to adjust prices or supply of rewards
- Key customers would have little reason to defect to other airlines

Multiple Levers:

- Number of earnings partners
- Quality of reward partner
- Reward attainability





- Mandate from Secretary England
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- Analysis of reform initiatives
- Findings, Conclusions and Recommendations
- Alternative approach – Identifying true impediments to reform
- **Bibliography and Case Studies**



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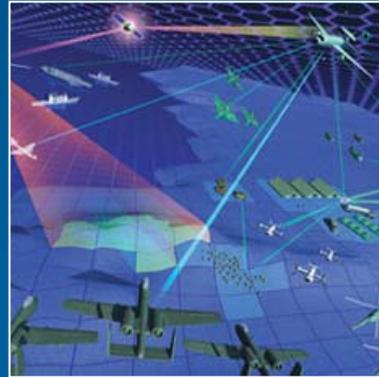
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Baseline Literature Review
Case Studies
IPPD and CAIV





Case Study — Background and Selection

- Even though the 28 initiatives identified in the literature review addressed specific issues, they have either individually or collectively fallen short with respect to achieving major and enduring improvements in the outcomes of the acquisition process.
- The 28 key initiatives were screened to identify potential case studies that might gain insight as to the root causes that may have limited these initiatives in achieving the broad impact that were originally expected.
- Two of these initiatives, **IPPD** and **CAIV**, were chosen for a closer look as part of the literature review
- There have been unintended consequences and implementation challenges that contributed to the shortfall in improved results; possible specific reasons included:
 - Limited or improper use of the initiative
 - Enabling conditions not satisfied
 - Lack of organizational commitment; partially due to limited incentives
 - Failed to influence underlying patterns of behavior
 - Benefits were overwhelmed by other failings of the acquisition system



Integrated Product and Process Development (IPPD)

A Case Study



Context for the IPPD Initiative

IPPD has been a DoD-suggested management tool since 1995, modeled largely on prior aircraft and auto industry success in applying the principles since the 1980s

Acquisition Environment

- A defense Bottom-Up Review (BUR) initiated in March 1993 by SecDef Aspin was intended to be a "comprehensive review of the nation's defense strategy, force structure, modernization, infrastructure, and foundations."
- The report advocated dedicating the bulk of the U.S. defense resources to meeting the requirement to wage two nearly simultaneous major regional conflicts (MRCs)
- Critics of the report charged that it focused on maintaining short term capability at the expense of investing in the military's long term capability
 - Furthermore, they argued that the policy was unaffordable and would become progressively less affordable over time, given projected resource constraints
 - The Center for Strategic and Budgetary Assessments estimated that the five-year plan would result in budgetary shortfalls of \$33–\$50 billion
- The government was looking at commercial practices as a way to improve operational effectiveness and reduce budget shortfalls

Internal DoD Drivers

- Following success in the auto industry some defense contractors began using Concurrent Engineering (CE), an early version of IPPD, in the 1980s
 - In 1988 an IDA study recommended the use of CE by DoD
- During the mid 1990s Defense budgets were decreasing as politicians sought to capture the peace dividend; simultaneously, the growing cost of programs cast doubt on DoD's ability to fund its requirements
 - Acquisition reform was declared a major priority of the Clinton administration in 1993
 - The 1993 Gore Report's focus on increasing government accountability and the passing of FASA in 1994 underlined the favorable climate
- In 1994, SecDef William Perry issued a memorandum mandating that IPPD and IPTs be applied throughout the acquisition process



Summary: IPPD Case Study

- This case study analyzes the IPPD goals, necessary conditions for success, and what DoD should consider in order to fully unlock the future benefits of IPPD.
- Broadly, the objective of IPPD is to include all program stakeholders, including the customer, in a joint working and review mode that reduces, or eliminates, the need to gain agreement and/or approval in a sequential manner.
- A central tenant is to establish formal Integrated Product Teams (IPTs), comprised of all relevant program stakeholders, to engage in the conduct of the work, reviews and decision making.
- The intent of IPPD in the DoD context was to apply an existing industry practice that had demonstrated significantly increase organizational effectiveness.
- IPPD has been a DoD suggested acquisition management tool since 1994; this is a reasonable amount of time to judge the performance and effect of the philosophy to date.
- The literature review revealed that, while there was a consensus that IPPD has been effective in selected cases, significant challenges to widespread adoption remain.
- IPPD is only one management tool to improve one aspect of the acquisition process (e.g., the application of IPPD to the F-22 program did not resolve all program challenges).



Summary (cont.)

Consensus Opinion

- Although consensus indicates that there are instances of IPPD successfully effecting acquisitions, barriers exist to wider adoption and full realization of benefits to DoD
- IPPD has not yet yielded large-scale benefits to the acquisition system --- some challenges remain, as reflected by the following citations:

“Systems designed and produced via concurrent engineering or IPPD usually need shorter logistics tails to accompany high quality designs”

“DoD still has a long way to go if it is to meet its own goals of effectively utilizing IPPD”

Study Hypothesis

- The reason DoD is only receiving partial benefits is because IPPD success is highly dependent on key “enabling” environmental characteristics necessary to achieve the potential benefits of IPPD; they include:
 - Establishment of the charter, responsibilities and empowerment
 - Funding appropriate to the IPPD approach
 - Inclusion of all “key” program stakeholders
 - Appropriate staffing and training
 - Incentives that promote the achievement of goals
- In practice, the establishment of IPTs has sometimes been implemented at too low levels of the WBS; formal IPTs should be limited to level 1 and 2 of the WBS (e.g., lower level IPTs can lead to adding people without increasing the work accomplished).



Summary (cont.)

The literature review found data supporting specific IPPD successes, but mixed sentiment on both its effectiveness system-wide, and DoD's effectiveness in encouraging its use

"A major fighter aircraft program reported a 10% reduction in development costs, a 50% reduction in engineering change proposals, and reduced rework / repair / scrap by more than 50%"

"A navigation system program reported reduced manufacturing costs by more than 40% and lifecycle costs by more than 25%"

"A major Navy program, which is following in the footsteps of the Boeing 777, is relying solely on computer-based design. The program IPTs are using leading edge design, manufacturing, and engineering technologies to reduce cycle time and development costs"

"A significant number of documented cases credit IPPD . . . for reductions in cost and cycle time, and increases in quality and performance"

"Problems may arise when DoD expects contractors to use IPPD approaches, but DoD does not participate in IPPD tools, teams or processes."

"IPTs were not uniformly implemented. Some folks thought that because they were a lower-level program, they would never be checked. People thought if they dragged their feet, the winds would change and they would never have to do IPTs. That feeling is now changing."

"Avoid a mandatory requirement for (contractors) to use IPPD / IPT techniques . . . we want the market place to decide what is the best practice in response to a performance-based requirement, even if that means that in some instances the best value is not to use IPPD / IPTs."

"Failures to provide timely team training, solidly establish a team focus, and consistently support the teaming concept have jeopardized the cultural change needed for lasting reform"

Source: IPD — One Year After; IPPD Gains Increased Emphasis through Publication of New DoD Handbook, August 1999; DoN Acquisition One Source; Integrated Product Team Effectiveness in the DoD, March 2002; A Model for Leading Change: Making Acquisition Reform Work, 1997; Passing Fancy or Permanent Reform?: An Evaluation of Defense Acquisition Oversight and Review IPT Implementation

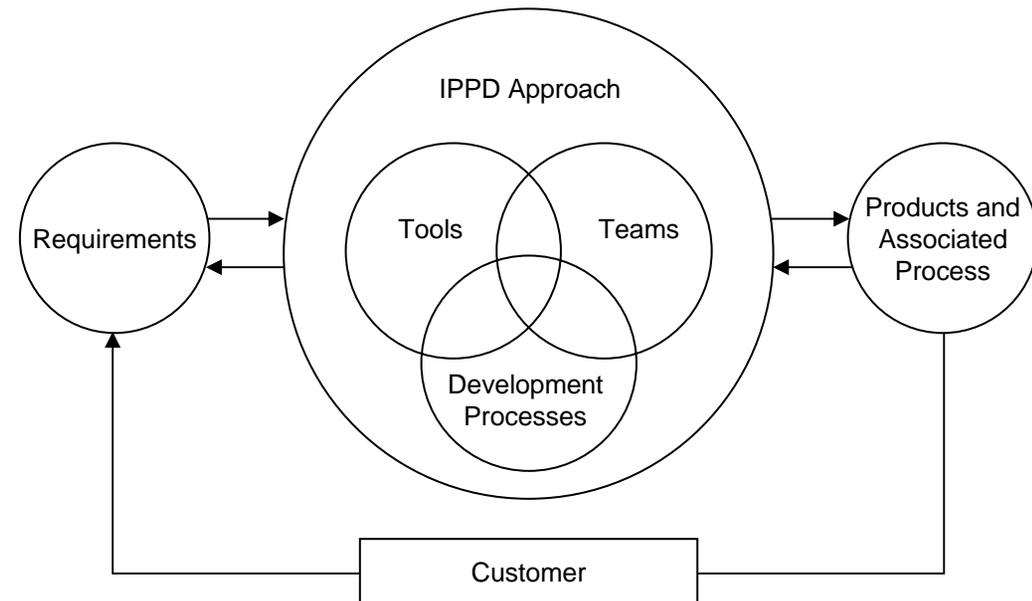


Definition of IPPD (1 of 2)

“A management technique that simultaneously integrates all essential acquisition activities through the use of multidisciplinary teams to optimize the design, manufacturing, and supportability processes. IPPD facilitates meeting cost and performance objectives from product concept through production, including field support.”

– DODI 5000.2

- IPPD involves three components:
 1. Teams: All stakeholders in the creation, use and support of the product are included in an *Integrated Product Team (IPT)*
 2. Tools: Include CAD / CAM, decision support, information sharing, process simulations, cost models etc
 3. Processes: Include techniques such as *IMP** / *IMS** to ensure the effective translation of requirements into design of a product and its associated processes
- From an industry perspective, the primary element that is new is the use of IPTs. The tools and processes are areas where the USG personnel just have not previously been exposed.

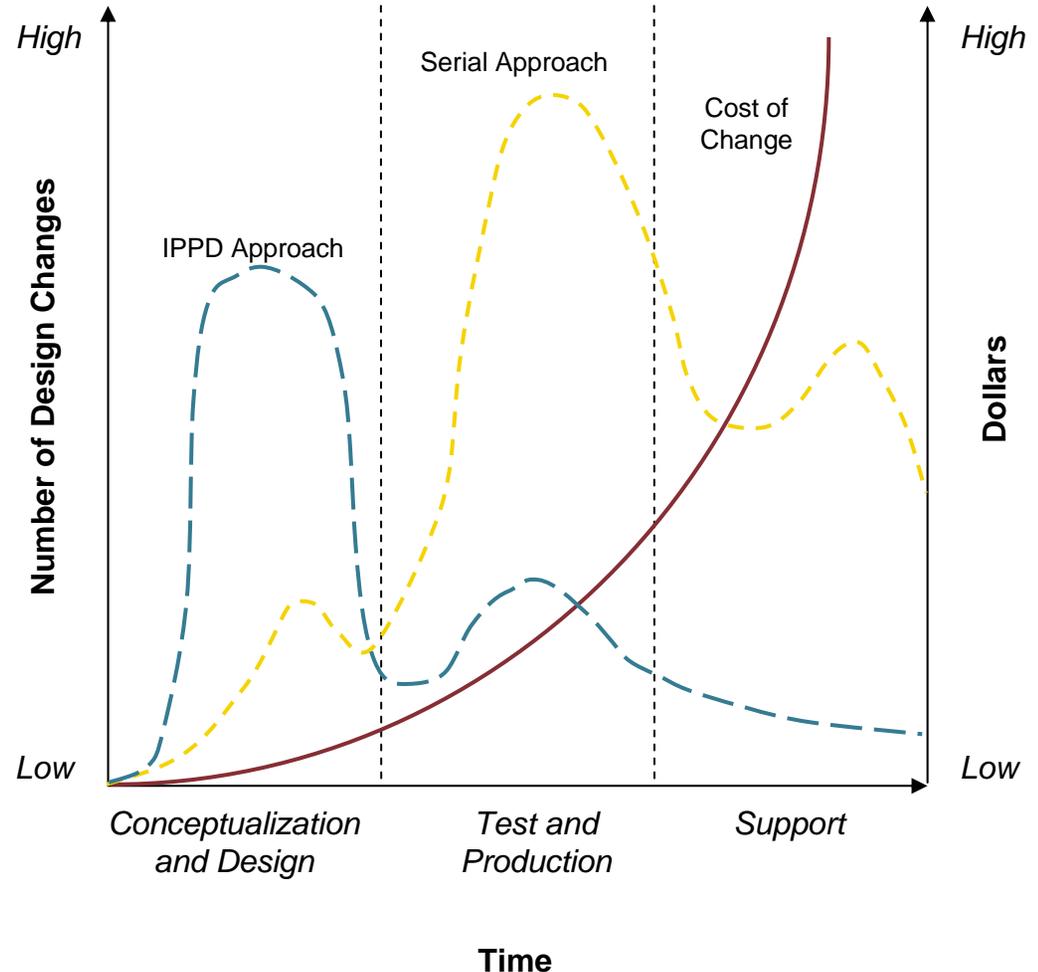


* Note: IMP = Integrated Master Plan, IMS = Integrated Master Schedule
Source: DoD Integrated Product and Process Handbook, Aug 1999



Definition of IPPD (2 of 2)

- IPTs are meant to include empowered representatives of all program stakeholders involved in the design, manufacture, and operation of a product. This enables the program to achieve a consensus of the best ideas in the shortest time, by reducing the iterative cycle.
- If implemented properly, the use of IPTs can reduce the total number of changes during the SDD and production process.
- IPPD offers the possibility of reducing the SDD schedule; this can result in an improved probability of meeting production schedule and cost objectives.



Source: *ibid*



Key Principles

IPPD, as a DoD management tool, can be characterized by the following key principles

Customer Focus

- Customer focus is accomplished by including the customer in multidisciplinary teams
- Conducting tradeoff studies during the requirements definition and development processes to ensure that the design goals remains constant and meets the customer stated/documentated needs (e.g., design meets firm program KPPs)

Concurrent Development of Products and Processes

- The inclusion of the production teams and the user community in the design process helps to ensure that the design can be manufactured efficiently and the product will be effective and maintainable in the field.
- Multidisciplinary teamwork and an emphasis on real-time and open communications are key to accomplishing this concurrent development

Early and Continuous Lifecycle Planning

- Early lifecycle planning with all stakeholders lays a solid foundation for the various phases of a product and its processes
 - Key program activities and events should be defined so that progress toward achievement of cost-effective targets can be tracked, resources can be applied, and the impact of problems, constraints, and requirements changes can be better understood and managed
- Ensures the delivery of a system that will be functional, affordable, and supportable throughout a product's lifecycle

Proactive Identification and Management of Risk

- By using integrated multidisciplinary teams, designers, manufacturers, testers and users work together to ensure that the product satisfies the customer needs.
- IPPD can help achieve a comprehensive approach for identifying and analyzing cost, technical, and schedule risks and instituting risk-mitigating options to control critical risk.

Maximum Flexibility for Optimization and Use of Contractor Approaches

- IPPD is a management approach, not a specific set of steps to be followed
 - Contractors must be allowed the flexibility to use innovative, streamlined best practices when applicable throughout the program
 - The formation of IPTs should be limited to the level needed for formal collaboration at reasonable task/function levels

Note: The DoD Guide to IPPD lists 10 basic tenets that can be characterized by the above principles. Other tenets not specifically listed include: Encourage Robust Design and Improved Process Capability, Event-Driven Scheduling, Multidisciplinary Teamwork, Empowerment, Seamless Management Tools
Source: DoD Integrated Product and Process Development Handbook, August 1998



IPPD Goals

	Goals	Intended Benefits
Organizational	<ul style="list-style-type: none"> • Create integrated USG and Industry integrated product teams (IPTs) that will be involved in the design and production of products, in a concurrent manner, by including representatives from all stakeholders. 	<ul style="list-style-type: none"> • Timely decision-making through the establishment of IPTs that enable the joint participation of all stakeholders, e.g., design, manufacturing, test and evaluation, logistics, and the users.
Reduce Costs & Maintain Schedule	<ul style="list-style-type: none"> • Reduce acquisition costs by: <ul style="list-style-type: none"> – Reducing late-stage design changes – Incorporating the voice of the customer in engineering decisions (promoting the use of CAIV) • Industry studies asserted development cost savings of up to can be substantial. 	<ul style="list-style-type: none"> • DoD pilot programs claimed design milestones 2.5 years sooner and had 90% fewer changes to the design than an earlier comparative program • In another program, IPPD implementation resulted in a cost reduction of 30% for equivalent products
Process Integrity (Products / Features and Technical Ability of the Product)	<ul style="list-style-type: none"> • Avoid shortfalls in the operation and maintenance phases of the program due to lack of consideration and understanding of user requirements. 	<ul style="list-style-type: none"> • Improved performance and customer satisfaction by including the user in defining the product and its associated processes (manufacturing, maintenance, operation).

Source: Use of Integrated Product and Process Development and Integrated Product Teams in DoD Acquisition, Dr. William Perry



Remaining Challenges to Achieve IPPD Goals

Organizational

- Maintenance of contractual baseline (e.g., avoid Requirements Creep)
- Excessive levels of IPTs (can lead to increased cost)

IPPD Process

- Reporting structure
- Design of communication channels
- Avoidance of team management 'overhead'
- Optimize by use of co-located teams
- Conduct of audits to validate optimum results

Implementation

- Should be implemented early in program
- Significant training requirement
- Scarce resources can get over-stretched
- Communication capabilities



Key Organizational Challenges

Challenge	Problem Description	Implications for Implementation
Requirements Creep	<ul style="list-style-type: none"> • Past experience indicates that meetings between the customer and industry technical personnel can result in decisions that represent a change in the scope of work under contract. • Typically the PCO properly instructs both the USG and contractor teams to the effect that only he/she has the authority/warrant to authorize changes to the contract. The COTR is then established as the day-to-day representative to administer the technical aspects of the contract. Inevitably, however, the COTR makes decisions that lead to contractor claims of scope change. 	<ul style="list-style-type: none"> • Even without IPPD, requirements creep represents a fundamental problem during SDD in almost all programs. Technical personnel generally have a desire to achieve the best end product capability possible without considering the contract terms. • The avoidance of requirements creep requires: <ul style="list-style-type: none"> – Contractor management diligence to surface potential changes for review with the PCO. – The PCO must become an active part of the USG program team
Limit the establishment of formal IPTs to high WBS levels	<ul style="list-style-type: none"> • IPPD is a management technique that promotes an integrated concurrent involvement of USG personnel in the conduct of the contractor's efforts. • The establishment of IPPD by DoD did not deal with the issue of what levels of formal IPTs should be established • There has been a tendency to flow down the establishment of formal IPTs to a very low level of the WBS structure. 	<ul style="list-style-type: none"> • Driving down the creation of formal IPTs to low levels can often result in unnecessary staffing on the part of both USG and industry. The optimum results can be achieved by: <ul style="list-style-type: none"> – Limiting formal IPTs to level 1 and 2 of the WBS. – Use Informal, ad hoc, coordination meetings to deal with lower level issues.



Key Process Challenges

Challenge	Problem Description	Implications for Implementation
Reporting Structure	<ul style="list-style-type: none"> Empowerment is a key issue for both USG and contractor personnel assigned to formal IPTs 	<ul style="list-style-type: none"> Limiting the establishment of formal IPTs can minimize this problem.
Design of Communication Channels	<ul style="list-style-type: none"> Lack of good communications. An effective IPT structure requires sophisticated organization of communication channels horizontally across functional lines and vertically through management layers 	<ul style="list-style-type: none"> If the lines of communication are not structured properly, the gains from 'open' communication will be negated by too much 'noise' in the system
Creation of Team Management 'Overhead'	<ul style="list-style-type: none"> Implementation must be planned carefully to avoid any possible increase of personnel required on a program due to the significant amount of time spent attending and administrating meetings 	<ul style="list-style-type: none"> Limiting the establishment of formal IPTs to level 1 and 2 of the WBS can minimize this problem. Some key personnel may have to be members of multiple IPTs
Optimize by use of Co-Located teams	<ul style="list-style-type: none"> Lack of close contact can inhibit the establishment of trust and rapport that are essential to success. Informal in-person meetings augment formal communications (phone, email, etc.) 	<ul style="list-style-type: none"> The cost of co-locating team members must be weighed against the benefits An adequate budget must be available at the start of the program for personnel relocation, or travel for important milestones, or for investment in communication assets (e.g., common databases) if co-location is impracticable.
Conduct of Audits To Validate Optimum Results	<ul style="list-style-type: none"> Mixed results suggest the possibility that DoD has not established adequate uniform guidelines regarding the optimum approach to using IPPD 	<ul style="list-style-type: none"> Effective management audits of the process can lead to the identifying and resolving process issues. DoD should adopt best industry practices that require an internal audit of processes used in order to determine their compliance and effectiveness.



Key Implementation Challenges (1 of 2)

Challenge	Problem Description	Implications for Implementation
Should Be Implemented Early in Program	<ul style="list-style-type: none"> • The IPPD's greatest potential for leverage occurs in the early stages of development, when the program is most flexible <ul style="list-style-type: none"> – The cost to implement product changes increases as a program moves forward 	<ul style="list-style-type: none"> • IPPD will capture the greatest benefit if it is implemented prior to SDD <ul style="list-style-type: none"> – Analysis of lifecycle issues and cost/performance trade-off studies can provide a balanced approach and prevent costly changes • At the latest, IPPD must be implemented at SDD award.
Significant Training Requirement	<ul style="list-style-type: none"> • Successful IPPDs require team members to hold open, honest discussions to empower other team members, raise issues early, and hold rational debate • Many of these behaviors involve cultural change and require training (e.g., stakeholders with differences in rank should be able to freely communicate issues and hold debate) 	<ul style="list-style-type: none"> • Include IPPD training as a part of the up-front planning • Participants must have a clear understanding of the IPPD philosophy, and the skills (e.g., team building) required for its success • It is critical that all stakeholders, from top-level management to worker-level participants, be well-trained in IPPD principles <ul style="list-style-type: none"> – Different levels of management need different types of training, focused on their part of the approach (e.g., top-level management needs to be trained on approaches/limitations of empowerment)



Key Implementation Challenges (2 of 2)

Challenge	Problem Description	Implications for Implementation
Scarce Resources Get Over-Stretched	<ul style="list-style-type: none"> ● To be effective, IPTs must be constituted with skilled personnel with representation from all key organizational components <ul style="list-style-type: none"> – Many individuals, particularly within DoD, are not dedicated to a single IPT; personnel often work on more than one IPT at a time – Scarce skilled resources (e.g., contracting and finance) can be spread across too many IPTs simultaneously 	<ul style="list-style-type: none"> ● IPPD assignments should be discussed and negotiated with functional leaders to get the best personnel mix on the team to ensure the expertise is available ● The team leader must compensate if the expertise is not immediately available — different phases need different expertise
Communication Capabilities	<ul style="list-style-type: none"> ● All stakeholders need to have access to the most current information on the program ● Identifying the “right” stakeholders is critical as IPPD relies on individuals’ ability to communicate effectively with teammates <ul style="list-style-type: none"> – Successful implementation of IPPD requires better than average communications skills 	<ul style="list-style-type: none"> ● Planning related to information management, communication networks, and methods of formal communications should take place at the beginning of all acquisition programs <ul style="list-style-type: none"> – Team members must be able to access information and communicate real-time ● Negotiate with functional leaders to ensure the best team is formed ● The team leader should create a positive, energetic environment to improve the performance of most team members



Condition Analysis

DoD's ability to influence these conditions varies widely

Challenge	DoD Ability to Positively Influence	Commentary
Organizational		
Requirements Creep		Traditional problem facing contractors; can become worse with IPPD unless steps are instituted to for regular reviews with PCO.
Limiting Formal IPTs To High WBS Level		Education and early coordination to establish ground rules can solve this problem
Design		
Reporting Structure		DoD has little influence over contractors' internal structures
Design of Communication Channels		Proper attention must be paid to developing communications channels
Creates Team Management 'Overhead'		Need precise clarity of product to avoid IPT proliferation
Most Effective for Co-Located Teams		Benefits must be weighed against costs
Implementation		
Must Be Implemented Early in Program		Programs already underway will see limited benefits, and the benefits of IPPD in new programs will take a while to become apparent
Requirement for Training		Proper training on IPPD will improve its implementation
Scarce Resources Get Over-Stretched		Properly chartered IPTs can mitigate this challenge
Communication Capabilities		Limited by individual communication skills
OVERALL		

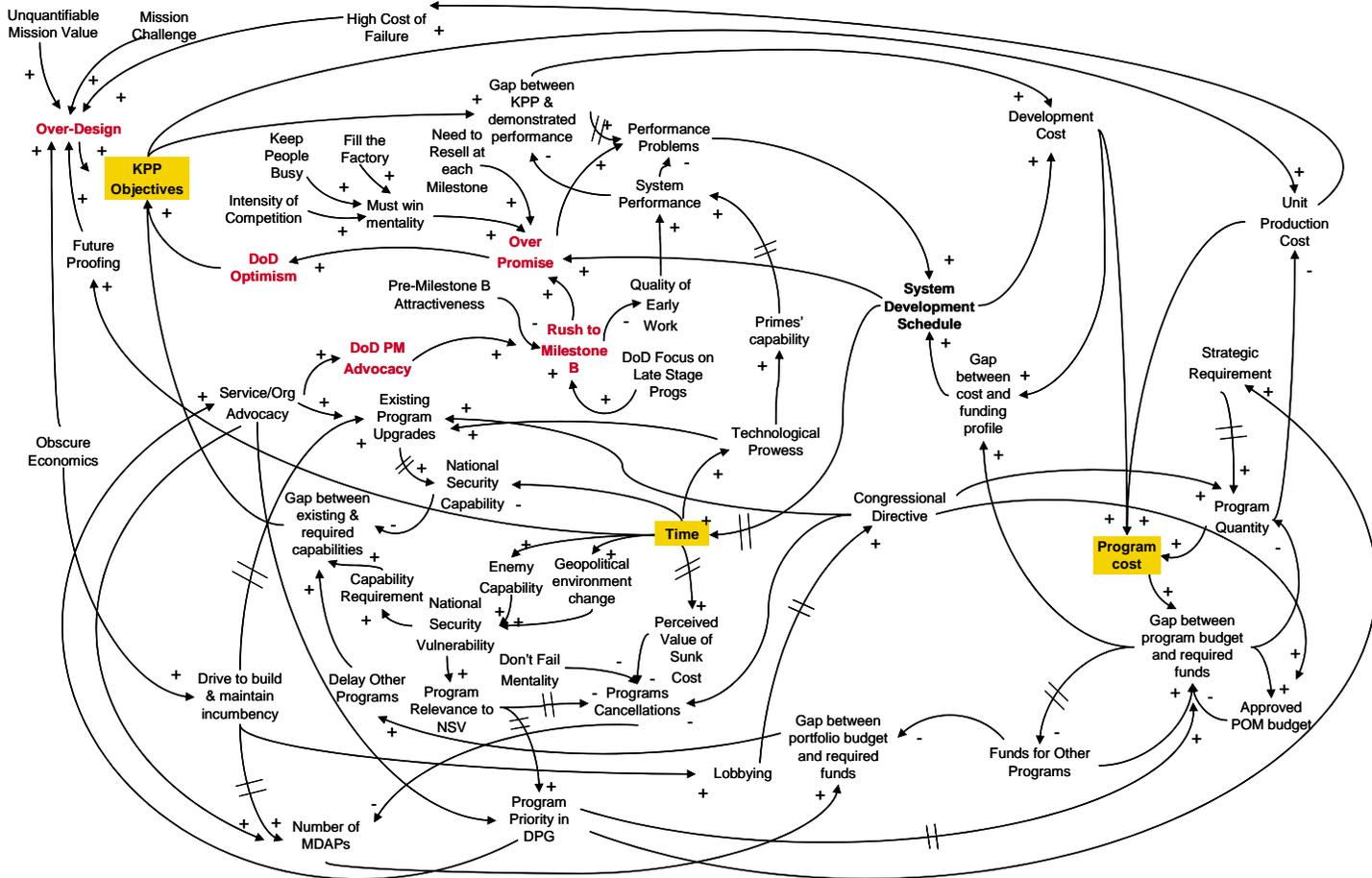
Low High



Diagnosis: System Dynamics Prior State

The primary systems impact of IPPD is to influence the interactions between DoD and KTRs. If successful it has the potential to ensure that KPPs are achievable, reducing time and program cost

Hypothesized Impact of IPPD on Level 1 Weapon Acquisition System Dynamics





Hypothesis Tested

- The reason DoD is only receiving partial benefits is because IPPD success is highly dependent on key “enabling” environmental characteristics necessary to achieve the potential benefits of IPPD; these include:
 - Establishment of the charter, responsibilities and empowerment
 - Funding appropriate to the IPPD approach
 - Inclusion of all “key” program stakeholders
 - Appropriate staffing and training
 - Incentives that promote the achievement of goals
- In practice, the establishment of IPTs has sometimes been implemented at too low levels of the WBS; formal IPTs should be limited to level 1 and 2 of the WBS (e.g., lower level IPTs can lead to adding people without increasing the work accomplished).

Lessons Learned

- IPPD has had some success; however, it is not a panacea.
- As is the case for most new management concepts and practices, they have to be put in practice before we determine all of the conditions required to achieve the most success.
- IPPD is not an really an acquisition reform; rather, if appropriately implemented, it is an another tool that can be used to improve the results of DoD’s acquisition process.
- Training and appropriate implementation steps continue to be impediments to successful adoption within the DoD



Our literature search did NOT find any fatal flaws in the use of IPPD as a DoD management tool -- IPPD results can be improved by appropriate DoD action in the future



Cost as an Independent Variable (CAIV)

A Case Study



Context for the CAIV Initiative

Acquisition Environment

- There have been many past attempts to deal with “uncontrolled costs.” Periodically, some series of program cost overruns lead DoD officials to look for new ways to reduce or eliminate these “surprises”
- In the late 70s and early 80s surprises prompted a “Design-to-Cost” (DTC) initiative that attempted to improve cost results by setting cost targets for systems/subsystems; this attempted to force design solutions that achieved the desired cost results
 - The results of DTC were mixed (at best); DTC did not substantially reduce the number of overruns. The underlying problem with DTC was that it did not challenge the technical performance requirements/specifications
- A defense Bottom-Up Review (BUR) initiated in March 1993 by SecDef Aspin was intended to be a “comprehensive review of the nation’s defense strategy, force structure, modernization, infrastructure, and foundations”
- The government was looking at commercial practices as a way to improve operational effectiveness and reduce budget shortfalls.

Internal DoD Drivers

- Dr. Paul Kaminski, then Under Secretary of Defense for Acquisition and Technology, through the Defense Manufacturing Council (DMC), established a department-wide working group to address approaches and measures to reduce life cycle costs. The group’s work recommended CAIV as a new approach – it was officially proposed in 1995 and approved in March of 1996.
- CAIV was developed due to schedule and cost growth attributed to performance-driven programs:
 - An evaluation of large DoD programs (Conrow) prior to 1995 indicated more than 80% had cost and/or schedule growth
 - Another study (Christensen) examined finished contracts (1988–1995) and found that previous reforms aimed at lowering cost overruns were ineffective; the average cost overrun was 20%
- The prior experience with DTC provided the evidence that attempting to manage costs without addressing the requirements and resultant specifications did not reduce the incidences of major cost overruns. CAIV was created with the understanding that something more fundamental needed to be done to control cost surprises. Unlike DTC, CAIV specifically challenged KPPs that went beyond mission requirements

Source: Stout, Robert, “CAIV’s Effect on System Attributes” 2005; Dr. Robert Kaminsky; DoN 2004; Acquisition Reform: Are We There Yet? Rand 2005



CAIV Case Study — Summary

- CAIV grew from an evaluation by DoD that many major cost overruns, and schedule delays, were the result of the pursuit of “high end” performance without regard to resultant costs
- CAIV has two objectives
 - Eliminate the focus on weapons systems performance without regard to resultant cost and/or schedule
 - Promote trade-offs between performance, schedule and cost within the space between threshold (minimum) and objective (maximum needed) KPPs. CAIV follows Design-to-Cost (DTC) as a DoD cost management tool, and ‘Target Costing,’ which was used in the private sector (e.g. the auto industry) for over 30 years. (In practice, the possible trade-off of schedule has not been given any significant emphasis.)
- CAIV is most effective early in the acquisition cycle; early stage RFPs and contracts should emphasize the use of CAIV
- CAIV shares some goals with R-TOC*: both seek to manage costs and both face the same issues that can impede the degree of their success
 - CAIV pursues trade-offs between cost, schedule and performance
 - R-TOC seeks reductions in life cycle costs without impacting mission performance
- CAIV has been in practice in the DoD since 1996. There is evidence to support resultant cost savings, but there is no clear consensus on the program’s long term impact:
 - Cost savings were identified in several early pilot programs (E-6 aircraft cockpit, Joint Standoff Weapon Program) but there is insufficient data to conclude that CAIV has led to major product life-cycle cost savings.
 - A few reports suggested that CAIV has led to an inappropriately reduced focus on the delivery of systems that meet mission performance requirements and customer ‘satisfaction’.

* R-TOC = Reduction of Total Ownership Cost



CAIV Case Study Summary (cont.)

Although there are instances of CAIV achieving success, its total results have been mixed

Consensus Opinion

- CAIV appears to have been successfully adopted across a wide range of acquisition programs
- Some cost savings have been identified as successes
 - SMART-T program: “\$790M system turned into a \$250M system and it will adequately perform the mission . . .”
 - Joint Standoff Weapon Program: \$643M in cost avoidance
 - Substantial consensus that CAIV has resulted in (at least) short term savings in major acquisition programs
- Despite advertised cost savings, reviews of CAIV’s effectiveness have been mixed:
 - “CAIV helps with design tradeoffs and helps bring the focus to cost . . .”
 - “CAIV helped our business unit to better estimate overall system cost and allowed us to bring the project under cost and deliver more”
 - “We always used to teach cost, schedule, and performance together. Then performance became king and we traded schedule to get performance. Now we have ‘CAIV’ and a fixed schedule and are sacrificing performance. We’re ‘empowering’ people but not letting them come back and trade among cost, schedule, and performance”
 - “The entire concept of CAIV is fatally flawed. Cost is a dependent function like performance and all other system attributes. Usually, any major CAIV design/production change involves some aspect of reducing performance and/or reliability”

Study Hypothesis

- CAIV, as a project planning tool, has distinct benefits to DoD’s acquisition program, but refinements are required
- CAIV, if applied properly, should lead to satisfactory results; the degree of success is dependent on an “enabling” environment:
 - Adequate training re: intent of CAIV and basic tenets
 - Definition of threshold (min) and objective (max) performance requirements
 - Credible life cycle cost (LCC) estimates; works best when there is flexibility to change the distribution of costs within the LCC.
- The successful use of CAIV requires that the planning and requirements process must set threshold performance values correctly; the PMO must maintain a set of threshold values that meet mission needs.
- CAIV is a logical and effective tool; however, it must be implemented correctly. With continued future training that reflects lessons learned from past programs, the use of CAIV can reach its full potential as an effective management tool.
- CAIV may not be optimal for all programs – other approaches may be better for revolutionary or urgent national security related acquisitions.
- While CAIV is a useful tool, fundamental issues around DoD’s lack of budgeting/funding stability and lack of effective management commitment limit its overall effectiveness

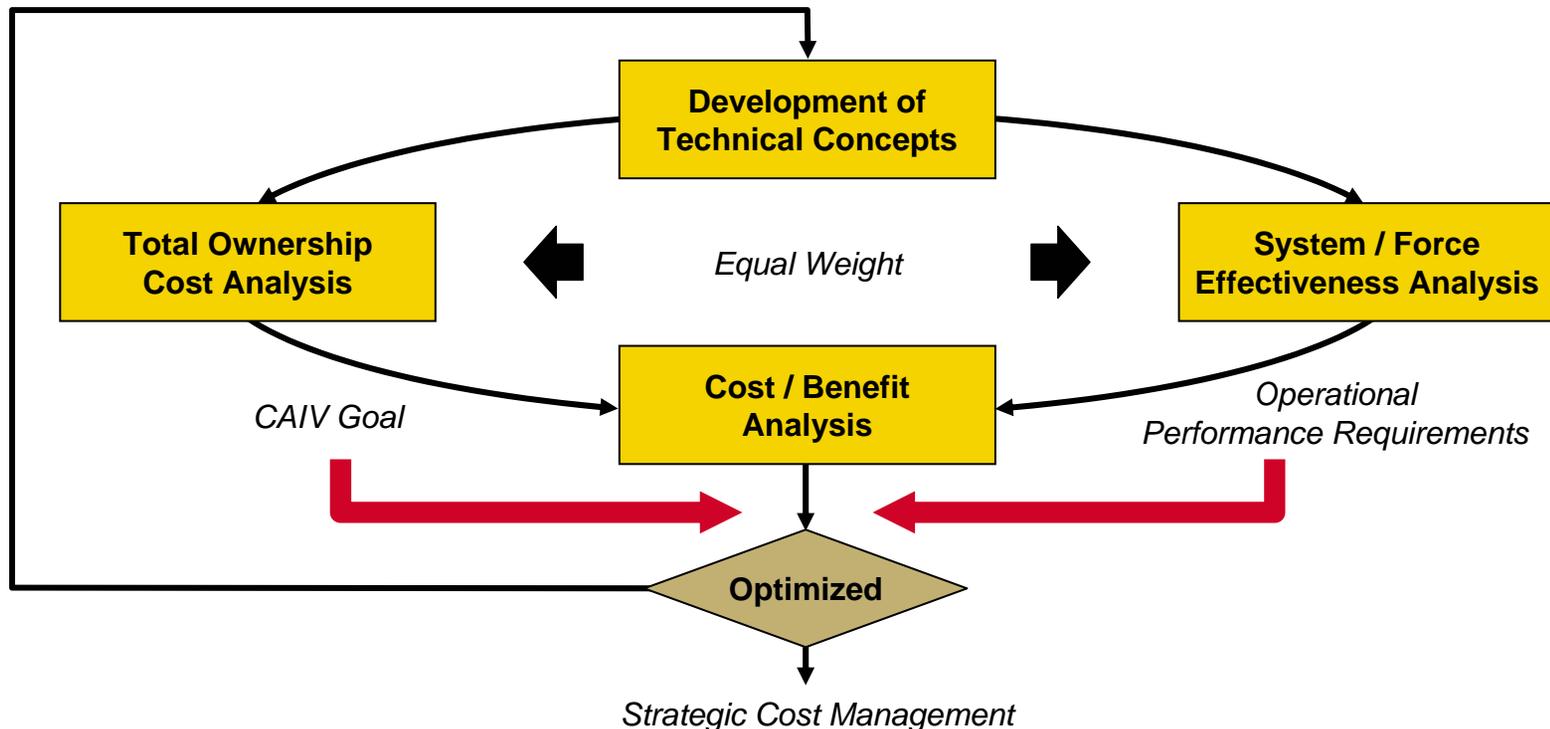
Source: Stout, Robert, “CAIV’s Effect on System Attributes” 2005; Dr. Robert Kaminsky; DoN 2004; Acquisition Reform: Are We There Yet? Rand 2005



CAIV Definition (1 of 2)

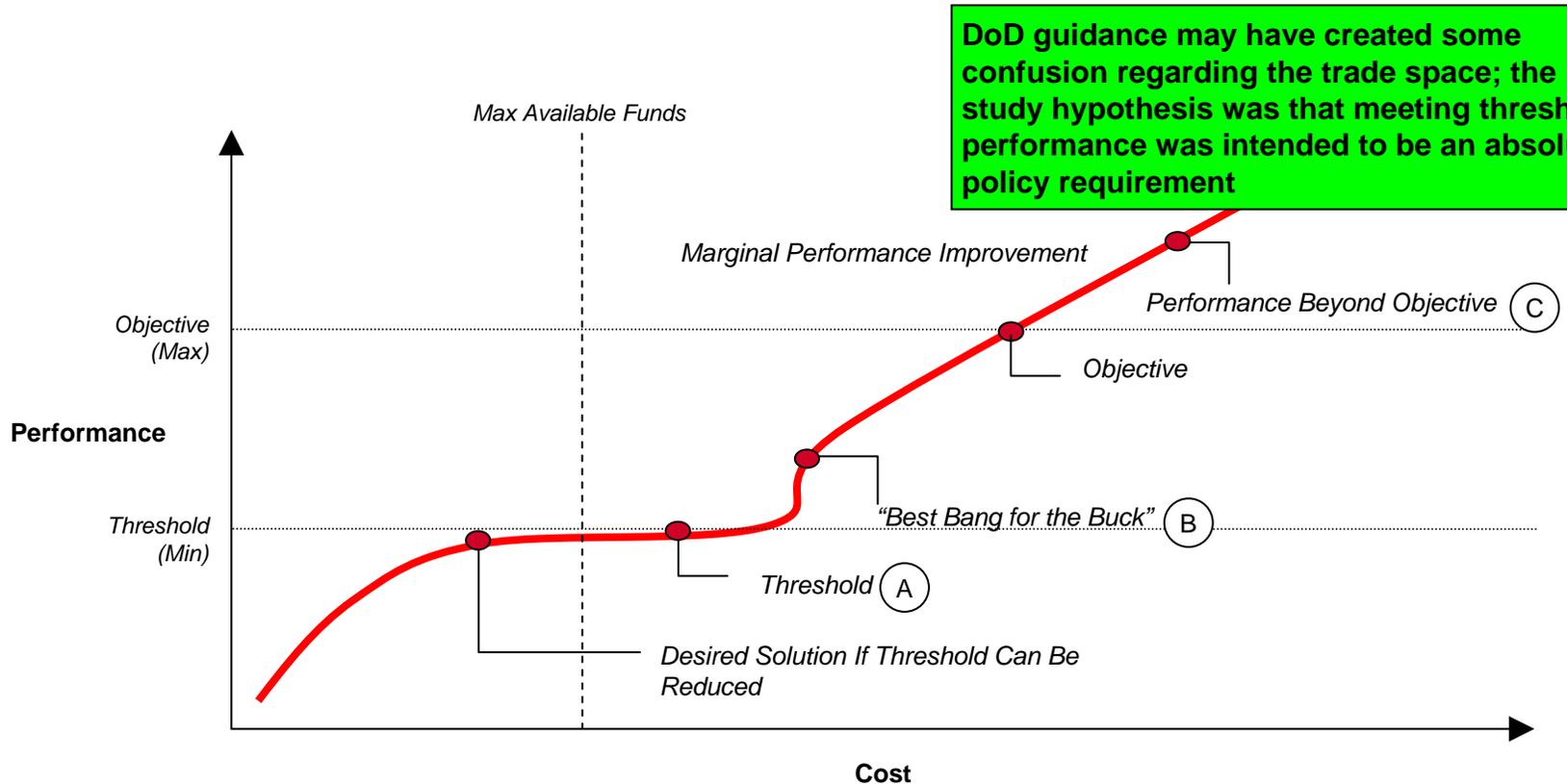
“A process that helps arrive at cost objectives (including life-cycle costs) and helps the requirements community set performance objectives. The CAIV process shall be used to develop an acquisition strategy for acquiring and operating affordable DoD systems by setting aggressive, achievable cost objectives and managing achievement of these objectives. Cost objectives shall also be set to balance mission needs with projected out-year resources, taking into account anticipated process improvements in both DoD and defense Industries” (Section 3.3.4 of DoD 5000.2R)

Notional depiction of CAIV Philosophy





CAIV Definition (2 of 2)



- The basic premises / tenants of CAIV are as follows:

- (A) Technical / cost tradeoffs are made in a manner that lead to the achievement of the best balance between cost and system performance. Technical specification chosen must achieve at least the minimum capability to satisfy mission requirements (e.g., “threshold” performance)
- (B) If the chosen technical requirements exceed minimum (e.g., “threshold”), it is because the higher performance levels can be achieved at relatively “modest” cost increases
- (C) In no case should the technical specifications be set at levels that exceed the maximum desired (e.g., “objective”) requirements



Key Principles of CAIV

CAIV, as a DoD management tool, can be described by the following key principles

Cost Focus

- Cost now viewed as an input, or independent variable in the acquisition process (co-equal with performance) — changing typical performance-driven cost-as-an-output approach
- Established cost targets (LCC) cannot be increased unless required to meet threshold (min) performance to assure mission success

Flexibility for Optimization of Cost/Performance Tradeoffs

- Conducting tradeoff studies during the requirements definition and development processes ensures that the performance and cost are both evaluated
- CAIV is a management approach, not a specific set of steps to be followed; contractors must be allowed the flexibility to use innovative, streamlined best practices when applicable throughout the program

Early Establishment of Program Cost and Performance Objectives

- RFPs utilizing CAIV must communicate cost objectives and minimum performance requirements. DoD should provide incentives to industry to meet or improve upon them
- Performance and cost objectives must be held constant to allow proper planning and execution of contracts
- CAIV must be initiated early and executed continuously through production phases of new and fielded systems

Strategic Management Focus

- CAIV is a strategic management process that embraces the long-term view when making trade-off decisions
 - Starts with determination of expected long-range availability of funds for a program and the establishment of life cycle cost estimates
 - Develop plans, metrics, and provisions for reporting results to ensure the proper execution of the program

Top Down-Bottom Up Continuous Approach

- Top-down because CAIV must start at highest levels to ensure that weapon system acquisition effectiveness is maximized within constraints of available budget, project manpower availability
- Bottom-up because each Integrated Product Team (IPT) member is empowered to recommend cost savings to decision makers
- Continuous because it originates with determination of affordability constraints and proceeds through analysis of alternatives to fulfill mission needs until the design is frozen



CAIV Goals

	Goals	Intended Benefits
Organizational	<ul style="list-style-type: none"> • There were no required organizational changes 	<ul style="list-style-type: none"> • Not applicable
Reduce Costs & Maintain Schedule	<ul style="list-style-type: none"> • End to the era of pure technical dominance that resulted in numerous programs exceeding their budget by a large margin (sometimes 100% to 200%) with resultant schedule delays of similar proportions • Prevent cost overruns by requiring that programs operate within strict budgetary constraints — cost as an input • Does not directly address schedule 	<ul style="list-style-type: none"> • Reduce / eliminate adverse budget surprises, eliminate cost overruns • Reduce total life cycle cost for some systems
Process Integrity (Products / Features and Technical Ability of the Product)	<ul style="list-style-type: none"> • The CAIV approach is centered upon establishing minimum performance criteria to ensure that mission goals are achieved while providing flexibility to contractors and PMs to make tradeoffs to achieve goals within cost constraints • Establish a process that controls/prevents unnecessarily ambitious performance requirements and specifications 	<ul style="list-style-type: none"> • Curtail / eliminate cost overruns caused by excessive performance specifications • Achieve the performance ‘sweet spot’ on the curve — the best performance at minimum cost, avoiding the best performance ‘at any cost’ approach used in the past • Seeks justification in order to pursue KPPs that exceed threshold performance levels



Remaining Challenges to Achieve CAIV Goals

Organizational

- Budget trade-off's within LCC
- Misaligned incentives

CAIV Process

- Incomplete or incorrect Key Performance Parameters (KPPs)
- Quality of technical specifications
- Lack of clarity regarding CAIV process
- Delineation of the "C" in CAIV
- Program schedule slip
- Limited scope of CAIV

Implementation

- Must be implemented early in program
- Building & maintaining capabilities



Key Organizational Challenges

There are a number of challenges that surface when implementing CAIV, including organizational challenges, design challenges, and implementation challenges

Challenge	Problem Description	Implications for Implementation
Budget Tradeoffs within LCC (R-TOC)	<ul style="list-style-type: none"> ● It is very difficult to get SDD and production funding; by comparison O&M money is comparatively easy to get <ul style="list-style-type: none"> – Additionally, it is difficult to get near-term money vs. commitments for future money ● These issues lead to imbalances and faulty tradeoffs in the acquisition system <ul style="list-style-type: none"> – Achieving SDD target cost may result in excessive O&M costs – Failure to invest additional funds upfront may increase production or maintenance costs ● This leads to programs that are excessively expensive on the back end 	<ul style="list-style-type: none"> ● Total Ownership Cost (TOC) must be taken into account — achieving ‘target cost’ up front might not always be optimal ● Tradeoffs must be adequately addressed and the ability to procure additional funding must be in place if clear back-end benefit can be demonstrated ● Fundamental budget process issues within DoD limit CAIV’s effectiveness – these issues (ability to obtain pre-SDD funding vs. O&M funding) need to be addressed for CAIV to achieve full potential as a reform tool ● Optimal performance level may require additional SDD schedule
Misaligned Incentives	<ul style="list-style-type: none"> ● Requesting additional up-front funding almost always leads to a review of program’s status — can lead to adverse decisions (delay / cut / cancel) ● Program managers and contractors have an incentive to lower costs up front — they can be punished for higher design and development costs even if these lead to lower TOC 	<ul style="list-style-type: none"> ● The disincentive to request additional SDD funding even if clear R-TOC benefit can be demonstrated must be addressed —additional funding should be made available when clearly justified by lower TOC ● Underlying issue: Contractors / PM incentives must be aligned with R-TOC in all cases, rather than being weighted heavily towards up-front costs



Key Design Challenges

Challenge	Problem Description	Implications for Implementation
Incomplete Definition of Key Performance Parameters (KPPs)	<ul style="list-style-type: none"> At the point of issuing SDD RFPs, Key Performance Parameters are often not set clearly enough for contractors to conduct CAIV analysis effectively Insufficient mandate to clearly define KPPs and resultant specifications prior to SDD 	<ul style="list-style-type: none"> KPPs must be clearly set early in the acquisition process for CAIV to be optimally effective Most of this work should be done during Concept and Technology phases
Quality of Technical Specifications	<ul style="list-style-type: none"> Often too vague & open to interpretation Sometimes call for more than is required 	<ul style="list-style-type: none"> Uncertainty leads to cost increases and/or schedule slips (scope creep)
Lack of Clarity around CAIV process	<ul style="list-style-type: none"> Different individuals may interpret CAIV differently Rules and guidelines for implementation of CAIV may not be clear to contractors 	<ul style="list-style-type: none"> The 'when, who, how early to apply' issues of CAIV must be clarified and aligned with initiative goals
Delineation of the 'C' in CAIV	<ul style="list-style-type: none"> The "C" in CAIV must be clearly delineated as being Life-Cycle-Cost (LCC) 	<ul style="list-style-type: none"> Additional education and clarity around CAIV is necessary to ensure consistent and effective application of the process
Program Schedule Slip	<ul style="list-style-type: none"> Despite some early references to the inclusion of schedule trade-offs, in practice CAIV focuses on a balance between cost and performance Use of CAIV can lead to schedule delays 	<ul style="list-style-type: none"> Clear guidelines for schedule implications of CAIV must be developed — schedule issues must be taken into account when conducting trade space studies
Limited Scope/Impact of CAIV	<ul style="list-style-type: none"> CAIV is only meant to address a limited portion of the acquisition process issues Initiatives such as R-TOC must also be pursued by DoD in parallel 	<ul style="list-style-type: none"> A successful CAIV implementation may not (alone) translate into a program success.



Key Implementation Challenges

Challenge	Problem Description	Implications for Implementation
Must Be Implemented Early in Program	<ul style="list-style-type: none">• To be effective, CAIV must be implemented during concept refinement and technology demo phases. However, this does not always occur due to lack of mandate to establish hard KPPs and begin CAIV process before SDD• Failure to implement CAIV prior to SDD results in limited leverage for optimal tradeoffs	<ul style="list-style-type: none">• CAIV will capture the greatest benefit if it is implemented prior to RFP for SDD<ul style="list-style-type: none">– Majority of CAIV trade space analysis (~90%) must be conducted prior to SDD for full effectiveness– CAIV must be essentially complete (~98%+) by CDR
Building, Maintaining Capabilities	<ul style="list-style-type: none">• Insufficient number of people currently trained to perform: a) LCC development, b) use of parametric estimating models• Fluctuating demand; difficult to maintain a trained staff• Lack of expertise available to properly implement CAIV	<ul style="list-style-type: none">• General level at which LCC analysis (including parametric analysis) is done should be raised to enhance demand and allow for adequate training and retention of skilled workforce• Parametric estimating is a vital tool; more funding must be provided to allow further refinement and updating of these models.



Condition Analysis

DoD's ability to influence these conditions varies widely

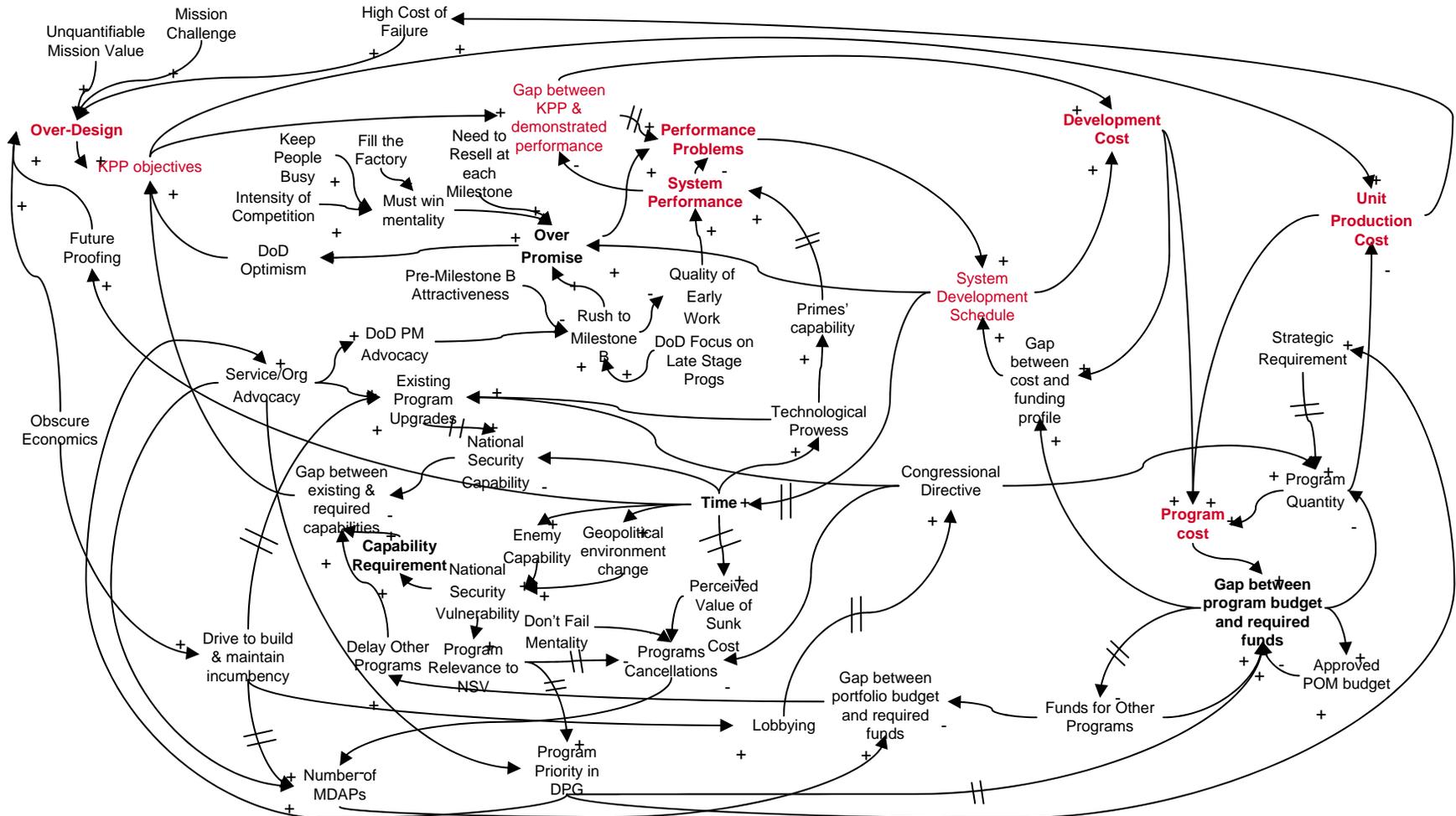
Challenge	DoD Ability to Positively Influence	Commentary
Organizational		
Budget Tradeoffs Within LCC (R-TOC)		Long term problem; will require fundamental changes
Misaligned Incentives		Long term problem; PMs must be properly incentivized
Design		
Incomplete or Inaccurate Definition of KPPs		Needs to become a milestone to enter SDD
Improved Quality of Technical Specifications		May need to become a pre-award USG/KTR action item
Lack of Clarity Around CAIV Process		Meeting Threshold performance cannot be traded-off
Delineation of 'C' in CAIV		USG should state LCC as definition of cost
Program Schedule Slip		Better product may result from SDD scope/schedule increases
Scope/Impact of CAIV		USG must set realistic expectations regarding impact of CAIV
Implementation		
Must Be Implemented Early in Program		Need to establish milestone/gates
Requirement for Training		Implement after resetting CAIV goals/process rules
OVERALL		

Low High



Diagnosis: System Dynamics Present State

CAIV alters DoD acquisition system dynamics in several areas (highlighted in red) – it intends to keep overall costs down and to prevent over-design; given the complexities of the acquisition system, its overall effect is unclear, it may lead to reduced system performance and schedule slip





CAIV Case Study -- Conclusion

Hypotheses Tested

- CAIV, as a project planning tool, has distinct benefits to DoD's acquisition program, but refinements are required
- CAIV, if applied properly, should lead to satisfactory results; the degree of success is dependent on an "enabling" environment:
 - Adequate training re: intent of CAIV and basic tenets
 - Definition of threshold (min) and objective (max) performance requirements
 - Credible life cycle cost (LCC) estimates; works best when there is flexibility to change the distribution of costs within the LCC.
- The successful use of CAIV requires that the planning and requirements process must set threshold performance values correctly; the PMO must maintain a set of threshold values that meet mission needs.
- CAIV is a logical and effective tool; however, it must be implemented correctly. With continued future training, that reflect lessons learned, from past programs, the use of CAIV can reach its full potential as an effective management tool.
- CAIV may not be optimal for all programs – other approaches may be better for revolutionary or urgent national security related acquisitions.
- While CAIV is a useful tool, fundamental issues around DoD's lack of budgeting/funding stability and lack of effective management commitment limit its overall effectiveness

Lessons Learned

- CAIV has had some success but it is not a solution to eliminate all cost overruns; it may not be appropriate for all programs
- It is an approach for a specific process with targeted benefits; it is part of a toolkit that can be used to benefit the successful management of programs
- There is insufficient evidence to determine if CAIV has been broadly successful; there are some concerns about inappropriate performance tradeoffs
- It appears that the acquisition environment in which CAIV exists limits its effectiveness
 - Incentives are misaligned – PMs and contractors are not necessarily rewarded for decisions that lead to lower life cycle costs or provide a better balance between cost and performance
 - LCCs are not taken into account to the degree necessary in the budgeting process
 - The work to define the right threshold and objective performance levels, and develop credible/useful LCCs does not get enough attention



CAIV has achieved some surface level success, but for any meaningful, long term impact, it is clear that more fundamental DoD acquisition structure and governance issues must be addressed

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