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Budgeting for Acquisition: Analysis of Compatibility between PPBES and Acquisition Decision Systems

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Abstract

The DoD employs three sophisticated systems to assist leaders in making decisions on warfighting requirements, weapons acquisition, and financing. These systems provide the DoD some of the best warfighting equipment in the world. However, the systems also exhibit dysfunction. Correction of related problems is part of Secretary of Defense Rumsfeld's transformational initiative. The purpose of this paper is to investigate the congruence between PPBES and Acquisition decision systems. We describe these systems, the fiscal and political environment in which they operate, and ongoing transformational efforts. We suggest the systems are imperfectly articulated; therefore, friction arises and dilutes desired outcomes.

Draft: Not for Quotation

Introduction

Transformation of the Department of Defense may best be understood in the context of the federal government's reform to introduce more efficient business-management practices, improve financial and accounting procedures and systems, improve strategic planning and

budgeting, and to manage more directly for performance and results. As explained in this paper, a considerable degree of transformational reform is currently under implementation in the Department of Defense**.**

This paper focuses on the business side of DoD transformation and not on the transformation of the fighting forces. However, the premise throughout is that business-management transformation must track, support and keep pace with the changes in the force structure and the needs of the fighting forces to respond to the threats posed in the national security environment. The business transformation initiatives of the Bush administration under Secretary Rumsfeld should be viewed as a continuation, albeit at an accelerated pace, of many of the recommendations for federal government reform recommended by the Packard and Grace Commissions in the 1980s, and of the very ambitious changes in business practices instituted under the Defense Management Report/Review (DMR) under Secretary of Defense Dick Cheney and his staff, including Deputy Secretary Donald Atwood, Comptroller Sean O'Keefe and Deputy Comptroller Donald Shycoff (Jones & Bixler, 1992; Thompson & Jones, 1994). Many of the DMR initiatives and programs were continued with success under Secretaries Aspin, Perry and Cohen during the Clinton administration, under the direction (for part of this time) of DoD Comptroller John Hamre and Under Secretaries of Defense for Acquisition and Technology Paul Kaminsky and Jacques Gansler, among others.

With respect to the continuing need for transformation throughout the DoD, hastened by the attacks of 9/11/2001 and the demands of fighting the war on terrorism, Secretary of Defense Donald Rumsfeld has explained, "We're likely to face fewer large armies, navies and air forces, and instead more adversaries who hide in lawless, ungoverned areas and attack without warning in unconventional ways. Our challenge is not conventional, it's unconventional" (cited in OFT, 2004). Recently, former Deputy Secretary of Defense Paul Wolfowitz approved the 2004 DoD Training Transformation Implementation Plan (IP) to better enable joint operations. This replaces the 2003 plan as a result of the department's experience in transforming the force and of lessons learned during operations in the Global War on Terrorism (OFT, 2004).

However, DoD transformation and the part of that initiative which relates to planning, budgeting and acquisition is not done in isolation within the Department. The leadership of the Department of Defense is compelled to live in a fishbowl in the environment of the nation's capitol. Much has been made of the transformation initiatives of Defense Secretary Donald Rumsfeld during the administration of President George W. Bush. And in this fishbowl, criticism is omnipresent. For example, on March 7, 2001, in testimony before Congress, Comptroller General David Walker articulated what many hope and believe, that the United States Department of Defense was the best in the world in its primary mission—that of warfighting: “The Department of Defense and the military forces that it is responsible for are the best in the world. We are an A in effectiveness, as it relates to fighting and winning armed conflicts, when those forces have to be brought to bear” (McCaffery and Jones, 2004, p. 335). Subsequent events in Afghanistan and Iraq provided ample support for this appraisal. That, however, was not the end of Walker's speculations. In the same testimony, Walker assigned the DoD a failing grade in economy and efficiency: “At the same point in time, the Department of Defense is a D plus as it relates to economy and efficiency.” Walker then indicated that the DoD had six of twenty-two federal government high-risk areas within its purview, noting that these ranged from human capital challenges, to information technology, to computer security. In the areas of acquisition and contracting Walker said, “the acquisitions process is fundamentally broken, the contracts process has got problems, and logistics as well” (McCaffery and Jones, 2004, p. 335). In testimony before the Senate Homeland Security and Governmental Affairs Committee, in February of 2005 Walker indicated that DOD was involved in 14 of the 25 high risk areas and called this ‘unacceptable.’

It is clear these are not trivial problems. GAO estimates that the DoD spent $146 billion in developing and acquiring weapons in 2004 and that this investment was scheduled to grow to $185 billion by FY 2009. Moreover, GAO warned that, as a result of inefficient systems and practices, the DoD invites a series of troubling outcomes: “Weapon systems routinely take much longer to field, cost more to buy, and require more support than provided for in investment plans” (GAO, 2005a, p. 68). GAO noted that when weapon systems require more resources than planned, "the buying power of the defense dollar is reduced" and this can result in unfavorable tradeoffs, such as increased spending or reduced defense capability. GAO opined:

> For example, programs move forward with unrealistic program cost and schedule estimates, lack clearly defined and stable requirements, use immature technologies in launching product development, and fail to solidify design and manufacturing processes at appropriate junctures in development. As a result, wants are not always distinguished from needs, problems often surface late in the development process, and fixes tend to be more costly than if caught earlier. (GAO, 2005a, p. 68)

No one wants to imperil the DoD’s “A” performance in warfighting; in fact, the transformation in military affairs in the DoD in the past five years is exemplary, although much remains to be done to adapt to a new warfighting environment and the Global War on Terrorism. Still, the fact remains that inadequate acquisition, logistics, and financial management systems have severe negative consequences—not only for the management side of the DoD, but for the military side as well. Money wasted as a result of poor management practices equates to loss of resources to improve the effectiveness of the fighting forces. Poor business practices may result in buying weapons systems that do not meet warfare requirements. Moreover, inefficient collateral weapons and forces support systems result in increased risk to warfighters. Because of mismanagement, inventory may be lost in transit and shortages of critical spare parts may occur. On the financial side, Secretary of Defense Donald Rumsfeld has estimated that modernized business management systems could save the DoD roughly 5% of its annual budget, about $22 billion dollars on the FY 2004 budget. In the late 1990s, when the DoD was pursuing non-compatible goals of recapitalization and budget reduction rather than transformation, $22 billion would have paid for about half of the more conservative estimates of dollars needed to achieve rebuilding the DOD hard asset base. And even if recapitalization was not deemed necessary, there are other reasons to adopt efficient systems. Underlying them all is the principle that in the use of taxpayer dollars, the DoD should be a good steward of its finances.

To its credit, the Department has made continuous efforts to improve its acquisition and financial management processes. GAO observed: "Specifically, DOD has restructured its acquisition policy to incorporate attributes of a knowledge-based acquisition model and has reemphasized the discipline of systems engineering” (GAO, 2005a, p. 68).

In addition, the DoD recently introduced new policies to strengthen its budgeting and requirements determination processes in order to plan and manage weapon systems based on joint warfighting capabilities. However, GAO also warns that the path ahead is still difficult:

> While these policy changes are positive steps, implementation in individual programs will continue to be a challenge because of inherent funding, management, and cultural factors that lead managers to develop business cases for new programs that over-promise on cost, delivery, and performance of weapon systems. (GAO, 2005a, p. 68)

GAO has been keeping a high-risk list since 1990 of programs it feels need urgent attention to ensure they are operated in the most effective and efficient manner. Programs are put on the list when GAO believes their systems are inadequate and could lead to abuses. GAO identifies these programs and reports on them to Congress with suggestions for improvement. GAO says of its high risk list:

> AO's high-risk program has increasingly focused on those major programs and operations that need urgent attention and transformation in order to ensure that our national government functions in the most economical, efficient, and effective manner possible. […] [F]ederal programs and operations are also emphasized when they are at high risk because of their greater vulnerabilities to fraud, waste, abuse, and mismanagement. In addition, some of these high-risk agencies, programs, or policies are in need of transformation, and several will require action by both the executive branch and the Congress. Our objective for the high-risk list is to bring "light" to these areas as well as "heat" to prompt needed "actions." (GAO, 2005a, p. 5)

Of the 25 high-risk areas on the 2005 update, the DoD is explicitly named in eight areas and participates in a least five other areas. The list is shown in Exhibit 1, indicating the high risk by area and the date it was placed by GAO on the high-risk list.

Exhibit 1. High-Risks Areas and Date of Nomination

Table 3: The Year that Areas on GAO's 2005 High-Risk List Were Designated as High Risk

Area	Year designated high risk
Medicare Program	1990
DOD Supply Chain Management	1990[a]
DOD Weapon Systems Acquisition	1990
DOE Contract Management	1990
NASA Contract Management	1990
Enforcement of Tax Laws	1990[b]
DOD Contract Management	1992
HUD Single-Family Mortgage Insurance and Rental Housing Assistance Programs	1994
DOD Financial Management	1995
DOD Business Systems Modernization	1995
IRS Business Systems Modernization	1995[c]
FAA Air Traffic Control Modernization	1995
Protecting the Federal Government's Information Systems and the Nation's Critical Infrastructures	1997
DOD Support Infrastructure Management	1997
Strategic Human Capital Management	2001
U.S. Postal Service Transformation Efforts and Long-Term Outlook	2001
Medicaid Program	2003
Managing Federal Real Property	2003
Modernizing Federal Disability Programs	2003
Implementing and Transforming the Department of Homeland Security	2003
Pension Benefit Guaranty Corporation Single-Employer Insurance Program	2003
Establishing Appropriate and Effective Information-Sharing Mechanisms to Improve Homeland Security	2005
DOD Approach to Business Transformation	2005
DOD Personnel Security Clearance Program	2005
Management of Interagency Contracting	2005

Source: GAO.

[a]This area was formerly entitled DOD Inventory Management.

[b]One of the two high-risk areas that were consolidated to make this area—Collection of Unpaid Taxes—was designated high risk in 1990. The other area—Earned Income Credit Noncompliance—was designated high risk in 1995.

[c]IRS Financial Management has been incorporated into the IRS Business Systems Modernization high-risk area. Both areas were initially designated as high risk in 1995.

There were 14 areas on the high-risk list in 1990. Over the intervening 15 years, twenty-nine areas have been added; 16 removed and 2 consolidated. However, no DoD area has ever been removed from the list. Supply-chain management and weapons system acquisition made the list in 1990. Of this, Senator Voinovich (R. OH) said, "I just think it's unacceptable […] Defense Department supply chain management—15 years; DOD weapons system acquisition, we're talking billions an billons of dollars—15 years, and nothing's been done" (Barr, 2005, p. B02).

It is not true that nothing has been done. As GAO notes:

> DOD has undertaken a number of acquisition reforms over the past 5 years. Specifically, DOD has restructured its acquisition policy to incorporate attributes of a knowledge-based acquisition model and has reemphasized the discipline of systems engineering. In addition, DOD recently introduced new policies to strengthen its budgeting and requirements determination processes in order to plan and manage weapon systems based on joint warfighting capabilities. While these policy changes are positive steps, implementation in individual programs

> will continue to be a challenge because of inherent funding, management, and cultural factors that lead managers to develop business cases for new programs that over-promise on cost, delivery, and performance of weapon systems. (GAO, 2005a, p. 68)

GAO worries that programs move forward with unrealistic program cost and schedule estimates, that they lack clearly defined and stable requirements, that immature technologies are used in product development and that there is a failure to solidify design and manufacturing processes at the appropriate times in the development processes. Thus says GAO, "wants are not always distinguished from needs, problems often surface late in the development processes, and fixes tend to be more costly" (GAO, 2005a. p. 68).

This is a picture crudely drawn, though it is of a sizeable and costly problem which has a direct impact on our nation's ability to wage war and its fiscal capacity to afford defense. It is not an insignificant problem. It is not an unrecognized problem. GAO, Congress, the executive branch and various Secretaries of Defense have confronted these issues, the last among them being Donald Rumsfeld. Progress has been made, but the problem seems so intractable that DOD financial management was put on the list in 1994, DOD business systems modernization in 1995 and the DOD approach to business transformation in 2005. Not only are the original problem in supply chain management (1990) and weapons acquisition (1990) still with us, but the solution process itself has become a high-risk venture.

It is no secret that DoD problems have historical antecedents, dating to the War and Navy department days. When the DoD was created, the different services constituted a confederation of fiefdoms, with each feeling that they contributed something unique that had to be supported with its own systems. Thus, stove-piped systems, some reaching back to Revolutionary War days, were preserved, as well as the ancillary systems which had developed in support of them. Not only were the main systems different, but so were all the collateral systems. With computerization, stovepipes (as they existed) were largely computerized; the result is that stovepipes are alive and well. They support and are supported by individual service cultures. This thinking is pervasive within the DoD as financial and program managers can hardly wait to break down numbers and get them into their own systems and models that they can work and trust, rather they relying on dozens of other providers for partial information.

The cultural imperative within the DoD is to do warfighting well—and regardless of what is said about the need to improve collateral systems, change has been slow. Partially this is because the DoD is large. Partially it is because the DoD is unlike the nation's largest private-sector companies; thus, simply borrowing solutions does not seem to work well. Also, the pace of technology means that the DoD—because of its size and cultural diversity—is still implementing a solution a generation or two old when the private sector has adopted it, seen its strengths and weaknesses and moved on to something newer and better. Leadership in the DoD is often singled out as the culprit in this story; leaders come, go, and underemphasize reform; or, they are not there long enough to exert enough pressure to do the job. All of these observations have some merit.

In this paper we want to suggest yet another problem. In essence we believe part of the problem lies in the solution. The DoD has created three sophisticated and intricate systems to surface warfighting requirements, acquisition needs, and resourcing decisions. We suggest these three systems are imperfectly articulated with each other; so, they each do the job they were intended to do, but their interaction causes offsetting frictions to come into play; in other words, the sum of the whole is less than that of the parts—something like a driver unexpectedly

confronted by an object in the road who wrenches the steering wheel while flooring the accelerator and stomping on the brake. The DoD analogs rest in the warfare-requirements determination system, the PPBE resourcing system, and the formal weapons acquisition system. We begin with an examination of the fiscal environment for national defense.

NATIONAL DEFENSE FISCAL ENVIRONMENT

We begin this line of explanation to place the topic of this paper—improving the fit between PPBES and Acquisition decision making systems—with a short analysis of the fiscal predicament which confronts defense resource managers and officials.

Acquiring weapons platforms such as aircraft, ships, tanks, and weapon support systems for military forces is central to accomplishing the mission of the Department of Defense. Each year, the President submits the defense acquisition budget as part of the overall budget for the Department of Defense to Congress for review and appropriation. Threats to national security and political priorities drive the amount of defense funding requested and appropriated for weapons acquisition. Congress, representatives from the executive branch and the DoD, industry lobbyists, analysts in defense think tanks, media experts and a variety of other agents debate the merits of spending and programmatic alternatives and maneuver to receive resources. Congress expects the DoD to provide quality products that meet warfighter needs while sustaining program stability—and, more recently, to shorten acquisition program cycle times, to develop more innovative approaches to weapons research, development, design, testing, evaluation, production, support, and use.

Program managers from the DoD promote and attempt to garner funding for their programs in the annual budget process. Following appropriation, Congress and the DoD provide directives and guidance to assist the military services in weapons acquisition. The weapons asset investment budget is constrained by the defense budget top-line and squeezed by increasing operating and support costs for aging weapon systems, and since September 11, 2001, the cost of fighting the war on terrorism. In the 1990’s, the procurement account constituted a declining share of a contracting defense budget. As is shown in Exhibit 10, in 2002 the procurement account remained substantially below its Cold War average, while aging weapons systems were kept in place and the cost of replacement systems accelerated.

While total defense budget has increased significantly since the events of September 11, 2001, much of the increase has gone into defense against terrorism and active war-fighting expenditures. The investment budget remains squeezed between rising costs for maintenance of increasingly aged systems and the necessity to re-capitalize and buy expensive new systems. This situation is primarily the legacy of the procurement holiday of the 1990’s. With the passage of time and the addition of new responsibilities, the unmet future burden backlog grows more serious.

In the past decade, increased acquisition costs have led to greater reliance on private-sector products and processes to improve performance. The movement to adopt better business practices is part of the Defense Department’s initiative instituted under the Clinton administration, and continued under the administration of George W. Bush, termed in the early 2000s as the "Transformation in Business Affairs" (TBA). The TBA has four primary goals in the area of acquisition. First, it intends to stimulate the production of high-quality defense products. Second, it is supposed to reduce average acquisition systems’ cycle time for all major acquisition programs by 25 percent (from 132 months to 99 months). Third, the DoD is to lower total ownership costs (TOC) of defense products, with the goal of minimizing cost growth in

major acquisition programs to no more than 1 percent annually. The fourth goal is to reduce overhead costs to provide less expensive weapons platforms. In some cases, these goals may be achieved by purchasing assets (typically components of, or support items for, weapons and systems) manufactured by the private sector for general (non-defense specific) markets. Given the size of the annual budget deficit for 2003 and beyond, constrained budgets for defense may be anticipated. However, the mission of the DoD continues to expand as the U.S. faces new, more diverse, terrorist threats. What this means in terms of major system asset renewal and re-capitalization for the DoD and the military departments and services is that such requirements inevitably exceed budgets. Thus, the operational question from a resource management and budgeting perspective is how to best cope with this reality?

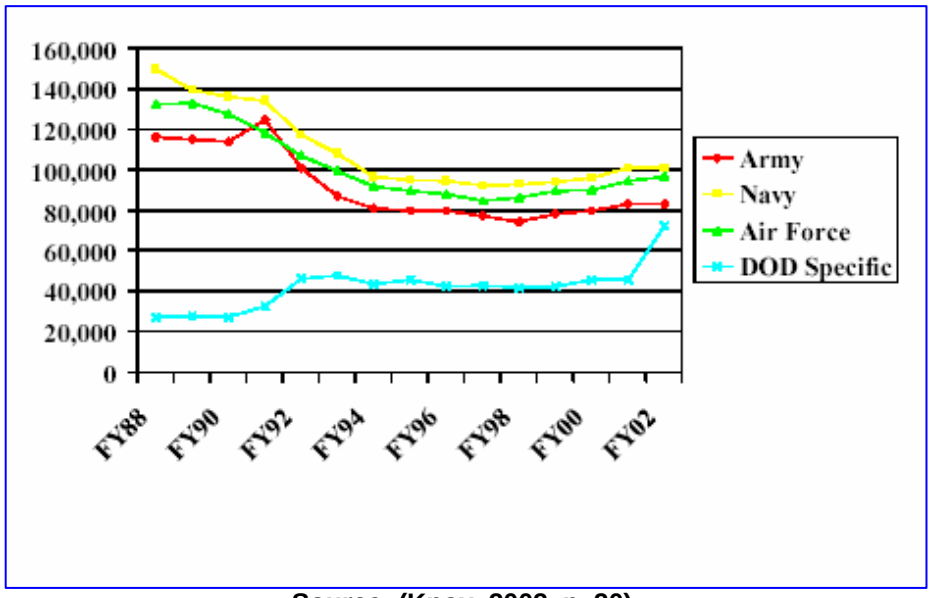
HISTORICAL TRENDS FOR ACQUISITION FUNDING

Our first task is to understand trends in funding for acquisition. This section provides budget data on weapons acquisition contrasted with military support accounts. It begins with a review of budget authority, total obligational authority, and outlays for the DoD for the period 1988 to 2000. Budget Authority (BA) is provided to the DoD through appropriation by Congress. BA grants the DoD permission to spend money to make or buy necessary defense assets. BA is appropriated for one year or for multiple years, e.g., three years for aircraft acquisition, five years for ship construction. BA allows departments and agencies to incur obligations and to spend money on programs. Thus, BA results in immediate fiscal-year or future-year obligations and outlays. Total Obligation Authority (TOA) is a budget term that indicates the total of all money available from prior fiscal years and the current fiscal year for spending on defense program in the current fiscal year. Typically, asset acquisition is paid for using both current- and prior-year appropriations and extends over a multiple year time horizon.

TOA is, in effect, the accumulation of annual Budget Authority. As with all federal departments and agencies, the DoD attempts to spend all the funds appropriated to it for the purposes specified by Congress. By law, unexpended BA for which spending authority expires before obligations are incurred is returned to the Treasury and is no longer available for the DoD to spend.

Budget Authority is spent via the obligation process. Hiring personnel, contracting for services, buying equipment, letting a contract are all ways of incurring obligations against Budget Authority. Outlays, then, are the actual expenditures that liquidate government obligations. Before passage of FY 1989 defense authorization and appropriation legislation, prior-year unobligated balances were reflected as adjustments against TOA in the applicable program year only. However, since then, both the Congressional Budget Office (CBO) and Office of Management and Budget (OMB) have scored (recorded) such balances as reductions to current-year BA. Previously, reappropriations were scored as new Budget Authority in the year of legislation. However, in preparing the amended FY 1989 budget, CBO and OMB directed scoring of reappropriations as Budget Authority in the first year of availability (Department of the Navy, 2002a). The change reduced DoD spending flexibility in out-years.

Exhibit 2. DoD TOA by Military Department and DoD specific (Constant FY 2003 $M)



Source: (Knox, 2002, p. 20).

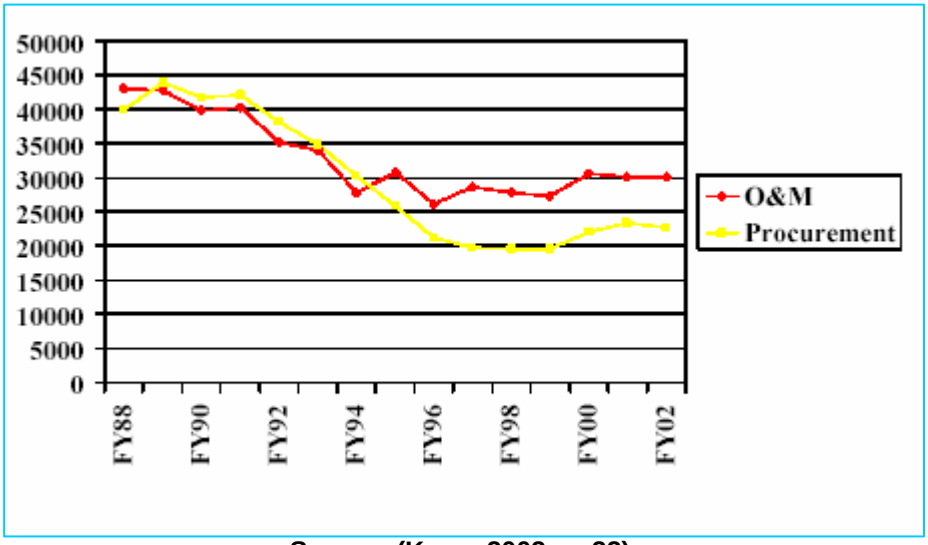
Exhibit 2 shows TOA by military department and service in constant FY 2003 dollars. The Exhibit reveals decreasing TOA from FY 1988 until FY 1994 when it leveled off until FY 1999, after which it has increased slightly. One of the most serious problems faced by the DoD is how to fund the replacement of used assets that have served far beyond their projected depreciation term. In an ideal world, new money would be appropriated by Congress to pay for new weapon assets. In the world as it exists, however, the DoD cannot make enough money available to fund new asset acquisition while sustaining spending in other parts of the DoD budget. This has and will continue to force the DoD to cut spending in non-acquisition accounts, programs, and activities to fund asset replacement. Some observers have argued that Operations and Maintenance funding has been cut over the past few years to free-up money for acquisitions. Others have argued the contrary, that the procurement accounts have been cut to fund the O&M accounts to support peacekeeping initiatives during the 1990s and that they remain compacted by the level of wartime activities in Iraq.

The historical record as to what happened is not clear; both the O&M and Procurement accounts declined during the 1990's (as is shown in Exhibit 3) and to suggest that one is borrowing from the other is to suggest that two neighbors equally impoverished are forced to borrow from one another. Measured by per-capita spending, CBO predicts that the O&M spending per service member will continue a slow growth pace out to 2020, but that investment per service member will peak in the year 2010 and then decline a bit (McCaffery & Jones, 2004, p. 71). Longer term predictions about fiscal matters are difficult to make now given the instability of the situation in Iraq which has led to large wartime supplemental appropriations. In 2005, the March supplemental was very large (about $80 billion, about 20% of the size of the total defense budget) and mixed together some personnel and transformation spending, which might normally have been included in the regular budget. (Senator Levin and others on the Senate Armed Services Committee argued that it should have been in the regular budget.) Then, in testimony over the regular DoD appropriation, CNO Clark defended the DoD's position that its transformation efforts would allow it to reduce its carrier force by one to fund its transformational shipbuilding account, which itself was underfunded. At the end of the day, despite an overall

increase and a reduction in one of its main lines of business—carriers—the Navy shipbuilding budget still appeared underfunded.

Exhibit 3 shows part of the historical record for these accounts. It shows Acquisition and O&M appropriations in constant FY 2003 dollars for one service, the Navy. O&M and acquisition dollars trended downward from FY 1988 to FY 1994, with a few spikes upward in FY 1995 and FY 1998.

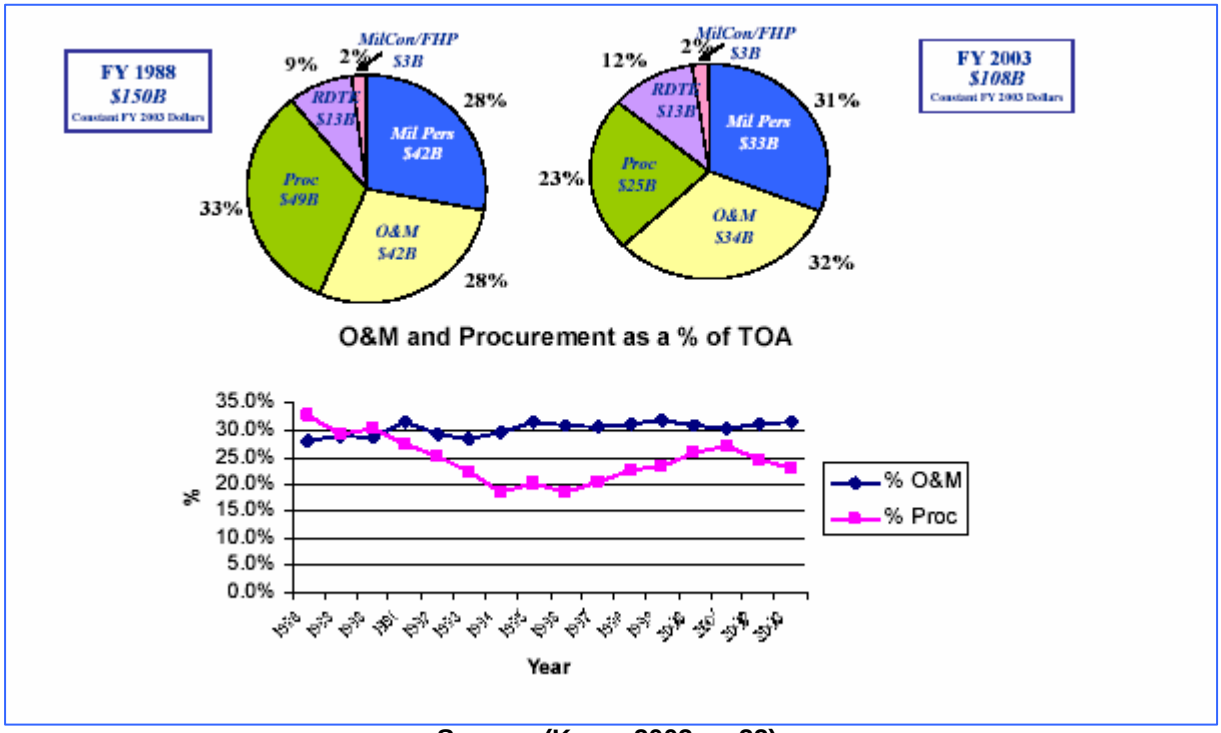
Exhibit 3. Navy O&M and Procurement Outlay Trends in Constant FY 2003$M



Source: (Knox, 2002, p. 22).

This is a rough measure, but it can be argued that some part of the O&M increase was caused by increased maintenance and repairs needed to support older ships and aircraft in FY 1996 to FY 1999. There was some recovery of acquisition funding in FY 2000, but the gap between O&M and acquisition funding rates remained relatively steady.

Exhibit 4. Navy TOA and Acquisition 1988 to 2003



Source: (Knox, 2002, p. 22).

The pie charts in Exhibit 4 indicate the change in budget share in the Department of Navy budget from 1988 through 2003. The line graph shows how Navy O&M and procurement have varied as a percentage of TOA. Here Navy O&M is roughly flat as a percentage of TOA while procurement declined from just below a 35% share to 20% in the mid-1990s before rebounding in the later years of the decade. While O&M has been consistent at about 30%, the procurement decrease in the mid-1990s is clearly evident.

ACQUISITION AND THE PLANNING, PROGRAMMING, BUDGETING EXECUTION SYSTEM

Budgeting for acquisition takes place within the PPBE system. The defense acquisition budget process integrates two major DoD decision support systems into PPBES. Within the Planning process, the warfare requirements' generation system identifies missions and matching assets needed to enhance force capability for existing systems or for adding new operational capabilities. Then, in the programming phase of PPBES, the acquisition-management system translates requests for new operational capability into operational system requirements for hardware, i.e., specific weapons and systems to perform mission requirements such as aircraft to operate from aircraft carriers or new tanks or ships. This process provides the basis for making informed decisions based on affordability constraints and the needs of the fighting forces.

The PPBE system is intended to provide a stable and routine decision process for planning, programming, and budgeting for the research, development, test and evaluation (RDTE), and acquisition, fielding, and maintenance of new or modified weapon systems. However, integration of the two support systems with the PPBES process is complicated as it operates presently; therefore, it causes delays and creates turbulence in the acquisition

process. Acquisition planning, programming, and budgeting integrate the definition of mission requirements and acquisition management demands into PPBES. Projections for future weapons system needed to counter anticipated threats are stated in the primary vehicle for planning, the Future Years Defense Plan (FYDP). In addition, the weapons acquisition system requires adherence to a set of milestone phases for decision that are prescribed in statutory (legislation passed by Congress) and administrative law (DoD regulation).

For purposes of clarification for the analysis that follows, some definition of terms is necessary. ACAT I programs are Major Defense Acquisition Programs (MDAP). The acronyms MDAP and ACAT I are used interchangeably here. An MDAP is defined as a program estimated by the Under Secretary of Defense for Acquisition, Technology and Logistics (USD (AT&L)) to require eventual expenditure for RDT&E of more than $365M (in FY 2000 constant dollars) or acquisition of more than $2.190B (in FY 2000 constant dollars), or other programs designated by the USD (AT&L) to be ACAT I. There are three major acquisition categories stipulated by regulation in DOD: ACAT I, ACAT IA and ACAT II. ACAT ID (defense) and ACAT IC (component or individual service) are analyzed in more detail subsequently.

Responsibility for coordinating the components of the acquisition funding process rests ultimately on individual program managers (PM). As the lead acquisition official for a program, the program manager is charged with integrating the administrative demands of PPBES (e.g., how much to ask for in the budget process) with the management demands of the acquisition process (e.g., meeting milestone requirements in acquiring weapons and weapons support systems). The process for major acquisition programs (ACAT I) is the most complicated, has the highest level of importance and, normally, the largest financial exposure. Consequently, this category receives the greatest oversight attention from various offices within the DoD and from Congress (Bendorf, 2000). An ACAT I program manager has to meet strict qualification requirements, higher than those for non-ACAT I program managers. Training and experience requirements are designed to select program managers who possess a broad base of acquisition experience. PMs must be or become adept at the skills of managing acquisition while also operating effectively as proponents and defenders of their programs in the programming and budget processes. Without proper positioning in the PPBES process, a weapon system can be designed and tested and still not be acquired because it does not survive the gauntlet of the PPBES and congressional review and decision processes.

Within PPBES, once a system has been identified as necessary to meet mission requirements (in the planning phase of PPBES) it has to be reviewed for inclusion in the Program Objective Memorandum (POM). The POM is constructed separately by each military service and department. For example, the Navy official responsible for preparing the POM is the Chief of Naval Operations (CNO) and the CNO staff (OPNAV). The POM and budget processes used to operate separately and sequentially. However, in 2001, Secretary of Defense Donald Rumsfeld required that the POM and budget processes operate concurrently.

According to the new process, once the POM and budget are approved by the service chiefs, e.g., the CNO for the Navy, the POM is sent to the Service Secretary (Secretary of the Navy) and then the program review staff of the Office of the Secretary of Defense. Military service and department (MILDEP) acquisition executives (Assistant Secretaries for Acquisition and related functions—also referred to as Component Acquisition Executives or CAEs) compile and review requirements for defense acquisition programming and budgeting before the POM and budget are forwarded to SECDEF staff—specifically to the Under Secretary for Defense for Acquisition (USDA, or, currently, the USD AT&L—Under Secretary of Defense for Acquisition, Technology and Logistics).

The Under Secretary of Defense for AT&L and staff review requests from the military services and departments to establish an Acquisition Program Baseline (APB) and budget for all of the DoD. This step requires an agreement between the Milestone Decision Authority (MDA) manager in the Office of the Secretary of Defense for Acquisition and the PM on the cost, schedule, performance objectives and thresholds of all acquisition programs. The Acquisition Program Baseline (APB) contains the most important cost, schedule, and performance parameters and is updated as required.

Weapons program officials establish the Acquisition Program Baseline (APB) to document the cost, schedule, and performance objectives and thresholds for their program. The program manager prepares the APB at program initiation for acquisition category programs, at each subsequent major milestone decision, and following a program restructure or an unrecoverable program deviation. APBs contain objectives for cost, schedule, and performance parameters, as noted above. The specificity and number of performance parameters evolve as the program is better defined. The schedule parameters include program initiation, major milestone decision points, initial operating capability and any other critical system events. These critical events are proposed by the PM and approved by the Milestone Decision Authority (MDA) for each program.

Maximizing PM flexibility to make cost, performance and schedule tradeoffs without "too much" higher-level review and micromanagement is deemed essential to achieving programmatic objectives from the view of the program office. Therefore, creating an executable agreement and sustaining consistent milestone reporting in conformance with the APB is a critical task for the PM. The level of ACAT designation (e.g., I, II, etc.) normally is assigned after approval of the operational requirements document (ORD) by the MILDEP and USD (AT&L). A proposed ACAT designation is provided in the requirements document.

THE DEFENSE ACQUISITION BOARD AND THE DEFENSE PROGRAM AND BUDGET

In the acquisition resource decision process, the intended weapon‘s user (e.g., the Army) identifies an operational need that cannot be satisfied by anything but a fixed asset (weapon, system or platform) and produces a Mission Need Statement (MNS). Once the MNS is approved by the service Chief of Staff and validated by the Joint Chiefs’ of Staff (JCS) Joint Requirements Oversight Council (JROC), the USD (AT&L) convenes the Defense Acquisition Board (DAB). The DAB is the Defense Department senior level forum for advising the USD (AT&L) on critical decisions concerning ACAT I programs (see exhibit 20). Some programs are administered at the DoD level and others at the military departmental level. The USD (AT&L) is the milestone decision authority (MDA) for "ACAT ID" programs where the “D” stands for defense. The service component is the milestone decision authority (MDA) for "ACAT IC" programs, where the “C” stands for component, e.g., Army, Navy, Air Force. For example, the Navy MDA is the Assistant Secretary of the Navy (Research, Development and Acquisition).

The DAB is comprised of DoD senior acquisition officials. The DAB reviews the mission needs statement (MNS) and makes recommendations to the Milestone Decision Authority (MDA) for concept studies of a minimum set of alternatives. This review and MDA approval constitute the Milestone 0 decision point. The MDA oversees the "concept studies" and approval process and directs the initiation of Phase 0 (concept exploration and definition) with an acquisition decision memorandum (ADM).

Milestones are major decision points for weapons systems. The milestone review process is predicated on the principle that systems advance to higher acquisition phases by demonstrating that they have met prescribed technical specifications and performance thresholds. For all ACAT I programs, a lifecycle cost estimate is prepared by the program manager in support of program initiation and all subsequent milestone reviews. For example, the Navy program manager establishes, as a basis for lifecycle cost (LCC) estimates, a description of the salient features of the acquisition program and of the system itself (Department of the Navy, 2002b). The LCC estimate plays a key role in the management of an acquisition program. At each milestone decision point, including the decision to start a program, lifecycle costs, cost, performance, schedule tradeoffs, cost drivers and affordability constraints are major considerations. Here the primary purposes include providing input to acquisition decisions among competing major system alternatives. Lifecycle costs (LCC) help determine requirements. Cost Drivers are identified among alternatives. LCC also provide an index of merit for trade-off evaluations in design, logistics, and manufacturing and the basis for overall cost control.

In budget preparation, various Departmental components initiate the process and state their spending and execution priorities. For example, the Navy Component Acquisition Executive, Assistant Secretary of the Navy, Research, Development and Acquisition (ASN RD&A) prepares the budget-estimate request for Navy ACAT I programs in support of Milestones II and Milestone III. Once the budget is enacted, the ASN (RD&A) exercises line management over Program Executive Offices (PEOs) and direct reporting program managers (Department of the Navy, 2002b). The PEO generally relies on hardware systems commands for administrative support, including comptroller functions for financial management. Once the budget begins the execution phase, the fund-flow for both PEO and hardware systems commands comes within a single conveyance via a normal path for appropriations. The PEO exercises control of designated resources within the hardware systems command allocation.

Once the programs and budgets for each military department have been reviewed by the Defense Acquisition Board, they are included in the approved SECDEF POM and, subsequently, in the DoD budget. The defense acquisition budget is merged with the budget comprised of all spending accounts by the Assistant Secretary of Defense, Comptroller and, once approved by SECDEF, is sent to the President's Office of Management and Budget for inclusion in the documents to be presented to Congress, where it then follows the normal appropriation process.

ISSUES IN BUDGETING AND MANAGING OF WEAPONS ACQUISITION

Members of the legislative and executive branches, including the Department of Defense, the military departments and services, defense agencies, program managers and special industry interest groups all are involved in budgeting for the acquisition of defense weapons. In the acquisition process, program managers must give specific attention to their actions and responses toward their external political and budgetary environment. However, dealing with the complexities of acquisition budgeting requires the attention of all players in the process. A number of issues seem to persist over time to confront acquisition budgeting. Some of the more important of these issues are addressed as follows.

Congress regards the President's budget as a statement of executive priorities to address the national interest and constituent needs. Congress also has its ideas about national priorities and constituent needs. Thus begins a long process of debate and amendment before a final appropriation is made to fund the new fiscal year needs. The FY 2003 budget proposed an

addition of $48 billion for national defense (see Exhibit 5). This represented a 13 percent increase in constant dollars—the greatest one-year increase since the defense build-up of the 1980s (Department of the Navy, 2002a). Defense outlays were projected to approach 3.5 percent of Gross Domestic Product in FY 2003, the highest levels since 1995. In contrast, during the mid-1980s defense spending averaged nearly 6 percent of GDP. Included in this request was $10 billion designated as “wartime contingency” for combating terrorism in Afghanistan or other locations, including Iraq. Funding for acquisition was increased by 13.2% in FY2003 budget.

Exhibit 5. Actual FY 2002, Estimated FY 2003, Requested FY 2004-2005 Funding

Procurement	Actual 2002 62,227.2	Estimate 2003 70,430.9	Request 2004 72,746.5	Request 2005 77,187.3
Percent change		13.2%	3.3%	6.1%

Source: (Department of Defense, 2003e).

After 2003, the President’s FY 2003 budget projected a much slower growth in budget authority for defense—for an average annual rate of 3.2 percent through 2012 (Department of Defense, 2003c). In the end, Congress, caught between defense hawks and tax cut hawks and other pressing needs, basically accepted the President’s budget, making only marginal changes in the appropriation bill while reacting to specific defense and homeland security needs with a series of large supplemental bills. Altogether, the DoD appropriation increased 29% for FY98 through FY2003, while the procurement account increased 42% for the same period. These were the largest increases since the Reagan buildup of the early 1980s. Nonetheless, they did not solve DoD problems with aging weapon systems and the need for recapitalization (e.g., buying ships, aircraft, and tanks on a planned replacement schedule to modernize the inventory). Meanwhile, SECDEF Rumsfeld pursued transformation efforts as a way around the fiscal dilemma to provide a more agile, more lethal force. These issues and their resolution demonstrated the inevitable tension in funding national defense between how much is enough and how much can be afforded. The perception of threat is crucial and relative; it is always open to interpretation. Further, constituent demands for defense spending, and particularly for acquisition dollars, typically is well-represented—new acquisition programs often mean new jobs and increased revenues to companies in the defense industry.

There is no magic number for spending for weapons asset acquisition. The Pentagon wants as much money as would seem commensurate with meeting the threat and realistic program development and execution. However, defense cannot have it all, and Congress often articulates and debates the tradeoffs that must be made between "guns and butter." Some insiders believe the defense acquisition budget process is best characterized as a reaction to contingencies. The budget is expected to respond to contingencies in the external threat environment and the changing political priorities of the President and Congress. Further, the change in the annual defense budget is in many ways less important than the trend represented in the President's projected requests for future years and Congressional Budget Resolution out-year spending targets.

The debate about how much spending is enough in effect results in a *de facto* multi-year budgeting approach for defense and acquisition, subject to annual revision. Budgeting for the rest of the discretionary budget generally focuses more on annual appropriations. In this respect, national defense budgeting is different. The stakes are higher when budget decisions over annual spending in the tens or hundreds of billions of dollars are accumulated over a multi-

year period. Only the overall federal deficit or surplus and spending for entitlement programs command the type of attention given to defense and acquisition budgets. Because the amount of spending is of such volume and magnitude, both the executive and legislative branches of government always have difficulty negotiating and reaching consensus on how much to spend, and what to spend it on. Absence of consensus tends to result in longer-term swings upward and downward, which makes acquisition of military assets harder to plan, budget, and execute (Jones & Bixler, 1992, p. 9).

Sustaining the Industrial Base for Defense Asset Production

The President's FY 2003 and out-year defense acquisition spending plan, intended to assist in recovery from defense spending cuts at the end of the Cold War, drew concerns from industry groups. Among those most vocal were defense-industry executives, including former Assistant Navy Secretary John Douglass (President of the Aerospace Industries Association), retired Air Force Lt. General Larry D. Farrell (President of the National Defense Industries Association), and former Congressman Dave McCurdy (President of the Electronic Industries). For example, Douglass remarked about ship-construction funding, "You can't maintain a defense base on five ships a year" (Douglass, 2002). A projected build rate of only five ships per year caused distress among defense-industry representatives—five was not enough in their view. They said the nation needed a viable defense industry to be prepared for a time of war and cited the reduced number of makers of major defense platforms as a cause for concern.

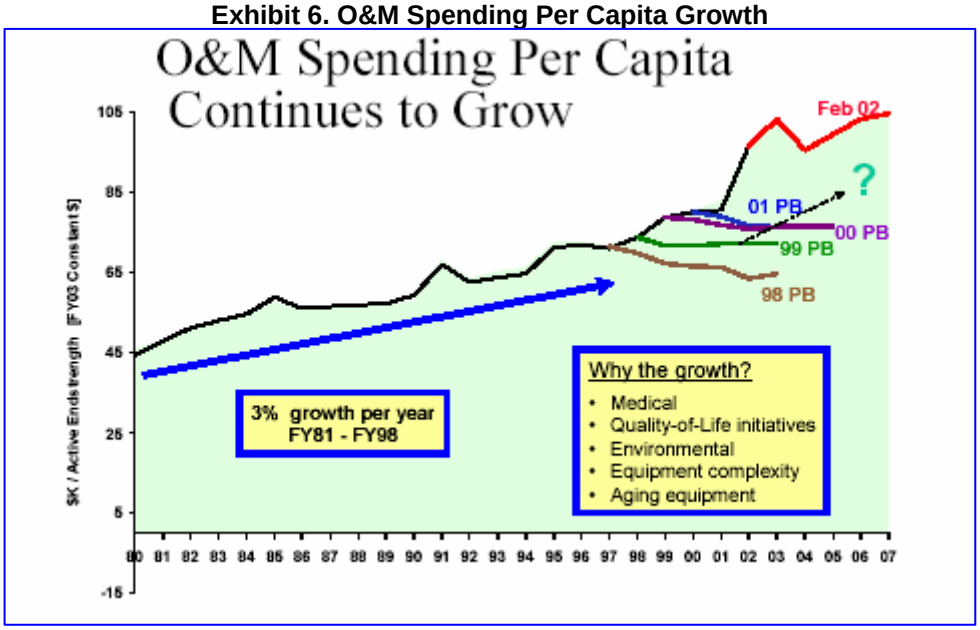
To combat the decline in shipbuilding and to maintain a force of 310 ships, the Navy acquisition plan includes the construction of an average of nine ships per year. However, getting the money in the DoD budget for construction at this rate has not been successful. After two DDG-51 destroyer ships were requested in the FY 2003 President's budget, the Shipbuilding Association asked Congress to add $935 million to the budget to procure a third DDG-51 in FY 2003 and to fund advance acquisition for a third DDG-51 again in FY 2004. This increase would, "move the Navy closer" (Farrell, 2002) to the requirement that it procure four DDG-51s a year, the rate needed (according to the National Defense Industries Association) to sustain a fleet of 116 destroyers and other surface combatant ships. In response to industry lobbying, a third DDG 51 was added by Congress to the FY 2003 budget.

Consolidations, mergers, and bankruptcies have reduced the number of major weapons systems contractors. Contractors making Navy surface ships shrank from eight to three from 1990 to 2000, as did the number of companies producing fixed-wing military aircraft (Ahearn, 2002). As of 2003, there still were two makers of submarines, although this was only because Northrop won a bidding contest with General Dynamics Corporation. Rotorcraft makers, such as helicopters and the V-22 Osprey tilt-rotor airplane, declined from four to three, while makers of strategic missiles shrank from three to two during this period (Ahearn, 2002). The number of companies filling contracts in the undersea warfare area fell by two-thirds, from fifteen to five, while producers of torpedoes slipped from three to two (Farrell, 2002).

Farrell estimates that, "shipyards are operating at 50 percent of capacity," which is inefficient, and costs the Navy, "hundreds of millions of dollars annually" as compared to costs of operating shipyards at higher, more efficient output levels (Farrell, 2002). Rep. Norm Dicks (D-Wash.), a member of the House Defense Appropriations subcommittee, charged that the Bush administration budget fell short of what several studies showed was needed to make up for years of under-funding acquisition. The Congressional Budget Office, a trusted source for such studies, found that acquisition should have risen to at least $94 billion (Selinger, 2002).

Congressman Dicks wrote, "The Defense Department acquisition budget is in crisis" (cited in Selinger, 2002). The Congressman said acquisition levels were not only inadequate to sustain the force structure, but were driving up operation and maintenance costs because aging weapon systems were not being replaced quickly enough. As an example, he noted that the aging Navy F-14 Tomcat aircraft experienced a 227 percent increase in maintenance hours per flying hour from 1992 to 1999. Aging equipment, increased equipment complexity, and quality-of-life issues have increased O&M spending. Although the DoD and the military departments have consistently cut O&M funding over the past five years to shift money to acquisition, Exhibit 6 shows the continued overall growth in O&M dollars as a result of aging equipment, environmental clean-up costs, medical care cost increases and so on. Not only have O&M costs grown, but they have grown faster than anticipated. As can be seen from the Exhibit, each year from 1998 through 2001, the President's budget (PB) anticipated a decline in O&M spending per capita; yet, in reality it grew, and grew by more than its historical average of 3% a year from FY81 to FY98.

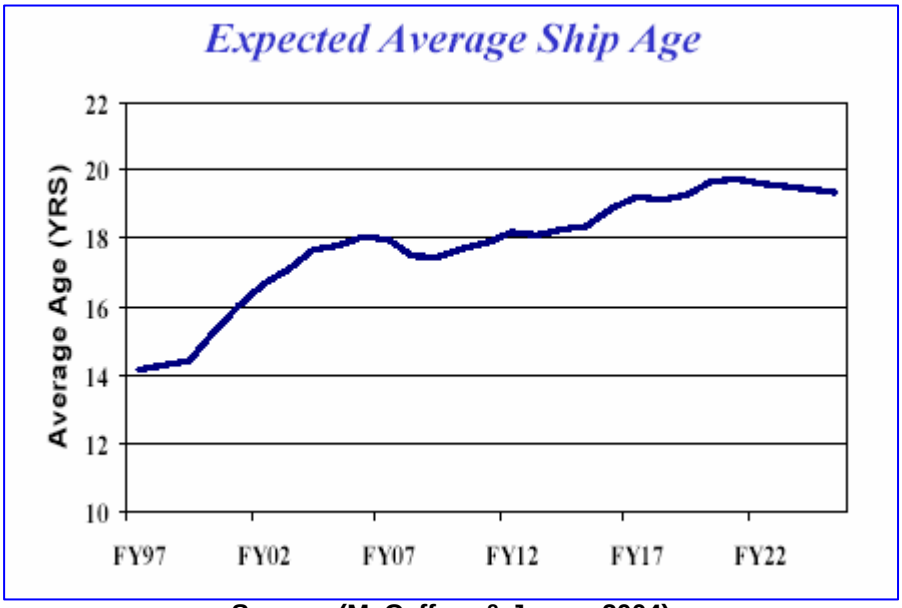
Exhibit 6. O&M Spending Per Capita Growth



Source: (McCaffery & Jones, 2004).

Secretary of Defense Donald Rumsfeld indicates that the low rate of ship production was not a problem in the near term due to the relatively young age of the fleet, averaging 16 years in 2002 (Wolfe, 2002). However, the expected average ship age is projected to increase, as shown in Exhibit 7. As fewer ships are built, the average age of ships increases; likewise, maintenance and repair costs also should increase. Secretary Rumsfeld was critical of the trend allowing the aging of Navy combat assets (Rumsfeld, 2002). Congressional efforts to add acquisition dollars into the budget over the President's request for recapitalization have been directed towards reducing fleet average age, which also would reduce some O&M costs. The Navy has had to make difficult choices in its budget to fully fund spare parts, munitions and steaming hours, as well as adding capability through ship conversion.

Exhibit 7. Expected Average Ship Age



Source: (McCaffery & Jones, 2004)

The Future Years Defense Plan calls for a build rate of five ships in FY 2004, seven in FY 2005, seven in FY 2006, and ten in FY 2007. Rumsfeld indicated that contractor problems and more realistic cost estimates for weapons systems by the DoD raised costs and resulted in fewer ships requested in FY 2003 (Defense Daily International, 2002, p. 23). Rumsfeld noted that the military services traditionally have underestimated contract costs. For example, in FY 2003, the Navy paid $600 million for past shipbuilding bills resulting from previously underestimated costs. Rep. Gene Taylor (D-MI) suggested to Rumsfeld that the real problem was not enough contracts and not enough money for shipbuilders. Taylor told Rumsfeld that no company would try to build a shipyard given the poor return on current shipyard operations (Defense Daily International, 2002, p. 23).

In 2005, GAO (GAO, 2005b) reported a study of eight ship construction projects, each at about the 30% completion stage. Half of the eight were first ships in a new class; the rest were more mature shipbuilding programs where there was greater certainty about costs. GAO found significant cost growth. Budgets for the eight ships required increases of $2.1 billion and increase of 11.3% over the original $18.5 billion budgeted. GAO estimates that by the time the ships will be finished the cost overruns will reach $3.1 billion, or 16.7% more than the original appropriation. These overruns are significant both in percentage and dollar terms.

GAO concluded that the cost growth happened for several reasons. First, shipbuilders reported that “design modifications, the need for additional and more costly materials, and changes in employee pay and benefits” were the key causes of this growth. For example, the San Antonio class lead ship continued to experience design changes “even as construction began” and this “required rebuilding of completed areas to accommodate the design changes.” Secondly, materials costs were “often underbudgeted as was the case with the Virginia class submarines and the Nimitz class carriers” (GAO, 2005b, Highlights). GAO concluded that Navy practices for estimating cost, contracting, and budgeting resulted in unrealistic funding of shipbuilding programs. GAO also noted that the Navy does not account for the probability of cost growth when estimating ship costs and does not do an independent cost estimate when substantial changes are made in the design (GAO, 2005b, Highlights). Finally, GAO noted that

incomplete and untimely reporting on the shipbuilding programs delayed the identification of problems and hampered Navy's ability to correct those problems. GAO (2005b, p. 5) also noted that during the 1980's, when the Navy was building about 17 ships a year, fiscal shortfalls and overruns could be smoothed out by making funding adjustments for under-spending programs from over-spending programs. Since 1999, however, the Navy has built an average of six ships a year, and this kind of smoothing is no longer possible—making accurate systems fiscal forecasts all the more important.

In the GAO study, about 38% of the cost growth was due to cost growth in materials; most of the rest was due to labor hour increases, either in direct labor or overhead. About five percent of the cost growth was due to the cost increase in Navy-furnished equipment. In regard to materials cost growth, GAO feels the Navy does not provide sufficiently for cost growth in the estimate. Yet, this is a difficult question to solve politically. An overly-generous estimate of materials cost growth could push the total cost of the program beyond what is acceptable within the current year topline limits, i.e., it could become too expensive to buy. No doubt one of the main contributing factors here is the small number of ships currently being built. Ships normally take from 4 to 7 years to build (according to GAO), and all programs have glitches here and there; thus, when the Navy was building 17 ships a year, smoothing the curves between fiscal under-runs and over-runs was easier. With six ships a year this "smoothing" becomes more difficult, if not impossible. Moreover, the Navy is at a point where almost all of its ship construction is transformational, i.e., first ship of a new class. What this means is that design changes are likely to become more, rather than less, likely. The tables below from the GAO study indicate what the shipbuilders reported as the reasons for cost growth, first in materials and then in labor rates and overhead (See exhibits 8 and 9: GAO 2005b, Tables 8 and 10).

Exhibit 8. Reasons for Materials Cost Growth

Table 8: Reasons Given by Shipbuilders for Material Cost Growth

Case study ship	Reasons for growth
DDG 91	• Consolidation with Northrop Grumman allowed for quantity material buy savings
DDG 92	• Rework requiring additional tools, utilities, and shop stock • Information technology costs shifted from overhead to materials
CVN 76	• Increases in costs for specialized materials • Underbudgeted material costs • Accounting changes • Additional subcontracting
CVN 77	• Increases in costs for specialized materials • Underbudgeted material costs
LPD 17	• Subcontractor engineering design efforts • Design tool development, originally assumed to be funded by the state resulted in additional costs to Northrop Grumman.
LPD 18	• Increases in LPD 17 translated into more costs for LPD 18
SSN 774	• Lack of suppliers for highly unique materials • Immature design on material components
SSN 775	• Lack of suppliers for highly unique materials • Nonrecurring costs for computer integration

Sources: Shipbuilder (data); GAO (analysis).

Source: (GAO, 2005b, p. 16: Table 8).

It is apparent from the breakdown above that the problem is more difficult than simply estimating what inflation will be four to seven years into the future and building it into the baseline estimate of the ship. Taken together with Exhibit 10, this information suggests that

whatever happens in the greater society also impacts these shipbuilding programs, including corporate mergers, increases in cost of specialized materials, lack of suppliers for highly unique materials, failure of the state to make good its promise to pay its share of tool development, health care cost increases, fluctuations in financial markets that change pension costs, union negotiations and the ebb and flow of work itself and its impact on overhead rates. All of these factors make it difficult for precise acquisition and budget-cost estimates.

Exhibit 9. Reasons for Overhead and Labor Rate Cost Growth

Table 10: Reasons Given by Shipbuilders for Overhead and Labor Rate Cost Growth

Case study ship	Reasons for growth
DDG 91	• Pension plans affected by financial market changes • Increase in medical benefit costs • Union negotiations increase labor rates • Loss of workload
DDG 92	• Medical care cost increases due to inflation and loss of favorable medical care contract • Loss of workload
CVN 76	• Changes in accounting of overhead • Union negotiations following strike increase labor rates
CVN 77	• Changes in accounting of overhead • Union negotiations following strike increase labor rates • Medical care cost increases • Capital investments • Pension plans affected by financial market changes • Workload changes
LPD 17	• Pension plans affected by financial market changes • Loss of anticipated workload • An over 2-year delay in lead ship delivery and change in the procurement schedule
LPD 18	• Pension plans affected by financial market changes • Loss of anticipated workload • An over 2-year delay in lead ship delivery and change in the procurement schedule
SSN 774	• Changes in pension, health care, and workman's compensation • Overhead rates decreased due to increased workload
SSN 775	• Loss of expected business and training new workers • Additional costs to restart submarine production capability at the shipyard

Sources: Shipbuilder (data); GAO (analysis).

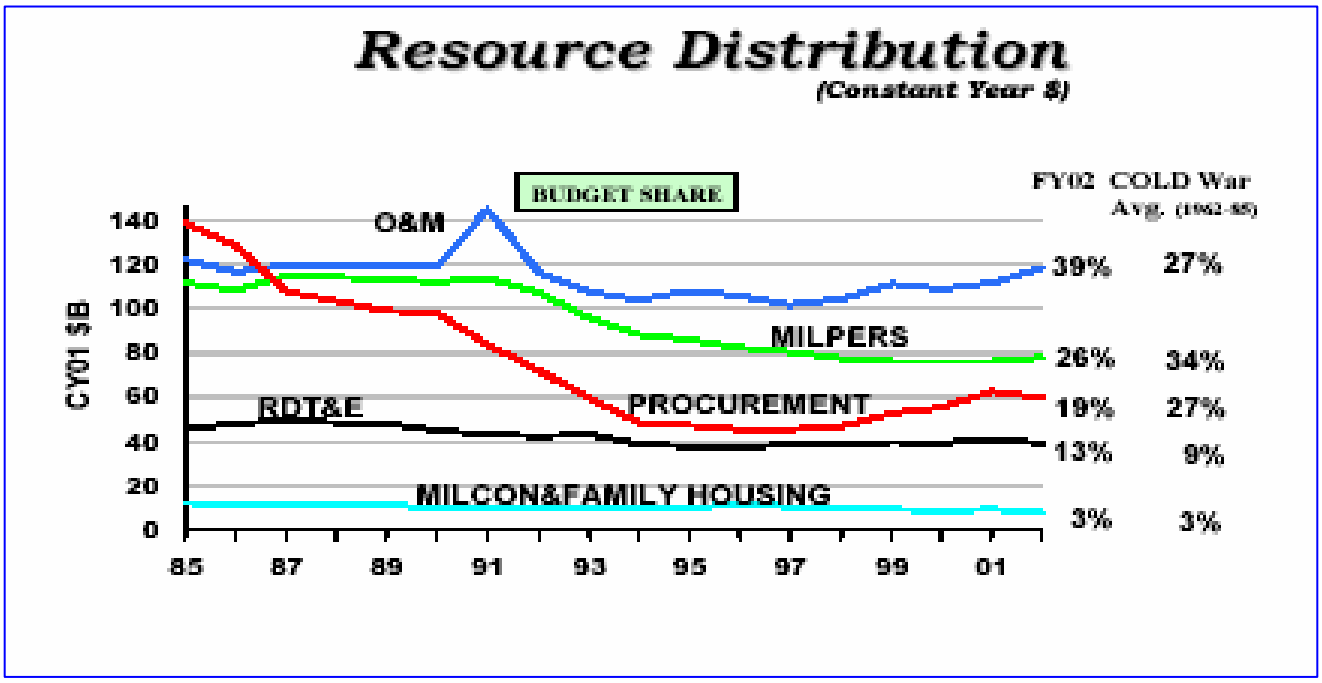
Source: (GAO, 2005b, p. 18: table 10).

Increased Operation and Maintenance Spending versus Acquisition Investment

As shown in Exhibit 10, O&M costs have increased since 1997 and comprised a 39% share of the DoD budget in FY2002—substantially more than their Cold War share. The decline in procurement from Cold War levels is evident. Moreover, according to the GAO, the DOD 2001 Future Years Defense Plan consistently understated cost and overstated savings projections in Operations and Maintenance (GAO, 2000c). The core problem is that planned spending increases for acquisition may be squeezed out to pay for operations and maintenance funding shortfalls. According to GAO, analysis of the costs, benefits, and alternatives for defending U. S. forces and assets by the DoD is weak and needs to be improved (GAO, 2001a). GAO suggested that better analysis was needed to allow decision makers in the DoD and Congress to make decisions on the number of missiles to buy. Exhibit 10 also shows the DoD

spending by primary account in 2001 constant dollars and as percentage of total expenditures from the Cold war years to 2002.

Exhibit 10. DOD Resource Shares (FY 2001 Constant $B)



Source: (McCaffery & Jones, 2004).

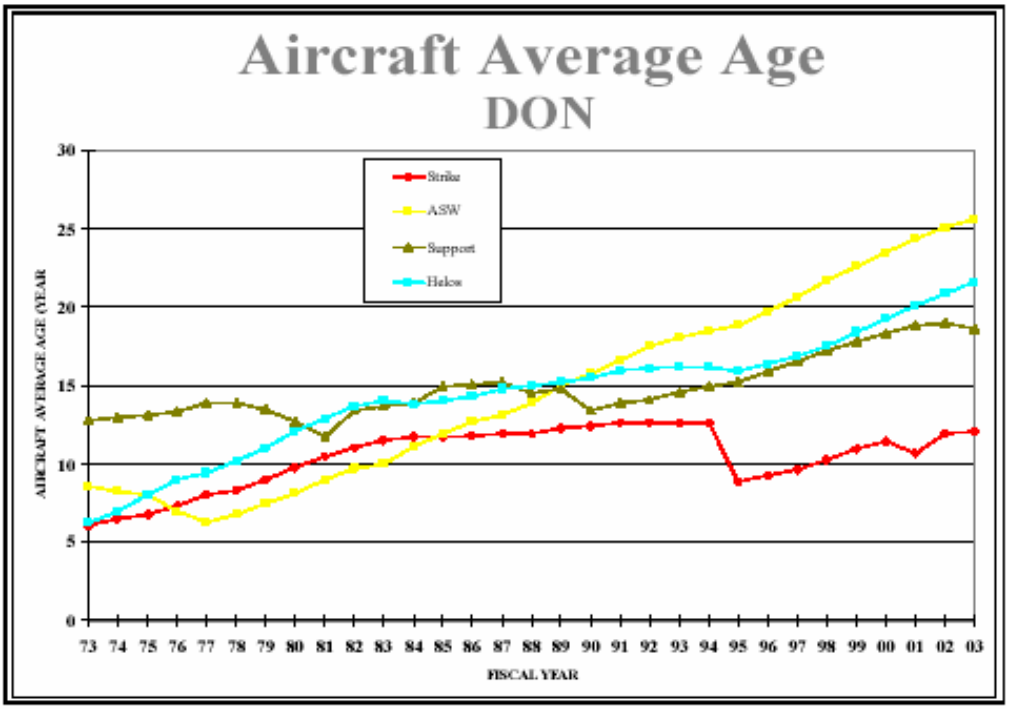
The increased ship operating tempos (OPTEMPO) in the war on terrorism has resulted in increased depot maintenance costs (Department of the Navy, 2002a). In 1993, the Navy had 108 ships forward deployed; this represented 24 percent of its 458 ship battle force. In 2003, the Navy projected that 87 of its 308 ships would be deployed—28 percent of the battle force (Department of the Navy, 2002a). In fact, this estimate was low due to the size of the force needed to support the war in Iraq. The high rate of utilization along with the aging of assets inevitably results in depot maintenance for ships and other assets that exceed costs projected in budgets (Department of the Navy, 2002a). It would appear that reductions in operations and maintenance spending and military personnel appropriations are necessary to generate the savings required to adequately fund ship and other weapons modernization. However, just the opposite trend is in progress. In 2005, Army budgets were increased in the supplemental appropriation, both for personnel costs and in expenditures for transformation. This will lead to increases in future-year personnel costs and in the O&M accounts in the annual budget and, absent future topline relief, may lead to compression in the Navy procurement accounts.

Limited Funds Force Acquisition Trade-offs

In 2002, Admiral Vern Clark, the CNO, observed that the Navy needed $12 billion more per year than it was receiving to buy aircraft, ships and other major weapons systems. Clark indicated that the Navy must make a $12-billion-a-year commitment to shipbuilding to have an adequate Navy in the future. “We can’t undo what has happened over the course of years in under-funding acquisition accounts,” Clark said in arguing that acquisition accounts must grow over the FYDP. “We must buy more ships and aircraft to meet the needs of tomorrow’s Navy” (Aerospace Daily International, 2002, p. 10). Years of under-funded weapons acquisition

programs have also contributed to aging aircraft. Exhibit 11 shows the increasing average age of Navy aircraft by category.

Exhibit 11. Average Navy Aircraft Age



Source: (McCaffery & Jones, 2004).

The trade-offs forced by limited funding for acquisition have produced heated discussion both inside the pentagon and in Congress. For example, the controversial acquisition of the Joint Strike Fighter (JSF) has competed with and driven out acquisition dollars for other assets for all of the military services. In essence, the JSF acquisition is the initiative of the DoD to attempt to save money by buying a single aircraft type that all services can use for strike capability. Funding for the JSF has been taken from each of the military service budgets, thereby reducing funding to support development and delivery of other systems. Former Secretary of the Navy, Gordon England, told the Senate Armed Services Committee in 2002 that the Navy had funded the JSF program adequately. The Navy provided $1.7 billion to the Lockheed Martin Joint Strike Fighter (JSF) when it could have bought other aircraft such as the F/A-18 or other aircraft or ships. The JSF is intended to enhance Navy strike capability for future war fighting forces (Defense Daily, 2002, p. 4). However, the issue for the Navy and other services is how to sustain acquisition of other assets while paying for this expensive program.

For the Navy, funding the shipbuilding program remains a critical problem. In House defense appropriations hearings, Representative Jo Anne Davis (R-VA) noted that shifting future carrier acquisition by one year and moving the DD-21 acquisition program into a research and development program rather than an actual buy would result in a “huge dip” in the future work force at Northrop Grumman Newport News Shipbuilding. “Right now, they’re having problems with their work force,” she said, adding that it was difficult to hire specialized shipyard workers again once they are let go (Davis, 2002). Congressman Rob Simmons (R-CT) said that laid-off workers at General Dynamics (GD) Electric Boat submarine facility often required at least two years to get their security clearances back once they are rehired (Defense Daily International, 2002, p. 23).

Congressman Reed, whose state is home to the GD Electric Boat facility, stated that buying one new attack submarine a year (as planned in the 2001 Quadrennial Defense Review) would not be adequate to sustain a fleet of 55 attack submarines. An attack submarine's life is about 30 years. Reed said the acquisition rate of two attack submarines has been proposed for years, but has been continually put off due to budget constraints. He warned that further delays in increasing the rate would create a deeper acquisition shortfall that would be even harder to overcome (Defense Daily , 2002, p. 23). The Shipbuilding Association proposed that Congress add $415 million to the Bush administration budget to fund advance acquisition to allow the Navy to reach an acquisition rate of two attack submarines a year by FY 2005.

Infrastructure Reduction Savings Do Not Always Result

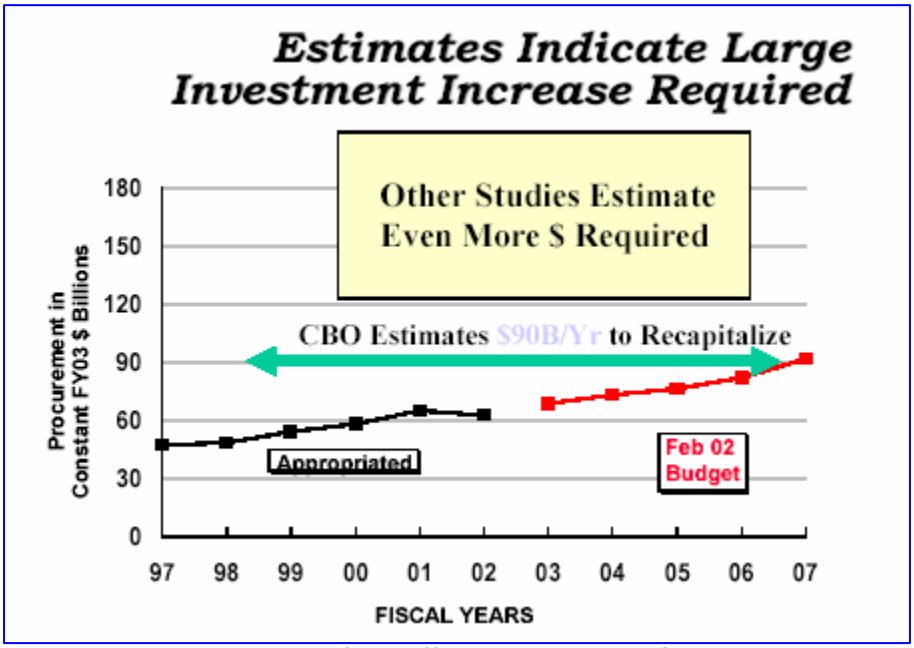
Over the past decade, proposals to reduce and streamline DoD infrastructure have been debated, and some have been implemented to generate savings to modernize weapon systems (GAO, 2001a). DoD officials have repeatedly emphasized in congressional budget hearings the importance of using resources for the highest priority operational and investment needs. Infrastructure reductions are difficult and painful because achieving significant cost savings requires up-front investment, closure of installations, and the elimination of military and civilian jobs. Further, promised infrastructure savings have not fully materialized. While it is expected that the next round of base closure and realignment in 2005 will be significant, it is also clear that past efforts to cut bases have not saved what was projected.

The 1988, 1991, and 1993 base realignment and closure (BRAC) produced decisions to fully or partially close 70 major domestic bases and resulted in a 15-percent reduction in plant-replacement value. Between FY 1996 and FY 2001, no significant savings resulted from infrastructure reforms; the proportion of infrastructure spending in DoD budgets remained constant. The 1995 BRAC was supposed to reduce the overall domestic base structure by a minimum of another 15 percent, for a total 30 percent reduction in DoD-wide plant-replacement value. However, the 1995 closures and realignments resulted in a total reduction of approximately 21 percent, 9 percent short of the DoD goal (GAO, 2001e). Still, 21 percent is a significant savings.

Inadequate FYDP Estimates for Acquisition

The DoD has attempted to re-sequence its acquisition spending timelines. The Department has reduced planned acquisition in successive FYDPs and has reprogrammed some acquisition to the years beyond the FYDP. Optimistic FYDP planning results in uncertainty with regard to defense priorities. The result of all this is that tough decisions and trade-offs have been avoided and pushed into the future (GAO, 2001a). Exhibit 12 illustrates that, according to the Congressional Budget Office, a large investment increase will be required to make up for deferred funding. This view conforms to that of the military departments. The challenge for senior DoD officials and program managers is how best to maximize weapons acquisition dollars in an uncertain funding environment where competing demands are numerous. The debate in 2005 clearly revealed that the number of ships that could be appropriated had decreased because each ship was more expensive. DoD planners pointed to increased capability and noted that warplanners now talk about targets per sortie, rather than sorties per target due to the increased capability of weapons systems. Even so, the turbulence around acquisition estimates in FYDP's remains as expected ship numbers decrease with each new FYDP.

Exhibit 12. Large Investment Increase Estimates



Source: (McCaffery & Jones, 2004).

Uncertainty and Low Rates of Initial Production

Program managers have been forced to sponsor low rates of initial production (LRIP) of military hardware by industry because of inability to demonstrate that weapon systems will work as designed. However, on many buys the DoD still has begun full-rate production of major and secondary weapons without first ensuring that the systems meet critical performance requirements. For example, the F-22 aircraft program involves considerable technical risk because it embodies technological advances critical to its operational success. Nevertheless, the DoD and the Air Force began production of the F-22 aircraft well before beginning initial operational testing, committing to a buy of 70 aircraft at a cost of $14 billion before initial operational testing was complete (GAO, 2003c). The General Accounting Office has reported that DoD policy to begin low-rate initial production of weapons with little or no operational testing and evaluation (OTE) has in some cases resulted in acquisition of substantial quantities of unsatisfactory weapons (GAO, 2003c).

Operational Test and Evaluation (OTE) is the primary means of assessing weapon system performance in a combat-representative environment. It consists of field tests, conducted under simulated "realistic" conditions, to determine the effectiveness and suitability of a fixed asset for use in combat by military users. The options available to the DoD and Congress are significantly limited when a system proves deficient. Used effectively, OTE can be a useful internal control tool to ensure that decision makers have good information about weapon system performance (GAO, 2003b). The decision to proceed with production should be made with OTE data because, in many cases, the LRIP is also the *de facto* full-rate of production. The primary problem with low initial rate of production is that unit costs are higher. This puts additional pressure on already under-funded projects (GAO, 2003c).

Too often under current practice, program managers begin production of weapon systems before development, and operational testing and evaluation (OTE) is complete. When

this strategy is used, critical decisions are made without adequate information about demonstrated operational effectiveness, reliability, logistics supportability, and readiness for production. Rushing into production before critical tests have been successfully completed results in purchase of weapon systems that do not perform as intended. Premature purchases have resulted in lower-than-expected availability for operations, higher maintenance, and often have led to expensive modifications. However, there are some advantages to properly managed and executed LRIP. LRIP can shorten the acquisition lead-time when utilized in combination with risk-mitigation techniques such as adequate testing and evaluation (Yoder, 2003).

Underestimation of Program Costs

The prevailing DoD acquisition culture continually generates and supports acquisition of new weapons. This is the role expected of spending agencies in the budget process (McCaffery & Jones, 2001, 164-165). Also typical is the presence of incentives, augmented by special-interest lobbying, to override the need to meet weapon requirements at minimal cost. As a result of this, the desire not to underestimate costs and to obtain some slack in the budget, program managers often exhibit a tendency to overestimate future funding and to underestimate program costs. This results in the creation of more programs than can be executed. The discovery of inadequate estimates also tends to undermine trust in the program manager (PM) and program.

In defense of the PM, there are increased costs of doing business where budgets are constrained, as noted above with low initial rates of production. For example, program managers often have to reduce, delay, and stretch out programs as ships get more expensive or as appropriations are smaller than expected; this substantially increases the acquisition and lifecycle cost of systems. In addition to the higher unit costs caused by program stretch-outs, the primary downside to the mis-estimation problem is the inability to address valid requirements because resources have been consumed on lower priority projects that were thought to be affordable due to poor cost estimation (GAO, 2003b).

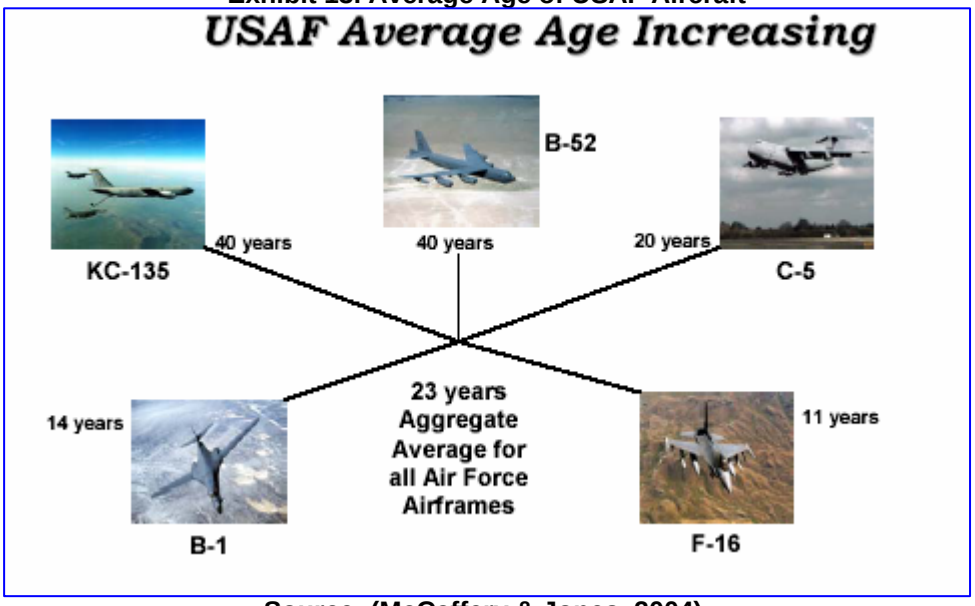
Pressure to Reduce Acquisition Cycle Time and Unreliable Cost Estimation

The DoD has a compelling need to accelerate the weapon systems acquisition cycle so that weapons are fielded more quickly. It is not in the interest of the fighting forces to take ten to fifteen years from planning for requirements to fielding weapons. An additional incentive to reduce cycle time is to lower average unit production costs. The Department has a goal to increase acquisition spending through "recapitalizing" about $10 billion dollars per year in the next decade by shifting funds to acquisition from other accounts. The DoD Inspector General (IG) expressed doubt that planned actions will free up the amount of funding required. The IG has reported that a significant gap exists between weapon-systems-modernization requirements plans and planned funding shifts and savings (Department of Defense, 2003b).

To make matters worse, in some cases program sponsors have made unrealistically optimistic assumptions about the pace and magnitude of technical achievement, material costs, production rates and savings. Some savings, anticipated as a result of increased industry competition to keep cost low by presenting attractive milestone schedules, appear to be unjustified. Budget problems are inevitable when weapon systems cost more to acquire than estimated, take longer to field, and do not perform as promised. This occurs when careful cost estimation is secondary to the speed of fielding a new system (GAO, 2002b). Here, the program manager faces a "Catch 22" situation; either meet the need for faster acquisition or reduce costs—the PM is required to promise both results when this outcome is unlikely.

The DoD continues to pursue a number of major defense acquisition programs on the assumption that savings needed to complete an economical buy will materialize. Far too much weapons-acquisition planning is based on overly optimistic assumptions about the maturity and availability of enabling technologies. The result is that DoD program and spending plans generally cannot be executed within the funding available (GAO, 1997b). Numerous problems persist in DoD and congressional budgeting and spending practices for weapon system acquisitions, suggesting that wants and needs are not balanced within affordability limitations. In 2002, the Air Force had a clear need for force structure modernization (see Exhibit 13), but no one was able to identify where the money would come; thus, the Air Force had to plan for force modernization without identifying the funding sources in the outyears of the FYDP. This is not uncommon; it sometimes appears as "taking a negative wedge against personnel" in anticipation of savings, but when the need is large and the personnel account itself is under pressure from other tensions, this practice is counterproductive.

Exhibit 13. Average Age of USAF Aircraft



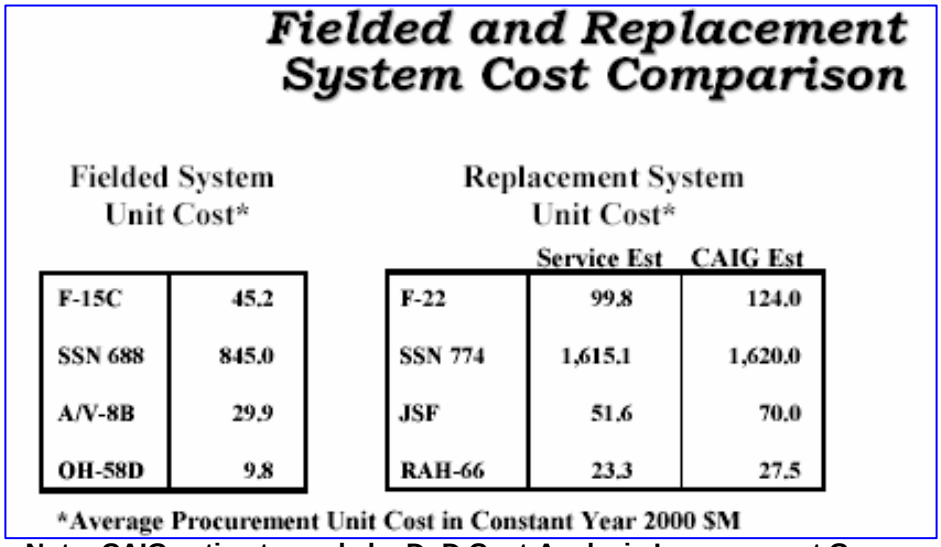
Source: (McCaffery & Jones, 2004).

Obsolete Systems Requirements

One of the tensions in the POM process currently is whether to prepare for a peer competitor in the near future (2015 or 2020) or to divert weapons system dollars totally to the War on Terrorism. Wisdom lies in doing both, of course, but this is harder than it seems. The result: some weapon systems are still under development with production rates which appear designed to meet warfighter needs of a decade past or more. Even though the Cold War threat upon which they were justified has disappeared, many anti-Soviet designed systems are still purchased by the DoD. These may meet the threat of a new peer competitor. Analysts who do not fear the rise of a peer competitor or who assume the threat can be negotiated away view these systems as obsolete Cold War relics. These feel obsolete requirements and solutions are wasteful and consume dollars needed elsewhere in the acquisition budget (GAO, 1997b). Continued acquisition of weapons and systems that do not satisfy the most critical current and future weapon requirements, along with continued commission of plans for more acquisition to programs than cannot reasonably be expected to meet future needs (and may not even be available in future) impairs efficient resource allocation in the DoD. This situation is intensified as the cost for obsolete weapons systems continues to rise while performance becomes

increasingly inadequate to the current war fighter. Further, delivery schedules continue to slip on modernization; some of them fail to meet current needs. Exhibit 14 shows the rising average cost of weapon replacement.

Exhibit 14. Fielded and Replacement System Cost Comparison



Note: CAIG estimate made by DoD Cost-Analysis Improvement Group.
Source: (McCaffery & Jones, 2004).

The DoD continues to generate and support acquisition of existing weapons, supposedly modernized to meet future requirements. However, when system upgrades fail to work or are not even produced, money is wasted. Inherent in the acquisition culture are powerful incentives that influence and motivate participants in the process (i.e., the military departments, OSD, Congress, and industry) to behave in what may be termed a dysfunctional, self-interested manner. The result is that acquisition money is wasted.

It is not unusual to discover some DoD incentives which resist comprehensive force modernization and replacement of assets and coincide with special-interest pressure to override the need to meet the most critical new weapon requirements. For example, the Air Force C-17 aircraft continued production despite analysis which showed that if the C-17 program were halted at 40 aircraft, 64 commercial wide-body aircraft could be added to the existing airlift fleet for an estimated lifecycle savings of $6 billion when compared with acquisition of a fleet of 120 C-17 aircraft. The Air Force acknowledged that there were considerably cheaper alternatives to meet airlift requirements than full production of the C-17, but delayed making a change, instead launching a new study to determine an optimal mix of aircraft to meet airlift requirements (GAO, 1994a). The C-17 continued in production despite significant schedule delays, performance shortfalls (e.g., problems with wings, flaps and slats) and cost overruns. Political pressure on the DoD from members of Congress helped keep the production line alive and caused the Air Force to incur substantial funding-opportunity costs. Cultural resistance to change, service parochialism, and public and congressional concern with the economic effects of reduced or cancelled weapons all contribute to reluctance to consider cutting programs that may no longer be effective. Moreover, since promotion goes to managers of successful programs, personal career advancement often results in some program managers pressing for continued support of their programs whether or not they meet the needs of the forces.

A number of decision points in the acquisition process exist to support the need for research on alternative systems before continuing existing weapons programs. The Analysis of Alternatives (AoA) is one such tool to determine whether weapon systems are needed. The AoA is an analysis of a proposed system's operational effectiveness related to its lifecycle costs compared to various other alternatives which could meet the mission need. Although the military services conduct extensive analyses to justify major acquisitions, these often are narrowly focused and do not fully consider alternative solutions.

The program manager's job is to provide analysis, advice and counsel to DoD acquisition executives, particularly regarding the selection and executability of proposed alternatives (Department of Defense, 2002b). Research and technology efforts are not disassociated from weapon programs until they reach the program definition and risk-reduction phase. Historically, military service analyses do not include joint acquisition of systems with other services (GAO, 1997b). Previous failed attempts at joint weapons development (such as the TFX Fighter) were due to parochialism, cultural biases and inaccurate requirement determination. In contrast, programs like the Joint Strike Fighter may prove to be a success in joint acquisition.

Because the DoD does not routinely develop information on joint mission needs and aggregate capabilities, there is little assurance that decisions to buy, modify or retire systems are based upon comprehensive assessment of all appropriate alternatives. This is an area in which the planning component of PPBES and related processes in the acquisition decision system are badly in need of transformation.

Outdated Acquisition Budget and Financial Support Systems

US defense outlays have purchased many of the world's most capable weapon systems. However, many acquisition contract administration systems and processes are costly and inefficient. The DoD continues to rely on a huge number of poorly coordinated and complex networks of financial, logistics, personnel, acquisition, and other management-information systems. Roughly eighty percent of these systems are not under the control of the DoD Comptroller or any other DoD official, including the USD (AT&L). These systems gather and store the data needed to support day-to-day management decision making. The Government Performance and Results Act (GPRA) and the Chief Financial Officer Act (CFOA) have not proven effective in forcing the DoD to reform this labyrinth of support systems, although some progress has been made.

Many DoD business operations use old, inefficient processes and outmoded "legacy" information systems, some of which were developed as long ago as the 1950s and 1960s. For example, the DoD still relies on the Mechanization of Contract Administration Services (MOCAS) system—which dates to 1968. The development of this network system has not been by design. Instead, like many DoD information systems, it has evolved into an overly complex and error-prone entity that presents many problems in use. These include the usual suspects: a lack of standardization across DoD components, multiple systems performing the same tasks, duplicate data stored in multiple systems, manual data entry into multiple systems, and a large number of data translations and interfaces that combine to reduce data integrity.

The Standard Procurement System (SPS) was intended to replace the contract administration functions currently performed by MOCAS. GAO reported that the DoD has not economically justified its investment in SPS because its analysis of costs and benefits was not credible (GAO, 2001e). Although the DoD committed to fully implementing SPS by March 31,

2000, the Department allowed this target date to slip by over 3 ½ years to September 30, 2003. Whether SPS will perform as intended once fully operational remains to be seen.

Another example of inadequate support systems is the DoD's financial-management information system. The DoD's financial systems have not been able to adequately track and report whether $1.1 billion in earmarked funds that Congress provided for spare parts and associated logistical support were actually used for intended purposes (GAO, 2002a). The vast majority of this funding, approximately 92 percent, was transferred to military service operation and maintenance accounts. Once the funds were transferred into O&M accounts, DoD could not separately track the use of funds. As a result, Congress lost confidence in the DoD's ability to assure that the funds it received for spare parts purchases were used for that purpose. This is only one example of many that indicate the weakness in DoD financial-management systems. Problems with the DoD's financial-management operations go far beyond accounting and finance systems and processes. Wasteful contract administration practices add billions of dollars to defense acquisition costs. In the following section, we turn our attention to recent initiatives to reform the acquisition process to improve planning, budgeting, and management.

ACQUISITION REFORM INITIATIVES

The mission of the DoD continues to expand as the US faces new, more diverse, terrorist threats. Consequently, acquisition, procurement and contracting processes must become more efficient and focus on cost control. Recent acquisition transformation initiatives emphasizing continuous reform include revision of the DoD 5000-series of acquisition rules and guidelines, spiral acquisition (continuous and simultaneous program and project research, development, test, evaluation and procurement rather than serial/sequential processes), commercial off-the-shelf procurement (COTS), and the Director of Acquisition program initiative (McCaffery & Jones, 2004). During the past decade, the DoD 5000-series has been continuously revised—both as Presidential administrations changed and in response to the attempt to integrate better business practices.

In 2002, Secretary Rumsfeld directed that DoD 5000.2R would be converted from a regulatory tool to a more functional and flexible policy-guidance document. The 5000-series had, in the past, been regarded as administrative law. It demanded user requirements including the preparation operational requirements documents (ORD) and estimation of initial operational capability. The 5000.2R acquisition requirements had been firm and not subject to modification without specific waivers. However, Rumsfeld and staff, the services, and program managers recognized the need for greater flexibility to manage acquisition. The new DOD 5000.2-R document promises to piggy-back on other recent acquisition reforms, allowing greater flexibility and control for acquisition leadership. DoD 5000.2-R was revised to recommend that integrated process teams (IPT) be used during program definition to improve the specification of requirements and system supportability. In addition, program structure changes are directed to include an acquisition strategy of open systems. To maximize program effectiveness, the program manager is directed to use commercial sources, risk management, and CAIV. Reforms direct Program Managers to use program designs incorporating integrated product and process development (IPPD) and place system-engineering emphasis on production capability, quality, acquisition logistics, and open system design.

Although previous versions of the 5000-series documents have always acknowledged the desirability and need for flexible management approaches, administrative discretion, and sound business judgments in acquisition, many in the DoD have tended toward a more bureaucratic mindset of strict adherence to these documents, thereby providing them the virtual

status of administrative law. The revision of May 12, 2003, approved by Deputy Secretary of Defense Paul Wolfowitz, continued to attack this mindset by promoting flexibility, responsiveness, innovation, and streamlined decentralized management as governing acquisition policies. Further, the framework for managing acquisition programs under the current 5000-series emphasizes evolutionary and incremental strategies rather than "grand strategies" that may tend to limit flexibility, change, and innovation.

The Director of Acquisition Program Initiative is another element of acquisition reform. Annually, the Director of Acquisition Program Integration determines if each major defense acquisition program (MDAP) has reached 90 percent or more of cost, schedule, and performance parameters when compared to acquisition program baseline thresholds. The appropriate decision authority must make a similar determination for non-major acquisition programs. If ten percent or more of program parameters are missed, a timely review is required. The review addresses any breaches in cost, schedule, and performance and recommends suitable action, which may include program termination.

Major acquisition defense program baselines must be coordinated with the DoD Comptroller before approval. Cost parameters are limited to RDT&E, acquisition, the costs of acquisition of items procured with operations and maintenance funds, total quantity, and average unit acquisition cost. As a program progresses through later acquisition phases, acquisition costs are refined based on contractor actual costs from program definition and risk reduction (PDRR), engineering, manufacturing and development, or from initial production lots. Cost, schedule, and performance objectives are used in application of the cost-as-an-independent-variable (CAIV) process to set the Acquisition Program Baselines. Cost, schedule, and performance may be traded-off by the PM, within the range between the objective and the threshold, without obtaining Milestone Decision Authority (MDA) approval. This initiative is intended to improve executive level oversight and program management reporting. In addition, it may enhance executive and PM flexibility in the best use of available funding.

The reforms noted in this paper have opened a wide range of new possibilities for acquisition which the DoD is only now beginning to explore. Stimulated under the leadership of former Under Secretary of Defense for Acquisition Jacques Gansler in the 1990s and continued under the Bush administration, the pursuit of these new approaches reflects fundamentally different configurations of government-contractor relationships in acquisition. The initiatives increased outsourcing, competitive sourcing, privatization initiatives, public-private partnerships, and franchising. The outcomes of such programs remain to be assessed, but they indicate the environment of tremendous potential (and uncertainty) that now exists for acquisition policy-makers and managers.

In mid-2004, Deputy Under Secretary for Defense (Acquisition, Transportation and Logistics) John Young requested that service acquisition system commands reorganize themselves to create and clarify ownership and accountability for weapons platform ,systems development and execution to eliminate poor management practices and overlapping, unclear lines of authority and responsibility characteristic of many of these commands. While this is an enormous undertaking, the commands have complied with significant redesigns of their structures and staffs. While the proof of this latest transformation effort in the acquisition commands is still in progress, many observers note that this type of change to clarify managerial and control responsibility and accountability is a long-needed improvement. However, whether the redesigned organizations will accomplish the desired objective remains to be evaluated.

To move focus briefly to the related area of contracting reform (much change has occurred in the contracting arena that is beyond the scope of this paper), as is the case for the rest of the federal government, recent trends reflect a significant increase in DoD contracting for services. Many functions that had been viewed in previous years as properly provided by government are now provided by private sources. While holding promise for increased efficiency and lower costs in service delivery, this trend raises numerous questions, e.g., how to best determine the proper definition and extent of "core" government competencies, how to design appropriate contracting mechanisms, and how to provide adequate oversight and contract management. Significant reform in education and training has been implemented in the past decade to upgrade the management capability of the DoD workforce; yet, large challenges remain, and new problems have emerged as contractors replace military and DoD employees in commands at home and abroad in the war-fighting environment.

In some cases, the appropriateness and wisdom of the roles of contractors working in military operations has provided high-visibility material for the media. As the scope of their duties also has been the subject of scrutiny from Congress, some number of highly trained special forces and other military personnel have left the services to become much more highly paid contractors. Further, the deaths of forty-two Halliburton/KBR employees (as of July 2, 2004) in support of the war in Iraq raise numerous contracting and logistical issues too complex to be explored here. It may be expected, however, that these issues will remain as US forces continue to employ contractors in trouble spots around the world to perform, via the private sector, what are quasi-military functions and duties. Some critics ask: is this the front-end phase of the privatization the US military will use to cope with high deployment and operating tempo requirements?

In summary, many of the issues and initiatives identified here have much to do with the world-wide trend of evolution of public-private relationships and partnerships. New institutional arrangements have emerged in virtually every area of provision of services to the public at all levels of government. The basic challenges in weapon system development and procurement remain, as evidenced in results, e.g., continuing management and technical problems in major acquisition programs including the F-22 Raptor and V-22 Osprey. Further, the effects of defense industry consolidation on weapons development and production remain unclear. The overall challenge to the DoD is how to re-capitalize an aging force structure where costs are high and RDT&E and procurement budgets do not match projected requirements or military service re-capitalization plans and schedules. Changes in the defense industry in many cases confound the problem of attempting to use the market to achieve the greater efficiency which is supposed to result from competition. Both the theory and the arguably partisan rhetoric about the advantages of market pressures are fine, but where there is no market (and, therefore, no competition), few, if any, advantages may be found.

The initiatives explicated here are but a few of the many acquisition changes currently under implementation as under the defense business transformation flag. Issues that have been raised about the wave of continuous reform include whether there is too much change taking place at once to be fully assimilated by a defense acquisition workforce that has been reduced in size and has lost some critical expertise due to budget and staff reductions—and whether new processes have resulted in excessive centralization of authority in the Office of the Secretary of Defense at the expense of efficiency, effective communication, program management and, in some cases, common sense (Dillard, 2003).

Pervasive problems persist in the process for acquiring defense assets. These problems include affordability, cost control, punctuality (keeping to schedules), and performance-

estimating errors. Accurate estimates of program affordability or weapons acquisition often are based on optimistic assumptions about the maturity and availability of enabling technologies (GAO, 1997b). The use of outdated information systems makes the ability to accurately track and measure acquisition costs even more difficult. Thus, weapons acquisition reform is driven by a myriad of factors and borne out of the desire to acquire the best weaponry at the least cost. Beyond technical issues, the politics of acquisition are complex and present additional challenges which must be overcome. In summary, continual tension persists between top-level policy and budget-process players (including Congress), and defense acquisition executives and mid-level DoD officials (including program managers and comptrollers) confronted with limited resources and competing political priorities.

The following section reviews some (old and new) of the more important procedural, regulatory, and legislative reforms to the defense acquisition process which have influenced (to varying degrees) transformational changes in the DoD. Some of the reforms noted have been enacted, but still require implementation effort and have implications for current and future processes. Though some of these changes are no longer under implementation, understanding their intent helps to paint a picture of how the DoD acquisition system has evolved to where it is today. For example, the Federal Acquisition Reform Act (FARA) and the Federal Acquisition Streamlining Act (FASA) have been incorporated into other DoD acquisition administrative law, referred to as instructions by number in the Department, e.g., DoD 5000.2R. In each example of reform, policy decisions and legislation have been intended to address significant acquisition reform problems.

Spiral Acquisition

The concept of spiral acquisition has permeated the acquisition community to the point that it is both common practice and, to an extent, "urban legend" in that it may be viewed too optimistically as a panacea to speed the development and fielding of weapons and systems. Spiral acquisition means continuous adoption of changes during the development of systems as new and better technology becomes available for incorporation into the designs of the warfighting assets acquired by the DoD. Spiral acquisition is particularly important with respect to the integration of new information systems and computer (and related) technology, because new hardware and software becomes available at a rapid pace in the highly competitive environment of private-sector technology development. The old idea of designing in specific hardware and software applications many years in advance of actual purchase of weapons systems has given way to incorporation of the best available technology *as* it becomes available.

While the idea of spiral acquisition is straight-forward, in practice it is both difficult and expensive to do. The cost of new systems, and the system software upgrading of such systems that becomes inevitable once these systems are installed, is one part of the difficulty. Also, new technologies often require changes at the point of interface with the ships, aircraft, tanks and other assets into which they are to be incorporated. And the basic problem of how much new technology can be afforded regardless of the advantages provided is always an issue in a cost-constrained environment.

There is much more to be said about spiral acquisition beyond the scope of this paper with respect to how to accomplish it (e.g., how to break into the regular cycle of acquisition decision-making to get new systems in and old systems out, how to change contracts and, in some cases, the suppliers of new technologies when existing contracts for older systems are still in place, system integration difficulties beyond those we have mentioned, and more).

However, that spiral acquisition is a significant part of the new business practices of DoD transformation is undeniable. It represents both opportunity and challenge to maintaining continuity in system development and procurement. In addition, implementation of spiral acquisition has been stimulated greatly by the demands of war. As one Navy admiral remarked in March, 2005, "Years ago I would never have believed that I would see the complete conception, development and fielding of a new system in the period of one year—but recently it has been done in response to the needs of the warfighters in OIF."

The Federal Acquisition Streamlining Act of 1994 (FASA)

The DoD issued an update to its regulations governing the acquisition of major weapon systems on 13 October 1994. Among other things, the update incorporated new laws and policies (including the Federal Acquisition Streamlining Act), separated mandatory policies and procedures from discretionary practices, and reduced the volume and complexity of the regulations. The Federal Acquisition Streamlining Act of 1994 (FASA) required the SECDEF to define cost, schedule and performance goals for all of the Major Defense Acquisition Programs (MDAP) and for each phase of their acquisition cycles. Highlights included streamlined proposal information or page count, shortened proposal submission time, reduced evaluation team size or evaluation time, and limited source-selection factors pertaining to cost, past experience, performance, or quality of content. FASA called for full and open competition, to be obtained when, “all responsible sources are permitted to submit sealed bids for competitive proposals" (Federal Acquisition Regulations, 2000). Full and open competition is achieved through open specifications (USC 253a (1) (A)).

FASA establishes a clear preference for acquisition of commercial items in the federal government. It requires agencies to reduce impediments to buying commercial products and to train appropriate personnel in the acquisition of such products. One such impediment is the use of design specifications, which restrict competition and make acquisition of commercial products difficult. Design specifications typically tell a vendor how a product is to be made or how a service is to be performed. A commercial vendor, whose product has been developed for public use, seldom conforms to government design specifications. FASA instilled flexibility, and timeliness into the acquisition process, but there are still some problems inherent in requesting particular design specifications in a commercial sector.

The Federal Acquisition Reform Act/The Clinger-Cohen Act (FARA)

The major pieces of legislation affecting acquisition and information technology were the Federal Acquisition Reform Act and the Information Technology Management Reform Act. While originally passed as two separate initiatives, their impact on each other made it impossible to consider each separately. The two acts were later combined and renamed the Clinger-Cohen Act (1996). The major impact on information technology was the repeal of the Brooks Act and its associated restriction on acquisition of resources. The Clinger-Cohen Act encouraged the acquisition of commercial off-the-shelf (COTS) IT products and allows the Office for Federal Acquisition Policy (OFPP) to conduct pilot programs in federal agencies to test alternative approaches for acquisition of IT resources. The Act directs agencies to use “modular contracting” based on successive acquisitions of “interoperable increments” (Federal Register, 1996, p. 27). The Clinger-Cohen Act created the Chief Information Officer for the Department of Defense, and combined life-cycle approvals for weapon systems and information technology systems into a single instruction—the DoD 5000.1 series.

FARA and FASA have been overtaken or superseded by other DoD reform initiatives applicable to MDAPs and weapons acquisition. Still, both FARA and FASA are still valid and enforceable. FARA, among many other things, expanded the definition of "commercial items" to include those things not only sold to the general public, but also those *offered* to the general public. These initiatives were pushed by industry, primarily because under the two Acts, firms participating in government acquisitions with qualified "commercial" products are exempted from over 100 statutory and regulatory requirements. For example, firms may be exempted from the Truth in Negotiations Act that requires firms to certify cost and pricing data on negotiated actions greater than $550K (Yoder, 2003).

Commercial Off-the-Shelf Procurement

Federal Acquisition Regulation (FAR) applies to all contracting regulations. The pertinent part of the FAR with regard to commercial off-the-shelf reforms (COTS) is part 12, which indicates, in essence, that federal government organizations should perform market research to maximize the use of commercial products. DoD enforcement of Part 12 of the FAR over the past five years has caused weapon program managers to evaluate and, where appropriate, purchase commercial or non-developmental items (CNDI), when they are available from industry and when they meet the organization needs. Defense contractors are required to incorporate CNDI to the maximum extent possible.

Initial feedback on the success of this initiative is highly positive. It appears that the change has permitted commercial firms to produce the kinds of outcomes from their development of new products that meet the Department's needs. Specifically, firms that developed sophisticated products in significantly less time and at lower cost than their predecessors have been rewarded with contracts. However, to some extent the quality and credibility of commercial-firm cost information available to DoD acquisition decision makers remains a problem. The long-term life cycle support costs associated with utilizing potentially rapidly obsolete commercial items has yet to be fully documented (Yoder, 2003).

Cost as an Independent Variable (CAIV)

DoD Directive 5000.1 directed a new development in cost analysis termed "Cost as An Independent Variable," or CAIV. System performance and target costs are to be analyzed on a cost-performance tradeoff basis. The CAIV process is intended to make cost a more significant constraint as a variable in analysis of effectiveness and suitability of systems. CAIV is intended to reduce acquisition costs. After Desert Storm and before the war on terrorism began on September 11, 2001, threats from potential peer competitors were not increasing in perceived capability at a fast rate. Also the fall of the Berlin Wall created expectations for a peace dividend and there was, in fact, a peace dividend, but it was not equally distributed across all DoD accounts. As Exhibit 15 illustrates, the procurement accounts took a greater hit.

Exhibit 15. The Cold War Dividend: % Change in DoD Accounts 1990-1998

Military Personnel	-31.17%
Operations and Maintenance	-9.05%
Procurement	-52.36
RDT&E	-13.70%
Military Construction	-7.69%
Family Housing	+2.50%
DoD total	-26.83%

(Adapted from McCaffery & Jones, 2004: Table 3.4, p. 60).

Absent a peer competitor and in a generally peaceful world, it was appropriate for the DoD to make cost a stronger driver in system design. Moreover, such an approach also was consistent with commercial practices in new system developments, where market forces drive the price of new systems.

CAIV helps the program manager recognize that the majority of costs are determined early in a program's lifecycle. This means that the best time to reduce lifecycle costs is early in the acquisition process. These cost reductions may be accomplished through cost and performance tradeoff analysis, which is conducted before an acquisition approach is completed. Incentives are available to both government and industry managers to achieve the objectives of CAIV. Awards programs and "shared savings" programs are used creatively to encourage generation of cost-saving ideas for all phases of lifecycle costs. Incentive programs target individuals within government and industry teams. The program manager (PM) works closely with the user to achieve proper balance among cost, schedule, and performance while ensuring that systems are both affordable and cost-effective. The PM, together with the user, proposes cost objectives and thresholds for MDA approval, which will then be controlled through the APB process (Lifecycle Costs). One of the responsibilities incumbent upon a program manager is to constantly seek out innovative practices to reduce lifecycle environmental costs and liability.

Research by Coopers and Lybrand identified over 120 regulatory and statutory "cost drivers" that, according to the contractors surveyed, increased the price the DoD pays for goods and services by 18 percent (cited in Lorell & Graser, 1994). These cost drivers included government-imposed accounting and reporting standards and systems such as Cost Accounting Standards (CAS) and complex contract requirements and statements of work (SOW) (Lorell & Graser, 1994). The basic goal of this study was to develop a more "commercial-type" defense acquisition process. This included reducing regulator burden, transferring more program cost, design and technology control authority and responsibility to the contractor, exploiting commercially developed parts, components, technologies and processes, and making cost/price a key requirement. This study was compatible with the goals of the Revolution in Business Affairs under the Clinton administration and, later, the Transformation of Business Affairs under the Bush administration.

The basic thrust of CAIV is to make cost important in monitoring and controlling acquisition and procurement. While it might seem surprising to say that cost should be considered seriously, this is not always the case in practice. Thus, this initiative was stimulated by the desire to increase awareness of cost in all phases of the acquisition process—and particularly in managing projects and programs in program and budget execution.

The Single Process Initiative

In 2002, Secretary of Defense Donald Rumsfeld directed the DoD to change the management and manufacturing requirements of existing contracts to unify them within one facility, where appropriate (Rumsfeld, 2002). This initiative is called the block change or single-process initiative (SPI). Program managers are tasked with ensuring that the SPI reduces weapon acquisition costs. Allowing defense contractors to use a single process in their facilities is a natural progression from the contract-by-contract process of removing military-unique specifications and standards initiated in FASA. Despite the likelihood of transition costs that equal or exceed savings in the near term, moving to common, facility-wide requirements is intended to reduce government and contractor costs in the long term.

In some ways, the changes to acquisition-decision making at the level of the Navy secretariat and at the OSD level reflect the concept of the single-process initiative. The Navy Assistant Secretary for Acquisition has convened a number of reviews of programs in a single forum—including all the primary players in a program buy or planned buy, asking them to work together in one place at one time to improve both communication and decision making. Reports from participants give this initiative high marks. Also, in the SLRG reviews chaired by Secretary Rumsfeld a similar approach has been taken to get all players to sit together to engage in fact discovery, analysis of alternatives and dialogue leading to better decisions.

DoD 5000.2R Transformation from Regulatory to Policy Guidance

In addition to what we have observed earlier in this paper on this topic, it is important to cite that in 2002, Secretary Rumsfeld directed that DoD 5000.2R be converted from a regulatory tool to a more functional and flexible policy guidance document. The 5000 series has in the past been regarded as administrative law. It specified user requirements including the preparation of operational requirements documents (ORD) and estimation of initial operational capability. The 5000.2R acquisition requirements had been firm and not subject to modification without specific waivers (Rieg, 2000). However, SECDEF, the services, and program managers recognized the need for greater flexibility to manage acquisition.

The new DoD 5000.2-R document promises to piggy-back on recent acquisition reform, allowing greater flexibility and control for acquisition leadership. DoD 5000.2-R was revised to recommend that integrated process teams (IPT) be used during program definition, to aid the definition of requirements and system supportability. In addition, program structure changes are directed to include an acquisition strategy of open systems. To maximize program effectiveness, the program manager is directed to use commercial sources, risk management, and CAIV. The PM is also directed to use program design incorporating integrated product and process development (IPPD) and place system-engineering emphasis on production capability, quality, acquisition logistics, and open-system design (Oberndorf & Carney, 1998).

Additional Related Acquisition System and Process Changes

Additional reforms have involved fostering the development of measurable cost, schedule, and performance goals and incentives for acquisition personnel to reach those goals. Among other things, program managers, as well as senior DoD and military department officials, now must establish cost, schedule, and performance goals for acquisition programs and annually report on their progress in meeting those goals. They must establish personnel performance incentives linked to the achievement of goals. Program Executive Offices also must submit recommendations for legislation to facilitate the management of acquisition programs and the acquisition workforce.

In this respect, it should be noted that each service has an acquisition executive responsible for acquisition and contracting workforce education and training, among other things. For example, in the Navy the Director of Acquisition Management (DACM) is responsible for all Navy acquisition career-management issues, both military and civilian, including, but not limited to:

- Promotion parity analysis
- Reservist policies
- Congressional and legislative education/training issues

- Defense Acquisition University mandatory training
- Acquisition Workforce Tuition Assistance
- Business and Financial management

Contracting out services has been a major initiative since 2000, under the guidance of the Office of Management and Budget. In 2000, federal agencies procured more than $235 billion in goods and services. Overall, contracting for goods and services accounted for about 24 percent of federal government FY 2001 discretionary resources (OMB, 2003a).

Complicating this reform process is a natural demographic situation. About 38 percent of acquisition personnel government-wide are either already eligible to retire or will be eligible by September 30, 2007 (OMB, 2003a). At DoD and DoE—the two largest contracting agencies—39 percent of the acquisition workforce will be eligible to retire by fiscal year 2008 (GAO 2003d). What this means is that the human capital skill mix will change dramatically as retirements proceed and new personnel are hired. In the meantime, new requirements, tasks, and skills are demanded of both old and new acquisition managers as a result of federal and acquisition regulatory reform efforts. A review of some of these changes follows.

THE CHANGING CONTEXT FOR ACQUISITION PROCESS REFORM

Defense acquisition has long been beset by problems related to both politics and efficiency. Numerous reforms since the 1950s have attempted to improve the acquisition process. Recent reforms including more open competition, streamlined acquisition procedures, elimination of obsolete regulations and more effective program management are some of the substantial changes made in DOD in the last ten years to improve acquisition budgeting and management. Establishing open competition also is a significant part of recent acquisition transformation initiatives. Changes in acquisition information technology resulting from the passage of the Clinger-Cohen Act, using cost as an independent variable as a means of reducing acquisition costs, and spiral acquisition practices are other changes expected to yield positive results.

Congressional and DoD transformation initiatives have focused on greater reliance on commercial products and processes and more timely infusion of new technology into new or existing systems. Commercial product usage is implemented with an understanding of the complex set of impacts that stem from use of commercial products (Oberndorf & Carney, 1998). Solicitation requirements are written to include performance measures. If military specifications are necessary, waivers must first be obtained. Solicitations for new acquisitions that cite military specifications typically encourage bidders to propose alternatives (Secretary of Defense, 2002a). The DoD has made significant progress in disposing of the huge inventory of military specifications and standards through cancellation, consolidation, conversion to a guidance handbook, or replacement with a performance specification or non-government standard.

Some reforms already have had unanticipated consequences. For example, FARA and FASA eliminate, with minor exceptions, the requirement for "certified cost and pricing data" under the Truth in Negotiations Act (TINA). This has been heralded as a blessing for industry, but has caused problems for contracting officers who are mandated to determine "fair and reasonable" cost and price prior to award of contract. Specifically, there are instances where firms have claimed "commercial item exemptions" from TINA, when not one single item has ever been sold to the general public, and hence, there is little or no standard for determining the reasonableness of the price. Without TINA and cost analysis, the contracting officer may be

awarding without solid factual benchmarks, standards, or measures of what is "fair and reasonable" (Yoder, 2003).

The Defense Acquisition Corps has increased education and training requirements for key positions such as for the Critical Acquisition Position (CAP). CAPs are the most senior positions in the defense-acquisition workforce, including program executive offices, program managers, deputy program managers of MDAP ACAT I defense acquisition programs and the program managers of significant non-MDAP ACAT programs. Maximizing program manager and contractor flexibility to make cost/performance tradeoffs without (unnecessary) higher-level permission is essential to achieving cost objectives. Therefore, the number of threshold items in program requirements documents and acquisition program baselines has been reduced. All of these changes add up to significant, albeit incremental, transformation of the DoD acquisition system.

Despite all of this change, the primary criticism of the acquisition process remain—that it is too complex, too slow, and too costly. In some cases it also may produce weapons that are “over-qualified” or irrelevant to the task at hand when they are finally put in the field because the threat and warfighting environment have changed since they were contracted. Annual budget cycle politics adds complexity, turbulence and confusion to this mix. The continual purchase of weapons because they are good for congressional electoral districts irrespective of defense needs is wasteful but cannot be stopped. In addition, there is the fact-of-life adjustment to the contemporary post-911 context following the period of retreat on objectives under the Clinton administration in the 1990s. The procurement holiday in this period resulted in increased maintenance costs for and continued use of older weapons systems. The outcomes include increased O&M account demands, and the fact that the gap in the procurement budget and in military recapitalization plans, a gap that will not be closed in the near future, now reaches into the tens of billions of dollars. Add to this mix that almost 40% of the federal and defense acquisition community will be eligible to retire in 2008. This combination would seem to leave a problem of substantial magnitude. However, as we have documented above, these are not new problems.

The defense acquisition process has almost always appeared to be broken to some degree; given the expectations and contingencies it must meet, this seems inevitable. However, the irony of this inevitability is that the products it produces are among the best in the world. The fact that Marines went into battle in Iraq in their fathers’ helicopters, that some pilots flew their grandfathers’ bombers over Afghanistan and Iraq, that the main U. S. battle tank has been superior to anything on the field for over a decade—all of this attests that good assets were bought in the fist place, but also that they are being used beyond their expected life-cycles. Moreover, the to-some-degree “broken” acquisition process engineered and deployed missile-firing UAV aircraft while the war in Afghanistan and OIF were in progress. The system can and has reacted quickly. America, the society of disposables, fast food, and microwave cuisine also has produced weaponry that is excellent and durable. The process is cumbersome, overly expensive, complicated—and highly political, but it does work. And critically, the American public continues to support it to the degree necessary considering the cost of acquiring new defense warfighting assets. Still, we wonder how much longer Congress will continue to support high defense spending, and OIF and GWOT through generous supplemental appropriations.

In the best of worlds, the DoD would acquire weapons assets in an environment of stable funding and management. Acquisition process reform over the past ten years has sought to provide this more stable environment in which to acquire better, more efficient weapons. However, the era following the end of the Cold war and the advent of the war on terrorism has

made acquisition more difficult. Further, reform of both the acquisition and PPBES processes has created its own turbulence simply because change has been continuous. At times, program managers and others involved in the DoD acquisition process have difficulty staying up-to-date on the status of change because one wave of reform spills over into the next. John Dillard suggests that one result of this is that program managers face a continuous cycle of decision reviews and may now have fewer resources to manage their programs as they spend more of their time and budgets on managing the bureaucracy. The result of this is that reforms may have actually lengthened the production cycle (Dillard, 2003). Nonetheless, continuing reform seems a fact of life, but this continuous improvement of weapons-acquisition budget estimation, execution and management has and will continue to present a challenge to all participants in the process. We should expect this process of continuous improvement to continue.

THE IMPORTANCE OF CHANGES IN PPBES TO ACQUISITION DECISION MAKING

For four decades the Department of Defense (DoD) has developed resource plans and budgets using the Planning, Programming, Budgeting System, or PPBS—renamed PPBES in 2003 with an "E" added to emphasize the importance of budget execution. As a decision process, PPBES is important to understand for many reasons, not the least of which is that through it commitments are made that result in spending over $400 billion annually (US Budget, FY2005, p. 87). This amount comprises approximately 49% (US Budget, FY2005-table 8.1, 125) of the discretionary portion of the U. S. federal budget for FY 2005 and approximately $2.6 trillion (Budget, FY2005-Outlays by Function-table 3.2, 58) in spending for the period 2004-2009. Despite the fact that PPBES coordinates spending of this magnitude, not much academic attention is paid to the DoD budget and resource management processes. Although the magnitude and opportunity costs of defense spending are questioned routinely, the resource decision process has been ignored to a considerable extent. Perhaps this is explained by the perspective that PPBES is too complex to be understood and that it is not comparable or relevant to analysis of budgeting in other federal departments and agencies, or to state and local government budgeting.

PPBES is part of what has been termed the transformation of business affairs in the DoD; it constitutes a significant initiative to improve and correct many of the evident problems that have weighted-down the functioning of PPBS. First, the change to PPBES merged separate program and budget reviews into a single review cycle performed concurrently rather than sequentially. Second, it incorporated a budget process matched to national electoral cycles, with major strategic changes slated for the second and fourth years of a Presidential term and minimal updating done in the first and third years, given no major change in the threat. Third, it fixed timing of the process so that planning and budgeting were clearly derivative processes driven by the Quadrennial Defense Review and the National Military Strategy. Fourth, it changed the cycle for Office of the Secretary of Defense provision of top-level planning information to the military departments and services from an annual to a multi-year schedule with a two-year combined program and budget review.

The essence of the PPBES reform is to establish a four-year resource planning and decision cycle to replace the previous system that operated in a six-year cycle for planning, a two-year cycle for programming and an annual cycle for budgeting. Year one would require "review and refinement" of the previous President's strategy and plans, including only limited changes in programs and budgets, an early national security strategy, and an "off-year DPG." MID-913 anticipated that in year one, "a small and discrete number of programming changes will be required to reflect real-world changes and as part of the continuing need to align the defense program with the defense strategy" (SECDEF, 2003a, p. 5). Changes would be made

in overall defense resource posture in response to information provided from two new and separate planning guidance documents and processes: the Strategic Planning Guidance (top-level DoD civilian staff input) and the Joint Planning Guidance (input from the military Joint Chiefs of Staff–the SPG and JPG) replaced the single Defense Planning Guidance. These two processes reflect incremental changes in the threat and the posture of the US and its allies**.** As is normal, a new administration may take steps to insert its defense policy priorities in the budget submitted to Congress and to make changes caused by fact-of-life events in acquisition programs.

In the summer of year one, work would be begun on the Quadrennial Defense Review for reporting to Congress. Part of the reason for this change in timing is that senior defense officials had argued to Congress that the requirement to submit a QDR in the first year was too much to ask of a new administration still involved in the rigorous congressional process. During this first year, the program structure and budget undergo minimal and incremental updates, given no major changes in the threat.

Year two is a year of major change. Following the completion of the Quadrennial Defense Review in late winter and other studies as directed by OSD and the military departments (for example, on the nature of undersea warfare), new SPG and JPG documents are prepared and a full program and budget review is undertaken. This constitutes a major scrutinizing of the force structure and resource priorities and patterns following the changes in the SPG/JPG. The POM and budget process for the following year are built around incremental changes to this DPG; therefore, the next year is termed an off-year. In the off-year, program-change proposals and budget-change proposals are considered as necessary to adjust to changes in the real world.

This means that in a four-year Presidential administration, fundamental change is targeted for the second year of the cycle with the first and third years changed only as threat environment demands increased modification. In practice, the most current fourth year, 2004, was devoted to fighting and financing the fighting of the war in Iraq. There was a controversial POM, particularly in respect to reductions in the Navy shipbuilding program. In a sense, 2004 was an on-year, but since it was not enveloped by a QDR, it can also be assigned off-year status. In the fourth year, a POM may be done, but it will not have the profundity of the second year POM which follows the QDR. Given a stable environment, year two (in the system where the results of the QDR drive the POM) would result in the most fundamental analysis and change in programs and budgets. Whether the defense environment is stable enough to support a four-year decision system remains to be seen.

The ‘E’ in PPBE indicates a new emphasis on budget execution. In 2003, DoD Comptroller Dov Zakheim (2003) indicated that the DoD would use the off-years when budgets were not prepared from scratch to examine how well the DoD was executing its programs and dollars. Zakheim (SECDEF, 2003a, pp. 3-4) reported that the intent was to measure the “burn rate” (rate of spending) in an execution review. Zakheim observed that the review would include asking questions such as how money had been spent, whether it should be moved to other areas and accounts, and what results have been achieved. The off-years provide additional decision-space for execution analysis.

These changes have created a combined two-year program and budget-review decision cycle (but not a biennial budget), with a complete review in year one, followed by limited incremental review in year two. This change in cycle from a full-program review and a full-budget review to a combined review is meant to reduce the inefficiencies of unnecessary re-

making of program decisions; the program should drive the budget rather than the opposite. With the programming and budgeting cycles operating contemporaneously, decisions are intended to be arrived at more effectively, whether they are made in the off- or on-year. Changes made in each off-year cycle are intended to have quicker effect by compressing the programming and budgeting cycles while still preserving the decisions made in the on-year cycle through the off-year by limiting reconsideration of decisions to only the most necessary updates. In essence, decisions flow from the Quadrennial Defense Review and other studies; then, a structure is erected in the Strategic and Joint Planning Guidances that provides direction for the remaining years of a Presidential term. This structure remains in place unless dramatic changes in worldwide threat occur. Year-to-year changes in the program structure and budget then are made only to adjust to incremental fact-of-life changes. The inefficiencies of conducting comprehensive reviews every year as intended in the previous PPBS process are avoided, and the decision process itself supposedly moves more responsively to war fighting and preparation demands.

The changes made in the period 2001-2004 came about in large part because Secretary of Defense Donald Rumsfeld believed (correctly in our view) that the PPBS process was too slow and cumbersome, and did not produce the best decisions on defense resource requirements. Also, we may speculate that he preferred reform, as did SECDEF Robert McNamara, which increased resource-decision control at his level (OSD) versus in the military departments and services.

Off-Year Changes

In this new PPBES cycle, the first and third years are off-years. During these off-years, military departments and the military commanders of major commands may create Program Change Proposals (PCPs) to affect the POM, and Budget Change Proposals (BCPs) to justify new budget requirements. The PCPs allow for fact-of-life changes to the previous year's POM; they are meant to be few and of relatively large size, and they must be balanced so they pay for themselves. Guidance for 2003 indicated the PCPs had to exceed a set-dollar threshold or had to be driven by serious policy and programmatic implications. For example, in 2003 the Navy submitted only three PCPs, one worth $100 million that involved 450 line items.

The PCP process provided the combatant commanders (those with direct warfighting responsibilities) with a new tool in the PPBES process, but like the military departments, they have to suggest offsets. For example, if a warfighter wants to increase force protection in one area at a certain cost, he/she has to suggest weakening force protection in another area as an offset or tradeoff for the increase. This is meant to be a zero-sum game. Changes have to be accompanied by offsets. As is usual with any offset procedure, budget claimants who submit either PCPs or BCPs take the risk that the offsets they suggest will be accepted, but the accompanying change proposals the offsets were intended to fund might not be funded. In such cases, the offset reveals a cache of money for a lower-priority item that might be directed to a higher-priority area. The budget change proposals (BCPs) were expected to be more numerous than PCPs, but smaller. They too would be largely fact-of-life changes (e.g., cost increases, schedule delays, new congressional directives) and would have to be paid for by offsets. Although the individual BCP need not be offset, the package of offsets proposed by a Military Department has to be offset and provide a zero-balance change. Whether in an off-year or an on-year, the results from the above decisions are consolidated into one database. This is an important change to the PPB system which had multiple databases for different purposes.

ANALYSIS OF THE SIGNIFICANCE OF A TRANSFORMED PPBES PROCESS

With the introduction of PPBES, the budget process within the DoD was dramatically changed. However, the outcome of this change still may be viewed as a triumph of incrementalism. For example, only changes to the POM and the budget were brought forward in 2003, and 2004 was a year primarily dedicated to fact-of-life changes in budget execution as the demands of the campaign in Iraq continued to impact the budget. This is a dramatic change from the past with its focus on complete review of the threat, force structure and programs.

One significant result of the 2003 budget process reform is that unless a budget change proposal is explicitly approved, then unit budgets are the same as they were in the previous year. This might be termed "re-appropriating the base." Even if an inflation adjustment is given, no new program changes are created. Thus, if a unit does well in the on-year cycle (second year and fourth year), it may carry some "fat" through the off-years. Since the stakes are now higher, it would seem that one long-run consequence would be an increase in the intensity of the struggle during the on-year process, both within the pentagon and Congress. Success is rewarded for at least two years and failure is doubly penalized. In other words, to change in the off-year, offsets have to be offered up; so, the only way to get better in the off-year is by giving up something else.

This new process puts the Secretary of Defense into the decision environment at an earlier stage than in the old PPB process; it puts him "in the driver's seat," in the words of one budgeteer. Decisions in the new PPBES are intended to reach the Secretary while options are still open, and while important and large-scale changes still can be proposed—before the final decision has become a foregone conclusion at the military department level. When the Defense Secretary's input came at the end of the stream of decisions, some changes that could have been made were pre-empted because they would have caused too much "breakage" in other programs.

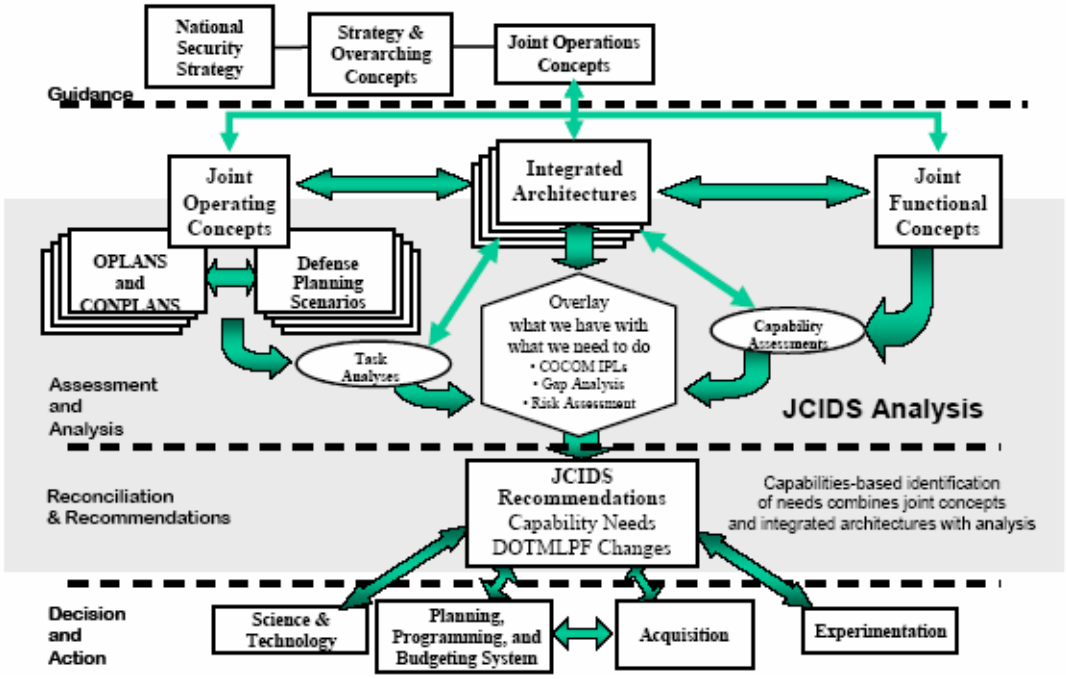
It is evident that Secretary Rumsfeld had a clear interest in process "transformation" through PPBES reform, but not all communities within the defense establishment were equally committed (or committed at all) to Rumsfeld's vision. We may note that inserting the Secretary of Defense into the decision process early stands up so long as history proves the decisions he makes are correct over the long-term. While this is true whether this input is early or late, elevating the role and authority of the Secretary in the PPBES process puts a larger burden of proof on his office and him personally.

Process Interactions

The Joint Capabilities Integration and Development System (JCIDS), Planning Programming, Budgeting and Execution (PPBE) system and Defense Acquisition System (DAS) form the core of Defense resource decision making and allocation. To understand incompatibilities in these three systems, some understanding of the individual processes and how they are linked is required.

JCIDS has replaced what used to be known as the Requirements Generation System (RGS).

Exhibit 16. Requirements and Defense Acquisition



The JCIDS Process (Source: Fierstine, 2004, p. 22)

Through JCIDS, Defense decision makers apply the general precepts of national and defense strategy to create joint fighting forces capable of performing the military operations required by the changing nature of the threat situation. JCIDS was developed to more effectively identify joint warfighting requirements and to emphasize a top-down orientation. Instead of the Services determining a "mission need" and discovering a joint need to increase a program's funding attractiveness while routing it up the chain of command, in JCIDS, the Chairman first determines if the required capability exists, then pushes it down to the resource sponsor for acquisition. If jointness is required, then the program is "born joint." In addition, the term "capabilities-based" can be confusing. In JCIDS, gaps in warfighting capability, either current or those programmed in the Future Years Defense Plan (FYDP), are identified and any risks associated with those gaps are quantified. JCIDS decision makers then determine future capabilities to address those existing gaps. In doing so, it is important the decision makers be specific enough about a new capability to include, "key attributes with appropriate measures of effectiveness, supportability, time, distance, effect (including scale) and obstacles to be overcome."

Additionally, the capability need be general enough to not prejudice decisions in favor of a particular means of implementation. Finally, National Security is not DoD specific. A gap between

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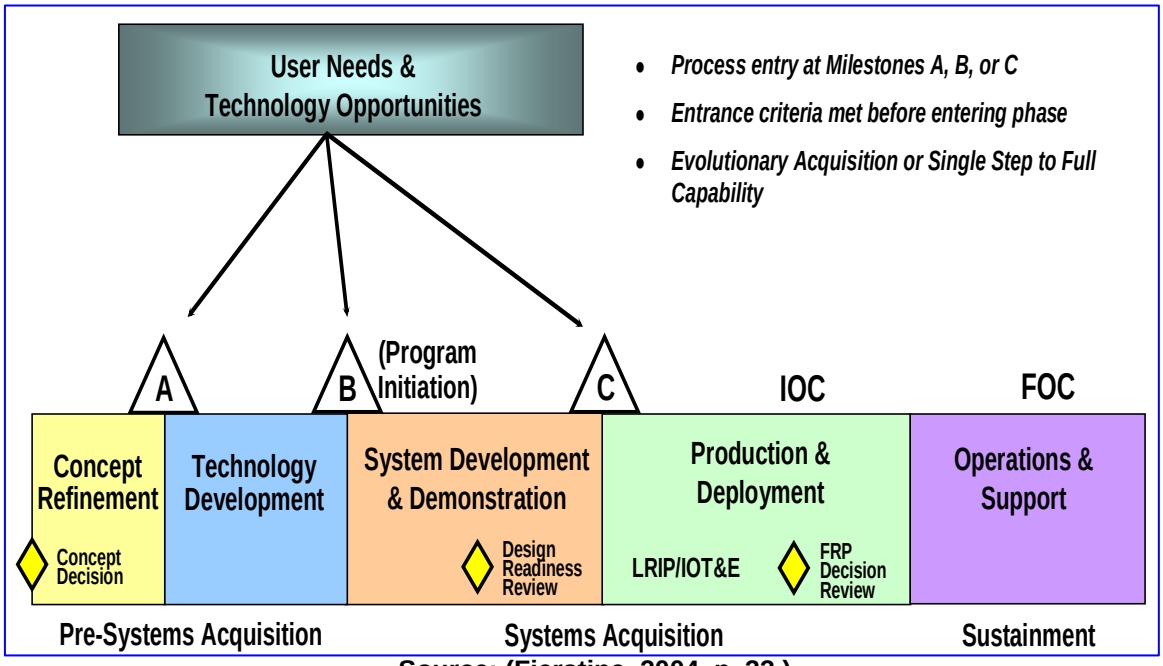
Additionally, the capability need be general enough to not prejudice decisions in favor of a particular means of implementation. Finally, National Security is not DoD specific. A gap between strategy, current capacity and the desired future capability to address that gap may cross governmental/ department boundaries (Homeland Defense, Immigration and Naturalization Service, Department of Transportation, etc.). Equally, other agencies may determine and/or have existing programs that could be leveraged by the DoD. JCIDS, Defense Acquisition System (DAS) and PPBES decision makers need to be sensitive to these possibilities and take advantage of them accordingly.

Exhibit 17. From User Needs to Acquisition



Source: (Fierstine, 2004, p. 33.)

Whereas decision makers use JCIDS to identify capability requirements as the current and future threat dictates, the Defense Acquisition System (DAS) takes JCIDS-discovered capability gaps, and initiates and executes procurement programs to field systems to bridge those gaps. In situations where the technology exists to fill a requirement, the DAS exists to acquire a tailored and capable product quickly and in a cost-efficient manner. When new technology is required to fill a capability gap, it is through the DAS that the DoD develops, tests, demonstrates and deploys the new technology in a timely manner and at a fair and reasonable price. In either case, the DAS is forward-looking and ensures that systems fielded support not only today's fighting forces, but also those of the future.

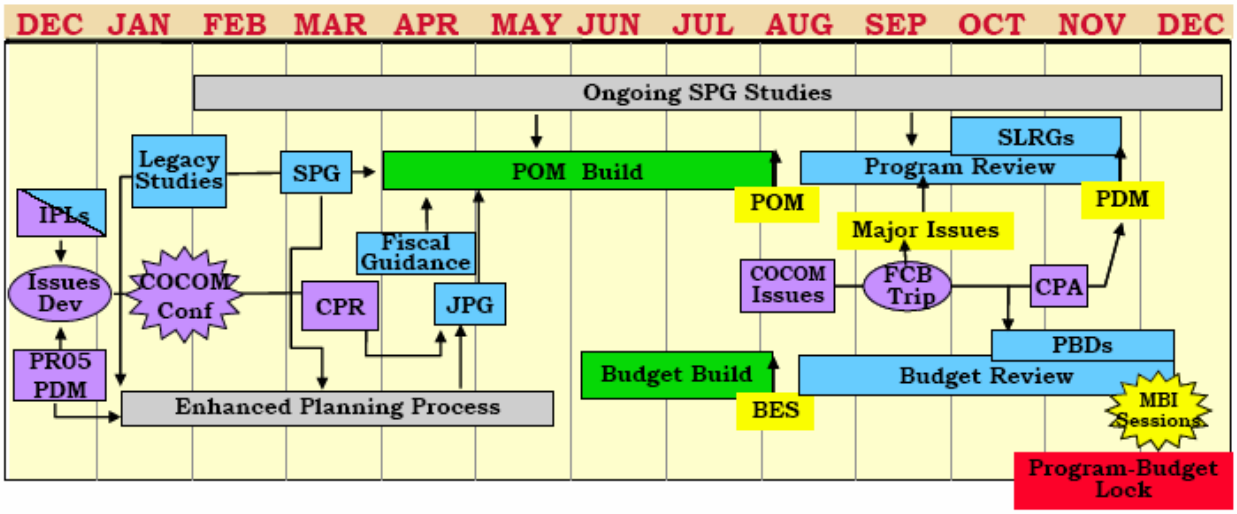
The DAS exists in a highly dynamic and political environment. Since Defense acquisition in aggregate involves billions of dollars each year, the process, participants and individual programs are linked to powerful stakeholders. These include the Executive branch of the federal government with the DoD acting as its agent, the Legislative branch where the Armed Services and Appropriations Committees dominate, private industry where large defense contractors compete for business, market share, and product continuity, their subcontractors and small businesses seeking a piece of the action, and state and local governments where the defense industrial base is located, where its workforce lives, where dollars are spent and where taxes are collected. These stakeholders are both mutually supportive in seeking dollars for defense acquisition and rivals for business; this is true not only in the private sector, but between the military departments and the DoD, the military departments and each other, and within the military departments as weapons projects fight for life and budget share.

Since the DoD determines DAS policies and procedures, negotiates each annual budget, makes the decisions regarding acquisition programs including lucrative contracts with private industry, each major player in the process with authority and access can influence the DAS, be it for efficiency reasons, personal or organizational ambition or other sources of motivation. Ultimately, Congress holds the power of the purse and must balance defense and non-defense spending and do it presumably with an eye toward fiscal prudence. Nonetheless, all these stakeholders compete for both the good of the nation and for corporate, organizational and/or professional gain. While the customary venue for most of these battles is commonly thought to be within the DoD and in its relations with Congress, in the summer of 2004 the struggle over the Navy shipbuilding budget broke out publicly in newspapers before the POM process was finished, with various shipbuilders arguing that they could not survive with the proposed building programs under consideration. As we noted, DoD acquisition is performed in the “fishbowl” environment of Washington, DC.

This particular battle has continued in Congress in 2005, but the point here is that the stakes are so high that locales usually considered solely bureaucratic and mostly secret sometimes find information has somehow leaked and the struggle has become publicized. To do the job well, those who manage projects within the DAS must understand the political, social and economic aspects of this process. From the lowest echelons of program management to the top, the Under-secretary of Defense for Acquisition, Technology and Logistics (USD, AT&L)), all DAS participants must be both knowledgeable and sensitive to these sometimes-contrasting forces and craft each project so that ultimately, warfighters are provided (in a timely manner) the best tools to safely do the job of supporting national security policy.

PPBES as a Multi-Level System Integration Challenge

Exhibit 18. The PPBE System



Source: (Fierstine, 2004, p. 49).

As noted, PPBES is a series of multistage and multilevel processes that cumulatively aide the DoD in determining capability needs based on strategic doctrine, the Defense programs that are needed to achieve the required current and future end-state, and the required annual monetary outlay required to acquire and sustain those programs. The machinations of the entire system regularly confound both participants and observers. This is due to the complicated nature of "colors of money," i.e., money in different appropriation accounts, and the tangled web of overlapping processes that make up PPBES and the sheer size of the budget (in terms of numbers of programs as well as the massive amounts of dollars involved) compounded by the need to meet a series of deadlines (Candreva, 2004). Colors-of-money restrictions also create difficulties in the process, because Congress divides money differently than does the DoD (McCaffery & Jones, 2004). Congress views Defense money in terms of appropriations for manpower, aircraft procurement, operations and maintenance (O&M) and the like, whereas the DoD structures its use of money in the FYDP and views money in terms of programs and program elements (PEs).

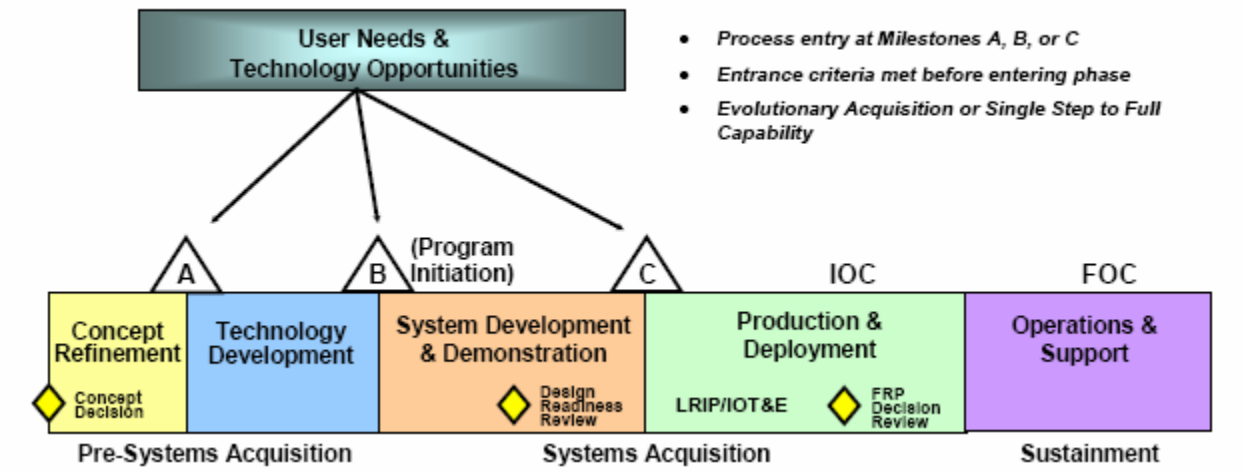
As can be seen from that graphic above, PPBES involves a programming and budgeting system operating roughly contemporaneously. This system is guided and shaped by wisdom from DOD's senior leaders at the Strategic Planning Guidance (SPG) and Senior Leaders Review Group stages (SLRG). The system is embedded in a net of ongoing legacy and planning studies. The Chairman of the Joint Chiefs and his staff submit input through the Chairman's Program Recommendation and the Joint Planning Guidance and the Chairman's Program Assessment. Combatant Commanders give input through their Integrated Priority Lists (IPL's) and through conferences and lessons learned and through participation on the SLRG. The services have input specifically in building in the POM and the budget and through the service of their senior leaders on the SLRG, on studies, and in the POM and budget decision process. Fierstine and Jones describe this system as involving, "a web of studies, planning systems, and decision making sub-processes, involving a monumental number of participants, the sum of which defies simple description as a comprehensive structure" (2005, p. 42).

TIES AND GAPS BETWEEN ACQUISITION AND RESOURCE MANAGEMENT SYSTEMS

The JCIDS and the DAS systems are tied to each other a number of different ways. A primary precept of the DAS is to acquire capabilities for the DoD as directed through the Joint Chiefs, so there is a clear lead-follow relationship between JCIDS and the DAS. Fierstine and Jones state, "This relationship is carried out formally through the four formal JCIDS documents as well as through the many required DAS program reviews. They are also informally linked through the leaders of each process some of whom have multiple roles to play in both" (2005, p. 54).

The JCIDS documents include the Initial Capabilities Documents (ICDs), Capability Development Documents (CDDs), Capability Production Documents (CPDs) and the Capstone Requirements Documents (CRDs). These are directly and formally linked to DAS events (Fierstine, 2004, p. 33). They are governed by policy and regulation and provide critical information to DAS leaders with respect to critical program elements like performance criteria, program size, impacts and constraints. They also help specify the level of administrative oversight required.

Exhibit 19. Formal Pathways from JCIDS to DAS



Source: (DoD Instruction 2004, p. 3. Cited in Fierstine & Jones, 2005).
Circles denote links between JCIDS and DAS.

Generally, different JCIDS documents are required before each DAS milestone review or DAS players have to submit documents to JCIDS players for approval before a program can proceed past a milestone; for example, before milestone B approval, "the CDD must be received from the JCIDS leadership. In order for the JCIDS decision-makers to approve the CDD, they must receive data from the DAS representatives and review the progress of the program" (Fierstine & Jones, 2005, p. 55). This represents a formal relationship where documents are passed back and forth between players in these two systems, with one set providing data and the other approving it before the first may give milestone approval. Notice in the schematic below how each of the milestone decision points (MS A, MS B, MS C) is accompanied by input from the JCIDS via JROC and DAS via DAB.

There are also formal links created between the two systems when the same players hold important positions in both systems. First among these is SECDEF and his staff, including Undersecretary for Acquisition, Technology, and Logistics, the Deputy Secretary of Defense and several Assistant Secretaries. In particular, USD (AT&L) is central to this process; he chairs the DAB and Milestone Decision Authority for all the large procurement programs. He also has the authority to ask the JROC to review a program at any time. This gives him a powerful hand in both the JCIDS and DAS processes. The Deputy Secretary of Defense chairs the Senior Leaders Group (SLRG) where all the important decisions are made which involve both JCIDS and DAS items. Various Under and Assistant Secretaries of Defense serve on the SLRG, the DAB, and Functional Capabilities Boards. Fierstine and Jones suggest that the most noteworthy of these may be the "Assistant Secretary of Defense for Networks and Information Integration (ASD(NII)) who serves on both the DAB, the SLRG and the FCBs" (2005, p. 58).

On the military side of the House, the most important link is probably the Vice Chairman of the Joint Chiefs (VCJCS) who functions as chairman of the Joint Requirements Oversight Council (JROC) and is Vice Chair of both the Senior Leader Review Group (SLRG) and the Defense Acquisition Board (DAB). Staff organizations with the Joint Staff apparatus also are important. These include the offices of J-8 who is the Joint Potential Designator (JPD) Gatekeeper, J-7, who is the executive agent for transformation, and J-6 who ensures IT/NSS interoperability and provides review, coordination and certification functions in support of the JCIDS and DAS (CJCS 3170.01D: B-4).

Within the military departments, the vice chiefs of each service sit on the JROC and the service secretaries sit on both the DAB and the SLRG. It should be remembered that individual military personnel form the lion's share of representation on oversight and analysis bodies related to both processes. Also, the Services are the sponsors for every program and research effort; service personnel form the program offices. Furthermore, the Services run the JCIDS analysis processes.

Since the JCIDS and the DAS are event-driven and follow similar courses, they are linked inextricably through their output (documentation and programs). While JCIDS and DAS are event-driven, the Planning, Programming, Budgeting and Execution System (PPBES) is a calendar-driven sequence of events. JCIDS or DAS events may or may not fit neatly in the POM/budget cycle. DAS events may or may not fit neatly into the off-year or on-year cycle.

For example, when a major program gets a "go" signal in an off-year, what this does to the basic concept of off-year is yet to be determined. It hardly seems like the program will be told to wait until next year, but if resources then are committed, does this mean that decision space is pre-empted from the following on year? Does this mean the on-year becomes an off-year? What if the go signal occurs in the first year of a Presidential regime? Will this mean a wait? If it is a major capacity enhancing acquisition, what will this mean for the QDR scheduled to arrive some 12 months later? Will strategy and doctrinal changes be pre-empted? What if a large program appears about to fail a major milestone, but it has been counted on as a part of a Presidential legacy in the fourth year of a Presidency: will the program be "forced" and the assumption made that it will get well (that its difficulty will be corrected) in the out-years? These decisions have consequences for each other, just as the battlefield concept in the late 1990s when the decision about armoring humvees was made: doctrine appears to have envisioned a front line/rear area split with little need to armor Humvees because only a few would be used in or near the front line. Iraq did not turn out that way, hence the scramble to uparmor Humvees.

The point is these systems have consequences for each other. It appears that, rather than through any other means, they are linked through personal interaction; PPBES particularly seems linked to the other processes primarily through the people who are involved. Also, any procurement effort can span multiple annual PPBES cycles, be under the influence of a series of layered PPBES decisions and feed data back into any number of current and future PPBES phases.

The link to PPBES formally comes from the Strategic Planning Council (SPC) which develops the Strategic Planning Guidance (SPG). The SPC is led by SECDEF and made up of the Senior Leaders Review Group (SLRG) and the Combatant Commanders; it includes virtually all of the senior leadership in the DoD, civilian and military, including 19 four-star billets, the service secretaries and various OSD-level representatives. This group produces the Strategic Planning Guidance, although it probably would be most correct to say that it is produced for SECDEF and belongs to him and that his views are predominant in the end product. The SPG sets the scene for the POM-budget process, feeding directly into the POM. The SPG focuses on such things as threat changes, war plans analysis, new concepts, and lessons learned. It identifies and sets up DoD-wide trade-offs and identifies joint needs, excesses, and gaps.

For example, one lesson learned might be that US forces may have to be prepared to fight in both traditional and non-traditional battlefields (WWII vs Iraq) and this could have consequences for both doctrine and acquisition of assets. If Humvees are going to be in harm's way wherever they go (a "front-line" is an everywhere scenario), then their armor needs will change. The POM process is also informed by issues surfaced by the Combatant Commanders (COCOMS) routed through an extended planning process to the joint staff. The result of this input of information is the Chairman's Program Recommendation (CPR) and the Joint Planning Guidance (JPG), which help integrate joint capabilities into the POM process. The link between DAS and PPBE here is that it is the JCIDS's capabilities analysis engine which is used to examine current and forecasted capability needs.

At the service level, a number of other interactions exist. For example, in the Department of the Navy during the POM and budget build/review processes, the Navy requirements officers and analysts under N7 and the Financial Managers and analysts under N8 independently conduct their own campaigns, scenario and program analysis. In doing so, they use the same scenarios, simulations and models as are used in JCIDS by OSD, the joint staff and the rest of the MILDEPS. Additionally, all the data regarding past, current and future program cost comes from the program offices who manage the Services' acquisition programs.

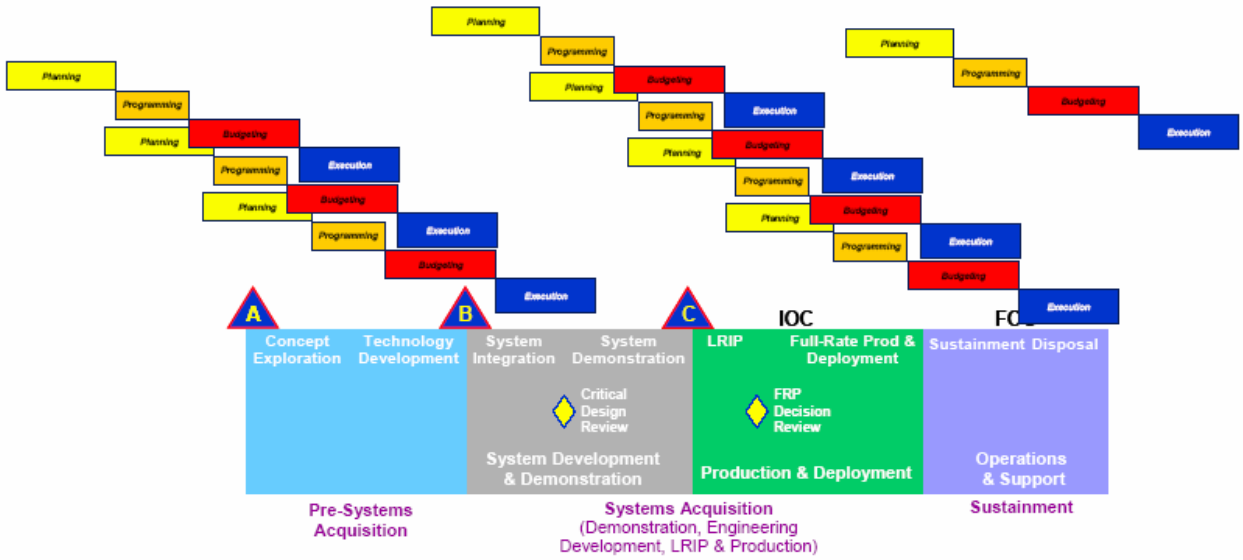
At the most basic level, the PPBE system and the Defense Acquisition system are linked through program cost data. Program offices build OSIPs (Operational Safety Improvement Programs); these are used to create the budget line items that detail program cost data and feed that data through their budget offices for their programs (BFMs) to the Navy Budget office (FMB); here, it is used during program cost analysis throughout the year. When the FMB asks questions about a program or recommends changes, it is done based on the data provided in these OSIPs. This may happen during the budgeting phase, when marks and reclamas (appeals of budget cuts) are made, or during budget execution. The analysts in N7, who represent the warfare requirements community, and the analysts in N8, who are the budgeters and linked to the PPBE, closely monitor the acquisition programs. Fierstine and Jones assert, "In the current year, if a program is under-executing, then the program and budget analysts will make adjustments as necessary to ensure that money is diverted to those programs that will spend it by the end of the appropriation period" (2005, p. 65).

The result is that the warfighting-needs system, the acquisition system (DAS), and the planning/budgeting system (PPBE) are various points on integration and articulation—from an assessment of the threat in the SPG to a design for joint capabilities in the JPG through the POM building process and into the annual budget preparation and review processes. Most, if not all, of the top leaders hold multiple responsibilities in these systems; thus, co-ordination happens by forcing decisions on different aspects of defense needs through the same sets of players. Formal documents are required and reviewed by these players before decisions are made initially and at subsequent important check points, be they milestones, POM, or budget decisions. Additionally, staffs of analysts in different organizational locales have responsibilities for data production and review in program creation, implementation, and execution. They tend to be single-issue focused—on, for example, the best weapon system, or the most weapon systems for the money available this year. These players assume coordination and integration is done at levels above them or prior to program starts, or whenever the POM is built and reviewed, or whenever the threat changes or when new capabilities are needed or old capabilities may be foregone, or even when a strike in a tin mine in South America may imperil the pace of a program.

There is no doubt but that this is a complicated arrangement. Perhaps the single most confounding factor in these equations is time. Weapon systems take time to develop and build. The V-22 for the Marine Corps has been in development of one sort or another since the late 1980's, the Navy LPD-17 since 1998. Engineering and deploying the surveillance drone in Afghanistan in 18 months is the exception to the rule. Most weapons acquisition programs take years to develop. Exhibit 20 illustrates the event-driven nature of the DAS system (its milestones) and shows how this may overlap several PPBE cycles. Fierstine and Jones state, "the procurement effort can span multiple annual PPBE cycles, be under the influence of a series of layered PPBE decisions and feed data back into any number of current and future PPBE phases" (2005, p. 54).

Notional Mapping of PPBE against the DAS Event Timeline

Exhibit 20. Acquisition Timeline Overlaps Several PPBES Cycles



Source: (Solis, 2004, 28. Cited in Fierstine, 2004, p. 54).

What this means is that when complicated programs (all weapons programs are complicated) are conceived and developed, they proceed through a series of PPB processes. What this means in practice is that they also are reviewed by different individuals. Turnover in personnel in the DoD is high. This happens by law and practice for military leaders; the effect is that turnover happens every two to three years. This level of turnover is just as true on the civilian side. Thus, the Marine V-22 program has seen six different SECDEF's. It was begun under Secretary of Defense (SECDEF) Caspar Weinberger and continued under SECDEFs Dick Cheney, Les Aspin, William Perry, William Cohen, and Donald Rumsfeld. In fact, the average tenure of senior leadership in the DoD is 1.7 years. Thus, co-ordination by position is riskier than it seems. If the distance between milestones A and B or B and C is more than two years, it is highly likely that most of the players in the SLRG will have changed. Even when they are the same people, they may be sitting in new positions and have changed the interests they represent. This is true for both civilian and military leaders. The result is that one should not count on the effectiveness of coordination by position. This leaves coordination by document as the fall-back position. Fiscal climate is also a complicating factor. Weapons systems that take years to develop and field will go thru varying fiscal climates: for example, the V-22 started in a rich procurement environment in the mid-1980s and was kept alive in the procurement holiday in the1990's. Change also comes from change in the threat situation or battlefield doctrine: Rumsfeld's goal of transforming the Army to a lighter, agile, and more lethal organization doomed the Crusader artillery system. Another aspect of this happens when a service can not decide on the capabilities it wants and, thus, decides to maximize all capabilities; this is roughly what happened to Navy air plans in the early 1990's. The result was a years-long delay for plans for new aircraft. Thus, the passage of time means that people, resources, and doctrine change. These are all threats to the orderly integration of the warfighting Requirements, DAS and PPBE systems.

ANALYSIS OF INTERVIEW DATA ON DECISION SYSTEMS INTEGRATION: MATCH AND MISMATCH

In a research project designed and supervised by the authors of this paper, interviews were conducted in the Pentagon environment on the topic of the degree of fit between PPBES and Acquisition decision systems. Navy CDR Kory Fierstine, assisted by L. R. Jones, interviewed current and past DoD process players in and around the Beltway, including some now working in the private sector doing business with the DoD. Those interviewed in this project included representatives of Navy contractors, representatives from Navy air and sea system commands, Washington-based Navy resource management officials, OSD acquisition officials and active and retired JCS officials. Jones supplemented these interviews with discussions and briefs with high-level military officials in the OSD Office of Program Analysis and Evaluation (PA&E) and the Joint Chiefs staff (J-8). Fierstine and Jones' findings are not definitive, but they provide insight unto potential and real dysfunctions within and between the PPBES and Acquisition analysis and decision processes. The problems that result in systems' discontinuity are divided into six categories.

Potential Dysfunctions in the PPBES-DAS Requirements Setting Processes

1) Politics and power
    a) All levels of the chain of command produce budget estimates that are above guidance.
    b) The political sensitivity of large weapons programs effect requirements analysis and resource decisions.

c) Many decision makers use political clout to stave off directives from higher authority.

2) Other interactions on resource decisions
   a) A small number of people in the processes have disproportionate amounts of influence.
   b) Decisions are adversely affected by time compression compounded by the lack of sufficient information.
   c) Decisions are adversely impacted by the excessive levels in the chain of command.
3) Overlap and churn
   a) There is excessive duplication in processes at each level.
   b) The excessive repetition of calculations to program cost data due to budget drills have an adverse affect on motivation.
   c) Users report significant difficulty in execution when budgeted funds are lower than required.
4) Transformation
   a) The concurrent processes of the new PPBE are causing a significant increase in workload without a significant increase in benefit.
   b) Transformation has not solved the issue of getting appropriate information to decision makers.
   c) Transformational change has added delays to many aspects of the processes.
5) Barriers to Change
   a) Emergent user needs are not addressed adequately.
   b) There is an over reliance on correct verbiage in the OSIPs.
   c) Blanket joint requirements are ill-defined and cumbersome to work through.
   d) The distribution of common funds is thought by some to be inequitable.
6) Innovation
   a) Use of multiyear procurements constrains budget decisions and may reduce churn.
   b) With regard to program documentation, semantics sometimes overshadows intent.
   c) Monetary constraints drive changes in schedule and/or performance requirements, which in turn have an unintended effect on cost.

Under the first topic area, politics and power, some interview respondents thought that, as budgets moved up the organizational hierarchy, there was a tendency to overestimate dollars in order to get the correct amount of warfighting capability; they felt this resulted in budgets exceeding guidance. Their second point has a horizontal aspect to it; respondents felt the large and expensive weapons systems which were built over several Congressional Districts or states were, perhaps, not subjected to as searching a warfare analysis scrutiny as they should have been. The third item, explained below, seems mainly to mean that Congress is able to keep some programs alive and embellish others beyond what DoD has requested.

In section 2, respondents were concerned that “leadership can and does direct funding for programs deemed important, yet not supported by the analysis, given the info available to mid-level experts” (Fierstine & Jones, 2005, p. 99). They also said the lack of time and

insufficient data or expertise impacted the quality of the budget decisions that were made. Section 3 on overlap and churn needs no explanation. Fierstine and Jones speculate as follows: "The Services, the joint staff and OSD all do nearly identical analyses using the same data, models and simulations (and in some cases the same personnel) adding time and manpower to the process without necessarily reducing the use of guesswork and intuition" (2005, p. 100).

With respect to Section 4, respondents felt that transformation of PPBES was still a work in progress and had not produced a significant increase in benefits. Fierstine and Jones state: "The primary difficulty here is that the budgeters begin work on a POM package that is constantly changing rather than having a fixed package after the programmers are through and the work level increases while the timeline stays relatively fixed." They also note that:

> in the budget and programming process people are routinely making decisions without a full grasp of all the facts and data. This was evident at all levels from those in the program and requirements offices having to route paperwork through people unfamiliar with their platform, to those in FMB making spot judgments due to time constraints. Finally, everyone interviewed complained about the length of time it takes to route paperwork and get decisions. (2005, p. 101)

In Section 5, Barriers to Reform, respondents worried that emergent needs were not identified and integrated into the system soon enough—in effect, that joint needs had priority, and some programs were identified as joint and given priority when the likelihood of their being used in a joint environment was low. They also chafed at the cumbersome procedures in clearing through the joint process. Fierstine and Jones uphold these concerns. They state:

> Specifically, all the programmers and requirements officers discussed how emergent needs of existing programs are not adequately addressed by the current system. They also agreed that a big part of it was the fact that the comptrollers were tied to the exact terminology in the OSIPs and that anything not specifically delineated in the OSIPs had to endure the lengthy delay of a new program start-up. They all complained about the difficulty navigating through the vague joint requirements required of all communication gear forcing them to route all associated programs and upgrades through numerous joint wickets even though many of the programs would not be used in such a manner as to require the joint standard. Finally a few interviewees took issue with the equitable distribution of funds in programs that took money from everyone in order to provide commonality to all platforms. They claimed that these funds were effectively an under-the-table system for certain airframes to get capability funded by everyone else. (2005, p. 103)

An interesting part of the research indicates the power of words; the analysis provides a vocabulary of terms used with certain appropriation accounts. Saying that something or some part of a process or decision "belongs" to another account can imply negative consequences for program funding, i.e., the effort top-push costs onto some other entity. Thus, the DoD programming and budget "game" must be played carefully and correctly—making it more time-consuming. The study (2005, p. 103) indicates that a number of terms are virtually synonymous and could be moved under any appropriation, without changing the general definition of the type of work done. However, programmers find themselves tied to each word as if they were pulled from "a sacred text." This indicates that a careful analyst would use the terms "investigate or research" when writing justification for an RDT&E account, but use the terms "analyze or assess" when doing the same for an APN justification. And an O&M request using these words

would be looked upon unfavorably. The word “track” is probably as close as the O&M accounts get to in depth analysis.

In Section 6, respondents were concerned with innovative adaptations to organizational stress. Here, Fierstine and Jones discuss how requirements change (downward) as programs fail to meet requirements, and how program managers have found that if they can move their program to a multi-year profile they can fend off much of the churn that is driven by the annual budget process, particularly one that takes place in an era of scarce resources. Fierstine and Jones state,

> programmers have begun to increasingly use multiyear procurement strategies in an attempt to fence off programs from the annual churn that is inevitable. […] [B]reaking a MYP contract is a tremendously powerful argument for use in reclamas. The programmers also have used BTRs (Below Threshold Reprogramming) to their advantage to protect their accounts from raids during execution. This has the added benefit of cushioning them against the end of the year need to spend their money or lose it by designating the recipient of moneys unspent and then possibly getting reciprocation after the new budget comes along. (2005, p. 104)

Reflecting on the above research, the authors observe that the most significant issue discovered during this research was that an overwhelming amount of redundancy exists at all levels of the chain of command. They note that this finding is supported by a study by the Center for Strategic and International Studies warning: “that various military bureaucracies ‘unnecessarily overlap, resulting in duplicative and, in some cases, overly large staffs that require wasteful coordination processes and impede necessary innovation’” (Schmitt, 2004).

Fierstine and Jones reinforced this perspective as follows:

> the research for this project found that almost every Secretary, Under Secretary, Assistant Secretary and Flag Officer with a required signature anywhere in these three decision making processes has their own group of analysts to recheck, re-verify and recertify the data provided them from others (all of which are in or near the Pentagon). An example with regard to aviation would be how the individual programs, BFMs, N7, N8 and OSD all have cost analysis experts on staff looking at the same data, yet coming up with different conclusions. Although risk reduction is important, it seems that DoD analysis capability has grown (in aggregate) past the point of diminishing returns. (Fierstine & Jones, 2005, p. 124)

The results of this research project call for an effort to reduce these redundancies. The authors also would like to see communication among the three processes improved and suggest the creation of an information system to communicate (near) real-time, highly detailed, accurate and useful programmatic cost, schedule, and performance information to decision makers. Included in this system should be highly detailed prioritization lists so that when decisions have to be made at subsequent levels of the budgeting process, those having to make those decisions can more adequately determine what should be cut when necessary, or what should be bought when there is extra funding available.

The research report adds that this might increase decision speed since top leadership officials would be able to make decisions based on data in the system without having to, “drill back down into the program offices to get data that may or may not satisfy their needs” (p. 125).

The study also calls for simplifying the entire acquisition document and review process, but makes no specific recommendation. They suggest that current operators are reducing the risk of making the wrong decision by increasing the time to make the decision. Fierstine and Jones also worry that currently there is no satisfactory way to address “ideas or concerns that bubble up from the fleet that would add small increases in capability in the near-term” (p. 127). They divide this between existing programs that require attention and emergent ideas that require immediate funding and could be fielded quickly and at low cost. They say, “An example of a less urgent nature includes F-14 adaptation of the Air Force LANTERN pod. This upgrade was on the community’s, 'top-ten upgrade list' for years, but was only able to get funding after a monumental demonstration of fleet innovation […]. [H]ad the acquisition pipeline been able to rapidly and cost-effectively address this need, then the fleet would not have been motivated to enter the business of test, evaluation and demonstration” (p. 128).

This research project commented that since changes like this are relatively small and tend to be “focused on the short term versus the JCIDS horizon of decades, they are unable to enter the funding debate without great difficulty” (p. 128). Fierstine and Jones argue that this is a small thing, but important to field users (in this case the fleets), and suggest a better system needs to be “established that will allow the adequate prioritization and swift communication of these fleet concerns up the chain of command” (p. 129). The authors also argue for:

> a non-partisan, Defense-oriented analysis of failed DoD programs over the past decade to determine if anything could have been done to discover the warning signs earlier. By doing so, one might expect to learn more about why programs failed, and what political, social or other forces kept the programs alive for so long, and in turn, restricting funding from other priority programs. This would be for the benefit of leadership so that future decisions can be more effective. Therefore, like aviation safety reports, the investigations and findings should be for official use only and not legally binding. (Fierstine & Jones, 2005)

We believe these recommendations deserve measured study. What may first be observed is that they call for a reduction in staffs to reduce redundancies, but also call for the installation of a comprehensive real-time information system that would serve the same information to all participants and the creation of a failure-analysis unit and system. The risk here is that adding a new and complex information system and a new organizational entity to systems already rife with information systems and complexity is problematic. Also, the call to allow some systems to service military department needs more quickly and in a more direct manner pushes against the joint and centralizing tendencies currently in progress under transformation. Lastly, these changes would be imposed on decision systems already undergoing substantial and continuous change. All of these decision systems constitute moving targets. Consequently, any change will have to be made to systems that are already in the process of change. Thus, even more change will be hard to justify relative to the benefits and costs projected to result.

CONCLUSIONS

With respect to the integration of the PPBES and Acquisition decision cycles, there are some points at which substantial and reinforcing linkages exist, and others where the systems operate separately. The question is: to what degree should those parts that are not integrated presently be better integrated in the future? A key point with respect to increased integration that has been established under the leadership of Secretary Rumsfeld is in the programming "endgame"—the last part of the programming phase of PPBES. This is where the Senior

Leadership Review Group (SLRG) established by the Secretary reviews, approves and sometimes is forced to cut major acquisition programs. In 2004 and 2005, the Secretary and SLRG have had to consider both significant increases in acquisition and reductions forced by the tight fiscal constraints of POM 07 and the FY 2006 defense budget. The SLRG review, forced by the need to reduce spending projections due to the costs of the Global War on Terrorism (GWOT) and other budgetary costs (including those for personnel and personnel entitlements programs), resulted in some major acquisition program shifts and reductions. These include approval of the Navy's decision to retire an aircraft carrier early (the Kennedy), cancellation of the C-130J buy and reductions in the size of buys in submarines and surface vessels for the Navy, modularization for the Army (the acquisition portion of this initiative), and cuts in the Joint Strike Fighter, and the F/A-22 aircraft program for the Air Force.

In budget execution, the problems we have identified in this paper remain (as far as we can ascertain). This is an area where the budget drives program to a great degree. Some of this is inevitable, e.g., as a result of congressional politics that produce changes in defense budgets and acquisition programs beyond the ability of the DoD to resist. When this ordering occurs, it causes significant disruption in the budget—both in preparation of future budgets and in the execution of current appropriations. It also forces changes in both the structure and content of the POM and QDR, causing the programming process to have to move in reverse (to accommodate budget changes) in a way that almost always causes discontinuity in program management and execution.

Consequently, we may conclude that under Secretary Rumsfeld, changes have been made to improve the manner in which PPBES serves as a decision system for the DoD and the degree to which this system has been integrated into acquisition decision planning and programming. This is in part as a result of Rumsfeld's demand for better information upon which to base decisions and his willingness to listen carefully and to question vigorously the data and options provided to him from his staff. In addition, it is a result of the changes made in PPBES (detailed earlier in this paper) to better connect the process to the Secretary's decision preferences. We also conclude that this linkage has been strengthened through program review by the JCS (J8) where not just defense-wide acquisition programs as was the case before transformation of PPBES, but *all* DoD acquisition programs now are reviewed for jointness and feasibility.

With respect to budget formulation as opposed to execution, the DoD comptroller staff hold the view that budgeting always has integrated acquisition programming. However, programmers do not share this view, contending that too many budget decisions have driven the POM rather than the other way around. This may have changed to some extent over the past four years, but there is insufficient evidence available to us to show a demonstrable change in how DoD budgeting operates now compared to prior to 2001. What we can document is that DoD budgeting has had to be highly responsive to changes in the threatening and warfighting environment in the past four years.

Increased budgetary responsiveness may be viewed as a contingent reaction; and, a systematic improvement in budget and acquisition decision-process linkage, if it has occurred, may be attributed to necessity. The cost of responding in the post 9-11 context and then financing the GWOT, combined with the recently emergent desire of political leaders to make progress in reducing the size of the annual federal budget deficit, and the prospect of reduced, and then no defense supplemental appropriations for 2007, and the ever-present budgetary pressure caused by the inevitable rise in entitlement spending all have made better and more

constrained program and budget spending plans a necessity for the Secretary and his staff, the military departments and services, and the JCS.

However, we do not wish to present too rosy a picture of the results of transformation of budgeting for acquisition. We must observe that at the program and project-management level (within budget execution from the financial management perspective), there remains a high level of uncertainty regarding financial stability and management control (see Zolin and Dillard/Nissen papers in this proceedings). While macro changes at the DoD level may make participants in OSD believe that the system has been changed (and they probably are right with respect to their position perspective), the larger question remains whether macro system changes have improved the cost, performance, speed of delivery of weapons and weapons systems in reality. This improvement will only result from better management and management control at the point of relationship of the buyer (DoD) and the supplier (the private sector contractors). It is evident from preliminary analysis (and from the experience-based knowledge of serving and retired program and project managers) that there still is much to be improved in the nature of contracting, contract management, enforcement of DoD and government controls through a properly designed and enforced management control system (Jones & Thompson, 1994).

The dilemma is in part a result of management failure on the part of government in assuming that private-sector contractors will obey DoD and federal acquisition rules and guidelines, and the restrictions built into contracts, without sufficient DoD leadership, oversight and enforcement of law and contracts. Is the blame for project-cost overruns the fault of greedy contractors that attempt to take advantage of government incompetence or lax enforcement? Is the blame due to this absence of control on the part of the DoD? It appears that both are causes of the problems of costs exceeding estimates, the extended time taken to develop and deliver new and increasingly more technologically complex weapons systems, late delivery, system failures (despite higher than projected costs), inadequate documentation provided for training of end-users, installation deficiencies and many other problems with the quality and performance of systems delivered to the fighting forces.

Our point is that it is unwise and incorrect to gloat about or claim victory in the battle to make acquisition and its funding more efficient at the top levels of the Pentagon, when at the level at which programs and projects must be managed so little has changed to achieve improved the efficiency and effectiveness goals of transformation. No amount of change at the Pentagon level will achieve these goals. To bring meaningful reform, change must reach down to the level at which spending occurs and programs are executed, where the government and contractor interface and relationships are so crucial to improving performance and results.

How can the process of transformation reach down to the program and project level? Some may argue that a great deal of effort has been exerted toward deregulating and contracting out, much to the benefit of the DoD (generally) and acquisition (specifically). That deregulation (e.g., of the FAR and DAR, the DoD 5000 series, etc.) has been a focus is undeniable. However, the attempts to improve management of acquisition programs at the government/contractor interface have concentrated on auditing. The problem with this approach is that of "closing the barn door after the cows have escaped." It is fine to discover contractor overcharging *ex ante* and to extract penalty payments from contractors as a result. However, this is merely a financial transaction that does little or nothing to improve the services to and benefits of the end user—the warfighter. When unworkable products are manufactured and delivered, no matter what the cost to government, the result for the end-user ranges from frustration in the best of circumstances to casualties and death under the worst of circumstances.

It may be argued that what is needed is not more deregulation but adequate level of effort in enforcing the rules that are in place, which can only happen through high-quality, knowledgeable and skilled leadership. This, in turn, implies investment in the education of leaders and decision makers, better selection of those properly prepared to lead, increased continuity of leadership and the ability to manage looking forward rather than backward in the manner that characterizes the "reform by audit" mentality. Who advanced the conclusion that auditors would be the best source of the management knowledge and expertise needed to improve business practice? Even the audit community itself would not advance this proposition. So, where do we go from here? We believe the knowledge about how to improve acquisition management at the ground level resides to a great extent with those who have done the job, i.e., experienced (and typically retired) program and project managers. If this were not the case, then why would the private sector hire and pay these people so well to represent them in dealing with the DoD? The question of leadership in ground-level transformation, where it will make the most difference for the end-user, thus becomes how to retain this expertise rather than force it into retirement to engage in profit generation for contractors?

In addition, improvement in the nature of contracting instrumentation is vital—and much effort has gone into this initiative in the past several decades. As a colleague remarked, "What kind of cost-plus contract haven't we tried to create the right incentives to perform and deliver the results? We have tried them all!" We would suggest that it is one thing to write a good and enforceable contract and another to actually enforce it. Learning how to do this is one obstacle; getting the attention of a revolving crew of leadership to either do it or permit it to be done is another. Our hope is that pointing out that improved management and control is a start to moving in the right direction (to be realized through adopting the appropriate control system design and execution strategy) and should be a prime target for transformation—equally worthy to the reformulation of the PPBE system—will bring reform home to the level where it matters most (Thompson & Jones, 1994; Jones & McCaffery, 2005 forthcoming).

With respect to the continuing pace of transformation throughout the DoD, no Secretary of Defense can alone manage an enterprise as complex as the Department of Defense. And in fact, it is important to point out that in the past and presently, input to program and budget decisions in the DoD is provided by the Deputy Secretary of Defense and staff, the position in the DoD that bears a large part of the responsibility for actually attempting to manage the DoD. In addition, the Under Secretary Comptroller, the Under Secretary for Acquisition, Transportation, Logistics, and Assistant Secretaries for other OSD functional areas including program analysis and evaluation, policy, force management and personnel, legislative affairs, health, reserve affairs and others, all provide views and analyses to guide program and budget decision making.

From this perspective it must be observed that the task of defense resource planning and budgeting is part managerial and part political. Thus, from our perspective, no amount of budget process, PPBES or business process transformation reforms will reconcile the different value systems and funding priorities for national defense and security represented by opposing political parties, nor will it eliminate the budgetary influence of special-interest politics. Value conflict was evident in the early 1980s when public support combined with strong Presidential will and successful budget strategy produced unprecedented peacetime growth in the defense budget, in particular in the investment accounts. And despite the implementation of deficit-control reforms since 1985 and the Peace Dividend drawdown of the 1990’s, constituent and special-interest pressures made it difficult for Congress and the DoD to realign the defense budget. While we applaud the changes made in 2001-2004, reform of defense budgeting process does not mean that producing a budget for national defense politically will be much

easier in the future than it has been in the past. Threat perception and assessment and politics drive the defense budget, not the budget process itself (McCaffery & Jones, 2004). Additionally, the size of the deficit and rate of increase in mandatory expenditures make top-line financial relief for the DoD unlikely.

We also may observe that a sequence of annual budget increases for national defense in the early and mid-2000s have not brought relief to many accounts within the DoD budget. At the same time, requirements of fighting the war on terrorism have intensified the use of DoD assets and the costs of military operations. Because the need for major asset renewal has been postponed for too long, new appropriations have gone (and will go in the future) largely to pay for new weapons system acquisition and for war fighting in battles against terrorism. What this means is that accounts such as those for Operations and Maintenance for all branches of the armed services will continue to be under pressure and budget instability; restraint will remain a way of life for much of the DoD. This places a heavy burden on DoD leadership, analysts and resource process participants to achieve balance in all phases of defense budgeting and resource management.

As explained in this paper, with respect to transformation initiatives beyond improved financial management systems and processes and PPBES implementation, considerable change is in progress. In the area of acquisition and logistics, transformation to what is termed spiral (continuous and simultaneous) and "sense and respond logistics" processes is underway. Improving information technology for management of inventory systems in real time to permit managers to know how much and where material is located on a worldwide basis also has been addressed and is fully operational in the Air Force. In information technology, network-centric combat information systems are under development in all of the military services. Such systems coordinate various types of data to a single command point in real time to improve the ability to see and manage military operations. Applications of network-centric IT in the area of business management may be the next step, although they are costly. However, such applications are one approach to coordination of decision making in flatter, network-types of organization (i.e., hyperarchies) rather than through traditional bureaucratic forms of organizing to solve complex and sometimes "wicked" problems (Jones & Thompson, 1999; Roberts, 2000). Given the vital importance of information technology, it is essential for the DoD to address the knowledge, skills and abilities of its workforce to fully leverage the potential of IT and other business-management methods.

These and the other initiatives identified in this paper are only a sample of the many transformational measures currently under some degree of implementation and experimentation in the DoD. Given the progression from the industrial age to the age of technology in an increasingly global commercial marketplace, capitalization on new technologies is a key part of transformation to create "knowledge warriors" for significant battlefield advantage. Most of these initiatives are not under implementation independent of budgets and cost accountability—virtually all are expected to reduce costs while cutting cycle time with either improvement of quality or, at least, no diminution of quality of service to customers. The business models and plans developed for these initiatives are mirrored on business processes tested and used in the private sector. Transformation also stresses continuous learning and the creation of self-learning organizations that can observe and orient themselves more quickly to new threat environments, then make decisions and take action to learn more quickly by trial and error in a cycle of restructuring, reengineering, reinvention, realignment and rethinking both means and objectives (Jones & Thompson, 1999). Further, critical issues related to transition management, organizational change, organizational design and appropriate institutional arrangements are raised whenever DoD reform is significant.

Overall, the major challenge facing the DoD in the period 2004-2008 is how to continue to modernize the fighting forces and continue the pace of business transformation while paying the high price of waging the war on terrorism. In essence, what the DoD must fund and support in the short-term must be traded-off against longer-term investments to improve both business-management efficiency and force readiness. Given this dilemma, key business-management challenges faced by the DoD leadership in the next decade include the following:

- How will the DoD business transformation keep pace and be coordinated with the transformation of military affairs?
- How will the DoD re-capitalize the force structure within limited budgets?
- How can DoD acquisition and procurement incorporate new technologies while producing and fielding war-fighting and support assets more quickly, especially given tight budgets in the foreseeable future?
- How will new cyber-management technologies and methods (e.g., net-centric warfare systems) be advanced within the limits of resource constraints?
- How will the DoD manage the transition of logistics support (e.g., toward spiral logistics) to the new environment of the war on terrorism?
- How will the DoD improve its accounting and financial management systems to enable analysis of performance and results related to costs, and provide the basis for better internal and external reporting?

These and other challenges face DoD officials as they attempt to improve budgeting, PPBES, acquisition processes and other management systems through transformation.

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