Chapter 4

DoD Software Acquisition Environment

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4.1 DoD Acquisition Revolution

> *"Radical ideas, nontraditional approaches, and the sparks that fly as they beat against the status quo and are exposed to light and to each other are the stuff of progress."* — VADM Robert F. Dunn (USN Retired) [DUNN98]

In **A Mandate for Change**, Secretary of Defense William J. Perry described the need for greater efficiency in Defense acquisition.

> *"DoD has been able to develop and acquire the best weapons and support systems in the world. DoD and contractor personnel accomplished this feat not because of the* [acquisition] *system, but in spite of it. And they did so at a price…the nation can no longer afford to pay."* [PERRY94]

To survive in the global marketplace, private sector organizations must constantly modernize and upgrade their management practices by increasing productivity and reducing costs. While maintaining military superiority, DoD must streamline operations to increase efficiency and lower costs. The bottom line is we have to improve the way we equip the warfighter — in the trenches, in the cockpit, and on the bridge — with the software systems they need, that work, are affordable, and delivered on time. [BROWN95]

The Federal reinvention crusade has been centered on the results-oriented, performance-based paradigm employed by leading organizations worldwide. This groundswell movement is manifested in DoD's self-proclaimed "Acquisition Revolution," which promises to bring profound changes to an outdated, burdensome Defense procurement system. The Acquisition Revolution foundations for success are illustrated in Figure 4-1.

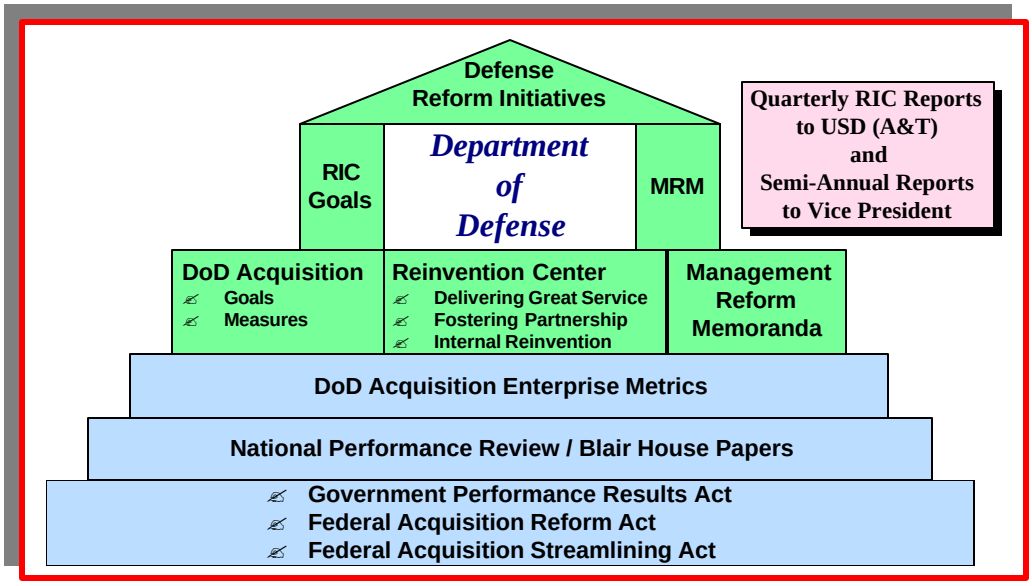

Figure 4-1. Acquisition Revolution Foundations for Success

According to Undersecretary of Defense Jacques S. Gansler, (acquisition and technology), "Acquisition reform is not a slogan. It is a fundamental transformation in our organization, structure, policies and processes — one which our acquisition work force welcomes and which

we all will work hard to achieve." Gansler explains that DoD acquisition reform has the full authority of Congress and the administration. It is a direct response to the major legislative initiatives discussed in Chapter 3 , *Statutory Framework Governing Software Acquisition*.

4.1.1 Acquisition Reform Vision

> *"DoD will be recognized as the World's smartest, most efficient, and most responsive buyer of best-value goods and services that meet our warfighters' needs from a globally competitive national industrial base."* — **DoD Acquisition Reform Vision**

Section 912 of the National Defense Authorization Act for FY98 directed the Secretary of Defense to submit a plan to Congress to streamline the Defense acquisition organization, workforce, and infrastructure. In his response, called the " **Section 912 Report**," Cohen stated his vision for the acquisition workforce.

> *"My vision of the acquisition workforce 10 years from now is one that is smaller and in fewer organizations; is focused on managing suppliers, rather than supplies; and is focused on the total cost of ownership to provide and support high quality goods and services required by our warfighting men and women. It will be a workforce that is engaged primarily in working with the Services to:*
> - *Determine affordability of requirements;*
> - *Helping to establish and execute budgets;*
> - *Working to reduce cycle times;*
> - *Establishing contractual vehicles that are easily accessed by our customers within DoD;*
> - *Overseeing contracts to make sure the work gets done on time, within tough performance parameters, and, of course, within budget; and,*
> - *All the while, ensuring the public's trust and confidence."* [COHEN98[1]]

4.1.2 Acquisition Reform Mission

Gansler explains our Acquisition Reform Mission as follows:

> *"We must capitalize on the lessons we have learned from successful commercial restructuring to adopt modern business practices, consolidate and streamline, embrace competitive market strategies, and eliminate or reduce excess support structures."* [GANSLER98[2]]

The DoD acquisition reform mission statement is as follows:

> *"Adapting the best practices of world class customers and suppliers;*
> - *Continuously improving the acquisition process to ensure it remains flexible, agile, and, to the maximum extent possible, based on best practices;*
> - *Providing incentives for acquisition personnel to innovate and manage risk rather than avoid it; and*
> - *Taking maximum advantage of emerging technologies that enable business process reengineering and enterprise integration."* — **DoD's Acquisition Reform Mission**

4.1.3 Acquisition Reform Goals

According to Gansler, acquisition reform "goals are clear: to do the job better, faster and cheaper. We are transforming the way we do business — cutting costs and infrastructure — to free up funds for modernization." [GANSLER98[1]] Thus, the goal of acquisition reform is to reengineer the acquisition system to be more effective, efficient, and timely in acquiring the best value goods and services to support DoD's mission to protect National Security. According to the Federal Acquisition Streamlining Act (FASA), major DoD acquisition reform goals are:

- Reduced cycle times,
- Cost savings,
- Program stability, and
- Technology insertion.

4.1.3.1 Reduced Cycle Times

The 21st Century threat demands our acquisition system field software-intensive systems and support products within reduced cycle time. To be competitive, world class U.S. companies have consistently demonstrated that *time* is the critical variable to success. The most successful companies develop and deploy in shorter cycle times, meet faster support response time requirements, meet unanticipated surge requirements, and perform at much higher levels than their competitors. Faster, better performance also reduces costs.

For weapon system acquisitions, DoD averages 13 to 15 years from conception to initial production. With post-Cold War budget cuts, these cycle times are often even longer. This costs more and prevents the expeditious deployment of needed software-intensive systems to support the warfighter. As illustrated in Figure 4-2, short-term annual budget cuts create program instability and often result in long term cost increases. Accelerating the time to equip and sustain the warfighter improves force readiness dramatically — and saves money.

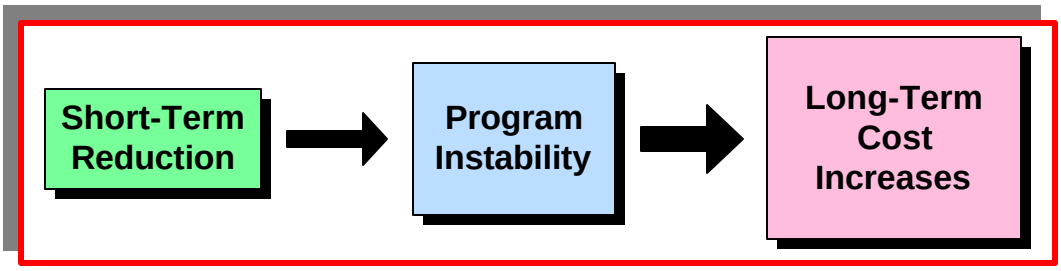

Figure 4-2. Short-Term Budget Cuts Increase Cost and Length of Program

> *"It's not the big companies that eat the small: It's the fast that eat the slow."* — Kim Sheridan [SHERIDAN96]

To shorten cycle times unneeded tasks must be identified and removed. Possible examples of unneeded tasks are audits, handoffs, and signature approvals. Merely performing the same process steps faster —automating existing processes, increasing employee overtime or extending shifts

— does not reduce cost or improve quality. These actions drive up over-head, add cost, and do little to improve software quality. Only those process improvement methodologies that positively impact time, cost, and quality should be used.

Critical path items must be evaluated and tradeoffs made that best meet user needs. If a solution achieves quality at a higher cost, it may not be a competitive solution (it may require additional funding, more inspections, longer cycle time, etc.). Alternatively, if one arbitrarily reduces cycle time (i.e., stops inspections without improving the process) then poor quality results. Both situations increase cost and/or diminish customer confidence. The proper process improvement methodology favorably effects speed, cost, and quality and addresses all aspects of software development: These include:

- Software development team skills;
- Standardization;
- Engineering process;
- Simplicity of design;
- Reusability;
- Reuse of existing designs, architectures, engineering processes, test sets, documentation, and plans;
- User involvement and teaming at the earliest point of system development; and
- Combining tasks and removal of handoffs.

This methodology was applied to the GBU-23 Bunker Buster program during Desert Storm. The Bunker Buster was conceived, developed, tested, and deployed in 28 days and was said to have played a significant role in ending the war. Time is a precious commodity and has value. Applying the correct process improvement methodology to cycle time, cost, and quality is key to user satisfaction and success. The bottom line is — *blinding speed equals competitive advantage*. [CLUBB96]

4.1.3.2 Cost Savings

The **Report of the Quadrennial Defense Review** states that, with no additional congressional funding, DoD must find other sources for monies to pay for needed force modernization. According to the Revolution in Business Affairs (RBA), acquisition reform cost savings are a major source of modernization revenues. These savings are to accrue by adopting the business best practices employed by leading private sector organizations. These include "reengineering" or "reinventing" acquisition processes (e.g., streamlining, reorganizing, downsizing, consolidating, automating, and using commercial best practices).

> *"Efficient business practices and reduced overhead will not only free up resources, they will also contribute directly to the transformation of the Department's support structure."* — Deputy Secretary of Defense John J. Hamre [HAMRE98]

4.1.3.3 Program Stability

In Chapter 2, *Software Acquisition Success: Exception or Rule?*, we learned that the main causes of software-intensive system acquisition program instability include:

- Creeping requirements,
- Software size/complexity growth,
- Inadequate estimates, and
- Technology-driven solutions.

These factors result in technical risk and lead to funding shortfalls caused by costly rework, blown schedules, and busted budgets. According to Daniel P. Czelusniak [director, Acquisition Program Integration, Office of the Deputy Undersecretary of Defense] technical risk and uncertainty in DoD modernization programs results in 2% to 4% cost growth across all Major Defense Acquisition Program (MDAP). Czelusniak warns that if we do not achieve the program stability goal, the cost and savings benefits gained through acquisition reform will be negated.

Major Defense Acquisition Program (MDAP) instability impacts acquisition funding throughout the Program Objective Memorandum (POM) cycle. During the execution year, poor management and workarounds make problems fester. During the budget year, risks may be recognized but funds are not available to fix problems and modernization efforts suffer. In the out years, optimistic estimates or ill-defined/ignored risks result in inadequate program funding. As illustrated in Figure 4-3, stabilizing mechanisms are pilot programs to weed out acquisition risks and establishing management reserves of funds for each stage of the budget cycle. Program *stability* translates into reduced cost and shorter cycle times. [CZELUSNIAK97]

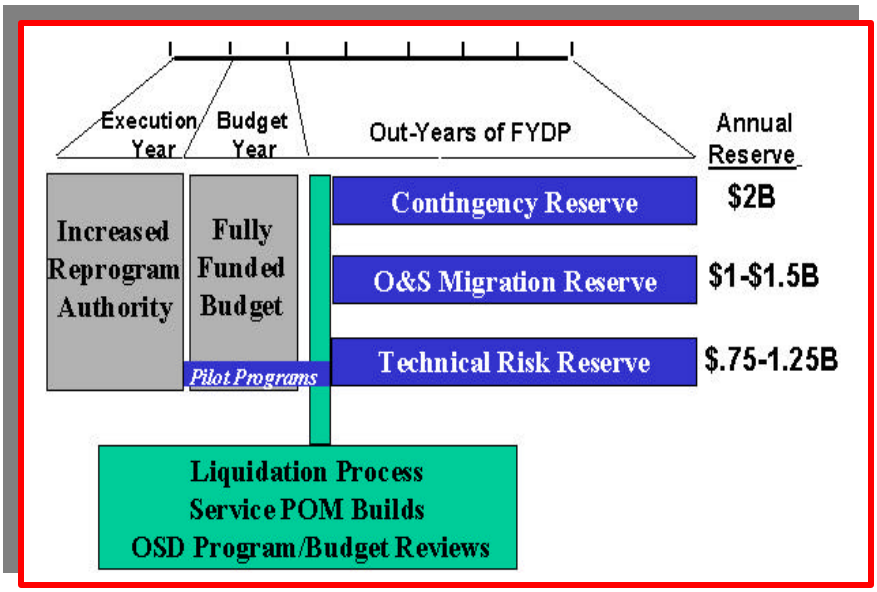

Figure 4-3. MDAP Program Stabilizing Mechanisms [CZELUSNIAK97]

4.1.3.4 Technology Insertion

According to the FASA (with 1994 as the baseline), acquisition reform initiatives must achieve the goal of a 50% reduction in the average length of time for technology insertion. This will be achieved by:

- Using commercially available technologies;
- Encouraging tradeoffs between cost, schedule, and performance at various development stages; and
- Expanding the use of Advanced Concept Technology Demonstrations (ACTDs).

4.1.3.5 Advanced Concept Technology Demonstrations (ACTDs)

According to John M. Bachkosky, Deputy Under Secretary of Defense, the Advanced Concept Technology Demonstration (ACTD) program was initiated in 1994 to permit early, inexpensive evaluation of mature, yet advanced, software-intensive technologies. Performed before formal acquisition, military users assess military utility, develop tactics, and concept of operations to realize the potential of new and emerging technologies — from both Defense and commercial sources. ACTDs are not acquisition programs, nor are they a means to circumvent the formal acquisition process. Rather, they provide a way to prepare for acquisitions based on user assessments of the military utility and value of the new capability.

Based on user acceptance, ACTDs allow for informed acquisition decisions and reduce the time to transition software-intensive technologies to the warfighter. An important precursor to the formal (DoD 5000) acquisition process, ACTDs focus on critical military needs, early, continuous warfighter involvement, and inexpensive military utility evaluations. With unprecedented global proliferation of technology, the life of advanced software-intensive systems is measured in months rather than years. ACTD programs work closely with the warfighter to ensure meaningful, credible evaluations, and with the acquisition community to ensure smooth, rapid transitions. [BACHKOSKY97]

4.1.3.6 DoD Acquisition Reinvention Impact Center

A key **National Performance Review** initiative was the creation of agency "reinvention labs." According to Vice President Al Gore, the objectives of the lab effort are

> *"...to pick a few places where we can immediately unshackle our workers so they can reengineer their work processes to fully accomplish their missions — places where we can fully delegate authority and responsibility, replace regulations with incentives, and measure our success by customer satisfaction."* [GORE93]

4.1.3.7 Achieving NPR Acquisition Reinvention Impact Center (RIC) Goals by Year 2000

SECDEF Memorandum: **Achieving National Performance Review Defense Acquisition Reinvention Impact Center Goals by Year 2000**, 22 November 1997, outlined 12 acquisition goals the **DoD Acquisition Reinvention Impact Center (RIC)** will achieve under the leadership

of the Under Secretary of Defense (Acquisition and Technology). According to SECDEF Cohen, RIC goals address three main areas contained in the **Blair House Papers** and serve as input to DoD's performance plan required under the Government Performance and Results Act (GPRA), listed below.

NOTE: The Blair House Papers contain instructions and rules for government reinvention. Vice President Gore presented these "reinvention marching orders" to the President's Cabinet at Blair House on 11 January 1997.

- Delivering Great Service
  - ? Reduce Cycle Time
  - ? Responsive Logistics
  - ? Purchase Cards
  - ? Continuing Education/Training
- Foster Partnership
  - ? Increase Procurement
  - ? Surplus Property and Housing Privatization
  - ? Decrease Paper Transactions
  - ? Environmental
- Internal Reinvention
  - ? Streamline Workforce
  - ? Life Cycle Costs Accounting
  - ? Reduce Inventory
  - ? Minimize Cost Growth

These goals are consistent with DoD's vision, strategy, and plan outlined in the **Report of the Quadrennial Defense Review**. The goals impacting the acquisition of major software-intensive systems include the following:

- **GOAL #1**. Deliver new major defense systems to the users in 25% less time. The key measure for this goal is the average elapsed time from program start to initial operational capability (IOC) (measured in months) for all MDAPs for a given calendar year.
- **GOAL #5**. With no top-line budget change, increase annual defense procurement spending to at least $54 billion, with a goal of $60 billion in 2001. Since 1988, DoD's emphasis has been on operations and support accounts at the expense of weapons modernization accounts. Weapons have aged to the point where replacement is necessary. Current procurement accounts fall short of assuring proper modernization for future combat forces. This goal recognizes the constrained budget environment by raising the amount available for procurement without affecting the top-line budget. The key metrics for this goal are the procurement account and DoD total obligation authority (TOA).
- **GOAL #7**. Decrease paper transactions by 50% through electronic commerce (EC) and electronic data interchange (EDI). This goal reflects the commitment to employ EC to reduce cycle time, improve data accuracy and availability, reduce costs, and present a single "*face*" to industry. The primary metric for this goal is the number of paper transactions as a percent of total transactions in contracting, data deliverables, government acceptance (DD 250) disbursement, and payment areas.

- **GOAL #9**. Eliminate layers of management through streamlined processes while reducing the DoD acquisition workforce by 15%. Management restructuring and acquisition reform initiatives have streamlined management tasks, thus enabling the reduction of manpower at the staff levels and in acquisition offices. Successful implementation of Integrated Product Teams (IPTs) has improved communications and reduced the need for oversight program reviews and program activity evaluations. The key metric for this goal includes the number of personnel in the acquisition workforce and in management.
- **GOAL #10**. Establish a cost accounting system that provides visibility into weapon system life cycle costs through activity-based costing and management. The system must deliver timely, integrated data for management purposes to: (1) permit understanding of total weapon costs; (2) provide a basis for estimating costs of future systems; and (3) provide input to other life cycle cost management tools. The lack of a robust and/or widespread cost accounting system is the single largest impediment to controlling and managing life cycle costs (LCC). The primary purpose of this goal is to improve the visibility into Total Cost of Ownership (TCO).
- **GOAL #12**. Minimize cost growth in Major Defense Acquisition Programs (MDAPs) to no greater than 1% annually. Keeping cost growth down in MDAP programs frees up more resources for force modernization. The metric for this goal is to track the rate of cost change in MDAP programs.

4.2 Acquisition Reform Best Practices Initiatives

Since the **National Performance Review**, the Defense acquisition system has been turned upside down, inside out, reinvented, reengineered, realigned, reorganized, and reinvigorated. Thus, the list of acquisition and management reform initiatives is formidable. While the reforms are intended to simplify the procedures for buying commercial services and products, the new software acquisition environment requires better business planning and knowledge of how to implement results-oriented management.

DoD is reengineering its acquisition processes to provide the warfighter with best-value goods and services. For example, the acquisition workforce has been cut by over 42% from its 1989 peak, with planned future reductions. To accelerate attainment of the acquisition reform vision, SECDEF Cohen explains that there are significant new reform initiatives in the following five categories:

1. Research, development, and test restructuring;
2. Sustainment restructuring;
3. Increased acquisition workforce education, and training;
4. Integrated, paper-less operations; and
5. Future focus areas (i.e., a price-based acquisition and full integration of test and evaluation activities into the acquisition process). [COHEN98[2]]

Current reform initiatives affecting the acquisition of major software-intensive systems include:

- Commercial Best Practices
- Contracting Best Practices
- Management Best Practices
- Performance Based Business Environment
- Defense Reform Initiative
- Software Acquisition Best Practices Initiative
- Software Program Managers Network
- Information Technology Management Reform Initiatives
- Single Process Initiative

4.2.1 Commercial Best Practices

> *"Over the past decade, the American commercial sector has reorganized, restructured, and adopted revolutionary new business and management practices in order to ensure its competitive edge in the rapidly changing global marketplace. It has worked. Now the Department must adopt and adapt the lessons of the private sector if our armed forces are to maintain their competitive edge in the rapidly changing global security arena."* — SECDEF William S. Cohen [COHEN97]

The DoD Acquisition Revolution is founded on the adaptation of standard commercial, industrial practices. Commercial practices enable suppliers to conduct business efficiently with the Government in a manner similar to that used with their private-sector customers. This includes a broad range of potential activities that can adapt to commercial practice. These include regulatory and statutory streamlining, to eliminate unique Government requirements and practices such as government-unique contracting policies and practices, government-unique specifications and standards, and reliance on cost analysis rather than price analysis. Standard commercial, industrial practices include, but are not limited to:

- Contracting policies and practices;
- Performance and commercial specifications and standards;
- Budget policies;
- Establishing fair and reasonable prices without cost data;
- Maintenance of long-term relationships with quality suppliers; and
- Acquisition of commercial and non-developmental items (including components). [HINTON98]

4.2.2 Contracting Best Practices

> *"Competition is the driving force in the American economy. It forces organizations to improve quality, reduce costs and focus on customers' needs. Continuously spurred by these forces, American firms are now global leaders in innovation, cost performance and technological development. Competition offers the same benefits to DoD and plays a vital role in our reform effort."* — Deputy Secretary John Hamre [HAMRE98]

DoDD 5000.2-R [discussed below] states that program managers must avoid imposing government-unique requirements on contractors that significantly increase industry compliance costs. The use of best practices is to be addressed at each acquisition milestone review. Examples of contracting best practices include:

- Commercial specifications and standards
- Commercial-of-the-shelf (COTS) and non-developmental items (NDI)
- Best value evaluation and award criteria
- Open systems
- Past performance
- Performance-based service contracting
- Performance-based specifications
- Software capability evaluations (SCEs)
- Paperless contracting

4.2.3 Management Best Practices

Management best practices employed by world-class U.S. companies are being used to attain the acquisition reform goals of program stability, reduced cycle times, cost savings, and technology insertion. Examples of management best practices designed to accomplish these goals include:

- Cost as An Independent Variable (CAIV).
- Integrated product design and development (IPDD)
- Integrated product teams (IPTs).
- Simulation Based Acquisition (SBA)
- Total Cost of Ownership
- Earned Value Management System (EMVS)

4.2.4 Performance-Based Business Environment

> *"There comes a moment in time when a door opens and lets the future in."* — Graham Green [GREEN98]

According to Lt. Col. Dennis Drayer (USAF), the Performance-Based Business Environment (PBBE) is a quality, business-like environment that simplifies and takes advantage of the basic acquisition and sustainment tools used to enhance the products we provide to the warfighter. The PBBE complies with the performance-based paradigm embraced by the Congress and mandated by the acquisition and management reform legislation [discussed in Chapter 3, *Statutory Framework Governing Software Acquisition*]. Software-intensive program managers must develop *reformed* program strategies, establish metrics, and report progress toward meeting mission goals. The following are guiding tenets of PBBE:

- Dual-use products and processes
- World-class processes
- Commercial state-of-the-art technology
- Integrate commercial and military development
- Better, faster, cheaper, smoother
- Integrate commercial efficiencies

DoD acquisition teams establish performance-based environments, primarily through contractual arrangements with excellent suppliers. The Government, as an informed products and services buyer, defines what it needs in performance terms (i.e., what the product is expected to do) along with ways to verify that performance. Likewise, essential technical and management processes (specified in terms of expected results rather than "*how to*" process descriptions) also promote the performance-based environment. With product specifications and key process expectations defined in terms of desired performance, industry can use innovative and efficient ways to produce desired products. This is achieved through:

- Contractor-developed or -controlled key management processes;
- Longer contractor involvement in system sustainment; and
- Less government oversight.

Such an environment encourages prime contractors to promote good systems and software engineering and similar business relationships throughout the supplier base. Acquisition teams can expect resulting efficiencies to flow back up through lower prices, shorter cycle times, and improved product quality. The objectives of the PBBE are to:

- Convey product definition and key process expectations to industry in performance terms;
- Promote life-cycle systems and software engineering and management practices, including integrated product and process development (IPPD) and support;
- Increase the emphasis on past performance;
- Motivate process efficiency and effectiveness up and down the supplier base;
- Simplify acquisition and support methods; and
- Encourage life-cycle risk management versus risk avoidance. [DRAYER98]

4.2.5 Defense Reform Initiative

The **Defense Reform Initiative (DRI)** was a follow–on to the Quadrennial Defense Review (QDR) and reflects the results of the QDR process. It reflects the insights of successful business leaders who restructured and downsized their corporations in a rapidly changing marketplace. Throughout the process, the Defense Reform Task Force adopted the motto of one leading corporation: "Strength with Speed." They learned that winning in the new era depends as much on the ability to respond quickly to new threats and opportunities as on the ability to overpower competitors head-on. The collective experience shared by leading corporate executives interviewed by the team was distilled in a common set of reform principles.

- Focus the enterprise on a unifying vision,
- Commit the leadership team to change,
- Focus on core competencies,
- Streamline organizations for agility,
- Invest in people,
- Exploit information technology, and
- Break down barriers between organizations.

These principles helped shape the Defense Reform Initiative, which mandates change in four major areas.

1. **Reengineer**. Adopt modern business practices to achieve world-class standards of performance.
2. **Consolidate**. Streamline organizations to remove redundancy and maximize synergy.
3. **Compete**. Apply market mechanisms to improve quality, reduce costs, and respond to customer needs.
4. **Eliminate**. Reduce excess support structures to free resources and focus on core competencies.

Vice President Al Gore praised the Defense Reform Initiative at a Pentagon meeting, He explained that,

> *"Big, all-powerful, all-knowing corporate headquarters operations are a thing of the past. Today's world needs fast-moving, fast-thinking, fully empowered front-line workers and front-line fighters. Information technology is changing everything from the way we buy equipment to the way we fight. It is the key to America's future strength as a Defense leader, just as it is the key to America's future as a business leader. Government should emulate the best in business, learn from them, and adopt their best business practices."* [GORE98]

4.2.6 Software Acquisition Best Practices Initiative

Under Secretary of Defense (USD) Memorandum: **Software Acquisition Best Practices Initiative** was signed on 8 July 1994. Its objective is to:

> *"Provide an effective framework for managing the acquisition of large-scale software development and maintenance programs that are an essential part of our increasingly complex weapon systems."*
> — Jennifer Jones [JONES94]

There are many effective practices for managing software in industry and Government. However, their use and understanding are not widespread within DoD software-intensive acquisition programs. These best practices directly address the underlying cost and schedule drivers that cause software to be delivered over budget, late, and with diminished performance capability. The goals of this initiative include:

- Focusing the DoD acquisition community on effective, high-leverage software acquisition management practices;
- Enabling program managers to focus their software management efforts on producing quality software;
- Enabling program managers to exercise flexibility in implementing best practices within disparate corporate and program cultures; and
- Providing program managers and staff with the training and tools necessary to effectively use and achieve the benefits of these practices. [JONES94]

The Software Best Practices Initiative represents the collective efforts of nearly 200 software development and maintenance expert practitioners, industry leaders, software visionaries, and methodologists from commercial and government worlds.

4.2.7 Software Program Managers Network (SPMN)

The **Software Program Managers Network (SPMN)** is a technology transfer organization funded by Congress to provide direct support to DoD software-intensive programs. It involves project offices from all services and OSD agencies and is a fundamental mechanism for improving the acquisition of large-scale software systems. The SPMN identifies best practices for major software-intensive system development and sustainment programs, then transfers those best practices and lessons learned to individual programs throughout the Department. Best practices (either management or technical) are those that consistently demonstrate significantly high bottom-line improvements [return on investment (ROI)] in one or more of the following.

- Productivity,
- Development and/or sustainment cost,
- Schedule,
- Quality,
- User satisfaction, and
- Cost and schedule predictability.

ATTENTION! Is your program experiencing any of the problems listed in Chapter 2, *Software Acquisition Success: Exception or Rule?* If yes, contact the Software Program Managers Network! A Focus Team of software experts will discretely come to your program and help get it back on track. Free of charge!

4.2.8 Information Technology Management Reform Initiatives

The Clinger-Cohen Act mandates that DoD improve day-to-day mission processes and properly uses information technology to support those improvements. *This legislation brings DoD acquisitions together by providing a closer link between the acquisition of weapon systems, Command, Control, Computers, Communications, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems, and DoD information activities.*

Software-intensive technologies must be fielded in an orderly, fast, and efficient way. DoD must use streamlined acquisition processes, commercial off-the-shelf products and services, and outsourcing, as appropriate, to take advantage of leading industry capabilities. The information system investment portfolio concept emphasizes the need to do a better job of prioritizing information system capital investments and being accountable for results.

Keeping the workforce (military and civilian) trained in new software-intensive technologies and improved processes is critical to achieving acquisition reform savings. In addition, this is all in vain if our information is not protected. The Department must implement management best practices that speed up development and acquisition programs, lower costs, and provide the best possible support to the warfighter.

4.2.9 Single Process Initiative

The 1994 SECDEF William S. Perry plan, **Mandate for Change**, explained that the pace of commercial technology advancement in many sectors far exceeds Government sponsored technology efforts. Commercial technology advancements are outpacing DoD-sponsored efforts in key technology sectors critical to military superiority (e.g., software, hardware, integrated circuits, communications, and advanced materials). DoD-unique laws and regulations are imposed on contractors, which place a premium on doing business with the Department. These non-value-added requirements include:

- Government cost accounting standards [e.g., material management systems, price and cost analyses procedures, Cost/Schedule Control System Criteria (C/SCSC)];
- The requirement to provide product cost data;
- Record keeping and reporting requirements;
- Audit and oversight requirements;
- Access to competitively sensitive financial data;
- Socioeconomic and mandatory source requirements;
- Requirements for rights in technical data;
- Security requirements; and
- DoD-unique product and process specifications and standards.

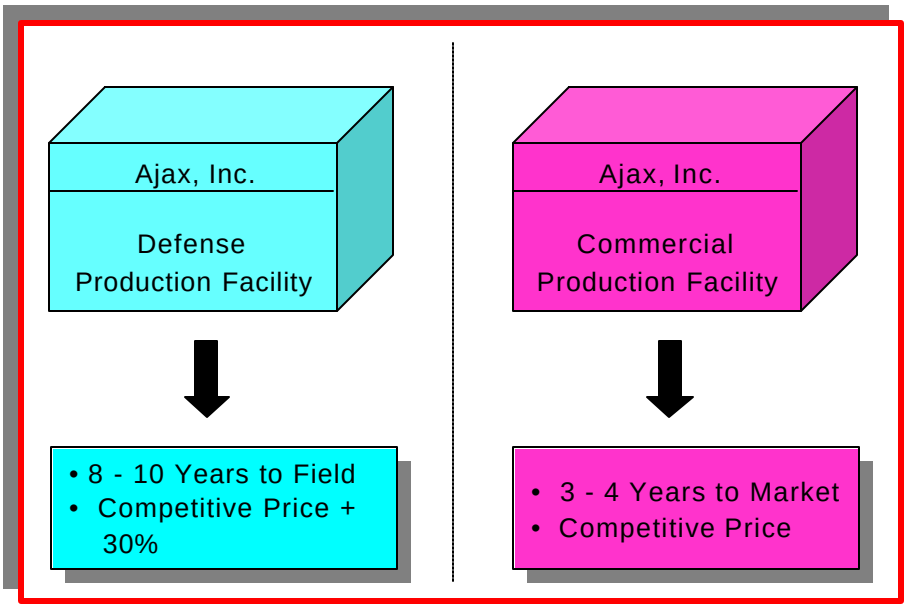

Figure 4-4. Defense-Unique Requirements Often Add 30% or More to the Price of Open Market Items

4.2.9.1 USD Memorandum: Single Process Initiative

USD Memorandum: **Single Process Initiative**, 8 December 1995, provides guidance for making block changes to existing contracts to unify the management and manufacturing requirements of contracts on a facility-wide basis. Current contractors are encouraged to prepare and submit concept papers describing practices that permit uniform, efficient facility-wide management and manufacturing systems and a method for moving to such systems. Contractor recommendations should be accompanied by a cost-benefit analysis adequate to determine the rough order of magnitude of the costs and benefits to the contractor of the proposed system changes (including any impact on the cost of performance of existing contracts).

The Commander, Defense Contract Management Command (DCMC), is the focal point for implementing this initiative and the contract block change process, illustrated in Figure 4-5. DCMC approves all requests for certified cost or pricing data in contractor SPI proposals unless such data are required by law. The block change process is built on existing structures within the components and OSD and is designed to create a sense of urgency in the approval process for streamlining the use of commercial specifications, standards or other processes on existing processes.

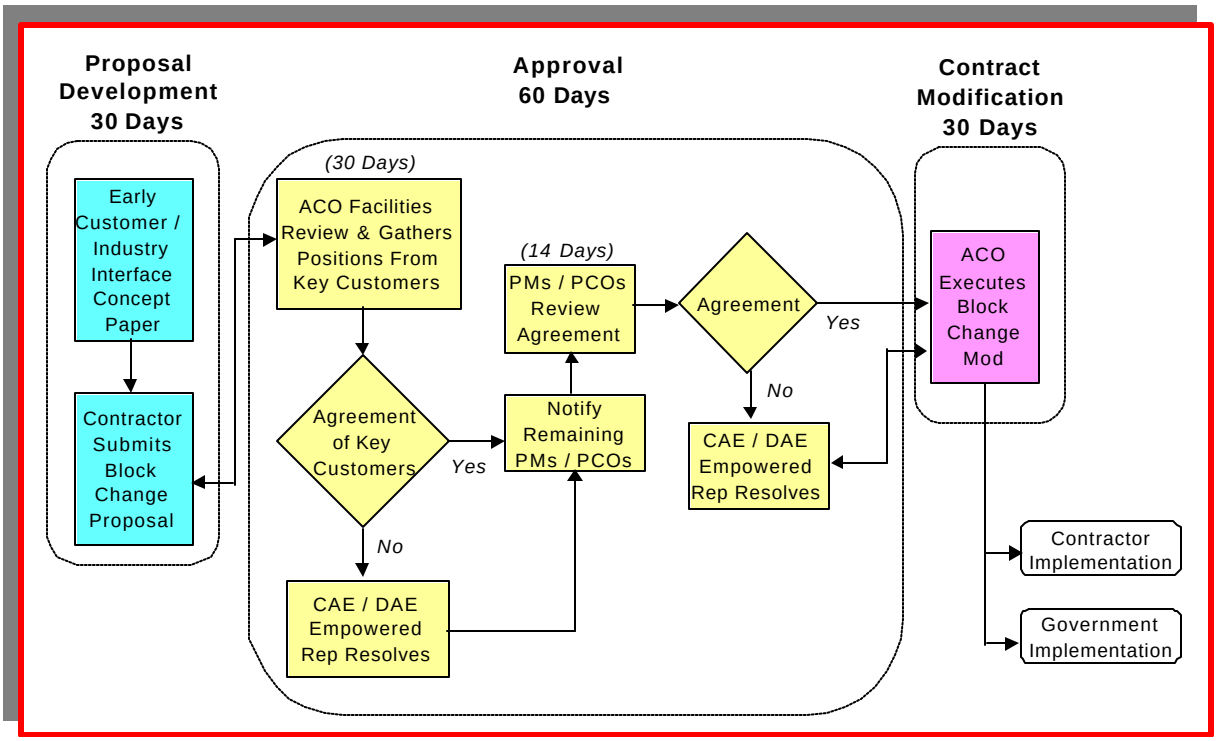

Figure 4-5. Block Change Process Overview

SPI goals are to ensure that contractors use best practices and advanced technologies to:

- Meet warfighter needs;
- Provide best value goods and services from a globally competitive national industrial base;
- Reduce manufacturing and management costs and eliminate unnecessary direct and indirect cost drivers;
- Facilitate lean Defense industrial base reengineering;
- Incorporate military specifications and standards reform in existing contracts and reprocurements;
- Improve cost, schedule, performance, and affordability;
- Allow transition to a Performance-Based Business Environment;
- Support civil-military integration (eliminate the distinction between doing business with the Government and commercial buyers);
- Improve processes for environmental health and safety; and
- Reduce the need for oversight.

4.2.9.2 Adoption of Common Practices at Defense Contractor Facilities

DCMC Memorandum: **Adoption of Common Practices** at Defense Contractor Facilities,11 Dec 1995, explains that the adoption of common processes by contractors en lieu of multiple, unique DoD standards and specifications is one of the cornerstones of acquisition reform. It established:

- Management Council. The Management Council is comprised of representatives from DCMC, the Defense Contracts Audit Agency (DCAA), the contractor, and key DoD stakeholders. The council performs SPI proposal reviews and approvals and ensures contractor proposed changes are technically acceptable and brings contractor and customers together.
- Component Team Leaders from each Service establish that contractor proposed process changes are technically acceptable.
- Administrative Contracting Officer (ACO) negotiates block changes that modify contracts to use common manufacturing and management process.

4.2.9.3 Prime/Subcontractor Relationship in the SPI

USD Memorandum: **Prime and Subcontractor Relationships in the Single Process Initiative (SPI)**, 3 September 1996, states that the SPI applies to prime contractors who are also subcontractors to other prime contractors. The review of the impact of the changes on their subcontracts and prime contracts will occur concurrently with the normal block change review.

4.2.9.4 Single Process Initiative and New Contracts

USD Memorandum: **Single Process Initiative and New Contracts** was signed 30 April 1997. Some DoD organizations are issuing solicitations that include military or Federal specifications for which the Government has agreed to accept alternative single processes. In a few instances, companies that have implemented the SPI indicate that they have been considered nonresponsive when requesting to substitute an accepted single process for a solicitation specification. When contractors propose Management Council-accepted single processes as substitutes for solicitation specifications, those single processes shall be accepted.

4.2.9.5 Review Approval of Single Process Initiative (SPI)

USD Memorandum: **Review and Approval of Single Process Initiative**, 1 May 1997, explains that the DoD Inspector General is concerned that Administrative Contracting Officers (ACOs) are inhibited from obtaining necessary technical or cost data from contractors by rigid interpretation of the 120-day goal for implementing SPI concepts. ACOs are to understand that the 120-day goal is achievable and they should adhere to it except where technical or cost benefit assessments cannot be adequately performed within that timeframe.

4.2.9.6 Subcontractor Single Process Initiative (SPI)

USD Memorandum: **Subcontractor Single Process Initiative (SPI)**, 16 May 1997 encourages subcontractors to submit SPI proposals to their prime contractors if processes flowed-down or imposed by the prime are inconsistent with SPI processes accepted by the Government for use at the subcontractor's facility. Prime contractors should allow the subcontractor to substitute Government-accepted equivalent processes. Management Councils at prime and subcontractor facilities will facilitate and enable substitution of accepted subcontractor SPI processes.

4.2.9.7 The Single Process Initiative — A Long Term Perspective

USD Memorandum: **The Single Process Initiative — A Long Term Perspective**, 3 June 1998, explains that the SPI has expedited the transition of existing contracts to common best processes by facilitating industry consolidation and plant modernization, and encouraging innovation and subcontractor reform. While at least 140 facilities have transitioned to the ISO 9000 quality standard, we have along way to go. Through the SPI initiative, emphasis must also be placed on integrating both prime contractors and suppliers into a Performance Based Business Environment (PBBE).

According to Lt. Gen. Drewes (DCMC), the three most frequently proposed SPI process changes are in the areas of quality programs; manufacturing processes, such as plating, encapsulation, and electrostatic protection; and business practices, including certification requirements, subcontracting authorization, and work measurement, as illustrated in Figure 4-6. [DREWES97]

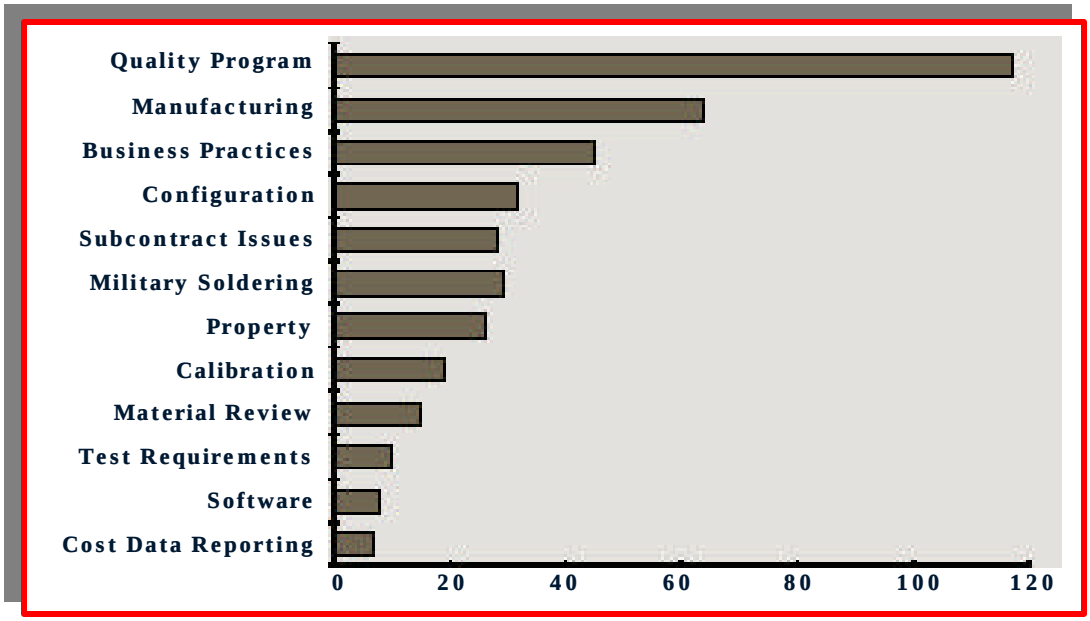

Figure 4-6. Most Frequently Requested Process Changes [DREWES97]

4.3 DoDD 5000.1/DoD 5000.2-R

DoD 5000.1, Defense Acquisition Directive and defense acquisition regulation, **DoD 5000.2-R**, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information Systems (MAIS), are DoD's update to its acquisition policies to accomplish several objectives, including compliance with the Federal Acquisition Streamlining Act (FASA), Paper Reduction Act (PRA), and the Cohen Act..

The most important item in the current revision applies to software-intensive systems. With the Cohen Act's repeal of the Brooks Act, acquisition policy for MDAPs (embedded weapon systems) and MAIS has been combined into one guidance document. Several separate AIS policy documents in the 7920 and 8120 directive and instruction series were cancelled. While the revised DoDD 5000.1 specifies guiding principles for all DoD acquisition programs, the new regulation

5000.2-R applies specifically to major programs. The intent of this change is to decentralize acquisition practice and allow Component Acquisition Executives more autonomy in managing the programs for which they are accountable.

4.3.1 Milestone Decision Authority (MDA)

MDAPs (ACAT I) are subject to Milestone Decision Authority (MDA) review by the DAB under the responsibility of the USD (A&T). The Program Manager (PM) is in charge of the program and Integrated Product Teams (IPTs) are empowered to help the PM resolve issues before DAB reviews, thus streamlining the review process. By combining all acquisition programs under the 5000-series, on joint ACAT I and ACT IA programs, program management requirements have been cut in half. Figure 4-7 shows that on joint programs only one of each of the following need be prepared:

- One quality assurance program;
- One program change control program;
- One integrated test program; and
- One set of documentation and reports to include:
- One joint program Operational Requirements Document (ORD),
- One Test and Evaluation Master Plan (TEMP),
- One Acquisition Program Baseline (APB),
- One Defense Acquisition Executive Summary (DAES),
- One Quarterly Report for ACAT IA programs, and
- One Selected Acquisition Report (SAR) for ACAT I programs.

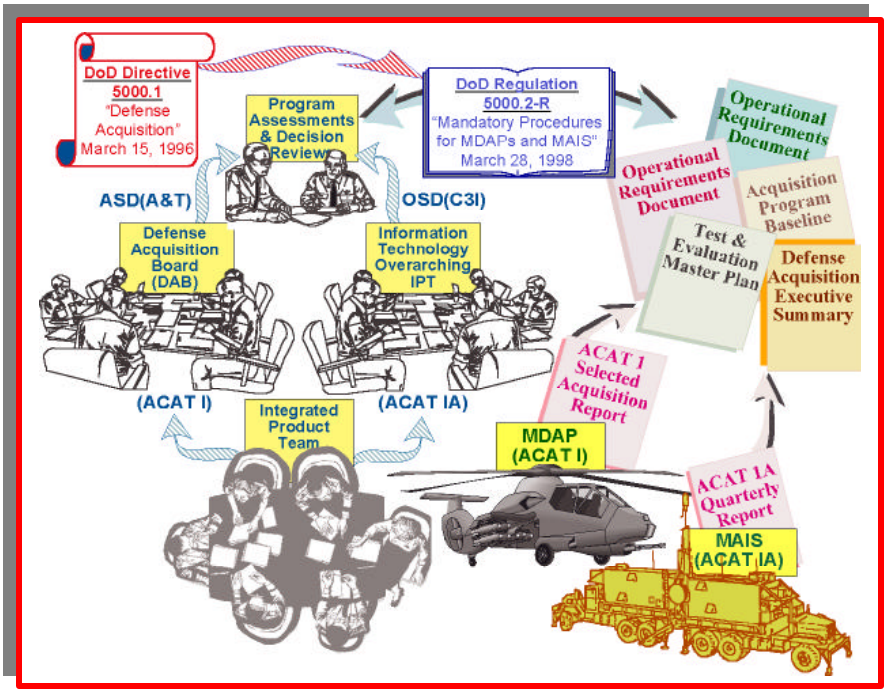

Figure 4-7. DoD 5000-2R MDAP and MAIS Review and Reporting Structure

4.3.2 Elimination of the MAISRC

OSD Memorandum: *Elimination of the Major Automated Information System Review Council (MAISRC)*, 28 July 1998, states that since 15 March 1996, oversight of Major Automated Information System (MAIS) acquisition programs (ACAT IA programs) has been largely conducted through the integrated product team (IPT) process. With the success of acquisition reform and the IPT process, and the related emphasis on teamwork, tailoring, and empowerment, it is rarely necessary to hold a formal meeting of the MAISRC. As part of DoD streamlining initiatives, the MAISRC is disestablished. The MAISRC Overarching IPT (OIPT) has been redesignated the Information Technology OIPT.

ASD(C3I), the DoD CIO, continues to be the MDA for ACAT IA programs. When issues regarding ACAT IA programs cannot be resolved by the IPT process, the DoD CIO or his designee will convene a special review to resolve issues.

4.3.3 Software-Intensive Systems

DoD 5000.1 recognizes that software is a critical element in DoD systems. It states that *it is critical that software developers have:*

- A successful past performance record,
- Experience in the software domain or product line,
- A mature software development process, and
- Evidence of use and adequate training in software methodologies, tools, and environments.

4.3.4 Software Engineering

DoD 5000.2R requires that all software developments must be managed and engineered using commercial best processes and practices to reduce cost, schedule, and performance risks. As required by the Cohen Act, software-intensive systems must be designed and developed based on systems engineering principles, which include:

- **Architecture**. Software system architectures are developed that support open system concepts; exploit commercial off-the-shelf (COTS) computer products; and provide for incremental improvements based on modular, reusable, extensible software.
- **Reuse**. Software reuse opportunities are identified and exploited (Government and industry) before beginning a new software development.
- **Programming languages**. Programming languages are selected in the context of the systems and software engineering factors that influence overall life-cycle costs, risks, and potential for interoperability [see ASD(C3I) Memorandum, Use of the Ada Programming Language, 29 April 1997.
- **Standard data**. DoD standard data is used [see DoDD 8320.1].

- **Successful contractors**. Contractors are selected with:
  - ? Domain experience in developing comparable software systems;
  - ? Successful past performance record; and
  - ? Demonstrable software development capability and a mature process.
- **Measurement**. Contractors are selected with a mature measurement process for planning, tracking assessing, and improving the software development process and software product(s).
- **Risk management**. Information system operational risks have been assessed [see DoDD S-3600.1].
- **Year 2000**. All software is Year 2000 compliant.

4.3.5 Information Security

In compliance with PRA and Cohen Act provisions, AIS systems must be managed and engineered using best known processes and practices to reduce security risks, including the risks of timely accreditation. Information assurance requirements must be included in program and systems design activities to ensure availability, integrity, authentication, confidentiality, and non-repudiation of critical program technology and information. This includes providing for the restoration of information systems by incorporating protection, detection, and reaction capabilities. Information assurance requirements are to be established and maintained throughout the acquisition lifecycle for all ACAT IA programs (and others as applicable). All AISs must meet security requirements in accordance with DoDD 5200.28 and be accredited by the Designated Approving Authority before processing classified or sensitive unclassified data. Exceptions to the **DoDD 5200.28** requirement to use trusted computer products, listed on the Endorsed Products List, will be granted only by the DoD CIO [ASD(C3I)].

4.3.6 C4I Support Plan

DoD recognizes that 60% to 80% of a software-intensive system's life cycle cost is incurred during post-deployment software support (PDSS). To implement Total Ownership Cost (TOC) initiatives, for C4I systems and all weapons systems/programs that interface with C4I systems, DoD 5000.2R requires that a support plan be prepared. The C4I Support Plan includes:

- System description,
- Employment concept,
- Operational support requirements (including C4I, testing, and training),
- Interoperability and connectivity characteristics, and
- Management and scheduling.

An evaluation of compatibility, interoperability, integration, and intelligence support for targeting requirements must also be performed for all major weapons systems and programs. C4ISR (C4I surveillance and reconnaissance) requirements must be reviewed and updated at every milestone decision and whenever the concept of operations or intelligence requirements change.

4.3.7 Results-Oriented Acquisition Management

Even before the FASA and Cohen Act, 10 U.S.C. 2435 required that DoD establish GPRA cost, schedule, and performance goals in an Acquisition Program Baseline (APB) document for each MDAP.

DoD's implementation of FASA, Title V performance-based management provisions are reflected in DoD 5000-2R by emphasizing the determination of producibility early in the development cycle. The policy states that producibility is key to managing risk and that existing development processes must be capitalized on when possible. It also states that production should not be approved until the design has been stabilized, development processes have been proven, and facilities, equipment, [and people] are in place. [HINTON98]

4.3.8 Linking Acquisition Programs to Strategic Goals

To comply with the GPRA, the Mission Need Statement (MNS) must be linked with the mission described in the DoD Strategic Plan (the QDR). This emphasizes the interrelationships among defining requirements, managing system development, and making funding decisions. The main objective is to translate users' needs into products with affordability as a key discriminator.

4.3.9 Nontraditional Acquisition

DoDD 5000.1 encompasses several guiding principles that reflect how a reinvented defense acquisition system is responding to larger changes in the global threat environment. For example, the new policy stresses the importance of nontraditional acquisition:

> *"Demonstrations based on mature technologies may lead to more rapid fielding. Where appropriate, managers in the acquisition community shall make use of non-traditional acquisition techniques, such as Advanced Concept Technology Demonstrations (ACTDs), rapid prototyping, evolutionary and incremental acquisition, and flexible technology insertion."* **[DoD 5000.2R Para 2.7]**

Other nontraditional policy principles include modeling and simulation, innovative practices, modular contracting for MAIS acquisitions, and Cost As an Independent Variable (CAIV). Moving away from the historical report-based interaction model, DoD 5000.2-R explicitly relies on Integrated Product Teams (IPTs) to break down the barriers between different organizations and acquisition disciplines. IPTs enable integrated solutions to management problems.

4.3.10 Acquisition System Reengineering

With the 5000-series, DoD consolidated an acquisition policy system that had grown out of control, by "*deconstructing*" and consolidating it into a minimal set of mandatory principles and procedures to empower managers with the greatest possible discretion. Thus, the regulation states that *it is not be supplemented by any DoD Component documents*. It directs DoD officials to keep to a minimum service-specific directives, regulations, policy memoranda, or

regulations to implement the mandatory procedures. It also seeks to separate mandatory policies and procedures from discretionary practices. The intent is to empower acquisition managers with the freedom to exercise sound judgment when structuring and managing defense acquisition programs. For example,

> *"The Department encourages PMs to continually search for innovative practices that reduce cycle time, reduce cost, and encourage teamwork."* [DoDD 5000.1, para 2.h.]

This revision has responded to the perception that the past 5000-series documents were unwieldy and too complex. To make them user-friendly, the current documents are incorporated into the **Defense Acquisition Deskbook**, the universal electronic and hard copy repository of all DoD mandatory and discretionary guidance. [FERRARA96]

4.4 Acquisition Reform: Challenge and Opportunity

> *"There is no single instant fix that the DoD can rely on to meet our national security needs. [Joint Chiefs of Staff Chairman Army Gen.] Omar Bradley once said that 'Drawing a plan is 10% of the job; seeing that plan through is the other 90%,' So, too, with…re-engineering, we need to see our plans through — over the long haul. It is easy to talk about why; harder to talk about how; even harder to do — it's impossible to do without incentives and ownership being passed down to the stakeholders. It means your plans will need to contain the right incentives, ones designed so organizations will have the motivation to implement your plans."*— Paul P. Kaminski [KAMINSKI96]

The acquisition reform train has left the station. It is moving forward at full speed. There will be mountains that challenge us in reaching our goals. There will also be valleys that give us the opportunity to improve our methods and smooth out the journey. Reaching our destination is an important mission for the acquisition corps. The warfighter and the nation are counting on our success. Our aging arsenal and technology infrastructure cry out to cut costs, shorten cycle times, improve software quality, and bring on the most advanced technology money can buy. Learn from these challenges and build on the opportunities!

4.4.1 Challenges

Too many have been satisfied to let things flow along as they have in the past and not rock the boat. Improvement includes more that having better ideas and methods. It also requires overcoming the inertia of the system in place. As we discussed in Chapter 2, *Software Acquisition Success: Exception or Rule?*, we not only have areas of failure, there are numerous obstacles which tend to keep us from changing. With so many areas that need improvement, it might seem overwhelming to the point of paralysis. We need to remember that challenge is the catalyst of growth, and that so many areas in need of improvement provide opportunities for almost everyone to make a difference in the total outcome.

4.4.2 Opportunities

According to Derek Vander Schaffer, former DoD Deputy Inspector General,

> *"DoD has either been trying or having someone else try to reform the acquisition process for as long as I can remember. This time there appears to be some real progress...* [the Deputy Under Secretary of Defense for Acquisition Reform and staff] *have advanced the acquisition reform ball further in the last two and a half years than it has been advanced in the last 20 years by all kinds of special commissions."* [VANDER SCHAFFER96]

Clearly, there is much more that can and should be done. This is not an attempt to wring out the last few percentage points of improvement in software acquisition processes. We still find ourselves relatively near the beginning, with opportunities for improvement all around us in every area. What is required are acquisition managers and team members who are determined to step beyond the status quo to make their projects perform better than previous efforts.

There are many things we already excel at [see Chapter 2, *Software Acquisition Success: Exception or Rule?*]. Searching our successes for lessons on what we do right can give us insight to meet our challenges and create more successes. The engine of change is moving and we have an opportunity like never before to implement real improvements.

4.4.2.1 Anderson and Rebentisch Study

Anderson and Rebentisch conducted a survey of program representatives from 37 acquisition programs that DoD and the Defense industry regarded as pioneers in incorporating commercial best practices into their acquisition strategies. These programs spanned all the Services — Army, Air Force, Navy, Marine Corps, and Coast Guard. From this group, 23 programs yielded sufficient data for detailed research and study purposes. Included in the 23-program sample were seven aircraft programs, five ship programs, four munitions programs, and seven other major software-intensive acquisition programs. Overall, they found commercial practices yielded strong benefits for cost, schedule, and quality with few, if any, reported compromises to life-cycle support and life-cycle costs. These commercial best practices included the following eight.

- **Past performance**. Previous performance on government contracts is used as a source evaluation factor. A 1995 change to the Federal Acquisition Regulation (FAR) mandated past performance for all contracts over $1 million.
- **Best value**. Contract award is based on a range of evaluation factors besides the lowest price, such as quality, life-cycle support, life-cycle costs, and other relevant factors.
- **Commercial warranties**. The acceptance and use of standard commercial product warrantees or the purchase of extended product warranties, rather than special, government-unique warrantee requirements.
- **Government/contractor cooperation and relationship**. A cooperative, mutually beneficial relationship between the Government and its contractors characterized by reduced government oversight, long-term partnerships, and contractor or industry participation in program integrated Product Teams (IPT).

- **Performance specifications**. Government requirements are defined in terms of performance. Contractors have more flexibility to reduce costs and enhance support. The ultimate responsibility for performance is shifted to the contractor.
- **Commercial specifications and standards**. The same design, production, management, and accounting practices are required in government contracts as are currently used in the commercial marketplace. In 1994, the Secretary of Defense mandated this practice.
- **Streamlined contract administration**. Government acquisition processes are simplified by streamlining internal policies and reducing contract data deliverables (CDRL). For instance: one program consolidated 23 management documents into only five; several programs reaped substantial efficiencies by using the Internet for electronic data interchange.
- **Commercial-off-the-shelf and non-developmental items (COTS/NDI)**. Recent FAR, Part 12 procedures simplified the COTS/NDI acquisition process. [ANDERSON98]

Figure 4-8 illustrates the frequency with which the eight commercial practices are being used by the respondent programs. Recent acquisition reforms (e.g., military specifications and standards reform, the use of performance specifications, and contract streamlining) figure prominently in the practices cited. Interestingly, a large number of program representatives considered developing a close working relationship between the Government and contractor as an important commercial practice.

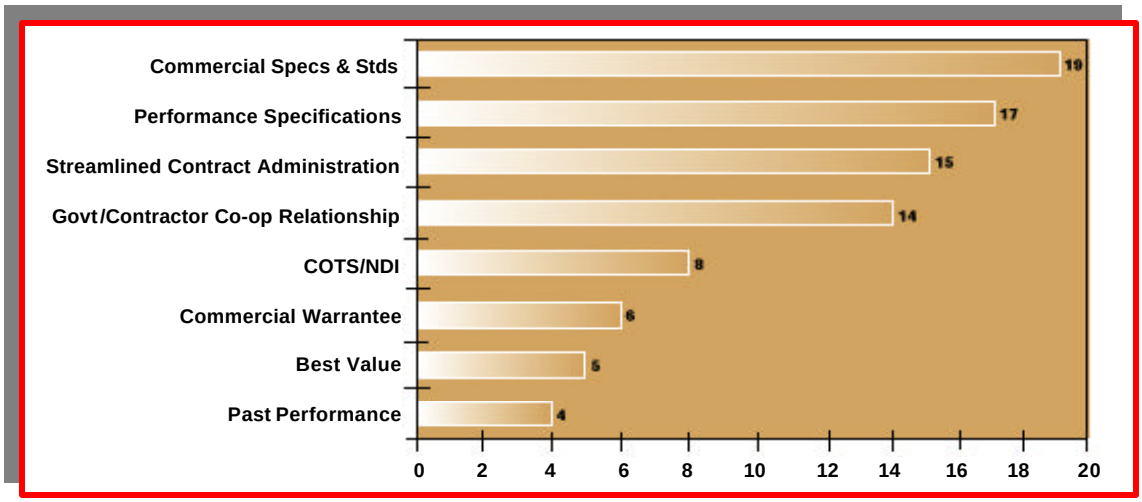

Figure 4-8. Frequency of Commercial Best Practice Used on 23 DoD Programs [ANDERSON98]

Anderson and Rebentisch found that improvements in cost and schedule performance attributed to the use of commercial practices varied substantially, depending upon the specific practice used. As illustrated in Figure 4-9, the practice of government/contractor cooperation was the leader for cost reductions, yet its impact diminished significantly for schedule reductions.

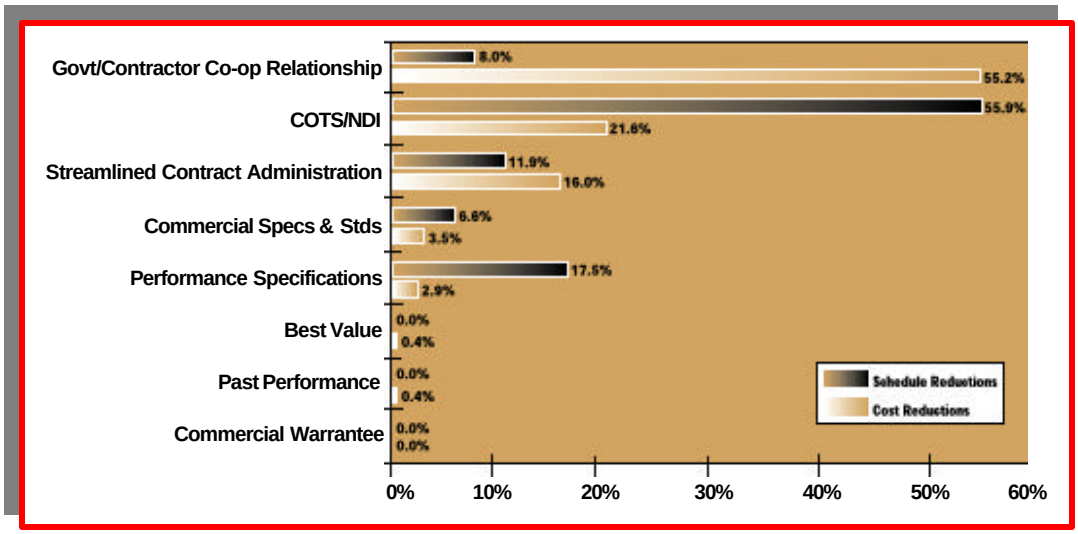

Figure 4-9. Cost and Schedule Reduction Results of Most Frequently Cited Commercial Practices [ANDERSON98]

Three practices reflected negligible performance impact, but Anderson and Rebentisch thought their benefits may be demonstrated during other phases of the system's life cycle such as source selection or sustainment. They include best value, past performance, and commercial warranty.

Representatives from the 23-program sample confirmed that the use of commercial best practices had yielded valuable program benefits. Their use resulted in direct program savings totaling almost $4 billion. That equates to average savings of 4.3% per program. [ANDERSON98] In other words, a few percentage points improvement across the board can save billions which can then be used to improve other areas.

4.4.2.2 Coopers & Lybrand Study

The 1997 DoD-sponsored Coopers & Lybrand study, **Acquisition Reform Implementation: An Industry Survey**, was an assessment of how well DoD is doing in implementing acquisition reform, at the contract level. It found that significant acquisition reform has been achieved over the past four years. However, implementation is uneven and inconsistent across and within the military services and buying commands. Continued commitment to training is vital with special emphasis in:

- Market research/exemptions to certified cost or pricing,
- Parametric estimating,
- Commercial product definition and pricing,
- Integrated product team practices, and
- Performance-based business environment.

Regarding industry awareness of individual change elements associated with DoD's acquisition reform effort, there is a moderate level of awareness that averaged 2.6 on a 0=low, 4=high point scale. The survey results show a moderate level of implementation of acquisition reform

based on responses across all interviews conducted that averaged 2.9 on the same scale. The Coopers & Lybrand study identified *snapshots of successes* to include:

- **Streamlined RFPs**. 40% positive reduction in page volume between the RFP for the previous buy and the post-reform RFP.
- **Open systems**. Positive impact on cost — new functionality at no cost increase.
- **Contractor configuration control**. Cost reduced 15%; simplifies design process, permits manufacturing technique changes to reduce complexity, mean-time-been-failure (MTBF) increased from 10 to 120 hours.
- **Simulation testing**. Contract costs reduced 60% to 65% by using simulation instead of engineering tests.

The Coopers & Lybrand study snapshots of opportunity include:

- **Specifications and standards**. Call outs in RFPs were significantly reduced but reappeared in other documents as references and requirements.
- **Simulation testing**. Testing community is blocking simulation instead of testing — rice bowl issue.
- **Reduced Truth in Negotiations Act (TINA) sweeps**. There is little evidence that government principle contracting officers (PCOs) are willing to agree to cut-off dates to reduce TINA sweeps.
- **Commercial quality programs**. Conversion to ISO 9000 resulted in an increase in quality audits and more written procedures than MIL-Q-9858A.

Recommendations from industry for effecting greater reform in the DoD acquisition process applicable to major software-intensive systems include:

- **Alpha contracting**. Improve quality and consistency of *one pass* contracting.
- **Truth in Negotiations Act (TINA)-related exemptions/provisions**. Increase the use of TINA-related exemptions and provision in the FASA. For example:
  - ? Commercial exemptions to certified cost or pricing data,
  - ? Alternative pricing mechanisms (price analysis, market research, etc.),
  - ? Parametric estimating, and
  - ? Cut-off dates to reduce the cost "sweeps" inherent in maintaining complete, accurate, and current cost packages.
- **Commercial pricing**. Provide education and training to government contracting personnel related to commercial pricing principles and techniques.
- **Single Process Initiative**. Continue application of the SPI with emphasis on facilitating the prime-subcontractor change process.
- **Electronic commerce/electronic data inter-change (EC/EDI)**. Accelerate the use of EC/EDI in the acquisition process.
- **Performance-based requirements**. Increase emphasis/ understanding of the Performance-Based Business Environment.
- **Integrated Product Teams (IPTs)**. Improve the effectiveness of IPTs by empowering members to act limiting *value-added* government personnel.

- **Logistics support**. Integrate life cycle support considerations into future acquisition reform strategies.
- **Contractor oversight**. Align field level staffing of contractor oversight consistent with risk-based management.
- **Program stability**. Foster initiatives to improve program stability. [COOPERS97]

4.4.2.3 Defense Acquisition Pilot Programs

Title V of the FASA requires the Secretary of Defense to propose one or more of the Defense Acquisition Pilot Programs (DAPPs) outlined in the Act to implement the concepts of mission-oriented, results-based program management. DoD is tracking the effects of FASA acquisition reform initiatives on seven pilot programs, which were afforded early statutory and regulatory relief to set the example for acquisition reform. The seven pilot programs include:

- Fire Support Combined Arms Tactical Trainer (FSCATT),
- Joint Direct Attack Munition (JDAM),
- Joint Primary Aircraft Training System (JPATS),
- Commercial Derivative Aircraft (CDA),
- Commercial Derivative Engine (CDE),
- Global Grid,
- Defense Personnel Support Center (DPSC). [NPR-DoD93]

According to the ***1997 Report: Celebrating Success: Forging the Future***, since their designation as DAPPs, the pilot programs have successfully implemented numerous innovative acquisition techniques including:

- **Specification/standards streamlining**. Reduced the number of unique Mil-Specs and Mil-Stds by 80% to 100%.
- **Commercial style milestone billing**. In conjunction with a fixed-price EMD, reduced administrative effort associated with progress payments and ensured demonstration of technical progress.
- **Earned value management**. Reduced contractor/government management burdens associated with cost/schedule reporting and provided enhanced *insight* into program progress.
- **Reduced oversight**. Using integrated product teams (IPTs) and electronic data interchange (EDI), improved management decisions.
- **Commercial practices**. Included long-term contracts, commercial logistic support, commercial R&D, and electronic commerce.
- **Rolling down-select**. Evaluated competing Dem/Val contractors through actual contractor performance with feedback and exchange. The approach reduced RFP costs by 70% and Bid and Proposal (B&P) costs by 50%. [DAPP97]

These techniques resulted in acquisition improvements including faster cycle times (time to first delivery), reduced contract costs, and more efficient program staffing compared to traditional programs, as illustrated in Table 4-2.

Program	Cycle Time	Contract Cost	Program Staffing
JDAM	35%	50% (AUPP)	30%
FSCATT	33%	13.5%	27%
JPATS	0%	49%	47%
CDE	60%	4%	42%

Table 4-2. DAPPs Improvements in Acquisition Efficiencies [DAPP97]

4.4.2.4 Acquisition Reforms Save Money and Improves Service

On 18 March 1998, Undersecretary of Defense Jacques S. Gansler (acquisition and technology), gave a speech before the Acquisition and Technology Subcommittee, Senate Armed Services Committee "**Acquisition Reforms Save Money and Improve Service**." In it, he cited two particular examples of acquisition reform results.

TRW now produces military-unique computer circuit boards for the Air Force's F-22 Raptor fighter aircraft and the Army's Comanche helicopter on the same production line as its high-volume commercial electronics products. This has resulted in 30% to 50% savings and a product that exceeds DoD requirements.

The Defense Logistics Agency has used commercial buying practices and purchased high-quality commercial items (instead of military-standard items) which, from a sample of more than $190 million worth of items, resulted in savings of more than 20%. The logistics response time differential, due to using commercial practices, improved by 50% and, when prime vendor practices were used, improved by 95%.

> *"Under acquisition reform, the culture changes from distrust and oversight to accountability, trust, and process controls. Government must rely on the contractor's software engineering process to ensure a quality product and it must understand the execution of that process. Both sides must accept some risks and adopt a paradigm of greater reliance on the contractor's commitment to deliver quality products and services."* — G.W. Pechin and S.K. Gupta [PECHIN97]

4.5 References

[ANDERSON98] Anderson, Lt. Cmdr. Michael H. (USCG) and Eric Rebentisch, "Commercial Practices — Dilemma or Opportunity: Risks — Yes, But Ultimately, Substantial Reward," *Program Manager*, Defense Systems Management College, Fort Belvoir, Virginia, March-April 1998.

[BACHKOSKY97] Bachkosky, John M., The Contribution of ACTDs to Acquisition Reform: Rapidly Moving New Capabilities from the Developer to the User, Special Issue, *Program Manager*, Defense Systems Management College, Fort Belvoir, Virginia, January-February 1997.

[BROWN95] Brown, Lori Hylton, Christopher Johnson, and William Warlick, *Global Competitiveness of the U.S. Computer Software and Service Industries*, U.S. International Trade Commission, June 1995.

[CLUBB96] Clubb, G. Dean, "Blinding Speed Equals Competitive Advantage," *Acquisition Review Quarterly*, Fall 1996.

[COHEN97] Cohen, SECDEF William S., "The Secretary's Message," Quadrennial Defense Review, .S. Department of Defense, The Pentagon, Washington, DC, August 1997.

[COHEN98[1]] Cohen, SECDEF William S., New Defense Strategy: Shpe, Respond, Prepare, Prepared statement of Secretary of Defense William S. Cohen to the Senate Armed Services Cmmittee, Volume 13 Number 13, 3 February 1998.

[COHEN98[2]] Cohen, SECDEF William S., Secretary of Defense Report to Congress: Actions to Accelerate the Movement to the New Workforce Vision (Section 916 Report), U.S. Department of Defense, The Pentagon, Washington, D.C., 1 April 1998.

[COOPERS97] Coopers & Lybrand, Acquisition Reform Implementation: An Industry Survey, Report prepared for the DoD Service Executives, October 1997.

[CZELUSNIAK97] Czelusniak, Daniel P., "Acquisition Program Stability," briefing prepared by the director, Acquisition Program Integration, Office of the Deputy Undersecretary of Defense (acquisition and technology), director, Acquisition Program Integration, Office of the Deputy Undersecretary of Defense (acquisition and technology), 1997.

[DAPP97] 1997 Report: Celebrating Success: Forging the Future, Defense Acquisition Pilot Programs, Pilot Program Consulting Group on Metrics (PPGM), Office of the Under Secretary of Defense (Acquisition Reform), 1997.

[DRAYER98] Drayer, Lt. Col. Dennis (USAF), "Performanced-Based Business Environment: PBBE — A Business Vision We Can Live With," *Program Manager*, Defense Systems Management College, Fort Belvoir, Virginia, January-February 1998.

[DREWES97] Drewes, Lt. Gen. Robert W., (USAF), "SPI—Progress Made and Lessons Learned: The Expedited Process is Working!" Special Issue, *Program Manager*, Defense Systems Management College, Fort Belvoir, Virginia, January-February 1997.

[DUNN98] Dunn, VADM Robert F. (USN Retired), as quoted in "The Sea Services," *U.S. Naval Institute Proceedings*, U.S. Naval Institute, Annapolis, Maryland, Volume 124/10/1/1,148, October 1998.

[FERRARA96] Ferrara, Joe, "DoD's 5000 Documents: Evolution and Change in Defense Acquisition Policy," *Acquisition Review Quarterly, Journal of the Defense Acquisition University*, Defense Systems Management College Press, Fort Belvoir, Virginia, Fall 1996.

[GANSLER98[1]] Gansler, Jacques S., Acquisition Reforms Save Money and Improve Service, Prepared statement of Jacques S. Gansler, Undersecretary of Defense for Acquisition and Technology, to the Acquisition and Technology Subcommittee, Senate Armed Services Committee, Defense Issues, Volume 13, Number 26, U.S. Department of Defense, The Pentagon, 18 March 1998.

[GANSLER98[2]] Gansler, Jacques S., Statement by the Under Secretary of Defense (Acquisition and Technology) to the Subcommittee on Acquisition and Technology, Committee on Armed Services, U.S. Senate, Washington, D.C., 18 March 1998

[GORE93] Gore, Vice President Al, Letter to the heads of each Federal Department and Agency, Office of the Vice President, Washington, D.C., 1 April 1993.

[GORE98] Gore, Vice President Al, American Forces Press Service, as quoted in Linda D. Kozaryn, "Gore Lauds DoD Reforms," *Program Manager*, Defense Systems Management College, Fort Belvoir, Virginia, January – February 1998.

[GREEN98] Green, Graham, as quoted by Lt. Col. Dennis Drayer (USAF), "Performanced-Based Business Environment: PBBE — A Business Vision We Can Live With," *Program Manager*, Defense Systems Management College, Fort Belvoir, Virginia, January-February 1998.

[HAMRE98] Hamre, John J., "Improved Business Practices Will Improve Military Effectiveness," Statement to the House National Security Committee, *Defense Issues*, Volume 13 Number 15, The Pentagon, Washington, D.C., 11 March, 1998.

[HINTON98] Hinton, Jr., Henry L., *Best Practices: Successful Application to Weapon Acquisitions Requires, Changes in DoD's Environment*, GAO/NSIAD-98-56, General Accounting Office, National Security and International Affairs Division, Washington, D.C., March 24, 1998.

[JONES94] Jones, Jennifer, "DoD Moves Toward 'Best Practices' Panel to Steer Toward Successful Approaches to Projects," *Federal Computer Week*, September 26, 1994.

[KAMINSKI96] Kaminski, Paul G., "Lean Logistics: Better, Faster, Cheaper," Defense Issues, Volume 11, Number 99, Remarks of the Undersecretary of Defense (acquisition and technology) presented to the DoD Logistics Offsite Conference, Leesburg, Virginia, 24 October 1996.

[OSD97] OSD Memorandum: Requirements for Compliance with Reform Legislation for Information Technology (IT) Acquisitions, (Including National Security Systems), Office of the Secretary of Defense, The Pentagon, Washington, D.C., 1 May 1997.

[PECHIN97] Pechin, G.W., and S.K. Gupta, "Acquisition Reform is a Cultural Change," 1997 Acquisition Research Symposium Proceedings; Acquisition Reform: Sustaining the Momentum — Full Speed Ahead! National Contract Management Association and Defense Systems Management College, Fort Belvoir, Virginia, 1997.

[PERRY94] Perry, SECDEF William ?, Acquisition Reform: A Mandate for Change, Plan provided by Secretary of Defense Perry to the House Armed Services Committee and the Governmental Affairs Committee, February 1994.

[SHERIDAN96] Sheridan, Kim, as quoted by G. Dean Clubb, "Blinding Speed Equals Competitive Advantage," *Acquisition Review Quarterly*, Fall 1996.

[VANDER SCHAFFER96] Vander Schaffer, Derek, as quoted by Lt. Col. Charles L. Beck, et al,), Model for Change: Making Acquisition Reform Work, Report of the Military Research Fellows, Defense Systems Management College, Fort Belvoir, Virginia, 1996-1997.