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The application of reengineering to the acquisition planning process for a major weapon system: a case for information technology

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THESIS

THE APPLICATION OF REENGINEERING TO THE ACQUISITION PLANNING PROCESS FOR A MAJOR WEAPON SYSTEM: A CASE FOR INFORMATION TECHNOLOGY

by
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THE APPLICATION OF REENGINEERING TO THE ACQUISITION PLANNING PROCESS FOR A MAJOR WEAPON SYSTEM: A CASE FOR INFORMATION TECHNOLOGY

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ABSTRACT

Effective and timely acquisition planning is vital to the successful procurement of a major weapon system. However, the underlying process may not be well understood or defined, is labor intensive and heavily bureaucratic. Efforts to improve the planning function for a major weapon system traditionally focus on the people and organizational aspects without showing any real reductions in time or increases in productivity. New approaches, such as business process reengineering, now show considerable promise in dramatically reducing cycle times, especially when combined with information technology as an enabler. This paper explores the use of information technology in the development of an acquisition plan at a major systems command and suggests that process innovations of 50% or more may be possible. To accomplish this improvement, the process of developing an acquisition plan is redesigned using database and workflow systems as enablers to the process.

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I. INTRODUCTION

Effective planning is vital to the success of any business undertaking. This is especially true in the acquisition of major weapon systems within the Department of Defense. Even though recent reductions in statutory and regulatory requirements make the Federal acquisition process less complex, it is still "apparent that sound acquisition planning is the key to success." [Ref. 1:p. 9]

A search of the literature indicates that prior to the Competition in Contracting Act (CICA) of 1984, acquisition planning in some Government agencies may have been performed in a sporadic and fragmented manner. Formal procedures or processes, if developed, may not have been followed, and if so were usually developed on a program-by-program basis. Planning that did occur was usually informal, and depended considerably on the interaction and experience of the personnel involved. This lack of a formal planning process may have "led to situations where the contracting officer had inadequate time to conduct procurement effectively." [Ref. 1:p. 9-10]

The 1984 Competition in Contracting Act corrected the lack of formal planning, at least indirectly, by requiring that agencies "do a better job of planning and preparing for competitive procurements." [Ref. 2:p. 81] Although procurement planning had been done in some form or another for at least 25 years, CICA now required its use. Congress expressed its belief that procuring agencies were not doing the kind of planning necessary to effectively manage the procurement process. [Ref. 2:p. 81] To correct this, Congress

directed in Title 41, U.S.C. Section 253a (a) (1) (B) and Title 10, U.S.C. Section 2305 (a) (1) (A) (ii) that agencies would now "use advance procurement planning."

The Federal Acquisition Regulation (FAR) at Part 7 defines acquisition planning as "the *process* [emphasis added] by which the efforts of all the personnel responsible for an acquisition are coordinated and integrated through a comprehensive plan for fulfilling the agency need in a timely manner, and at a reasonable cost." The FAR requires the development of a comprehensive acquisition plan as soon as the agency need is determined.

As a result of CICA, and its shift toward competitive procurements, acquisition planning now became more necessary and formalized. [Ref. 2:p. 81] Acquisition plans are required by FAR 7.105 to have milestones that address all of the technical, business, management, and other significant considerations that will control the acquisition. Although the FAR spells out all of the elements of an acquisition plan, nowhere does the FAR spell out a specific process to use in developing an acquisition plan. At best, acquisition planning can best be thought of as an iterative process that becomes increasingly more definitive as the weapon system progresses from program initiation through post-production support. [Ref. 3:p. 3.3-3.4]

The underlying process, or processes, that drive the development of an acquisition plan are not well understood or defined. In a study conducted by the Logistics Management Institute (LMI) of several Government agencies, it found that no documented acquisition planning process existed prior to LMI's efforts to develop one.

Many organizations depended on their staffs to handle the next acquisition plan "just like they did the last one." [Ref. 4:p. 378] Most often the only record or insight that existed of the acquisition planning *process* was in "the memory of the participants, particularly for steps at the interface between components." The elements of an acquisition plan may be relatively well defined, but the process of generating, or formalizing, the acquisition plan may not be as well understood. [Ref. 4:p 382]

In order to begin understanding acquisition planning as a process, the term process must first be understood. A process is a structured and measurable set of activities designed to produce a specific output. Processes are centered around *how* things are done, as opposed to *what* is to be done, such as an acquisition plan. Typically, processes have a beginning, an end, and a clearly identifiable input and output. Processes cut through the typical hierarchical and vertical structures associated with organizations. "Whereas an organization's hierarchical structure is typically a slice-in-time view of responsibility and reporting relationships, its process structure is a dynamic view of how the organization delivers value." [Ref. 30:p. 6]

Many business processes "are characterized by a mode of operation in which work flows in a serial fashion from one process to another." [Ref. 4:p. 378-379] When these administrative processes break down, "patches" are applied to fix the problem. Over time, a series of patches will most likely produce a poorly operating process. Fragmentation and splintering will result and further reduce the efficiency of this process. Perhaps the

only way to effectively correct this problem is by redesigning, or reengineering, the existing business process. [Ref. 4:p. 379]

Michael Hammer and James Champy in their 1993 book, *Reengineering the Corporation: A Manifesto for Business Revolution*, defined Business Process Reengineering (BPR) as:

> *[T]he fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality, service, and speed.*

Within this definition, Hammer gave four key words that provide the essence of reengineering. The first word, *fundamental*, provides the most basic notion of reengineering; Why do we do what we do? It takes nothing for granted, ignores what *is*, and concentrates on what *should be*. The second key word, *radical*, means getting to the root of the problem. In context, it means disregarding all existing procedures and inventing completely new ways of doing things. The third word, *dramatic*, means a quantum leap in performance, not a marginal or incremental improvement such as with Total Quality Management (TQM). A 50% or greater improvement, not a five or ten percent improvement. And the last, and most important word, *processes*, is used within reengineering to mean a collection of business activities or tasks that takes inputs and provides an output of value to a customer. Reengineering is different in that it does not focus on discrete tasks, jobs, people or structures, but on a business process as a whole. [Ref. 5:p. 32-36]

In the most basic sense, reengineering is about starting over with a blank sheet of paper. It is about inventing new approaches to business processes that may bear no resemblance to existing processes. It is not about restructuring or downsizing merely for the sake of cutting budgets. Nor is BPR about new ways to reorganize or eliminate bureaucracies. It differs from Total Quality Management (TQM) in that TQM is about continuous, iterative improvements approach to business processes. BPR innovates. Finally, BPR is not the same as automation. Automation, in many cases may only provide a more efficient way of performing a broken process. [Ref. 5:p. 47-49]

Within BPR, automation is considered an enabler that fosters dramatic improvements in business process. However, automation of business processes has not produced the dramatic improvements in productivity as previously envisioned or hoped. Private corporations have spent billions of dollars over the last forty years to automate tasks with no fundamental improvement in performance. There has been a tremendous outlay of organizational capital on automation, usually with questionable or disappointing returns. [Ref. 5:p. 25]

Much of this disappointment with technology in BPR is attributable to the application of automation over the existing business process found within an organization. Information technology (IT) sped up existing business processes, but did little, if anything, to change imbedded process deficiencies that the successful application of BPR would demand. "Automating existing process with information technology is analogous to

paving cow paths. Automation simply provides more efficient ways of doing the wrong kinds of things." [Ref. 5:p. 48]

Information technology has assisted the process of developing acquisition plans mainly through word processing, spreadsheet, and limited database applications. For instance, development of the Naval Sea Systems Command (NAVSEA) sponsored Master Acquisition Planning Program (MAPP) consolidates the over 100 plans potentially referenced in the typical acquisition plan. Its goal is "to improve the planning process through enhanced communication, more efficient use of resources, and reduced cycle time." However, MAPP may have little or no effect on the underlying process that produces the acquisition plan. [Ref. 6:p. i-iii]

A. RESEARCH QUESTIONS

The primary research question is:

How can the acquisition planning process for a major weapons system be reengineered to effect order-of-magnitude improvements in performance? Subsidiary questions would include:

I. What are the principal elements that make up the acquisition planning process?

II. What reengineering or process improvements have been made to the acquisition system and what effect have these had on acquisition planning?

III. What has been the role of IT in these process improvement efforts and what effects has the introduction of IT had on the process?

A. What effect did the initial introduction of IT have on the acquisition process in terms of productivity?

B. How has the introduction of IT into the acquisition process affected both personnel and organizational structures?

C. What is the current state of IT in the acquisition planning process and what changes will take place in the immediate future?

IV. What pathologies and faults remain in the current acquisition planning process and what technologies or redesigns can be implemented to overcome them?

V. What steps are required to successfully implement these technologies or redesigns?

VI. How would the employment of the BPR model change future implementations of IT in the acquisition planning process?

B. RESEARCH METHOD

Information used in the preparation of this thesis was obtained through literature and field research. Online library catalogs and periodical databases were searched. Additionally, a comprehensive search of the Internet was conducted using various search engines. Relevant books, articles and other documents cited as a result of these literature searches are in the List of References. Some of the material was brought to the researcher's attention during phone conversations and interviews.

A major system command, the Naval Air System Command (NAVAIR) was approached to provide a source of current and relevant information on the acquisition planning process. Command instructions and other published guidance was used to assess

the NAVAIR acquisition planning process and improvements that could be attained using information technology. However, it was not treated as a case study in order to critique NAVAIR's efficiency in developing particular acquisition plans, its programs or their personnel. In reality it was chosen for two reasons.

First, NAVAIR's use of a core competency approach to the management of its planning process was conducive to effectively allowing the studying of the process. Core competency requires management to think much more carefully about the firms business activities. [Ref. 42:p. 66] This focus on core competencies eliminates many of the extraneous problems associated with the poor management of people and resources. Second, NAVAIR is very proactive in the study and automation of acquisition processes, providing a fertile area for research. Combined, this allowed the researcher to effectively study the underlying acquisition planning process and use it as a practical input to the BPR analysis.

Additional information was gathered from other organizations that develop or acquire acquisition planning software systems. These included systems used, or planned for use in the near term, by the Departments of the Navy, Air Force and Department of Defense (DoD).

C. SCOPE OF THESIS RESEARCH

The main thrust of this thesis is on the application of BPR to the process of developing an acquisition plan within a major system command. It also includes, for

background and clarification, a limited analysis of the organizational, legislative and personnel factors that contribute to, or affect, an acquisition plan.

The contribution of IT to the process of developing an acquisition plan is examined as an integral part of the overall acquisition process, not as a stand alone factor. This thesis attempts to apply the BPR model with the goal of presenting a new process for developing acquisition plans that takes advantage of, and leverages, the power of modern IT. Based on the analysis using BPR, a new process for developing acquisition plans will be suggested for future study.

This thesis does not look at IT from a micro level view. No new code or software development is anticipated, although some areas ripe for development may be suggested. Examples would include the use of collaborative integrated design (CID) software, Knowledge-Based Systems (KBS), Artificial Intelligence (AI), software agents and expert systems in the development of an acquisition plan.

II. BACKGROUND

A. INTRODUCTION

The Defense acquisition system is extremely complex. Literally hundreds of thousands of employees work within an administrative system designed to execute millions of contract actions each year. Major weapon systems, involving billions of dollars, push the envelope of technology by attempting to achieve performance levels not previously imagined. The combination of all these factors causes high levels of contract uncertainty and considerable technical risk in the developmental process for a major weapon system. [Ref. 7:p. 109]

The risk represented in these inherently complex acquisitions manifests itself in all phases of the program or process. It is measured by the inability to achieve overall program goals and objectives within defined cost, schedule, and technical/performance constraints. The two components of this measure are the *probability* of failing to achieve a particular goal or outcome and the *consequences* of failing to achieve the goal or desired outcome. Risk management is the term applied to the act or practice of controlling risk within a program. It includes identifying and tracking risk drivers, developing risk mitigation plans and continuously assessing risk to determine how it changes over the course of the program.

Given that risk is present throughout all phases of a program, failure to adequately manage and anticipate it can have an extremely adverse affect on a program's success. The

primary method to manage and control risk is an early and comprehensive planning effort followed by the aggressive execution of that plan. [Ref. 8.] Within DoD this planning effort is partly managed by two formal documents, the acquisition strategy and the acquisition plan.

B. ACQUISITION STRATEGY AND PLANNING

The acquisition strategy provides a top level description that is used by senior decision makers to assess whether a program makes good business sense, effectively implements laws and policies, and reflects top management's priorities. Once approved by the Milestone Decision Authority (MDA), the acquisition strategy provides the basis for more detailed planning. [Ref. 9.]

The Program Manager (PM) is responsible for developing the acquisition strategy. In the most basic sense, the acquisition strategy is "the framework for planning, organizing, staffing, coordinating, and leading a program. It provides a master schedule for research, development, test, production, fielding, and other activities essential for program success and for formulating functional strategies and plans." [Ref. 10:p. 1-1] This document covers the program from initiation through post-production support and includes all critical events necessary for the success of the program. By its very nature, the acquisition strategy is a plan that evolves through an iterative process, becoming increasingly more defined as the program matures through its various phases. The acquisition strategy provides a substantial portion of the functional acquisition plan. [Ref. 3:p. 3.3-3.4]

The acquisition plan is also the responsibility of the PM, but the actual preparation is performed by the Contracting Officer (CO). Acquisition plans differ from strategies in that they are functional, execution level oriented documents. [Ref. 10:p. 4-3] It coordinates and integrates planning of all functions needed to execute the acquisition program. The Federal Acquisition Regulation (FAR) requires acquisition planning for all procurement, and the Defense Federal Acquisition Regulation Supplement (DFARS) requires PMs to prepare written acquisition plans for most acquisitions exceeding $5 million. [Ref. 9.]

C. ACQUISITION PLANNING REQUIREMENTS OF FAR PART 7

The FAR, Part 7, requires federal agencies to perform acquisition planning for all acquisitions. This planning should include and integrate the efforts of all personnel responsible for significant aspects of the acquisition with the purpose of ensuring that the Government fulfills its needs in the "most effective, economical, and timely manner." Although it does not say a written plan should be prepared in every case, it does say that agency heads should establish criteria at which increasingly complex acquisitions may require written acquisition plans.

Acquisition planning as envisioned by the FAR encourages acquisition planning as soon as the agency's need is identified. One of the key points of the FAR is the requirement that the acquisition planner form a team consisting of "all those who will be responsible for significant aspects of the acquisition, such as contracting, fiscal, legal, and

technical personnel." Additionally, this involvement must occur "early" in the planning process and should be done with requirements and logistics personnel.

Along with considering the technical and logistical concerns, the written plan must address all of the "technical, business, management, and other significant considerations that will control the acquisition." Specific contents of a plan may vary depending on the "nature, circumstances, and stage of the acquisition." However, in actually writing and preparing the plan, the planner is required to follow and address mandatory sections of the FAR at Part 7 (See Appendix A).

The written acquisition plan as prescribed by the FAR can be an inherently complex document. It is nominally broken down into two sections. The first section deals with the background and objectives of the acquisition and "considers what the Government is buying, how it will evaluate price and other cost factors, where it is to be performed, and the risk involved." [Ref. 1:p. 22] The second section, the plan of action, describes the steps the agency will take to procure the weapon system.

The complexity issue arises from all of the divergent and overlapping factors laid out in the acquisition planning requirements of FAR Part 7. For instance, consideration must be given to logistics support issues throughout the life of the acquisition plan. If changes occur to Integrated Logistics Support plans (as invariably will occur), this input must be reflected in the acquisition plan if the desired results are to occur. By some estimates, over 100 plans are developed during the acquisition planning process for a major weapons system. [Ref. 11]

D. NAVY AQUISITION PLANNING REQUIREMENTS

The Navy Acquisition Planning Guide (APG) states that the Acquisition Plan (AP) documents the results of advance acquisition planning. It includes, usually by reference, other plans developed during the acquisition planning process such as the Integrated Logistics Support Plan (ILSP), the Test and Evaluation Master Plan (TEMP), or the Navy Training Plan (NTP). When approved, it represents a formal agreement between the acquisition Program Manager (PM), Procuring Contracting Officer (PCO), Chief of the Contracting Office, and the Program Executive Officer (PEO) as to how the PM will execute the program. Within the Department of the Navy, a written AP is required for the following acquisitions: [Ref. 12]

- All ship construction programs and Service Life Extension Programs (SLEP).
- Acquisitions for development programs estimated at $5,000,000 or more.
- Acquisitions for production or services estimated at $30,000,000 or more for all years and $15,000,000 or more for any fiscal year.
- Any other acquisition as designated by the Assistant Secretary of the Navy (ASN) or higher authority.

APs are not required for procurements such as military construction, commercial items, spare parts, overhauls, and final buy out or one-time buys.

1. Naval Aviation Systems Command Requirements

At the Naval Air Systems Command, the acquisition plan is the principal document used by the PM for program review and oversight. As a matter of practice, the AP is

initially prepared at the same time that available funds and resources are identified to solve a particular need. Because of this, the AP is linked directly to the Future Year Defense Program (FYDP) and becomes the primary means to introduce the scope and magnitude of a particular program into the budget process. [Ref. 13:p. 2-1]

E. SUMMARY

Acquiring a major weapon system is an inherently complex undertaking because of its large dollar value and technological requirements. Because of this, considerable risk is present in all phases of the acquisition. The development of an acquisition strategy and plan is intended to lower risk by defining key elements: performance, risk, and cost. Acquisition plans act as vehicles to combine other functional plans into a coherent whole that the PM uses to manage the overall acquisition.

A thorough search of the literature revealed that acquisition planning is predominately concerned with the functional and administrative aspects such as who is responsible for their development, policies to follow in development, and the form plans should take when completed. Thus, what is required to be in a formal acquisition plan or strategy is generally well defined. How we plan for the acquisition of a major weapon system is less certain and is frequently left to the discretion of those involved. The focus is on the product and not on the process. Although acquisition planning is defined as a process in the FAR, little is actually written that describes the underlying process.

III. IMPROVEMENTS TO THE ACQUISITION SYSTEM

A. INTRODUCTION

Improvements in the acquisition system have come about as a result of both internal and external pressures. Internally, changes that occurred in the acquisition of major weapon systems were driven by the growing complexity of these systems since World War II. Technological changes combined with increasing cost made previous organization methods unsuitable for managing the intricate weapon systems now demanded by the war fighter. This resulted in the evolution of the project management approach when acquiring major weapons systems.

Externally, other forces acted to improve the acquisition system. Over the years Congress has periodically taken the initiative to improve or influence the acquisition of defense systems. Major legislative actions include the Competition in Contracting Act (CICA) and, more recently, the Federal Acquisition Streamlining Act (FASA).

Of relevance here is to what extent have changes to the acquisition system, both internal and external, influenced the process of planning for these acquisitions. Understanding of the intent of these improvements to the acquisition system may shed some light on where the focus has traditionally been. In some cases, changes evolved or were initiated that applied directly to the process. And, in other cases, the change may have focused more on achieving a desired outcome with little thought for the underlying process.

B. ORGANIZATIONAL IMPROVEMENTS

As stated by Michael Hammer, "There are some differences between the private and public sectors, but it's my experience that differences are much less important than similarities." [Ref. 14] Most private industrial corporations are organized, for internal operations, along functional lines as are their Government counterparts. [Ref. 2:p. 120-121] The underlying cause for any differences between the two is that Government organizations have somewhat different goals and objectives. [Ref. 15:p. 1-1] These would include the fulfillment of social and economic goals and objectives such as those for Socially Disadvantaged and Minority Firms, Federal Prison Industries, Buy American Act, and Small Business Act. [Ref. 2:p. 1 and Ref. 16:pg. 8-9]

Within the DoD slightly different procurement organization structures have developed in response to the rigorous demands of developing a major weapon system. To comprehend the difficulty of planning for an acquisition requires an understanding of the complex business and administrative systems prevalent in procurement organizations. These systems employ planning and control functions that are sometimes at odds with the traditional hierarchical approach found in the management of many organizations. [Ref. 2:p. 120-121]

1. Development of the Project Management Organization

Since World War II the approach to acquisition management and organization has changed considerably. One reason has been the constantly growing change in the technical complexity and the sheer size of weapon systems acquisitions. As weapon

systems became more complex and technologically challenging, the ability of traditional bureaucratic organizations to coordinate and control the actions of virtually hundreds of other organizations and thousands of people proved to be unrealistic. [Ref. 2:p. 120]

The principles of division of labor and hierarchical control of organizations appeared to be ineffective when applied to the acquisition and management of highly visible, complex, and costly weapon systems. When it became apparent that these management techniques did not possess the flexibility and robustness necessary for success, new management approaches were developed. [Ref. 2:p. 120-121]

The chief change that evolved in the acquisition of weapon systems was the development of the Project or Program Management approach. Program management tends to violate traditional management structures such as lines of authority, span of control, unity of command, and task specialization. Under project management, a parent organization establishes the project and assigns the personnel. Upon completion of the project, the temporary organization disbands and the personnel are reabsorbed back into the parent organization. Program management appears to be one of the current approaches used in managing complex undertakings. [Ref. 2:p. 120-121]

There are two prevalent organizational structures used in project management: the project organization and matrix organizations. Project organizations are more routinely used in laboratories and advanced development program offices. In this organization, project team members report directly to the project manager rather than to a functional or

line manager. Team members from a variety of disciplines are integrated into a single unit that supports one project at a time. [Ref. 17:p 22.2-22.3]

Major weapon systems are more frequently managed in a matrix organization referred to as program office or system program office (SPO). In this organization structure, the program office is managed by a program director or a program manager (PM) who normally reports to a program executive officer (PEO). Under the PM are a number of functional areas such as contracts, logistics, and systems engineering controlled by division heads. The program office also includes a projects division comprised of project managers. Project managers may be responsible for specific subsystems, integration projects, or system modification efforts. They may also be responsible for multiple projects depending on the size of the undertaking. [Ref. 17:p. 22.2-22.3]

2. Development of the Integrated Product Team

Until recently, matrix organizations have been the prevalent means of managing the acquisition of a major weapon systems program. However, Integrated Product Teams (IPT) are rapidly surfacing as the primary method for controlling large undertakings. In the latest version of the DoD 5000.2-R the Secretary of Defense "directed that the Department of Defense perform as many acquisition functions as possible, including oversight and review, using IPTs." Additionally, the Secretary decreed that "IPTs would be composed of representatives from all appropriate functional disciplines working together to build successful programs and enabling decision-makers to make the right decision at the right time." [Ref. 3:p. 1-7]

IPTs may overcome some of the more traditional problems still present in matrix organizations. Even though independent technical organizations such as engineering, testing, and procurement provide matrix support to the PM, layered functional management still exists. Time consuming meetings, briefings, and staffing requirements may slow the acquisition process and decision making. Additionally, vestiges of the functional organization remain, vying for limited program management office resources. This tends to result in the management "stovepipes" and inefficient communications, those things that the matrix organization originally sought to remove. [Ref. 18:p. 165]

One result of implementing IPTs in the acquisition process is a flatter organization with a streamlined decision making process. A flatter organization moves decision making down to the lowest possible level. These benefits manifest themselves as one would expect—reduced development time, lower personnel cost, and improved integration of the finished product. [Ref. 18:p. 164]

One inevitable problem cited with these new organizational structures is the conflict that arises between project managers and the vestiges of traditional organizations, the functional division managers. This conflict arises out of the power struggle as each of these managers vies for the organization's resources. Dilemmas arise between team members regarding priorities, commitments and allegiances. If not dealt with in a timely manner, severe problems can affect the acquisition. [Ref. 17:p. 22.6]

C. HUMAN RESOURCE IMPROVEMENTS

Since enactment of CICA in 1984, there has been an acceleration in procurement initiatives undertaken by Congress. [Ref. 2:p. 79] This rapidly changing environment will most likely require personnel who are capable of understanding and implementing those changes. If the acquisition workforce can not comprehend important process changes or their effect on the overall system, it is not likely that those processes will succeed. In recognition of the fact that people are the key element to the success of any process change, the Congress and the Department of Defense promulgated a number of changes in the career management of individuals involved in the acquisition process. These changes have included implementation of the Defense Acquisition Workforce Improvement Act (DAWIA), the establishment of a consortium of acquisition schools under the leadership of the Defense Acquisition University, and the Defense Management Review.

1. Defense Acquisition Workforce Improvement Act

A possibly lasting change in the management of personnel involved in the acquisition process has been the DAWIA. Although many studies previously conducted on this issue proposed changes in the management of acquisition personnel, few succeeded or carried the weight of change as the DAWIA. Signed into law by the President on November 5, 1990, it brought together improvements previously only suggested by studies such as the Packard Commission Report and the China Lake Demonstration Project. [Ref. 2:p. 107-110]

The DAWIA differed from previous legislative efforts in that it looked at underlying weaknesses in the management of acquisition programs and identified personnel education and training as the key. It avoided the common legislative remedy of adding additional layers of management and oversight to correct previous failures in the acquisition process. The general intent of DAWIA was to improve the acquisition process by strengthening and improving the professionalism of the individuals responsible for the process, the acquisition workforce. [Ref. 2:p. 107-110]

The DAWIA identified many problems in human resources management within DoD. A principal weakness identified had to do with the short tenure of incumbent acquisition personnel, a lack of career incentives, the inflexibility in the current civilian personnel system and a lack of qualification standards for appointment to key acquisition positions. Congress corrected many of these shortcomings by requiring the Secretary of Defense to take several actions, the more significant include; (1) establish policies and procedures to manage the acquisition workforce, (2) the establishment of an "acquisition corps," and (3) the establishment of a Defense acquisition university structure. [Ref. 2:p. 109-110]

Although the requirements of DAWIA were far ranging, the actual effects on the acquisition process are less well known. As of this writing, almost four years have passed since the last mandatory provision of DAWIA was enacted in 1993, yet the full effects are not yet known. As with many Government process improvements, little effort was

expended to establish the structures and mechanisms required to collect useful data and identify emerging trends. [Ref. 19:p. 97]

2. The Defense Management Review (DMR)

The Defense Management Review was a response to a presidential directive in National Security Review (NSR-11) to develop a plan for fully implementing the recommendations of the Packard Commission and the Goldwater-Nichols Defense Reorganization Act. The DMR examined a broad range of issues within DoD and called for management improvement actions in various areas.

Within the acquisition community, the DMR highlighted the need for improving the human resource element. The DMR shared many of the improvements called for by DAWIA with regard to personnel issues. It also called for the creation of "small, high quality staffs" supported by strong initiatives to "reduce management layers, motivate personnel, consolidate functions, and refocus attention on core functions. An objective of achieving a 10 percent or $5 billion reduction in administrative cost was established." [Ref. 2:p. 112]

The effects of the DMR, as with DAWIA, with regard to the human resources improvements are also unclear. Although it is a positive step, the actual results of any process improvements are difficult to measure. Its focus may have been more on the outcome than on the process itself.

D. LEGISLATIVE IMPROVEMENTS

In exercising its power of the sovereign, the Congress enacts various laws and rules affecting the acquisition system and its process. These laws are normally interpreted by executive agencies and promulgated in the form of regulation. Improvements in the acquisition process must be consistent with the framework that the Congress establishes or as a result of the statute enacted by Congress. Over the years Congress normally reacted to real or perceived problems within the acquisition process by passing a variety of new laws including the Competition in Contracting Act (CICA) and the Federal Acquisition Streamlining Act (FASA). Both of these have had an effect on the acquisition planning process.

1. Competition in Contracting Act (CICA)

According to Sherman, the Competition in Contracting Act "deserves status as the keynote for government procurement processes for the foreseeable future." Enacted into law as Title VII of the Spending and Reduction Act of 1984, CICA set the stage for the micromanagement of government procurement. CICA affected virtually all the participants, both private and public, involved in procurement programs. [Ref. 2:p. 79]

Although CICA mandated many seemingly broad and encompassing changes to the procurement process, perhaps its most significant impact was the congressional urging that Federal agencies do a better job of planning and preparing for competitive procurements. [Ref. 2:p. 81] As Nash contends, "Acquisition planning in many agencies has historically been performed in a sporadic and fragmented manner. Any planning that

occurred was often informal and haphazard—often dependent on the personnel involved." [Ref. 1:p. 9-10] Through CICA, Congress expressed its belief that procuring activities "were not doing the kind of advanced thinking and planning necessary to achieve an effective and efficient procurement process. . ." where competition was believed to be the key. [Ref. 2:p. 81]

The CICA requires that executive agencies "use advance procurement planning . . . in preparing for the procurement of property or services." [Ref. 1:p. 10] However, neither CICA nor subsequent legislation defines what constitutes an advance procurement plan.[1] Federal regulatory bodies such as the Office of Federal Procurement Policy (OFPP) have promulgated the requirements for a formal acquisition plan in the FAR (Part 7), but these only spell out documentation requirements. Additionally, Congress, through CICA, urged Government procurement experts to find ways to simplify and streamline the existing processes. However, CICA itself may be at odds with this declaration in that it includes a significant increase in administrative requirements as well as new procedural rules. [Ref. 2:p. 82-83]

2. Federal Acquisition Streamlining Act (FASA)

The Federal Acquisition Streamlining Act of 1994 introduced changes described as "sweeping" and "of paramount importance." [Ref. 2:p. 93] Signed into law by President Clinton as a major element of his "Reinventing Government" initiative, FASA alters or

[1] It should be noted that prior to CICA, the Armed Services Procurement Regulation (ASPR) did require Advanced Procurement Planning, but the extent to which it was used is not known.

affects some 225 provisions of law affecting the procurement process in Government. Based on the work of the Packard Commission of 1986 and the Section 800 Panel Report chartered by Congress in 1991, FASA introduces legislative changes that insert practical, result oriented policies into the acquisition process. [Ref. 2:p. 92]

Among the more significant changes, FASA revised the traditional definition of what constituted commercial products or items in an attempt to exclude these from governmental bureaucracies and regulations. It also changed the Simplified Acquisition Procedures (SAP) threshold to $100,000 from $25,000 and required agencies to develop electronic commerce capabilities in order to retain use of these procedures in the future. And, it established $500,000 as the threshold for requiring cost and pricing data. [Ref. 20:p. 15-17]

The real question at this point is to what extent will FASA improve the acquisition planning process? A GAO report issued in 1996 indicates that while DoD is complying with a majority of FASA's requirements, many civilian agencies may not be complying with the act as originally intended. [Ref. 21:p. 2-4]

E. INFORMATION TECHNOLOGY IMPROVEMENTS

Sherman states that, "[t]he computerization of government procurement programs has evolved slowly." He goes on to say that most advances in the automation of the acquisition process are the result of individual effort and not the result of any significant agency initiatives. From a policy point of view, more effort is devoted to "procurement controls, ethics, policy, and audit than automation." The adoption of information

technology by the government does not match the progress achieved by private industry. [Ref. 2:p. 131]

Within many corporations, automated purchasing systems are integrated with inventory, demand forecasting, scheduling, and distribution systems. These systems, in most cases, far exceed what is available at most government organizations. For instance, at Ford Motor Company, IT was the key enabler that allowed them to revamp their parts procurement or acquisition process. It allowed them to reduce personnel in the purchasing department from 500 to 125. This quantum leap in productivity would not be possible without IT. [Ref. 5:p. 41-44]

1. Information Technology in Acquisition Planning

Within the Government acquisition environment, there seems to be a general paucity of data concerning the use of IT in the acquisition planning process. This researcher has found that searches of automated databases, the Internet and periodical literature for information about application of IT to the Government acquisition process in general yields little information. A similar search conducted on commercial systems yields considerably more information.

Explanation for this occurrence may be two-fold. First, there is a tendency in Governmental organizations to develop automated procurement systems at a level that benefits top management. This is done to provide upper echelons with a comprehensive management information system used in its oversight function. Secondly, automated systems within Government were initially developed to compile statistical data as a means

of proving compliance with various socio-economic programs. In either case, the impetus to develop automated systems within the Government provided a different initial motivation from that of the private corporations which have most always been driven by a desire to increase productivity, and hence, profitability. [Ref. 2:p. 132]

2. Survey of Current IT System Capabilities and Applications

Only recently has the DoD begun to realize the importance of IT in the acquisition planning process. In January 1995, the Under Secretary of Defense for Acquisition and Technology (USD[A&T]) chartered an Automated Acquisition Information (AAI) Process Action Team (PAT) to "define a vision and build a roadmap to institutionalize an automated acquisition information process to provide current and comprehensive information . . . to effectively and efficiently buy weapon systems." This charter recognized the need to apply IT to the DoD acquisition processes, but what was decidedly unique about this PAT was its orientation across functional areas. For the first time, it recognized the need to integrate program management, logistics, engineering, and finance into the automation of the acquisition planning process. [Ref. 22:p. 26-27]

Another area of concern recognized by the AAI PAT was the lack of a list of automated information software used in the acquisition process. Individual agencies often develop unique software in support of their particular needs when information systems may already exist that would satisfy that requirement. The result is the parallel and duplicate development of numerous automated acquisition systems within the Government acquisition community. To correct this deficiency, the AAI PAT recommended that the

Naval Air Systems Command (NAVAIR) PMA-250 collect information on all automated systems used in the acquisition process. [Ref. 22: p 31]

A recent review (February 1997) of the Defense Acquisition Deskbook web site on the Internet confirmed NAVAIR PMA-250's efforts to collect this data. Under a Software Tool Information link, there was a listing of approximately 89 different acquisition related software (Appendix B). This is consistent with a 1989 study conducted by the Logistics Management Institute that identified 76 information systems supporting DoD procurement organizations. [Ref. 23]

The PMA-250 list includes over 17 functional areas such as contract management, program management, logistics, test and evaluation, engineering, and financial management. Of these, there were approximately 49 systems that describe contract management as one of the functional areas supported by that software. Briefly, 53 described program management, 30 logistics and 37 financial management.

The PMA-250 list, however, is not all inclusive and may only include DoD software. A search of the Internet for acquisition planning tools resulted in several hits, both commercial and private. Of these, the General Services Administration (GSA) Home Page revealed a similar undertaking to locate and canvas agencies for software used in the acquisition planning process. For example, the National Aeronautics and Space Administration (NASA) listed a system called the Acquisition Planning Expert (APEX) that reportedly saved over six million dollars in five years of use. And, GSA reported the use of a system called Transmitting Records Electronically and Quickly (TREK) that

reduced the number of document handoffs from 49 to 4, and reduced the days to process a purchase request from 36 to 14.

3. Planned Improvements

The previously reported information does not include planned improvements. Currently, the Defense Logistics Agency is undertaking the development of yet another acquisition related software. Known as the Standard Procurement System (SPS), this system is intended to replace legacy systems across the DoD and automate still existing manual operations. This is an inherently complex task given that DoD procurement is conducted at over 1500 contracting offices involving approximately 56,000 individuals. [Ref. 23]

The Program Baseline Plan describes SPS as a system that will use "commercial software which will form the basis for an automated DoD contracting system and employ standard data and data transmissions within DoD and with industry." SPS will use an open systems architecture with an underlying relational database and will be Electronic Commerce/Electronic Data Interchange (EC/EDI) capable. It will operate on a stand-alone Personal Computer (PC), in a network environment, or in a "megacenter," and includes hardware, training, maintenance, and deployment services. The system will be capable of performing the full range of acquisition functions including procurement planning, solicitation, contract award, and contract administration. The estimated program cost is approximately $326 million and the life cycle cost through the year 2005 is $3.088 billion. [Ref. 24]

One of the key goals of SPS is to standardize procurement processes within the procurement functional area of the DoD. SPS satisfies this goal by embedding existing procurement policies and procedures into a single automated system with a database shareable by other DoD users and then replacing existing and legacy systems throughout the DoD. By linking with other non-procurement legacy systems, such as existing financial systems used by the Defense Finance and Accounting Service (DFAS), SPS will hopefully ensure quicker and more accurate contract payments. [Ref. 23:p. iii]

F. SUMMARY

Efforts at improving the acquisition process have not produced clear and easily discernible results. Organizational changes, such as the recent development of IPTs, may have only allowed acquiring agencies to keep up with rising work demands caused by the increasing complexity of weapon systems. Changes to personnel requirements and training have yet to produce any demonstrable results or improvements in the acquisition process. Legislative improvements have been numerous, and in some cases far reaching, but one cannot point to any substantial gain in productivity as a result. Various technological improvements to the acquisition system have been attempted, but again with uncertain or marginal success.

Given that all these efforts have failed to produce dramatic improvements in the acquisition process, what avenues are left open? Organizational and personnel changes may only be capable of producing so much given their physical limitations and finite abilities. Legislative changes are top down approaches that many times impose more

requirements than they eliminate, consume considerable time, and produce unpredictable outcomes.

Information technology, though often seen as a panacea, has also failed to produce substantial gains in productivity within Government. However, many private corporations, constrained by some of the same organizational and personnel problems as Government, have recently used IT to produce phenomenal improvements to their processes. The following chapter examines the role of information technology and suggest ways in which IT could be used for leverage to produce dramatic gains in productivity in the acquisition process.

IV. THE ROLE OF IT IN THE ACQUISITION PROCESS

A. INTRODUCTION

The Department of Defense planned to spend over $9 billion on Information Technology (IT) and related services in 1996, over a third of the total Federal IT budget of $26.5 billion. This does not include an estimated $24 billion to $32 billion that DoD will spend for software embedded in major weapon systems. [Ref. 25:p. 3,10] But since the Office of Management and Budget (OMB) does not collect comprehensive budget data on IT expenditures, the actual amount spent on IT may be unknown. Nor do Government agencies, including DoD, break out IT obligations as separate line items in budget submission. [Ref. 25:p. 3-4] However, the passage of the Information Technology Management Reform Act (ITMRA) may have some future effect on these problems. [Ref. 26:p. 3]

The real question, however, is what impact has this voluminous spending had on improving Government operations or processes? Little, if any, according to the General Accounting Office (GAO). GAO states repeatedly that these information systems "cost millions more than expected, take longer to compete than anticipated, and fail to produce significant improvements in the speed, quality, or cost of federal programs." [Ref. 26:p. 2] "Despite spending more than $200 billion on information management and systems in the last 12 years, the government has too little evidence of meaningful returns." [Ref. 27:p 3]

The GAO is not alone in this assessment. The Software Technology Support Center (STSC) states that [Ref. 28:p. 1-1]:

> *The software industry is reaching its 50 year mark, however, the same problems that plagued us 20 years ago still persist. DoD has had a distressing history of procuring elaborate, high-tech software-intensive weapons that do not work, cannot be relied upon, modified, or maintained. Many of these over budget, overdue programs have been canceled after reaching full-scale production with millions of dollars wasted, and not a single unit reaching the warfighters' hands. With virtually every acquisition snafu, the* ***software component*** *can be isolated as the prime source of our dilemmas.*

This problem is not unique to the DoD or even the Federal Government. Currently, GAO reports that 11 federal agencies have significant problems with information management systems under development and has labeled them as "high-risk." These information systems are defined as high-risk "because they are especially vulnerable to waste, fraud, abuse and mismanagement, and were potentially costing the government billions of dollars without clear returns." [Ref. 25:p12] The systems identified are key elements of mission critical components that together represent a *multibillion* dollar investment of scarce Government resources. One example, DoD's Corporate Information Management (CIM) initiative, is cited as consuming over $3 billion annually without demonstrating any real benefit. [Ref. 25:p. 12-14]

B. RECURING FAILURES IN THE ACQUISITION OF IT

A more prominent, and consistent theme in the acquisition of IT is the repeated failures that occur over time. As early as 1979, GAO reported that of the custom built Management Information Systems (MIS) under development for governmental agencies,

more than 60% had schedule overruns, over 50% had cost overruns, more than 45% of the software could not be used for its intended purpose, and 29% was never even delivered. Normally had such problems been publicly scrutinized, there would be an intense effort to correct the problem. However, over the next 15 years the problem did not go away. As shown in Table 1 (adapted from the STSC), these problems continue through to the present. [Ref. 28:p. 1.3 - 1.6]

GAO REPORT	REPORT FINDING
Contracting for Computer Software Development: serious Problems Require Management Attention to Avoid Wasting Additional Millions November 9, 1979 (FGMSD-80-4)	Analysis of custom-built MIS systems (163 contractors and 113 Government personnel surveyed) produced the following results: • +60% of contracts had schedule overruns • +50% of contracts had cost overruns • +45% of software was never delivered • +19% of software had to be reworked to be used • -3% of software had to be modified to be used • -2% of software was unusable as delivered
Sergeant York: Concerns About the Army's Accelerated Acquisition Strategy May 1986 (GAO/NSIAD-86-89)	• 64 (of planned 614) units delivered and subsequently scrapped • FOT&E results showed significant performance shortfalls • Cost and schedule overruns projected if government demanded required functionality • $1.8 billion lost • **Program canceled**
Navy Decision to Terminate its Standard Automated Financial System March 1989 (GAO/IMTEC-89-37)	• $446.5 million (99..9%) projected cost overrun • 5 year projected schedule overrun • $230 million lost • **Program canceled**
Embedded Computer Systems: Significant Software Problems on C-17 Must Be Addressed May 1992 (GAO/IMTEC-92-48)	• 2 years behind schedule (as of March 1992) • $1.5 billion cost overrun • Software size/complexity underestimated • MilStds waived for contractor with limited software experience • Shortcuts taken on software testing and software supportability issues
Software Challenges in Mission Critical DoD Systems December 24, 1992 (GAO/IMTEC-93-13)	15 major systems studied had the following common problems: • Poor software engineering concepts, methods, and practices used • Proceeded despite serious problems • Requirements were ill-defined and unstable • Architectures were inflexible • Security requirements not met • Poor testing methods and procedures used • No systems-level integration testing performed
Attach Warning: Status of the Cheyenne Mountain Upgrade Program September 1994 (GAO/AIMD-94-175)	• 8 years behind schedule (at time of report) • $792 million over budget (at time of report) • 11 years projected schedule slip • $896 million projected budget overrun • $22 million/year additional costs for continued operation/maintenance of old system
Comanche Helicopter: Testing Needs to be Completed Prior to Production Decisions May 1995 (GAO/NSIAD-95-157FS)	• Cost tripled in 10 years (from $12.1 million in 1985 to $34.4 million in 1995, 185% cost increase) • Software development and testing problems • Required performance has been decreased by 74%

Table 1 - GAO Reports on DoD Software Failures

In all fairness, these failures in the acquisition of IT are not strictly a DoD, or even a Government, problem. A study conducted by IBM of 24 leading companies that were developing large, software intensive systems, all suffered similar problems. Of these commercial and state government entities, 55% had cost overruns, 68% had schedule overruns and 88% had to be redesigned to be useable. Similarly, a third of all large-scale IT programs are canceled and three quarters are operational failures. Table 2 lists some major non-military IT acquisition failures. [Ref. 29:p. 88-89]

Year	Project	Results
1980s	International Telegraph & Telephone *4 switching systems*	• 40,000 function point system • $500 million lost • **Canceled**
1987	California Department of Motor *Automated Vehicle/Driver License System*	• 3 (5,000 function point size) • $30 million lost • **Canceled**
1989	State of Washington *Automated Social Service Caseworker System*	• 7 years to build • Failed to meet use needs • $20 million lost • **Canceled**
1992	American Airlines *Flight Booking System*	• $165 million lost • **Canceled**

Table 2 - Major Non-Military Software Acquisition Failures

The preceding discussion may lead to the erroneous belief that all IT acquisitions are failures. Several programs, including both Government and commercial, are IT success stories. These include the IT portions of the Air Force's F-22 Advanced Tactical Fighter Program and the Boeing Corporation's 777 passenger airplane. Additionally, many companies successfully implement IT in their companies with dramatic improvements in productivity and quality standards. [Ref. 28:p. 23-30] The real question is— what defines and separates these organizations from others that failed?

C. IT TOOLS AND THE ACQUISITION PLANNING PROCESS

Over the last 12 years the Federal Government has spent over $200 billion on information technology trying to correct efficiency problems. As previously discussed, the results are disappointing and continue to this day. But what causes this failure when government tries to implement information technology to improve its processes? Michael Hammer provides a very succinct and powerful observation about how IT should be applied: [Ref. 5:p. 83]

> *A company that cannot change the way it thinks about information technology cannot reengineer. A company that equates technology with automation cannot reengineer. A company that looks for problems first and then seeks technology solutions for them cannot reengineer.*

The solution within an organization begins with first understanding the capabilities of information technology. This understanding need not be in depth or extreme, but rather a generic understanding of what tools a particular technology or application brings to the process table. All this understanding must do is establish a connection between a process objective and the IT tool that will enable its accomplishment. What is most important to remember about information technology is that it is a "means of solving business problems, not technologies looking for uses." [Ref. 30:p. 55]

The Federal Government may now just be realizing this lesson. Recent legislative efforts including the Paperwork Reduction Act and the Clinger-Cohen Act of 1996 emphasize the meeting of agency goals through the effective use of IT. The Clinger-Cohen Act: [Ref. 31:p. 9]

> *[E]xplicitly requires agency heads to analyze the mission of their organizations, benchmark and assess the performance of their business*

processes and, based on this analysis, redesign their mission-related and administrative processes (as appropriate) before making significant investments in information technology to support those missions. In plain terms, agencies should maximize the potential of technology to improve performance, rather than simply automating inefficient processes.

The real influence of information technology on the acquisition planning process potentially lies in its "disruptive power." Leveraging this power requires that long established, traditional rules about how work is done be broken. This "breaking of the rules" allows individuals to begin to think inductively about how to apply technology during the reengineering process. Only then can these long standing work rules, on which the underlying process was built, be changed to take advantage of the full power of IT. Breaking the old rules creates the possibility for new ways of working and with that reengineering can begin. [Ref.5:p. 91]

Information technology is the essential enabler to reengineering because it allows business processes to be redesigned. Merely throwing computers and software at an existing process does *not* constitute reengineering. Many times automation only reinforces old, often outdated, ways of doing business. Nothing new was created. If what was being done was wrong in the past, it is now being done wrong even faster. This, combined with the inherent complexity of the existing business process, is a certain recipe for failure. In fact, the misuse of technology may actually block any anticipated improvements in performance and reinforce old ways of thinking and undesirable behavioral patterns. If we take it as a given that IT is misapplied to business processes, then how is this corrected? [Ref. 5:p. 83-84]

Hammer provides eight key examples of how to improve business processes with technology. Although not all inclusive, the elements in these examples break existing ways of looking at information technology. Some examples of these technologies are:

- Shared databases
- Expert systems
- Telecommunications networks
- Decision support tools
- Wireless data communications and portable computers
- Interactive video disk
- Automatic identification and tracking technology
- High performance computing.

None of these technologies are new or startling. But if used correctly, they are the enablers that foster process innovation. It is the critical element in creating a new way of viewing an existing process. [Ref. 5:p. 92-99]

1. Shared Databases

A considerable portion of modern day business processes are a reflection of pre-automation paper "shuffling" techniques. The structure of many business processes was originally developed around the file folder. Information was captured on paper and distribution limited to those who possessed the folder. It was thought that copying machines would solve this problem but they probably exacerbated it by creating multiple copies of different versions of the same file. [Ref. 5:p. 92]

Another result is that many business processes tend to be structured in a sequential nature. Information gets passed from one individual to the next, with the first individual failing to see what later edits accomplished. Information technology did not solve this problem for most. Word processors replaced typewriters, but the paper trail remained. The implicit rule is that information can appear in only one place at one time. [Ref.5 :p. 92]

An example of this may be Navy acquisition plans. The Navy Acquisition Planning Guide (APG) specifies that "[t]he AP shall be limited to 25 pages. . . " and that this page limit ". . . is to be exceeded only in exceptional cases." The approximately 100 or more program plans (Appendix C) that are incorporated into the AP are done by reference only. These additional plans are maintained apart from the AP. In no one place can the whole acquisition plan be viewed. [Ref.32]

This is very interesting when it is considered that the APG states that the ". . . AP defines the structure of the program throughout its acquisition cycle." It also states that "[a]cquisition planning is the *process* by which the resources and efforts of key personnel responsible for the acquisition are *coordinated and integrated* through a comprehensive plan . . ." Given this preamble, and the actual makeup of the plan, it is questionable if the two can ever be reconciled to achieve the goal of ". . . fulfilling the agency need in an effective and timely manner, and at a reasonable cost." [Ref. 32]

However, information technology could potentially change this approach. Shared databases allow information to appear in as many places as it is needed, simultaneously.

Any number of people can share this information. Acquisition plans need not incorporate, by reference, other plans. Nor do the plans have to be subdivided. *The database itself may now become the plan.* Instead of the process being fragmented by territorial and inter-organizational competition, all efforts are directed at the same goal, maintaining the acquisition plan as it was originally intended, as a coordination and integration tool.

2. Expert Systems

Expert systems use business rules and problem solving techniques along with databases to evaluate situations or determine courses of action. These systems are designed specifically to capture and apply consistently the expertise of a human specialist in a particular field. Expert systems are usually very powerful, but limited in their scope of application. Examples currently in use are medical diagnosis, manufacturing quality control and financial management. [Ref. 33:p. 494]

Many existing information systems may have expert systems imbedded in them as part of a transaction processing system or it may be as simple as a terminal where users query the system for answers. At the heart of expert systems is a database of rules called a knowledge base. These are typically a set of instructions stated in an "IF-THEN" format. For example, it might say; If the price is under $2,500, then check to see if a credit card was used to buy the item. [Ref. 33:p. 494-495]

Expert systems first became widely available in the 1980's. At that time, most considered them primarily as a means of replacing costly and sophisticated experts with cheap machines. However, that reality did not come to be. What did transpire was that it

allows relatively unskilled employees to now operate at nearly the level of the highly trained expert. What this implies is that one generalist supported by expert systems can potentially do the work of many specialists. Now, instead of having several individuals each trained to do a specific function, one individual, called a case worker, can accomplish all the functions.

At first, this may not seem like a major accomplishment, but consider what happens in a highly sequential administrative process. Previously, each worker accomplished one part and then passed it to the next person to accomplish their part. Any one who has dealt with a bureaucracy knows that each step adds considerable time to the process. If at any point work must be rerouted back in the chain, it becomes even longer. Each handoff or error adds even more time to the process. [Ref.5:p. 92]

The above description substantially illustrates the acquisition planning process for a major weapon system. Many of the improvements discussed in Chapter III alleviated some of the delays and bureaucracies associated with the acquisition process, but none have dramatically increased the productivity of the process. New project management organizations, IPTs, legislation, and numerous other efforts have been attempted, but none as of yet have resulted in a significant improvement in procurement lead times. Some have made coordination easier, provided better visibility over projects, or even brought better people to the existing process, but none have had the impact that the application of expert systems could provide.

Expert systems have the potential to dramatically reduce the time element associated with acquisition planning by eliminating handoffs, delays and errors that cause rework. A single "case worker" could manage an entire acquisition plan backed up by an expert system and a database. This case worker would be responsible to the PM for the entire acquisition planning process, from beginning to end. Less time or effort would be expended on passing plans back and forth, going to endless meetings, and doing another iteration of a plan that is already out of date.

3. Decision Support Tools

A technology closely related to expert systems is Decision Support Systems (DSS). Decision support systems, like expert systems, are designed to assist and support the user in the decision process, except the DSS is used in situations where the decision process is relatively unstructured and only part of the information needed is structured in advance. The significance of the DSS is that it allows the structuring of the problem by providing needed information, much like advanced help programs in commercial software programs. The difference though is that DSS may, because of the nature of the problems it is used in, require the system to retrieve and process data from several files and databases. It may also use information provided online by individual decision makers in the decision process.

Information requested from a DSS are not presented in pre-formatted reports. Instead, each query generates its own unique output in a format determined by the recipients at the time of need. Typically, queries to the DSS are structured as questions

such as, "How will changing the requirement from 400 aircraft to 380 affect the overall price of the program?" As can be seen from this simple question, the ability to query the system makes it possible to model very complex problems with many inter-related issues. [Ref. 33:p. 487-488]

One of the appurtenances of the industrial age in modern organization is hierarchical decision making. This exists because workers are expected to do only one job and not think or make decisions about it. All decisions are referred up the ladder because managers, with their broader views, are the only ones that have the perspective necessary to make informed decisions. However, it is costly, especially within Government, to retain decision making authority at higher levels. [Ref. 5:p. 95-96]

In a memo by the Under Secretary of Defense (Acquisition and Technology), Dr. Paul Kaminski stated that "[u]nnecessary layers of review should be eliminated and the decision making authority maintained at a lower level more familiar with the details of the acquisition." [Ref. 34] This statement suggests that decisions should be made at the lowest level consistent with regulation. However, the empowerment of individuals to make decisions cannot be achieved only by conferring the authority to make decisions. *It must also be accompanied with the information necessary to make those decisions.*

Modern DSS combined with database technology can provide information previously only available to higher level managers. Lower level personnel, properly trained, and employing easy to use analysis and modeling tools can make sophisticated decisions in support of the planning process. This capability allows decision making to be

retained at the lowest level possible. Decisions are made much quicker and are resolved when they appear in the process, not when they are noticed by higher management. [Ref. 5:p. 95-96]

4. Electronic Commerce/Electronic Data Interchange (EC/EDI)

EC/EDI is a form of electronic communications that allows trading partners to exchange business transactions, such as purchase orders, in a form that can be readily processed by application software. Approximately one third of all business documents (invoices, payments, etc.) are transmitted by EC/EDI. One of the advantages inherent in EC/EDI is its ability to reduce the time needed to complete business transactions and to obtain the goods and services an organization requires. [Ref. 33:p. 372]

Within the Government, EC/EDI is becoming increasingly important. FASA provided an incentive for all procuring agencies to start using EC/EDI by raising the ceiling for purchases allowed under small purchase rules to $100,000 from $25,000. However, FASA provides a lower, interim threshold of $50,000 premised on whether agencies can verify that they are performing 75% of their contracting actions using EC/EDI methods. [Ref. 39:p. 19]

By itself, EC/EDI may contribute little to improving the acquisition planning process. While it may provide more opportunities to increase efficiency in small purchase scenarios, in larger transactions it may become less important. It may still prove useful in coordinating acquisition planning over geographically dispersed sites and in the identification of potential sources of supply. However, the real innovation that is possible

with EC/EDI is in combining it with other process changes that lead up to the electronic transaction. [Ref. 30:p. 60-61]

5. Work Flow Systems

A relatively new appearance in information technology is the workflow system. Workflow systems take the paper forms and documents an organization uses in its day-to-day business processes and automates them using IT. By doing this, it captures the policies and procedures of the business into electronic forms that can then be filled, processed, authorized, and routed by various workers. Workflow automates the flow of information within the business or organization. [Ref. 35:p. vii]

Initially, workflow systems were developed for converting paper documents to electronic form with scanning systems and then either storing them for later retrieval or transmitting them electronically with rudimentary e-mail systems. It was thought this would lead to a "paperless" environment. What actually occurred was that information generated on paper often exist simultaneously in electronic media, leading to the proliferation of more paper. [Ref. 35:p 214-215]

The new generation of highly sophisticated workflow systems have similar goals, but the starting point, assumptions and impacts are entirely different. Early workflow systems attempted to automate existing paper-based business processes, there was no attempt to review the underlying process itself. Modern day workflow still has some of the concerns associated with imaging, but now the focus is on redesigning the process before implementing workflow systems. Workflow systems are tools that may allow

reengineering to take place, but it is not an inherent solution to business process problems. Rather, a business process should be evaluated and workflow technology inserted *only if* it brings about the desired change or improvement in that process. [Ref. 35:p. 209]

Within the acquisition planning process, the use of workflow systems is not clear. A review of systems being used indicates that some packages may have this capability because of the underlying commercial software that is used. For instance, the Master Acquisition Planning Program (MAPP) may have workflow capability because it utilizes Microsoft Word as the underlying software. [Ref.6] Word provides a basic routing capability that when combined with e-mail allows the originator to control the process that the document goes through. [Ref. 36:p. 329]

Recent literature now suggests the use of workflow systems as a means of reengineering a part of the acquisition process, specifically the development of Request for Proposals (RFP). As envisioned, the RFP process would be supported by a workflow system combined with a shared database. There, work documents would be indexed and stored for retrieval and transmitted using an electronic communication such as e-mail to various workers involved in the RFP process. [Ref. 37:p. 92]

What really makes this a robust and vital workflow scheme is its definition and control over the RFP process. "[T]he sequence of steps and agents involved in a process is generally enumerated beforehand, and used to automatically route work to the proper agent, when the work is required to be completed." [Ref. 37:p. 92] Additionally, templates are available "that describe the overall flow of work in a process, along with on-

line process "help" and reference information (e.g., regulations, contract clauses, etc.)." [Ref. 37:p. 92] This technology is readily available commercially and easily adaptable to Government use. However, it is expensive and requires an investment in personnel training. None the less, the decision has been made to invest in this technology by some Government organizations. [Ref. 37:p. 92-93]

D. SUMMARY

The Federal Government's investment in Information Technology is, and has been, nothing less than staggering by any estimate. The yield on this investment is questionable at best. Over a third of all information technology projects are never delivered. Those that are delivered will likely be over schedule and over budget. And, of those that are delivered, many are unusable for their intended purposes and require considerable redesign to be useful.

At least part of this information technology crisis may be a result of how agencies view technology. Many see IT as a way to automate existing processes and never question this assumption. Others fail to recognize the solutions that IT presents or to take advantage of what this could do change long standing administrative processes.

V. PATHOLOGIES OF THE ACQUISITION PLANNING PROCESS

A. INTRODUCTION

In the last few years, there has been an increasing demand for a smaller Government that provides improved services at a lower cost. Making Government more effective and efficient has become a national issue. [Ref. 26:p. 2] Part of the problem is that many of the largest Federal agencies "find themselves encumbered with structures and processes, aimed at the demands of earlier times, and designed before modern information and communications technology came into being." [Ref. 38:p. 6] If this is true, then the current acquisition process may have some of these pervasive and systemic problems, or pathologies, that can be easily identified.

B. PATHOLOGIES IN THE ACQUISITON PLANNING PROCESS

In describing opportunities to use IT during process innovation, Davenport identifies several pathologies that are present in existing business processes. His discussion is premised on the basis that before a process is redesigned, it must be understood what effect IT can have on the process and where this effect is felt the most. In other words, what underlying symptom would benefit the most from the intelligent application of IT. [Ref. 30:p. 50]

1. Labor and Paper Intensive Activities

Perhaps one of the more recognized benefits of automation is its ability to eliminate or reduce human labor. Although this element is more frequently seen with the automation of manufacturing processes, it is also associated with administrative processes as well. However, in administrative and service environments, processes are frequently, if not routinely, defined by the existing document flow. The introduction of IT, at a minimum, provides the opportunity to remove the paper from the process by employing work flow tools that define the paths an electronic document takes through the process. This in turn may significantly reduce the need for some human labor at every step and increase productivity. [Ref. 30:p. 51]

Another benefit of the impact of IT on the process is the structure it lends to that process. Regardless of whether the administrative process is efficient or not, it is now probable that automation will cause it to be done the same way every time. The process is now better defined with less handoffs and passing of documents. [Ref. 30:p. 51]

Within the acquisition process, program managers are facing a challenge of maintaining high levels of service to customers while simultaneously increasing staff productivity. As previously seen in Chapter III, ". . . changes to the acquisition process alone have not gone far enough to raise staff productivity. Increasingly, program managers must turn to technology to help solve the problem." [Ref. 39:p. 19]

Even acquisition processes that are currently considered well managed may still be too labor intensive and paper based. A recent study of the Request for Proposal (RFP)

process by Nissen concluded that "the baseline RFP process represents a labor-intensive, linear sequence of manual, paper-based activities that are interspersed between numerous handoffs and reviews." [Ref. 37:p. 91]

2. Capturing Information

Not only can IT reduce or eliminate human labor from a process, it can also augment the effort. If IT is exploited to capture information about process performance, then that information can be analyzed to determine what improvements or changes are required to optimize performance. This analysis can be done by individuals involved in managing the process or may be done by other IT tools such as expert or decision support systems. [Ref. 30:p. 51]

As shown in previous chapters, many procurement organizations seldom use information about process to improve productivity. The result of this is that information, or metrics, critical to the effective operation of contracting organizations is not available. Generally, these organizations rely upon "their staffs to use their memories to handle the next acquisition 'just like they did the last one." [Ref. 4:p. 378] The overall effect is that management and acquisition process owners may lack the information necessary to improve the quality, timeliness, efficiency and effectiveness of their operations. [Ref. 4:p. 378]

At NAVAIR, a review of AP and related procurement process instructions yields little information about automated systems used to capture information about the process.

Mention is made of four different automated systems associated with the procurement process at NAVAIR. These are summarized in Table 3:

System	Description	Acquisition Instruction
PM Information System (PMIS)	Management Information System	NAVAIR Acquisition Guide
Program Acquisition Information System (PAID)	Text and graphics image retrieval system of Navy/DoD acquisition documents.	NAVAIR Acquisition Guide
Acquisition Tracking System (ATS)	Automated database of NAVAIR/PEO ACAT programs and their milestone dates.	NAVAIR Acquisition Guide
Acquisition Document Processing and Tracking System (Bar Code System)	Tracks draft APs through Phase II review.	Acquisition Plans NAVAIRINST 4200.36

Table 3 - AP Related Systems

Of interest is that most, if not all of these systems, capture very little information about the structure of the acquisition process. Information is collected on the overall time a program take to complete (PMIS), or where a document is in the review chain (Bar Code System), but none appear to manage or help direct the flow of the process.

3. Sequential Processes

One of the primary benefits of defining a given process is that the flow can better be examined for opportunities to reduce sequential paths. Within predominately administrative systems, IT can significantly reduce cycle time and substantially increase productivity by allowing some previously sequential steps to be performed in parallel. It

also makes it easier to identify bottlenecks created by sequential work flows and provides a means for reconfiguring around these bottlenecks. [Ref. 30:p. 52]

Since "most administrative systems are characterized by a mode of operation in which work flows in a serial fashion. . . ," it is likely that many acquisition processes suffer from this same problem. [Ref. 4:p. 378-379] Given this understanding, it becomes more clear why IT often does not produce the large productivity increases that were originally anticipated. Many government contracting organizations "attempt productivity advancements through investments in technology without examining the basic interoffice communications processes. Senior leadership is left questioning the value of new technology following *marginal increases in productivity*. If the 'paper process' is broken before technology insertion, the 'paperless process' will also be broken." [Ref. 39:p. 22]

4. Analysis of Information

As previously noted, expert systems and DSS are having a considerable impact on the analysis of information. IT can now support the decision making process in ways not widely available even ten years ago. Numerous private corporations are now routinely using expert systems to make decisions ranging from whether to extend credit to a customer to what any given customer should pay for insurance. Many are also using the power of these systems to collect, analyze and distribute information to key management personnel. Many are reporting that managers' understanding of the business are substantially improved and a dramatic reduction in time spent on routine meetings. [Ref. 30:p. 52-53]

Based on the information in Table 3, it appears to the researcher that little analysis is done by any expert system or DSS. Nowhere in the relevant instructions does it discuss the application of information provided by such an automated system. Nor does it instruct PMs or PEOs to collect such information for analysis by any system. [Refs. 46,47,48]

5. Database Integration

One of the more critical aspects of IT on processes is its ability to integrate information. In the future, it may become increasingly difficult to radically improve process performance for tasks that are highly segmented. One of the reasons these tasks remain segmented is that information on various processes are stored in several databases throughout an organization. This splitting of process information throughout the organization precludes anything but incremental improvements in processes because of the complexity of dealing with all those databases. Organizations that opt for more conservative approaches, that are incremental in nature, may find themselves increasingly behind when competing with others who have achieved radical redesign of processes. [Ref. 30:p. 53-54]

This problem of integration applies to the acquisition planning process as well. As shown in Table 3, numerous databases are used just in the AP process. And, as was previously noted in Chapter III, over 80 types of acquisition software are currently in use within DoD. In fact, several of these may be in use in the same office. As has been observed, "[t]he typical program office has a mixture of automation technologies." [Ref.

39:p. 20] To add to this problem, many program offices may not have established procedures for managing all of these IT resources effectively. [Ref. 39:p. 20]

6. Expert Knowledge of Processes

One of the greatest assets of any organization is the knowledge and experience of the people who make up that organization. However, many times the knowledge and experience these personnel possess is not well managed. Part of the reason is that common wisdom may hold that knowledge intensive activities are not viewed as processes. However, a number of private corporations are capturing this knowledge using IT and making it readily available to the rest of the company. The goal of this undertaking is to make expert knowledge readily available to the entire company. [Ref. 30:p. 54]

Within DoD, this intellectual vision may be taking shape. The Defense Acquisition Deskbook (DAD) is "an automated reference tool providing the full complement of acquisition information 'at the fingertips' of the acquisition profession." [Ref. 40:p. 40] The DAD provides information on several levels. First it provides current mandatory DoD regulations that must be followed. Then it provides discretionary information and guidance where mandatory regulation leaves off. It also provides an information structure where innovative practices, practical advice and lessons learned can be reviewed. Finally, it will stay up-to-date in the future by linking directly to the DAD web page. [Ref. 40:p. 40-42]

C. SUMMARY

The business processes in many organizations have evolved over time. Many of these broke down the process into discrete tasks so that the paperwork aspects could be more easily managed. The introduction of rudimentary IT did not improve performance, and may actually have hurt it, because it was added over the existing paper based process.

Within the acquisition planning process, as with most administrative systems, the file folder has driven the development of many processes. The result is that most of the processes tend to be highly sequential in nature and repetitious. Information must be sent through the sequence over and over again for all individuals to have a chance to perform their edit. It also has limited the size and complexity of documents. Many are split into several individual folders or files when in reality it would make more sense to combine and integrate them.

Another problem has been the inability of administrative systems to capture the knowledge and expertise of its members, to help them make decisions about it, or the sharing of this information with other administrative systems. Regulations and instructions attempt to do this but are only as good as the human memory. Organization innovations such as IPTs and matrix organizations may have only helped marginally. Decision making is still retained at higher levels, even while that higher level exhorts decisions to be made at the lower levels.

Recent developments in information technology over the last several years added new capabilities that need to be revisited with respect to administrative processes. In the

strictly paper environment, information was limited in how it could be manually distributed and copied. The introduction of databases allows information to be available in several places at the same time. Expert systems and decision support systems change the way in which the information can be analyzed and decisions made. Workflow packages can overview and help define key document processes.

These changes in technology require that the acquisition planning process must be looked at anew. What previously made sense from an organizational point of view may no longer work. In fact, the misapplication of these technologies may prevent the fundamental changes that are required to achieve dramatic improvements in the acquisition planning process.

All of the above points to an acquisition planning system that is still highly bureaucratic, plagued by paper and still highly sequential even in the best of organizations. For example, the Naval Air Systems Command (NAVAIR), a premier contracting organization, devotes one publication of well over 300 pages to document the RFP *process* as it currently exists. [Ref. 13:p. i] However, an extensive review by the researcher reveals that only 3 out of 21 chapters (26 of 300 plus pages) deal even nominally with the process. The vast majority of this publication explains, block by block, how to fill out all of the paperwork required to support the RFP.

No amount of training on this publication could substantially improve the RFP process. No matter how well written or organized, this publication could not materially affect the process other than to document it at a given point in time. To achieve order-of-

magnitude improvements, it is necessary to reengineer this process using information technology as the essential enabler.

VI. REDESIGNING THE ACQUISITION PLANNING PROCESS

A. INTRODUCTION

The primary goal of the Department of Defense is maintaining a strong national defense. To achieve that goal the DoD must maintain a strong business operation that is capable of effectively and efficiently supporting the warfighter. Acquisition reform is a key link in this support issue. Placing innovative and technologically superior weapons in the hands of that warfighter, within an austere and shrinking Federal budget, will be an extremely daunting task.

Accomplishing this task will require new approaches. Dr. William Perry, former Secretary of Defense, in a memorandum dated 14 September 1994, remarked that "[t]he private sector has found that attacking business-process cycle times is a powerful weapon in its reengineering arsenal which generates more efficient processes, greater product quality and improved organizations for less cost." Dr. Perry was convinced that focusing on cycle time reductions would result in "substantial gains in . . . reducing infrastructure, streamlining and improving customer service." To accomplish this reduction in cycle time, Dr. Perry challenged the Military Departments to reduce cycle time "by at least 50 percent by the year 2000." [Ref. 41]

But, as was seen in Chapter III, various attempts to improve the acquisition process have not produced substantial or definite results. These resorts to "business as usual" may not prove effective in the developing austere fiscal environment. Nor has

information technology alone, as described in Chapter IV, proven to be the "silver bullet" needed to achieve the substantial gains in productivity currently being sought. The pathologies associated with the acquisition process, as presented in Chapter V, are still prevalent and among us.

However, if we are still intent on radically improving the acquisition process (a 50% improvement in cycle times appears to be radical), then we must attempt new approaches. It is the point of this paper to suggest that redesigning the acquisition planning process to take advantage of the enabling power of information technology is at least *part* of this productivity problem. It is understood that IT, in and of itself, cannot change the process alone. Other human and organizational factors will have to be considered. But an understanding of the existing acquisition process may suggest avenues for the introduction of IT into that process. [Ref. 30:p. 17]

B. DEFINING THE EXISTING ACQUISITION PLANNING PROCESS

Several writers on Business Process Reengineering (BPR) have expressed the importance of understanding existing processes before designing a new one. [Ref. 4, 5, 30, 35] Some may argue that the essence of reengineering is starting over with a clean sheet of paper so as not to be hampered by preconceived assumptions. However, Davenport provides four basic reasons for defining an existing process before designing a new one. [Ref. 30:p. 137]

First, the very act of defining the process serves to stimulate understanding and communication among the participants of the redesign. It provides a common ground that

all can agree upon as a starting point. This can become particularly important when the process is relatively unstructured or when individuals find it difficult to even view their work as a process. Secondly, in most complex organizations, such as the DoD, there may be simply no other way to migrate to a new process without defining and understanding the existing process. [Ref. 30:p. 137- 138]

Third, understanding the existing problems in a process can ensure that they are not repeated in the redesign process. This has routinely happened with the automation of an existing process that had not been sufficiently defined (hence, "paving the cowpaths"). Not realizing that the existing process is highly sequential may result in the same after redesign. As a corollary, endemic problems may frequently go unnoticed until the entire process is thoroughly studied. Defining the process will most likely identify pathologies not previously understood or noticed. [Ref. 30:p. 138]

And, most critically, understanding and defining the current process will provide a measure against which the redesigned process can be valued. The existing process allows the collection of data for a baseline against which to measure the redesign objective. For example, in the acquisition process this would be a time measure of the Procurement Administrative Lead Time (PALT) before and after redesign. [Ref. 30:p. 138]

1. Federal Acquisition Processes

To begin to understand the existing acquisition planning process for a major weapon system, the researcher first looked at the guidance provided by policy or procedure. The Office of Management and Budget (OMB) Circular A-109 provides the

basic policy to be followed by executive branch agencies in the acquisition of a major program. In setting the acquisition policy, it only defines "the rules or guidelines that express the *limits* within which action should occur." [Ref. 42.p. 4] OMB does not specify any process, or procedure, for the acquisition of a weapon system; it only sets broad policy requirement within which agencies must act. [Ref. 43]

The FAR, at Parts 7 and 34, begins many of its discussions on acquisition planning with procedures[2]. Part 34 "describes acquisition policies and *procedures* [emphasis added] for use in acquiring major systems consistent with OMB Circular No. A-109." Although Part 34 directs agencies to "establish written procedures" for the acquisition of major weapon systems, it does little in the way of actually presenting a defined process for the acquisition of those system. At best, it is a policy document in that it provides limits within which program managers and contracting officers should act. FAR Part 34 also directs the program manager to prepare an Acquisition Plan (AP) in accordance with Part 7.

The acquisition planning as defined by the FAR at Part 7 is a "process by which the efforts of all personnel responsible for an acquisition are coordinated and integrated through a comprehensive plan for fulfilling the agency need in a timely manner and at a reasonable cost." But in the actual delineating of procedure (Section 7.104, General

[2] Before going any farther it may be useful to differentiate between process and procedure. The American Heritage Dictionary defines a process as a "series of actions, changes, or functions bringing about a result." It similarly defines procedure as a "series of steps taken to accomplish an end." As can be seen from the definitions, both could be used interchangeably. For the purposes of this research, both are considered essentially the same, differentiated only in that a procedure could be considered a part of a larger process.

Procedures), it only states three actual steps a planner need take; 1) form a team, 2) consult with requirements or logistics personnel, 3) coordinate and secure concurrence with the contracting officer. Other than that it does not provide any procedures or processes in developing a plan. What it does provide is policy guidance on the content of the AP.

2. DoD Acquisition Processes

Within the DoD, the DoD Directive 5000 series provides policy and procedures for the acquisition of major weapon systems. The March 15, 1996 update broke the DoD 5000 into two parts while "significantly reduc[ing] the length and complexity." DoD Directive 5000.1 is a discretionary document specifically directed at providing "general principles to guide all defense acquisition programs." As such, it is strictly a policy document and differs from the DoD Directive 5000.2R which "establishes mandatory procedures" for major weapon system programs.

Part 1 of the DoD 5000.2R provides an overall acquisition management process for the DoD. It defines in broad, overall phases the process a weapon system would take from the determination of a need through the disposal of the system. Follow on parts of the DoD 5000.2R, though entitled Program Definition, Program Structure, and Program Design, provide more on policy issues than the actual process.

However, much of this may be by design. The DoD 5000.1 enjoins "Program Managers and other participants in the defense acquisition process" to turn to the Defense

Acquisition Deskbook (DAD) for "assistance in implementing guiding principles and mandatory procedures."

The DAD is currently managed by the Joint Program Office (JPO) located at Wright-Patterson Air Force Base in Ohio. The DAD is a two part automated tool of DoD acquisition information. A reference library contains the FAR, DFARS and DoD 5000 series documents along with every supporting document or statute. The information structure contains discretionary guidance accessed via the topic or the process. [Ref. 40:p. 41]

The process portion of the DAD provides information on the actual steps in the acquisition process. This process information can be accessed via graphical interface in a "point and click" mode. Information on the process flow is numbered according to steps and the level of refinement. For example, process information is initially broken down into four steps numbered 1.1 through 1.4 as shown in Figure 1.

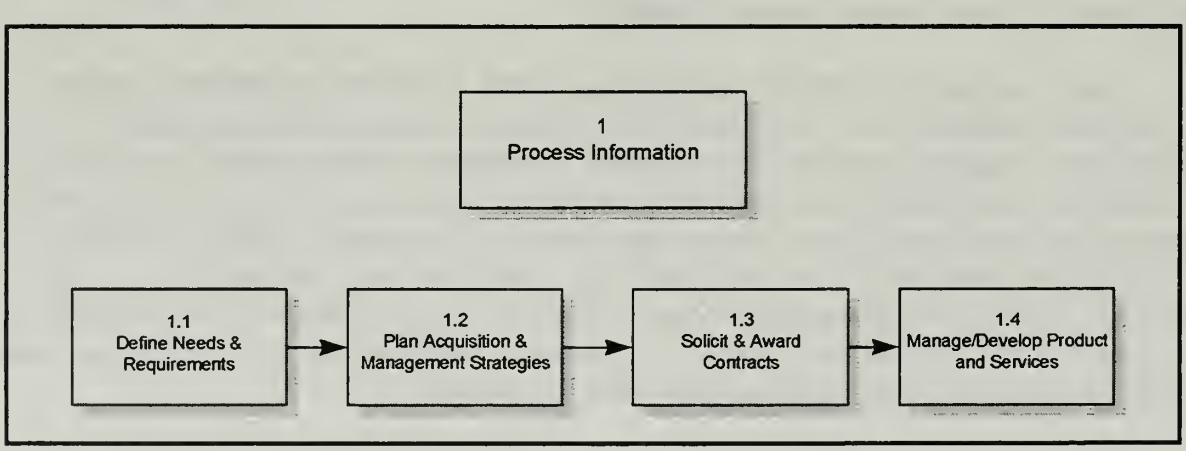


Figure 1- DAD Acquisition Process

Each subsequent block can then be broken down farther to define the process below it. Under the block labeled 1.2 in Figure 1, Plan Acquisition and Management Strategies, several more blocks then define the next steps. The following steps are then laid out sequentially:

1.2.1 Develop Management Strategy

1.2.2 Develop Acquisition Strategy

1.2.3 Determine Program Baseline

1.2.4 Establish Risk Management Plan

1.2.5 Document Required Program Information

1.2.6 Review and Approve Plans and Resources

After this point, in addition to being sequential, the diagram is setup so that every step after the first one (1.2.1) flows into every step after it (1.2.2, 1.2.3, 1.2.4, etc.). Because of this interconnection between every step, the flowchart loses some of its ability to portray the actual process except in the broadest sense. This pattern is repeated down to three or four levels under each basic step. However, it is still very much a macro overview of the acquisition process and does not substantially define the acquisition planning process. [Ref. 44]

3. Naval Air Systems Command Acquisition Processes

The Naval Air Systems Command (NAVAIR) in 1993 managed approximately 17.3 billion dollars in contracts distributed in over 200 programs. NAVAIR employs over 47,000 military and civilian personnel and is currently headquartered in Washington, DC.

Additionally, it is located at 18 major technology and engineering centers, test and evaluation facilities, depots, and logistics support activities nationwide. Its primary mission is to deliver and support aircraft and related systems which can be operated, based, and sustained at sea. Life cycle support is provided for: [Ref. 45]

- Carrier and other air capable ship based aircraft and systems.
- Integrated air antisubmarine warfare and antisurface warfare mission systems.
- Marine expeditionary forces aviation systems.
- Maritime air launched and strike weapons.
- Training systems for aircrew and maintenance personnel.

The acquisition process for the development, production and support of these weapon systems is extremely complex and lengthy. To manage this process, NAVAIR provides its program managers with several sources of guidance. The NAVAIR Acquisition Guide (AG) is designed to provide "corporate management with a single consolidated overview of the major internal NAVAIR acquisition processes." [Ref. 46:p. 1] As such it attempts to consolidate in one document all the activities, regulatory guidance, and documentation requirements needed in assisting acquisition managers to plan ahead. It is felt that the need for "program managers, particularly new managers, to know the process and sequence of events and average time to complete events is essential for planning their programs. . ." [Ref. 46:p. 1] Additionally, it states very succinctly the motivation behind this focus on process:

> *In addition, corporate management, by seeing the entire process, can focus on better ways to manage that process by minimizing the number of program reviews, maximizing parallel vice serial*

documentation reviews, establishing time limits for each part of the acquisition process, and providing a feedback system for performance measurement against established time standards.

The acquisition process at NAVAIR is broken down into several subprocesses. These processes include:

1. Program Initiation process.
2. Milestone Review/Approval process.
3. Program Authorization process.
4. Procurement process.

Of these, the procurement process is most relevant to this research. In general, it interfaces the program initiation process, is an integral part of the Milestone Review/Approval process, and includes the program authorization process. As can be seen from the flow chart in Appendix D, the procurement process begins with the identification of a requirement and generally ends with the release of a solicitation. Within the procurement process is the development of the Acquisition Plan (AP). [Ref. 47: enclosure (1)]

The NAVAIR AG defines the AP as the "principal document for in-depth program planning, review, and oversight." [Ref. 46:p. 28] In support of this requirement, NAVAIR issued a separate instruction, NAVAIR Instruction 4200.36 of 26 January 1994 to provide guidance on the preparation of APs. As shown by the flow chart in Appendix E, it also provides a macro overview of the actual process necessary for the preparation of the AP. The AP process, as shown, is divided into two major phases. [Ref. 48]

In Phase I, the PM designates an AP Action Officer and an AP Preparation Team that will prepare the draft AP for review. This team consists of a minimum of eight personnel from most of the functional areas within the NAVAIR organization such as contracting, engineering, business-financial management, training and so forth. It is their responsibility to coordinate the input for each section of the AP from the various functional codes within NAVAIR. Below this level, the process is not broken down further. In Phase II, the completed draft AP is sent back out for extensive review by a minimum of 27 different functional areas within NAVAIR. Again, how the review process flows is not shown in the literature. However, it does suggest that both reviews are conducted by individuals who then return their comments to Action Officer who incorporates comments as received. [Ref. 48:p. 5-7, enclosure (5)]

This review is conducted in a strictly paper mode. Numerous copies are dispersed throughout the organization for review and comment as required by instruction. To control the flow of paper, an automated bar code system named the Acquisition Document Processing and Tracking System (Bar Code System) is used. This system provides "couriers to hand deliver draft copies of unclassified AP's to those codes required to review and comment . . . plus any additional codes that the acquisition manager wants to have involved in the AP review." [Ref. 48:p. 7]

At the end of Phase II, comments are reviewed and resolved by the PM. In some cases, major issues may surface and require resolution at a higher level. If all issues are

resolved at the PM level, the AP is approved and signed by the PM, PCO, Assistant Commander for Contracts, and the Program Executive Officer (PEO). [Ref. 48:p. 7-8]

The time frame for each step varies. As Table 4 shows, the development, review and approval of the AP requires a minimum of 108 days to complete and can go to greater than 163 days. [Ref. 46:p. 28]

Step	Days	Process
1	15	PM establishes AP Preparation Team
2	45	Team develops draft AP
3	20-75+	Formal review process
4	5	PM resolves review comments (PEO Programs)
5	5	APEO reviews for format and policy compliance
6	5	PM and PCO sign
7	5	AIR-2.0 Signs (Contracts)
8	8	AIR-1.0 (Plans and Policies) or PEO approves AP
	108-163+	Total time required for AP process

Table 4 - AP Process Time Table

Given that APs must be complete before contract award, this process could potentially add a considerable amount of time to the acquisition process. When the average time from identification of a requirement to contract award is 403 days [Ref. 46:p.32], this time of 108 days or greater becomes a more significant part of the entire acquisition process.

Some redesigns of the process have been initiated by NAVAIR. As part of a Management Plan developed by the Contracts Competency (AIR-2.0), the AP process was reviewed. Changes included removal of the requirement for strict compliance with the AP document format, only requiring that it meet the requirements set forth in the FAR and DFARS. It also allows PMs to use other program documents such as the Acquisition Strategy Document (ASD) to fulfill the acquisition planning requirement. It also removes

some minor, internal, administrative requirements. However, the basic process is essentially the same. [Ref. 49]

C. REDESIGNING THE ACQUISITION PLANNING PROCESS

Given the above definition of the acquisition planning process at NAVAIR, a number of questions must be asked and answered during the redesign process. If it is agreed that the preparation and review of an AP is a highly sequential, paper based, people intensive process, then what IT tools could be brought to the table to improve the process? Which part of the process is most ripe for these technological improvements? And finally, should the redesign be innovative and completely new, or an improvement to the existing process?

First, a review of the AP process shown in Table 4 and Appendix E indicates that Phase I and Phase II of the process, up to review and approval, shows that most of the time involved in the development of the AP are in the first three steps (80 to 135 days). This would seem to be a productive area to concentrate redesign efforts. If the time required for these three steps were reduced by 50%, time for the preparation of an AP would fall to 68 to 95 days. This also seems like a productive area to start in because of the considerable paper work involved and the high level of human labor and interaction (meetings, conferences, etc.) required.

As stated in previous chapters, IT can provide some of the leverage needed to improve processes. Some technology is currently being used in the process. Some, such as the Bar Code System, are used to manually track paper documents through the review

process. Word processors and spreadsheets are no doubt used throughout the process as well. Other systems are alluded to such as the Program Acquisition Information Database (PAID). PAID is a text and graphic retrieval system of select Navy and DoD documents used in the acquisition process. [Ref. 46:p. 2] Some systems, such as the Acquisition Tracking System (ATS), are used to track weapon systems programs and their respective milestone dates. [Ref. 46:p 21] Still others, such as the Program Managers Information System (PMIS), are management information systems used to provide oversight data. There is strikingly little information in the AP publications and instructions on any other automated system used in this process.

What IT tools could be used in the AP process? Table 5 considers the key IT tools from above and what effect each potentially could have on the AP process. Note that a considerable amount of the effect is the potential reduction in time. Other effects include:

- Reduction in management oversight
- Improved process control by management
- Better decision making.

	Information Technology			
Step	**Shared Database**	**Expert System**	**Decision Support**	**Work Flow Systems**
1	Maintain database of available personnel for task; Team exist "virtually." *Effect: Reduce time.*	Suggest personnel capabilities needed for particular AP development. *Effect: Better team*	None suggested.	None suggested.
2	Database becomes AP; All personnel involved view AP	Evaluates AP under development; Reduce number of	Provide what if scenarios for management	Define AP document flow; provide electronic document control and

	simultaneously during development. *Effect: Reduce time.*	people involved in AP; eliminate handoffs; Caseworker. *Effect: Better AP.*	evaluation; reduce or eliminate hierarchical decision making. *Effect: BetterDecision.*	routing; readily available. *Effect: Control Process*
3	Allow concurrent viewing as AP developed; may eliminate step 3 entirely. *Effect: Reduce time.*	Same as above, may eliminate step 3. *Effect: Reduce time.*	Inject management control in decision making process. *Effect: Increased management control.*	Same as above; may eliminate step 3.
4	Eliminate or significantly reduce step 4 to 1 day. *Effect: Reduce time.*	Same as above, may eliminate step 4. *Effect: Reduce time.*	Same as above; may eliminate step 4. *Effect: Reduce time.*	Same as above, may eliminate step 4. *Effect: Reduce time.*
5	Eliminate step 5. *Effect: Reduce time.*	Eliminates step 5. *Effect: Reduce time.*	Eliminates step 5. *Effect: Reduce time.*	None suggested.
6	Reduces to 1 day.	Reduce to 1 day.	None suggested.	None suggested.
7	Reduce or eliminate.	Reduce or eliminate.	None suggested.	None suggested.
8	Reduce or eliminate.	None suggested.	None suggested.	None suggested.

Table 5 - Effect of IT on AP Process

Given this information on IT, what would the redesigned AP process now look like? The estimates summarized in Table 6 assume that a shared database and a workflow system are implemented to redesign the current process. Expert systems and decision support systems (DSS) could also innovate the process, but in order to keep the redesign simpler and based on current, readily available technology, these technologies are excluded in the present study. Once the database and workflow systems have been implemented, it may be prudent to reconsider these other technologies. This will also dramatize the point that the correct application of IT can have considerably more effect than the application that has traditionally been used such as with NAVAIR's Bar Code System for tracking paper shuffles during the AP process.

Steps	Days	Process
1	1	PM establishes AP Preparation Team
2.0	45	Team develops draft AP

2.1	0	Concurrent formal review of draft as developed
2.2	0	Concurrent PM resolution of review comments as raised
2.3	0	Concurrent APEO review for format and policy compliance Note: step may be eliminated with expert system
3.0	1	Concurrent signatures electronically
	47	Total time required for AP process

Table 6 - Redesigned AP Process

In the first step, it is assumed that if personnel information is available within a combined database, 15 days would no longer be necessary to establish the team. Functional area managers would release or obligate their personnel based on managed workloads kept in the shared database. In the second step, it is assumed that developing the draft would occur essentially as it is done now. What is different is that because of the sharing of information via the database, approval could essentially occur as the AP is written. Reviewers would be able to see the AP as team members are drafting it. As the reviewers become more sophisticated in the use of work flow systems, the process time may drop further as the process itself becomes more visible to the participants.

It should be clear from this redesign that we are not just simply introducing IT into a broken process (i.e., "paving the cowpaths"). Rather, we are redesigning the process for operation in an IT environment.

D. PROTOTYPING AND IMPLEMENTING THE REDESIGN

The previously discussed redesign may, or may not, be a plausible solution to reducing the total time required to develop an AP. A radical change to the acquisition planning process based solely on the above analysis may not provide an acceptable level of

risk for most managers. A way to mitigate this risk would be through the development of a prototype. Prototyping is an acceptable method to simulate and test the operation of a new process and central to the "re-invention lab" concept. Davenport defines it as "an iterative process in which the fit between new process structure, information technology, and organization is refined and re-refined." [Ref. 30:p. 156] It is analogous of a scientific experiment performed to validate a hypothesis.

From an organizational aspect, it would be a small scale version that replicates the intended process to check the validity of the design. Given the nature of the intended change in the AP process, it would be only prudent to first test the process redesign. This is especially important because of the sometimes unintended consequences that occur with the implementation of new IT. Also, prototyping is essentially a learning activity. What was constructed on paper may lack a certain reality when implemented in person. By prototyping, lessons can be learned from mistakes in a controlled environment. Many iterations may be required to perfect a redesign in this manner. [Ref. 30:p. 156-157]

Perhaps the most important effect to consider is on the personnel in the organization. In more than one occasion, both within and outside of government, organizations have mandated the implementation of a new system without a consideration on the people involved. The technology may have been flawless, the plan superb, but the process redesign failed to provide the desired results. Much of this is a failure to consider the fit of technology to the people within the organization. Destroying or disrupting social interaction by confining everyone to a computer cubicle may not produced the desired

results even if it should have worked on paper. Prototyping may overcome this, gradually reshaping the organizational environment or allow for a revising of the technology involved. [Ref. 30:p. 156-157] It may also highlight new needs in terms of personnel skills, education, and training as well as organizational changes.

E. SUMMARY

Radical changes are needed to achieve the level of performance that will be demanded in the future. Many personnel and organizational innovations have been tried but have failed to achieve large, demonstrable returns. Process improvements, often ignored, are once again becoming the focal point for decreasing cycle times to meet new demands on Government organizations.

Redesigning a process demands an in depth analysis and definition of that process. This is a learning exercise that informs and communicates much about the process under study. It is a necessary part of the redesign effort in that it prevents the recurrence of problems that reengineering seeks to eliminate.

Most of what is written in the form of regulation is concerned with policy over procedure or process. This sets the boundaries within which agencies must act, but not how they accomplish the acquisition. Only recently, via the automated Defense Acquisition Deskbook, has the DoD began to place more emphasis on the process and not on policy.

The acquisition planning process at NAVAIR is a relatively mature and well developed process, but it is not well documented. It is heavily sequential, paper based,

and personnel intensive. Little effective use of IT has been implemented. Systems currently in place are more concerned with automating existing processes than using them to leverage the process. Internal redesign efforts focus more on changing the existing process through eliminating paper requirements. Overall gains from these efforts were most likely marginal at best.

The redesign described above considered the use of IT to dramatically improve the process. To mitigate risk, the technology used was limited to the readily available, off the shelf variety. Startling new technologies will not necessarily make a process more effective or efficient. In many cases, lower risk, existing technologies with a proven track record, well applied in the design of a process, can have a considerable impact on the productivity of an organization.

At NAVAIR, as with many other Government organizations, technology is viewed in a completely deductive mode. What are we doing now that could be done faster with technology? This approach will provide some improvements, but only marginal at best. A more productive line of reasoning is inductive; how can the process be redesigned to take advantage of technology's power?

NAVAIR, as may be representative of most Government organizations, applied technology to track where the location is of a piece of paper in a manual routing process. It treated the information as inventory to be accounted for in its location. At best, the AP draft is accounted for now, no matter where it is located. A better application of technology would be to eliminate the paper and develop a common database combined

with a workflow scheme that is an electronic, or "virtual" plan. This requires a different way of viewing the process. One way looks at it as a process that is broken down into its smallest parts. The other way looks at it in the whole for a solution.

VII. RECOMMENDATIONS AND CONCLUSIONS

A. INTRODUCTION

In doing this thesis, the researcher has tried to avoid the overuse of terms like reengineering, Business Process Reengineering (BPR), re-invention, acquisition reform, or any number of other terms associated with these very recent management initiatives. This was done to avoid connotations similar to what Total Quality Management (TQM) inspires in some minds. However, these are only the most recent in a spate of management techniques spawned over the years. Management by objective, operations research, management by walking around (MBWA), risk assessment and financial analysis all fall in this genre.

Whatever the value of the above listed techniques, most, if not all, brought some useful element or tool to the table depending on the time and the place. It is the same with BPR. The difference in this case is that Hammer and Champy were able to bring attention to BPR at a time when its potential could be most fully realized— when the maturity of Information Technology (IT) could finally start to have a substantial impact on processes. But the "reinvention" of this process focus is an idea whose time has come.

B. RECOMMENDATIONS

The following recommendations are a suggested list of actions that many acquisition organizations could take to reengineer their procurement functions. It is not proffered as a cookbook approach to making reengineering a workable solution. Instead,

it is submitted as a possible course of action that could, if properly applied, significantly reduce process times and radically improve organizational performance.

1. Identify the Process

Acquisition organizations should first learn to correctly identify and study business processes. Too narrowly or widely defining a process reduces the likelihood of success. The research at hand investigated the acquisition planning process. Going to a higher level than this would have meant dealing with a process that was too large and unwieldy. Any smaller and the benefits may begin to decrease. Additionally, the opportunity for introducing IT into the process is less clear at either end of the extremes. The literature suggest that somewhere between 10 and 20 key processes exist within any organization. [Ref. 30:p. 28] However, based on the researcher's experience and observations, many organizations place process identification at the lowest priority.

Throughout the research effort, there was strikingly little information available on organizations that had studied their key processes. Only three articles even remotely spoke to process analysis within organizations. The researcher can only assume that this is indicative of its consideration on a whole. Some progress in this area may be indicated. The Defense Acquisition Deskbook (DAD) now focuses considerably on the process initiative. Some management literature the researcher reviewed from the Naval Air Systems Command (NAVAIR) showed a recent, and renewed, interest in process definition and analysis.

2. Additional Technologies

In proposing a redesign to NAVAIR's acquisition planning process, the researcher purposely avoided proposing the use of expert systems and decision support systems (DSS). The reason, in addition to what was stated, was to avoid "assuming solutions" to problems. The use of readily available IT made the solution plausible using today's technology. However, expert systems and DSS are both mature technologies that have been around for a number of years. The problem with inserting these technologies is that considerable ground work must be done to develop the actual human knowledge or wisdom that makes them viable. However, additional future gains could be made from these technologies if started now. The researcher estimates that these systems could be in place in two to four years from start date.

3. Evolving Processes

As seen in Chapter IV, many of the IT solutions the Government undertakes will most likely fail or cost considerably more than anticipated while not producing the productivity enhancements being sought. Of the many reasons previously expressed for this failure, it is the researcher's opinion that much of it has to do with how these systems are evolved. Typically, one of two things occur. An IT system is bought for an organization, or group of organizations, that will supposedly solve all of their productivity problems. An example of this would be the various purchasing systems such as SACONS, or APADE. The other end of the spectrum is that individual offices within several organizations will develop their own unique solutions to IT problems (Appendix B).

Neither of these approaches will work if IT is to be successfully applied to solve process problems, and increase productivity substantially. An new approach must be developed.

The approach suggested by the researcher is to identify a particular program management office within a major systems command as a test laboratory. Here a redesigned procurement process would be prototyped using IT in the manner described in Chapter VI. A comparable or similar procurement could be done in a traditional manner to serve as a benchmark for the test lab. In this controlled environment, metrics could be easily established and data collected. Subsequent trials could be used to refine, or "tweek," the system to achieve the greatest process improvement. When the system has proven itself, and the process is well defined, it could then be exported to similar offices. If it subsequently fails, then the damage has been contained to one area and is not as intolerably expensive as some of our more noticeable IT failures today.

C. RECOMMENDED AREAS FOR FUTURE FOR STUDY

The application of business process reengineering to acquisition processes is an area ripe for study. Little work has been done in this area, but it will undoubtedly receive more attention in the future. This is because it is the only way to achieve the dramatic improvements in time and money that will be required in the future. As pointed out in Chapter III, other improvements have not dramatically improved the business cycle times or cost elements. As more acquisition professionals realize the potency of reengineering principles, increased attention will be focused on this area.

Some recommendations for future study include:

1. A detailed study of the development of an Acquisition Plan within a major systems command.
2. The relative importance of various IT tools in reducing cycle times within a given acquisition area or process.
3. The use of workflow software in defining acquisition processes.
4. The definition of all the major processes within a major systems command.

D. CONCLUSIONS

It has been the researcher's intent to wave the flag; the red flag. We are at a critical cusp in the world of acquisition reform. Much good work has been done before us by a long line of acquisition professionals and organizations. However, the increases in productivity and reductions in cycle time required in the future will be even more dramatic than today. In the near term, decisions may have to be made to trade off acquisition overhead for warfighting assets. The strategic employment of information technology will make these decisions much more bearable. Accomplishing a reduction in cycle times through IT will also allow us to get the latest technology in the hands of those warfighters even sooner than we already do.

APPENDIX A - WRITTEN AP ELEMENTS (FAR PART 7)

(a) Acquisition background and objectives.

(1) Statement of need.

(2) Applicable conditions.

(i) requirements for compatibility with existing or future systems or programs and

(ii) any known cost, schedule, and capability or performance constraints.

(3) Cost.

(i) Life-cycle cost.

(ii) Design-to-cost.

(iii) Application of should-cost.

(4) Capability or performance.

(5) Delivery or performance-period requirements

(6) Trade-offs

(7) Risks (technical, cost, and schedule)

(8) Acquisition streamlining.

(b) Plan of action:

(1) Sources.

(2) Competition.

(3) Source-selection procedures.

(4) Contracting considerations.

(5) Budgeting and funding.

(6) Product descriptions.

(7) Priorities, allocations, and allotments.

(8) Contractor versus Government performance.

(9) Inherently governmental functions.

(10) Management information requirements.

(11) Make or buy.

(12) Test and evaluation.

(13) Logistics considerations.

(14) Government-furnished property.

(15) Government-furnished information.

(16) Environmental and energy conservation objectives.

(17) Security considerations.

(18) Other considerations.

(19) Milestones for the acquisition cycle:

Acquisition plan approval.

Statement of work.

Specifications.

Data requirements.
Completion of acquisition-package preparation.
Purchase request.
Issuance of synopsis.
Issuance of solicitation.
Evaluation of proposals, audits, and field reports.
Beginning and completion of negotiations.
Contract preparation, review, and clearance.
Contract award.

(20) Identification of participants in acquisition plan preparation.

APPENDIX B - ACQUISITION SOFTWARE SURVEY

As of 21 February 1997:

Acquisition Center's Executive System (ACES)
Acquisition Professional (AcqPro 1.6)
Acquisition Tracking Tool (ACQTRACK 1.0)
AEGIS Document Imaging System (ADIS)
Air Force Acquisition Model (AFAM)
Air Force Medical Acquisition Model (AFMAM)
Analysis Product (Archer 1.0)
Artillery Systems Analysis Product (Battleaxe 1.0)
ASC Source Selection Application (EZSource 1.1)
Automated CDRL and Tracking System (ACTS)
Automated Cost Estimating Integrated Tools (ACEIT 2.3)
Automated Data Management System (ADMS 4.0)
Automated Information Retrieval System (AIRS/PDM)
Automated Lesson Learned Capture and Retrieval System (ALLCARS)
Automated Test Planning System (ATPS)
Automation of Procurement and Accounting Data Entry System (APADE)
Biweekly Indicator Tracking System (BITS 2.02)
Budget/Readiness Analysis Technique (BRAT 3.0)
Commerce Business Daily-Synopsis (CBD-Syn v.1.7.2)
Computer Resources Information Base (CRIB)
Computer Resources Life Cycle Management Plan (CRLCMP)
Computer. Opt. Mod. Predicting/Analyzing Support/Structure (COMPASS 2.0a)
Conformer (Conformer 2.1)
Consolidation Risk Assessment Methodology (CORAM 3.2)
Contract Action Tracking System (CATS 2.0)
Contract Appraisal System Module (CAPPS 2.2)
Contract Data Requirements List (CDRL)
Contract Monitoring Automated System (CMAS 1.2)
Contracts Information Management System (CIMS 3.0)
Correlation Calculator for Cost-Risk Analysis (C-RISK 3.0)
Cost Analysis Decision Support System (CADSS 2.0)
Data Management System (DMS 5.25)
Distributed INFOSEC Accounting System (DIAS)
Early Warning System (EWS No Ver #)
EDI Watch! (EDI Watch N/A)
Electronic Personnel Security Questionnaire (EPSQ)
Federal Acquisition Regulations Automated (FARA 6.0)
Financial Management & Execution System (FMETS 4.3)

Force Cost Model (FCM 96.0)
Formal Risk Analysis (FRISK 3.2)
Fuzzy Logic Applied to Risk Evaluation (FLARE)
Helicopter Analysis Product (Leonardo 1.0)
Integrated CDRL and Routing System (ICARS)
Integrated Management Information System (IMIS)
Joint Advanced Strike Technology Operating and Support Technology Evaluation Model (JOSTE 1.0)
Joint Modeling and Simulation System (J-MASS)
Joint Services Cost Oriented Resource Estimating (JCORE) Model (JCORE 1.42)
LAN Integration and Network Kernal (LINK (TM) 1.2)
Litigation Support Data Base (LSDB 3.5.21)
Logisitcs Planning and Requirements Systems (LOGPARS 3.1)
Louis Link and Louis II (LOUIS 2.38)
Maritime Patrol Aircraft Analysis Product (Pegasus 1.1)
Master Acquisition Program Plan (MAPP)
Merged Obligation and Liquidation Tracking System (MOLTS 1.1)
Military Specifications and Standards Data Repository (MILSPEC 1.1)
Modernized Parts Control Automated Support System (MPCASS)
Multi-User Engineering Change Proposal Automated Review System (MEARS)
Naval Aviation Lessons Learned (NALL No Vers #)
Operating and support Management Information System (OSMIS FY95)
Paragraph Analyzer (PARANA)
Parametric Cost Estimating Relationship Module (PACER 2.0)
Parametric Review of Information for Costing and Evaluation (PRICE PRICE S V2.11, PRICE H/HL/M V3.0)
Performance Analyzer for Windows (PA Win 1.2)
Pre-Award Information Exchange System (PIXS 2.0)
Process Analysis and Project Integrated Environment-Integrated Knowledge Environment (PAPIE-IKE 4.0)
Procurement and Contracts Tracking System (PACTS 6.5)
Procurement Contract Monitoring System (ProCMAS 3.0)
Procurement Network (PROCNET)
Procurement Request Information System Module (PRISM 6.4)
Program Acquisition Management System (PAMS 1.12)
Program Integration Scheduling and Management System/ARDEC (PRISM/ARDEC 3.0)
Program Management Automated Data System (PMADS 1.0)
Program Manager's Workstation (PMWS)
Proposal Evaluation tool (PET 1.1)
Purchase Request Entry Module (PREM 6.4)
Reliability and Maintainability Logistics (RAMLOG No Vers #)
Requisition Automated Processing System (RAPS)
Resource Analysis Decision Support System (RADSS 5.3)

RFP Guidelines (RFPGUIDE5)
Satellite Communications Management Information System (SCMIS 3.1)
Security Information Management System (SIMS)
Security Management System (SecurTrac 1.0)
Shared Program Information Network (SPINE)
Software Specification Assistant (SSA 3.4)
Specification Trainer-Editor (SpecTrE)
Supply Automated Management System (SAMS)
System Evaluation and Estimation of Resources (SEER)
Team Work Plan (TWP)
Turbo Streamliner (TURBO 1.0)

APPENDIX C - PLANS SUBSUMED BY THE MAPP

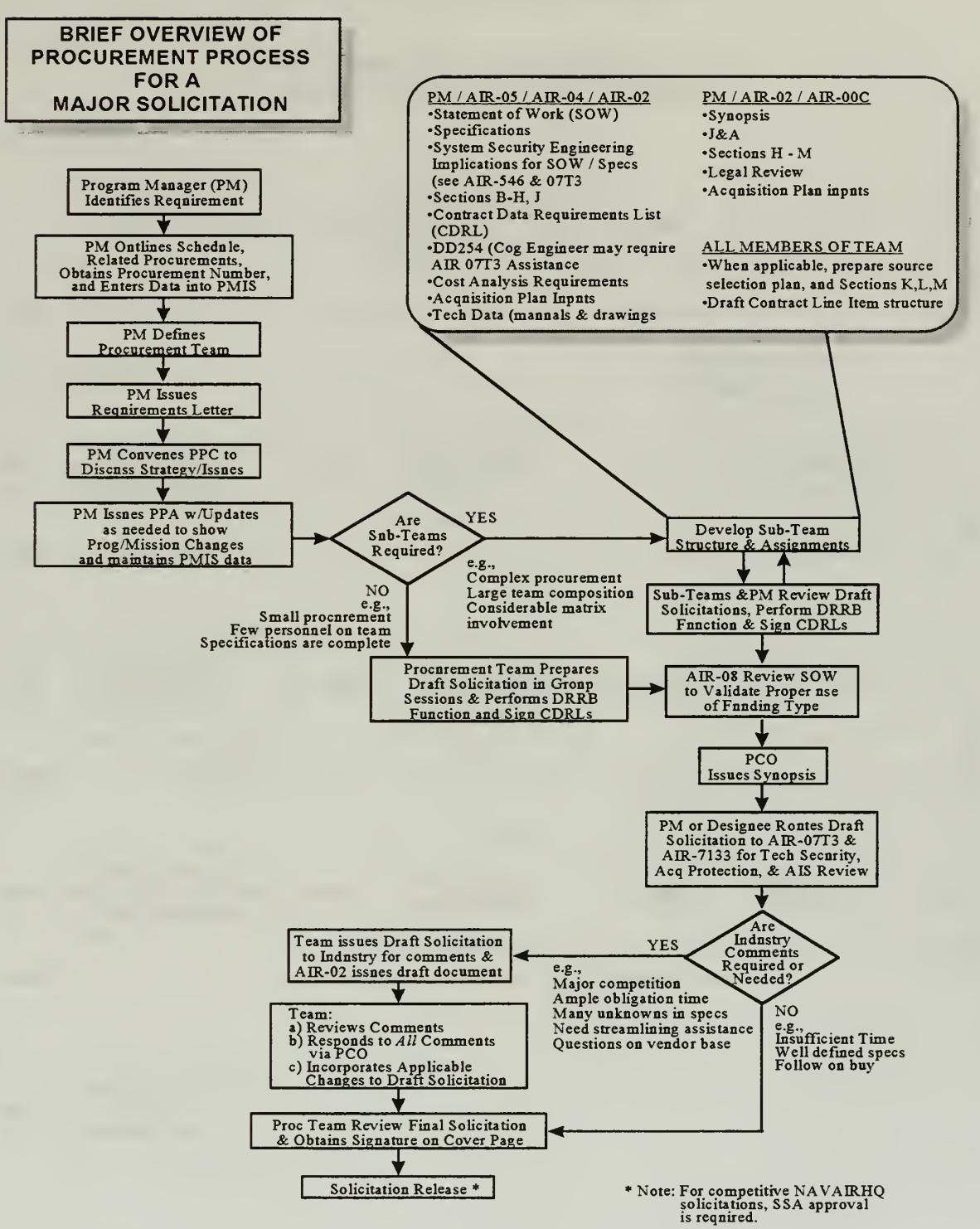
Source: NAVSEA Master Acquisition Planning Program Handbook

1. **Acquisition Plan**
2. Computer Resources Integrated Support
3. **Computer Resources Life-Cycle Management Plan**
4. Configuration Audit Plan
5. **Configuration Plan**
6. Continuous Acquisition and Life-Cycle Support (CALS) Implementation Plan
7. Depot Planning Annex
8. Electromagnetic Compatibility Program Plan
9. Electromagnetic Interference Control Plan
10. Electrostatic Discharge Control Program Plan
11. Engineering Change Proposal System Safety Report
12. Engineering Data Management Plan
13. Equipment Facilities Requirements Plan
14. Facilities Requirements Plan
15. Facilities Requirements Report
16. Failure Modes Effects and Criticality Plan
17. Government Concept of Operation (CALS)
18. **Hardness Assurance, Maintenance, and Surveillance Plans**
19. Hardness Surveillance Plan
20. Human Engineering Dynamic Simulation Plan
21. Human Engineering Program Plan
22. **Human Systems Integration Plan**
23. Implementation Plan
24. Integrated Logistic Support Plan
25. Integrated Support Plan
26. Interface Requirements Specification
27. Interim Contractor Supply Support Management Plan Report
28. Interim Contractor Support Plan
29. Interim Support Plan
30. Level of Repair Program Plan
31. Logistic Support Analysis Plan
32. **Logistics Requirements Funding Summary**
33. Logistics Support Analysis Plan
34. Logistics Support Analysis Use Study
35. Maintenance Plan
36. Manpower, Personnel, and Training (MPT) Concept Document
37. Military Characteristics Document
38. MPT Resources Requirements Document
39. **Navy Training Plan**
40. Nuclear Hardness and Survivability Program Plan
41. Nuclear, Biological, and Chemical Contamination Survivability Assurance Plan
42. **Operation Requirements Document**
43. Operations Support Plan
44. Packaging Management Plan
45. Packaging, Handling, Storage, and Transportation Program Plan
46. Phased Support Plan
47. Post Production Support Plan
48. Program Protection Implementation Plan
49. Quality Assurance Program Plan
50. Radar Spectrum Management Control Plan
51. Real-Time Outfitting Management Information Systems Management Plan
52. Reliability and Maintainability Program Plan
53. **Risk Management Plan**
54. Safety Studies Plan
55. Site Evaluation Report
56. **Software Development Plan**
57. Software Quality Program Plan
58. Software Support Transition Plan
59. Standardization Accomplishment Report
60. Standardization Program Plan
61. Supply Support Management Plan
62. Support Site Activation Plan
63. Supportability Assessment Plan
64. System Safety Hazard Analysis Report
65. System Safety Program Plan
66. Technical Data Acquisition Plan
67. Technical Data Management Plan
68. Technical Manual Organization Plan
69. Technical Manual Plan
70. Technical Manual Publication Plan
71. Technical Manual Quality Assurance Program Plan
72. Technical Manual Schedules and Status Report
73. Technical Manual Validation Plan
74. Technical Manual Verification Plan
75. **Test and Evaluation Master Plan**
76. Test and Evaluation Program Plan
77. Testability Program Plan

78. Training Device Requirements Document
79. Training Effectiveness Evaluation Plan
80. Training Equipment Requirements Document
81. Training Facilities Report
82. Training Systems Alternative Report
83. Transition Plan
84. Transportation Plan
85. **User's Logistics Support Summary**
86. Verification, Demonstration, and Evaluation Plan
87. Version Description Document
88. Waiver or Deviation Safety Report
89. Weapon System and Equipment Transition Plan

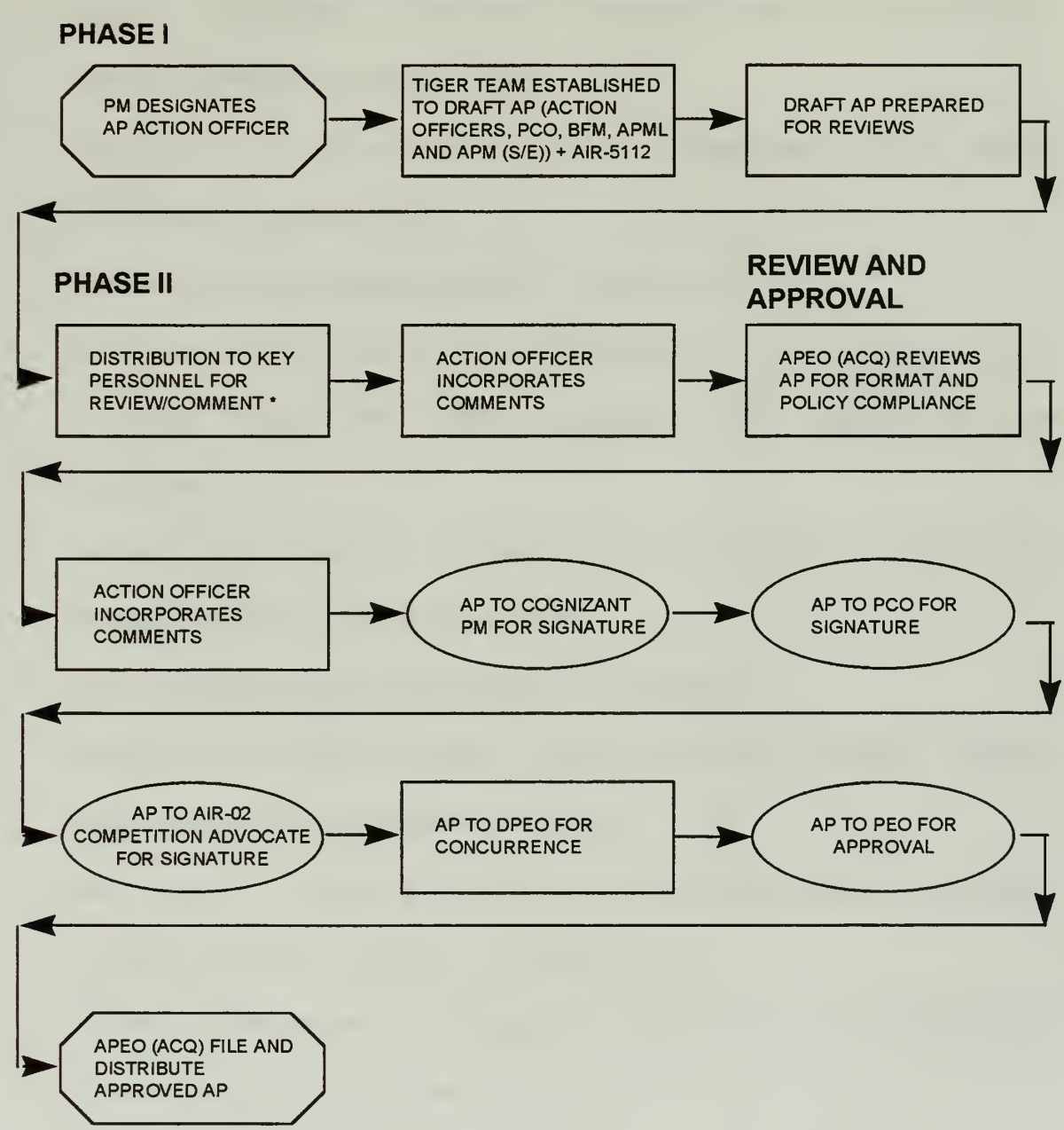
Note: Plans in **bold type** are required by DoD/DoN 5000 series instructions.
Note: Many of the incorporated plans have duplicate titles. The total number of plans subsumed in the current version of MAPP is 101.

APPENDIX D -NAVAIR PROCUREMENT PROCESS



APPENDIX E - NAVAIR AP PROCESS

PEO (A) and PEO(T) ACQUISITION PLAN
PREPARATION AND APPROVAL PROCESS



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