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TENETS FOR LEAN U.S. ARMY PROJECT MANAGEMENT OFFICES

by

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June 1996

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Secretary of Defense William Perry directed DoD to develop a restructuring plan for the acquisition organization to accomplish a personnel reduction, reduce the acquisition process costs, and eliminate activities that are either unnecessary or not cost-effective. To this end, DoD and the Services initiated acquisition reforms aimed at changing the management and conduct of research, development and acquisition projects and more closely emulate world-class commercial companies' best practices. Objectives at the heart of these initiatives are to increase product quality and user satisfaction, decrease cycle times and costs, obtain predictable results, and reduce Government acquisition management overhead. This research examined the current state within the Army PMOs, the current environment in which Army PMOs operate, and the significant policies that influence the Army PMO organizational designs. The research examined world-class commercial corporations and military project management processes and the author interviewed project management personnel to identify the minimum core PMO processes and responsibilities, characterize opportunities that might meet the goals and objectives to obtain lean PMOs, and develop a supporting set of tenets. The results of this research can be used as a guide for the challenges faced in the ensuing organizational redesign efforts in the Army.

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TENETS FOR LEAN U.S. ARMY PROJECT MANAGEMENT OFFICES

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ABSTRACT

Secretary of Defense William Perry directed DoD to develop a restructuring plan for the acquisition organization to accomplish a personnel reduction, reduce the acquisition process costs, and eliminate activities that are either unnecessary or not cost-effective. To this end, DoD and the Services initiated acquisition reforms aimed at changing the management and conduct of research, development and acquisition projects and more closely emulate world-class commercial companies' best practices. Objectives at the heart of these initiatives are to increase product quality and user satisfaction, decrease cycle times and costs, obtain predictable results, and reduce Government acquisition management overhead. This research examined the current state within the Army PMOs, the current environment in which Army PMOs operate, and the significant policies that influence the Army PMO organizational designs. The research examined world-class commercial corporations and military project management processes and the author interviewed project management personnel to identify the minimum core PMO processes and responsibilities, characterize opportunities that might meet the goals and objectives to obtain lean PMOs, and develop a supporting set of tenets. The results of this research can be used as a guide for the challenges faced in the ensuing organizational redesign efforts in the Army.

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I. INTRODUCTION

A. OVERVIEW

In the 1994 memorandum entitled, "Acquisition Reform: A Mandate for Change," Secretary of Defense William Perry directed:

> DoD must reduce the costs of the acquisition process by elimination of activities that although being performed by many dedicated and hard working personnel, are not necessary or cost effective in today's environment. [Ref. 1: p.1]

The Department of Defense (DoD) and the Services have initiated acquisition reforms aimed at changes in the management and conduct of research, development and acquisition projects to more closely emulate the best practices of world-class commercial companies. At the heart of these initiatives are the objectives to increase product quality and user satisfaction, decrease cycle times and costs, obtain predictable results, and reduce Government acquisition management overhead. Five Defense Acquisition Pilot Programs (DAPPs) are an integral component of the DoD's approach to investigate new techniques and measure the benefits of reforming the acquisition process. According to the *Pilot Program Consulting Group's 1995 Interim Report*,

> Results to date, as reported by the statutory DAPPs, show that acquisition reform contributes to reduced contract costs, improved development and delivery schedules, and substantial gains in in-house efficiencies. Furthermore, these results appear to apply across a wide-range of DoD weapon systems. [Ref. 2: p. ES-1]

Acquisition reform experiences outside the DAPPs also support that reasonable results are being accrued, with one exception. This exception is the reduction of Government acquisition overhead, of which Government labor and support contractor costs are the primary components.

Whether or not our Government acquisition organizations are efficient and cost effective has not been a question that DoD officials have often had to worry about. That

is changing. As recently passed in the National Defense Authorization Act of 1996, the Secretary of Defense is required to develop:

> ...a plan on how to restructure the current acquisition organization of the Department of Defense in a manner that would enable the Secretary to accomplish...(the reduction) of military and civilian personnel assigned to, or employed in, acquisition organizations of the Department of Defense (as defined by the Secretary) by 25 percent over a period of five years, beginning on October 1, 1995. [Ref. 3: Section 906(b)]

This mandated reduction in the Government's acquisition workforce is perceived by Congress as one of the dividends from acquisition reform.

> In designing the plan under paragraph (1), the Secretary shall give full consideration to the process efficiencies expected to be achieved through the implementation of the Federal Acquisition Streamlining Act of 1994 (Public Law 103-355), the Federal Acquisition Reform Act of 1995 (division D of this Act), and other ongoing initiatives.... [Ref. 3: Section 906]

By October 1, 1996 there will be an immediate reduction of 15,000 DoD civilian and military acquisition personnel. [Ref. 3: Section 906(d)]

The Army has further detailed the impending reductions. Based on memoranda from the Vice Chief of Staff of the United States Army and the Deputy Director for Acquisition Career Management, the Army acquisition workforce will face a 20 to 30 percent reduction by the end of the decade. [Ref. 4] [Ref. 5] Some anonymous sources indicate these reductions will occur more quickly. The net result of the reductions, according to another source, will help the Army save about $2 billion that would be applied to the Army's ailing modernization efforts. [Ref. 6] Another expected benefit is the release of military members of the Army acquisition workforce back to the war-fighting units from which they originally came. From the war-fighters' perspective, the Army acquisition workforce contains a division's worth of officers. Though it is too early in the process to tell, the contemplated reduction of military members may return a brigade's worth of military acquisition personnel back to war-fighting units.

The expected reductions identified in the preceding paragraph come on the heels of significant reductions in the Army acquisition workforce that took place in the earlier

part of this decade. From the author's experience, these earlier reductions did not change the amount or type work conducted by the acquisition workforce. Fewer people are doing basically the same work. Marginal changes sustained the earlier reductions. However, as observed by one Air Force program director who has managed one of the DAPPs and has already faced the same ominous downsizing situation as currently faced by Army project managers, "We cannot dramatically downsize and continue to do as we've always done. Won't work! Less with less means big change, not marginal change." [Ref. 7] Fundamental change is required to meet the challenges directed by Secretary Perry. Army management must address the problem of how to become more efficient, while maintaining or improving effectiveness, in a dynamic acquisition reform environment.

B. OBJECTIVES AND BENEFITS

> "Man is the only animal capable of purposeful evolution; he makes tools." This insight of Alfred Russell Wallace, co-discoverer with Darwin of the principles of evolution, means that man and his social organizations can innovate. They can create, so to speak, a different animal. Indeed, in a changing environment their survival depends on their capacity to innovate. [Ref. 8: p. 643]

This observation by Peter Drucker, a highly regarded author of the science of management, encompasses the primary objective of this effort - to identify opportunities and practices for innovative Army Project Management Offices (PMOs). The investigation focuses on a critical re-examination of the basic essence of the PMO purpose, responsibilities, processes, structures, jobs, management systems, values and beliefs. This re-examination will center on the opportunities provided by emerging acquisition reform initiatives and the experiences related to military and commercial efforts aimed at obtaining leaner organizations . However, care must be taken that the efficiencies desired through downsizing must be a result of a flexible project-driven organizational design tailored to the specific needs of a PMO. Re-engineering an organizational design must be guided by the selection of sound tenets (practices and

principles) which are formed into an integrated strategy. As Drucker also observed,

> Structure follows strategy. Organizations are not mechanical. It is not "assembly". Organization is organic and unique to each individual business (application) or institution. For we know that structure, to be effective and sound, must follow strategy. [Ref. 8: p. 523]

To this end, this thesis is intended to identify a core set of PMO processes and responsibilities that should be performed by all PMOs, characterize a set of opportunities that can be restated as a set of goals and objectives of lean PMOs, and the development of a fundamental set of tenets. The result can be used as a guide for the challenges faced in the ensuing organizational redesign efforts in the Army. Like the stated objective of a related Air Force study,

> [The result of the thesis is not] ...intended to provide a mathematical model for downsizing, but rather a toolbox that should be applied thoughtfully based on the careful judgment of the integrated program team (at all levels) to 'right size' an individual (PMO) for a specific program. [Ref. 9: p.5]

C. RESEARCH QUESTIONS

To address the topic of leaner Government staffing levels within Army PMOs, the primary research question asks: *How can the Army obtain leaner project management offices and what are the associated issues?* The essence of this primary research question is captured by the following subsidiary questions:

- What are the characteristics of current Army PMOs and their environment?
- What are the attributes of the most significant policies that influence Army PMO design?
- What are the key tenets and attributes of lean project management organizational designs exhibited in world-class commercial companies?
- What are the key tenets and attributes of lean project management organizational designs exhibited by non-Army, "black world", and Defense Acquisition Pilot Projects?

- From the point of view of Army managers and prime contractors, what are the key tenets and associated issues for obtaining leaner PMOs?
- What is a minimum core set of responsibilities and processes which should be accomplished by any Army project management office?
- What are the major opportunities and tenets that have the potential to save manpower in PMOs?

D. SCOPE AND LIMITATIONS

The topic of lean PMOs is one of considerable breadth.. The study of lean PMO organizations could be investigated from any number of different aspects in (e.g., strategic planning, organizational design, implementation/change, continuous improvement) the organizational development process. However, this investigation focuses on the identification and characterization of the opportunities and tenets used by the organizational design process. Organizational development policy, strategic planning, the organizational design or the implementation will not be the subject of this investigation.

There are several other critical assumptions and constraints that will limit the scope of this thesis to a manageable and meaningful product. These scope limitations are listed below:

- The focus of this thesis will center on Army PMO organizations located within Program Executive Organizations (PEOs). As such, the tenets developed will be oriented towards PMOs primarily engaged in the materiel development life cycle phases of concept development, program definition and risk reduction, and engineering, and manufacturing development. These are the most labor intensive of the life cycle phases.
- This investigation does not evaluate any specific PMO.
- No attempt will be made to quantify the downsizing impacts of the tenets developed nor does this thesis intend to provide a mathematical model for PMO sizing. The sizing issue encompasses the complexity of evaluating the

entire acquisition workforce, determining the research, development and acquisition needs of the Army, etc., which are all well beyond the scope of this thesis.

- The total workforce available to the project manager (PM) includes organic Government employees and support contractor resources. The allocation of PMO processes and tasks between core, matrix and support contractors will not be addressed.

E. DEFINITIONS

There are several key terms and definitions that are critical to the understanding of the objective products and succeeding methodology. They are described in the following paragraphs.

1. PMO

The acronym "PMO" is generically used to identify any Government program, project or product management office. The PMO consists of Government core and matrix personnel, as well as, contractor support and technical services. The core personnel form the permanent portions of the PMO, while the matrix personnel positions and contractor support are tailored to fit changes in workload.

2. Opportunity

For the purposes of this investigation, an opportunity is a situation or arrangement associated with a PMO organizational design, that if recognized and changed would afford a chance for attaining the goal of an efficient PMO which requires less manpower.

3. Tenet

The *American Heritage Dictionary* defines tenet as an opinion, doctrine, or principle held as being true by a person or especially by an organization. [Ref. 10] For the purposes of this thesis a tenet generally refers to either a principle, practice or procedure that, when applied to the PMO organizational design effort, may achieve

efficiencies in operations and reduction in manpower. [Ref. 9: p.1] Tenets are used to exploit identified opportunities.

4. Organizational Design Strategy

Strategy is the consistent integration of domain, objectives, goals and policies in such a manner as to address the questions, "What is our business and what should it be?" [Ref. 8: p.75] According to Galbraith,

> [Domain]...determines which parts of the total environment are relevant for goal setting. [Goals and objectives determine]...how to relate to the relevant elements in the environment and which specific goals will be pursued. Domain is determined by choices of (1) product and services to be offered (2) customers and clients to be served (3) technology to be utilized and (4) location at which work is to be performed. Collectively these four choices determine the boundaries of the organization or points at which the organization is dependent on others outside the organization (the environment). The second part of strategy (goals and objectives) is the determination of how to relate to these others. [Ref. 11: p.5]

The "direction" strategy takes towards some desired end state (i.e., the goals) is driven from the top-down by descriptions of organizational vision, mission and purpose. A plan to reach the desired goals is defined in the strategy and is influenced from the bottoms-up by environment, strengths, weaknesses, threats and opportunities. Tenets elaborate on the goals defined in the strategy and underpin the plan for the implementation of the organizational design elements (i.e. processes, structure, technology, jobs, management systems, and values and beliefs). This investigation focuses on the manpower efficiency aspects of the strategy. Policies both guide and constrain the choices made and the tenets selected.

5. Process

The most basic building block of an organization, a process is "...a collection of activities (or tasks or functions) that take one or more kinds of inputs and create an output that is of value to a customer." [Ref. 12: p. 35] A process is a way of doing work. Processes can have internal or external customers. A process may span the boundaries of organizational units and may rely on multiple individuals performing specific tasks. The

business processes contemplated in this investigation are further described as either inherently Governmental in nature or those that can be performed by either the Government or a services contractor.

6. Inherently Governmental Functions

The Office of Federal Procurement Policy, as a matter of policy, defines an "inherently Governmental function" as,

> ...a function that is so intimately related to the public interest as to mandate performance by Government employees. These functions include those activities that require either the exercise of discretion in applying Government authority or the making of value judgments in making decisions for the Government. Governmental functions normally fall into two categories: (1) the act of governing, i.e., the discretionary exercise of Government authority, and ... monetary transactions and entitlements. [Ref. 13: p. 2]

7. Structure

Structure is the interrelated groupings of people, which is supported by a physical and technological infrastructure (e.g., facilities, business equipment, manufacturing machinery), performing jobs that implement the business processes in accordance with the business strategy.

8. Management and Measurement Systems

The management and measurement systems are the policies and procedures which dictate how people are recruited, trained/educated, paid, directed, evaluated, rewarded and promoted.

9. Values and Beliefs

Values and beliefs encompass "...the issues and concerns that people in the organization think are important and to which they pay significant attention." [Ref. 12: p. 81]

F. METHODOLOGY

1. Overview

The methodology proposed for this thesis is graphically depicted in Figure 1. There are nine steps which can be generally described as either data collection or data analysis steps. Most of the steps in the methodology are self-explanatory. However, there are several aspects of this methodology which are addressed in subsequent sections.

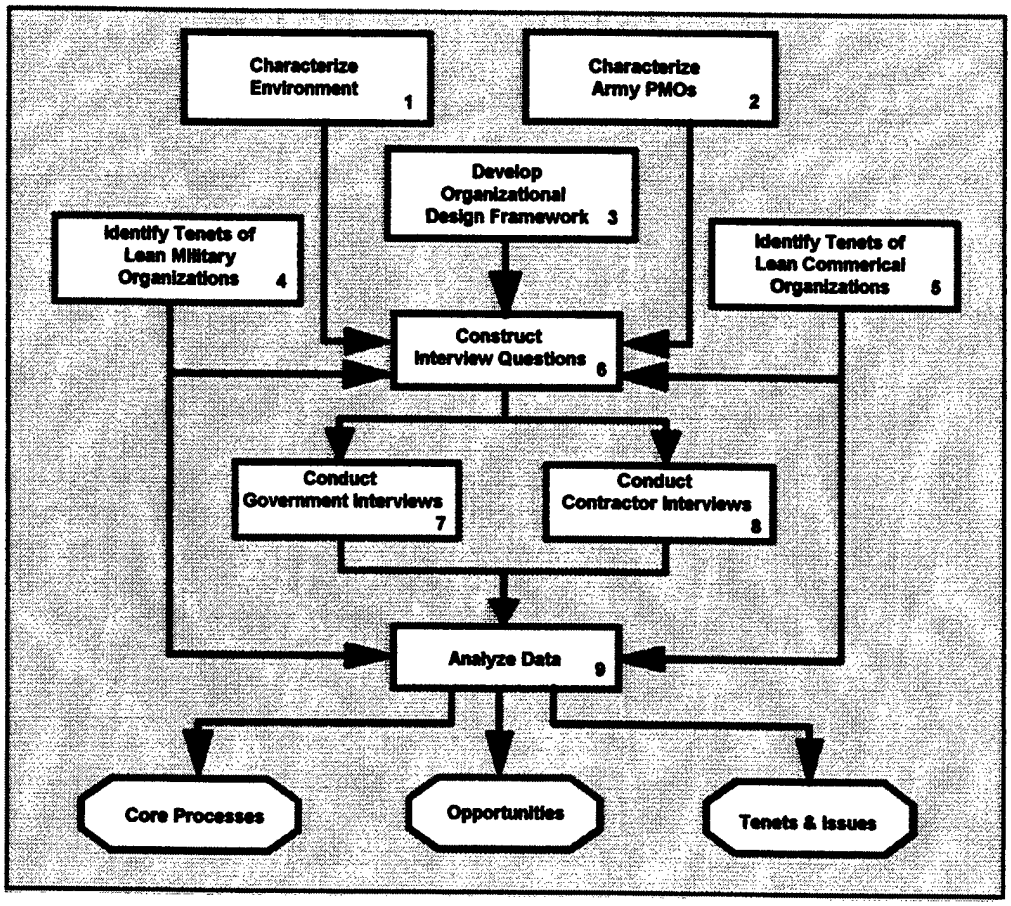

Figure 1. Methodology Flow Chart

2. Data Collection

The data collection portion of the methodology uses two primary approaches to obtain research data -- literature reviews and informal interviews. The literature reviews focused on tenets associated with lean military and commercial organizations. Within the

military area three primary thrusts were pursued: highly classified "black world" projects, the Defense Acquisition Pilot Programs, and the Air Force System Program Office downsizing efforts. The data were collected from existing studies, case studies, and other pertinent documentation.

Informal telephone interviews provided the other source of research data. A representative sample of current or past Army headquarters, Program Executive Office, PMO and prime contractor program management personnel were interviewed using informal telephonic communications. The questionnaire was sent to interviewees prior to the interviews. The telephone conversations were recorded. A non-attribution policy was placed in effect if requested by the interviewee. The interviews were scheduled to last about 30 minutes each.

The questionnaire used for the informal interviews is in Appendix A. The questionnaire is divided into three areas. The questions in the first area capture demographic and organizational information. The questions in the second and third areas were developed with the aid of an organizational design framework, which also became a part of the questionnaire. The organizational design framework is described in the following section. This area solicits information on current PMO goals, missions, responsibilities, core processes and sizing factors. The third area focuses on identifying specific opportunities, tenets, issues and constraints associated with the different organizational design elements and external interfaces found in the organizational design framework.

3. Data Analysis

The analysis of the data focuses on identifying downsizing opportunities, associating useful tenets with the opportunities, and identifying any constraints or issues related to the particular opportunity or tenet. In general, the identification of opportunities and tenets was facilitated by looking for situations where:

- Processes could be shifted from the Government to a contractor or other external organization,

- Duplicate processes exist,
- Unneeded processes exist (usually characterized by self-serving internal processes),
- Efficiencies in process performance could be obtained
- Structural inefficiencies,
- Inconsistencies between processes, structures, management systems and values and beliefs.

A systematic investigation of these situations was also accomplished by constructing and using an organizational design framework which emphasized several interrelated organizational design elements. These elements are significantly influenced by interfaces to the external environment. As one of the Air Force DAPP project managers reported, "A program office exists for one reason: interfaces. Every systems acquisition has a host of interfaces that must come together if the acquisition is to succeed." [Ref. 7]

The organizational design framework also served several other purposes for this investigation. Specifically, this framework guided development of the informal interview questions, focused the literature reviews and facilitated the arrangement of the results of this investigation.

4. PMO Organizational Design Framework

> The new job description of leaders will involve design of the organization and its policies. This will require seeing the company as a system in which the parts are not only internally connected, but also connected to the external environment, and clarifying how the whole system can work better. [Ref. 14: p. 343]

Taking this philosophy and applying it to the problem at hand, a set of organizational design elements (a.k.a. parts) and the associated external environment have been identified, developed and graphically depicted in Figure 2. As previously defined in the definition section, the center of Figure 2 contains the organizational design elements: values & beliefs; business processes; structure, jobs, and technology; and management and measurement systems. The organizational design elements have been

derived from the Business System Diamond developed by Hammer and Champy. [Ref. 12: pp. 80-81]). It is important to note that all of the organizational design elements are interrelated. Changes in one will impact the others. Therefore, the tenets developed in this investigation must be addressed from several different interrelated aspects of an

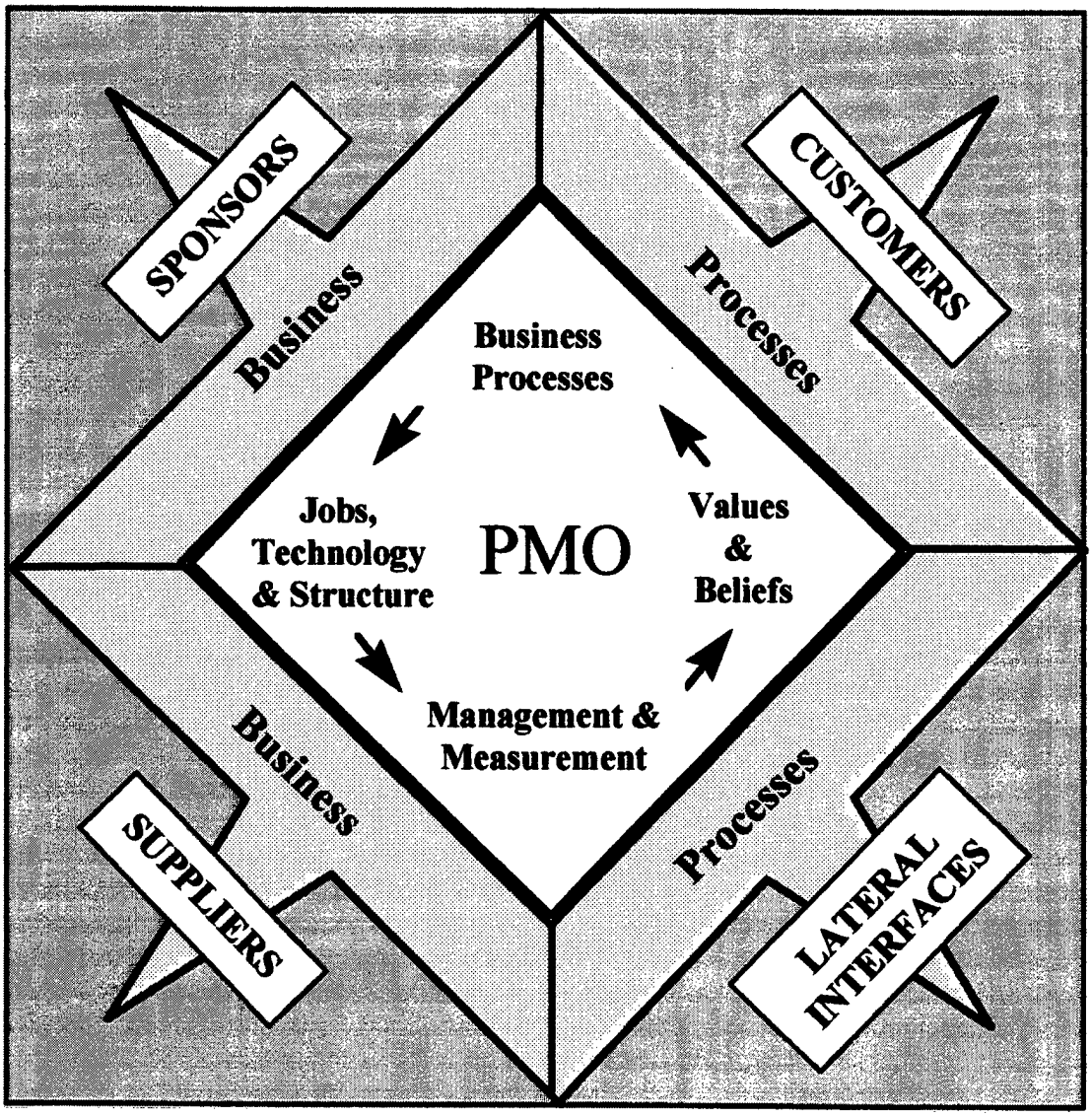

Figure 2. Organizational Design Framework

organizational design to be complete. Michael Hammer describes the interrelationship of the organizational design elements in the passage below:

> We see an organization as having four interrelated aspects. First are the processes, the mechanisms by which work is performed and value created.

> The design of business processes shapes the design of jobs and the kinds of people needed to perform them. These in turn give rise to an appropriate set of organizational structures and management systems for measuring, hiring, training and developing these people. These systems in turn include a set of attitudes, beliefs, and cultural norms defining what is important; these support the performance of the process. [Ref. 15: pp. 11-12]

The interface processes are extensions of the PMO business processes which link the PMO with its external environment to form a seamless, integrated system. These are the four primary external interface areas:

- Sponsor interfaces to include acquisition oversight under DoD 5000 series directives, and Planning Programming and Budgeting System.
- Customer interface to include user, foreign military sales, other Government PMO customer.
- Supplier interfaces to include prime contractor, and other Government suppliers (e.g., Government, test facility and technology suppliers).
- Lateral interfaces to include horizontal product integration and independent activities (e.g., operational test offices).

Many of the PMO interface processes may be performed in varying degrees and amounts by the external organizations, Government PMO personnel, or PMO support contractors.

G. ORGANIZATION OF THE THESIS

This thesis consists of seven chapters. Chapter II establishes the background of the specific issues associated with this investigation and addresses the first two subsidiary thesis questions. It provides a characterization of the changing acquisition environment influencing PMO organizational designs, overviews acquisition reform initiatives and identifies general requirements for future PMOs. Chapter II also provides a brief description of the theories and polices that govern current Army PMO organizational designs.

Chapters III through V presents the results of the literature reviews and the interviews. These chapters address the third through the fifth subsidiary questions.

Chapter VI comprises the results of the analysis conducted on the data extracted from interviews and literature searches. It identifies common opportunities, tenets and issues. Discontinuities between expectations and organizational development tenets at the various hierarchical levels in the acquisition management chain are also identified and discussed.

Chapter VII summarizes the analysis from the previous chapters. It uses the results from the investigation to draw conclusions and make recommendations. The chapter also provides recommendations for further research.

II. BACKGROUND

A gap exists between the attributes and capabilities of current PMOs and the attributes and capabilities required by PMOs as a result of a rapidly changing acquisition environment. This gap is at the heart of today's challenge to downsize PMOs. As such, this chapter focuses on characterizing the two major sources of this ever widening gap. The first section provides insight into the changing acquisition environment. Included is an overview of the acquisition reform initiatives identified as the catalyst to improve PMO efficiency and cost effectiveness. The second section addresses the organizational design legacy and policies that govern PMO structures and capabilities.

A. THE CHANGING ACQUISITION ENVIRONMENT

The acquisition environment has produced major changes that have significantly impacted the DoD research, development and acquisition systems. These changes have been a source of new PMO requirements of which "leanness" is but one requirement.

1. General

A briefing given at the last Army Acquisition Executive/Program Executive Officer Day Conference held at Ft. Hood in February 1996 explains that the Army acquisition organization is "...built on assumptions which no longer fit reality. Reality has changed, but the theory of business has not changed with it." [Ref. 16, Slide 2] The briefing goes on to address what that reality is. It compares the acquisition environment in 1986 to that in 1994 in terms of budgets, quantity of suppliers, competition, production, spin-on versus spin-off, acquisition force structure, project manager resources and available expertise as shown in Figure 3. [Ref. 16, Slide 3]

Figure 3 highlights that the changing environment demands flexibility. An equally important requirement of the environment is efficiency and cost effectiveness caused by the decrease in budgets and the associated limitations placed on the PM's resources to staff and operate his PMO. As previously discussed, the PMOs must

downsize to obtain leaner PMO structures (and supporting contractors), but the new PMO organizational designs must be flexible as well as cost effective.

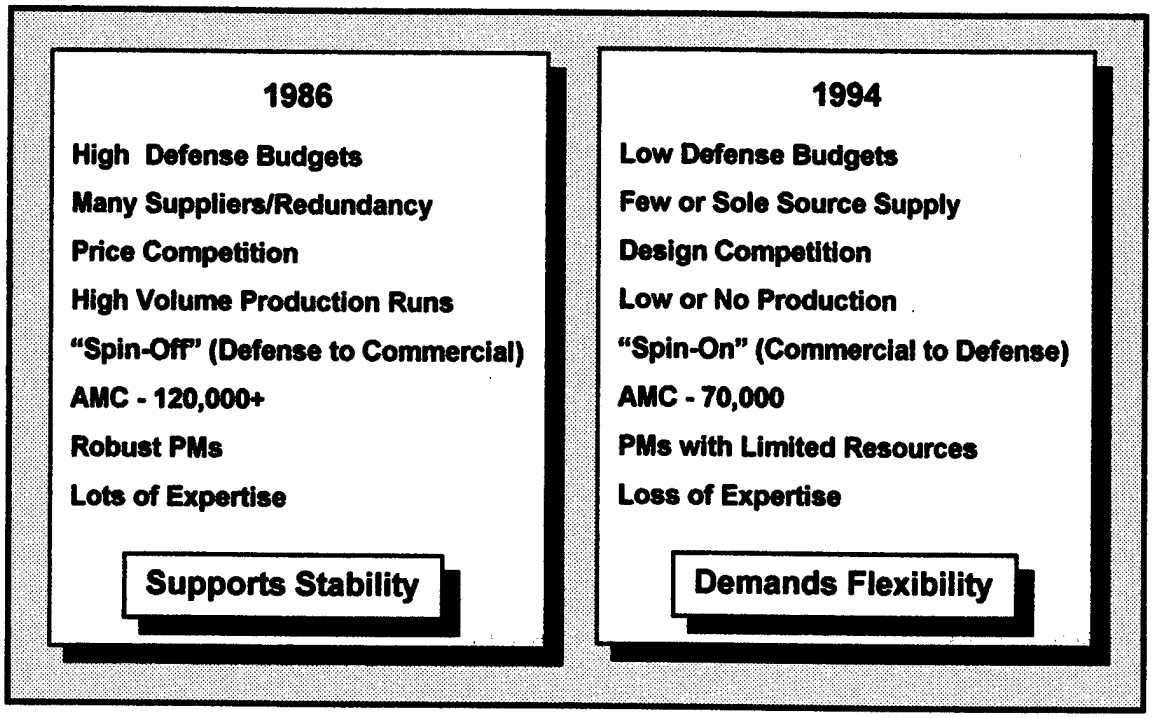

Figure 3. Comparison of the Acquisition Environment - 1986 to 1994

From the author's fifteen years of experience in DoD acquisition, Figure 3 did not recognize other very notable changes in the environment that produce new PMO requirements. In general, the nature of the acquisition projects conducted by PMOs has changed. In the mid-eighties, acquisition projects focused on developing, producing and replacing complete main-line or major weapon systems. These weapon systems absorbed large amounts of resources, deeply based on significant technological improvements (which entail greater risks), and required long development times. The new environment seems to foster acquisition projects which are either incremental improvements to the existing major weapon systems or integration of major systems into a "system-of-systems" to leverage capabilities arising from the synergy found in coordination. These projects seem to be greater in number and usually require fewer resources, emphasize commercial off-the-shelf or non-developmental solutions, and entail a much shorter development and implementation schedule. In this sort of

environment, PMOs must not only be flexible and lean, but they must also be dynamic, going from one project to another, many running concurrently, in a relatively short period of time.

Another change in the environment has been the increasing demands of the ultimate customers, the users. Since the mid-eighties, the operations tempo of the forces using the products of the acquisition system has been steadily increasing. Not only has the operations tempo been increasing, but the types of operations where the products of the acquisition system are being used have broadened in scope. The military has added peace keeping, humanitarian aid and low intensity conflicts to its currently increasing variety of operations. More use and different uses have uncovered many inadequacies that the users are wanting changed, quickly! The acquisition system must be agile and responsive to a more demanding customer.

2. Acquisition Reform

> In designing the plan (to downsize the acquisition workforce) under paragraph (1), the Secretary shall give full consideration to the process efficiencies expected to be achieved through the implementation of the Federal Acquisition Streamlining Act of 1994 (Public Law 103-355), the Federal Acquisition Reform Act of 1995 (division D of this Act), and other ongoing (Acquisition Reform) initiatives to increase the use of commercial practices and reduce contract overhead in the defense procurement system. [Ref. 3]

The mandate is clear. The PMOs redesign to meet the impending downsizing must use the tenets found in Acquisition Reform oriented laws, instructions, and policies. As summed up by Colleen Preston, the overall mission of acquisition reform is to "...emulate the best practices of world-class customers and suppliers, develop our own best practices, and become the most efficient buyer possible." [Ref. 17: p.2] To meet this mission, Dr. Perry outlined several goals:

- Strengthen and enforce the preference and purchase of commercial items.
- State requirements in terms of required performance.
- Provide for the timely infusion of new technology.

- Provide for the appropriate participation of potential suppliers when establishing the system requirements.
- Allow DoD to leverage its investment with that of the private sector.
- Streamline the acquisition process, focus on continuous process improvement, and ensure that the acquisition process is responsive to customer needs in a timely fashion.
- Provide incentives for acquisition personnel to innovate, while providing appropriate guidance and the benefit of "lessons learned" in the past.
- Be more flexible and agile to be able to respond to the constantly changing threat and the pace of technology advancements.
- Provide more funding stability and flexibility to manage programs in the best manner possible.
- Encourage innovation in products and practices, both in Government and industry, even if it will result in occasional mistakes.
- Base reductions in the acquisition infrastructure, including personnel and organizational changes, on the changes in the acquisition process, rather than to reach arbitrary targets.
- Substantially reduce the time it takes to acquire products and services.
- Make maximum use of technology to facilitate and enable re-engineering of the acquisition process.
- Establish clear measurements of system responsiveness.
- Eliminate functional stove-pipes and replace them with integrated decision teams that provide the necessary cross-section of functional expertise to address and resolve program issues at the lowest possible management level.
- Empower people by providing appropriate education and training, moving decisions to the lowest level possible, and providing appropriate guidance, not rules. [Ref. 1: pp. 9-13]

Critical to implementing these goals are the several different acquisition reform initiatives covering a broad spectrum of acquisition related topics. One set of initiatives to reform DoD contracting practices was enacted in two far reaching laws (and several policy statements) - the Federal Acquisition Streamlining Act (FASA) of 1994 and the Federal Acquisition Reform Act (FARA) of 1995. Another initiative focused on requirements' specification, commercial items and practices, and military specifications and standards. The result of this initiative fabricated Dr. Perry's policy on military specifications and standards. Yet another very important initiative is Integrated Process and Product Development (IPPD). IPPD is "the management process that integrates all activities from product concept through production/field support, using multi-functional teams, to simultaneously optimize the product and its manufacturing and sustainment processes to meet cost and performance objectives." [Ref. 18, Attachment 2] Paramount to the acquisition reform initiatives was the fundamental revision of the DoD's acquisition directives, known as the 5000-series documents, which incorporate most of the acquisition reform principles and laws. Earlier version 5000-series have governed the DoD acquisition system and culture for over 25 years. [Ref. 19: p.1]

3. The PMO's Challenge

The acquisition environment demands a more flexible, lean, agile, dynamic and responsive PMO which incorporates the tenets of acquisition reform. This rapidly changing environment with lots of reform policies must seem formidable to most PMOs. However, PMOs must "Bring the (acquisition) organization's behavior in line with the new realities of its environment." [Ref. 16, Slide 6] This challenge is complicated by the current state of PMO culture and organizational designs.

B. ARMY PROJECT MANAGEMENT OFFICES

General thought is that PMOs, like most other Government organizations, are inefficient and unresponsive. The basis of this belief comes, in major part, from the legacy of organizational designs during this country's early 20th century manufacturing corporations and from the mechanistic PMO organizational design policies. Within the

last five years the Army PMO organizational design policies produced much needed workforce savings, but they have done little to facilitate the necessary reforms and cultural shifts in response to the prevailing acquisition environment. As Theodore Bloomer, a policy analyst at the Defense Systems Management College noted, "...real leadership and cultural shifts do not occur until an irresistible force demands it." [Ref. 20: p. 23] Emerging Army PMO policy, following Congressional mandates to downsize the acquisition workforce, is the force to change the PMO organizational design.

1. The Legacy -- Bureaucracy and Specialization

Army PMOs organize and operate based on American business philosophies developed over two hundred years ago. Secretary of Defense William Perry observes:

> The existing DoD acquisition system -- not unlike that of many companies in the U.S. and around the world -- can best be characterized as an "industrial era bureaucracy in an information age." DoD and many of its suppliers are still practicing many management techniques and philosophies that were fundamentally developed by Adam Smith and Alfred Sloan. [Ref. 1]

The central idea of these early philosophies is the division or specialization of labor. This specialization of labor is deep-seated in process fragmentation into many simple standardized tasks taught quickly to workers. The larger the organization, the more fragmented the work and the more specialized the worker becomes. [Ref. 12: p. 12] Work passes between single individuals performing single tasks. The result is a fragmented process where errors and misunderstandings are inevitable. [Ref. 12: p.51] An overarching, bureaucratic structure coordinates and controls these separate tasks in an attempt to reduce misunderstandings and errors. This may be an adequate process for assembling a bicycle, but it is an inefficient method for PMOs to manage a complex project.

Despite its popular meaning, a bureaucracy, "...is a rational, systematic, and precise form of organization in which rules, regulations, and techniques of control are defined clearly." [Ref. 1: p.208] Bureaucracy is the glue that binds the fragmented processes together. [Ref. 12: p. 48] There are a significant number of the people in a

bureaucratic organization responsible solely for developing and implementing the rules and control systems to paste the fragmented work back together. As Champy and Hammer observed, "Simple tasks, demand complex processes to knit them all together, and for two hundred years companies have accepted the inconvenience, inefficiencies, and costs associated with complex processes in order to reap the benefits of simple tasks." [Ref. 12: p. 51] Secretary Perry described the characteristics of the modern organization resulting from these early philosophies:

- Specialization, leading to economies of scale, as the most efficient way to produce products;
- Rigid lines of authority and reporting;
- Creation of rules or practices to address every contingency, if possible;
- Extensive paperwork to document that appropriate actions occurred;
- Detailed design and "how-to" specifications as the only way to ensure an acceptable product, and to ensure a "level" playing field for competition;
- In-process inspections, audits and reviews as the most effective means to assure compliance with the system; and,
- Program people to conform with established procedures to ensure that systems would be predictable, workable, and safe. [Ref. 1]

The authors of the book, *Reengineering the Corporation: A Manifesto for Business Revolution,* Michael Hammer and James Champy also note that systems produced by traditional philosophies are less than perfect in today's world. Systems of this type:

- Create functional stove-piping in which no one person is accountable for an entire process;
- Result in so many hand-offs during staffing that errors and waiting time dominate the system; and,
- Make the ability of any one person to change the process small if not impossible. [Ref. 15]

Few in Government would disagree that this bureaucratic system, as described, is an integral part of our acquisition process, has ingrained itself into our culture, and has created inefficiencies in DoD acquisition process. The Carnegie Commission on Science, Technology and Government found:

> ...using an indirect measure of the cost of the DoD regulatory system, calculated that the overhead, or management and control costs, associated with the DoD acquisition process were about 40% of the DoD acquisition budget, as compared to 5% to 15% for commercial firms. This figure includes both the Government's internal costs, and the costs borne by DoD contractors and ultimately reimbursed by the Government. [Ref. 1: p. 7]

It is not unreasonable to expect that traditionally organized Government PMOs are contributors to DoD's excessively inflated overhead. According to one anonymous Headquarters, Department of the Army official, the PMO's overhead for Government and support contractor management oversight within one Army Program Executive Office (PEO) is currently 47%. [Ref. 21] Almost a half of the resources available go to non-product producing activities. While not all PEOs have such a high management oversight overhead, most are above 10%. [Ref. 21]

2. Current Army PMO Organization Design Policy

As part of the initial effort to downsize DoD, the first wave of Government acquisition workforce reductions within PMOs took place during the early 1990's. Most of these reductions resulted from eliminating vacant positions and offering early-out incentives to senior civilian employees. Subsequent reductions resulted from two mechanistic, structures-oriented policies [Ref. 22] [Ref. 23] that are essentially the same.

The most recent is a memorandum entitled *Model Program /Project /Product Management Office Organization* signed on 11 May 1994 by the Army Acquisition Executive, Mr. Decker. Mr. Decker envisioned PMO organizations that had:

- A core PMO capable of managing the program through the acquisition cycle.
- Co-located matrix support assigned to successfully assist the PMO move through an acquisition phase, e.g., Engineering-Manufacturing Development.

- Functional matrix support provided as needed, to accomplish specific tasks, e.g., maintenance engineering.
- Contractor support provided where capabilities or capacity is not otherwise available. [Ref. 23]

Mr. Decker also set forth a set of guidelines to establish a starting place from which adjustments could be made to account for a program's phase in the acquisition cycle, size, and complexity:

- PMOs should not contain more than 40 persons for a Major Defense Acquisition Program (MDAP) and 20 persons for non-MDAPs capable of accomplishing inherently Governmental functions.
- PMOs should be capable of accomplishing technical, logistics and business management functions, e.g., Planning, Programming, Budgeting and Execution System requirements.
- All division chiefs in the PMO must be on the PMO's Table of Distribution and Allowance.
- The grade of officers and civilians within an organizational element should be at least one grade below that of the immediate supervisor.
- A product manager in the PEO structure does not normally warrant a deputy. HQDA policy limits the use of deputy, executive or assistant positions to circumstances where 1) the head of the organization is frequently absent on official business, or 2) the workload justifies the additional position.
- PMO administrative staff (GS-9 and below) should not exceed 20 percent of the total staff.
- Matrix support includes its own administrative and support cell. [Ref. 23]

In most cases, PMOs accomplished the same work after downsizing, as before, with fewer people. The acquisition reform initiatives in 1994 offered opportunities to change the acquisition process. While a few situationally aware PMOs have taken advantage of the efficiency offered by acquisition reform, most PMOs have not.

3. Emerging PMO Organizational Policy

A newly emerging PMO organizational design policy is determined by the "manpower and cost associated with the direct management, control and oversight". [Ref. 5] The resulting metric is management and oversight overhead, a metric that has always been of great importance to our industry counterparts. As interpreted by the author from the available documentation, management and oversight overhead tasks are those conducted by either core, matrix or support contractor personnel to service the PMO interfaces to resource sponsors, customers, suppliers and lateral associations.

Mr. Decker, the Army Acquisition Executive, suggests that the nominal rate for industry management and oversight overhead is four to six percent. [Ref. 25] The emerging policy requires reductions in the components associated with direct management and oversight overhead to five percent for hardware heavy systems, ten percent for software intensive systems, and eight percent for hybrid systems (e.g., electronic warfare systems). [Ref. 24][Ref. 25] There are still many issues relating to this policy which need to be addressed:

- Definition of relationships between management and oversight overhead performance management and acquisition workforce manpower (position/space) management;
- Detailing of overhead components;
- Incentives to maintain or improve overhead performance;
- Relationship with current policies;
- And adequacy of current PMO resource accounting systems to monitor overhead performance.

Irrespective to the future of this emerging policy, the associated reductions will certainly have a significant impact on many PMOs. Many of the changes implemented by downsized PMOs will need to leverage the tenets associated with the acquisition reform initiatives.

III. LEAN COMMERCIAL ORGANIZATIONS

> Unlike the federal Government, businesses cannot afford to hold on to activities, people, practices, divisions, or subsidiaries that have become irrelevant to the core business, outmoded, inefficient, or a financial drain on the rest of the company. In the business world, management must determine precisely what the company should and should not be doing, and then take decisive action. If they fail to do so, they die. [Ref. 26: p. 1]

This philosophy has governed the last decade's rampant downsizing trend prevalent in this country's commercial industries. In fact, "more than 85 percent of the Fortune 1000 firms initiated major reductions between 1987 and 1991, affecting more than five million jobs." [Ref. 27: p. 18] This chapter taps into the considerable knowledge and experience amassed from these commercial downsizing efforts to identify the downsizing tenets applied within commercial organizations.

A. TENETS OF LEAN COMMERCIAL ORGANIZATIONS

Four principles emerged from the data collection and reduction process:

- Right-sizing through a "systems approach",
- Reengineering work processes,
- Flattening organizational structures, and
- Employing information technologies.

These principles contain constituent supporting tenets identified as part of the data reduction process.

1. Right-sizing Through a "Systems Approach"

Research conduct by Michael Hitt and associates on a large number of corporations "...suggests that fewer than half of the downsized companies achieved a reduction in overall expenditures." [Ref. 27: p. 18] Businesses and other human endeavors are systems bound by the invisible fabrics of interrelated actions. [Ref. 14: p. 7] Changes to one part of the organizational system ultimately impact the other parts, many times in unintended and detrimental ways. Peter Senge observes that "...we tend to

focus on snapshots of isolated parts of the system, and wonder why our deepest problems never seem to get solved." [Ref. 14: p. 7] Across-the-board downsizing, so often sought to equitably "spread the pain", very rarely considers little more than staff size and budget.

Right-sizing is a strategic approach that considers the various interrelated aspects of an organizational system. Right-sizing, as defined by Michael Hitt and associates,

> ...is an integrated, internally consistent and externally legitimated configuration of organizational processes, products, and people based on shared vision of the future of the organization and a clearly articulated mission and strategy supported by management, well understood by the members of the organization, and in which members have a sense of "ownership". A strategic approach to right-sizing requires a continuous analysis of the organization's mission and long-term strategies, actions required to implement them and the skills and people necessary to perform those processes, the type of incentive system necessary to support those behaviors, and so on. [Ref. 27: p.19]

Right-sizing relies on several tenets that were common throughout the literature research; strategic planning and analysis, system thinking, and continuous monitoring and improvement.

Strategic planning and analysis addresses longer term goals/objectives which guide short-term actions. Strategy is a plan of action defining how an organization will use its resources and typically determines the functions it will perform, the products and services it will produce and the markets it will serve. [Ref. 32: p. 49] Chief Executive Officer (CEO) Mark De Michele of Arizona Public Service Company (APS), provides an insight into strategic planning,

> (When restructuring is)...carried out with an eye toward reducing head count and expenses by some arbitrary percentages, employees invariably respond by trying to protect their own positions and security. Goals fall by the wayside. But when restructuring is driven by strategy, the company can emerge revitalized. (It)...requires that the most capable employees recognize the competition confronting their organization and see that management is committed to implementing a positive strategy, decisively and fairly, to build a stronger company, not just a smaller one. [Ref. 28: p. 82]

Mr. De Michele goes on to say,

> ...their initial goal was to determine what kind of organization would best enable employees to implement a new strategic plan. Work force reductions, to the extent they were required, were the outcome, not the objective. [Ref. 28: p. 84]

The results of strategic planning conducted by APS were highly successful. In three years APS went from struggling with high cost, low customer satisfaction, and insensitive bureaucracy to one of the best power companies in the United States. [Ref. 28: p. 82]

Underpinning strategic planning are the supporting tenets listed below:

- *Determine the "core" business functions* to be performed. All other activities should be scrutinized for elimination, downsizing, reorganization, movement to state and local Governments, or privatization. [Ref. 26: p. 2] As part of the GAO report on downsizing strategies, "...one company (official) pointed out that simply reducing staff does not make the work they were doing go away, but with proper planning, downsizing can be targeted to specific skills the organization no longer needs in its revised structure." [Ref. 29]
- *Identify and protect core competencies.* Competencies are the knowledge, skills and personal qualities that uniquely distinguish one company from their competition. Competencies describe what is necessary for accomplishing a job. [Ref. 28: p. 86]
- *Involve teams of employees*, where it is possible, in planning for restructuring. [Ref. 30: p. 9]
- *Involve partners.* Strategy development must accommodate formal processes to ensure alignment of strategic objectives with partners. [Ref. 31: p. 129]
- *Identify the desired culture* (values and beliefs) to foster lean organizations. Consider the actions needed to drive toward the culture that is envisioned. For example, changes may be necessary in job expectations, performance evaluation, and compensation strategies to foster the appropriate culture. [Ref. 30: p. 9]

Use a systems approach to develop and assess strategic options/plans and organizational designs. Organizations break down, despite individual brilliance and innovative products, because they are unable to pull their diverse functions and talents into a productive whole. [Ref. 14: p.70] Systems thinking is "a shift of mind from seeing parts to seeing wholes". [Ref. 14: p. 69] Susan Mohrman and Thomas Cummings, in their book *Self Designing Organizations*, go further in defining "the systemic nature of organizational change":

> Organizational design components form a system, with changes in one element affecting the others. Because the components need to mutually reinforce high performance (or any other strategic goal for that matter), they must be designed as a system of interacting parts. The design of each element must be consistent with the design of the others. [Ref. 32: p. 31]

There are many different "systems" models of organizations that identify the various organizational design components and their interrelationships. [Ref. 15, 31, 32, 33, 34] However, it is Peter Senge that points out that the real power in systems thinking lies in "seeing interrelationships rather than linear cause and effect chains and seeing processes of change rather than snapshots." [Ref. 15: p.73]

Institute continuous monitoring and improvement. Donald Rumsfeld, a veteran of corporate restructuring warns,

> After the reductions have been accomplished, don't turn your head for a second, or you will find the waste moving right back in. It is inevitable that it will happen, and fast, unless the managers are vigilant. As the saying goes, "If you're coasting, you're going down hill." [Ref. 26: p. 3]

Change must be understood as continuous rather than a single event. [Ref. 27: p. 20] Restructuring is part of an overall continuous improvement process. The competencies of the existing workforce do not always match the competencies needed for new strategies or new phases which the program will enter. [Ref. 30: p. 9] Furthermore, decisions must continually be reevaluated in the context of the firm's performance, competitor's actions, and future potential. [Ref. 27] One researcher went as far to say,

"The need to reduce the waste and inefficiency that builds up over time in organizations is as necessary as a periodic tune-up for an automobile or a workout to reduce body fat." [Ref. 31: p 1]

2. Reengineering Work

> ...if an organization simply reduces the number of its employees without changing its work processes, staffing growth will recur eventually. Indeed, a 1993 survey by the Wyatt Company, which summarized the restructuring practices of 531 U.S. companies, found that only 17 percent of the companies that downsized succeeded in cutting back without later replacing more than 10 percent of the employees they had dismissed. [Ref. 29]

Reengineering, as defined by Hammer and Champy in their book *Reengineering the Corporation*, "is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical...measures of performance" (i.e., PMO overhead). [Ref. 15: p.46] The focus is the re-integration of fragmented business processes. Out of the reintegration comes the elimination, or at least significant reduction, of bureaucratic and non-value-added tasks/processes.

> Most of the checking, reconciling, waiting, monitoring, tracking - the unproductive work that exists because of the boundaries within an organization (or even external to the organization) and to compensate for process fragmentation - is eliminated by reengineering. [Ref. 15: p. 69]

Additional tenets associated with reengineering work processes are identified and discussed in the following paragraphs.

Change Jobs to Multi-Dimensional Work. The basic premise of reengineering is that jobs -- and the workers who perform them -- should be complex, knowledge-based and holistic so that the command and control aspects can be as simple as possible. [Ref. 35: p. 53] By allowing one person to perform multiple tasks, of perhaps a diverse nature, several jobs can be combined into one. Several supporting tenets are listed below:

- *No rigid job descriptions.* [Ref. 33: p. 147] Employ competency-based position descriptions that communicate future corporate needs. The job description would list minimum requirements, major accountabilities and critical competencies. [Ref. 28: p.147]
- *Job preparation changes - from training to education.* [Ref. 15: p. 71] "If jobs in reengineered processes require that people not follow rules, but rather that they exercise judgment in order to do the right thing, then employees need sufficient education so that they can discern for themselves what that right thing is." [Ref. 15: p. 71]
- *Job rotation* to develop multiple skills and operational flexibility. [Ref. 28: p. 148]
- *Cross-functional teams* as a mechanism to balance the individual needs for variety and support with the work needs for consistency and dependability. [Ref. 28: p. 148] In a lean organizational environment, cooperative teamwork is necessary to accomplish the multiple interdependent tasks. [Ref. 27: p. 26]

Perform work where it makes the most sense. Work is shifted across organizational boundaries to improve overall process performance. [Ref. 15: p.57] This shift can be to or from suppliers, customers, and/or lateral interfaces. Shifting work through outsourcing of non-core competencies or core businesses should be a technique to be considered. [Ref. 36: p. 33]

Reduce checks and controls. Hammer and Champy propose that,

> Instead of tightly checking work as it is performed, reengineered processes often have aggregate or deferred controls. These control systems will, by design, tolerate modest and limited abuse, by delaying the point at which abuse is detected or by examining aggregate patterns rather than individual instances. [Ref. 15: p. 58]

3. Flattening Organizational Structures

As a result of in-depth interviews with 65 executives that had just gone through an organizational downsizing, "An overwhelming 76 percent of the firm executives stated that a goal for their firm's downsizing was to reduce layers from the organizational

structure." [Ref. 27: p. 23] Flattened organizational structures rely on delayering the hierarchical structure found in most organizations today. Michael Hitt and associates observe that delayering, "...reduces the number of levels (and numbers of management and supporting staff) between the bottom of the organization and the top and provides the opportunity to de-centralize and make decisions more quickly and effectively." [Ref. 27: p. 25] Additionally, "when a whole process becomes the work of a team, management becomes part of the team's job." [Ref. 15: p. 77] Eliminating layers of management is not usually an end-unto-itself. A flattened organization relies on many other tenets to make it viable.

- *Cross-functional/boundary work teams* relying on lateral interactions. [Ref. 15] [Ref. 27] [Ref. 31] [Ref. 33] [Ref. 37]
- *Empowered team members* with the responsibility and authority to make decisions. [Ref. 15] [Ref. 27] [Ref. 31] [Ref. 33] [Ref. 37]
- *Managers who "coach" vs. supervise*, thus substantially increasing the manager to worker ratio. [Ref. 15: p. 79]
- *Advancement in level is tied to ability* (to fulfill desired corporate competencies) not work performance. [Ref. 15] [Ref. 31]

4. Employing Information Technologies

"Shared information systems, and data bases, computer networks, distributed information, and common languages are important integrative mechanisms." [Ref. 31: p. 133] Information technology is an enabler for very efficient forms of reengineered processes and lean, flattened organizational structures. Additionally, information technology increasingly enables companies to operate as though their individual units were fully autonomous, while the organization still enjoys the economies of scale that centralization creates." [Ref. 15: p. 63] James Quinn and Penny Paquette found as part of their research that technology "...often disintermediates costly organizational bureaucracies, dramatically lowers overhead costs, supports rapid execution of strategies, and substantially increases the system's customer responsiveness." [Ref. 38]

Though not a complete list, some of the more important supporting tenets associated with a lean organization's use of technology are listed below.

- *Implement technology as a part of reengineering.* Several case studies show the benefits of such synergy. [Ref. 15: pp. 81-101]
- Use *shared data bases* across organizational boundaries to eliminate duplicate processing and storage.
- Use technology to foster *virtual teams* which give people working in large and scattered organizations the same freedom of interaction and information exchange as is enjoyed by a small team working in the same room.
- *Employ expert systems* that will allow generalists to leverage the knowledge of specialists. [Ref. 31: p.49]

B. COMMERCIAL PROJECT MANAGEMENT PROCESSES

Project management is a subset of the activities found in both commercial and DoD PMOs. The commercial world has defined a minimum set of generally accepted processes which govern project management offices. They are found in the Project Management Institute's (PMI) *A Guide to the Project Management Body of Knowledge (PMBOK)* and reiterated in the International Standards Organization standard *ISO/CD 10006 - Guideline to Quality in Project Management.*

Figure 4 graphically represents the relationship of PMI's PMBOK with project management, general management and application area disciplines. General management is defined by PMI as "encompassing planning, organizing, staffing, executing and controlling the operations of an ongoing enterprise." [Ref. 39: p.8] "A project is a temporary endeavor undertaken to create a unique product or service." [Ref. 39: p. 4] And, project management is the application of knowledge (to include processes), skills, tools and techniques to project activities. [Ref. 39: p. 6] Application areas are defined as, "...categories of projects that have common elements significant in such projects but not needed or present in all projects." [Ref. 39: p. 8] An application area is normally specific to a particular type of PMO (e.g., Government, software

development, construction). The PMBOK identifies the overall set of project management, general management and applications area specific knowledge, processes and practices that are generally accepted to be "applicable to most projects most of the time." [Ref. 39: p. 3]

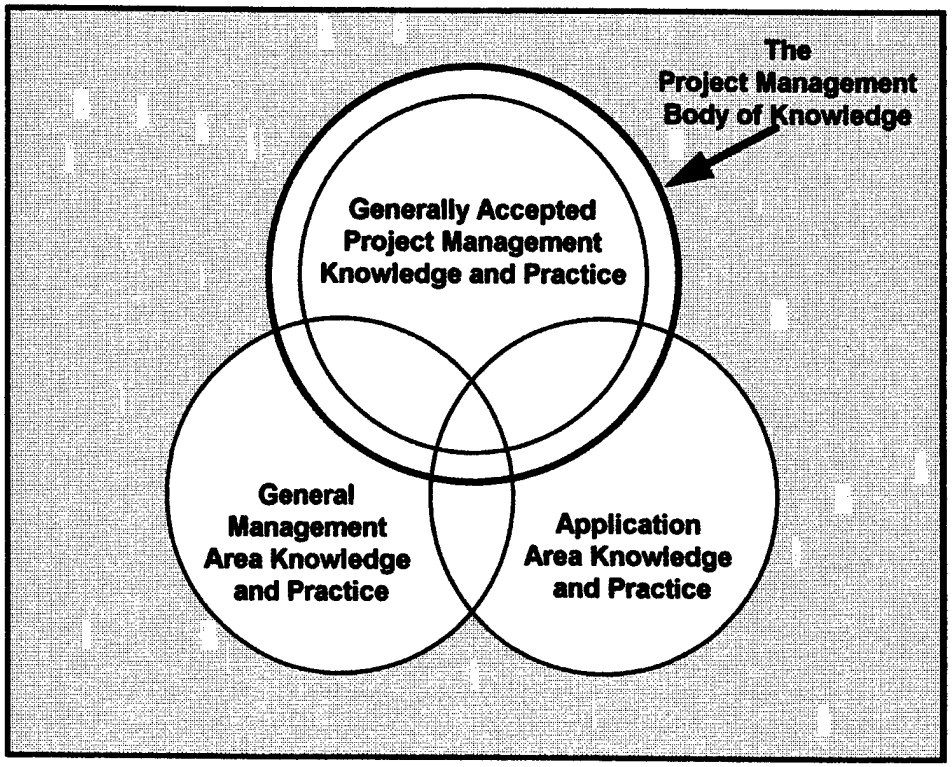

Figure 4. Relationship of Project Management to Other Disciplines [Ref. 39: p. 9]

The PMBOK identifies and arranges project management processes into five interrelated top-level process groups as seen in Figure 5. Each of these five process groups is defined below:

- Initiating processes - recognizes that a project or phase should begin and committed to do so.
- Planning processes - devises and maintains a workable scheme to accomplish the business need that the project was undertaken to address.
- Executing processes - coordinates people and other resources to carry out the plan.
- Controlling processes - ensures that project objectives are met by monitoring and measuring progress and taking corrective action when necessary.
- Closing processes - formalizes acceptance of the project or phase and bringing it to an orderly end. [Ref. 39: p. 28]

Each process group is composed of one or more interacting processes. Detailed decomposition of each of the five process groups can be found in Appendix B.

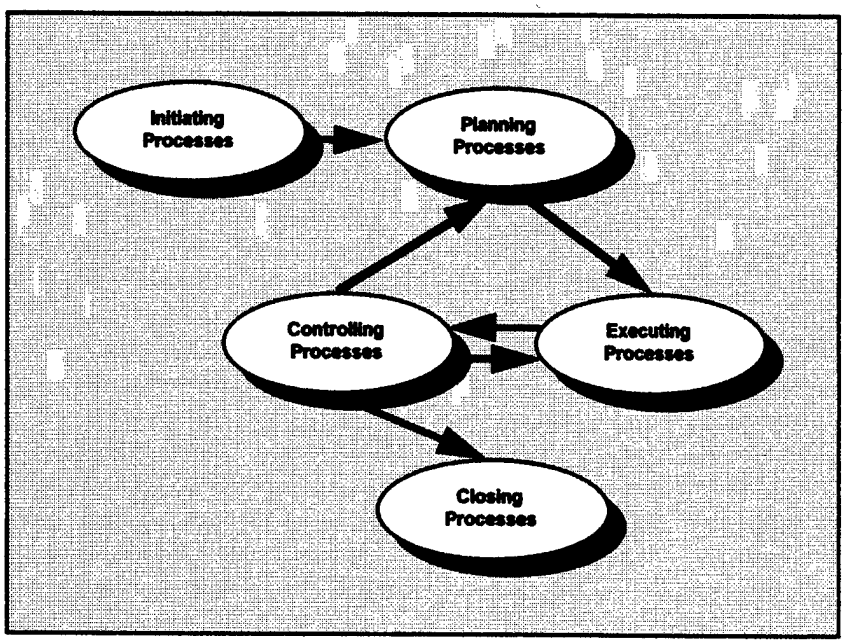

Figure 5. PMBOK Process Groups [Ref. 39: p. 28]

For the purpose of education and certification testing, PMI uses a framework of knowledge areas that capture all of the project management processes into like areas. These can be found in Figure 6 below.

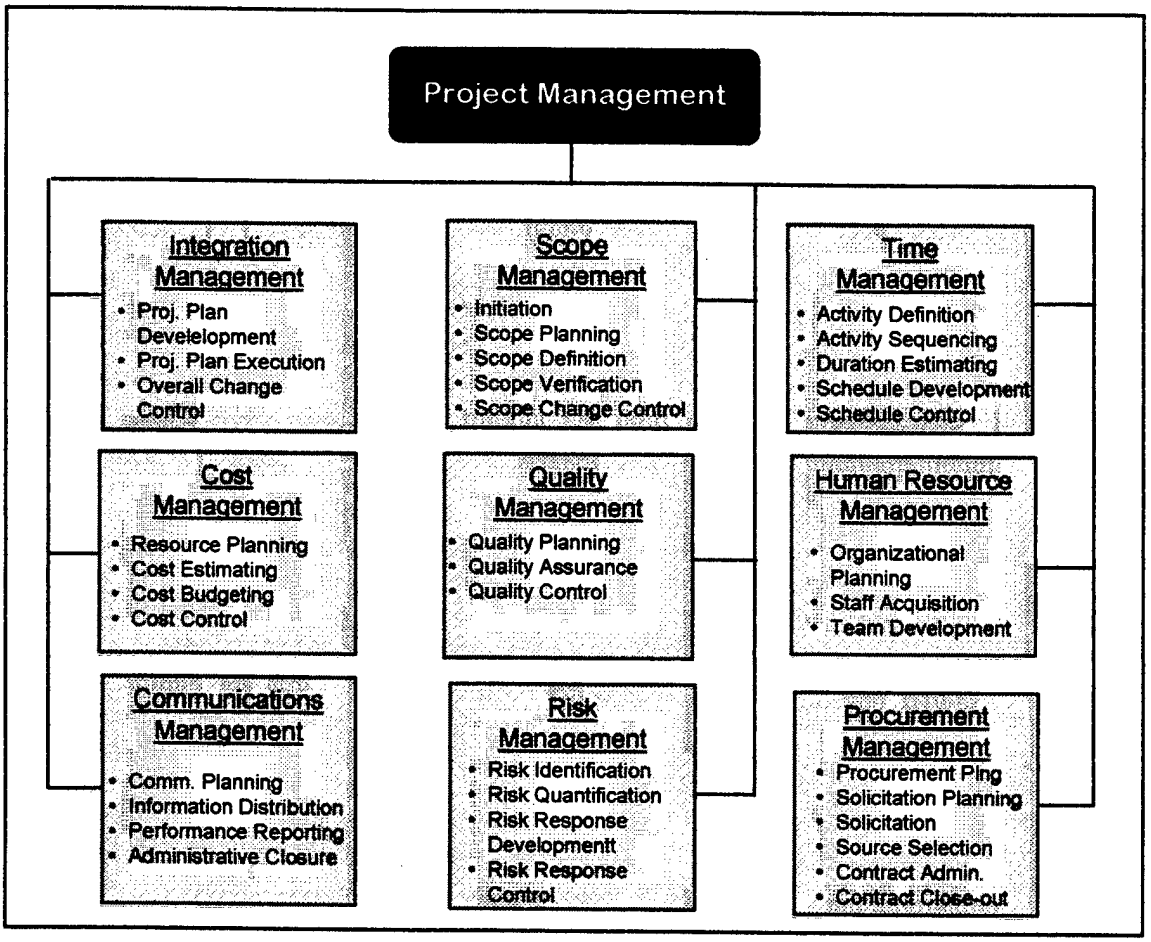

Figure 6. The Project Management Framework [Ref. 39: p. 7]

IV. LEAN MILITARY ORGANIZATIONS

A. SOURCES

The investigation of tenets used to obtain lean military PMOs encompassed a broad spectrum of DoD activities associated with a myriad of DoD and Service organizations. This investigation uncovered three sources which were keys to identification of these tenets and warrant further description.

1. Downsizing Air Force System Program Offices (SPO)

In May of 1995, the Acting Assistant Secretary of the Air Force for Acquisition, Darleen A. Druyun, issued eight "Lightning Bolt" initiatives to implement acquisition reform. With workforce reductions impending, Lightning Bolt #3, System Program Office (SPO, also known as PMO) Downsizing Tenets, investigated acquisition reform as an opportunity to dramatically reduce Air Force SPO size by implementing streamlining initiatives. [Ref. 9: p. 1] The objective was to develop "...a 'toolbox' of tenets to assist the System Program Director (Single Managers) in restructuring their programs in the streamlined environment." [Ref. 9: p.1] The Air Force has made it their goal to reduce Government and contractor resources to "...140 people in large development SPOs and 50 people in large production SPOs." [Ref. 9: p.1]

Two integrated process teams (IPTs) implemented the Lightning Bolt #3 initiative. The first team reviewed the concept of operations and tenets of highly classified "black world" programs. The second IPT reviewed all of the current reengineering, reform, and streamlining initiatives implemented by each of the nine Air Force Material Command's Product and Logistic Centers. [Ref. 9: p. 4] As part of the Air Forces' data collection process, they conducted several conferences, workshops, and industry round tables.

Three products from the Lightning Bolt #3 initiative were extensively used by the author in the conduct of this investigation. The primary product used was a comprehensive final report entitled, *Tenets to Assist the System Program Director*

Achieve Efficiencies in Operations and Reductions in Manpower. Additionally, the author obtained, assessed and incorporated the results from two industry round-table meetings associated with the Lightning Bolt #3 initiative.

2. Acquisition Reform

The investigation of tenets associated with acquisition reform encompassed a broad spectrum of documentation. Pertinent documentation included magazine articles, newsletters, informal and formal reports, electronic mail messages, DoD and Service policies, and United States law. Two areas were of significance -- the Pilot Program Consulting Group's (PPCG) 1995 interim report on the Defense Acquisition Pilot Programs (DAPPs) and new 5000-series directives.

The DAPPs are five statutory and two regulatory DOD programs charged by the Under Secretary of Defense for Acquisition and Technology (USD(A&T)) to "...demonstrate new and innovative approaches in the use of commercial practices and the acquisition of commercial products." [Ref. 40: p. ES-1] The five programs listed below were designated statutory DAPPs on 15 December 1994:

- Joint Direct Attack Munition (JDAM)
  (Air Force/ Navy Category ID)
- Fire Support Combined Arms Tactical Trainer (FSCATT)
  (Army Category III)
- Joint Primary Aircraft Training System (JPATS)
  (Air Force/ Navy Category IC)
- Commercial Derivative Engine (CDE)
  (Air Force Category ID)
- Commercial Derivative Aircraft (CDA)/ Non-Developmental Airlift Aircraft (NDAA)
  (Air Force Category ID) [Ref. 40: p. ES-1]

The purpose of the DAPPs is to serve as trailblazers in implementing the broader provisions of the Federal Acquisition Streamlining Act of 1994 (FASA '94) and providing results and lessons learned for subsequent DoD-wide implementation. [Ref. 40: p. 1-7]

According to the Pilot Program Consulting Group's (PPCG) 1995 report on the DAPPs,

> Results to date... show that acquisition reform contributes to reduced contract costs, improved development and delivery schedules, and substantial gains in in-house efficiencies. Furthermore, these results appear to apply across a wide-range of DoD weapon systems. [Ref. 40, ES-1]

Table 1 quantified the key results obtained by the DAPPs to date. The highlighted cells in the table point out the reductions of program office staffing associated with the acquisition reforms implemented.

Table 1. NTH/DAPP Key Results (Percent Reductions from Baselines)

[Ref. 40: pp. ES-3, 2-15, 3-11, 4-9, 5-3, & 6-3]

Key Measure	NTH	JDAM	FSCATT	JPATS	NDAA	CDE
Mil Specs/Standards	100%	100%	100%	47%	100%	100%
CDRLs*	44%	89%	84%	60%	98%	#
Contract Costs	3.5%	50%	13.5%	**	#	#
Program Office Staffing	~60%	26% (86=> 64)	27.3% (11=> 8)	50% (140=> 74)	79% (150=> 32)	42% (36=> 21)
Contract Schedule	#	35%	33%	8%	#	#

* Contract Data Requirements Lists (CDRLs)
** Not available due to ongoing protest
# Not available

The report's analysis drew a correlation between the implementation of acquisition reforms and the subsequent staff reductions in PMO staff. When used in concert with other DAPPs reported documentation, this report yields several valuable tenets.

The new 5000-series directives -- DoD Directive 5000.1 and DoD Regulation 5000.2-R -- incorporate new laws, policies and principles associated with many Acquisition Reform initiatives. The major laws and policies in the new 5000-series

include the Federal Acquisition Streamlining Act (FASA) of 1994 and the institutionalization of Integrated Product Teams (IPTs). [Ref. 24: p.1] The new directives provide a general reduction in the defense acquisition bureaucracy. Specifically, in response to the President's Executive Order 12861 to reduce the volume of internal regulatory guidance, DoD 5000.1 and DoD 5000.2-R have been significantly reduced in length and complexity. [Ref. 25: p. 2] The 5000-series contains the primary policies and principles for all DoD acquisition programs and contain several key tenets which support lean PMOs.

3. "Black World" Projects

Noted in the Air Force's Lightning Bolt #3 report, "The concept of Special Access Required (SAR) acquisition management has become synonymous with acquiring DOD weapon systems both quickly and successfully with small program office teams." [Ref. 9: p. 1] These "black world" projects have been publicly associated with such famous "skunk works" type projects as the SR-71 Blackbird, the F-117 stealth fighter and the Corona space reconnaissance programs. Relatively small teams managed all of these important acquisition programs.

This part of the investigation relied on the growing amount of publicly available literature on black world programs, Air Force's Lightning Bolt #3 report comments from four major defense contractors who have good performance track records performing SAR programs, and this author's own personal knowledge.

B. CORE PMO PROCESSES

Identification and definition of work processes determine what we expect a PMO to do and subsequently, what organization is necessary to implement that work. There are many schools of thought and opinions on this subject. It seems that most agree that the work to be done is a function of the specific project under consideration, the required responsibilities in the acquisition directives and regulations, and the required Governmental responsibilities defined in policies concerning inherently Governmental functions. The responsibilities found in the acquisition directives govern the existence of

many, but not all, of the processes found in the PMO managed programs/ projects. The inherently Governmental functions dictate what minimum set of these processes must be retained by the Government portion of the PMO.

1. Responsibilities Found in DoD Acquisition Regulations

DoD Regulation 5000.2-R, *Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs*, identifies a set of elements necessary to structure a successful program. [Ref. 41: p. X3.1] These elements dictate responsibilities that govern programs managed by a MDAP or MAIS PMO. DoD Regulation 5000.2-R also "serves as a general model for other than MDAPs or MAISs." [Re. 41: p. 1] The following paragraphs identify and overview the responsibilities found in DoD 5000.2-R. Although a fairly comprehensive list of responsibilities, there are at least three major responsibilities not explicitly covered -- planning, programming, and budget system (PPBS); interfaces to Congress, media, etc.; and contracting.

Establish program goals. "Every acquisition program shall establish program goals for the minimum number of cost, schedule, and performance parameters that describe the program." [Ref. 41: p. 23]

Develop and maintain acquisition strategy. Each Project Manager (PM) is responsible for developing and documenting an acquisition strategy, in an iterative fashion. This strategy serves as the road map for program execution from program initiation through post-production support. [Ref. 41: p. 25] "A primary goal in developing an acquisition strategy shall be to minimize the time and cost of satisfying an identified, validated need, consistent with common sense and sound business practices." [Ref. 41: p. 25]

Develop a cost, schedule, and management program for performance risk. The PM must establish a risk management program to identify and control performance, cost, and schedule risks. [Ref. 41: p. 28]

Conduct a test and evaluation program. The PM's test and evaluation (T&E) program must integrate all developmental test and evaluation (DT&E), operational test and evaluation (OT&E), live-fire test and evaluation (LFT&E), and modeling and simulation activities. This requires a closely coordinated T&E integration with different agencies for an efficient continuum. [Ref. 41: p. 36]

Conduct Life-Cycle Resource Estimating. The PMO must prepare a life-cycle cost estimate for all ACAT I and IA programs. This is necessary to support of program initiation (usually Milestone I) and all subsequent milestone reviews. Additionally, the Component's manpower authority prepares a manpower estimate for ACAT I programs in support of Milestone II and Milestone III. [Ref. 41: p. 43]

Program Planning and Execution. Program plans describe details of activities necessary to carry out the strategies addressed above and to manage program execution throughout the life-cycle of the program. [Ref. 41: p. 45]

Systems Engineering. "The Program Manager shall ensure that a systems engineering process is used to translate operational needs and/or requirements into a system solution that includes the design, manufacturing, test and evaluation, and support processes and products." [Ref. 41: p. 47] The systems engineering process:

- Ensures the compatibility, interoperability and integration of all functional and *physical interfaces* and the establishment of *interface controls.*
- *Characterizes and manages technical risks.*
- *Conducts trade-off studies* among requirements (operational, functional and performance), design alternatives and their related manufacturing, testing and support processes, program schedule and life-cycle cost. The studies should be at the appropriate level of detail to support decision-making and lead to a proper balance between performance and cost.
- Controls the system products, processes and related documentation through a *configuration management process.*

- Captures and controls the technical baseline (configuration documentation, technical data, and technical manuals) through an *integrated data management system.*
- *Establishes performance metrics* to measure how well the technical development and design are evolving.
- Contains a *structured review process* to demonstrate and confirm completion of required accomplishments.

The new DoD 5000.2 R considers the following part of the systems engineering process as PM areas of responsibility:

- *Acquisition Logistics* -- "The PM shall conduct acquisition logistics management activities throughout the system development." [Ref. 41: p. 49]
- *Software Engineering* -- "Software shall be managed and engineered, to include ensuring that information warfare risks have been assessed." [Ref. 41: p. 51]
- *Reliability, Maintainability and Availability* -- "The PM shall ensure that reliability, maintainability, and availability activities are established early in the acquisition cycle to assure meeting operational requirements and reduced life-cycle ownership cost." [Ref. 41: p. 52]
- *Environment, Safety, and Health* -- "All programs, regardless of acquisition category, shall be conducted in accordance with applicable federal, state, interstate, and local environmental laws and regulations, Executive Orders, treaties, and agreements." [Ref. 41: p. 52]
- *Human Systems Integration* -- "A comprehensive management and technical strategy for human systems integration shall be initiated early in the acquisition process." [Ref. 41: p. 54]

Program Protection. Program protection planning begins early in the acquisition life-cycle. The PM must update this plan as required to identify elements of the program, classified or unclassified, that require protection. This prevents unauthorized disclosure or inadvertent transfer of critical program technology or information. [Ref. 41: p. 55]

Information Systems Security. Establish system security requirements and maintain throughout the acquisition life-cycle to preserve integrity, availability, and confidentiality of critical program technology and information. [Ref. 41: p. 56]

Electromagnetic Environmental Effects (E3) and Spectrum Management. All activities must ensure that designs of electric or electronic systems are mutually compatible with other electric or electronic equipment within their expected operational environment. [Ref. 41: p. 56]

Value Engineering. PM applies Value Engineering to projects and programs as required by Office of Management and Budget Circular A-131. [Ref. 41: p. 56]

Program Assessments & Decision Reviews. PM establishes mandatory policies and procedures for conducting periodic assessments and milestone decision reviews of Acquisition Category (ACAT) I and ACAT IA programs. [Ref. 41: p. 58] Similar policies for programs under Army milestone decision authority are in place.

Periodic Reporting. Periodic reports provide Milestone Decision Authorities (MDAs) with adequate information to oversee the acquisition process and make necessary decisions. [Ref. 41: p. 63]

2. Inherently Governmental Functions

The researched policies address the unacceptable transfer of official responsibility, inherently Governmental functions, to Government contractors. Not all PMO functions may be performed by contractors. However, many civil service functions "historically performed" in the past due to the belief that the function was inherently Governmental are not now performed. "In fact, the premise of Circular No. A-76 is that many functions historically performed by Government employees can more appropriately be performed by the private sector." [Ref. 13]

The Office of Federal Procurement Policy (OFPP) Policy 92-1 defines an "inherently Governmental function" as,

> ... a function that is so intimately related to the public interest as to mandate performance by Government employees. These functions include those activities that require either the exercise of discretion in applying Government authority or the making of value judgments in making decisions for the Government. Governmental functions normally fall into two categories: (1) the act of governing, i.e., the discretionary exercise of Government authority, and (2) monetary transactions and entitlements. [Ref. 13]

Inherently Governmental functions do not normally "include gathering information for or providing advice, opinions, recommendations, or ideas to Government officials." [Ref. 13] While approval of a Government document is an inherently Governmental function, drafting of that document is not necessarily such a function unless there is an appearance of a conflict of interest. [Ref. 13]

Appendix C contains two lists from the OFPP policy: (1) a list of inherently Governmental functions and (2) another list of services and actions not considered to be inherently Governmental in nature but they approach that category due to their nature.

The OFPP policy addresses the extent of reliance on which service contractors may perform functions which approach being inherently Governmental in nature:

> (Reliance) is not by itself a cause for concern. Agencies must, however, have a sufficient number of trained and experienced staff to manage Government programs properly. The greater the degree of reliance on contractors, the greater the need for oversight by agencies. What number of Government officials is needed to oversee a particular contract is a management decision to be made after analysis of a number of factors. These include, among others, the scope of the activity in question; the technical complexity of the project or its components; the technical capability, numbers, and workload of Federal oversight officials; the inspection techniques available; and the importance of the activity. [Ref. 13]

3. Minimum Core Functions

The Air Force senior leadership "... determined that only certain functions must be retained by an Air Force System Program Office (SPO, an Air Force PMO), while all

others could be sourced through the prime contractor, support contractors, or eliminated completely." [Ref. 9: p.5] The Air Force identified and defined four areas where a SPO performs "inherently Governmental functions" [Ref. 9: p.5]:

- Program Management - Understanding and managing risk through evaluation of program cost, schedule, and performance. A key component of this area is technical assessment -- determining pass or fail of intermediate and final test criteria.
- Budgeting and Financial Management - Programming for, obligation of, and accounting for SPO funds.
- Requirements Determination - Setting the quality, quantity, and performance characteristics required from a procurement.
- Contracting - Processing of the contractual documentation and paying the Government obligation for provided materiel and/or services.

The Air Force's list is surprisingly close to another list of areas where inherently Governmental functions are performed. The other list was offered by Gary Christle in an electronic mail message about how to reduce PMO staffing (including matrix or IPT functional support) [Ref. 42: p.1]:

- Systems engineering (turning requirements into specs);
- Contracting (turning specs into a contract);
- Budget/financial (PPBS is a fact of life);
- Oversight of contract execution (measuring and monitoring progress, not managing detailed execution).

The four areas identified in both lists above contain many sub-functions that are not "inherently Governmental functions" as defined by the Office of Federal Procurement Policy Letter 92-1, Inherently Governmental Functions. Many non-inherently Governmental functions are lucrative areas where short-term service contracting could be beneficial to the Government. For example, support contractor services are frequently used to provide technical and administration services during the source selection process of the contracting function.

Mr. Decker tasked the Army Program Executive Officers to capture the core competencies associated with PMOs and PEOs. The result is the closest analog the Army has to a list of the core functions and contains a superset of the core functions found in the two lists presented above. [Ref. 43] There was more emphasis in this report on the logistics and engineering aspects of the acquisition responsibilities.

C. LEAN PMO TENETS

The review of the literature for lean military PMO tenets was a significant undertaking, uncovering a large number of obvious and not-so-obvious tenets. The following sections combine the results of this search and review into the eleven principal tenets:

- Reduce oversight of contractor.
- Streamline Contracts
- Maximize Teaming Efforts
- Conduct Process Reengineering
- Tailor Oversight of PMO
- Leverage the System Definition
- Minimize Contract Data Requirements List (CDRLs)
- Reduce Engineering
- Leverage Developmental Test & Evaluation (DT&E) Alternatives
- Use Flat Organizational Structures
- Use Information Technology

Within each of these principal tenets, supporting tenets are described.

1. Reduce Oversight of Contractor

Gain insight versus oversight. PMOs reduce oversight by concentrating on obtaining insight. PMOs gain insight through understanding and verifying contractor processes through periodic review of contractor metrics and participation in contractor process teams. [Ref. 9: p.6] Dr. Perry in his memo, *Specifications and Standards - A*

New Way of Doing Business, noted that direct Government oversight can be reduced "...by substituting process controls and non-Government standards in place of development and/ or production test, inspection, and military-unique quality assurance systems." [Ref. 44: p.4] Government staff savings can be reaped by not performing PMO functions that the contractor can and does perform well. The Government relinquishes process control to the contractor, moves away from mandatory Government inspections and concentrates on statistically out of control processes. [Ref. 9: p. 8] This statistical process control relies on a minimum set of "value-added" metrics which the Government approves and monitors. [Ref. 9: p. 12] This concept has been a fundamental tenet in many black world programs developed in lean "skunk works" environments. [Ref. 47] Fundamental beliefs in open, collaborative, non-adversarial and trusting Government-contractor relationships are essential.

Industry identified the following supporting tenets when asked the question by the Air Force -- "What should the Government do to have less oversight and more and better insight into the process and work of the contractor?" [Ref. 45][Ref. 46]

- Small resident presence at contractor site versus large periodic entourages.
- Replace formal decision milestones (e.g., preliminary design review (PDR), critical design review (CDR)) with continuous participation and/ or peer reviews.
- Participate in internal contractor reviews.

Conduct Aggressive Risk Management. Accept risk in exchange for the reduction of PMO oversight resources. "Oversight services can be delivered more efficiently and effectively when managers focus resources in areas where the risk for potential problems exists and the impact is significant." [Ref. 51: p.1] "Information sharing" directives require DoD oversight activities (that is, contract administration offices, contracting offices, technical activities, and program management offices) to consider all relevant

and credible information. This mitigates risk and the need for DoD oversight before designing and applying direct DoD oversight of contractor operations. [Ref. 41: p.14]

According to the Air Force's *Lightning Bolt #3 Final Report*, there are two key practices attributed to this principle.

- Communicate accepted risks as part of acquisition strategy development. This equates to a management buy-in of the risks taken.
- Shift culture to support beliefs that risk acceptance will not kill careers if things go wrong.

In two round-table discussions with the Air Force, industry offered additional insight to "How can the Government better manage risk?" [Ref. 45] [Ref. 46]:

- Obtain and maintain a well-trained and educated multi-skilled workforce, especially in the business oriented implications of all program decisions.
- Encourage formal risk identification and management to focus the Government on early identification of problems and potential risks.
- Have early discussions with the contractor to identify processes for risk management and to identify key metrics.
- Tailor the amount of oversight based on program change and maturity.
- Hold contractors accountable for risk management plans before there is a crisis to manage.

One of the major findings from the contractors' round-table discussion concluded that the "...concept of risk management is not well understood in Government and contractor community." [Ref. 45][Ref. 46] The author generally agrees with this comment, given his experiences.

Ensure Clear Accountability in Design (CAID). "To the extent practical, the Air Force assumes no design responsibility below the functional baseline (system specification) level until the end of Engineering and Manufacturing Development (EMD)." [Ref. 9: p.2] This tenet saves PMO staff by the eliminating unwarranted Government functions that try to control the design below the system (or performance) specification level. Particular areas of concern include engineering and design

documentation, configuration control levels, and military manufacturing and management standards -- all of which drive up the cost of doing business [Ref. 55]

Several of the DAPP programs indicated that they (with the contractor) only managed at the system specification level, leaving the contractor solely responsible for the design. As an example, this normally led to contractor configuration management. For the commercial-off-the-shelf based New Training Helicopter program (the GAO-selected acquisition reform baseline program), "...contractor configuration management was employed and, thus, the Government configuration control board was eliminated. This enabled the program office to focus on system performance." [Ref. 40: p. 1-4]

The recommended underlying practices and processes are captured in the detailed tenets below:

- Manage the contract for end performance. To the extent practical during development, Government specification control does not go below the functional baseline (performance/system specification) level until the end of EMD.
- The Government normally takes control of the allocated baseline (performance) specifications at the end of EMD, after successful completion of Functional Configuration Audit (FCA).
- The Government may take control of the top-level allocated baseline (performance) specifications before the end of EMD when conditions such as risk or logistics considerations warrant such control.
- The Government takes control of the product baseline (hardware, design) specifications after successful completion of Physical Configuration Audit (PCA) when program acquisition and maintenance strategies require Government control of the design solution.
- Make CAID contingent upon the establishment of an effective risk management process.

- Establish the Government/contractor team with clearly defined roles.
- Have contractor perform audits and verify compliance via documentation. Such responsibility could include Independent Validation and Verification (IV&V) if required. [Ref. 9: p. 7-8]

The contractors participating in the Los Angeles Industry Round Table meeting with the Air Force added an additional tenet that would be applicable to CAID. The Government would not control class two or three formal engineering changes as long as performance is maintained. [Ref. 45]

2. Streamline Contracts

The objective of this tenet is to minimize the number of contracts and contract line items and make them milestone based. Fewer contracts, structured with a minimum number of contract line item numbers (CLINs) can be managed by fewer people. This is supported by the following practices:

- Let critical program requirements drive a simplified contract structure.
- If appropriate, use a single integration contractor from the start. Consider consolidating existing multiple contracts into one or a limited number of contracts. The "black world" extensively uses this concept. [Also Ref. 56]
- Develop a top-level statement of work based on critical program objectives and requirements -- which the Air Force now calls the statement of objective (SOO). Only address "what" requirements (i.e., performance) and not "how to". This inevitably leads to a smaller number of requirements that the Government has to manage and assure.
- Keep CDRL items to the absolute minimum. Use contractor data bases and formats to the maximum extent possible to gain insight while eliminating CDRLs.
- List the minimal number of simple CLINs to support the top-level requirements. Incorporate favorable contractor payment methods such as

milestone billings as rewards or incentives. This enhances cash flow normally slowed by a traditional CLIN structure. [Also Ref. 40]

- Reduce contract administration efforts by negotiating fewer but longer contracts (options and multi-year). Minimize the number of contract changes. [Ref. 9: pp. 13-14]

3. Maximize Teaming Efforts

Kelley Johnson, founder of Lockheed's "skunk works" lived by fourteen basic operating rules. The following tenets support rule twelve:

> There must be absolute trust between the military project organization and the contractor with very close cooperation and liaison on a day-to-day basis. This cuts down misunderstanding and correspondence to an absolute minimum.

The reduction of misunderstanding in effect reduces costly re-work.

Maximize teaming efforts to include other Government agencies. Called Integrated Weapon System Management by the Air Force, this tenet focuses on optimizing teaming efforts with the contractor and other Government agencies to ensure efficient use of resources. [Ref. 9: p.14] The object is for the PMO to "partner" with their contractors and other Government associates. The Army Training and Doctrine Command recently moved in this direction by directing that "all requirements will be developed by 'integrated concept teams' of individuals from Army user, requirements and acquisition communities and relevant DoD staffs, industry and academia." [Ref. 50: p. 2]

The Air Force's Lightning Bolt #3 report formulated key supporting tenets:

- Use a totally integrated team approach. Cover the system from development to disposal. Key is joint participation on process teams.
- Delegate on-site activities as much as possible to Defense Contract Management Command (DCMC) Administrative Contracting Officer's (ACOs) pricing, and engineering resources. Prime consideration is which agency can perform the task the best.

- Outside agencies accept accountability to the project manager for successful program implementation and support.
- Use Defense Logistics Agency (DLA) and Defense Contract Audit Agency (DCAA) to off-load traditional in-house PMO contracting and pricing functions -- do not duplicate these at the PMO.
- The team jointly develops the Acquisition Program Baseline, Draft Request for Proposal (RFP), Statement of Work (SOW) and Contract Data Requirements List (CDRL) to the maximum extent possible.
- Team with the contractor during proposal preparation to streamline validation of direct hour and material requirements.
- Augment any contractor weakness with Government strength. We each bring our strengths to the teams and thereby increase each other's efficiency. [Ref. 9: pp. 14-15]
- Guide the relationship with contract terms in partnership arrangements. Ensure both parties understand each other's needs and goals, rather than dictating and restraining the relationship.
- Use cross-functional teams to the maximum extent possible.
- Foster a cooperative environment with problem solving techniques. Encourage employees to communicate problems as they arise, and work together to resolve them. [Ref. 48: pp. 8-11]
- Develop trust and open communications through long-term relationships. [Ref. 15] [Ref. 48: p.6]

Long-term relationships build trust and commitment within a program because both sides have a vested interest in success. [Ref. 9: p. 16] Additional supporting tenets are offered by seeking these long-term contracting arrangements [Ref. 9: p. 15]:

- When the mission is stable and competition is not practical, senior acquisition leadership approves multi-year class Justification and Approval (J&A) and acquisition plans for the entire program.

- When competition is possible and in the best interest of the program, ensure EMD Request for Proposals (RFPs) require out-year unit production pricing curves or not-to-exceed unit costs extending as far into the future as practical. If the contractor meets the proposed curves and costs, consider significant incentives. If the contractor fails to meet proposed curves or costs, apply significant penalties, such as paying to qualify a second source.
- Incorporate long-term warranty provisions where possible. [Also Ref. 47: p. 325]
- Long-term depot support services are incentives for the contractor.
- The contractor is held accountable with meaningful rewards and penalties.

Many of the supporting tenets come from the concept of partnering. Partnerships, long used in industry, have found their way into DoD through the Alternative Disputes Resolution Act of 1990, with some success. [Ref. 48] [Ref. 49] Partnering is defined as the commitment among two or more organizations to improve communications and avoid long, unresolved disputes. [Ref. 49: p. 41] Partner relationships are usually specified in a contract or written agreement. Partnering is accomplished though a team made up of technical and administrative personnel whose purpose is to interface with contractors, open lines of communications, resolve conflicts, identify problems early and prevent contract disputes. [Ref. 49: p. 41]

4. Process Reengineering

The DoD 5000-series directives focus "...on implementing major improvements necessary to streamline the acquisition process, reduce infrastructure, and enhance customer service through process reengineering." [Ref. 24: p. 7] PMs are encouraged to continually search for innovative practices that reduce cycle time, reduce cost, and encourage teamwork. The ultimate outcome of such practices "...increase its (DoD's) ability to fund warfighting requirements and continued research and development." [Ref. 24: p. 7] Reengineering and process improvement are critical to the successful implementation of efficient team processes. Supporting tenants include:

- Incentivize acquisition personnel for innovation, while providing appropriate guidance and the benefit of "lessons learned" in the past. [Ref. 1]
- Conduct off-site process definition and team-building meetings at the start of the project. [Ref. 52: p.3]

5. Tailor Oversight of PMO

Current studies suggest that program oversight is not generally a lucrative area for PMO reductions. However, there are still opportunities in this area. [Ref. 53] DoD 5000.1 states, "Milestone Decision Authorities (MDAs) shall promote flexible, tailored approaches to oversight and review based on mutual trust and a program's size, risk, and complexity." [Ref. 24: p. 8] PMOs should take advantage of this directive to eliminate activities associated with low-risk portions of the program. Tailoring of the acquisition program is encouraged for other aspects of the acquisition process, as long as certain core issues are addressed and statutory documentation delivered at the appropriate milestone. These aspects include program documentation, acquisition phases, the timing and scope of decision reviews, and decision levels. For example, the Joint Direct Attack Munition (JDAM) Defense Acquisition Pilot Program (DAPP) program accomplished oversight reduction by reducing the number of DAB documents from 22 to four. This shortened the Defense Acquisition Board (DAB) preparation cycle from six months to about three months, and allowed the SPO (i.e., PMO) to operate with a smaller than average staff. [Ref. 54: p. 2]

The PEO for Command and Control Systems, in a 2 August 1994 memo, postulated one other practice that could reduce some oversight. He suggested the practice of the Office of the Secretary of Defense (OSD) approval of RFPs should be stopped or streamlined. "It's micromanagement when OSD insists on reviewing a $20 million RFP merely because it is part of an acquisition category I (ACAT I) program." [Ref. 57: p.2]

6. Leverage the System Definition

Encourage the use of commercial sub-systems and components where appropriate. Acquisition of commercial sub-systems and components should contain less risk and, thus, reduce the need for oversight. The Fire Support Combined Arms Tactical Trainer (FSCATT), Joint Direct Attack Munition (JDAM), and the Commercial Derivative Engine (CDE) programs seemed to benefit from this reduced oversight. As part of the report write-up, the CDE partially attributed smaller team size to the commercial nature of their product. [Ref. 40: p. 5-3]

Avoid the use of Government-Furnished Property (GFP). The NDAA program eliminated the Government and contractor resource required to run a Government approved GFP accountability system. [Ref. 40: p. 6-3]

7. Minimize Contract Data Requirements List (CDRLs)

Reducing the amount of data received by the Government also reduces the time required to review the data received. All of the DAPPs instituted significant reductions in CDRLs. The Non-Developmental Airlift Aircraft (NDAA) program practically eliminated CDRLs by requiring access to contractor data bases. [Ref. 40: p. 6-3] Three supporting tenets are listed below:

- Engineers work closely and informally with their industry counterparts, so that CDRLs are tailored and are not the primary line of communication.
- Government accepts that contractor databases constitute the majority of the program's database. Having access to contractor databases allows continuous updates, not just periodic reports. (For example, both Government and contractor always working with most current and common information.) [Also Ref. 40: p. 6-3]
- Both the Government and the contractors record important work, not the minutia. [Ref. 9: pp. 8-9][Also Ref. 47]

8. Reduce Engineering

Minimize and refocus engineering staff Gary Christle, in an electronic message to Mr. Longuemare, discussed the opportunities for reducing PMO staffing levels:

> I believe they (the opportunities) are in "engineering", broadly defined to include design, systems engineering and test, logistics, and quality assurance. I'm not going to suggest that these are unimportant, but there is a legitimate question as to how much of these engineering functions should be a Government responsibility and how much should be a contractor responsibility. [Ref. 42: p.1]

This tenet shows the reliance on a minimum number of engineers that possess both technical breadth and depth. This is a move away from employing many different functional specialists who tend to micro-manage their area of expertise, to reliance on fewer generalists. [Ref. 9: p. 17] When specialists are required, supplement the engineering staff with short-term help on an as-needed basis. This objective is met by the use of these supporting tenets:

- Select personnel based on specific qualifications matching PMO needs, as well as the individual's motivation, positive attitude, and leadership qualities, not seniority.
- Use a flexible engineering skills mix to meet the changing program risk or progress requirements. As the program progresses and the required engineering skills mix changes, move out engineers no longer needed by the program from the PMO and bring in the necessary new talent.
- Eighty percent of program cost is determined early in acquisition, so peak staffing must occur in the up-front portion of the program. A cradle-to-grave workforce management plan will reflect this acquisition strategy.
- Bring engineers into the program early to participate in the continual requirements generation and interpretation process.
- Empower engineers to make decisions.
- Make use of short-term engineering experts, "borrowed help," from other organizations and Services. Judicious use of short-term home office,

laboratory, Federally Funded Research and Development Center (FFRDC), and Contracted Advisory and Assistance Services (CAAS) support contractors provides a powerful experience base at minimum cost.

- Ensure a "sunset clause" (i.e., a time limit) is built into the specialist's tenure on the program. [Ref. 9: pp. 17 - 18]

Contractor developed logistics support plan. At the heart of this tenet is a single plan for life-cycle -- cradle to grave -- logistics support, developed by the prime contractor in coordination with a small cadre of program office and user personnel. The objective is to eliminate duplicative planning activity by logistics partners and enable faster decision making. [Ref. 9: p. 16] The following supporting tenets were offered to meet this objective:

- The prime contractor develops a single plan based upon the Government's concept for integrated support and refines it through close coordination with logistics partners on the team. As a result, the number of logistics personnel resident in the program office can be significantly reduced.
- Agreements on joint requirements, while more difficult, must be achieved for multi-service/user programs to ensure development of a single plan. Thorough coordination with users is critical.
- The project manager is responsible for managing support activities and coordinating tasking for logistics partners. As a result, support activities are always well-focused early enough to benefit the program.
- The logistics partnership includes support from relevant logistics center(s) when required. Logistics personnel with sustainment skills define life cycle, fielding and modification considerations during requirements determination phase and beyond.
- Use critical tasks to focus contractor efforts and tailor any needed Logistics Support Analysis (LSA). Streamline CDRL requirements and use contractor formats. As a result, there is a reliance on the contractor's data base as the

predominant source of information. This information should be available electronically.

- In-depth contractor analysis focuses only on critical logistics tasks. [Ref. 15: pp. 16-17]

Several of the DAPP programs allowed "commercial-style" or contractor provided logistics. Contractor logistic support encompassed contractor provisioning, commercial manuals, contractor provided training (including the contractors' schools), and no "required" technical data. [Ref. 40: pp. 1-4 & 6-2] All technical publications were prepared consistent with commercial practices. Joint Direct Attack Munition (JDAM) used a "commercial-like" warranty that guarantees the contractor will repair or replace any defective item for a 20-year period. [Ref. 40: p.2-3] It is assumed that these tenets helped reduce Government logisticians staff requirements to perform many of the tasks performed by the contractor.

9. Leverage Developmental Test & Evaluation Alternatives

Developmental Test & Evaluation (DT&E) can be a very staff intensive process, many times containing duplicative activities to those performed during Final Qualification Testing (FQT), during the internal quality assurance (QA) process of the contractor, or during Operational Test and Evaluation (OT&E). Alternatives more efficiently use contractor test activities and other Government agency capabilities. Supporting tenets are:

- Use Contractor DT&E. Place emphasis on understanding test procedures and results instead of direct monitoring. As a result, we emphasize understanding how the tests will verify performance and reviewing the results. Examples: Have contractor develop the Test and Evaluation Master Plan (TEMP) in coordination with program office and user.
- Minimize redundant testing by the contractor and Government by close cooperation and a complete understanding of test metrics required.

- Use another agency or organization to provide PMO test support functions. This can include everything from writing the TEMP to performing the entire DT&E function. The Air Force provided two examples of this: the AMRAAM SPO's use of the 46th Test Wing as the responsible test organization and the F-22 Combined Test Force concept.
- In recognition of the strong role the contractor already plays in DT&E, realize additional personnel savings through movement to an insight role and take advantage of contractor testing already performed to ensure compliance.
- Accomplish duplicative DT&E and Operational Test and Evaluation (OT&E) test points only once and credit in both places. [Ref. 9: p. 19]

10. Use Flat Organizational Structures

According to the Air Force, using flattened organizational structures facilitate,

> Streamlined organizations that have fewer people, fewer meetings, fewer people at meetings, less appraisals, and smaller administrative staffs. The small number of managers permits PMs to concentrate on facilitating, coordinating, and controlling broad areas of responsibilities, rather than on narrow aspects of the program. [Ref. 9: pp. 9-10]

Industry felt strongly that reduction in the number of PMO staff would allow reductions in the contractor staff as well. For example, industry believes it must duplicate the PMO staff and maintain a near one-to-one relationship. They stated that if six low-observable engineers are in the PMO, then the contractor requires at least six low-observable engineers to answer Government questions. [Ref. 9: p. 21] The following supporting tenets were identified in the documentation:

- Keep the number of Government managers small to prevent internally generated and duplicative work or responsibility.
- Considering that PMOs with more personnel tend to create more work, keep the size down to minimize the work by the Government and by contractors. This implies a continuous re-baselining process.
- Program Directors must resist burdening their personnel with tasks not directly adding value to the program.

- Eliminate functional stovepipes, with all program personnel focused on a single goal -- product delivery.
- Employ Integrated Product Teams with the Government and contractor members. [Also Ref. 1, 18, 40, 45, 46, 48, 52, 55]
- Consider PMO sizing and organization during the Acquisition Strategy deliberations. [Ref. 9: pp. 9-10] This leads to staffing trade-offs.

11. Use Information Technology

The objective is to facilitate Government-contractor concurrent engineering. by making maximum use of technology to facilitate and enable re-engineering of the acquisition process. [Ref. 1] By sharing information, project personnel can instantly communicate with each other to access, share and store up-to-date information in a transparent way. This must be unhindered by geographic separation, organizational structure, product complexity, and incompatible tools, databases or computing resources. [Ref. 58: p. 26.] Make optimal use of information systems technology such as video teleconferencing (VTC), networking -- both local area (LAN) and wide area (WAN), world wide web, electronic bulletin boards, electronic mail, client server databases, etc. Supporting this tenet:

- Facilitate the pre-award processes (e.g., request for information, draft requirements document development, request for proposal (RFP) development, solicitation distribution) by use of the electronic bulletin board in the competitive environment.
- Task the contractor to prepare relevant program and contractual documentation and transmit via LAN/WAN/disk.
- Conduct negotiations and conferences, etc., via VTC.
- Use electronic evaluation tools.
- Share contractor and Government contracting/pricing databases. [Ref. 9: p. 11]

V. INTERVIEWS

A. DEMOGRAPHIC DATA

This investigation included 29 interviews with 20 Government personnel and with nine DoD contractor personnel.

The Government interviews included active and inactive Army military and civilian members of the acquisition workforce. Of these Government interviewees, nine were military and eleven were Department of the Army civilians. The group included three interviewees at the Secretary of the Army for Research and Development level, three interviewees at the PEO level, and 14 interviewees at the PMO level. The PMO interviewees were a mixture of program / project / product managers and division / branch chiefs. Additionally, two of these Government interviewees had extensive experience as DoD contractors. The interviewees represented nine different PMOs in five different PEOs. The PMOs spanned the range of both hardware and software intensive systems from various mission areas (e.g., field artillery, air/missile defense, command and control).

The DoD contractor interviews included representatives from five different corporations. Three of the interviewees identified experiences while working for other DoD contractors. Two of the interviewees had worked in "black world" projects. The interviewees were a mixture of subcontract managers, general managers, logistic / engineering / test chiefs, and project managers / leaders.

B. GOVERNMENT INTERVIEWS

1. Factors Influencing PMO Sizing

Those interviewed identified many factors that influence PMO sizing. Mr. Charles, the Deputy Assistant Secretary for Plans, Programs and Policy for the Assistant Secretary of the Army for Research, Development and Acquisition suggested that, in general, the size of a PMO staff is related to the "complications involved in each of the

three measures of cost, schedule and performance." [Ref. 59] During the interview with Mr. Lehnes, one of the Deputy PEOs for Command, Control and Communications, the author captured several PMO sizing factors from his observations that supplement Mr. Charles' observation:

- *The dollar value of the program and the stability of the budget.* The dollar value is one of the main factors in determining the amount of oversight placed on the project. Funding instability caused unplanned resource expenditures to re-plan, modify contracts, etc..
- *Visibility of the program.* Considers whether the program has tri-Service, international, OSD or Congressional interests.
- *The number of projects managed.* Savings can be reaped by consolidating a few projects together. However, "If you are managing 50 projects, even though those projects are individually very small, you would need a lot more (people) than if you are managing one big project."
- The program's *technical complexity* (and risk) in terms of the system components' maturity (e.g., use of commercial-off-the-self components or military uniquely developed components).
- *Type of system components* in terms of the mixture of hardware and software. Software development of major systems over the long-term of the program is a lot more complicated to manage than a pure hardware system.
- *External (e.g., Congressional, oversight and audit) interfaces.*
- *The amount of system integration required.* The amount of technical horizontal and vertical integration required has a "great impact on PMO and PEO resources." [Ref. 60]

Other interviewees generated similar responses to these observations. David Matthews, ex-project manager for the Army Tactical Missile System, adds, "Not all contractors know what they are doing or have control over their processes." [Ref. 61] There is risk associated with *the quality and capability of the contractor* selected for a project. The PM's staffing must address the quality and capability of the contractor.

2. PMO Responsibilities and Competencies

During discussions of minimum core functions that should be part of any PMO, two distinct but interrelated topics were identified: core Government responsibilities and core competencies. Core Government responsibilities are the core set of functions or activities that have to be performed by Government personnel in a PMO. The core competencies are knowledge, skills and personal qualities that are required to successfully implement these inherently Governmental responsibilities. Weaknesses or shortfalls in these competencies should be the focus of future personnel and organizational development activities. Currently existing core competencies also distinguish unique strengths and capabilities of Government personnel in a PMO that should be nurtured and protected.

Core Government responsibilities. The fundamental functions of a PMO are those associated with cost, schedule and performance. [Ref. 59] Most interviewees believed that programming and budgeting, the acquisition strategy, the acquisition plan, financial execution, contract administration are the pith of what a PM shop needs to have organic. The systems engineering / analysis, "-ility" engineering, configuration management, and the like could be contracted. However, the Government needs to retain smart people in order to stay on current and to not lose the technology bubble. [Ref. 60]

Core Competencies for PMO. The interviews identified three major core competency groups. Number one is leadership. "We must substantially enhance our training of civilians with regard to leadership talents." [Ref. 59] The use of IPPD requires the Government to have the ability and the desire to lead. The second most sought after competency is acquisition skills, underpinned by experience. Acquisition is unique to a PMO -- dealing with a contractor, contracting for products and services, understanding cost and schedule, assessing and managing risk, etc.. The division chiefs of the Armored Gun System looked for personnel with acquisition skills and experience. [Ref. 62][Ref. 63][Ref. 64] Mr. Charles clearly hit the third major competency in the following statement:

> ...[We] have to improve the quality of the people that are there (in the PMO) in order to shrink the size (of the PMO). [We] want well-rounded people in the AAC, we can not afford narrowly focused people. We have to have generalists, whose prime focus is leadership. [Ref. 59]

This philosophy was echoed by several other interviewees. [Ref. 65][Ref. 66][Ref. 62][Ref. 63] However, as one interviewee noted, "There seems to be a stigma attached to using civilians in different jobs (cross-training)...a culture has been built around 'it's not in my job description.'" [Ref. 66]

3. Downsizing Tenets

The Government interviewees identified many significant downsizing tenets:

- Flatten organizational structures staffed by high quality people.
- Provide more PMO flexibility to obtain the right personnel for the core structure.
- Emphasize performance versus rank-based grade structures.
- Encourage active management of PMO overhead.
- Reduce or eliminate explicit program integration organizations.
- Encourage effective team usage.
- Foster "value-added" beliefs and values.
- Reduce oversight as trust is gained.
- Change the support contractors' culture.
- Leverage information technologies.
- Increase funding stability.
- Reduce CDRLs.
- Take advantage of optional DT&E where appropriate.
- Eliminate or delay below-system-level Government configuration management.
- Use contractor-supplied logistics where appropriate.
- Increase PM authority to take risk.

- Contract out project management.
- Lease equipment.

Flatten organizational structures staffed by high quality people. One Government PMO division chief attributes the small size (seven Government personnel) of his business management division to a flattened organization. In essence, he structured his division without branches. In such a small organization the availability of top-quality personnel and on-call matrix or contractor support to address workload spikes is the key to success. [Ref. 62][Ref. 65] The quality referred to here includes not only the depth, but also the breadth (cross-function) of skills. [Ref. 69][Ref. 70][Ref. 71][Ref. 59][Ref. 63][Ref. 72]

Another Government interviewee, an ex-defense industry employee, pointed out that the ratio of Government workers to management is much less (roughly one half to one third) than that of industry. The reason for such disparity may be in the industry practice of selecting ad-hoc first level management "leads", who are not part of the formal management chain, but rather senior or talented employees. [Ref. 67]

Provide more PMO flexibility to obtain the right personnel for the core structure. Part of the reason for the large matrix-support organization demand is due, in part, to the continued "squeeze" placed on the "core" portions of PMO organizations. [Ref. 59] As Mr. Charles observed,

> Given the personnel rules, the PMs are left with people they really don't want in the core. We have built into our personnel rules a natural bias for a PM to buy a lot of matrix, because he can hand-pick the people and replace them instantly. The PM cannot do it to his core. [Ref. 59]

Emphasize performance versus rank-based grade structures. The Government does not recognize an employee's grade as a pay grade, but rather it recognizes the grade as a rank. [Ref. 65] As such, large hierarchies have grown top-heavy in management to support a promotion path. As the acquisition workforce continues to be downsized, there will be fewer and fewer "management positions." "You have super-stars with good ideas and you can't promote them because there is nowhere in the organizational structure that you can put them." [Ref. 60] The incentive is to construct additional hierarchy to

promote good people so that they are compensated for their service value. In the commercial sector, grade is just a pay grade to reward talent. There is little, if any, restriction of who works for whom. [Ref. 67]

Encourage active management of PMO overhead. PMO's staffs tend to increase as the program builds, as the program complexity increases, and as new requirements or modifications are added, etc., etc. and the size keeps building. When the things that caused the PMO to increase in size go away, the PMOs do not tend to decrease in size. [Ref. 60] One Deputy PEO attributes this to "the inertia of people in-place, ... not an effective matrix-management philosophy in-place," and to a "... certain amount of risk-avoidance" of trying to get back slots previously released. [Ref. 60] We do not have the ability to respond rapidly. The structure is counterproductive in that it does not allow the application of the right people to the right position at the right time to get the required work done. The development of metrics, collection systems, responsive staffing systems and incentives, that is supported by a shift in cultural beliefs, is needed to actively manage overhead. [Ref. 59][Ref. 65][Ref. 67]

Reduce or eliminate explicit program integration organizations. "People try to make a function out of integration...it should not be an independent function that a PM should build an office around." [Ref. 59] "The Government loves integration shops." [Ref. 67] Frequently there is a great overlap between the systems engineering organizations and the integration organizations found in PMOs. [Ref. 65] The bottom line is that integration is a necessary function -- one that is an inherent responsibility of everyone in a PMO. [Ref. 59]

Encourage the effective team usage. During the course of this investigation, many of the Government personnel interviewed pointed out that IPPD and contractor teaming were excellent ways to promote possible PMO efficiencies. Several different teaming aspects are offered below:

- Teams work best when they are populated by a small number of people who know what they need to do. [Ref. 67]

- Government needs a cultural change from "spear-chuckers" (critical oversight) to "getting on board the boat with the contractor" (cooperative insight) and helping the contractor succeed. "If you find a rotten plank, poke at with your spear so we can get it fixed, but do not go poking holes in perfectly good boards." [Ref. 67]
- Current awards systems, though changing, do not generally support the team concept. Mr. Lehnes had one of his project managers nominate a successful PMO team containing 30 people for a team award. The response from headquarters was to pick five or six members of the team and give them an award. [Ref. 60]
- The Government should endeavor to become members of the contractors' teams, as opposed to forming Government-unique teams populated by contractor members. [Ref. 65] This includes participation in the contractors' and sub-contractors' design reviews to get insight. [Ref. 63]
- Assign Government personnel as cost account managers per the work breakdown structure and have them work directly with their industry counterparts to detail the work packages. [Ref. 71]

Foster "value-added" beliefs and values. One Government official observed that many times there is not a product focus in the Government.

> We are hung up so much on process and learning things that we have forgotten one fundamental thing: these (the processes) are tools that you apply to reach an objective. There is no utility in learning things if you don't apply them to the end purpose. The Government tends to be information brokers... the more they know that, in itself, is inherently good. (But) this behavior does not lend itself to getting products out the door in an efficient manner. [Ref. 67]

The crux of this observation seems to be that Government personnel should, as second-nature, always be mindful of their role and recognize that the value of their role is in accomplishing the overall mission to produce a product.

Reduce oversight as trust is gained. As the contractor demonstrates performance, the Government should "back-off" and minimize the resources expended on contractor oversight. [Ref. 71] Organizations have the management systems in place to determine when and how much to reduce oversight. Personnel management systems must be flexible enough to allow the dynamic nature of such a tenet.

Change the support contractors' culture. Support contractors are many times scored and awarded by how many "spears they can throw" at the development / production contractor. [Ref. 67] The result can be extraneous meetings, unneeded "additional analyses" and costly Government intervention. Support contractors must be given clear value-added activities that are oriented to the ultimate goal of producing the system.

Leverage information technologies. "Don't underestimate the power of communications technology...it has great leverage." [Ref. 73] Both COL Boutelle, PM Army Field Artillery Tactical Data System, and Brent Sherman, a deputy project manager for the Bradley PMO, said that video teleconferencing on-site, linked to the prime and major sub-contractors is required by a lean PMO. [Ref. 71][Ref. 73] COL Boutelle encouraged standardizing electronic formats between the major project stakeholders to readily re-use briefing charts, documents, etc. [Ref. 73]

Increase funding stability. The week-to-week, year-to-year program budget uncertainty has an enormous impact on the PMO's efficiency and on his prime contractor. The single most important thing that can allow a PM to do his job more efficiently -- in terms of his internal resources and the resources to apply to his actual product development -- is stability of his program budget. One way to accomplish this is "phase funding". That is, when a program's next phase is approved then that phase's budget is approved and assured. No one, including Congress, would be able to touch that money for that phase. [Ref. 60]

Reduce CDRLs. Very simply, the fewer CDRLs, the less review and data management required by the Government. [Ref. 65]

Take advantage of optional DT&E where appropriate. Recent policy changes make the requirements for DT&E optional. It is the PM's decision as to how much formal developmental testing is required to pass operational testing. The PM should leverage the contractor's testing as much as possible to prepare for operational test. [Ref. 59]

Eliminate or delay below-system-level Government configuration management. Configuration management below the system-level is an area many interviewees identified as a function already performed by the contractor and unnecessarily duplicated by the Government. For example, AGS planned to take control of the design-level configuration at production and, even then, they planned to leave the contractor in charge of the components and parts. [Ref. 63] Still others indicated that the Government really does not need a technical data package (TDP) if spares are ordered through the contractor. [Ref. 61][Ref. 64][Ref. 65][Ref. 60]

Use contractor-supplied logistics where appropriate. Contractor-supplied logistics is another area for opportunities to shift more responsibility to the contractor. Two Government officials supported the concept, while others were more cautious. [Ref. 61][Ref. 60]

Increase PM authority to take risk. Mr. Keith Charles suggests that the "key denominator for making any downsizing tenet work is to ensure the project manager is given more authority. The more external influences the PM has in dictating what he must do to be 'successful,' the less risk he is able to take on his own." [Ref. 59]

Contract out project management. A Deputy PEO proposed some "out-of-the-box" thoughts on how to substantially reduce PMO sizing. First, he suggests that the Government in certain circumstances could get out of the day-to-day management of the project -- contract out for the entire project management for the system.

> This alternative entails turning over a requirement to someone who is not a developer and producer, but a guy who is going to determine how to contract the requirement out, how to manage the program, how to assign the contracts for the hardware, for the software, for the integration, for the testing, for the training, for the logistics support, and depot maintenance. [Ref. 60]

This author and Mr. Lehnes identified several working examples of this concept during the interview. They include the Army's Safeguard system, the Space Shuttle program and the Multiple Subscriber Equipment program.

Lease equipment. Mr. Lehnes also suggested another alternative is to not buy equipment but to lease it. This concept entails taking a set of performance requirements and asking industry to provide a piece of equipment that is serviceable for a certain period of time. The contractor provides the support and repairs it if and when it breaks. [Ref. 60]

C. CONTRACTOR INTERVIEWS

The contractors interviewed were asked from their perspective how the Government can downsize and still effectively perform its mission. Not to this author's surprise, the contractors focused their responses on the contractor-Government interfaces and how to make them more efficient. The following tenets are the consolidated result of the contractors' responses.

Select contractors with proven past performance. Most of the contractors interviewed identified trust as a key attribute required to produce leaner oversight. The amount of Government oversight "needs to be adapted to a particular contractor and his specific track record." [Ref. 74] One industry manager associated with a "black world" project attributed leaner oversight in that type of project, in great part, to the selection of contractors with demonstrated past performance. Only the contractors with proven track records (and the right security clearances) were invited into a limited competition. [Ref. 75] Given the level of trust and past performance, tailor oversight to "what is necessary vs. what is not necessary" and when it is necessary. [Ref. 76][Ref. 77]

Avoid micro-management of the contractors' processes; instead, focus on the result. [Ref. 76] Behind this tenet is the idea that the Government should focus on the result -- the product. The Government should understand and monitor the process and its capability / quality, but not micro-manage its design and implementation. A good portion

of the systems engineering process is focused on how to implement systems engineering and not whether the design was good or met actual performance requirements. [Ref. 78]

Oversight -- the prime to sub relationship. This author noted that primes generally only put small amounts of oversight on subs: "they can have either minimum or maximum oversight, ...help when needed, ...subcontracts manager engineering and contracting competencies." [Ref. 77] Subcontractors are "brought on the team and given very clear product responsibilities." [Ref. 75] The subcontractor management offers an interface with a single technical and contracts point-of-contact. On paper that is what the Government has, but in reality that is not how it works. [Ref. 75]

Have high quality PMO staffs. One industry manager indicated that the PMO personnel quality had a lot to do with ultimate PMO size. [Ref. 75] In discussing the attributes of black world programs he worked on, this manager said,

> ...The best (Government) personnel were picked for the PMO. These people knew what they were doing, they didn't need advice givers. These people usually were younger and higher in rank. Personnel at one rank managed personnel of the same rank. [Ref. 75]

Use contractor-Government rotation programs. One contractor recommended a rotation program between contractor and Government PMO personnel that would build "shared-relations," understanding, and trust. [Ref. 75]

Become generalists versus specialists. "Government engineers should be highly technically qualified and need to understand the system from its entirety ... in essence, a systems engineer versus a designer." [Ref. 75] Government education needs to support the development of these generalists. Another contractor stated that,

> The good Government engineers, although highly technically qualified, are such specialists that they 'nit-pick' the contractor to death on technical issues that ultimately may or may not matter in the grand scheme of things. A lot of times, primes run-around and spend a lot of resources attempting to answer the detailed design questions. Sometimes this is warranted but most of the time it is not. ... Some of these Government specialists come up with great technical solutions on the surface but these solutions are either too costly to implement, not technically feasible from the system's point-of-view, or not useful when looking at the situation. [Ref. 78]

Look for duplication in engineering and logistics. Most duplication of effort between the Government and contractor occurs in the engineering and logistics areas. [Ref. 74] There is a "one-on-one counterpart relationship" that forms between the Government and the contractor in the engineering and logistics areas. [Ref. 77]

Contractor provided logistics. Contractor supported logistics systems allow for smaller Government offices. [Ref. 76]

Delay Government TDP configuration management. Turning over the TDP should be delayed as long as possible. Allow the contractor to use their "less cumbersome" system since the Government TDP control is very "paper-work intensive." [Ref. 77]

Avoid premature design reviews. One of the contractors interviewed indicated that there is a tendency to prematurely lock-in many aspects of the system by having design reviews too early in the process (while staffing is taking place). Many of these design decisions require a re-look later. [Ref. 74]

> By having a design review during the staffing process, the contractor sometimes provides a design that is not always practical or complete due to the schedule demands. ... After further staffing and evaluation occurs, a design which makes the system more efficient or less work intensive or a design flaw could be discovered. ... The contractor may decide against the change because it would require formal approval by the Government ... results in an "over-reaction" by the Government and a bunch of engineers descending on the contractor to micro-manage and look for other problems. [Ref. 78]

Define specific purposes for Government support contractors. "Don't get support staff for general areas, get them for a specific purpose and define the requirements for them." [Ref. 75] Give support contractors clearly defined roles based on requirements not activities. [Ref. 75] The point is that PMOs should use support contractors only when needed for a specific purpose.

Other governmental agency interfaces. A significant factor that drives PMO staffing is all the other governmental agencies (OGAs) that PMOs must bring on-board later in the program. The importance of making OGAs a part of the team quickly and getting empowered people from these organizations was emphasized. [Ref. 76]

Additionally, the PMO members must have credibility within their own ranks to be able to deal effectively with these OGAs. [Ref. 76]

Minimize Government IPTs and participate on contractor IPTs. Generally, contractors see IPTs as a way to obtain leaner offices, if they are used properly. One contractor felt that "too many times the IPTs were populated with every possible stakeholder with any sort of influence on the outcome of the team, many of them with the same expertise." [Ref. 67] The Government forms too many of their own IPTs forcing the contractor to populate or mirror the Governments teams. [Ref. 79] The Government should become part of the contractors' teams and minimize the number of Government teams. [Ref. 79]

Contractor testing support. Contractors could perform many of the test roles performed by the Government. However, the OGAs "are going to feel more comfortable dealing with a Government counterpart in the foreseeable future." [Ref. 80][Ref. 74]

Reduce test costs by leveraging other tests. Programs should use the prime's own quality assurance process including any laboratory or informal field tests (technical or even operational using contractor personnel) to eliminate, as much as possible, DT&E costs. Additionally, use of small-incremental demonstrations instead of large formal DT&E tests could reduce testing costs significantly and reduce overall risks. [Ref. 78]

VI. OBSERVATIONS AND ANALYSIS

The preceding three chapters collected and reduced many different useful tenets on how to downsize and obtain a lean organization. The analysis presented in this chapter focuses on the development of a general downsizing strategy. This strategy is built from an identification of downsizing opportunities. The downsizing opportunities, in turn, beget a set of top-level strategic objectives for downsizing a PMO and then maintaining it. These top-level objectives were analyzed and detailed with interrelated sets of the most fundamental tenets that systematically address all of the basic organizational design elements (i.e., processes, structure, management systems, and values and beliefs).

A. OPPORTUNITIES

There are many areas within a PMO that provide downsizing opportunities. The author has found that the tenets used depend on the specific situation being considered. Many factors govern each PMO's situation. The author, using the data collected, suggests that there are seven major factors, found in Table 2, which have greatest impacts on PMO sizing.

One can manipulate in a proactive fashion some of these factors to prevent or change those undesirable situations that cause inefficiently staffed PMOs. However, there are some factors that are very difficult to change (e.g., Congressional and media oversight, the need for cutting edge technology to satisfy demanding requirements, replacing a marginal but not deficient contractor). This investigation seeks the opportunities to leverage these factors to produce a more favorable situation (environment) for avoiding growth and facilitating leaner PMOs.

Of these factors, one is important to discuss in detail -- PMO interfaces to external organizations. According to Terry Little, Program Manager for the Air Force's Joint Direct Attack Munitions project office, "A program office exists for one reason: Interfaces. ...Every systems acquisition has a host of interfaces that must come together

Table 2. Major Factors Influencing PMO Sizing

FACTORS	INFLUENCE
Visibility • Program Size and Phase • External Interest	• Amount and Level of Oversight/Interest to be Serviced • Amount of Mandatory Procedures
System Being Developed • Technical Interfaces (Number & Complexity) • System Domain (e.g., Nuclear, Aircraft, Admin.) • Development Precedence (Unique or Developed Before) • Composition (Hardware, Software, Non-Developmental Items) • Government Furnished Property	• Amount and Level of Technical Oversight • Level of Risk • Number of Mandatory Special Processes (e.g., Nuclear Surety, Security) • Overhead Associated with Property Management • Overhead Associated with Controlling Technical Interfaces
Programmatic Interfaces • Vertical • Horizontal	• Number of Interfaces to be Serviced or Coordinated by PMO Resources.
Risk • Cost • Schedule • Performance	• Amount of Oversight From the MDA and on the Supplier.
Stability of Budget	• Amount of Resources Dedicated to Making Changes in the Program
Policies and Regulations	• Dictates Organizational Design Solutions
Supplier Quality and Capability	• Amount of Oversight

if the acquisition is to succeed." [Ref. 7] The framework defined and discussed by the author in Chapter I identifies four interface groups:

- *Sponsor interfaces* to include MDA oversight; Planning Programming and Budgeting System; Congressional and media.
- *Customer interfaces* to include user, foreign military sales, other Government PMO customers.
- *Supplier interfaces* to include prime contractor, and other Government suppliers (e.g., matrix providers, Government test facility and technology suppliers).
- *Lateral interfaces* to include horizontal product integration and independent activities (e.g., operational test offices).

It is the author's experience, as well as several of those interviewed, that these interfaces are significant drivers in determining PMO size requirements. However, with the increased emphasis on "customer satisfaction" and the increased requirements to integrate weapon systems, the user and lateral interfaces seem to be areas that reductions may not be readily found.

The oversight interface and specifically the milestone decision authority (MDA) oversight process were considered by some to be a prime target area for PMO reductions. Figure 7 graphically depicts the PMO oversight effort in relation to the total PMO effort. As Gary Christle points out,

> ...much to everyone's surprise,...oversight, even when very broadly defined amounted to only 16% of the total PMO effort (However, top PMO managers spent 34% of their time on "oversight."). While the Systems Acquisition Management Corporate Information Management Provisional Program Office's data base was small (9 PMOs), Blaise Durante noted that a RAND study currently being finished up for the AF found similarly small oversight workloads based on a review of more than 70 PMOs. When you consider that nearly half of this workload is outside the A&T (Office of the Under Secretary of Defense (Acquisition and Technology)) community's ownership (audits, PPBS, Congressional), and the fact that much of the "acquisition" oversight is simply the cost of doing business, oversight does not appear to be as lucrative a source for personnel reductions as anecdotes might suggest. [Ref. 42]

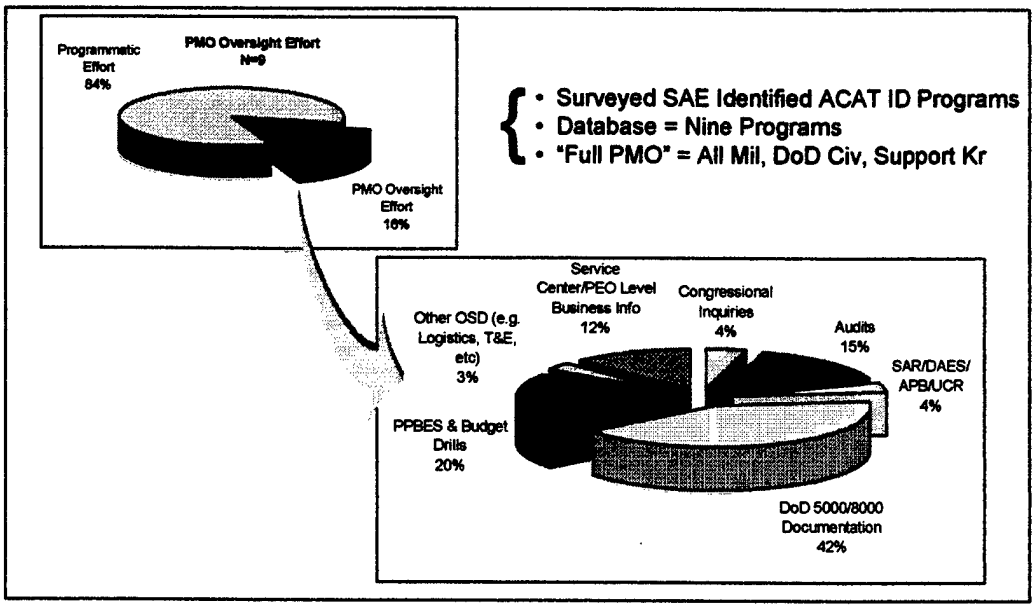

Figure 7. ACAT ID Oversight Workload: Full PMO

[Ref. 42, Attachment 1]

Though every opportunity should be taken to streamline the oversight interface, this investigation undoubtedly pointed to the final interface, the supplier (specifically prime development contractor), as being the most lucrative for finding reduction opportunities. Mr. Christle observes "...that we spend far too much effort 'helping' the contractor do its job ...we don't behave like a commercial customer." [Ref. 42] From the data collected, this extra help seems to be predominately in the engineering disciplines. A legitimate question arises: What do we want a project office to do? Key to answering this question is to determine what the core business of a PMO is and to assess which of the PMO functions are already performed by the suppliers.

The investigation also indicates that many other opportunities exist in the way PMOs organize and perform their business processes. "Hidden factories" living by the often-accepted concept that "we don't have the time to do it right the first time but will make the time to fix it when it bounces back" is a prime example. [Ref. 20: p. 23] Deep hierarchical structures, functional stove-piping, and inefficient, fragmented processes are

other opportunities associated with inefficient PMO structures and processes. The pertinent question here is: How can PMOs operate more efficiently?

Since the days of the creation of the first organization, human forces have automatically driven organizations to grow. It seems that the best way to downsize is not to have to downsize at all. Though this might be wishful thinking, one should not dismiss any opportunity to manage PMO growth.

Through this investigation, the author has identified three postulated organizational growth laws. The first law of organizational growth is that organizations, if left to their own devices, have the tendency to automatically build-up over time. As observed by one DoD acquisition professional at the Defense Systems Management College, the staffing process appears to be driven by a continuous "racheting-up" effect. This process is characterized by:

- Failing to reduce personnel resources when work needs are low.
- Stretching work activity to the hours that we have to clock (i.e., busy work or unneeded work fills the void and becomes institutionalized / standardized).
- Obtaining additional resources whenever work needs increase.
- Failing to verify the current validity of past staffing decisions using a baseline theory. [Ref. 81: p.19]

The second law states that growth in an organization's size is generally thought to be good, thus minimizing any desire for self-correcting mechanisms to incrementally re-baseline organizational size. Without a profit incentive to help keep overhead in check, Government managers very rarely concern themselves with streamlining PMO overhead costs. On the contrary, increases in organizational size are thought to provide greater ability to perform risk control activities, provide a hedge against future hiring freezes or reduction in force, and provide the ability to respond to unforeseen tasks. [Ref. 61][Ref. 81][Ref. 74][Ref. 73]

The third law, and probably the most significant, is that the decision to downsize usually comes after a long build-up, it comes as a surprise and it usually entails large layoffs and re-structuring. The importance here is not that a PMO's size increases or

decreases; this is part of the dynamic nature of projects. Rather, the issue is the amount and the time period over which the organization's size increases or decreases. Figure 8 graphically depicts the phenomena being described. The first two laws describ the inevitable build-up, as indicated by the growth to point A, to levels of staffing greater than what is needed for the job at hand. At point A, the over-staffing surprise hits and management reacts. Top management directs very quick and mechanistic cuts. The focus is almost always a structural solution: cut out administration support, take specified percentage reduction, etc.. Downsizing is driven by the numbers of positions eliminated, not the work that needs to be performed or eliminated. The ultimate result seems to be an over-reaction in downsizing (point B) that leaves an organization with less than what it needs to perform its mission and with an immediate desire to start increasing its size over again.

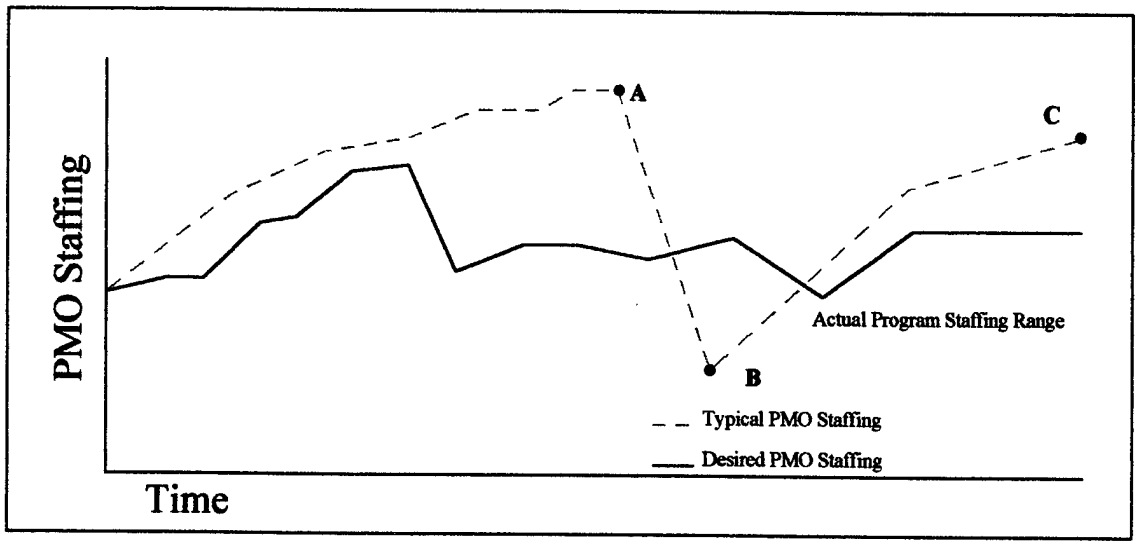

Figure 8. PMO Staffing

Planned and controlled dynamic sizing activities, represented by the band in Figure 8, could theoretically provide the opportunity to eliminate large disruptive layoffs and help reduce PMO overhead expenses. However, there are significant management system and cultural issues that would have to be overcome.

B. A GENERAL STRATEGY

The opportunities identified in the last section lead to the postulation of three top-level strategic downsizing objectives:

- Define core processes and streamline PMO interfaces.
  (What should a PMO do?)
- Reengineer the PMO organizational design elements (i.e., processes, structure, management systems, and values and beliefs).
  (How should the PMO do it?)
- Manage the tendencies to grow.
  (How can it stay lean?)

There is not a best way or best set of tenets for downsizing a PMO and keeping it lean. These three objectives, when systematically detailed to leverage the appropriate downsizing tenets, provide a sound general strategy. The author has found that the tenets used depend on the specific situation being considered. However, some fundamental tenets were stressed over and over again. These "fundamental" tenets, shown in Figure 9, are associated with each of the three downsizing objectives developed above.

Upon examination, these fundamental tenets in Figure 9, when developed and implemented in an integrative fashion, address all of the basic design elements that comprise a PMO organization. This design process is an example of using a systems approach (or systems thinking).

Figure 9 also shows where (i.e., which organizational design element) and to what extent (i.e., principal and supporting tenets) each organizational design strategy draws its tenets. Each of these organizational design strategies, with its underlying tenets, is described in the following sections.

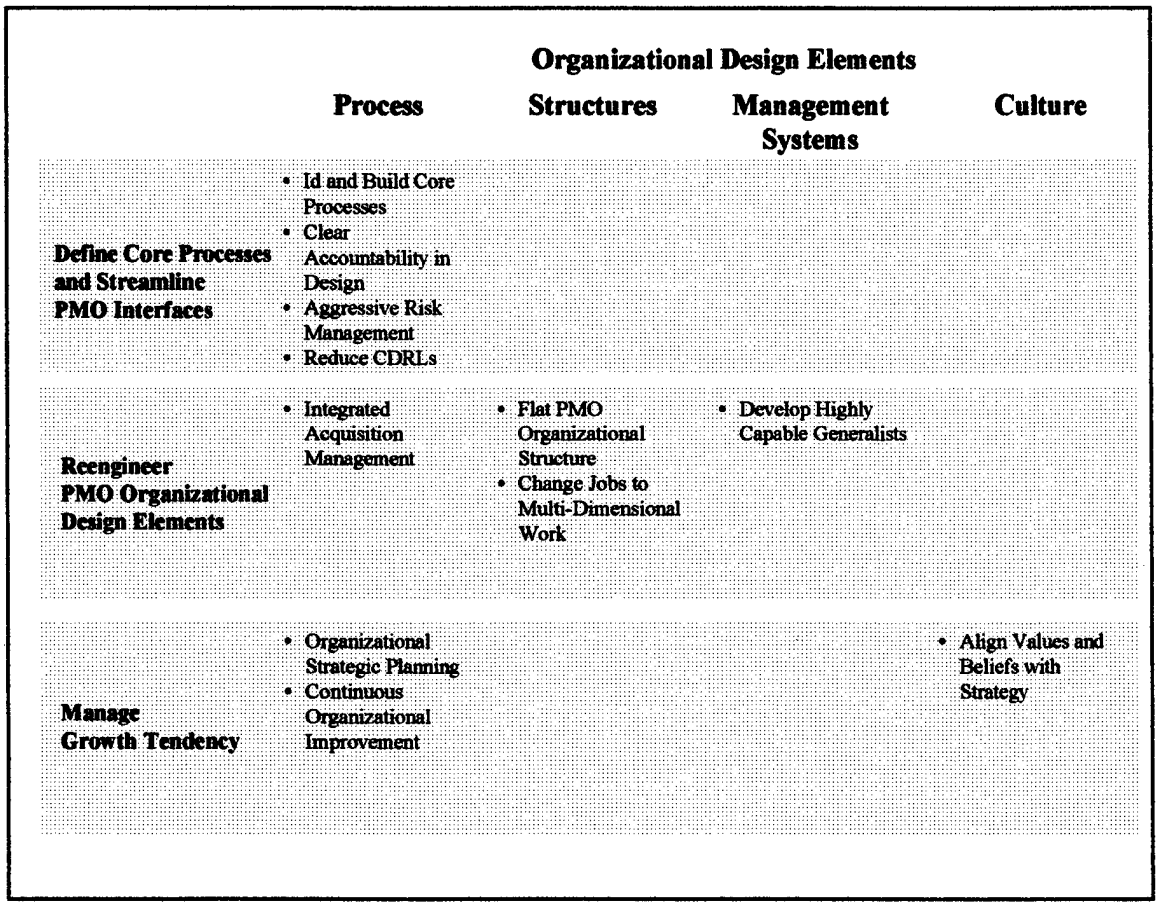

Figure 9. Lean Organizational Design Strategies

1. Define Core Processes and Streamline PMO Interfaces

Goal. Reducing a staff does not automatically mean that work is going to go away. The primary goal is to determine the minimum appropriate PMO business processes performed by a PMO. Ask the question: What is our fundamental business? These business processes must as a minimum encompass the inherently Governmental functions. Once done, downsize, reorganize, shift (to other organizations), or privatize competencies that are no longer needed.

A PMO can realize additional reductions in resources by judiciously streamlining the PMO's interfaces. Table 3 contains the fundamental tenets aimed at fulfilling these goals.

Table 3. Reengineer PMO Processes Fundamental Tenets

FUNDAMENTAL TENET	DESIRED RESULT
Identify and Build Around Core Processes	• Focus on the core business, eliminating, transferring or privatizing all other competencies. • Limit long-term staffing requirements to a minimal set of core processes.
Clear Accountability in Design	• Limit Government's scope of oversight • Eliminate duplicate activities.
Aggressive Risk Management	• Reduce oversight
Reduce CDRLs	• Reduce Government review and data management resources.

Identify and build around core processes. The role of the Government on the acquisition team should be to do just two things: (1) those that are inherently Governmental functions (i.e., something the Government must do) and (2) those that the contractor could plausibly do but that the program office can do better, faster, or cheaper. [Ref. 7] The author has identified several basic areas of responsibilities where a PMO performs inherit Government functions:

- Plan and get approval for a program;
- Turn user requirements into specifications;
- Turn specifications into contract(s) with suppliers;

- Measure and monitor contract(s) execution / progress;
- When necessary, make program changes to maintain performance (cost, schedule and performance);
- Keep stakeholders informed and manage budget / financial matters (i.e., PPBS).

With little inspection, it is clear that the essence of these responsibilities is project management in nature, though many require engineering competencies.

The availability of process models that describe these responsibilities is sorely lacking in DoD. However, these responsibilities are wholly contained in the definition of the commercial world's standard project management process model (i.e., the PMBOK) discussed in Chapter III. The project management processes can be found in Appendix B. With little tailoring, this model can adequately incorporate the unique requirements of the PMO processes. The DoD-tailored list (below) captures the functional areas from which project management processes are found:

- Acquisition Plan Management (a.k.a., scope management)
- Project Plan Management (a.k.a., integration management)
- Schedule Management (a.k.a., time management)
- Cost Management
- Requirements Management (a.k.a., quality management)
- Risk Management
- Contracts Management (a.k.a., procurement management)
- PMO Resource Management (a.k.a., human resource management)
- Data & Reporting Management (a.k.a., communications management)

The author believes that these functional areas, as generally defined in the PMBOK, contain the core PMO processes that dictate the type of business on which PMOs should focus.

Upon initial glance, the project management nature of these processes will draw great criticism from a PMO culture that has been predominately engineering-centric. Upon closer examination, the "project management" processes specified contain many of

the traditional engineering processes found in today's PMOs. For example, the project management process model contains quality assurance, risk identification, specifications' development processes. However, the message gained is that there is a tight coupling of "business" processes with those of traditional engineering processes. This means that PMO jobs implementing PMO core processes, need to require a level of competence with the entire set of project management processes. Evidence of the growing realization of the importance of project management competencies is the requirement for many "acquisition critical" jobs to require some level of project management education and certification.

Clear Accountability in Design. The list of functional areas containing PMO core processes, only partially meets the goal of minimizing what the PMO should do versus what the suppliers should do. An additional fundamental tenet provides more insight. There should be clear accountability in design. [Ref. 9: pp. 7-8] As stated earlier in this investigation, this tenet saves PMO staff by eliminating unwarranted Government activities that try to control or conduct design below the system (or performance) specification level. Opportunities for applying this tenet include engineering and design documentation, configuration control levels, logistics tasks and manufacturing and management processes. Particularly thorny issues arise with this tenet when faced with a contractor with immature or questionable design processes.

Aggressive risk management. The essence of this tenet is to reduce oversight resource requirements by accepting risk in portions of the supplier's process. This is a basic shift from risk avoidance to risk management. Aggressive risk management relies on the ability of the Government to gain insightful understanding of the contractor's processes and manage the program via process metrics. [Ref. 9: p. 2] Fundamental beliefs in open, collaborative, non-adversarial and trusting Government-contractor relationship are essential. The Government PMO must be flexible enough to dynamically change the oversight as risk is retired or discovered. Figure 10 depicts this tenet graphically. The Government should review and use the contractor's risk management activities instead of duplicating these efforts as trust is built up. The use of

early integrated baseline reviews can be the key for getting insight to the contractor's processes and risk management plans.

The author fears that PMOs will be unable or unwilling to reduce oversight. There is a cultural stigma about accepting risk. Careers end due to bad results. Personnel resources, especially good ones, can be difficult to get back once released. The Government needs to foster a belief that a person in an oversight position is successful if he (or she) can work himself out of a job.

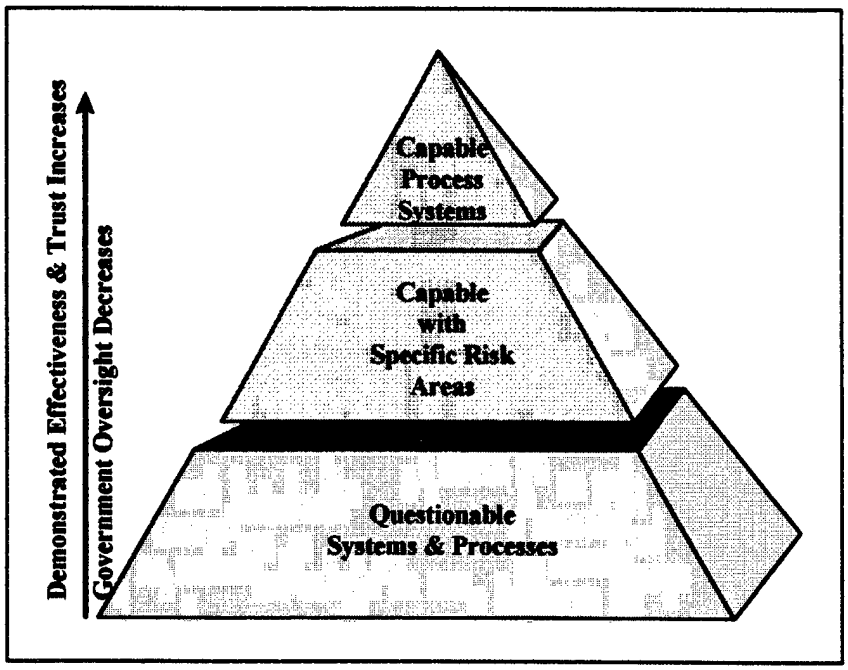

Figure 10. Dynamic Government Oversight

Reduce CRDLs. Reducing the amount of paperwork between the various stakeholders was cited universally as one of the most significant tenets that affords a PMO the opportunities to downsize. CRDLs should not be the primary means of communications with suppliers, users and MDAs. Maintaining insight through continuous communications should significantly replace the need for voluminous amounts of paper.

2. Reengineer PMO Organizational Design Elements

Goal. The goal of this objective is to focus on reducing PMO resources by finding efficiency gains through process reengineering. The focus is on slowing inefficiencies associated with process fragmentation and organizational boundaries (both internal and external to the PMO). PMOs must be structured to facilitate boundary-less partnerships that leverage IPPD. This allows the best people (regardless of grade) to work on the project and to accommodate dynamic PMO staffing requirements. The fundamental tenets aimed at fulfilling this goal are found in Table 4.

Table 4. Reengineer PMO Organizational Element Fundamental Tenets

FUNDAMENTAL TENET	DESIRED RESULT
Integrated Acquisition Management	• Eliminate duplicate core process activities by leveraging external resources. • Facilitate insight => reduced oversight. • Promote horizontal communications, reducing PMO brokered vertical coordination.
Flat PMO Organizational Structure	• Reduce the number of managers.
Change Jobs to Multi-Dimensional Work	• Enable the consolidation of perhaps diverse process activities into fewer jobs.
Develop Highly Capable Generalists	• Support the use of multi-disciplined jobs.

Integrated acquisition management (IAM). IAM has two focuses: (1) broadening teams to include primary interface stakeholders and (2) the re-integration of fragmented project management processes and non-value added activities between the PMO and the integrated acquisition management team.

Re-integration of acquisition processes recognizes the duplication and fragmentation of the core PMO processes. The emphasis is on integrating a single acquisition management system between the suppliers and the PMO. Re-integration allows the elimination -- or at least significant reduction -- of duplicative, bureaucratic and non-value-added process activities. To many acquisition professionals' surprise, only a few activities within the PMO core processes are inherently Governmental

functions. [Ref. 7] Therefore, Government staff savings can be reaped by not performing PMO core functions that the suppliers do successfully. For example, the prime contractor provides the overall program scheduling, normally done by a PMO or its support contractors, and directly interfaces with all stakeholders (e.g., test facility suppliers, GFP suppliers). In the author's experience, many times the Government pays an independent support contractor to develop an overall integrated schedule. This is provided to the prime contractor, who then provides it back to the Government in his own particular format with further detail.

Integrate acquisition management, like the Air Forces' Advanced Integrated Weapon System Management tenet, also broadens the focus of IPPD to incorporate the major external interfaces of the PMO. [Ref. 9: p.8] These interfaces include the user, major suppliers (to include other Government agencies), and MDA oversight organizations. A virtual project of interrelated teams is formed and becomes the center-piece of PMO organizational design efforts. It is not patterned after the organization of the PMO or made an "extension" of the PMO, but rather a separate virtual organization produced by the collaboration of the stakeholders. Figure 11 shows a graphical depiction. The PMO and other organizations supply personnel for the virtual project organization. This tenet blurs the line of PMO, customer, sponsor and contractor to "help ensure clear transmission of requirement, as well as elimination of false performance expectations." [Ref. 9: p. 8] Additionally, it facilitates horizontal communications between parties aimed at avoiding "rework" due to misunderstandings.

Geographical separation of team members is a significant issue for the successful implementation of such an organizational concept. Information technology is the enabler that allows the trend toward virtual organizations. Other significant issues include distrust, leadership buy-in, having a mature / capable contractor, lack of teaming skills of Government personnel, need for dispute resolution techniques and the lack of empowered decision makers.

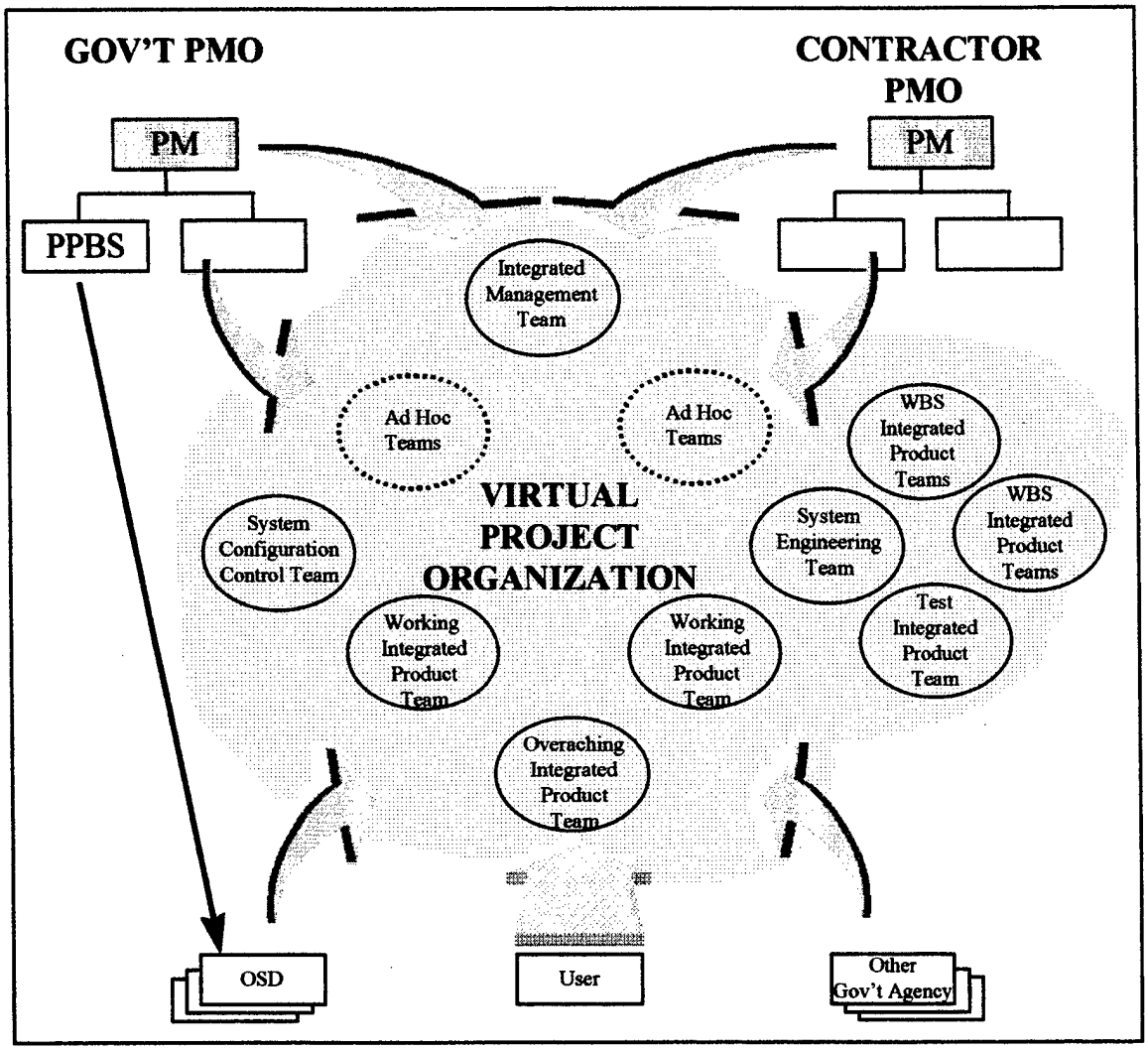

Figure 11. Notional Virtual Project Organization.

Flat Boundary-less PMO Organizational Structure. The author identified flattening the organizational structure as the most often cited and suggested method for downsizing. Flattening an organizational structure involves the elimination of management layers, shifting coordination and decision responsibilities to empowered teams. Flattening can be very successful when combined with process reengineering efforts and the establishment of multi-disciplined teams that target the elimination of functional boundaries. However, the author noticed that both in the commercial world, as well as DoD, organizational flattening many times resulted in no changes to the work and teams are established around the same functional boundaries as before.

Besides savings in eliminated management positions, flattening can also have the benefit of allowing a PMO's structure to be more flexible, facilitating boundary-less partnerships with its stakeholders. As such, the Government's PMO can more readily mutate its structure to accommodate a virtual organization, facilitate tailoring of life-cycle phases, and participate in ad hoc activities.

Flattening the PMO creates a serious issue. DoD's current personnel management system is based on rank-based grade structures. With fewer management positions available, there is less opportunity for highly skilled workers to be promoted.

Change Jobs to Multi-Dimensional Work The basic premise of reengineering is that jobs -- and the workers who perform them -- should be complex, knowledge-based and holistic so that the command and control aspects can be as simple as possible. [Ref. 35: p. 53] By allowing one person to perform multiple tasks, of a diverse nature, several jobs might be combined into one. Some examples are listed below:

- Engineers that can read, interpret and report contractor cost and schedule performance.
- Systems engineers that can develop and/or review test documentation.
- Systems engineers that can perform or review logistics processes.
- Project managers and systems engineers, or for that matter everyone in a PMO, that know and understand software management.

With flexible organizations that use personnel to perform many varied tasks, position descriptions must change to be performance and competency based, not rigid, task-based position descriptions. [Ref. 33: p. 147] The need is for the Army's personnel management systems to be capable of producing highly capable generalists, especially for the positions supporting core PMO processes. The author developed Table 5 to show the set of required competencies for a person who would fill a position implementing core PMO processes.

Table 5. Core PMO Competencies

CORE PMO COMPETENCY	SKILLS, KNOWLEDGE & CAPABILITIES
Project Management	• Requirements Management • Schedule Management • Cost Management • Risk Management • Procurement Management • Quality Management • Human Resource Management • Communications Management
Leadership	• Willingness to Accept Responsibility/ Empowerment • Motivating & Inspiring Others • Decision Making
Teaming Skills	• Team Building (IPPD) • Conflict Resolution • Communications Techniques • Motivating & Rewarding
Innovation	• Systems Thinking • Process Reengineering • Continuous Measurement & Improvement Methods
Diversity	• Multi-Disciplined • Diverse Experiences

Develop Highly Capable Generalists. The personnel management systems of today have the focus of developing and staffing narrowly focused functional specialists that in many cases lack an understanding of the big picture of acquisition. The Army will always need functional specialists. However, PMOs of the future are going to need an increasing number of highly-skilled and motivated generalists. These generalists will require a broad set of competencies, like their military counterparts. The trend of more and more competition between military and civilian for program management jobs implies the need for this change. Additionally, both acquisition generalist and specialist will require promotion opportunities that recognize performance-based grade structure.

An appropriate model for the civilian defense acquisition population, can be found in the Critical Intelligence Personnel Management System (CIPMS), which establishes a common tri-Service framework for managing defense intelligence personnel from a variety of occupation categories. [Ref. 82: p. 26] The list below summarizes some of the important aspects of the CIPMS: [Ref. 82: pp. 26-28]

- Conditions for employment to ensure the attributes sought for a quality acquisition workforce are guaranteed. Such conditions might be mobility, educational and training requirements or core competencies.
- Capability invigorates the workforce through recruitment of new talent or through personnel movement between existing organizations.
- Flexibility and responsiveness to changing requirements, comparability for similar personnel, professional development, timely adjustments in workforce composition in response to current workload pressures, and the incentives necessary to recruit and keep quality personnel.
- The CIPMS system advocates delegation of authority for personnel management decisions to line managers, thus placing the budgetary and execution responsibilities for personnel-related expenses at the level closest to personnel doing the actual work. The likelihood that appropriate levels of salary, benefits, recruitment and retention incentives, awards and training opportunities will occur is thus higher.

3. Manage the Tendencies to Grow

Goals. Managing the tendencies to grow embodies three proactive tenets aimed at avoiding or controlling the growth tendencies of a PMO. These tenets can be seen in Table 6 below.

Table 6. Manage Growth Tendency Fundamental Tenets

FUNDAMENTAL TENET	DESIRED RESULT
Organizational Strategic Planning	• Avoid the tendencies to grow through the development and trade-off of strategic options.
Continuous Organizational Improvement	• Ensure re-baselining is accomplished to revisit staffing decisions.
Align Values and Beliefs with Strategy	• Ensure downsizing tenets are supported by those responsible for the implementation.

Organizational Strategic Planning. Strategic planning defines where an organization will use its resources over the long-term. In the case of a PMO this could be over the life of the project or a life-cycle phase. Strategic options are developed and traded-off to produce an organizational design philosophy. Typically, these options will trade reductions associated with the sizing factors found in Table 2 of this chapter with other benefits. The list below captures some examples of these tradeoffs:

- Commercial-off-the-shelf system (reduces oversight) against system performance.
- Single development contract (less contract administration and oversight) against multiple contractors (less risk).
- Avoid Government-furnished equipment (less PMO administration) against increased contract cost, interoperability, etc..

The results of the tradeoffs are a preferred set of strategic options that provide a philosophy for PMO design (e.g., man-loading over time, core / matrix / support contractor requirements, oversight policy) and establishes a set of goals that can be used to institute continuous organizational improvement processes. Figure 12 depicts how the strategy planning process integrates within the PMO organizational development process.

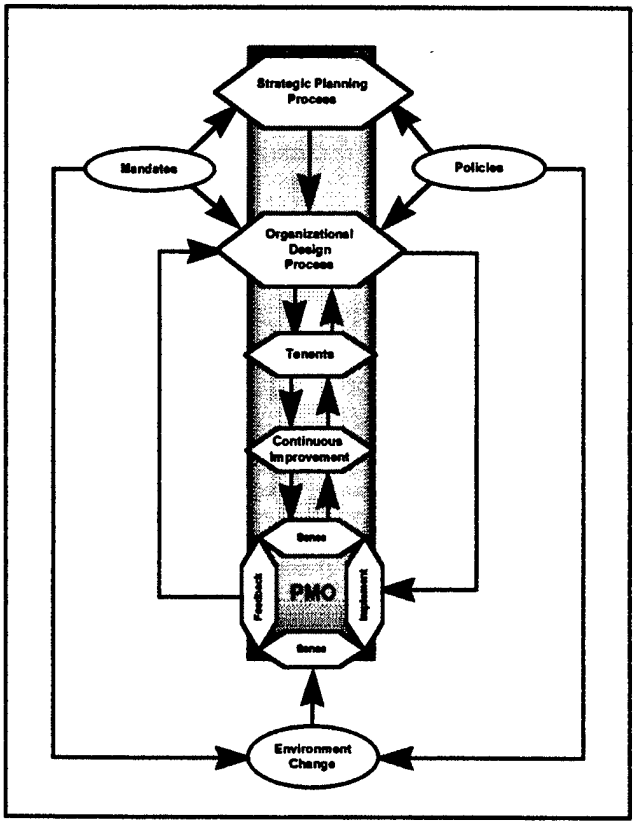

Figure 12. PMO Organizational Development Process

Institute continuous organizational improvement processes. Organizational changes must be understood as continuous rather than a single event. [Ref. 27: p. 20] Figure 12 depicts the proactive (continuous improvement) and reactive (driven by environmental changes) nature of organizational changes. This tenet seeks to institute a continuous incremental organizational sizing process to keep an organization the right size. Continuous improvement requires active measurement of a set of metrics. Although not the focus of this investigation, the author postulates the following metrics:

- Percentage of PMO core, matrix, and support contractor costs to total program costs.
- Percentage of PMO core, matrix, and support contractor costs to program labor costs.
- Percentage of PMO core, matrix, support contractor, and infrastructure (e.g., technology, building) costs to total program costs.

- Ratio of Matrix and support contractor costs and or head count to the core costs or head count.

Continuous improvement processes rely on the application of the same tenets developed in the previous three chapters for downsizing .

Align Values and Beliefs with Strategy. Identify the desired culture (values and beliefs) to foster the lean organization desired. Consider the actions needed to drive toward the culture envisioned by the strategy. For example, changes may be necessary in job expectations, performance evaluation, and compensation strategies to foster the appropriate culture. [Ref. 30: p. 9] Important values and beliefs that should be considered are listed below:

- Building trust
- Frequent open and honest communications
- Innovation in products and practices
- Empowerment to resolve issues at the lowest level
- Risk taking
- Importance of teams
- A "value-added" philosophy
- Quality in process performance (avoid rework)
- Value of the PMO core competencies

VII. CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the answers to the primary and subsidiary research questions. It also contains recommendations on the findings and for further research.

A. THESIS QUESTIONS ANSWERED

The primary research question was addressed by answering seven subsidiary research questions. The answers to these research questions and recommendations for each question are presented below.

1. First Subsidiary Question

What are the characteristics of current Army PMOs and their environment? The environment in which Army PMOs find themselves has significantly changed in the last six years. Budgets have significantly decreased. Acquisition reform has brought a new set of streamlined processes and practices to the acquisition community to try to address these budgetary issues. At the same time there is continual pressure to downsize the acquisition workforce. Army PMOs, are dependent on a turn-of-the-century bureaucratic organizational model that emphasizes inefficient functional units. The combination is not flexible enough to address the challenges of today's acquisition environment. Currently envisioned downsizing efforts have the opportunity to substantially change the design of Army project management, while at the same time saving precious Army financial resources.

2. Second Subsidiary Question

What are the attributes of the most significant policies that influence Army PMO design? Army policy regarding PMO over the last six years has taken a very mechanistic approach to PMO organizational deign. A "core", co-located matrix, functional matrix support, and support contractor PMO have resulted. The outcome has been a stagnating, entrenched core, increasingly dependent on matrix and contractor support. Associated policy mandates are listed below:

- All division chiefs in the PMO must be on the PMO's Table of Distribution and Allowance.
- The grade of officers and civilians within an organizational element should be at least one grade below that of the immediate supervisor.
- A product manager in the PEO structure does not normally warrant a deputy. HQDA policy limits the use of deputy, executive or assistant positions to circumstances where 1) the head of the organization is frequently absent on official business, or 2) the workload justifies the additional position.
- PMO administrative staff (GS-9 and below) should not exceed 20 percent of the total staff.

The overall impact of these Army policy mandates has often been smaller structures that are doing the same work with less people. These design oriented mandates sometimes leave the PM with limited organizational design alternatives.

The newest emerging policy is a step in the right direction. Manpower and cost associated with the direct management, control and oversight (i.e., project overhead produced by the PMO) is the newest mandate. [Ref. 5] The resulting metric is management and oversight overhead, a metric that has always been of great importance to our industry counterparts in managing staffing.

3. Third Subsidiary Question

What are the key tenets and attributes of lean project management organizational designs exhibited in world-class commercial companies? Four principal tenets emerged from the data collection and reduction process:

- Right-sizing through a "systems approach",
- Reengineering work processes,
- Flattening organizational structures, and
- Employing information technologies.

These principal tenets contain constituent supporting tenets identified as part of the data reduction process contained in Chapter III.

Several attributes are characteristic of lean commercial organizations and their downsizing processes. Commercial industry seems to spend more effort than DoD on strategic long-term planning and the ramifications of downsizing. Driven by a strong profit motive that benefits from efficiency, downsizing using many different innovative organizational design methods (e.g., reengineering, quality functional deployment, information engineering) is generally more accepted than in DoD. Human resources seem to be carefully managed such that core competencies are preserved, irrespective of seniority. Information technologies, as an enabler, seem to be more prevalent in commercial industry. The industrial sector tends not to care what process a supplier is using as long as the performance of the product or service meets specifications and cost, and is delivered on time.

4. Fourth Subsidiary Question

What are the key tenets and attributes of lean project management organizational designs exhibited by non-Army, "black world", and Defense Acquisition Pilot Projects? The tenets used to obtain lean military organizations were numerous and are organized into the twelve management areas containing associated tenets. The management areas are listed below:

- Reduce oversight of contractor,
- Streamline Contracts,
- Maximize Teaming Efforts,
- Tailor Oversight of PMO,
- Leverage the System Definition,
- Minimize Contract Data Requirement List (CDRLs),
- Reduce Engineering,
- Leverage Developmental Test & Evaluation (DT&E) Alternatives,
- Use Flat Organizational Structures,
- Use Information Technology.

The distinguishing attribute of military PMO tenets is their orientation to external interfaces (i.e., sponsors, suppliers, users, and lateral). The remaining minority of tenets were structurally focused (e.g., flattening the organizational structure, using information technology) Of the interfaces, the supplier interface (specifically the prime contractor) received the most attention. The interactions between the contractor and the Government are seen as inefficient. A general conclusion can be drawn that DoD is not a very good customer from the commercial point of view.

5. Fifth Subsidiary Question

From the point of view of Army managers and prime contractors, what are the key tenets and associated issues for obtaining leaner PMOs? The Army managers listed the following downsizing tenets:

- Flatten organizational structures.
- Emphasize performance versus rank-based grade structures.
- Increase and broaden workforce expertise.
- Provide more PMO flexibility to obtain the right personnel for the core structure.
- Encourage active management of PMO overhead.
- Reduce or eliminate explicit program integration organizations.
- Encourage effective team usage.
- Foster "value-added" beliefs and values.
- Reduce oversight as trust is gained.
- Change the support contractors' culture.
- Leverage information technologies.
- Increase funding stability.
- Reduce CDRLs.
- Take advantage of optional DT&E where appropriate.
- Eliminate or delay below-system-level Government configuration management.

- Use contractor-supplied logistics where appropriate.
- Increase PM authority to take risk.
- Contract out project management activities where feasible.
- Lease equipment.

The Government's list obtained through interviews is a very broad list, recognizing some of the personnel, human resource management and cultural issues surrounding downsizing. Of these issues, the cultural issues are the most damaging to the success of a downsizing tenet.

The contractor interviews basically came up with many of the same tenets and issues as the Government. The list of contractor supplied tenets can be found in the list below:

- Select contractors with proven past performance.
- Avoid micro-management of the contractors.
- Have high quality PMO staffs.
- Use contractor-Government rotation programs.
- Become generalists versus specialists.
- Look for duplication in engineering and logistics.
- Use contractor provided logistics.
- Delay Government TDP configuration management.
- Avoid premature design reviews.
- Define specific purposes for Government support contractors.
- Manage other Governmental agency interfaces.
- Minimize Government IPTs and participate on contractor IPTs.
- Leverage contractor testing support.
- Reduce test costs by leveraging on other tests.

6. Sixth Subsidiary Question

What is a minimum core set of responsibilities and processes which should be accomplished by any Army project management office? The author has identified several basic areas of responsibilities where a PMO performs inherently Governmental functions.

- Plan and get approval for a program;
- Turn user requirements into specifications;
- Turn specifications into a contract(s) with suppliers;
- Measure and monitor contract(s) execution/progress;
- When necessary, make program changes to maintain performance (cost, schedule and performance);
- Keep stakeholders informed and manage budget/financial matters (i.e., PPBS).

Most of these responsibilities are clearly seen to be management oriented. Because of the lack of any suitable DoD oriented process model, the author tailored a standard commercial project management process model which easily incorporated the Government responsibilities. The DoD tailored list below captures the functional areas from which PMO core processes are found.

- Acquisition Plan Management (a.k.a., scope management)
- Project Plan Management (a.k.a., integration management)
- Schedule Management (a.k.a., time management)
- Cost Management
- Requirements Management (a.k.a., quality management)
- Risk Management
- Contracts Management (a.k.a., procurement management)
- PMO Resource Management (a.k.a., human resource management)
- Data & Reporting Management (a.k.a., communications management)

The author also developed a list of core competencies needed by PMO organizations to implement the PMO core processes. They are found below:

- Project management
- Leadership
- Teaming skills
- Innovation
- Diversity

7. Seventh Subsidiary Question

What are the major opportunities and tenets that have the potential to save manpower in PMOs? The tenets thought to have the most potential for manpower savings, called the fundamental tenets, have been identified by an analysis process that first identified opportunities. Through analysis three top level opportunities, restated as strategic objectives, have been derived.

- Define core processes and streamline PMO interfaces
  (What should a PMO do?)
- Reengineer the PMO organizational design elements
  (How should the PMO do it?)
- Manage the tendencies to grow
  (How can it stay lean?)

Eleven fundamental tenets are postulated to fulfill those strategic objectives. They are identified in Table 7 below.

B. RECOMMENDATIONS

Like the cartoon below implicitly reminds us, downsizing, restructuring, whatever you want to call it is a constant and inevitable process. What is provided by this investigation is a general strategy and a fundamental set of tenets for downsizing a PMO and then keeping it lean. The result should be used as a guide for the challenges faced by policy makers and program managers in organizational design and restructuring efforts in

Table 7. Fundamental Tenets

FUNDAMENTAL TENET	DESIRED RESULT
Identify and Build Around Core Processes	• Focus on the core business, eliminating, transferring or privatizing all other competencies. • Limit long-term staffing requirements to a minimal set of core processes.
Clear Accountability in Design	• Limit Government's scope of oversight. • Eliminate duplicate activities.
Aggressive Risk Management	• Reduce oversight.
Reduce CDRLs	• Reduce Government review and data management resources.
Integrated Acquisition Management	• Eliminate duplicate core process activities by leveraging external resources. • Facilitate insight => reduced oversight. • Promote horizontal communications, reducing PMO brokered vertical coordination.
Flat PMO Organizational Structure	• Reduce the number of managers.
Change Jobs to Multi- Dimensional Work	• Enable the consolidation of perhaps diverse process activities into fewer jobs
Develop Highly Capable Generalists	• Support the use of multi-disciplined jobs
Organizational Strategic Planning	• Avoid the tendencies to grow through the development and trade-off of strategic options.
Continuous Organizational Improvement	• Ensure re-baselining is accomplished to revisit staffing decisions
Align Values and Beliefs with Strategy	• Ensure downsizing tenets are supported by those responsible for the implementation.

the Army. As pointed out in a related Air Force investigation, this guideline is intended to "be applied thoughtfully based on the careful judgment of the integrated program to 'right size' an individual (PMO) for a specific program." [Ref. 9: p.5]

Figure 13. Downsizing Reality [Ref. 83]

C. RECOMMENDATIONS FOR FURTHER RESEARCH

This section provides a list of topics identified during this investigation of the thesis questions as requiring additional research.

1. Innovative Personnel Management Systems

The long term success of soon to be downsized PMO will rest on the Army's ability to find, develop and maintain highly capable people. To this end, the author has recommend that the Army pursue a reengineering of its personnel management systems that staffs PMOs and includes hiring, training / educating, promoting, rewarding, and releasing employees. Requirements for a new system would have to be developed. Current excepted service systems, personnel and staffing policies, and current initiative would be assessed. The result needs to be an evaluated set of alternatives.

2. PMO Overhead Policy

Investigate and evaluate the use of the overhead policy in the management of PMO staff sizing. Quantify, compare and contrast the overhead associated with different types of PMOs within different PEOs. Verify and validate current overhead goals and metrics. Investigate and postulate additional sizing metrics and goals for those metrics. Investigate the incentives that would ensure overhead would be continually managed and minimized.

3. Army Organizational Design Process

Investigate and reengineer the organizational design process. The object would be to pass as much control as possible to the project manager so that there would be more flexibility in staffing. This would be accomplished by identifying the current organizational design processes, identifying shortfalls, synthesizing and evaluating alternative and characterizing the best approach.

APPENDIX A. INTERVIEW QUESTIONNAIRE

Appendix A contains a list of interview questions provided to the interviewees prior to teleconferences. Upon response to this questionnaire, interviews were arranged.

LEAN ARMY PROJECT MANAGEMENT OFFICES
INTERVIEW QUESTIONNAIRE

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Interim results of the Defense Acquisition Pilot Programs have indicated that acquisition reform contributes to reduced contract costs, improved development and delivery schedules and substantial gains in in-house (program/project/product management offices (PMO)) efficiencies. There are expectations that staffing efficiencies will soon be accrued in all PMOs. This informal questionnaire investigates the opportunities, tenets and issues/constraints associated with obtaining leaner PMOs within Army PEOs.

The interviews will be conducted with a representative sample of SARDA, PEO, PMO and prime contractor personnel using informal telephonic communications. The telephone conversations will be tape recorded. A non-attribution policy will be placed in effect if requested by the interviewee. The interview is expected to last about 30 minutes.

Since the interview question will be given Government personnel at various levels in the Army acquisition chain of command and DoD contractors, some questions may not make sense for a particular interviewee to address. Notations preceding the questions will indicate which questions are addresses to which group of interviewees. These notations are: (A) all, (PMO) project management office personnel, and (C) contractor.

Demographics Questions

Questions concerning demographics are used to establish a point of reference to evaluate and compare responses. These questions are found in the list below:

(A) What is the name, rank, and position/title of the interviewee?

(PMO) What is the name and type (program, project or product) of the PMO?

(C) What PMO do you support?

(PMO/C) What life cycle phase is your office supporting?

(PMO) What is the size of the PMO? Core? Matrix? Contractor support?

(PMO) What is the labor mix (job series, grades and quantities)?

(PMO) Do you have an organization chart I can have?

Identification of Goals, Mission and Sizing Factors

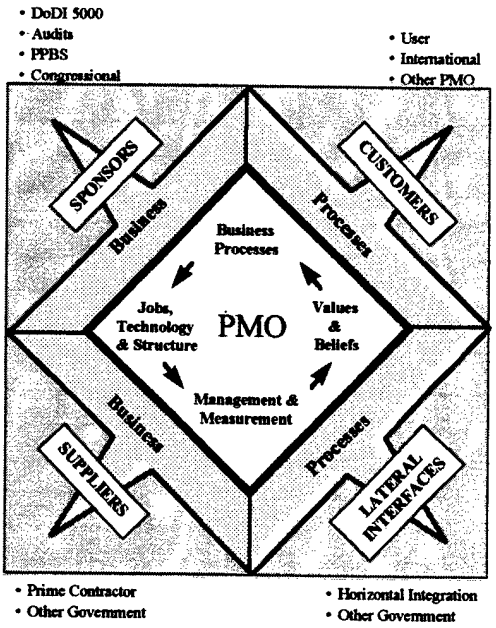
(A) What are the mission responsibilities and core processes of a PMO? Have they changed because of acquisition reform? Should they change? What should they be?

(A) What are the PMO staff sizing (both Government and support contractor) goals and principles of the Army? What should they be?

(A) What factors drive PMO (contractor) organizational sizing?

Identification of Opportunities, Tenets and Issues/Constraints

The opportunities to construct leaner PMOs are potentially found in the PMO structure, core PMO processes and processes that support PMO interfaces to external organizations.. The diagram, explanatory list, definitions and example are provided to give the interviewee some ideas what opportunities, tenets and issues might be discussed:



- Organizational structure to include hierarchy, labor mix, deputies, collocation, role of IPTs, and management roles.
- Organizational design process to include how organizations are approved, modified and staffed.
- Use of information management systems and communications devices.
- Sponsor interfaces to include acquisition oversight a la DoD 5000, PPBS, etc..

- Customer interface to include user, foreign military sales, other Government PMO customer.
- Supplier interfaces to include prime contractor, and other Government suppliers (e.g. DPRO, range and technology suppliers).
- Lateral interfaces to include horizontal integration and independent activities (e.g. operational test offices, etc.).

Below are a couple of definitions that might be handy:

For the purpose of my thesis an **opportunity** is a situation, position or process associated with the PMO that if changed would afford a chance for progress or advancement. An opportunity should be described in such a manner that others could use the description to recognize the same situation, position or process in another PMO. For example an opportunity might be, "configuration management of design data through a Government configuration control board/activities where risk conditions do not warrant it."

A **tenet** is a practice or procedure that when applied to PMO organizational development efforts may achieve efficiencies in operations and reduction in manpower. Many of the tenets may come from acquisition reform initiatives. Carrying forth with the configuration management example might yield a tenet to "use clear accountability in design". The attributes of such a tenet might include: 1) Government should only control performance specifications (not to go below the functional baseline level) and technical external interfaces until the end of EMD and 2) the Government may take control of the top level allocated baseline before the end of EMD when conditions such as risk or logistics considerations warrant such control, 3) the Government normally takes control of allocated baseline at the end of EMD after successful completion of FCA, 4) ensure an effective risk management process is in place, and 5) a government/contractor team is established with clearly define roles.

(A) What are the opportunities to consolidate, reduce, eliminate or reallocate PMO positions, processes or tasks?

(A) What are the associated tenets to exploit the opportunities? What are the attributes of the tenet? What are the expected impacts or advantages?

(A) What are the issues or constraints associated with the implementation of the tenet? Are changes in current organizational design policy or procedures required?

Acquisition Reform "efficiency dividend" and continued pressure to modernize the operational forces has driven the efforts to reduce the size of PMOs.

My purpose is to recognize the opportunities to "right size" PMOs, by identifying the minimum core responsibilities and processes that should be performed by a PMO. It is envisioned, that to get any sort of substantial saving in manpower, a wholly different way of conducting PMO operations must be found.

I will also identify the tenets (practices/doctrine), that id applied, should achieve efficiencies in PMO operations and reductions in manpower. These tenets are being collect from four different sources; commercial business, black world projects, acquisition reform pilot projects, Army project managers, defense contractors, Army PEOs and HQDA acquisition staff.

What are the principle factors influencing PMO sizing?

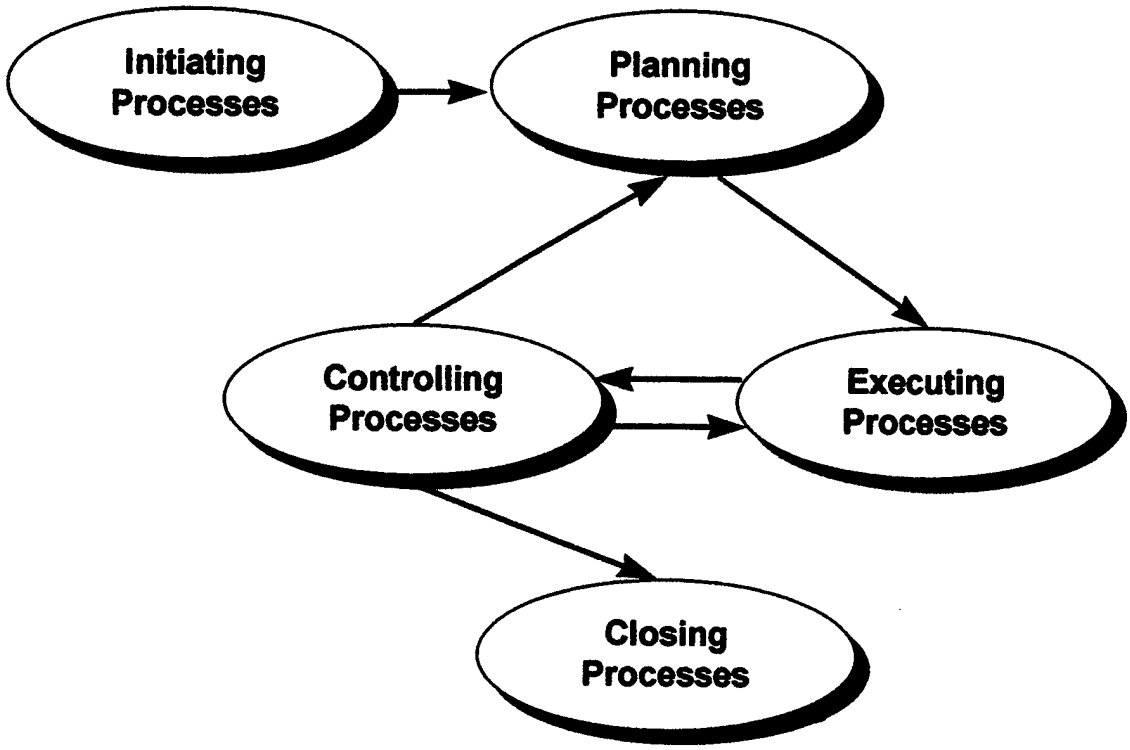
With the inevitable PMO downsizing lurking in the near future, what are the core responsibilities and competencies that should be retained by the PMO? Which core processes/responsibilities can be eliminated or shifted?

Much of the a PMO sizing is determined by the interaction of the PMO with its' external interfaces. What tenets could be employed to reduce the manpower required to service operations at the interfaces?

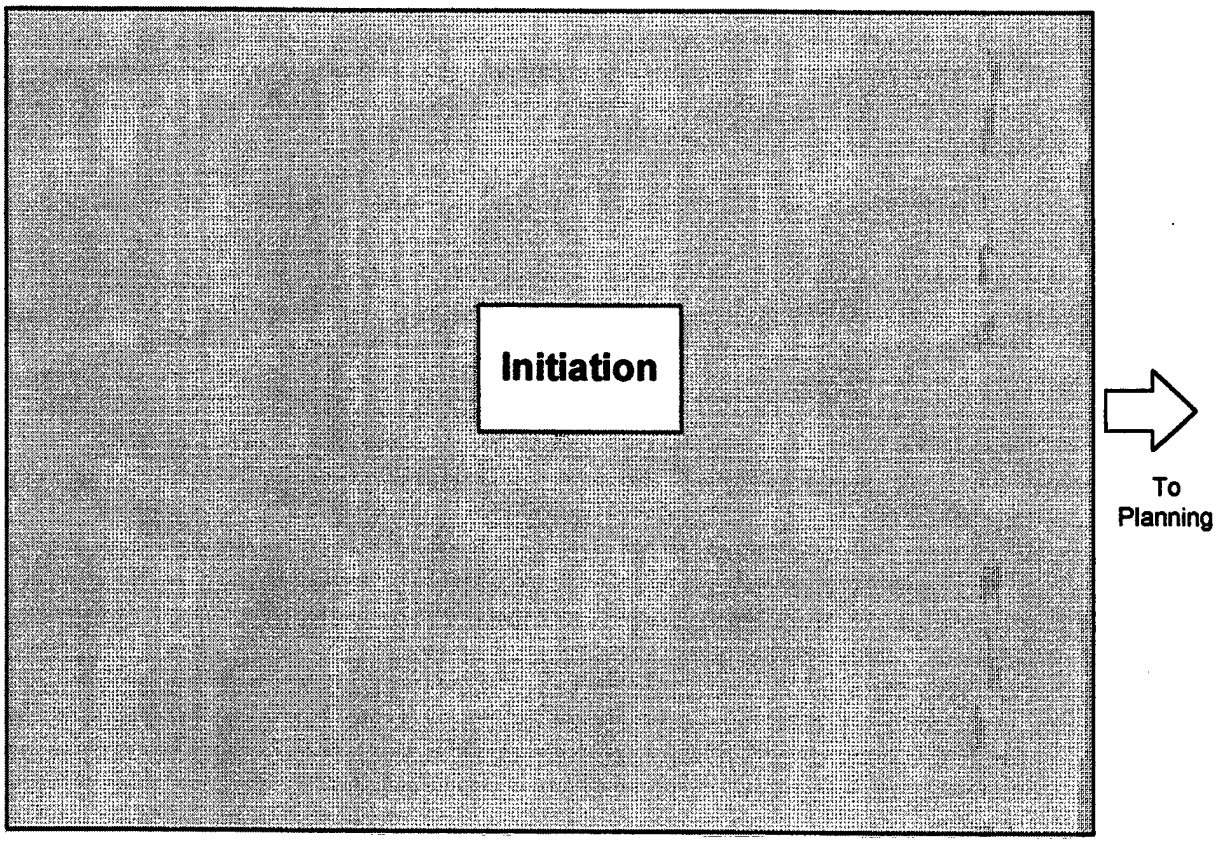
APPENDIX B. PMBOK PROCESSES

The Project Management Institute's (PMI) Project Management Body of Knowledge (PMBOK) guide provides commercially accepted practices for project management. The following Appendix contains a series of briefing charts which outline the project management processes from the PMBOK.

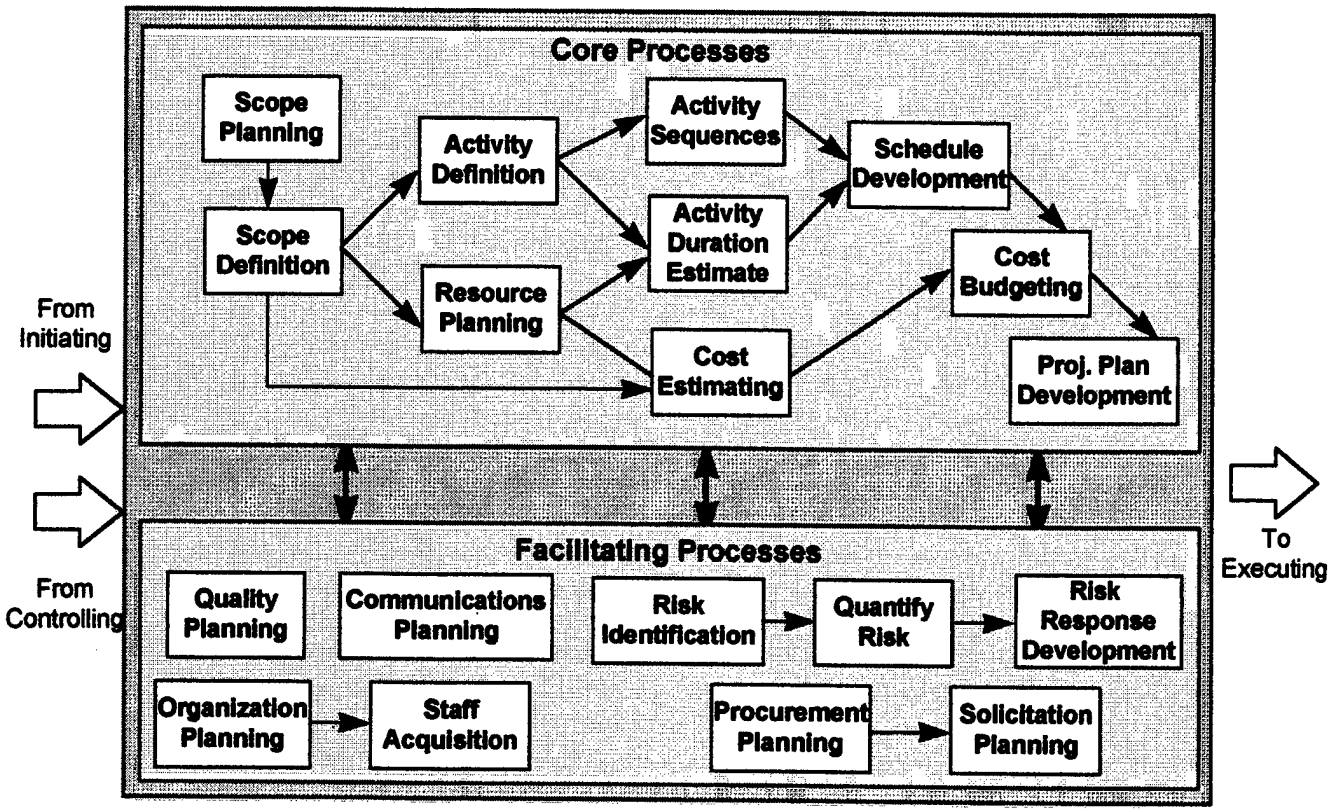
Top Level Project Management Processes



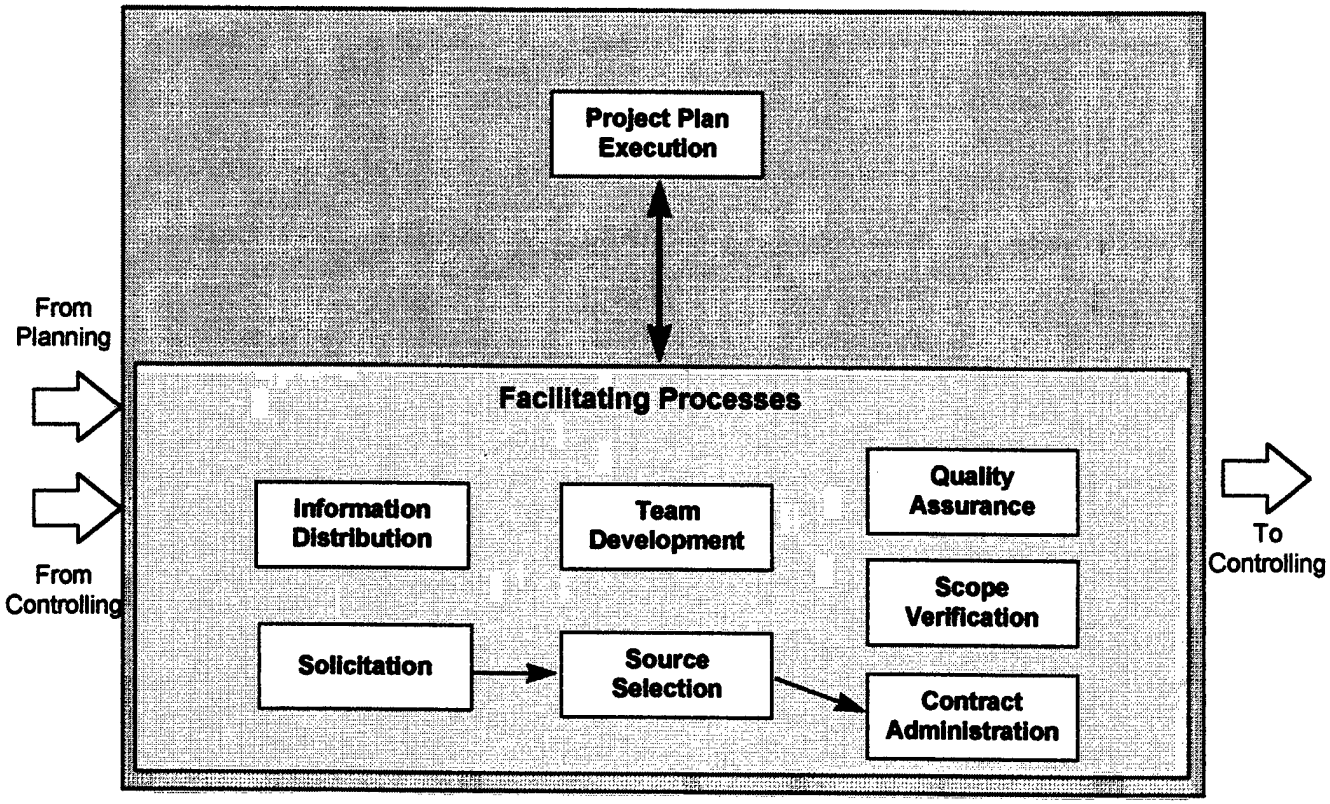
Initiating Processes



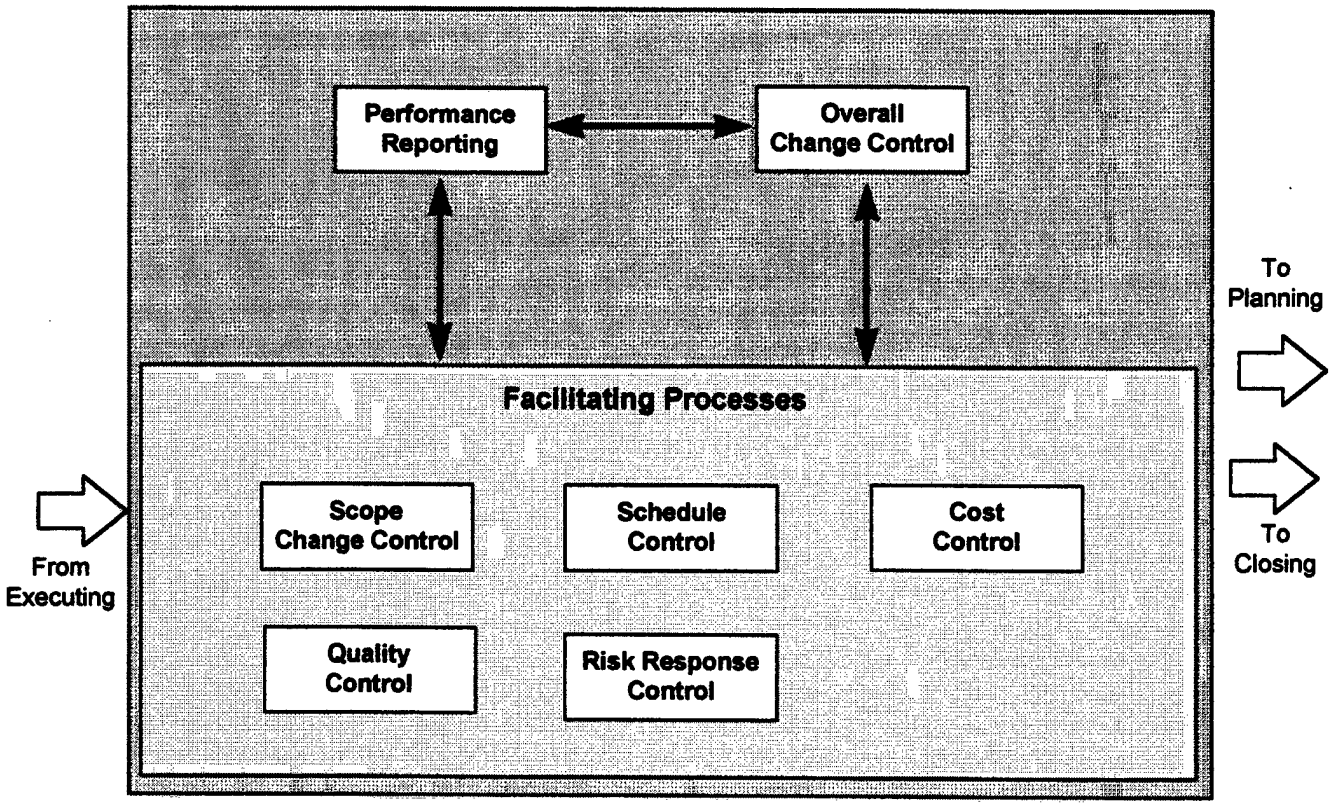
Planning Processes



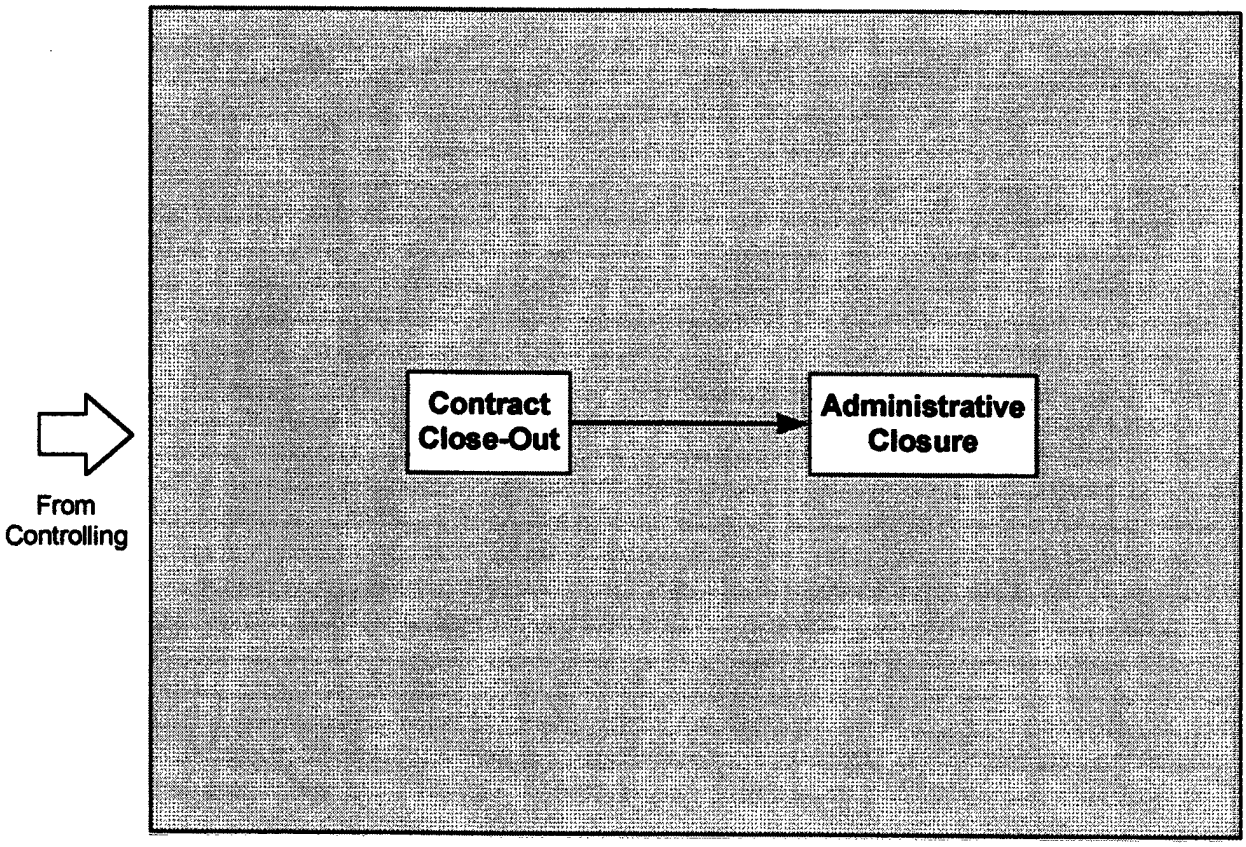
Executing Processes



Controlling Processes



Closing Processes



APPENDIX C. OFFICE OF FEDERAL PROCRUREMENT POLICY LETTER 92-1

The Office of Federal Procurement Policy (OFPP) Letter 92-1 contains two example lists which are provided within this Appendix. The first contains functions considered to be inherently Governmental. The second contains functions considered not to be inherently Governmental.

September 23, 1992

POLICY LETTER 92-1

SUBJECT: Inherently Governmental Functions

The following is an illustrative list of functions considered to be inherently Governmental functions.

- The direct conduct of criminal investigation.
- The control of prosecutions and performance of adjudicatory functions (other than those relating to arbitration or other methods of alternative dispute resolution).
- The command of military forces, especially the leadership of military personnel who are members of the combat, combat support or combat service support role.
- The conduct of foreign relations and the determination of foreign policy.
- The determination of agency policy, such as determining the content and application of regulations, among other things.
- The determination of Federal program priorities or budget requests.
- The direction and control of Federal employees.
- The direction and control of intelligence and counter-intelligence operations.
- The selection or nonselection of individuals for Federal Government employment.
- The approval of position descriptions and performance standards for Federal employees.
- The determination of what Government property is to be disposed of and on what terms (although an agency may give contractors authority to dispose of property at prices with specified ranges and subject to other reasonable conditions deemed appropriate by the agency).
- In Federal procurement activities with respect to prime contracts,
  (a) determining what supplies or services are to be acquired by the Government (although an agency may give contractors authority to

acquire supplies at prices within specified ranges and subject to other reasonable conditions deemed appropriate by the agency);

(b) participating as a voting member on any source selection boards;

(c) approval of any contractual documents, to include documents defining requirements, incentive plans, and evaluation criteria;

(d) awarding contracts;

(e) administering contracts (including ordering changes in contract performance or contract quantities, taking action based on evaluations of contractor performance, and accepting or rejecting contractor products or services);

(f) terminating contracts; and

(g) determining whether contract costs are reasonable, allocable, and allowable.

- The approval of agency responses to Freedom of Information Act requests (other than routine responses that, because of statute, regulation, or agency policy, do not require the exercise of judgment in determining whether documents are to be released or withheld), and the approval of agency responses to the administrative appeals of denials of Freedom of Information Act requests.
- The conduct of administrative hearings to determine the eligibility of any person for a security clearance, or involving actions that affect matters of personal reputation or eligibility to participate in Government programs.
- The approval of Federal licensing actions and inspections.
- The determination of budget policy, guidance, and strategy.
- The collection, control, and disbursement of fees, royalties, duties, fines, taxes and other public funds, unless authorized by statute, such as title 31 U.S.C. [[section]] 952 (relating to private collection contractors) and title 31 U.S.C. [[section]] 3718 (relating to private attorney collection services), but not including:

(a) collection of fees, fines, penalties, costs or other charges from visitors to or patrons of mess halls, post or base exchange concessions, national parks, and similar entities or activities, or from other persons, where the amount to be collected is easily calculated or predetermined and the funds collected can be easily controlled using standard cash management techniques, and

(b) routine voucher and invoice examination.

- The control of the treasury accounts.
- The administration of public trusts

The following list is of services and actions that are not considered to be inherently Governmental functions. However, they may approach being in that category because of the way in which the contractor performs the contractor the manner in which the government administers contractor performance. This is an illustrative listing, and is not intended to promote or discourage the use of the following types of contractor services:

- Services that involve or relate to budget preparation, including workload modeling, fact finding, efficiency studies, and should-cost analyses, etc.
- Services that involve or relate to reorganization and planning activities.
- Services that involve or relate to analyses, feasibility studies, and strategy options to be used by agency personnel in developing policy.
- Services that involve or relate to the development of regulations.
- Services that involve or relate to the evaluation of another contractor's performance.
- Services in support of acquisition planning.
- Contractors providing assistance in contract management (such as where the contractor might influence official evaluations of other contractors).
- Contractors providing technical evaluation of contract proposals.
- Contractors providing assistance in the development of statements of work.
- Contractors providing support in preparing responses to Freedom of Information Act requests.

- Contractors working in any situation that permits or might permit them to gain access to confidential business information and/or any other sensitive information (other than situations covered by the Defense Industrial Security Program described in FAR 4.402(b)).
- Contractors providing information regarding agency policies or regulations, such as attending conferences on behalf of an agency, conducting community relations campaigns, or conducting agency training courses.
- Contractors participating in any situation where it might be assumed that they are agency employees or representatives.
- Contractors participating as technical advisors to a source selection board or participating as voting or nonvoting members of a source evaluation board.
- Contractors serving as arbitrators or providing alternative methods of dispute resolution.
- Contractors constructing buildings or structures intended to be secure from electronic eavesdropping or other penetration by foreign governments.
- Contractors providing inspection services.
- Contractors providing legal advice and interpretations of regulations and statutes to Government officials.
- Contractors providing special non-law enforcement, security activities that do not directly involve criminal investigations, such as prisoner detention or transport and non-military national security details.

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