

# **A Study of the Federal Government's Experiences with Commercial Procurement Practices in Major Defense Acquisitions**

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Submitted to the Alfred P. Sloan School of Management and The School of Engineering  
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## **ABSTRACT**

The continual decline in our country's defense budget has severely impacted both government and the defense industry. To cope, the government has increasingly relied on the use of commercial procurement practices, a central tenet of federal acquisition reform. This thesis examines the impact of new commercial procurement practices from the perspective of the average defense acquisition manager. Using research information gathered from 23 current defense acquisition programs which used commercial procurement practices successfully, the thesis identifies specific practices in use, documents lessons learned from practice implementation, and investigates five core hypotheses regarding the direct impact of the practices on acquisition costs, acquisition schedule, quality, life cycle support, and life cycle costs.

From a vast array of possible business practices, thesis research identified eight specific practices that are permitted by existing policies and actively promoted within the government. Analysis of data from 23 programs found that four practices were employed by a majority of programs surveyed. Likewise research revealed that almost half of the programs reported uncertainty with item performance as the most critical risk posed by commercial procurement practices and the challenge of cultural acceptance as the greatest obstacle to implementation. In addition, a program-type analysis concluded that munitions and systems acquisition programs were the most active users of commercial procurement practices. On average, these programs used four or more specific practices per program, while in comparison aircraft programs on average used less than four practices and vessel programs averaged less than three.

After thorough analysis, the research data provided evidence to support all five thesis hypotheses. Data showed that commercial procurement practices indeed reduced program acquisition costs by 4.3% and afforded indirect savings by enabling substantial staff reductions and cost/performance decision making. In addition to cost reductions, it was found that the practices directly achieved a 17 month average program schedule reduction. In general, the majority of acquisition managers surveyed concluded that the use of commercial procurement practices actually improves product quality, does not degrade life cycle support, and does not increase life cycle costs.

An examination of common themes in the use of commercial procurement practices concluded that five practices accounted essentially for all reported program cost and schedule reductions. In conclusion, the thesis accomplished all intended goals. The thesis provided evidence to support the five core hypotheses, therefore substantiating acquisition reform rhetoric regarding the value of commercial procurement practices. In addition, the thesis revealed valuable managerial insights into the actual benefits and risks of commercial procurement practices and offered proven strategies for implementing the practices.

Thesis Supervisor: Eric Rebentisch  
Title: Research Associate

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Most of all, I thank my family for their patience and support. I appreciate the blessing of coming home to my smiling, happy boys Skyler and Keaton. I am especially grateful to my wife Cynthia for her steadfast love and support. I am such a lucky man to have such a talented and devoted companion. Lastly, I dedicate this thesis to my father who got me started on the right track not so many years ago.

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## **Chapter 1. Thesis Introduction, Goals, and Organization.**

**Chapter Summary.** The continual decline in our country's defense budget has severely impacted both government and the defense industry as well. To cope, the government has increased its use of commercial procurement practices, a central tenet of federal acquisition reform. Numerous legislative reforms and internal agency policies have not only permitted but in certain cases mandated the use of specific commercial procurement practices. This thesis examines the impact of new commercial procurement practices from the perspective of the average defense acquisition manager. Using research information gathered from 23 current defense acquisition programs that claim to have successfully implemented commercial procurement practices, the thesis seeks to identify the types of commercial procurement practices in use, to document lessons learned from actual implementation, and to evaluate the five core thesis hypotheses. The five core hypotheses probe the direct impact of commercial procurement practices on acquisition costs, acquisition schedule, quality, life cycle support, and life cycle costs.

### **1.0. Introduction.**

The prevailing austere fiscal climate in the federal government has considerably strengthened support for government acquisition reform. Government agencies and the corresponding government-industrial sector sorely need more efficient and streamlined business practices to offset the impacts of increasingly severe budget reductions. This thesis examines one of the central tenets of government acquisition reform - the implementation of commercial procurement practices.

The present federal acquisition process is arguably ultimately effective, yet entails complicated and laborious practices which are largely unique to the government. As a result, government acquisitions typically cost more than similar purely commercial transactions. Moreover, government-unique acquisition requirements significantly contribute to the detrimental dependence of government suppliers on federal contracts. These weaknesses have become more pronounced as federal budgets continue to decline. Government agencies must become more fiscally savvy and its suppliers must likewise become more competitive in order to survive. To achieve these ends, strong support has emerged for government acquisition reform. Well beyond simply reducing costs, the key strategic objectives of federal acquisition reform are to promote broader accessibility to government contracts, increase the government's use of new technology, and to assist traditional suppliers in evolving dual-use

production. Dual-use describes the practice of producing both government and commercial products from the same manufacturing process or facility.

A key strategy toward achieving these acquisition reform goals is the implementation of commercial procurement practices. Commercial procurement practices enable suppliers to conduct business with the government in a similar manner as performed within industry. The call for increased use of commercial practices and products in defense acquisitions has been a recurring theme for over 25 years. Numerous studies of Department of Defense (DoD) acquisition practices concluded that federal acquisition laws and regulations create significant barriers to entry for commercial-oriented firms seeking government contracts. The Fitzhugh Commission in 1970, The Commission of Government Procurement in 1972, The Grace Commission in 1984, The Packard Commission in 1986, and the recent DoD sponsored Coopers and Lybrand Study of 1994, all concluded that the adoption of commercial procurement practices would reduce acquisition costs and lead times.<sup>1</sup>

In the past, the practical implementation of many commercial procurement practices were prevented by legislative and regulatory barriers. However, several recent legislative reforms, such as the Federal Acquisition Streamlining Act (FASA) of 1994, the Defense Acquisition Management Reform Act (DAMRA) of 1995, and the Federal Acquisition Reform Act (FARA) of 1996, have authorized and in some cases mandated the use of many specific commercial procurement practices. In addition, within the DoD, as well as other government agencies, acquisition policies have been revised to promote and in certain cases require the use of particular commercial procurement practices.

### **1.1. Thesis Goals.**

The author is motivated to study the value and government experience with commercial procurement practices as he will be working in major systems acquisition for the U. S. Coast Guard following graduation from the Massachusetts Institute of Technology. The topic of commercial procurement practices is of great personal interest and the insights and knowledge gained will be directly applicable to future career responsibilities.

The fundamental goals of this thesis are to identify the specific commercial procurement practices in use, to document lessons learned from actual implementation, and to evaluate the five core thesis hypotheses. The approach to the thesis considered the implementation and impact of commercial

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<sup>1</sup> Michael Heberling and Tracy Houpt. "What is, and What is Not, a Commercial Item." Working Paper, Manufacturing and Technology Division, Wright Patterson Air Force Base, 1994, p. 1.

procurement practices from the perspective of the average defense acquisition program manager.<sup>2</sup> As highlighted in the introduction, considerable change is underway in the realm of government acquisition policies. The average defense acquisition manager hears much of the rhetoric about the value of acquisition reform and more specifically the reports of how the use of commercial procurement practices will reduce acquisition costs, shorten acquisition schedules, and in general are good for both government and industry. Yet, the acquisition manager is where the “acquisition rubber meets the road.” He/She is personally accountable for acquiring a defense product that does the job right, is reliable and supportable, and is delivered on time and within budget. How would these new commercial procurement practices impact their acquisition program? What are the risks to product quality, life cycle costs, and life cycle supportability?

Seeking the answers to these practical questions confronting defense acquisition managers became the fundamental premise for this thesis. Specifically, this thesis studies the following five core hypotheses for the implementation of commercial procurement practices in defense acquisition programs:

- ◆ **Hypothesis #1** - The use of commercial procurement practices reduces acquisition program costs.
- ◆ **Hypothesis #2** - The use of commercial procurement practices shortens acquisition program schedule.
- ◆ **Hypothesis #3** - The use of commercial procurement practices does not compromise product quality.
- ◆ **Hypothesis #4** - The use of commercial procurement practices does not degrade product life cycle support.
- ◆ **Hypothesis #5** - The use of commercial procurement practices does not increase product life cycle costs.

These thesis hypotheses are relevant and important to defense acquisition managers, because if true, they confirm prevailing rhetoric of the potential value of commercial procurement practices under existing regulations. Furthermore, the thesis will lend valuable insight into which specific commercial procurement practices are most valuable and the strategies acquisition managers have developed to successfully implement these practices. To test the thesis hypotheses, 23 defense acquisition programs which employed commercial procurement practices were contacted and surveyed to capture their experience with respect to the five core thesis hypotheses.

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<sup>2</sup> Note - Although the U. S. Coast Guard is part of the Department of Transportation, it is one of the country’s military services, and for generic descriptive purposes herein is considered a “defense” service. It is acknowledged and understood that the Coast Guard follows DOT acquisition policies, not those of the DoD.



## **1.2. Thesis Organization.**

The thesis is organized into five chapters and two appendices. The general subject and content of each chapter is as follows:

- **Chapter 1. Thesis Introduction, Goals, and Organization.**
- **Chapter 2. Research Strategy and Methodology.** Describes the process and philosophy for collecting information from actual defense acquisition programs. Discusses which programs were targeted, and the survey strategy to capture their experiences.
- **Chapter 3. Eight Specific Commercial Procurement Practices and Analysis of Defense Program Experience.** Defines the term commercial procurement practices and describes eight specific commercial procurement practices identified during thesis research. Reports research findings from the 23 defense acquisition programs studied on the frequency of use, perceived risks, obstacles to implementation, and sources of reference information on commercial procurement practices.
- **Chapter 4. Analysis of Thesis Hypotheses.** Examines research findings in depth with respect to the 23 defense acquisition programs studied with respect to each of the five core thesis hypotheses.
- **Chapter 5. General Themes and Thesis Conclusions.** Discusses general themes observed in the use of commercial procurement practices. Summarizes specific thesis findings and results and suggested topics of interest for further research.
- **Appendix A.** Provides a copy of the standard thesis research survey.
- **Appendix B.** Provides a brief description of the defense acquisition programs studied.

## **Chapter 2. Research Strategy and Methodology.**

**Chapter Summary.** The purpose of thesis research was to examine actual defense acquisition program experience on the implementation and resulting impact of commercial procurement practices. The primary research methodology was to collect information by means of a standard research survey. The survey balanced the desire for comprehensive data collection with the practical time constraints of the participating acquisition managers. As a result, the survey is very broad in scope but somewhat subjective and limited in depth. The availability of information and extent of acquisition process waivers was evaluated for 37 potential programs which claimed to use commercial procurement practices. From this group, 23 programs were studied in detail. In general, all acquisition managers were extremely helpful and eager to share their lessons learned.

### **2.0. Introduction.**

The fundamental intent of this thesis is to capture the government's actual experience with commercial procurement practices. The specific thesis goals were: identify the specific commercial procurement practices in use; document the lessons learned from actual implementation; and evaluate the five core thesis hypotheses. Therefore, the thesis research methodology primarily focused on contacting and interviewing practicing government acquisition managers with hands-on familiarity with commercial procurement practices. Although this research approach gathered a wealth of valuable program insights, it consequently lacked a control group to compare findings with respect to the five core thesis hypotheses. As a result, the research can only offer to lend support to the thesis hypotheses.

The data collection strategy consisted of three principal steps. The initial step consisted of an exhaustive review of commercial procurement practice literature. This review provided the necessary familiarity and expertise with the basic concepts and specific practices. As the second step, a standard open-ended data collection survey was prepared. This standard survey ensured that comparable information was collected on each defense program studied. This uniformity of information provided a consistent basis for comparing the acquisition programs. The third step involved the identification and selection of those defense acquisition programs worthy of study and subsequently contacting these programs to gain the desired survey information.

The following sections of this chapter discuss survey development, the process for selecting programs to research, and in conclusion, the lessons learned from the actual survey/data collection process.

### **2.1. Research Survey Development.**

The data collection survey was developed by methodically formulating questions based upon the vast scope of processes, reports, and responsibilities of defense acquisition programs that afforded meaningful insight toward the three fundamental thesis goals. The critical challenge in developing the research survey was defining questions that singled out the impact of commercial procurement practices from the many other acquisition reform and general contracting influences in the government's defense acquisition process. Greatly complicating this task was the lack of uniform project management benchmarks or accounting systems common to all defense programs. In consideration of these issues, the general philosophy employed was to develop open-ended questions that represented key issues to the thesis and dealt with management aspects within the control of defense acquisition program manager.

The first draft yielded a ten page, 100+ question survey. This "ideal" survey uniquely and comprehensively examined every aspect of the five thesis hypotheses. Unfortunately the real world is hardly an ideal world. It was correctly assumed such a lengthy and detailed survey would pose too imposing a task to potential respondents. As a result, the initial survey was halved in length. This five page survey was tested on the first few acquisition programs studied and found to be too burdensome to the extremely busy defense acquisition managers targeted. Once again, the survey was further reduced to a total of 35 questions requiring only three pages. A copy of the final research survey is provided in Appendix A at the end of the thesis.

As a result of the tradeoffs to minimize its length and to make it applicable to the range of programs under study, the final survey is very broad in scope but rather shallow in depth. The survey relies on only a few questions to capture the essence of each hypothesis research area. This is a challenging task for topics as expansive as product quality or life cycle costs. The final survey is also somewhat subjective in nature. Many of the survey questions fundamentally call for the acquisition manager's opinion to concisely depict the program's experience on the particular research topic. A more rigorous approach would have been to collect volumes of program raw data, and to cull through program reports and documentation to factually determine the program's experience on these same issues. Although it is more desirable, the rigorous approach is simply beyond the scope of labor and time available for this thesis. An approach of this type would have greatly constrained the breadth of research topics and compromised the total number of programs examined during research.

The subjective nature of some survey questions became glaringly apparent by the inadvertent survey of the same acquisition program by two entirely distinct program representatives. Although the two surveys were largely similar, the representatives stated markedly different opinions on the impact of

commercial procurement practices on program staffing, life cycle costs, and life cycle support. This lack of agreement clearly illustrates the strong influence of the relative opinion of the person completing the survey. To minimize the research subjectivity, respondents were asked to cite the sources for quantitative survey data, such as cost and schedule impacts. In addition, attempts were made to have the survey completed at the highest level possible within the program staff - ideally by the program manager or deputy program manager. It was believed, the higher level manager would possess a better overall understanding of the impact of commercial procurement practices.

In actuality a fundamentally subjective study is simply unavoidable. Even heavily funded major government studies, such as the DoD's recent study by Coopers and Lybrand, are essentially subjective in nature as well. The absence of common program accounting methods and acquisition reform benchmarks makes a rigorous comparison based on purely quantifiable data extremely difficult, if not practically impossible.

### **2.2. Process for Selecting Programs to Research.**

The first inclination was to study a broad range of government acquisition programs claiming to use commercial procurement practices. This approach would have included researching the gamut of products and services acquired by the many different agencies throughout the federal government. Although this aggregate survey would have been extremely valuable, this approach raised significant practical obstacles, most in particular, each government agency operates under somewhat different acquisition rules and policies – especially in the use of commercial procurement practices.

The lack of consistent acquisition policy standards resulted in a strict focus on defense acquisition programs, specifically those acquisition programs reporting to use commercial procurement practices in the Army, Navy, Air Force, Marine Corps, and Coast Guard. These armed services employ relatively comparable formal and informal acquisition policies. Even though it is part of the Department of Transportation (DOT), the Coast Guard's acquisition practices largely mirror those of the DoD services. By focusing solely on defense programs a more coherent was made possible by the fundamental commonality between programs.

The intent of this thesis is to examine defense acquisition programs actively implementing commercial procurement practices. Specific programs were selected based on literature search leads and more frequently upon word of mouth recommendations from current acquisition managers. All programs surveyed were queried to suggest other defense programs worthy of study.

In all, more than 37 defense acquisition programs were contacted. From this group, only 23 were actually researched for the purposes of this thesis. Table 2-1 provides the titles of these programs

**Table 2-1. List of Defense Acquisition Programs Surveyed during Thesis Research.**

<b>Aircraft Programs</b>
1. USA Longbow Apache Attack Helicopter Program
2. USA Black Hawk Utility Helicopter Program
3. USA Comanche Helicopter Program
4. USAF C-130J Aircraft Acquisition Program
5. USAF C-17 Aircraft Acquisition Program
6. USAF F-22 Aircraft Acquisition Program
7. USAF F-15 Aircraft Acquisition Program
<b>Systems Programs</b>
8. USAF Joint Tactical Information Display System (JTIDS)
9. USAF Milstar Satellite Program
10. USAF T-38 Avionics Upgrade Program
11. USAF Integrated Maintenance Data System (IMDS)
12. USAF PACER Compass, Radar and GPS Program (PACER CRAG)
13. USN Joint Maritime Communications System - Afloat Telecomms System Program (JMCOMS ATS)
14. USN Joint Maritime Communications System - Mini-DAMA Program (JMCOMS MD)
<b>Vessel Programs</b>
15. USCG 180' Seagoing Buoy Tender Replacement Program (WLB)
16. USCG Coastal Buoy Tender Replacement Program (WLM)
17. USCG Cutter Boat Replacement Program
18. USCG Coastal Patrol Boat Replacement Program (WPB)
19. USN LPD-17 Amphibious Transport Dock Ship Program
<b>Munitions Programs</b>
20. USAF Advanced Air-to-Air Missile Program (AMRAAM)
21. USAF Joint Air-to-Surface Missile Program (JASSM)
22. USAF Sensor Fused Weapons Program (SFW)
23. USN Joint Standoff Weapon Program (JSOW)

and Appendix B provides a brief summary description on each of these programs. As the format of Table 2-1 indicates, the 23 defense programs are categorized into four distinct functional acquisition groups – aircraft (7 programs), systems (7 programs), vessels (5 programs), and munitions (4 programs). These categories are significant to the research analysis detailed in Chapters 3 and 4 by highlighting the similarities and differences in use and value of commercial procurement practices to the respective program types.

The acquisition programs contacted but not included in the thesis research were excluded for a variety of reasons. Some culled programs – had not actually used commercial procurement practices, simply had no records on the information sought, were too mature for commercial procurement practices to have any appreciable impact, or simply the programs were too busy to provide the desired information in the time available.

Another major program selection criteria was the impact of acquisition process/policy waivers. All programs were questioned about waivers granted for the program. Acquisition process waivers were a program screening factor because the intent of the thesis was to examine commercial procurement practices from the perspective of the “typical” acquisition manager. A few programs had been granted special waivers of legislative and/or agency acquisition process requirements that are not available to the “typical” acquisition program. Programs operating with the advantages provided by these special waivers were excluded from the study to more accurately reflect the findings of “typical” acquisition programs.

### **2.4. Lessons Learned from the Survey Process.**

In general, it was quickly confirmed that defense acquisition managers are extremely busy. Simple persistence was the most valuable tool in collecting information. Periodic telephone calls and in many cases daily telephone calls or email messages were necessary to gain access to program representatives and then to ensure provision of the desired information.

Nonetheless, the defense acquisition managers were almost unanimously interested and helpful in the thesis research process. Most managers were eager to provide information and share their lessons learned. It is believed the author’s background in defense acquisitions greatly promoted the rapport and willing participation of the programs. By promoting a professional yet understanding relationship, the author could simultaneously empathize with the strain of an unsolicited data call and still gently prod for its completion. For example, one acquisition manager sent the following email reply to a thesis survey status inquiry, “Frustration level rising. We had unexpected IG and GAO follow up meetings and questions hit and was unable to finish your paper. We will be reviewing over the weekend and sending out late Monday, early Tuesday to you. I will be TDY next week and [alternate poc] will be sending response to you via fax.” This note illustrates that in spite of their demanding workloads, the acquisition managers demonstrated a strong and genuine spirit of cooperation and commitment.

A few common problems emerged during the survey process. For instance, most surveyed programs consisted of several acquisition phases and procurement actions. Survey respondents were not intimately familiar with all program aspects and noted some difficulty to coherently assess the impact of commercial procurement practices across all program activities. For example, one acquisition manager responded that, “Because the [program name] is a large and complex program, I had difficulty answering many of your questions in the space and context of your questionnaire. Therefore, rather than provide overly simplistic answers regarding our perspective on the underlying issues, I have written a fairly lengthy response.” As this example shows, some programs provided extensive supplemental information

in addition to their survey responses. Other programs chose to focus on a specific acquisition sub-program within the larger program. Another tactic was to allow extra time for survey completion, so the survey could be passed around the program office to the various individuals responsible for the issues under question.

The recent implementation of commercial procurement practices poses another problem. Although the practices have been applied in the program, no contract deliverables have been received, making responses to some survey questions difficult or impossible. This short acquisition history particularly impacts the thesis research on quality and life cycle support and costs. Unfortunately, there was no practical solution for this problem.

Lastly, in a few cases, commercial procurement practices posed a “Catch-22” dilemma. The program streamlined contract administration and data deliverables (a commercial procurement practice discussed at length in Chapter 3) to the point that the contractor was not required to provide the administrative and accounting information necessary to assess the specific impact of commercial procurement practices. These programs would reply to survey questions with a statement such as, “We know we are achieving program savings, but we just can’t quantify how much or the specific practices driving the savings.”

## **Chapter 3. Eight Specific Commercial Procurement Practices and Analysis of Defense Program Experience.**

**Chapter Summary.** From a vast array of possible business practices, literature search and thesis research combined to identify eight specific practices that are permitted by existing policies and actively promoted within the armed services. These eight practices collectively define the scope of commercial procurement practices for the purposes of this thesis. The eight practices are: Performance Specifications, Government/Contractor Cooperation and Relationship, Commercial Specifications and Standards, Streamlined Contract Administration, Past Performance, Best Value, Commercial Warranties, and Commercial-Off-the-Shelf/Non-Developmental Item (COTS/NDI). As each practice was examined in extensive detail, it was found that the first four practices were the most widely used. Likewise research revealed that almost half of the surveyed programs reported uncertainty with item performance as the most critical of eight risk factors identified. Acquisition managers reported encountering five types of obstacles during implementation, with the challenge of cultural acceptance cited most frequently. A review of reference sources discovered an apparent training deficiency as two thirds of the surveyed programs stated self-education as the primary source of knowledge on commercial procurement practices. Lastly a program-type analysis revealed many interesting program-specific insights, most notably munitions and systems programs were the most active users of commercial procurement practices, averaging in excess of four practices per program.

### **3.0. Introduction.**

For the purposes of this thesis, the definition of the term commercial procurement practices is offered by the Defense Systems Management College (DSMC). DSMC defines commercial procurement practices as the “techniques, methods, customs, processes, rules, guides, and standards normally used by business but either applied differently or not used by the federal government.”<sup>1</sup>

As many defense acquisition managers quickly pointed out, this definition is rather broad and encompasses a gamut of business practices. Yet, the range of possible practices is rather limited. Some commercial procurement practices are not currently achievable due to legislative and regulatory barriers; while others are simply not suitable for the government environment. For these reasons, a fundamental goal of this thesis is to identify specific commercial procurement practices in actual use by defense

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<sup>1</sup>Defense Systems Management College, Commercial Practices for Defense Acquisition Guidebook. Washington, DC, Government Printing Office, 1992, p. v.



acquisition programs. During the course of the thesis research, an extensive review of relevant acquisition reform and commercial procurement practice literature, close examination of survey responses, and countless discussions with current defense acquisition managers all combined to yield the conclusion that eight distinct commercial procurement practices pervade defense acquisitions. These eight practices are both executable under existing government regulations/policies and are being actively promoted and implemented within the federal government. These eight practices are:

- Past Performance
- Best Value
- Commercial Warranties
- Government/Contractor Cooperation and Relationship
- Performance Specifications
- Commercial Specifications and Standards
- Streamlined Contract Administration
- Commercial-Off-the-Shelf/Non-Developmental Item (COTS/NDI) Procurement

In addition to the above eight standard commercial procurement practices, a range of other business practices and acquisition strategies were encountered and after careful consideration excluded from the study. These other practices, although valuable, were not included in the thesis as they failed to meet the core definition of commercial procurement practices. For example, three programs obtained positive results from employing financial incentives to manage costs and contractor performance. However, financial incentives are a proven traditional management and motivation strategy common to both government and commercial contracting. Another two programs cited the value of Cost As an Independent Variable (CAIV) management techniques. Although CAIV is a highly regarded initiative of federal acquisition reform, it was also deemed more of a government cost management strategy than a commercial procurement practice. Other cited practices which similarly failed to meet the thesis definition of commercial procurement practices were: early user involvement, the outsourcing strategy for total contractor logistics support, and the parallel implementation of several simultaneous program feasibility studies/contracts.

This chapter defines the eight standard commercial procurement practices identified through literature search and survey research and reveals practical lessons learned on these practices from current defense acquisition programs. The chapter consists of three principle sections. Section 3.1 is divided into eight individual subsections. Each subsection delves into one of the eight specific practices and comprehensively defines the practice, cites relevant regulatory, legislative or agency policies, and notes

strategies for implementation. In addition, each of the subsections describes research observations regarding the practice's frequency of use among the 23 programs studied and when available offers insights on the perceived risks and major obstacles encountered during implementation.

Section 3.2 of this chapter consists of two subsections that examine aggregate research findings from the sample of 23 defense acquisition programs, on the status and perceptions resulting from implementation of commercial procurement practices. The first subsection compares and discusses the overall frequency of use of the eight core practices, the perceived risks, the major obstacles encountered during implementation, and the program's principle sources of program reference. The next subsection offers a program-type analysis where research data on frequency of use, risks, obstacles, and sources of information is sorted according to the four types of programs in the study. As defined in Chapter 2, the four types of programs researched are: aircraft, systems, vessels and munitions. This comparison offers insights into the impact and value of commercial procurement practices for each of the four types of programs studied.

The chapter closes with a discussion of chapter conclusions in Section 3.3. This section provides a brief summary of significant chapter findings and discusses general observations and conclusions regarding the use of commercial procurement practices.

### **3.1. Description of Specific Commercial Procurement Practices.**

Each of the following eight subsections address one of the eight core commercial procurement practices. In addition, Chapter 4 examines the direct impacts of these eight practices with regard to the examination of the five core thesis hypotheses.

#### **3.1.1. Past Performance.**

In the commercial sector, a supplier's past performance is a critical selection criteria. Current regulations allow the government to implement this same practice. Furthermore, a 1995 change to the Federal Acquisition Regulations (FAR) mandated that all contracts over \$1M *must include* past performance as an evaluation criteria. The obvious benefit to the government from this practice is the ability to disqualify disreputable low bidders. Unfortunately, in spite of its legality, the practice can be difficult to implement. A few acquisition managers noted that the constantly evolving structure of industry with its corporate reorganizations, mergers, and alliances, can cause uncertainty in determining the entity responsible for poor past performance. Another aspect mentioned by acquisition managers is the liberal federal contract appeal procedures. Protests from disqualified bidders jeopardize not only contract award but also the government's entire delivery schedule. Nonetheless, when rigorously

applied, past performance criteria can be extremely valuable and withstand contractor protests. For example, one program in the study used past performance as its principle evaluation criteria and successfully withstood two contractor protests.

Discussions with defense acquisition managers indicated that the respective armed services have various means and systems for tracking contractor past performance. One acquisition manager reported that the Air Force has been using past performance as a bid evaluation criteria for the past ten years. To aid the Air Force's evaluation, the service developed a special form and format for documenting contractor performance - the Contractor Performance Assessment Report (CPAR). After completion of a contract, the responsible Air Force acquisition manager completes the CPAR, making the information accessible for evaluating that contractor's past performance in future USAF contracts.

As with the other armed services, using past performance as a bid evaluation criteria is standard practice for major acquisitions in the Coast Guard. Given that the scope of Coast Guard acquisitions is relatively small in comparison to the larger DoD services, the Coast Guard frequently relies on past performance records of the other services when evaluating contractor proposals. One recent Coast Guard acquisition program gained valuable past performance data on bidders by examining contractor performance histories on Navy contracts.

In the survey of 23 defense acquisition programs, only four programs cited the use of past performance in their acquisition program. Given that the FAR requires past performance in all acquisitions above \$1M, one might assume that all of the programs employed past performance (as they all had acquisition budgets over \$1M), but only four programs cited past performance as a meaningful contribution to the acquisition program.

### **3.1.2. Best Value.**

In the commercial sector, the selection criteria for suppliers can include a range of critical decision factors besides lowest price. In similar fashion to past performance, the government not only has the legal ability but also regulatory pressure to employ best value practices for government contracts. Recent initiatives, such as the National Performance Review and the FASA, enable trade-off considerations between cost, quality, life cycle support and maintenance, and any other relevant factors which yield cost reductions or provide better efficiency/service to the government. In a practical sense, acquisition managers again noted the potential for protests from losing bidders. Although no programs reported experiencing such a protest.

The most successful strategy for implementing best value contracting appears to employ a performance-based contract specification and specifically to define the best value evaluation criteria in

the contract solicitation. Although this extra effort up front typically requires more time and expertise, it clearly defines government expectations and reduces the subsequent chance of contractor protest.<sup>2</sup>

In the survey of 23 defense acquisition programs, five programs cited the use of best value in their acquisition program. Given the recent regulatory initiatives to promote best value, in similar fashion as with past performance, it is assumed that most of the surveyed acquisition programs employed some form of best value, but in only five programs did best value yield noteworthy contributions to the acquisition program.

### **3.1.3. Commercial Warranties.**

Warranties tend to be a standard feature of most products and services sold in the marketplace. Two aspects of commercial warranties emerge from the literature search and acquisition program surveys. The first is government acceptance and use of the standard commercial product warranty. The second is the government's purchase of extended product warranties. A practical strategy to balance the government's need for adequate warranty coverage and its corresponding cost is to employ best value and past performance contracts. These two proposal evaluation criteria enable the government to evaluate the merits of supplier warranties in terms of cost, coverage and the contractor's historical performance in honoring the warranty.<sup>3</sup>

#### **3.1.3.a. Standard Commercial Warranty.**

In the commercial sector, the typical buyer receives the standard manufacturer warranty with the purchase of the good or service. However, the traditional government approach has been to require special warranty provisions to meet its unique needs and to serve as yet another measure to ensure receipt of quality products and services. The Federal Acquisition Regulations (FAR) serve as the basis for the government's authority to require special warranties and defines several types of warranty clauses that may be included in government contracts.

From the commercial perspective, special warranties increase the cost of government contracts and also discourage participation from purely commercial-focused firms. Under commercial procurement practices, the government would accept the basic commercial warranty whenever possible. After all, the FAR specifically does not mandate government-unique warranties, but rather directs that government obtain adequate warranty coverage. The determination of warranty adequacy is appropriately left to the government's acquisition officials.

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<sup>2</sup>DSMC Guidebook, chpt. 3.

<sup>3</sup>DSMC Guidebook, chpt. 5.

In the survey of 23 defense acquisition programs, six programs cited the use of commercial warranties in their acquisition program. Of these six programs, two purchased the standard commercial warranty.

#### 3.1.3.b. Extended Commercial Warranties.

The second aspect of commercial warranties is the relatively recent marketplace focus on extended product warranties. For a premium over and above a product's market price, the manufacturer (or sometimes third party entities) offers the option of extending the warranty coverage of the product. The traditional view is the government is self-insured and can provide adequate organic support for a vast range of products and services - so extended warranties are not necessary. However, under commercial procurement practices, the government assesses the cost effectiveness of traditional government support. In certain circumstances cost and workload advantages are achieved by having the manufacturer/contractor accountable for extended warranty support and repair of the procured items.

In the survey of 23 defense acquisition programs, six programs cited the use of commercial warranties in their acquisition program. Of these six programs, four purchased extended commercial warranties.

#### **3.1.4. Government / Contractor Cooperation and Relationships.**

Two aspects of government/contractor cooperation and relationship emerge from the literature search and acquisition program surveys. The first is the fundamental cultural change to a cooperative mode of government/contractor relations. The second is the government's acknowledgment of the value of long term supplier relationships. In the survey of 23 defense acquisition programs, 14 programs cited the value of government/contractor cooperation and relationship. As discussed more thoroughly in Chapter 4, the survey responses indicated the use of government/contractor cooperation and relationship resulted in substantial program cost savings.

#### 3.1.4.a. Government/Contractor Cooperation.

The traditional nature of the government/contractor relationship can be characterized as rather adversarial, with each side solely looking out for its own interests. Under commercial procurement practices the relationship between the government and the contractor, and with industry in general, is more trusting and partnership-oriented. Several specific practices encourage and promote this cooperative relationship. The practices of COTS/NDI, performance specifications, and commercial specifications and standards collectively serve to broaden the range of firms eligible to bid on

government contracts. Likewise, the practices of best value and past performance enable the selection of the most efficient and responsible government suppliers.

Nonetheless, the change to a cooperative government/contractor relationship can be very challenging to defense acquisition programs with long acrimonious histories. Some acquisition managers from mature programs commented the cultural change to a cooperative relationship was exceedingly difficult. Several years of cooperative team building and in some cases the removal of certain obstinate key individuals were necessary to overcome the affects of past disagreements and conflicts before mutual trust was possible.

The concept of cooperative government/contractor relations was found largely to consist of two practices – the reduction of government oversight and the commercial participation in program Integrated Product Teams (IPT).

The traditional government oversight approach was largely shaped by pervasive and somewhat restrictive policies mandated by legislation such as the Competition in Contracting Act (CICA), the Truth in Negotiations Act (TINA), Cost Accounting Standards (CAS), and the Federal Acquisition Regulations (FAR). Collectively these regulations created processes to oversee a gamut of contractor efforts in order to ensure the proper manufacture and delivery of procured material at a fair and reasonable price. Under commercial procurement practices, the new catch phrase is “government insight - not oversight.” The government places more trust in the contractor’s ability and integrity. This trust is more feasible in the current acquisition environment where past performance can affect a contractor’s future opportunities. Fourteen programs acknowledged the value of government/contractor cooperation; seven specifically reduced the level of government oversight.

The benefits of reduced oversight are substantial savings on fiscal and staff resources. The government’s traditional oversight practices are very thorough and correspondingly very expensive and labor intensive. In the most extreme example studied, one program streamlined government oversight by reducing the number of government acceptance events from over 300 to one, and also cutting the number of inspections during item production from almost 20,000 to about 3,700. The benefits reaped from these efforts were an estimated program cost savings of \$115M - about half of the program’s total cost savings from employing commercial procurement practices - and a program staff reduction of about 90 people.

The second observed practice of government/contractor cooperation is to include industry or contractor representation on program IPTs. Although the use of IPTs most likely originated in highly innovative and specialized government “skunkworks” programs of a few decades ago, the practice of commercial participation on government IPTs was rarely employed in mainstream acquisition programs.

In contrast, the commercial sector was the first to recognize the merits and widely apply the concept of supplier involvement on IPTs. Only recently with the promotion of commercial procurement practices and other government acquisition reform initiatives has the practice of government/contractor IPTs gained widespread acceptance and use. For this reason, the practice of IPTs is included in the study even though it does not precisely meet the thesis definition of commercial procurement practices.

Of the 14 programs using government/contractor cooperation, 12 had chartered IPTs with active industry or contractor participation. These programs highly praised the improved efficiency and increased scope of knowledge achievable by having regular industry/contractor interaction. Some of these programs even sought out general industry participation on collaborative government/industry teams to evaluate and recommend acquisition program strategies and even to assist in developing the program's request for proposals (RFP).

### 3.1.4.b. Long Term Supplier Relationships.

The current trend in commercial industry is toward lean inventories and long term supplier relationships instead of traditional competitive lowest priced contracts. Much of the impetus for long term supplier relationships comes from prevailing business management practices such as: just in time inventory, lean production, and the increasing practice of outsourcing nonessential functions. Commercial business understands that supplier partnerships can increase productivity, reduce capital equipment and operating costs, shrink inventories and related costs, and improve overall supplier responsiveness to company needs.

In contrast to the commercial approach, the government remains focused on massive inventories supplied by frequently re-competed contracts to obtain the lowest possible prices. The need for more efficient government inventory management is well known. For instance, the greatest cost driver in the DoD's \$50B spare parts inventory is the ordering lead time from the supplier. The government's inherently protracted procurement processes requires DoD to maintain correspondingly larger inventories. DoD estimates that a 1% decrease in overall spare parts lead time would achieve an annual cost reduction of \$200M.<sup>4</sup>

Although long term government contracts are possible, such contracts have extensive administrative requirements and are not widely accepted in the prevailing government acquisition culture which prefers more frequent market competition. The more typical government practice is to award long term contracts based on option years. However, the uncertainty of option renewal and the government's ability to terminate contracts at its own "convenience" discourages suppliers from making mutually

beneficial long term capital improvements. Of the 23 acquisition programs studied, only four have committed to long term contracts with the supplier. Yet in the most noteworthy case of the programs studied, Congressional approval of a special seven year commitment resulted in a \$1B reduction in the contract cost.

### **3.1.5. Performance Specifications.**

There are two principle types of acquisition contract specifications - performance-based and requirements-based. The commercial sector traditionally uses performance specifications which are typically based on common industry standards and describe customer needs in terms of desired item performance (such as: speed, weight, length, interoperability, mean time between failures, etc.). Performance specifications rely on the competitive forces of the marketplace to generate the best solution that balances customer needs and cost. Although the government has had the legal ability to implement performance-based specifications, it has traditionally taken the other tact and employed requirements specifications. The requirements specification not only describes exactly what the government needs but also defines the specific processes the contractor must use in the production of the desired product.

However, current promotion of acquisition reform and high-level emphasis on commercial procurement practices has many government agencies making performance specifications the standard acquisition strategy. For instance, 17 of the 23 defense programs studied claimed to have employed performance specifications.

Yet it is enlightening that over half (53%) of the programs reporting to have implemented the practice of performance specifications also cited concern with item performance as the single greatest risk factor resulting from the use of commercial practices. Government acquisition managers are accustomed to having full control over the contractor and the product's design and construction. It is a major cultural shift for these managers to use performance specifications and in turn delegate much of the design decisions and procurement management to the contractor. For instance, one acquisition manager made the analogy, "Would you buy your house with a performance spec? Not likely. You'd never know for sure what you're getting."

### **3.1.6. Commercial Specifications and Standards.**

The use of commercial specifications and standards is a strongly promoted tenet of government acquisition reform. The intent of the practice is to create acquisition efficiencies by requiring the same

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<sup>4</sup>DSMC Guidebook, chpt. 8.



design, production, management and accounting practices in government contracts as are currently used in the commercial marketplace. Commercial specifications and standards range from those set by formal commerce or industry organizations (such as: the International Standards Organization (ISO), the American National Standards Institute (ANSI), the Institute of Electrical and Electronics Engineers (IEEE), etc.) to the standard practices that individual firms have developed, implemented, and proven over time.

In contrast, the traditional government approach has been to develop and mandate an entirely separate set of standards and practices uniquely necessary for conducting business with the government. These government requirements, such as extensive military specifications and standards (MIL-SPEC/STD), developed over time as the government needed to more comprehensively direct contractors in the production of government-unique and frequently state-of-the-art products and services. Over the years government standards and practices proved invaluable throughout countless government acquisitions of products and services. However, the blanket application of government standards occasionally resulted in acquisitions where products were excessively over-engineered and unreasonably expensive. As a result, recent acquisition reform initiatives emphasized the shift to commercial specifications and standards whenever possible. For example, MIL-STD-970 prescribes the following order of preference for specifications used in government contracts: non-government standards, performance specifications, and lastly government originated specifications and standards. Within the DoD an even stronger policy was mandated. A 1994 Memo from Secretary of Defense William Perry specifically banned the use of MIL-SPEC/STDs in DoD acquisition contracts. Only through the approval of specific waivers are MIL-SPEC/STDs authorized.

To accelerate the wide-spread application of commercial specifications and standards in defense contracts, the DoD chartered the Single Process Initiative (SPI). Spearheaded by the Defense Contract Management Command (DCMC), the SPI seeks to enable industry to substitute their own company or industry standards, specifications, or practices that “meet the spirit of MIL-STDs/SPECs.”<sup>5</sup> Under SPI’s Block Change program, defense contractors can petition DCMC to replace government mandated standards on existing DoD contracts. This powerful program enables the shift to commercial specifications and standards on existing DoD contracts rather than waiting until these contracts are due for re-competition. A noteworthy example of the SPI Program is exemplified by the Raytheon Corporation. Through a single Block Change Request, Raytheon commercialized a gamut of processes

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<sup>5</sup> “Single Process Initiative Scores.” Acquisition Reform TODAY, Aug./Sep. 1996, p. 3.

(such as soldering, engineering change approval, quality assurance, accounting, etc.) affecting 16 different facilities and 884 ongoing government contracts.<sup>6</sup>

Among the defense acquisition programs researched, the strategy of commercial specifications and standards was the most widely used of the eight standard commercial procurement practices. Nineteen of the 23 programs surveyed employed commercial specifications and standards in lieu of traditional MIL-SPECs/STDs. Since the use of commercial specifications and standards is DoD policy, this finding is not surprising. The programs that had not employed commercial specifications and standards generally had awarded their contract prior to the DoD mandate. Nonetheless, the Coast Guard, which follows DOT acquisition rules, also employed commercial specifications and standards as standard acquisition procedure.

To illustrate the significant impact of this practice, consider that one program reduced the number of contractually mandated MIL-SPECs/STDs from over 1500 to only 4, and another program totally eliminated all 1550. Changes of this magnitude were described by the involved acquisition managers as extremely laborious and time intensive. To remove each contractually mandated MIL-SPEC/STD the acquisition program staff had to research a suitable commercial replacement, or rewrite the contractual requirement in terms of a generic performance specification, or request a formal waiver. For this reason, six of the programs studied listed the conversion process to commercial specifications and standards as the single greatest obstacle encountered in the implementation of all commercial procurement practices.

The surveyed programs typically stated that the MIL-SPECs/STDs which remained in their contracts directed system interface and interoperability. A rather interesting comment from four programs was that their contractors voluntarily chose to follow a select number of MIL-SPECs/STDs. For these contractors the MIL-SPEC/STD process was the firm's standard practice and commercial standards either were unsuitable or unavailable for these certain practices or changing to a different commercial procedure appeared cost prohibitive. In fact, one program sponsored a study with several potential prime contractors to assess the cost reduction from shifting to commercial specifications and standards. The general consensus among all the firms was costs would initially rise as the new processes and practices are implemented, yet eventually a 2-4% reduction of the contract cost could be achieved.

The research found the practice of commercial specifications and standards, in spite of its widespread use, was perceived as a key risk factor by defense acquisition managers. Two of the highest rated risk factors, Item Performance and Interoperability (see Figure 3-2 in section 3.2.1.b.), epitomize the

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<sup>6</sup> Major General Robert W. Drewes. "SPI - Progress Made and Lessons Learned." Program Manager, Jan./Feb. 1997, pp. 37-39.

fundamental uncertainty about how well commercial specifications and standards are suited for the military environment. Acquisition managers were concerned about the quality of regulation, content, and oversight of commercial industry specifications and standards. The issue of commercial standards oversight and regulation is an interesting topic for future research. In addition, the third highest risk factor was concern about the lack of suitable commercial standards or specifications applicable to the program's product area. Many acquisitions are for defense-unique products (like munitions or weapons systems) and government specifications and standards are largely the only ones available.

### **3.1.7. Streamlined Contract Administration.**

A fundamental aspect of commercial procurement practices is the drive to simplify and streamline the government's acquisition process. Of the 23 defense acquisition programs studied, 15 cited the value of new acquisition process streamlining practices. These programs acknowledged two general areas of process improvement: streamlined internal acquisition management policies and practices, and reduced amounts of contract data deliverables.

#### **3.1.7.a. Streamlined Internal Acquisition Management.**

In the spirit of acquisition reform, many acquisition offices and procurement activities within the armed services have streamlined their internal acquisition management procedures and policies. The newly accepted practice of consolidating acquisition documents into a Single Acquisition Management Plan (SAMP), reduced milestone reviews, and widespread use of electronic data distribution has reduced some of the administrative burden on defense acquisition managers. For example, one program lobbied and received approval to consolidate 23 acquisition management documents into only five. In addition, four programs commented on the increasing trend toward delegation of acquisition decisions down the chain of command.

Although valuable, internal acquisition management efficiencies have been rather challenging to obtain. Ten of the 23 defense programs cited cultural acceptance - or the "we've always done it this way" attitude - as the greatest obstacle to their implementation of commercial procurement practices. Moreover, six additional programs attributed their greatest obstacle to the lengthy internal bureaucratic processes required to obtain waivers or permission to implement innovative, new resource saving acquisition management techniques.

Reflecting the growing influence of the Information Age, four programs in the study touted the benefits of electronic data interchange. These programs enthusiastically espoused the benefits of electronically disseminating information - even as the means for receiving contract deliverables. Most of

the programs in the study maintained homepages on the Internet. In fact, these program webpages were extremely valuable in performing thesis research. Even more, some programs utilized their websites as a forum for interactive dialog with users, industry and the public in general. Three programs electronically posted draft contract requirements including the draft RFP and solicited feedback from industry. Some programs used the electronic medium to streamline the contracting process. Four programs required many bid and contract data deliverables be provided strictly by electronic means.

### 3.1.7.b. Reduced Contract Data Deliverables.

Traditionally the government required volumes of data to monitor contractor progress, pricing, and production performance. In fact, one program commented that prior to employing commercial procurement practices, periodically a semi-truck would arrive at the program office and deliver pallet loads of required documentation and reports. A collective benefit from implementing commercial practices is that much of the traditional contractor information is no longer necessary. Implementation of the various aspects of commercial practices eliminates the need for many of the traditional oversight, technical and administrative reporting requirements.

Of the 15 programs citing the use of streamlined contract administration, 13 specifically noted the value of reducing Contract Data Requirements List (CDRL) data deliverables. These programs reaped substantial benefits from the reduced staff time required for CDRL review. One of the programs eliminated 83% of the CDRLs from the contract - from 165 to only 28. As a result, this program cut its staff size in half (a reduction from 20 to 10 people).

Unfortunately, not all government data deliverables are employed at the discretion of the acquisition program. For example, the Truth in Negotiations Act (TINA) requires specific cost and pricing data be provided as part of government contracts to ensure the government obtains a “fair and reasonable” price. In addition, another regulatory requirement is cost accounting standards (CAS). Required for major acquisitions. CAS is a government mandated accounting process that must be performed throughout the term of the contract to provide the government with specific cost monitoring information. Together TINA and CAS requirements can greatly increase the administrative overhead of doing business with the government. A recent study by the defense consulting firm TASC Inc., found that government cost/pricing requirements on weapons systems contracts add an average of 18% to contract overhead and administrative expenses.<sup>7</sup>

Despite legislative opposition, two of the surveyed acquisition programs perceived the cost/pricing data as unnecessary and challenged the TINA requirements. After considerable bureaucratic

deliberation and delays, both programs obtained waivers from TINA requirements. These programs commented that their requests were rather revolutionary at the time, but their waiver efforts have paved the way for further waivers for subsequent acquisition programs.

### **3.1.8. COTS/NDI.**

The government already has streamlined the process for buying Commercial-Off-The-Shelf or Non-developmental Items (COTS/NDI). Purely COTS/NDI acquisitions are much simpler to perform and generally achieved at significantly less cost. These benefits are derived from the unique commercial item acquisition process prescribed in FAR Part 12. In general, most commercial item procurements use performance type contracts that are based largely on commercial/industry standards and require only minimal amounts of technical and cost/pricing data.

Broadening the government's commercial item definition is a continuing challenge of acquisition reform. The 1994 FASA did not expand the definition criteria as widely as expected. The FASA only included four of the five recommended definitions to determine a commercial item. Unfortunately, the omitted definition prevents the use of the streamlined processes when purchasing from purely commercial firms fulfilling defense-unique requirements.<sup>8</sup> This inability hinders the acquisition reform goals of promoting a broader supplier base and the conversion to dual-use production.

As will be discussed more thoroughly in Chapter 4, the survey results reveal that the use of COTS/NDI acquisition strategies yielded substantial program schedule reductions. Of the 23, eight surveyed programs procured items from COTS/NDI sources. As the programs studied were largely major systems programs, purely COTS/NDI procurements were only possible for two of the eight programs. The other six programs employed a hybrid-COTS/NDI strategy, where commercial items served as the product core and were modified to meet specific government requirements. However, all eight of these programs cited concern with aspects of item performance (such as: reliability, durability of a commercial product in a military environment, and interoperability of a commercial product with existing military systems) as the most critical risk posed by commercial procurement practices to their program.

## **3.2. Research Insights on Defense Acquisition Program Experience with CPP.**

The previous section provided a fundamental familiarity with each of the eight specific commercial procurement practices identified during thesis research. This section offers a collective

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<sup>7</sup>Jeff Ehrlich, "DoD Eyes Factory Experiment" *Defense News*, 01 May 1995, p. 18.

<sup>8</sup>Michael Heberling and Tracy Houpt, "DoD Skirts Commercial Path." *Defense News*, Nov. 1995.

perspective of all eight practices by analyzing the aggregate research data from the 23 defense programs studied. In particular, the defense program experiences and data regarding frequency of use, perceived risks, implementation obstacles, and program sources of information are captured and examined. To afford better insights into the general trends and possible conclusions from the data, the analysis is first performed in general terms for all the programs studied. Next a program-type analysis is performed.

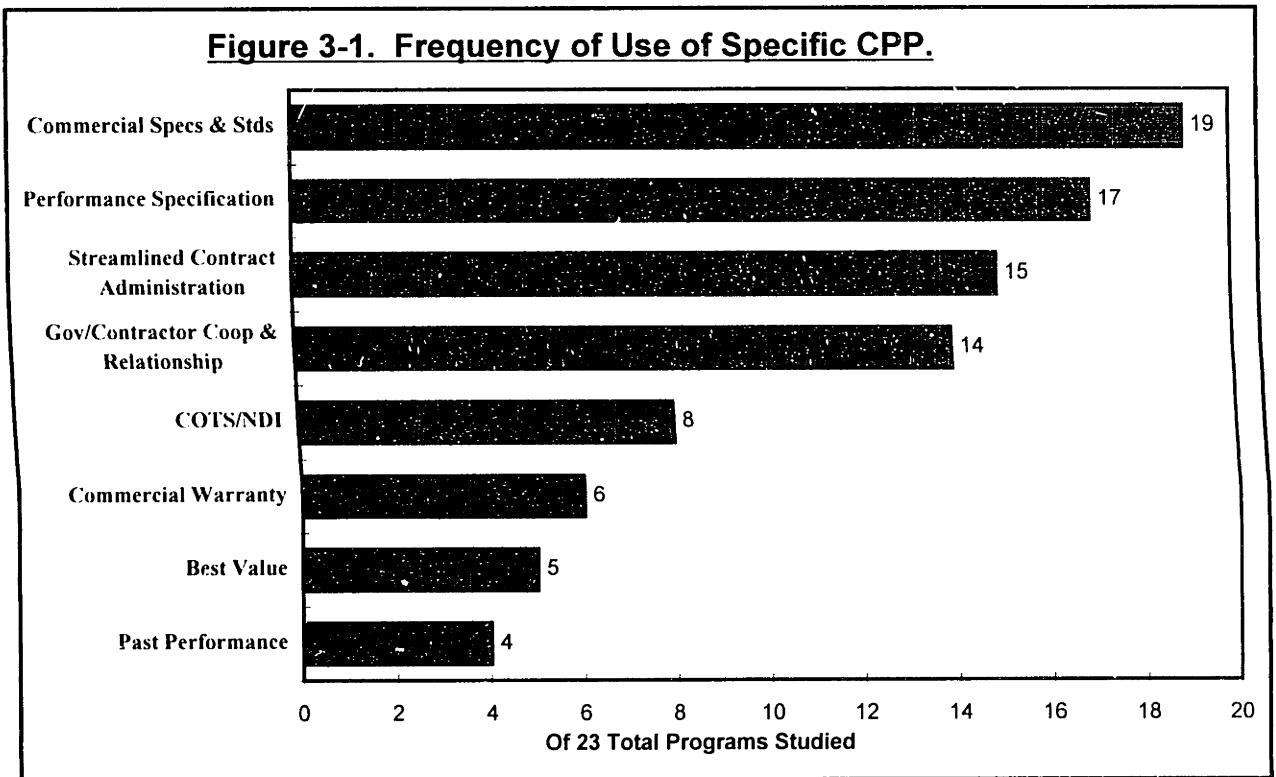
### **3.2.1. Collective Program Analysis of Commercial Procurement Practice Research Data.**

As indicated on the standard survey questionnaire provided in Chapter 2, research data was collected from 23 defense acquisition programs to capture the number of specific commercial procurement practices in use, the perceived risks resulting from these practices, the most significant obstacles overcome during implementation, and the general sources of commercial procurement practice reference information. Each of these four research topics is examined in turn in the following paragraphs.

#### 3.2.1.a. CPP Frequency of Use.

The research findings on the overall frequency of use of the eight core commercial procurement practices (CPP) are summarized in Figure 3-1. As the figure illustrates, the four most frequently used practices were employed by more than half of the programs surveyed. Another interesting observation is the relatively little use of the mandated practices of Best Value and Past Performance. As described earlier, it is assumed that all programs used these practices as required but only in the few programs reporting their use were these two source selection criteria of appreciable value.

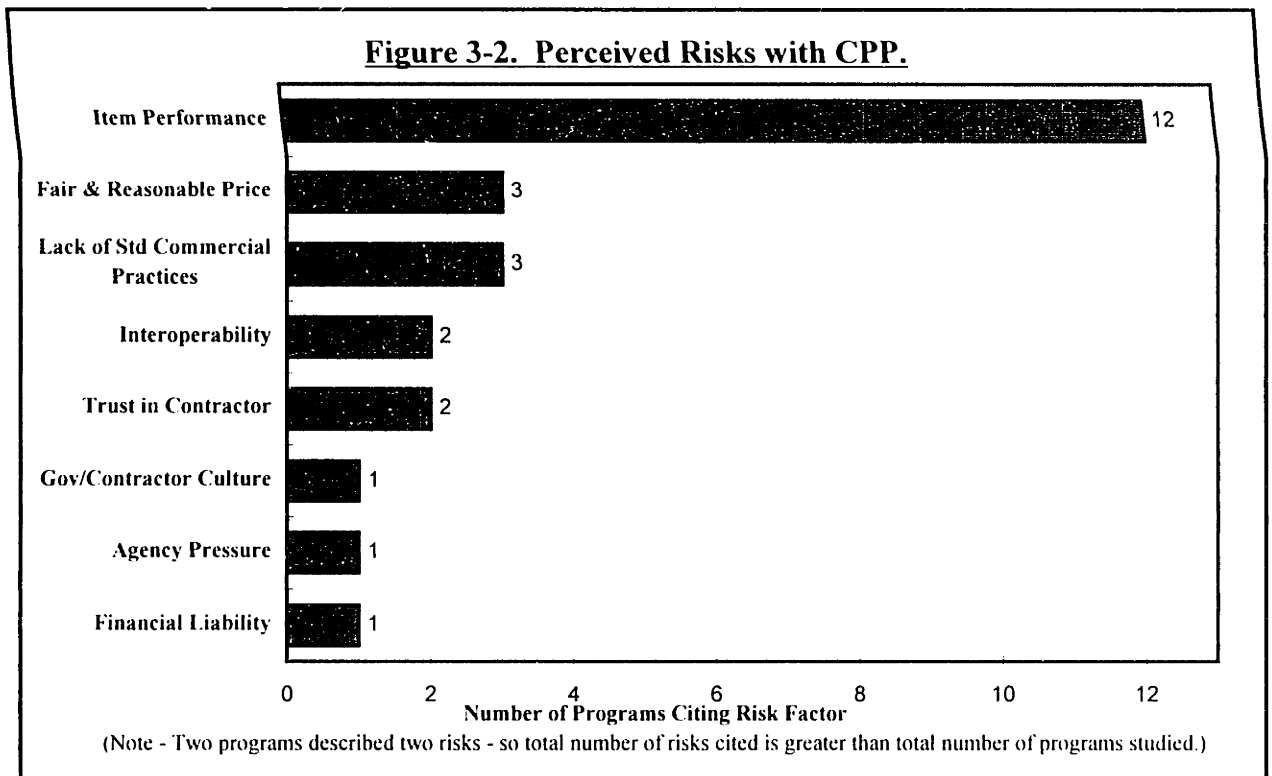
In general, the relatively marginal use of commercial procurement practices, an average of less than four (approximately 3.8) practices per program surveyed, indicates the movement toward and acceptance of commercial procurement practices is still largely in the initial stages. A more ubiquitous adoption of these practices would have indicated wide spread acceptance of the commercial procurement practice initiative. However, as numerous acquisition managers explained, not all commercial procurement practices are appropriate for all acquisition programs. Common sense must apply in determining which practices are appropriate and add value to individual acquisition programs.



#### 3.2.1.b. CPP Perceived Risks.

Each of the 23 defense acquisition programs studied were asked to cite the principle risk posed by the use of commercial procurement practices (CPP). The term principle risk depicts the most significant potentially negative direct or indirect effect of commercial procurement practices on critical attributes of acquisition program performance - such as the impact on schedule, budget, product quality, etc. The responses largely consisted of the eight general risk factors which were cited by the respective number of programs noted in Figure 3-2.

- 1) **Item Performance** - Twelve programs cited concern and uncertainty over how well the acquired item meets the specified contract performance criteria and its reliability, maintainability, and durability in the demanding military environment. In addition, some of these programs were concerned that satisfying the unspecified but equally important expectations of the item's user would be difficult as well.
- 2) **Fair & Reasonable Price** - Three programs were concerned that, although it is working very hard to streamline acquisition requirements and processes, the government may not receive adequate financial compensation in return. In several cases, the government did not ask for nor receive detailed cost data to evaluate the contractor's price. This is furthered complicated by the fact that many of the new commercial procurement practices lack established baselines to guide government estimates of expected cost reductions.



- 3) **Lack of Standard Commercial Practices** - Many defense acquisitions are unique to the military, making it difficult for commercial industry to establish commercial standards or best practices. Examples include: munitions, weapons systems, and large ship construction. As a result of DoD policy, three programs had difficulty adopting the commercial specifications and standards practice when there were few appropriate commercial standards and practices available to employ.
- 4) **Interoperability** - For two programs the shift to performance contract specifications and to commercial specifications and standards created the concern of interoperability of the acquired items with existing legacy systems/platforms.
- 5) **Trust in Contractor** - In general programs have delegated much of the oversight, design, and configuration control to the contractor. This is a major process and cultural change. Some programs liken it to “leaving the fox to guard the hen house.” Two managers noted the critical dependence upon trust in the contractor as the program’s greatest risk factor.
- 6) **Cultural Acceptance of CPP** - The cultural resistance to change and “business as usual” mindset was the most commonly noted obstacle to implementation of commercial procurement practices (CPP). However, one program found the cultural challenges so severe as to pose significant risk to the program. This illustrates that unless both government and contractor personnel and their corresponding supervisors are totally in agreement with commercial



procurement practices, it will be very difficult to reap the potential benefits and overall program success is jeopardized.

7) **Agency Pressure** - One program felt increased agency pressure and oversight to apply commercial procurement practices for political reasons rather than practical ones. This program highlighted that all aspects of commercial procurement practices are not valuable nor practical for all government acquisition programs. A recurring theme among all programs studied was the need for common sense in determining which commercial procurement practices and acquisition strategies are beneficial to a program.

8) **Financial Liability** - One program was concerned about Integrated Product Teams (IPT) inadvertently making constructive changes to the contract. Although no programs reported this problem actually occurring, it is somewhat likely with the prevailing practice of expanding the autonomy and role of IPTs which frequently consisted of both program and contractor representatives.

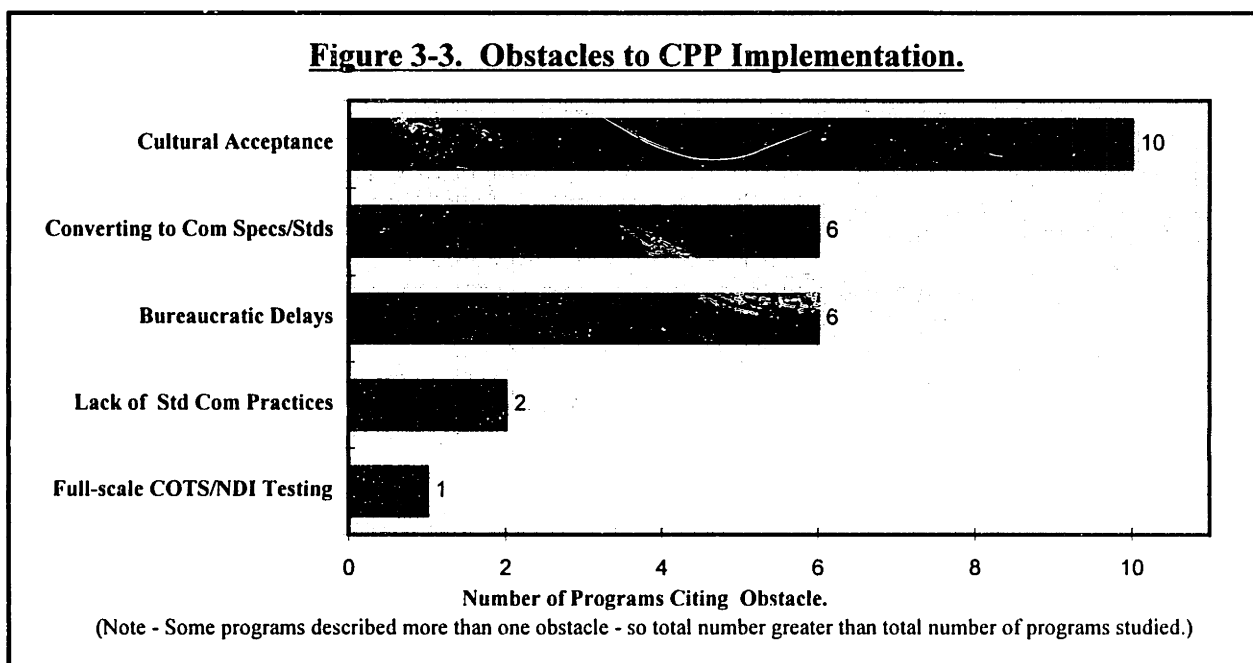
Upon reviewing the above risk factors, one would logically ask how severely did these risks affect the respective programs? The usual response to this question from the acquisition managers is “we’re not yet sure.” The program managers are not sure because, even though they are all proactively taking steps to minimize these risks, the concern or uncertainty would not be resolved until future milestones occur. For instance, programs concerned about item performance are being extra thorough in the testing phases of the program to identify problems as early as possible. Yet the uncertainty about item performance cannot be completely resolved until the acquired item has ultimately proven itself in actual operational use.

As shown in Figure 3-2, an overwhelming number of programs were most concerned with the ultimate performance of the acquired item. This is quite understandable given that the shift to commercial procurement practices changes the fundamental management of the acquisition program. Four specific practices directly influence the government’s control over item performance. These practices are: performance specifications, commercial specifications and standards, COTS/NDI, and government/contractor cooperation and relationship. Performance specifications allow the contractor substantial design flexibility. The use of commercial specifications and standards shifts the entire specification foundation to a new and unfamiliar commercial core of requirements. The tactic of buying COTS/NDI introduces uncertainty of the durability of commercial products in the rigorous military environment. Lastly, a key tenet of government/contractor cooperation and relationship is a significant reduction in government oversight. The combination of these four practices essentially shifts the

fundamental familiarity and certain aspects of control from the government to the contractor. Naturally experienced defense acquisition managers will find this reduction of managerial power somewhat disconcerting. Substantiating this conclusion, two thirds of the programs' citing item performance as its key risk factor, also employed at least 3 of these 4 noted commercial procurement practices. As commercial procurement practices become more commonplace and acquisition managers gain further experience the inherent concerns regarding item performance should decrease.

### 3.2.1.c. CPP Implementation Obstacles.

Each of the 23 defense acquisition programs studied were asked to cite the principle obstacle encountered during the implementation of commercial procurement practices (CPP). The responses cited the five general implementation obstacles depicted in Figure 3-3.



1) **Cultural Acceptance of CPP** - Ten programs cited the frequent challenges posed by the “we’ve always done it this way” mindset. This was commonly found in both government and industry. Also, the ultimate users of the acquired item had to accept a more vague definition of the final product. Users were accustomed to firm requirements-type specifications, which meant users knew exactly the product they would receive. New reliance on performance-based specifications provided the users with a rather vague definition of the eventual product. This uncertainty served as a recurrent source of pressure on the acquisition program.

2) **Converting from MIL-SPEC/STD to Commercial Specifications and Standards -**

Several programs had to totally rewrite the contract specification to replace MIL-SPECs/STDs with the commercial equivalent or performance specs. Six of these programs noted this conversion process as the most challenging obstacle encountered. As described in subsection 3.1.6 on commercial specifications and standards, some programs found the revision process extremely burdensome. Both government and industry were accustomed to the MIL-SPEC/STD way of business. Waivers were required to retain MIL-SPECs/STDs in cases where there were no commercial substitutes.

3) **Bureaucratic Delays -** In spite of the encouraged spirit of innovation and high-level support for acquisition reform, six programs endured lengthy delays in approval of waivers from traditional requirements. There is still a long road ahead to fully implement the many initiatives and streamlined practices of acquisition reform within government defense agencies.

4) **Lack of Standard Commercial Practices -** Many defense acquisitions are unique to the military and there is not a large commercial industry to set standards or define best practices. Examples - munitions, weapons systems, and large ship construction. As a result, two programs studied noted the absence of an established commercial industry as their greatest obstacle to commercial procurement practices.

5) **Full-scale Testing of COTS/NDI -** In direct response to the key risk factor cited regarding item performance, one program cited extensive testing to ensure military ruggedness and satisfactory minimum performance levels of its COTS/NDI equipment as the largest obstacle.

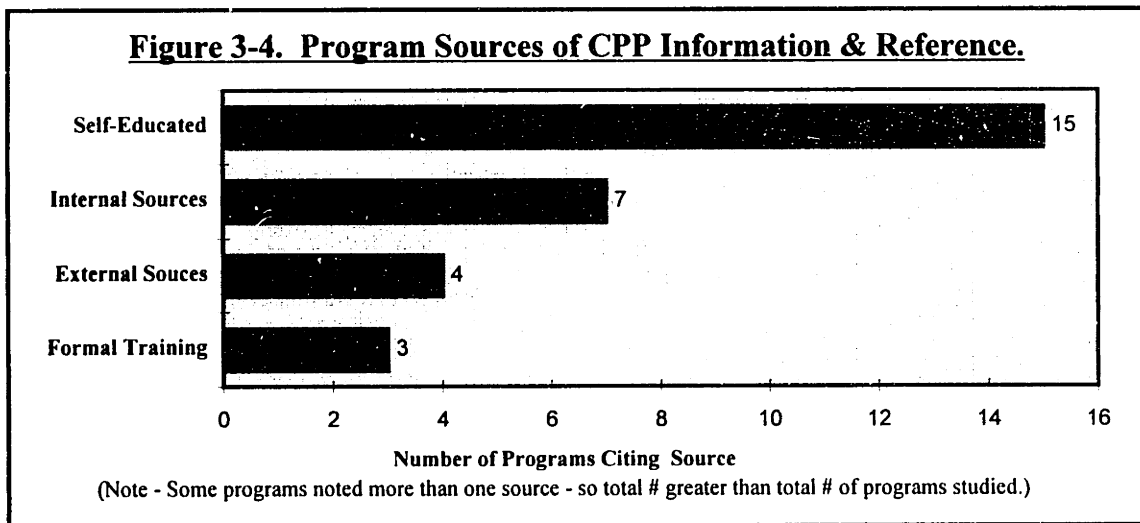
As shown in Figure 3-3, the most commonly cited obstacle was the barrier of cultural acceptance of commercial procurement practices. In addition, to the ten programs specifically citing this obstacle, another six cited a related obstacle - bureaucratic delays. Typically the program delays encountered were largely due to the slow acceptance or approval of proposed innovative new practices by the acquisition programs' chain of command. The frequent citing of both these obstacles illustrates that although commercial procurement practices are highly publicized and encouraged at the highest levels, in general the overall defense acquisition force is not uniformly onboard and supportive of implementation.

3.2.1.d. Program Sources of Information on CPP.

The last general commercial procurement practice (CPP) question on the standard research survey sought to capture the defense acquisition program's most valuable source of reference information. The survey offered the following multiple choice categories:

- a. self education from published CPP literature
- b. formal CPP training from government or private instructor
- c. internal department/agency CPP experience & sources
- d. external department/agency sources (such as gov experts from other agencies, consultants)
- e. Other \_\_\_\_\_

The responses from the 23 defense programs studied are summarized in Figure 3-4. Although a few programs responded Other, the comments from these programs could be ascribed to fit one of the four prescribed categories. In addition, many programs noted that in practice they used all four of the survey categories but frequently noted the single category that was most widely employed. It is very interesting that 65% of the programs relied on Self-Education to gain the familiarity necessary to implement commercial procurement practices. In particular, one program noted that in addition to self-education from CPP literature, the personnel were self-educated from the “school of hard knocks.” This finding strongly suggests inadequate training opportunities and sharing of information on commercial procurement practices within the defense services studied.



Another interesting finding was that all four programs citing External Sources as the most beneficial information resource, listed industry as the single most valuable external resource. These programs all had successful IPTs with industry involvement. These IPTs were able to comprehensively evaluate the advantages and disadvantages of commercial procurement practices with the benefit of industry’s perspective prior to implementation.

### 3.2.2. Program-Type Analysis of Commercial Procurement Practices.

The following four subsections analyze the frequency of use, perceived risks, implementation obstacles, and sources of information in terms of the four types of defense acquisition programs studied. The four program types were defined in Chapter 2 and consist of: aircraft, systems, vessels, and munitions programs. In addition to the discussion here, Chapter 4 presents the program-type analysis with respect to the five core thesis hypotheses.

#### 3.2.2.a. CPP Frequency of Use by Program Type.

The research findings on the overall frequency of use of the eight core commercial procurement practices by each of the four defense acquisition program types are summarized in Table 3-1. The table illustrates several interesting trends and patterns which are highlighted by gray shading.

Commercial Procurement Practice	7 Aircraft Programs		7 Systems Programs		5 Vessel Programs		4 Munitions Programs		CPP Totals
	#	%	#	%	#	%	#	%	
Past Performance	0	0%	2	29%	1	20%	1	25%	4
Best Value	0	0%	3	43%	1	20%	1	25%	5
Commercial Warranty	3	43%	1	14%	0	0%	2	50%	6
Gov/Contractor Coop & Relationship	5	71%	4	57%	1	20%	4	100%	14
Performance Specification	4	57%	5	71%	5	100%	3	75%	17
Commercial Specs & Standards	6	86%	6	86%	4	80%	3	75%	19
Streamlined Contract Admin	7	100%	4	57%	0	0%	4	100%	15
COTS/NDI	1	14%	5	71%	2	40%	0	0%	8
<b>Total # of CPP per Program-Type</b>	<b>26</b>		<b>30</b>		<b>14</b>		<b>18</b>		<b>88</b>
<b>Average # of CPP per Program</b>	<b>3.7</b>		<b>4.3</b>		<b>2.8</b>		<b>4.5</b>		<b>172</b>

Given that munitions programs procure largely military-unique products in contrast to programs in the other three program categories, it is rather surprising that munitions programs are the overall leaders in the use of commercial procurement practices - with an average of 4.5 practices per program. Close behind are systems programs with an average of 4.3. At the opposite end of the spectrum are vessel programs, with an average of less than three practices in use per program.

Another common and less startling finding is that the two most frequently used commercial procurement practices, commercial specifications and standards and performance specifications, were widely used by all four program types. However, it is rather interesting that the third most widely used practice, streamlined contract administration, was not used at all by the vessel programs. This finding may indicate unique agency or industry barriers. Nonetheless, implementation of this practice offers an

area of potential benefit to these programs. In similar fashion, only one vessel program used the practice of government/contractor cooperation and relationship which is the fourth most commonly cited commercial procurement practice. The other categories of programs widely employed this practice.

Vessel programs, however, unanimously employed the practice of performance specifications. Indicating a rather significant change in fundamental naval engineering strategy for the maritime services of the Coast Guard and Navy.

As already noted, munitions programs were the most active users of commercial procurement practices. The four programs studied all used the two practices of government/contractor cooperation and relationship and streamlined contract administration. In general munitions programs tended to consistently employ the four most common commercial practices and then sparingly use the other four practices. In contrast, the second most active user of commercial procurement practices, systems programs, had a much more expansive use of all practices. Every practice was used by at least one program and six of the eight practices were used by 3 or more programs. These results seem to indicate these programs are actively pursuing a broader scope of practices rather than focusing on a well-known few.

Although essentially all programs were under budgetary pressures, discussions with acquisition managers indicated funding for aircraft programs seemed to be particularly tight. As a result, aircraft programs had to innovatively maximize efficiency in order to cope with budget shortfalls. Streamlining contract administration was an effective tactic employed by all aircraft programs to gain administrative efficiencies.

### 3.2.2.b. CPP Perceived Risks by Program Type.

The research findings on the overall perceived risks posed by commercial procurement practices for each of the four defense acquisition program types are summarized in Table 3-2. An interesting observation from the table, is that the most common risk factor, item performance, was not cited by any munitions programs but is the most crucial risk factor noted by almost two thirds of all other programs. One possible explanation is that munitions programs are simply more accustomed to using performance-oriented acquisitions than the other programs. Another explanation is that munitions programs generally do not have the reliability and durability concerns of the other programs due to the expendable “one shot” nature of munitions. In any regard, this result is an interesting topic for further research.

Munitions programs also were the only programs to cite the lack of commercial specifications and standards as a prime risk factor. Several other programs, particularly vessel programs, mentioned

Risk Factor	7 Aircraft Programs		7 Systems Programs		5 Vessel Programs		4 Munitions Programs		CPP Totals
	#	%	#	%	#	%	#	%	
Item Performance	3	43%	5	71%	4	80%	0	0%	12
Fair & Reasonable Price	3	43%	0	0%	0	0%	0	0%	3
Interoperability	1	14%	1	14%	0	0%	0	0%	2
Trust in Contractor	0	0%	2	29%	0	0%	0	0%	2
Lack of Commercial Specs & Stds	0	0%	0	0%	0	0%	3	75%	3
Cultural Acceptance of CPP	0	0%	0	0%	0	0%	1	25%	1
Agency Pressure	0	0%	0	0%	1	20%	0	0%	1
Financial Liability	1	14%	0	0%	0	0%	0	0%	1
<b>Totals</b>	<b>8</b>		<b>8</b>		<b>5</b>		<b>4</b>		<b>25</b>

Note - some programs listed more than 1 risk - so total # of risks cited is greater than total # of programs.

this concern during research interviews. Yet none of these programs noted it as the most significant risk factor.

In contrast to munitions programs, four out of five vessel programs were solely concerned with item performance. All five vessel programs employed performance specifications and four out of five employed commercial specifications and standards as well. As mentioned previously, these practices serve to empower the contractor with more design and process control. Consequently, this shift in management control resulted in greater uncertainty to the acquisition managers of vessel programs.

Lastly, aircraft programs noted the only financial risk factors in the research. The risk factors regarding fair and reasonable price and financial liability were cited exclusively by aircraft programs. This finding may offer insight into the nature of the relationship between the government and the aircraft industry. Program uncertainty regarding contractor financial performance perhaps is one of the stronger motivations for 5 out of 7 aircraft programs to implement the practice of government/contractor cooperation and relationship.

### 3.2.2.c. CPP Implementation Obstacles by Program Type.

The research findings on the obstacles encountered during implementation of commercial procurement practices for each of the four defense acquisition program types are summarized in Table 3-3. Review of the table shows a rather even distribution of obstacle categories. Hence, although the implementation of commercial procurement practices posed challenges to overcome, none of the program types appears to have any unique advantages nor unique difficulties during implementation.

**Table 3-3. Implementation Obstacles of CPP by Program Type.**

Noted Implementation Obstacles	7 Aircraft Programs		7 Systems Programs		5 Vessel Programs		4 Munitions Programs		CPP Totals
	#	%	#	%	#	%	#	%	
Cultural Acceptance of CPP	4	57%	2	29%	3	60%	1	25%	10
Converting to Commercial Specs/Std	2	29%	2	29%	2	40%	0	0%	6
Bureaucratic Delays	1	14%	3	43%	0	0%	2	50%	6
Lack of Commercial Specs/Std	0	0%	0	0%	1	20%	1	25%	2
Full-scale Testing of COTS/NDI	0	0%	1	14%	0	0%	0	0%	1
<b>Totals</b>	<b>7</b>		<b>8</b>		<b>6</b>		<b>4</b>		<b>25</b>

Note - some programs listed more than 1 obstacle - so total # cited is greater than total # of programs.

### 3.2.2.d. CPP Sources of Information and Reference by Program Type.

The research findings on the sources of information and reference utilized by the four program types to gain familiarity with commercial procurement practices are summarized in Table 3-4. Review of the table clearly illustrates the common program reliance on self-education. This finding confirms the wide-spread nature of the apparent problem with disseminating practical commercial procurement practice information and lessons learned throughout the defense services studied.

**Table 3-4. Sources of CPP Information and Reference by Program Type.**

Noted Implementation Obstacles	7 Aircraft Programs		7 Systems Programs		5 Vessel Programs		4 Munitions Programs		CPP Totals
	#	%	#	%	#	%	#	%	
Self-Educated	4	57%	4	57%	4	80%	3	75%	15
Internal Sources	3	43%	2	29%	0	0%	2	50%	7
External Sources	0	0%	2	29%	1	20%	1	25%	4
Formal Training	3	43%	0	0%	0	0%	0	0%	3
<b>Totals</b>	<b>10</b>		<b>8</b>		<b>5</b>		<b>6</b>		<b>29</b>

Note - some programs listed more than 1 info source - so total # cited is greater than total # of programs.

### 3.3. Chapter Conclusions.

From the gamut of possible commercial business practices, the thesis research identified and described in detail eight specific practices that are currently permitted under defense acquisition policies and actively promoted within the armed services. Research responses showed a wide variation in the usage of these specific commercial procurement practices. From the 23 programs surveyed, the most common practice was cited in use by 19 programs and the least common by just four. In addition, the program responses reflected a relatively moderate average of only 3.8 practices per program. These findings, coupled with the understanding that the programs surveyed were largely the defense acquisition



leaders in commercial procurement practice implementation, indicate that this acquisition reform initiative is still in the early stages of acceptance. The research revealed that inadequate training and a failure to cultivate available sources of expertise may partially contribute to the slow familiarity and acceptance of commercial procurement practices. The vast majority of programs surveyed reported that self-education, rather than formal training or internal or external agency reference sources, was the primary means for gaining commercial procurement practice expertise.

From the program-type analysis, in general, systems programs appear to be the most well versed and proactive in implementing commercial procurement practices. Although munitions programs were slightly more active in implementing overall numbers of practices (munitions averaged 4.5 practices per program, systems averaged 4.3), systems programs were found to employ a greater variety of practices. This larger variety indicates systems programs were more familiar with the overall potential benefits and impacts of commercial procurement practices.

## **Chapter 4. Analysis of Thesis Hypotheses.**

**Chapter Summary.** After thorough analysis, the collected research information supported all five thesis hypotheses. Research on the first hypothesis found that commercial procurement practices indeed reduced program acquisition costs by an average of 4.3%. In addition, the practices promoted indirect cost savings by facilitating cost/performance decision making and enabling substantial staff reductions at 13 programs. Research on the second hypothesis concluded that on average commercial procurement practices directly resulted in a 12-month average program schedule reduction. Examination of the reported impacts on quality yielded a stronger conclusion than the statement posed by the third hypothesis. Not only does commercial procurement practices not degrade product quality but evidence suggests that it actually improves the quality of the acquired item. For the fourth and fifth hypotheses, in general, the majority of surveyed acquisition managers concluded that the use of commercial procurement practices does not degrade life cycle support nor does it increase life cycle costs.

### **4.0. Introduction.**

This chapter examines in detail each of the five thesis hypotheses. Conclusions are offered on the support or lack of support for each hypothesis based upon careful analysis of the research data collected from 23 defense acquisition programs. Each of the following five chapter sections addresses a specific thesis hypothesis and the concluding sixth section offers general overall analysis and discussion.

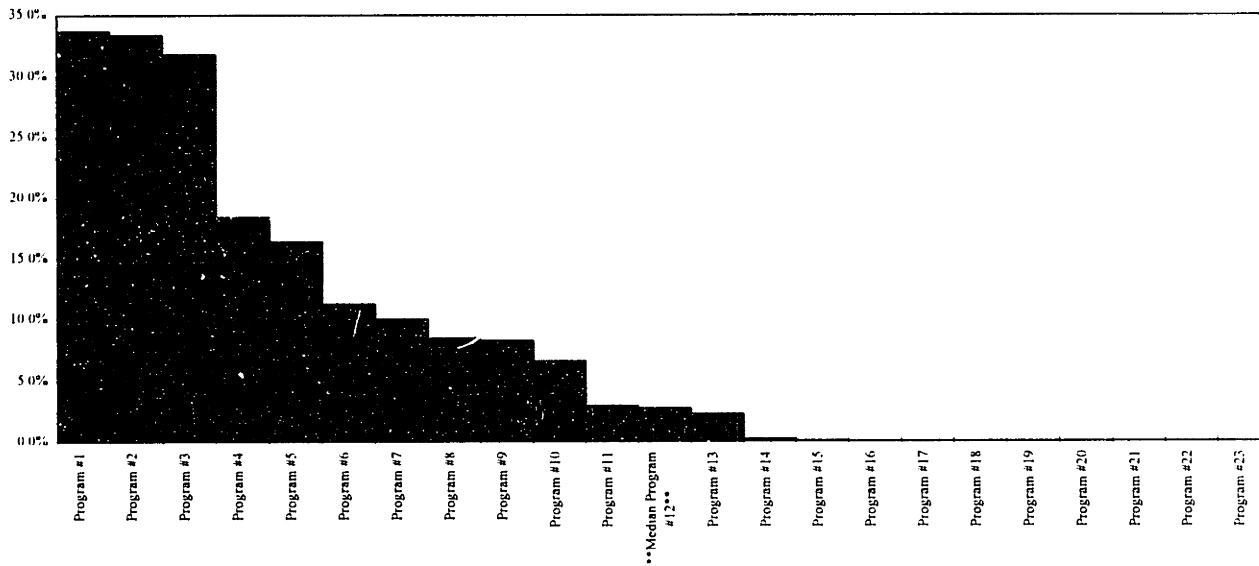
### **4.1. Analysis of Hypothesis #1. The use of CPP reduces acquisition program costs.**

Based upon thorough examination of the research information provided from 23 defense acquisition programs, **the data provides evidence to support the first hypothesis.** The following five subsections describe in detail the thesis findings concerning the first hypothesis.

#### **4.1.1. Estimated Cost Savings Directly Resulting from CPP.**

As part of the standard research survey, all 23 defense acquisition programs estimated program savings directly resulting from the use of commercial procurement practices (CPP). Three of the programs surveyed distinguished past cost savings already obtained from future projected cost avoidance. To account for this lack of uniformity in cost information, this thesis considers the term cost savings as encompassing both savings already realized as well as future projected cost avoidance. The

**Figure 4-1. Reported Percent Savings from CPP.**



program cost savings estimates are graphically illustrated in Figure 4-1 and concisely summarized in Table 4-1.

As shown in Table 4-1, for the 23 defense acquisition programs surveyed with a combined budget of almost \$87B, the use of commercial procurement practices directly achieved a *lower bound* cost savings of almost \$4B. These results yield an average cost savings of approximately 4.3% of the average program budget. The results are believed to be a lower bound estimate because the methods for evaluating program estimates served to conservatively calculate program cost savings. The following two paragraphs elaborate on the methodology employed in computing program cost savings estimates.

A primary cause for conservatively estimating programs savings directly resulting from commercial procurement practices is the lack of adequate accounting reports and metrics to quantify the magnitude of these savings. For instance, Table 4-1 lists 8 programs as having no cost savings (an entry of \$0). Yet 5 of these 8 programs reported a strong belief that the program’s commercial procurement practice actions would yield cost savings. For example one of these programs reported, “...program did no-cost mod in 1995 to remove all MIL-STDs and to greatly reduce CDRs; although this specific mod didn’t result in [immediate] savings, all concerned believe it will yield savings in the long run.” Another reason programs did not capture savings is the lack of financial information to specifically quantify the amount of savings. Typically these programs streamlined the exact cost accounting processes and reports that would have enabled collection of this information. For example, another program explained that the “Government cost estimate for the program prior to award was \$900 million.... Current program estimate for awarded contracts is \$616.3 million. It is a savings of \$284 million for the program. We are

**Table 4-1. Reported Cost Savings Directly Resulting from CPP.**

<b>PROGRAM</b>	<b>PROGRAM BUDGET (in \$M)</b>	<b>PROGRAM SAVINGS (in \$M)</b>	<b>% Savings (=Sav/(Bud+Sav))</b>
<b><u>First Quartile</u></b>			
	\$591	\$300	33.7%
	\$200	\$100	33.3%
	\$6	\$3	31.8%
	\$7,040	\$1,588	18.4%
	\$460	\$90	16.4%
	\$988	\$125	11.2%
<b><u>Second Quartile</u></b>			
	\$1,200	\$133	10.0%
	\$73	\$7	8.4%
	\$190	\$17	8.2%
	\$3,370	\$236	6.5%
	\$41,350	\$1,250	2.9%
<b>**Median**</b>	\$2,030	\$57	2.7%
<b><u>Third Quartile</u></b>			
	\$430	\$10	2.3%
	\$996	\$2	0.2%
	\$4,000	\$2	0.0%
	\$120	\$0	0.0%
	\$18,000	\$0	0.0%
	\$616	\$0	0.0%
<b><u>Fourth Quartile</u></b>			
	\$900	\$0	0.0%
	\$400	\$0	0.0%
	\$641	\$0	0.0%
	\$90	\$0	0.0%
	\$3,000	\$0	0.0%
<b>TOTALS:</b>	<b>\$86,690</b>	<b>\$3,919</b>	<b>N/A</b>
<b>AVERAGES</b>	<b>\$3,769</b>	<b>\$170</b>	<b>4.3%</b>

unable to [estimate] savings [from] CCP due to the pricing approach.” In any event, because these 5 programs were unable to quantify the amount of savings they are conservatively listed as \$0 savings for the purposes of research analysis and Table 4-1.

Another reason for undervaluing the estimated commercial procurement practice cost savings is the practical realities of the programs’ political environment. Acquisition managers acknowledge that in the near term they are encouraged to report success stories regarding the positive results of commercial procurement practices in reducing program costs. However, in the long term they are motivated to report more conservative or vague estimates for cost reductions. The reason for this conservative forecast is

that acquisition managers are reluctant to project too significant cost savings in fear of these estimates being used to offset future program budget cuts.

It is interesting to compare the relative magnitude of the estimated cost savings to other studies on commercial procurement practices. First of all, three programs in the research sample reported performing cost impact studies of their own. One program noted that, “a Should Cost review was conducted on the program in preparation for the Milestone IIIB decision. This review included a sub-team that specifically looked for worthwhile ‘commercial practices’, and found very little of significant benefit.” Another program observed that, “contractors who did not apply acquisition reform had higher [priced] proposals (10-48%) than those who implemented reform.” The third program actually funded a study at each of five qualified industry bidders to assess the cost impact of eliminating all MIL-STD/SPEC requirements from the contract. The general consensus was an estimated net savings of 2-4% after an initial increase in cost as new practices and processes were learned and implemented. A second source of comparison is the 1994 DoD sponsored Coopers and Lybrand study. This study concluded that implementation of acquisition reform initiatives, such as the implementation of commercial procurement practices, to minimize government regulatory and oversight requirements, would result in an acquisition program savings of essentially 9%.<sup>1</sup> Hence, the findings of this thesis appear to be roughly consistent with similar findings from individual programs and the overall DoD study by Coopers and Lybrand.

Lastly, discussion has strictly focused on cost reductions achieved from the implementation of commercial procurement practices. The finding of no cost increases is attributed to the fact that only successful commercial procurement practice programs were found in the course of thesis research. This fact does not infer that no bad examples exist. To the contrary, the discussion of the risks and obstacles in Chapter 3 illustrated several direct implementation impacts, such as the burden of converting from a MIL-SPEC/STD base to commercial specifications and standards, and many serious risk factors that could quite possibly result in higher program costs. The examination of negative impacts from commercial procurement practices is a valuable topic for further research.

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<sup>1</sup> Coopers and Lybrand. “The DoD Regulatory Cost Premium: A Quantitative Assessment.” December 1994. The study specifically stated savings of 18% of value added costs. Generally value added costs account for 50% of a contract’s cost. Hence, Coopers and Lybrand essentially find a total savings of about 9% of a contract’s actual total cost.

4.1.2. Program-Type Analysis of CPP Derived Cost Savings.

Table 4-2 depicts the reported cost savings data sorted by program type. The table illustrates several clear findings, most notably the overwhelming influence of the major aircraft programs in the study. The aircraft programs account for 84% of the total for both program budget and program savings. For this reason, Table 4-2 includes a calculation of results for all the non-aircraft programs. The result is not significantly different in terms of percent savings, a 4.6% average without aircraft programs as compared to 4.3% for all programs. However, the average dollar savings is dramatically less. For all programs, including aircraft, the average commercial procurement practice derived savings was \$170M. By removing the big ticket aircraft programs, this average falls to only \$40M for the remaining 16 programs. For this reason, normalized results in terms of percentage savings are more meaningful indicators of program savings performance.

**Table 4-2. Program-Type Cost Savings Directly Resulting from CPP.**

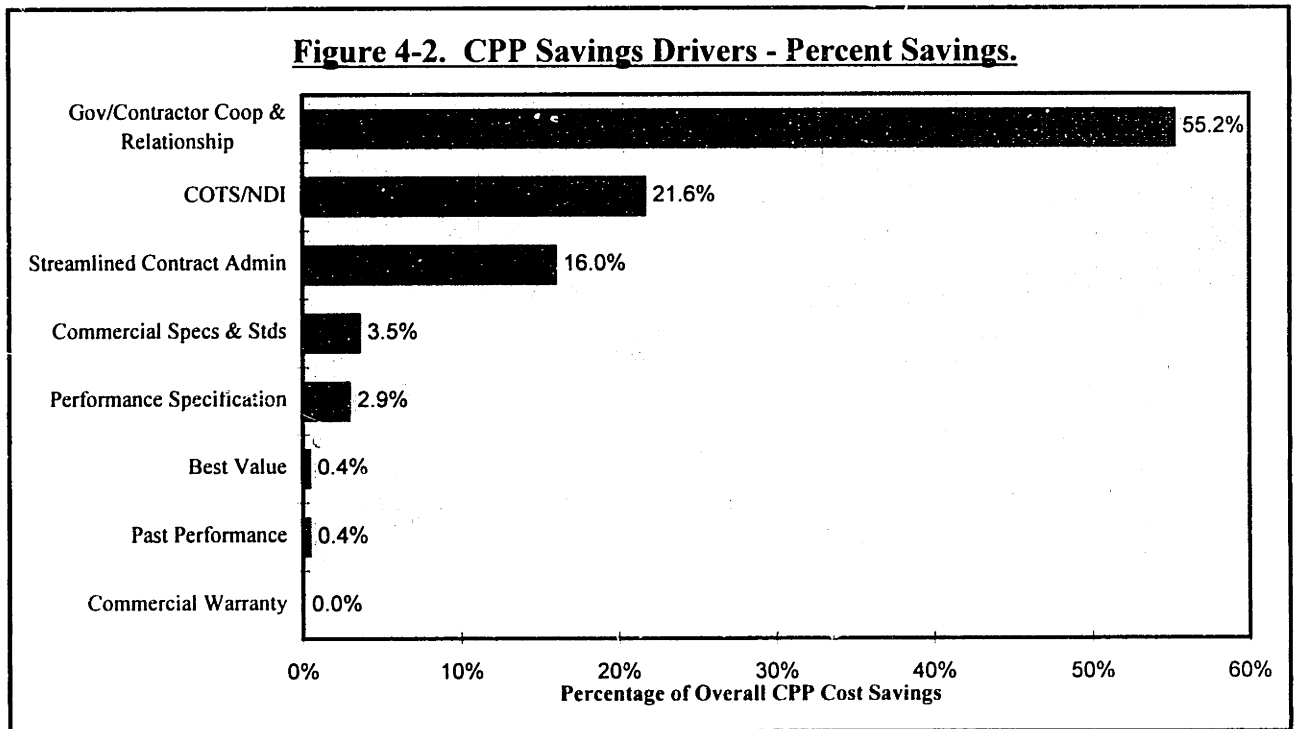
PROGRAM	PROGRAM BUDGET (in \$M)	PROGRAM SAVINGS (in \$M)	% Savings (=Sav/(Bud+Sav))
Aircraft Program Total	\$3,177	\$1,272	43%
Systems Program Total	\$3,268	\$243	7.8%
Vessel Program Total	\$2,137	\$20	0.9%
Munitions Program Total	\$6,108	\$182	2.9%
Non-Aircraft Total	\$13,513	\$645	4.6%
<b>GRAND TOTALS</b>	<b>\$86,690</b>	<b>\$3,920</b>	<b>4.3%</b>

Another interesting observation from Table 4-2 is that systems programs were the most successful in terms of percent savings. This finding supports the conclusion in Chapter 3 that systems programs were the most proactive and broadly experienced program category for the implementation of commercial procurement practices (averaging approximately 4.3 practices per program). On the other hand, vessel programs saved slightly less than one percent of program costs. This finding appears to also reflect Chapter 3's conclusion that vessel programs are the least active in employing commercial procurement practices (averaging only 2.8 practices per program).

4.1.3. Specific CPP Cost Savings Drivers.

A standard research survey question asked the defense acquisition programs to specify the percent contribution of each commercial procurement practice employed toward the program's resulting

cost savings. Figure 4-2 illustrates the collective survey responses. Unfortunately, the cost accounting structure of the programs studied typically could not directly provide the desired information. The data gathered likely reflects a subjective estimate. In addition, 15 programs reported direct cost savings from commercial procurement practices but three of these programs were unable to determine the requested itemized percent contributions. Consequently, the data in Figure 4-2 is based upon responses from only 12 of the 15 programs reporting cost savings.



As Figure 4-2 clearly shows, the specific practice of government/contractor cooperation and relationship accounts for over half of all reported cost savings. Four other practices largely comprise the remaining half. This result is of great practical value to acquisition managers. Defense programs contemplating commercial procurement practices should consider implementing the practice of government/contractor cooperation and relationship, as it appears to yield the highest cost savings return.

Another interesting observation is the relatively negligible contribution of three practices - best value, past performance and commercial warranties - toward program cost reductions. Upon further consideration this finding probably is due to the indirect nature of these practices. Best value and past performance are source selection criteria whose contribution, although valuable to the program, occurs prior to contract award rather than throughout the program's life. Hence years later the benefits from these two practices can be largely overlooked and difficult to capture. In the case of commercial warranties, this practice is of maximum value once the acquired items are in actual use out in the field.

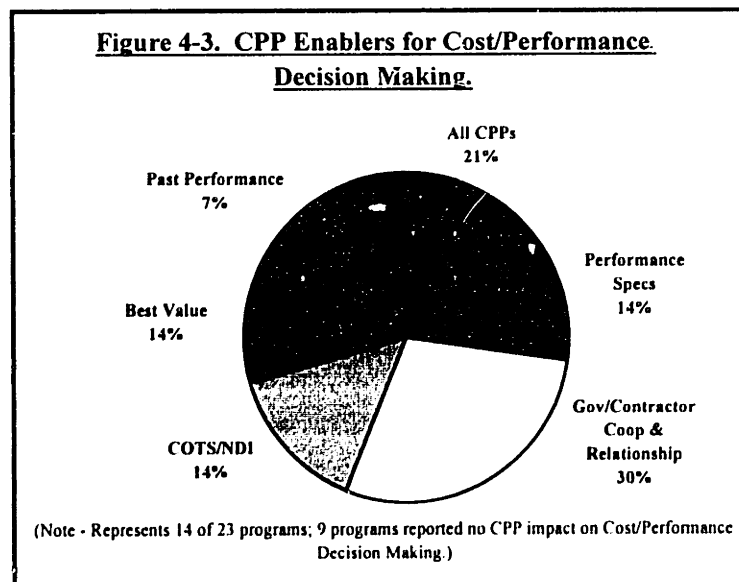
As most of the programs surveyed have not reached the full-scale production point in the program schedule, it is assumed that most of these programs have not fully taken advantage of their acquired item's warranty and therefore have little realized cost savings value to report.

4.1.4. CPP Enabled Program Staff Reductions.

A standard research survey question asked programs whether the use of commercial procurement practices (CPP) enabled reductions in the acquisition program staff. Of the 23 studied, 13 programs noted staff reductions were achieved directly as a result of the use of commercial procurement practices. For these 13 programs, the average staff reduction was about 33% for a total of 884 program positions. A one third reduction in program staffing is a sizable cost benefit from commercial procurement practices. Moreover, for 12 of these 13 programs, the personnel cost savings resulting from these staff reductions is in addition to earlier reported program budget savings.

4.1.5. CPP Enhancement of Cost/Performance Decision Making.

A reported benefit of commercial procurement practices is the improved ability to make informed cost/performance tradeoff decisions. To test this reported benefit, the standard research survey asked programs to comment whether commercial procurement practices enabled cost/performance tradeoffs and in particular which practices were the most useful. Of the 23 defense programs studied, a slight majority (12 programs) acknowledged that the use of commercial procurement practices did enable cost/performance decision making.





The principle practices cited as most beneficial to enabling cost/performance decision making are depicted in Figure 4-3. As the figure illustrates, the most valuable and commonly cited practice was government/contractor cooperation and relationship, cited by 30% of the programs. In particular, these programs acknowledged the value of forming IPTs with industry and/or contractor participation. These IPTs provided a forum for the commercial representatives to comment on the impact of potential government strategies and courses of action. Three of the 14 programs (21%) believed that all the practices equally contributed to cost/performance decision making.

### **4.2. Analysis of Hypothesis #2. The use of CPP shortens the acquisition program schedule.**

Based upon thorough examination of the research information provided from 23 defense acquisition programs, **the data provides evidence to support the second hypothesis**. The following three subsections describe in detail the thesis findings concerning the second hypothesis.

#### **4.2.1. Estimated Program Schedule Reductions Directly Resulting from CPP.**

As part of the standard research survey, all 23 defense acquisition programs estimated program schedule impacts directly resulting from the use of commercial procurement practices (CPP). The reported schedule reduction estimates are summarized in Table 4-3.

As shown in Table 4-3, 16 of the 23 defense acquisition programs surveyed acknowledged a program schedule reduction directly resulting from the use of commercial procurement practices. Overall, the 16 programs reported an average reduction of 17 months per program, which represents about 29% of the average program schedule. In similar fashion to the estimated commercial procurement practice derived cost savings, these results represent a rather conservative estimate of potential schedule reductions.

One of the surveyed programs believed that commercial procurement practices achieved schedule reductions but could not specifically quantify the size of the reduction at present. This program is listed as Unknown in Table 4-3 and does not contribute to the overall schedule reduction results. Another source for undervaluing commercial procurement practice cost savings is due to the relatively new nature of these practices. Many programs conservatively estimated future reductions during full-scale item production even though the managers are cautiously optimistic that substantial reductions are likely.

**Table 4-3. Reported Schedule Reductions Directly Resulting from CPP.**

<b>PROGRAM</b>	<b>Reduction Achieved??</b>	<b>Reduction in Months</b>	<b>Total Program Sched (Months)</b>	<b>% Reduction of Total Pgm Sched</b>
<b><u>First Quartile</u></b>	Yes	48	76	63%
	Yes	16	27	60%
	Yes	11	18	60%
	Yes	9	18	50%
	Yes	20	40	50%
	Yes	9	24	37%
<b><u>Second Quartile</u></b>	Yes	24	73	33%
	Yes	14	42	33%
	Yes	24	73	33%
	Yes	6	24	25%
	Yes	48	209	23%
<b>**Median**</b>	Yes	24	120	20%
<b><u>Third Quartile</u></b>	Yes	1	5	20%
	Yes	3	25	10%
	Yes	3	38	8%
	Yes	5	100	5%
	Unknown	0		
	No	0		
<b><u>Fourth Quartile</u></b>	No	0		
	No	0		
	No	0		
	No	0		
	No	0		
<b>TOTALS</b>	<b>16</b>	<b>265</b>	<b>912</b>	<b>N/A</b>
<b>AVERAGES</b>		<b>17</b>	<b>57</b>	<b>29%</b>

#### 4.2.2. Program-Type Analysis of CPP Derived Schedule Reductions.

Table 4-4 depicts the research schedule reduction data sorted by program type. The table illustrates that aircraft, systems, and vessel programs averaged comparable schedule reductions in the range of 30-32%. Munitions programs, however, averaged a schedule reduction of approximately 18%. Once again systems programs achieved the broadest positive results. Systems programs were the only program category in which all constituent programs reported obtaining a schedule reduction. In all other program categories, at least 25% of the programs failed to achieve a schedule reduction.

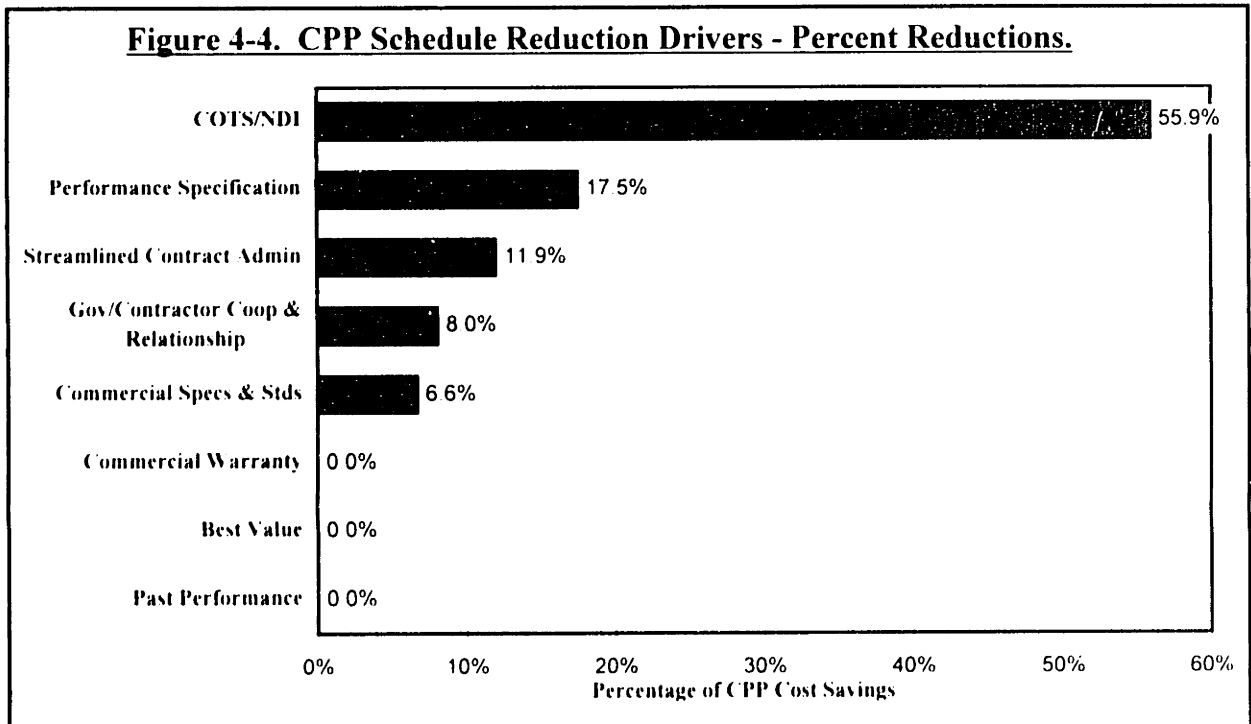
**Table 4-4. Program-Type Schedule Reductions Directly Resulting from CPP.**

<b>PROGRAM</b>	<b>% Pgms w/ Reductions</b>	<b>Reduction in Months</b>	<b>Total Program Sched (Months)</b>	<b>% Reduction of Total Pgm Sched</b>
Aircraft Program Averages	57%	110	341	32%
System Program Averages	100%	97	324	30%
Vessel Program Averages	40%	30	97	31%
Munitions Program Averages	75%	28	150	18%
<b>Averages for ALL Programs</b>	<b>70%</b>	<b>265</b>	<b>912</b>	<b>29%</b>
<b>NonAircraft Program Averages</b>	<b>75%</b>	<b>155</b>	<b>571</b>	<b>27%</b>

4.2.3. Specific CPP Schedule Reduction Drivers.

A standard research survey question asked the defense acquisition programs to specify the percent contribution of each commercial procurement practice toward the program’s corresponding schedule reduction. The collective program responses are illustrated in Figure 4-4. However, of the 16 programs citing schedule reductions, 3 were unable to determine the desired itemized percent contributions. Therefore, the data in Figure 4-4 is based upon responses from only 13 of these 16 programs.

**Figure 4-4. CPP Schedule Reduction Drivers - Percent Reductions.**



Analysis of Figure 4-4 shows the strong positive impact of the commercial procurement practice of COTS/NDI. In a finding similar to cost savings drivers where one practice largely dominated, for schedule reductions the practice of COTS/NDI accounted for over half of all reported schedule reductions. Surveyed programs commented that a COTS/NDI acquisition strategy dramatically reduces the traditional item development cycle. Four other practices account for the remaining schedule reductions. In addition, it is interesting that the dominating practice with respect to cost savings, government/contractor cooperation and relationship, only achieved modest returns for schedule reduction (Note - a comparison of cost and schedule reduction performance is provided in Chapter 5).

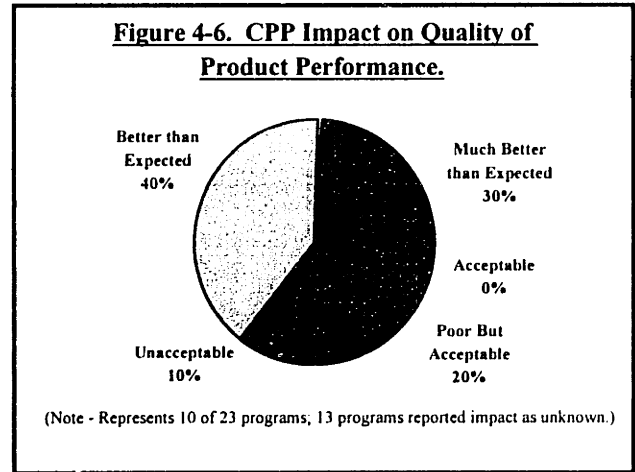
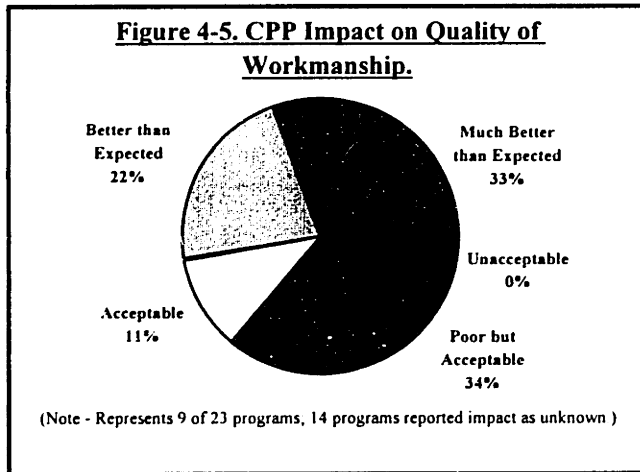
A final observation of Figure 4-4 is that once again the practices of best value, past performance and commercial warranties failed to contribute toward schedule reductions. As was assumed and explained in the analysis of cost savings drivers, it is once again assumed the indirect nature of these practices serves to conceal their real value to the programs.

### **4.3. Analysis of Hypothesis #3. The use of CPP does not compromise product quality.**

Commercial procurement practices are a highly regarded tenet of federal acquisition reform primarily because of their reported cost and schedule reducing benefits. Indeed, research for this thesis substantiates these valuable advantages. However, there is little documented information directly assessing the corresponding impact of commercial procurement practices on product quality. Skeptical government acquisition managers should appropriately question whether the benefits of commercial procurement practices are achieved at the expense of product quality. To investigate this potential side-affect, this thesis probed the direct impact of commercial procurement practices on quality. After thorough examination of the research information provided from 23 defense acquisition programs, **the data provides evidence to support the third hypothesis.** In fact, the research data lends support to a much stronger conclusion, that commercial procurement practices may actually improve product quality.

Two specific aspects of acquisition quality were researched - quality of workmanship and quality of product performance. Quality of workmanship assessed aspects of product quality such as fit and finish, number of defects, and reliability. Quality of product performance assessed the product's actual performance and included aspects such as how well the product met the user's needs, positive or negative feedback from actual users, and the product's performance in the "real" world environment. Programs surveyed were asked to rate these two attributes on the following scale: unacceptable, poor but acceptable, acceptable, better than expected, much better than expected. In addition, programs were asked to elaborate on which aspects of commercial procurement practices had the greatest influence.

Of the 23 programs studied, 14 programs were unable to comment on quality of workmanship because they had not yet received product deliverables. Responses from those programs able to comment are illustrated in Figure 4-5. Using a rating of acceptable as the baseline level of workmanship quality, Figure 4-5 clearly shows the valuable contribution of commercial procurement practices. Approximately 55% of the programs found commercial procurement practices actually resulted in workmanship quality that was better than expected. As opposed to 11% of the programs which reported no impact, and only 34% that experienced quality results that were less than expected.

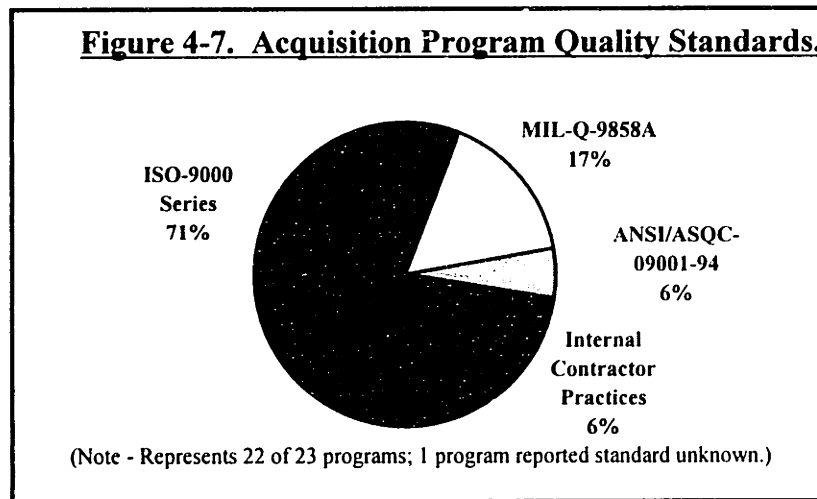


For quality of product performance, only 10 of the 23 programs studied had received advanced or full production product deliverables on which to comment. Figure 4-6 depicts the responses from these programs. In a result even stronger than found for quality of workmanship, approximately 70% of the programs found performance quality improved as a result of commercial procurement practices. While only 30% found the practices degraded the quality of product performance.

In general the program comments on the influence of specific commercial procurement practices were largely similar for both aspects of product quality. The specific practices noted to enhance quality were: extended commercial warranties, past performance, government/contractor cooperation – particularly active involvement in joint IPTs, performance specifications, and the use of commercial specifications and standards. The practices noted to result in a degradation of quality were difficulties modifying COTS/NDI equipment to meet government requirements and loss of control in the product’s design as a consequence of a performance specification.

The final aspect of quality researched was the link between the quality standards and the program’s corresponding perception of product quality. Figure 4-7 illustrates the respective quality practices used by 18 programs providing this information. In keeping with the commercial procurement practice philosophy, not all of these practices were specifically required in the program contracts.

Approximately three quarters of the programs did not mandate a specific quality standard. These programs let the contractor select its own quality standards. As Figure 4-7 shows, ISO-9000 series quality standards are employed by the vast majority of program contractors. In fact the ubiquitous application of ISO-9000 standards resulted in the lack of meaningful correlation between perceived product quality and the quality standard in use. Programs citing poor quality used ISO-9000 as well as programs citing good quality. In addition, an insufficient number of programs commented on the other standards to enable meaningful observations as well.



**4.4. Analysis of Hypothesis #4. The use of CPP does not degrade product life cycle support.**

Life cycle support implications of commercial procurement practices (CPP) is a rather broad concept to quantify and analyze. To facilitate research and analysis, the general concept of support was represented by five distinct aspects – warranty coverage, maintenance and repair, spare parts, training, and documentation. The standard research survey asked acquisition managers to assess the direct impact of commercial procurement practices on each of these five aspects. After thorough examination of the research information provided from 23 defense acquisition programs, **the data provides evidence to support the fourth hypothesis.**

In fact, the research results are so one-sided, it could be interpreted to support a much stronger conclusion, that commercial procurement practices actually improves product life cycle support. However, since almost all of the programs surveyed were in the development or early low rate initial

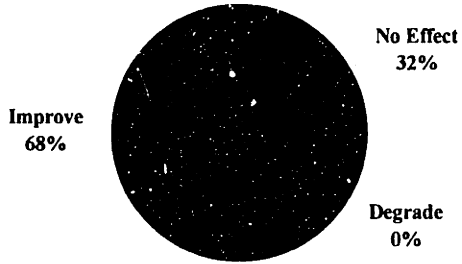
production phases, it is believed the data is based too heavily on projected performance and impact rather than actual program experience. Therefore, a more conservative interpretation of the data is more appropriate.

The exact research findings for each of the five aspects of life cycle support are graphically summarized in Figures 4-8 through 4-12. In collecting this information, each program was asked to rate the direct impact of commercial procurement practices on the five standard aspects using the following scale: improves, degrades, no effect, unknown. A rating of improves indicates a positive impact from commercial procurement practices, degrades indicates a negative impact, no effect means the practices had no influence on the support aspect, and unknown reflects a program's total lack of information on the aspect.

As figures 4-8 through 4-12 clearly show, programs noted no degradation of support for 4 out of the 5 aspects. Only in documentation were a minor 11% of the programs (i.e. 2 programs out of 17) dissatisfied with the impact of commercial procurement practices. Subsequent discussions with these programs revealed that degraded documentation was the result of deliberate cost/benefit decisions. These programs made the conscious decision to purchase less costly and likewise less detailed commercial level documentation.

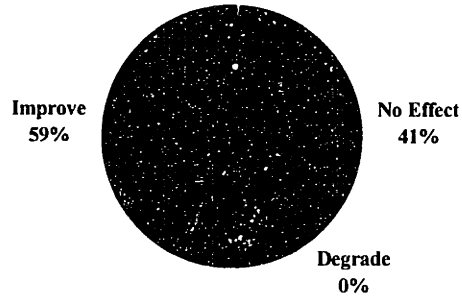
Another interesting aspect is the very high improvement ratings for warranty support and maintenance and repair, Figures 4-8 and 4-9 respectively. Many of the programs citing high ratings for these two aspects had employed the commercial procurement practice of extended commercial warranties. As a result, these programs had little uncertainty or logistical problems in supporting the acquired items. A similar comment on this topic, echoed by several programs, is the tremendous value of pursuing a support strategy of full contractor logistics support. Acquisition managers explained that by making the contractor fully responsible and accountable for support ultimately results in a more reliable and maintainable product. The logic for this assertion is that a contractor responsible for providing full support as well as manufacturing the product will give higher priority to reliability and maintainability concerns during product design. In the absence of contractor logistics support, the fundamental focus of the contractor is to produce the product at lowest cost to themselves while still meeting the government's minimum reliability and maintainability requirements.

**Figure 4-8. CPP Impact on Warranty Support.**



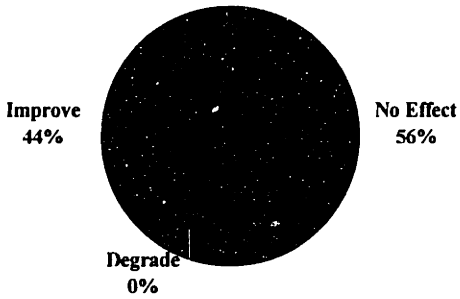
(Note - Represents 19 of 23 programs; 4 programs reported impact as unknown.)

**Figure 4-9. CPP Impact on Maintenance and Repair.**



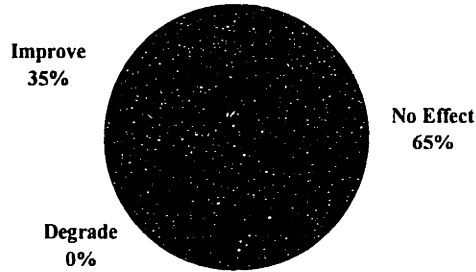
(Note - Represents 17 of 23 programs; 6 programs reported impact as unknown.)

**Figure 4-10. CPP Impact on Spare Parts Support.**



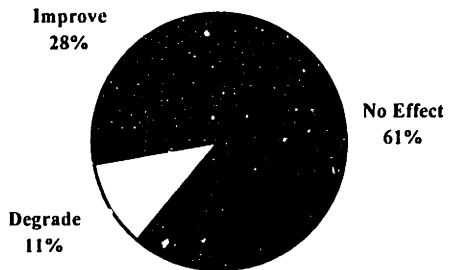
(Note - Represents 18 of 23 programs; 5 programs reported impact as unknown.)

**Figure 4-11. CPP Impact on Training Support.**



(Note - Represents 17 of 23 programs; 6 programs reported impact as unknown.)

**Figure 4-12. CPP Impact on Documentation.**



(Note - Represents 18 of 23 programs; 5 programs reported impact as unknown.)



### **4.5. Analysis of Hypothesis #5. The use of CPP does not increase product life cycle costs.**

Life cycle cost implications of commercial procurement practices (CPP) is another broad concept to quantify and analyze. To facilitate research and analysis, the cost impacts of the same five fundamental aspects of support considered for hypothesis #4 are examined here as well. In addition, a new aspect is considered - the issue of product obsolescence. Rapid technical obsolescence is a critical challenge to acquisitions involving high-technology components and equipment. To assess this aspect, programs were asked to rate the impact of commercial procurement practices on three additional product attributes. These additional attributes are: the level of initial product technology, the ability to upgrade product technology, and impact on eventual product replacement costs. After thorough examination of the research information provided from 23 defense acquisition programs, **the data provides evidence to support the fifth hypothesis.**

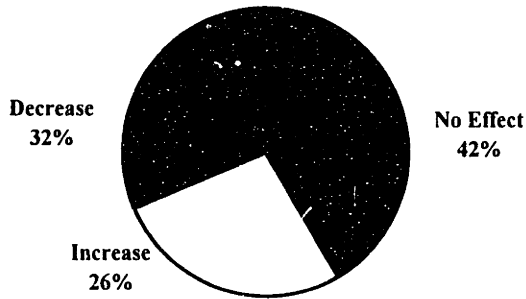
As was found with the fourth hypothesis, the results appear to support a much stronger conclusion, that commercial procurement practices actually decrease life cycle costs. However, once again it is believed the data is based too heavily on projected cost impact rather than actual program experience so a conservative interpretation of the data is appropriate. The following two subsections discuss the specific research findings in regard to the cost impacts of the five core aspects of life cycle support and in regard to the three attributes of product obsolescence.

#### **4.5.1. The Cost Impacts of CPP on the Five Core Aspects of Life Cycle Support.**

The research findings for the cost impacts of commercial procurement practices (CPP) on each of the five aspects of life cycle support are graphically summarized in Figures 4-13 through 4-17. To collect this information, each program was asked to rate the direct impact of commercial procurement practices on life cycle costs with respect to each of the five standard support aspects. Programs were asked to note their responses on the following scale: increases, decreases, no effect, unknown. A rating of increases indicates a negative higher cost impact from commercial procurement practices decreases indicates a positive cost savings impact, no effect means the practices had no influence on life cycle costs, and unknown reflects a program's total lack of information on the cost impact of this support attribute.

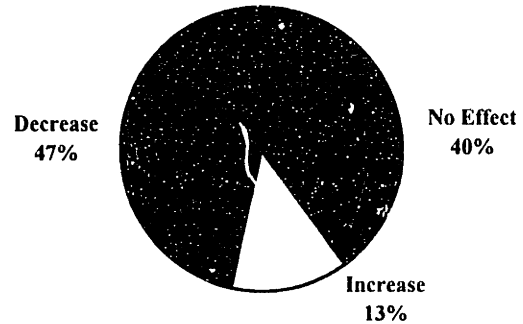
Observation of Figures 4-13 through 4-17 reveals that essentially acquisition managers largely believe commercial procurement practices have no direct impact on life cycle costs. This finding is based upon the observation that the response of "no effect" was cited by a majority of programs surveyed for four of the five life cycle support attributes. Nonetheless, a slight positive impact on life cycle costs

**Figure 4-13. CPP Impact on Warranty Costs.**



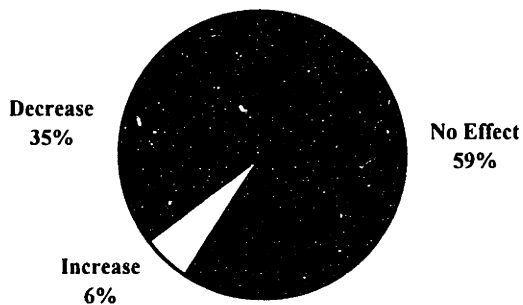
(Note - Represents 19 of 23 programs;  
4 programs reported impact as unknown.)

**Figure 4-14. CPP Impact on Maintenance & Repair Costs.**



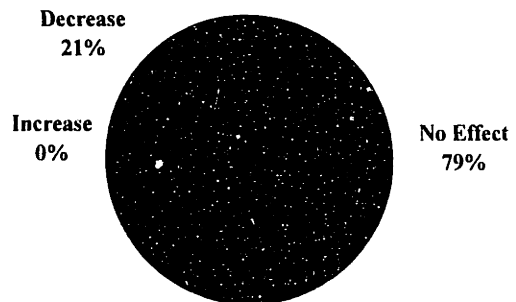
(Note - Represents 15 of 23 programs;  
8 programs reported impact as unknown.)

**Figure 4-15. CPP Impact on Spare Parts Costs.**



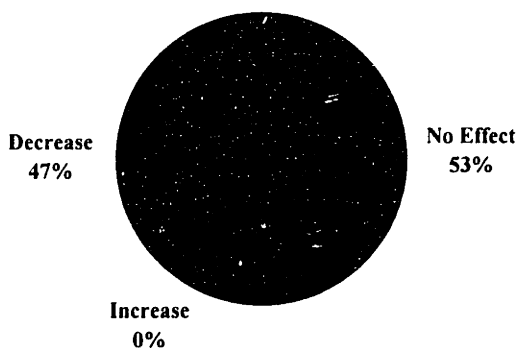
(Note - Represents 17 of 23 programs;  
6 programs reported impact as unknown.)

**Figure 4-16. CPP Impact on Training Costs.**



(Note - Represents 14 of 23 programs;  
9 programs reported impact as unknown.)

**Figure 4-17. CPP Impact on Documentation Costs.**



(Note - Represents 17 of 23 programs;  
6 programs reported impact as unknown.)

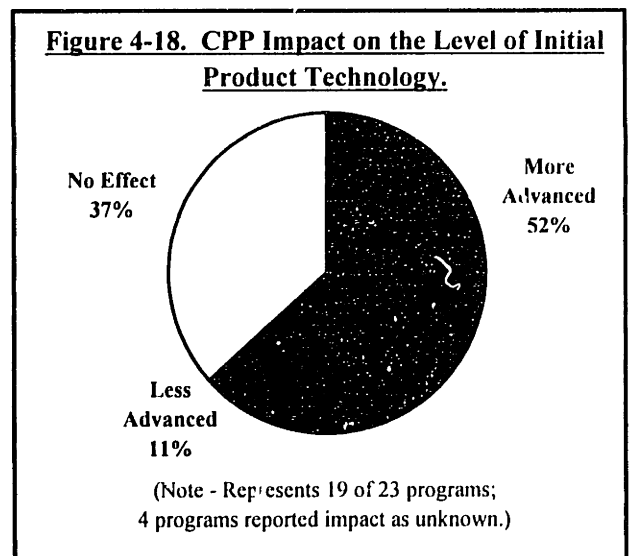
is indicated by examining the remaining minority views on increasing vs. decreasing cost impact. For all five support aspects, more programs believed life cycle costs would decrease rather than increase. Hence, combining the responses of “no effect” and “decrease” results in a sizable majority opinion from the acquisition managers surveyed that commercial procurement practices do not increase life cycle costs.

Two final observations on Figures 4-13 through 4-17. First of all, the largest reported cost increase was attributed to product warranties. This result is somewhat surprising because only two of the five programs reporting increased warranty costs purchased extended warranties (which typically cost more than standard product warranties). It is suspected, but not known for certain, that the remaining three programs required special government unique warranty requirements. The second observation is that almost half of the programs responding found that commercial procurement practices decreased documentation costs. These programs typically noted that the specific practice of streamlined contract administration eliminated copious amounts of unnecessary contractor reports and documents on a range of accounting, oversight, and technical topics.

4.5.2. The Life Cycle Cost Impacts of CPP on Product Obsolescence.

The exact research findings for each of the three attributes of product obsolescence are illustrated in Figures 4-18 through 4-20. To collect this information, each program was asked to rate the direct impact of commercial procurement practices on each of three core aspects of product obsolescence. To assess the impact on the level of initial product technology, programs responded on the following scale: more advanced, less advanced, no effect, unknown. To assess the impact on the ability to upgrade the product’s technology, programs responded in terms of: enhanced technical upgrade, degraded technical upgrade, no effect, and unknown. Lastly to assess the impact on eventual item replacement costs, programs responded using a scale of: increased costs, decreased costs, no effect, unknown.

As Figure 4-18 clearly shows, the majority of programs surveyed found commercial procurement practices enabled acquisition of a more technically advanced product than would have been possible otherwise. Most of these programs cited the value of the combined specific practices of performance

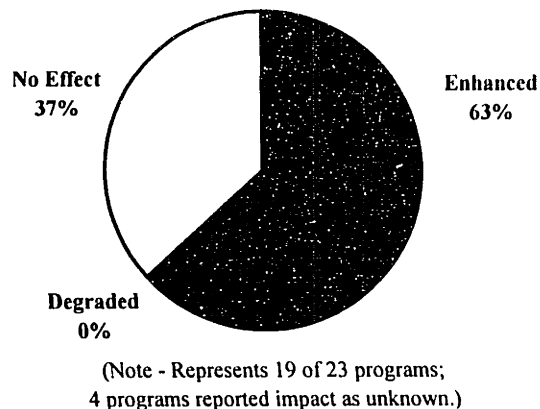


specifications and commercial specifications and standards. Together these two practices provided access to the latest technologies in the commercial marketplace.

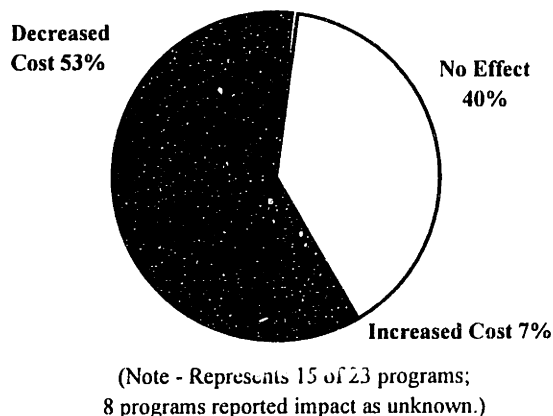
Per Figure 4-19, an overwhelming majority of programs surveyed reported that commercial procurement practices facilitated the future technology upgrade of the acquired product. The most commonly cited practice here was the use of commercial specifications and standards. This practice generally afforded product compatibility with the next generation of commercial product or component technology.

Lastly, as shown in Figure 4-20, the majority of programs reported that commercial procurement practices decreased eventual product replacement costs. In similar fashion to the ability to upgrade technology, most of these programs cited commercial specifications and standards as offering consistent interface and interoperability benefits with likely future replacement products.

**Figure 4-19. CPP Impact on Ability to Upgrade Product Technology.**



**Figure 4-20. CPP Impact on Eventual Item Replacement Costs.**



#### **4.6. Chapter Conclusions.**

In general, extensive thesis research of 23 defense acquisition programs yielded a solid foundation to assess the five core thesis hypotheses. The result that the data provided evidence to support all five hypotheses corroborates the prevailing rhetoric regarding the reported benefits of commercial procurement practices. In addition, the thesis offers sizable supporting evidence on the positive influence of commercial procurement practices on the less publicized impacts to critical acquisition concerns of item quality, life cycle support, and life cycle costs. Collectively, the thesis

findings provide a more complete understanding of the nature and impact of commercial procurement practices.

In terms of program-type analyses, systems programs appeared to be the most savvy and proactive in taking advantage of commercial procurement practices. Systems programs reported substantial benefits for cost and schedule reductions and in general displayed the broadest positive results from commercial procurement practices. For instance, systems programs were the only program category in which all of the programs surveyed reported achieving schedule reductions. Moreover, it is likely that the overall successful implementation of commercial procurement practices by systems programs is significantly influenced by the observed similarity between system program requirements and available commercial products and technologies. Nonetheless, a general study of systems programs should offer valuable program insights and lessons learned on successfully implementing commercial procurement practices.

## **Chapter 5. General Themes and Thesis Conclusions.**

**Chapter Summary.** The thesis accomplished all intended goals. In addition to examining five core hypotheses, the thesis provided valuable insights regarding the implementation and benefits of commercial procurement practices. An analysis of common themes in the use of commercial procurement practices concluded that five practices account for essentially all of the reported program cost and schedule reductions. In addition, general patterns of commercial procurement practices usage were examined and several pairs of specific practices were found to achieve complementary benefits. A recurring observation during the thesis was the critical role that the defense acquisition culture plays in the overall acceptance and efficient use of commercial procurement practices. The thesis concludes by suggesting that in spite of substantial apparent advantages the mandatory application of commercial procurement practices would not benefit all defense acquisition programs.

### **5.0. Introduction.**

Overall the thesis successfully fulfilled its intended goals. The extensive research of 23 ongoing defense acquisition programs provides a wealth of insights regarding the significant benefits, perceived risks, encountered obstacles, and proven strategies for implementation of commercial procurement practices. In addition, the collective information supports the five positive assertions posed in the core thesis hypotheses which in turn lends corroborative evidence of the prevailing rhetoric espousing the benefits of commercial procurement practices.

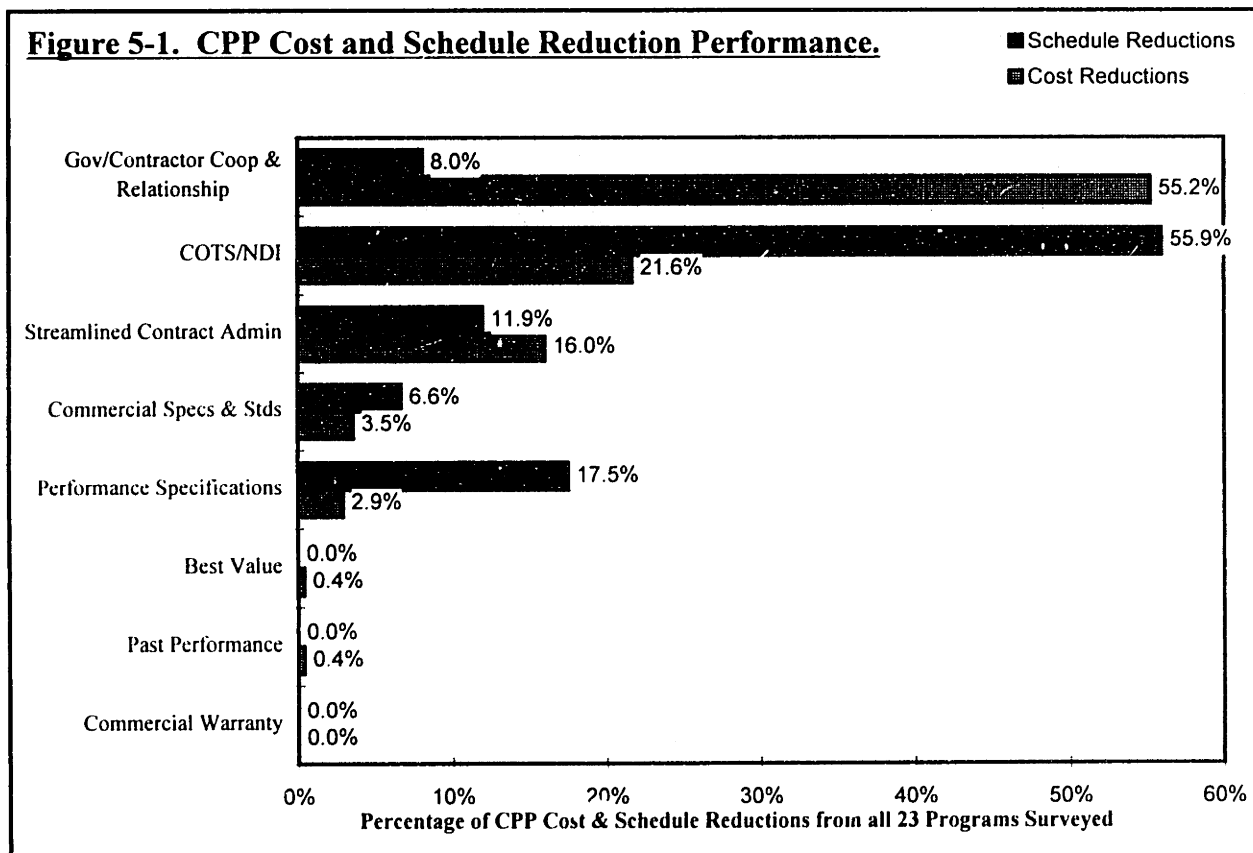
To facilitate sharing of commercial procurement practice information, Table 5-1, provided at the end of this chapter, concisely summarizes the most interesting and valuable thesis observations and conclusions. In addition, on several occasions during the thesis, interesting comments and findings were noted as excellent topics for further research and investigation. These intriguing topics are summarized in Table 5-2 which also follows at the end of the chapter.

The analysis of Chapter 3 was essentially limited to the program insights regarding the implementation of commercial procurement practices. Chapter 4 principally examined each individual thesis hypothesis. This chapter focuses on some general observations and themes of commercial procurement practices. The first observation considers which commercial procurement practices offer the greatest overall cost and schedule reduction benefits. Next, synergies and strategies are examined from the joint use of certain pairs of commercial procurement practices. The discussion then acknowledges the critical influence of the acquisition culture toward the implementation of commercial

procurement practices. The chapter concludes by considering the issue of discretionary vs. mandatory implementation of commercial procurement practices for defense acquisition programs.

**5.1. General Observations and Common Themes of CPP.**

For the purposes of overall comparison, the respective cost and schedule reduction performance for each specific commercial procurement practice is depicted in Figure 5-1. It is very interesting to note that each practice achieved substantially different levels of performance for cost and schedule reductions. For instance, the practice of government/contractor cooperation and relationship was the most successful by far in terms of cost reductions, yet its impact diminished significantly in regard to schedule reductions. Nonetheless, the figure clearly illustrates that five commercial procurement practices accounted essentially for all the reductions achieved. This important finding indicates that defense acquisition managers may not need to focus on all practices but rather a select few to reap significant commercial procurement practice benefits. However, this conclusion may be premature as it is solely based upon the evidence provided here. It is quite likely that interdependencies exist between practices, and poses an interesting and valuable topic for future research.



Another interesting finding is that none of the 23 surveyed programs reported using all five of the best performing practices depicted in Figure 5-1. This finding may indicate that a more aggressive use of these practices could result in even greater program benefits, or that some practices may create essentially mutually exclusive processes that prevents comprehensive application. Again, further research of these aspects is necessary.

Groups of specific commercial procurement practices that appeared to create synergistic benefits were also analyzed overall. For instance, 75% of all COTS/NDI oriented programs also implemented the practice of performance specifications. The acquisition strategy of jointly using these two practices enabled COTS/NDI oriented programs to shift the burden of ensuring performance and/or modifying COTS/NDI equipment to the military's unique requirements onto the contractor. It was observed also that 82% of the programs citing the use of performance specifications, also employed the practice of commercial specifications and standards. The combination of these practices affords maximum flexibility to the contractor to design and produce the acquired product. Also, 80% of the programs citing the use of best value similarly employed past performance. The joint use of these two practices provides a very robust contract proposal evaluation process. A surprising finding was that only 13% of all programs relying on COTS/NDI products also used the product's commercial warranty. It is believed these programs instead tended to cite special warranty requirements to mitigate the perceived risk of poor item performance. Lastly, 79% of programs using government/contractor cooperation and relationship also implemented the practice of commercial specifications and standards. The combination of these practices shifted the fundamental nature of the acquisition from essentially a government-unique foundation to a more broadly competitive commercial basis.

A recurring theme of the thesis is the issue of cultural acceptance or the cultural implications resulting from the implementation of commercial procurement practices. Cultural rationales were noted for the reluctance toward implementing several individual practices. In addition, cultural resistance was noted as a perceived risk factor and was the most commonly cited obstacle to general implementation of the practices. From the perspective of the front line acquisition manager, commercial procurement practices in fact represents a considerable shift in the essential foundation of government acquisitions. Beyond simply eliminating unnecessary bureaucracy and inefficient government unique processes, commercial procurement practices promotes a fundamental change in the nature of the government's acquisition process and relationships. The traditional roles of the government vs. the contractor have given way to a new relationship of collaboration and partnership. The former management model of strict oversight and control is swept aside as more trust is placed in the contractor's integrity and ability



to perform. Hence, it is not surprising that such dramatic changes have engendered strong cultural responses.

Upon reflection, it appears this cultural resistance to change poses the greatest barrier to widespread adoption of commercial procurement practices. As one acquisition reform author noted, “The DoD is like a supertanker – superb at accomplishing its primary mission but sluggish in changing course.”<sup>1</sup> Several acquisition managers commented that a few of their colleagues still believe that commercial procurement practices as well as other initiatives of government acquisition reform are simply the latest fad or political rhetoric. These initiatives can be outlived or outlasted with business eventually returning to “normal.” These single-minded acquisition managers have failed to realize that remarkable changes in global politics and substantial reductions in defense funding have irreversibly changed the nature of the defense industry. Dramatic actions by the government are necessary to adapt to this new environment. One aspect of these necessary actions is the acquisition reform tenet of commercial procurement practices. For this reason, former Secretary Perry’s mandate to apply new commercial specifications and standards was a marshaling event for change in the DoD. The banning of tried and true military specifications and standards impacted all DoD acquisition programs and sent the unmistakable message to the DoD acquisition community that change must occur.

Lastly, several acquisition managers reflected on the possible expansion of former Secretary Perry’s mandate for commercial standards to encompass the mandatory use of all commercial procurement practices. This thesis supports the prevailing rhetoric that commercial procurement practices reduce program costs, shrink program staffs, shorten acquisition schedules, may actually improve quality, and achieve these benefits without sacrificing life cycle support or costs. Mandatory implementation would force a reluctant acquisition corps to get onboard with these positive practices and potentially reap immediate and sizable returns. Yet, in spite of commercial procurement practices’ value, it is believed that such an all encompassing mandate may ultimately be a mistake. It is acknowledged in Chapter 3 that the practices are presently sporadically employed and greater actions are needed to promote the use of commercial procurement practices. However, not all practices are appropriate for all acquisition programs. Mandating the use of all practices is an extreme and over-reactive action. Such a requirement would encumber acquisition managers with situationally inappropriate practices and would likely result in commercial practice “horror stories,” undermining the reputation and confidence in the practices.

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<sup>1</sup> Lt. Col. Bruce D. Sweeney, et al. Using Commercial Practices in DoD Acquisition. Defense Systems Management College, Government Printing Office, Washington, DC, Dec. 89, p. viii.

A more responsible approach is to first address the observed deficiency in training and sharing of commercial procurement practice information. Arming acquisition managers with the knowledge and insights on the eight practices presented here and then empowering this educated acquisition workforce with the autonomy and latitude to selectively implement only those practices which add value to their particular acquisition programs will ultimately achieve the greatest returns in defense acquisition efficiency. This tactic appropriately delegates commercial procurement practice decision making to those with the most information and the actual responsibility and accountability for delivering the acquired items.

<b>Table 5-1. Summary of Thesis Topics and Finding of Particular Interest.</b>
1. <b>Scope of CPP.</b> Thesis research identified 8 specific commercial procurement practices (CPP) that are both widely in use and actively promoted with the government. These eight practices are: Performance Specifications, Government/Contractor Cooperation and Relationship, Commercial Specifications and Standards, Streamlined Contract Administration, Past Performance, Best Value, Commercial Warranties, and Commercial-Off-the-Shelf/Non-Developmental Item (COTS/NDI). (ref. 3.1)
2. <b>Mandated CPP.</b> The use of the following specific practices were found to be mandated by specific regulatory or agency policies: Past Performance, Best Value, Performance Specifications, and Commercial Specifications and Standards. (ref. 3.1.1, 3.1.2, 3.1.5, 3.1.6)
3. <b>Value of Electronic Data Interchange.</b> Four programs touted the benefits of electronic data interchange. The benefits included: rapid dissemination of program information via program homepage for internal comms (Intranet) and external comms (Internet) with industry & the public; efficient delivery medium for documentation contract deliverables and contract bids; Internet websites served as a useful forum for interactive dialog with users, industry and general public; 3 programs electronically posted draft contract requirements including the draft RFP and solicited feedback from industry. (ref. 3.1.7)
4. <b>Greatest CPP Risk - Item Performance.</b> Almost half of all programs perceived the uncertainty regarding actual item performance as the greatest risk from CPP. (ref. 3.2.1.b)
5. <b>Greatest CPP Obstacle - Cultural Acceptance.</b> Ten programs cited the frequent challenges posed by the "we've always done it that way" mindset. This was commonly found in both government and industry. Also, the ultimate users of the acquired item typically were uncomfortable accepting a more vague performance-based definition of the final product. (ref. 3.2.1.c)
6. <b>4.3% Average Cost Savings!</b> In the aggregate, the average cost reduction directly resulting from CPP for the 23 programs surveyed was 4.3%. In terms of program averages, only systems programs achieved a better result, with an average of 7.8% for the seven programs studied. (ref. 4.1.1, 4.1.2)
7. <b>Substantial Staff Reductions.</b> CPP resulted in staff reductions of 884 positions at 14 of the 23 programs studied. This represents an average staff reduction of almost one third for these 14 programs. (ref. 4.1.4)
8. <b>Average 29% Month Schedule Reductions.</b> Of the 23 programs surveyed, 16 reported schedule reductions directly attributable to CPP. The average normalized schedule reduction for these programs was approximately 29%, which equates to approximately 17 months per program. (ref. 4.2.1)
9. <b>CPP Improves Quality.</b> Research concluded that CPP far exceeded the hypothesis of not degrading quality and was actually found to improve product quality. (ref. 4.3)
10. <b>ISO-9000 Series Most Common Quality Standard.</b> Approximately 71% of the programs surveyed employed ISO-9000 series quality standards. Far exceeding the former government standard MIL-Q-9858A which was used by only 17% of the programs surveyed. (ref. 4.3)
11. <b>CPP Does Not Degrade Life Cycle Support.</b> CPP was found to have no detrimental impact on the following five aspects of life cycle support: warranties, maintenance & repair, spare parts, training, and documentation. (ref. 4.4)
12. <b>CPP Does Not Increase Life Cycle Costs.</b> CPP was found to have no significant cost escalating impact on the following five aspects of life cycle support: warranties, maintenance & repair, spare parts, training, and documentation. (ref. 4.5.1)
13. <b>CPP Enhances Product Technology.</b> The majority of programs responding cited that CPP: improves the initial level of product technology, enhanced the ability to upgrade product technology, and reduces eventual costs to replace the product with the next generation. (ref. 4.5.2)
14. <b>Greatest Cost &amp; Schedule Reduction Impact.</b> The five practices accounted for essentially all of the reported cost and schedule reductions. These 5 practices are: Performance Specifications, Commercial Specifications and Standards, Government/Contractor Cooperation and Relationship, Streamlined Contract Administration, and COTS/NDI. (Ref. 5.1)

**Table 5-2. Topics of Interest for Future Research.**

1. **Contractor Logistics Support (CLS).** Three programs specifically advocated the value of CLS. These programs believed making the contractor fully responsible and accountable for support ultimately results in a more reliable and maintainable product. After all, it is in the contractor's best interest to design and manufacture a product that is highly reliable and simple to maintain. In the absence of contractor logistics support, the fundamental focus of the contractor is to produce the product at lowest cost while still meeting the minimum government requirements. (ref. 4.4)
2. **Regulation & Oversight of Commercial Specs and Stds.** MIL-SPECs/STDs are actively reviewed and updated by the government and generally were developed as the result of previous government lessons learned. A concern of acquisition managers in regard to adopting the practice of commercial specs and stds is the quality of regulation, content, and oversight of commercial industry specifications and standards. The question of assessing how well commercial industry maintains its specs and stds is a valuable topic for future research. (ref. 3.1.6)
3. **Munitions Programs Uniquely Unconcerned with Risk of Item Performance.** The most common risk factor, item performance, is not cited by any munitions programs but is the most crucial risk factor noted by almost two thirds of all other programs. Why are munitions programs more comfortable with CPP? Is it that they are simply more accustomed to using performance oriented acquisitions than the other programs? This result is an interesting topic further research. (ref. 3.2.2.b)
4. **Capture Lessons Learned from "Bad" CPP Program Experiences.** The finding of only cost and schedule reductions does not mean no "bad" experiences have occurred in the use of CPP. To the contrary, the discussion of the risks and obstacles in Chapter 3 illustrated several direct implementation impacts, such as the burden of converting from a MIL-SPEC/STD base to commercial specifications and standards, and many serious risk factors that could quite possibly result in higher program costs. Lessons learned from any "bad" experiences would be most valuable to the users of CPP. (ref. 4.1.1)
5. **Study of Systems Programs to Gain Additional CPP Lessons Learned.** From program-type analyses, systems programs appeared to be the most savvy and successful. Consequently, systems programs are an excellent program category to study in depth to gain further insights and lessons learned on successfully implementing CPP. (ref. 4.6)
6. **Select Few Practices Yield Majority of Benefits?** A comparison of practices revealed that five practices achieved almost all cost and schedule reduction benefits. Can acquisition managers simply focus on these select few practices to reap significant benefits? Or is this conclusion invalid as it is solely based upon the evidence provided here. Quite likely essential interdependencies may exist between practices. (ref. 5.1)
7. **Mutually Exclusive CPPs?** None of the 23 programs surveyed used all five of the best performing practices. This finding may indicate that a more aggressive use of these practices could result in even greater program benefits, or that some practices may create essentially mutually exclusive processes that prevents comprehensive application. This is an interesting aspect to probe in future research. (ref. 5.1)

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**Appendix A. Standard Research Survey.**

Acquisition Program: \_\_\_\_\_ Date: \_\_\_\_\_

Survey Completed by (please provide name, title/position, agency/office, phone, email):  
\_\_\_\_\_

Did the acq program obtain any waivers or special exemptions from normal gov acquisition process regulations? Y / N (circle one) If so, please describe: \_\_\_\_\_

Overall Acq Program Budget: \$ \_\_\_\_\_

Overall Acq Program Schedule.                      Formal Program Creation Date: \_\_\_\_\_  
Contract Award Date: \_\_\_\_\_  
Date of First Deliverable: \_\_\_\_\_  
Contract Expiration Date: \_\_\_\_\_

**G1. Description of Commercial Procurement Practices (CPP) used in Acq Program**

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_
4. \_\_\_\_\_  
\_\_\_\_\_

**G2. What was the greatest risk CPP posed to the acq program?**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**G3. Describe the most difficult obstacle overcome in implementing CPP?**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**G4. What was most valuable reference source to the acq program staff for implementing CPP?**

- a. self educated from published CPP literature
- b. formal CPP training from government or private instructor
- c. internal dept/agency CPP experience & sources
- d. external dept/agency sources (such as gov experts from other agencies, consultants)
- e. Other \_\_\_\_\_

**Research Hypothesis #1: CPP Reduces Acquisition Costs.**

H1-1. CPP Cost Savings Achieved: \$ \_\_\_\_\_ As % of total Acq Program Cost: \_\_\_\_\_ %

H1-2. Primary CPP savings drivers?

- 1. \_\_\_\_\_ Accounted for \_\_\_\_\_ % of total savings.
- 2. \_\_\_\_\_ Accounted for \_\_\_\_\_ % of total savings.
- 3. \_\_\_\_\_ Accounted for \_\_\_\_\_ % of total savings.

H1-3. Basis for determining CPP cost savings? (circle one)

- a. Compared to ongoing similar contract using “traditional” methods.
- b. Benchmarked to similar past “traditional” method contracts.
- c. Projected cost savings if performed by “traditional” method.
- d. Other. \_\_\_\_\_

H1-4. Did CPP enable or facilitate informed cost - performance tradeoff decisions? Y / N

If so, how and which CPPs? \_\_\_\_\_

H1-5. Did CPP enable reduced acq program staff? Y / N

If so, what were the “traditional” staff size: \_\_\_\_\_, the reduced staff size: \_\_\_\_\_  
 What tasks/roles were minimized/eliminated? \_\_\_\_\_

**Research Hypothesis #2: CPP Reduces Acquisition Program Schedule.**

H2-1. CPP reduced acq schedule by: \_\_\_\_\_ As % of total acq program schedule: \_\_\_\_\_ %

H2-2. Primary CPP drivers to schedule reductions:

- 1. \_\_\_\_\_ Accounted for \_\_\_\_\_ % of total reduction.
- 2. \_\_\_\_\_ Accounted for \_\_\_\_\_ % of total reduction.
- 3. \_\_\_\_\_ Accounted for \_\_\_\_\_ % of total reduction.

H2-3. Basis for determining CPP schedule reduction? (circle one)

- a. Compared to ongoing similar contract using “traditional” methods.
- b. Benchmarked to similar past “traditional” method contracts.
- c. Projected cost savings if performed by “traditional” method.
- d. Other. \_\_\_\_\_

**Research Hypothesis #3: CPP Does Not Compromise Acquisition Quality.**

H3-1. How do you rate the quality of workmanship for the contract deliverable? (Aspects relating to contractor performance, such as: fit & finish, number of defects, field reliability, etc...)

Unacceptable      Poor but Acceptable      Acceptable      Better than Expected      Much better than Expected

What aspects of CPP had the greatest influence (positive or negative) on quality workmanship?

\_\_\_\_\_

H3-2. How do you rate the quality of performance of the contract deliverable? (Aspects relating to performance are: meet user needs, positive/negative user feedback, performance in “real” world, etc...)

Unacceptable      Poor but Acceptable      Acceptable      Better than Expected      Much better than Expected



What aspects of CPP had the greatest influence (positive or negative) on quality performance?

H3-3. What standards were mandated by the contract to manage quality?

H3-4. What additional standards did the contractor employ to manage quality?

**Research Hypothesis #4: CPP Does Not Compromise Life Cycle Support, and Research Hypothesis #5: CPP Does Not Increase Life Cycle Costs.**

Describe the impact of CPP on the following life cycle support and cost attributes:

H4-1. Warranty Support (e.g. coverage or duration)	improve	degrade	no affect	unknown
H5-1. Warranty Cost (e.g. coverage or duration)	increase	decrease	no affect	unknown
H4-2. Maintenance & Repair Performance	improve	degrade	no affect	unknown
H5-2. Maintenance & Repair Costs	increase	decrease	no affect	unknown
H4-3. Spare Parts Support (e.g. provisioning or repair)	improve	degrade	no affect	unknown
H5-3. Spare Parts Costs (e.g. provisioning or repair)	increase	decrease	no affect	unknown
H4-4. Training (e.g. maintenance or operator)	improve	degrade	no affect	unknown
H5-4. Training Costs (e.g. maintenance or operator)	increase	decrease	no affect	unknown
H4-5. Documentation (e.g. technical or operator)	improve	degrade	no affect	unknown
H5-5. Documentation Cost (e.g. technical or operator)	increase	decrease	no affect	unknown

Describe significant impacts: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

H4-6. Was provisioning technical documentation (PTD) bought to enable independent 3<sup>rd</sup> party support if necessary? Y / N If so, at what cost? \$ \_\_\_\_\_

**The impact of CPP on life cycle obsolescence? CPP's affect on the:**

H5-6. Level of initial product technology?	More Advanced	Less Advanced	No Impact	Unknown
H5-7. Ability to upgrade with new technology?	Enhanced	Degraded	No Impact	Unknown
H5-8. Eventual replacement costs?	Increased Cost	Decreased Cost	No Impact	Unknown

Thank you for assisting in my research on the government's experience with commercial procurement practices. Please return this survey to LCDR M. H. Anderson, (617)762-9481, by either fax (617)253-2560, email mhanders@mit.edu or by U.S. mail to: 128 Rock Street, Norwood, MA 02062.

## **Appendix B. Description of Defense Acquisition Programs Surveyed.**

### **1. USA Longbow Apache Attack Helicopter Program**

The Apache is the premier attack helicopter in the world. The Army program to upgrade AH-64D Longbow Apache is intended to maintain this distinction. Under this program, the aircraft are stripped down to the basic airframe, then modified by the prime contractor, McDonnell Douglas Helicopter Systems (MDHS), to incorporate an integrated avionics suite produced by Lockheed Martin. To reduce costs the government and MDHS formed Integrated Product Teams (IPT) in the areas of Acquisition, Integrated Product Development, Production, and Product Support. Initial brainstorming sessions by the IPTs yielded 67 major improvement ideas. After discussion and analysis, the list was pared to 12. (Ref. Klein, Ron. "PEO Aviation Commercialization." Program Manager, Nov./Dec. 1996, pp. 16-20.)

### **2. USA Black Hawk Utility Helicopter Program**

Nearing its twentieth production year, the Black Hawk remains the world standard for military utility helicopters. Sikorsky has produced over 1,700 Black Hawks since 1977. Current fiscal constraints have reduced procurement rates from 60 to 36 per year. Sikorsky offered to use commercialization initiatives to reduce costs to the extent that the per aircraft remains the same despite the decreased production rate. (Ref. Klein, Ron. "PEO Aviation Commercialization." Program Manager, Nov./Dec. 1996, pp. 16-20.)

The specific acquisition program studied was the Army's effort to award the fifth multiyear production contract for Sikorsky Black Hawk utility helicopters. The contract is for five years and includes production lots 21 - 24, with possible joint service execution of an option for lot 25. As mentioned above, this contracting effort heavily relied on commercial practices to reduce costs in order to acquire more aircraft. The government asked Sikorsky to submit all their cost reduction ideas and the government implemented those deemed appropriate. Sikorsky submitted numerous cost savings ideas but without the corresponding estimated cost savings for each idea. As a result, the government evaluated the cost saving ideas primarily on its impact on risk to the government.

### **3. USA Comanche Helicopter Program**

Comanche is the next generation of the Army's reconnaissance-attack helicopter. The program has had a turbulent history and survived a few budgetary cutbacks that threatened to terminate the program. To cope with budgetary shortfalls, the program's schedule has continually been extended and the program has aggressively implemented commercial practices. The prime contractors are Sikorsky and Boeing. Presently the first six preproduction Comanche aircraft are due in 2002.

### **4. USAF C-130J Aircraft Acquisition Program**

After more than 40 years, 2000 production models, nearly 60 variants, and over 20 million accumulated flight hours, the C-130 Hercules remains a major airlift power for the U.S. Military Forces. The C-130J is the next generation of this stalwart military cargo aircraft. Lockheed Martin undertook the J model redesign at company expense, with intended sales to the U.S. and various foreign markets. The USAF procurement of the C-130J is a FAR Part 12, commercial item acquisition. The Air Force's acquisition program consists of two phases: Part 1 - purchase of 2 C-130J prototypes for test and evaluation. Delivery of these aircraft is scheduled for Dec 97. Part 2 - A 5 year contract to buy up to 210 C-130J aircraft, with first delivery in FY98.

5. **USAF C-17 Aircraft Acquisition Program**

The C-17 is a highly flexible aircraft which provides the United States with a core airlift capability to rapidly project, reinforce, and sustain combat forces worldwide. The C-17 is capable of rapidly carrying passengers and cargo (including outsize) over intercontinental distances into austere airfields in forward areas. The C-17 System Program Office (SPO) has embraced acquisition reform, with highly successful results. The program now has a unique multiyear contract, specifically approved by Congress, which if funded every year in accordance with current plans will cover 7 authorization years and require the delivery of 80 aircraft. These years are FY-1997 through 2003, with deliveries running into FY 2005.

6. **USAF F-22 Aircraft Acquisition Program**

The F-22 will be the world's pre-eminent air superiority fighter for the 21<sup>st</sup> century. The aircraft will feature low-observable stealth characteristics, supersonic cruise without afterburner, advanced integrated avionics, thrust vectoring, and significantly reduced operations and support costs. The F-22 Program from its inception recognized the need for acquisition reform and new vistas in forming their Engineering and Manufacturing Development (EMD) program. Their vision was simple – do what makes sense. The team – program office, maintainers, warfighters and contractors – led the way in implementing Lean Enterprise and CAID (Clear Accountability in Design) initiatives. In preparing to contract for pre-production verification vehicle, the F-22 team has implemented lessons learned from EMD to improve and streamline the acquisition process. (Ref. Navy Acquisition Reform Success Story on F-22 Program, [http://www.safaq.hq.af.mil/acq\\_ref/stories/stories.html](http://www.safaq.hq.af.mil/acq_ref/stories/stories.html))

7. **USAF F-15 Aircraft Acquisition Program**

The acquisition program studied was the most recent and probably last F-15E aircraft acquisition contract from the USAF's F-15 program staff. The Air Force's fleet of F-15s was just enough to meet documented requirements. This contract was to procure 18 F-15E aircraft to account for aircraft attrition from the present till about the year 2020. The contract was a sole source contract to McDonnell Douglas (the only contractor making F-15s) and was structured as the purchase of 6 aircraft with FY96 funds with two out-year options of 6 aircraft each.

8. **USAF Joint Tactical Information Display System (JTIDS)**

The JTIDS program procured class 2 terminals for major military platforms. The next step in the JTIDS program was to build/procure less capable and less expensive JTIDS terminals for smaller platforms. The acquisition MIDS FDL achieves this specific objective for the F-15 aircraft. The acquisition built on existing JTIDS class 2 technology, MIDS Engineering Manufacturing Development (EMD), and Industry IR&D to qualify, test, build, and support 500 non-development item (NDI) LINK-16 capable, reduced cost data link terminals for the F-15 C/D aircraft. The MIDS FDL terminal will be ultimately be a GFE item for the F-15 program.

9. **USAF Milstar Satellite Program**

Milstar is the next generation of military satellite communications. It provides world-wide secure, survivable, highly jam resistant communications to support U.S. strategic and tactical combatant forces (USAF, USA, USN) in hostile environments well into the next century. The overall Milstar Program has suffered significant budget shortfalls - about \$1.4B worth since 1992. As a result the program had to be very aggressive in reducing costs. The use of commercial practices was one of the program's cost reduction initiatives.

The acquisition program studied is Milstar's Satellite Team (as opposed to the Joint Program Office, the Mission Control Team, and Advanced Programs Team). Milstar I satellites consisted of a

constellation of two low data rate (2400 bps) satellites. The Milstar II satellites consist of a constellation of four more advanced medium data rate (1.54 Mbps) satellites. The Milstar II satellites will be constructed by Lockheed-Martin, with delivery expected from 1998 -2001. The Satellite Team has embraced Acquisition Reform and the use of commercial practices to streamline the acquisition process and reduce costs in the Milstar II satellite contract.

**10. USAF T-38 Avionics Upgrade Program**

The overall objective of the T-38 AUP is to provide a timely, cost effective modernization of the Northrop T-38A and AT-38B aircraft avionics systems. The objectives of the T-38 Avionics Upgrade Program (AUP) are: 1) Provide an upgraded avionics system and related cockpit functions to provide supportable, cost effective training for the Bomber-Fighter Track tasks of Specialized Undergraduate Pilot Training; 2) Provide upgraded Aircrew Training Devices (ATD) as a companion element to T-38 Training; 3) Provide Contractor Logistics Support (CLS) for the T-38 AUP aircraft and ATDs; 4) Define and manage a flexible, executable acquisition program that takes full advantage of acquisition streamlining and reform.

McDonnell Douglas Aerospace (MDA) was selected through a competitive source selection process to upgrade the T-38 avionics systems to meet Government requirements as specified in three contracts awarded on 31 July 1996. To accomplish this task, MDA has Total Systems Performance Responsibility (TSPR). The program requires upgrading no more than 460 USAF T-38 aircraft to a single, T-38C configuration. An option was included in the contract to upgrade an additional 40 T-38 aircraft, which are based at Sheppard AFB and used for Euro-NATO Joint Jet Pilot Training. There is potential to upgrade additional T-38 and T-38 style (F- ) aircraft through the Foreign Military Sales (FMS) program.

**11. USAF Integrated Maintenance Data System (IMDS)**

IMDS is an information technology (IT) program to provide all Air Force personnel with the maintenance related information needed to perform their jobs. The architecture integrates legacy IT systems and databases with new IMDS hardware and software. The program employs an evolutionary development strategy that fields incremental IMDS enhancement on an annual basis.

**12. USAF PACER Compass, Radar and GPS Program (PACER CRAG)**

The existing low power black and white radar/compass system in USAF transport aircraft was technologically obsolete, becoming unreliable, and lacked newer performance features for safety. The PACER CRAG program was established to buy a replacement system. Preliminary efforts found the development of a military unique replacement to be too costly. The program then examined the commercial market and successfully integrated COIS components into a fully functional replacement. The new higher power system employs the latest technology and features. Specifically the system adds GPS navigation capability, color radar display, and weather radar capability.

**13. USAF Advanced Air-to-Air Missile Program (AMRAAM)**

The AIM-120 AMRAAM is a new generation air-to-air missile. It has an all-weather, beyond-visual-range capability and is scheduled to be operational beyond the year 2000. AMRAAM is the premier air-to-air weapon of choice by America's aviator against low-altitude targets. It incorporates an active radar with an inertial reference unit and micro-computer system, which makes the missile less dependent upon the fire-control system of the aircraft. Once the missile closes on a target, its active radar guides it to intercept. This enables the pilot to aim and fire several missiles simultaneously at multiple targets. The pilot may then perform evasive maneuvers while the

missiles guide themselves to their targets. The AMRAAM acquisition studied, was specifically the purchase of lot 11 with an option for purchase of lot 12. (Ref. SAFAQ Acquisition Success Story on AMRAAM program, dtd 05 Dec 1996.)

**14. USAF Joint Air-to-Surface Missile Program (JASSM)**

JASSM is the next generation of air-to-surface missile. The missile will be jointly used by the Air Force and the Navy. The Air Force expects to purchase 2400 units over the ten year period from the year 2000 to 2010. Navy procurement quantities are TBD. The JASSM system consists of a weapon (airframe, guidance & control, propulsion, munitions/warhead, and fuses), support and test equipment, aircraft interfaces, software, mission planning, training, and personnel. The JASSM Program is a high profile Acquisition Reform success story. The program, being relatively new, has adopted and implemented the vast majority of AR initiatives right from the start. The program currently awarded contracts to two contractors to perform the early stage Program Definition and Risk Reduction (PDRR) phase.

**15. USAF Sensor Fused Weapons Program (SFW)**

The SFW is a 1000 pound class, unpowered, unguided wide area munitions compatible with most USAF, USN, USMC and NATO tactical aircraft. After release the SFW projectiles scan the area under their flight path with a two-color passive infrared sensor. Upon detecting a target, the projectile fires the explosively-formed penetrator which is capable of defeating the top armor of threat vehicles (tanks, armored personnel carriers, self-propelled artillery, and trucks).

The first SFW development contract awarded in 1985 to Textron Systems Corp. Initial low rate production contract as awarded to Textron on 28 March 1992. Since then, there have been annual production contracts, with annual awards expected to continue until 2004 and last production delivery in 2006. A Producibility Enhancement Program (PEP) was initiated in FY92 to implement design refinements to increase producibility and reduce munitions costs.

**16. USCG 180' Seagoing Buoy Tender Replacement Program (WLB)**

The program will procure the replacement for the 180 foot seagoing buoy tender (WLB) class of Coast Guard cutters. The primary mission of the WLB class is servicing the nation's short range aids to navigation. The contract was one of the first true performance specification acquisitions for the Coast Guard. One of the performance criteria is to reduce staffing from existing WLB levels. The new WLB and WLM fleets will operate with a total staff reduction of about 500 sailors.

The contract for the design and construction of the first six ships was awarded to Marinett Shipyards. The contract for the construction of the next 10 ships will be a hybrid performance spec. The Coast Guard will use the Marinett design and allow the next contractor some redesign flexibility to enable construction at facilities other than Marinett and to promote further cost reductions.

**17. USCG Coastal Buoy Tender Replacement Program (WLM)**

The program will procure the replacement for the 157 foot coastal buoy tender (WLM) class of Coast Guard cutters. The primary mission of the WLM class is servicing the nation's short range aids to navigation. The contract was a true performance specification and modeled after the WLM replacement performance specification. One of the performance criteria is to reduce staffing from existing WLM levels. The new WLB and WLM fleets will operate with a total staff reduction of about 500 sailors.

The contract for the design and construction of the first six ships was awarded to Marinett Shipyards. The contract for the construction of the next 8 ships will be a hybrid performance spec. The Coast Guard will use the Marinett design and allow the next contractor some redesign flexibility to enable construction at facilities other than Marinett and to promote further cost reductions.

**18. USCG Cutter Boat Replacement Program**

All major cutters carry small deployable rigid hull inflatable boats (RHIB). This project is to procure replacement boats for all major cutter classes (except the 270' WMEC class). The project is buying three different sizes of RHIBs and may purchase up to 125 boats. Three individual IDIQ contracts were awarded for each RHIB size.

**19. USCG Coastal Patrol Boat Replacement Program (WPB)**

Originally constructed for a 20-year service life, the 82' Point Class Patrol Boats are exceeding 30 years of actual service. Over recent years the Coast Guard has systematically eliminated seventeen 82' WPBs in the worst physical condition. While annual operating hours for each WPB has remained constant at about 1300 hours per year, the 82' WPB's annual maintenance and repair cost has doubled in the last five years. From \$97K to almost \$200K per vessel.

The WPB replacement program seeks to acquire a more capable, cost effective craft. At this stage of analyzing the coastal zone missions, the Coast Guard anticipates procuring a total of 31 Coastal Patrol Boats to replace the existing WPB fleet.

**20. USN LPD-17 Amphibious Transport Dock Ship Program**

The LPD 17 is a 12 ship Navy procurement program to replace four aging amphibious transport classes of ships. Avondale Industries Inc. in Avondale LA won the initial detailed design and construction contract. Avondale will construct the first ship, LPD 17 USS San Antonio, with options for construction of LPD 18 and LPD 19. The LPD 17 class of ships are intended for Amphibious Warfare. The vessels are flight deck equipped with an overall length is 208m, beam 31.9m, and draft of 7m. The ship's complement will be 493 sailors with accommodations for 704 embarked Marines.

**21. USN Joint Maritime Communications System - Afloat Telecommunications System Program (JMCOMS ATS)**

The JMCOMS ATS program is initiating a non-traditional way to augment the capacity of military satellites by awarding a fleet-wide service contract. ATS is establishing a commercial vendor shipboard presence to offer commercial frequency band satellite telecommunication service to ships at sea, providing bulk capacity voice/fax/data/STU III/ISDN, high capacity communication services to the Fleet. The contract will provide official and unofficial non-personal use, and unofficial personal use voice and data telecommunications services, while providing rapid fielding, and technology insertion upgrades.

**22. USN Joint Maritime Communications System - Mini-DAMA Program (JMCOMS MD)**

The Mini-DAMA Program is procurement of miniaturized equipment to achieve UHF DAMA capability aboard submarines and aircraft. It will have integral SATCOM and Line-of-Sight (LOS) capabilities, orderwire COMSEC module, function on both 5 kHz and 25 kHz DAMA and non-DAMA satellite channels, be inter-operable with USAF 5 kHz DAMA, and have embedded AFSATCOM and OTCIXS II capability. Mini-DAMA transitioned from a full MIL\_SPEC to commercial open systems architecture; and contract was awarded to TITAN Link-A-Bit.

**23. USN Joint Standoff Weapon Program (JSOW)**

JSOW is an air-to-ground weapon designed to attack a variety of targets during day, night and adverse weather conditions. JSOW will enhance aircraft survivability by providing the capability for launch aircraft to standoff outside the range of most surface-to-air threat systems. JSOW is a family of weapons. The Unitary variant acquisition program is a significant success story, yielding substantial savings over the program's life cycle. Texas Instruments (soon to be acquired by Raytheon) is the sole source prime contractor. In April 1995 the Navy gave approval to begin low rate initial production of 140 unitary weapons. The total planned inventory is 7,800 units. In 1993 the Unitary Variant Program applied to be designated as an SECDEF acquisition streamlining pilot programs. In 1995, the program earned this distinction.