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A Manpower Model for U.S. Navy Operational Contracting

5 June 2012

by

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A MANPOWER MODEL FOR U.S. NAVY OPERATIONAL CONTRACTING

ABSTRACT

Reports by the Acquisition Advisory Panel (2007) and Gansler (2007) have both expressed concerns that the DoD contracting workforce is not adequate in size to handle the current contracting workload. Core to determining the correct workforce size is establishment of a proven manning model that can be used throughout the DoD to estimate the number of contracting specialists required to handle a given workload.

This project looked at the demand factors that two U.S. Navy systems commands (SYSCOMs) use to signal when they need more contracting full-time equivalents (FTEs). The study applied the Air Force Manning Standard Operational Contracting model to the Naval Supply Systems Command's contracting workload. Results show that the model effectively estimates manning for that SYSCOM. The results suggest that the model could be used to estimate contracting FTE manning in other DoD major commands.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACASR	Army Contracting Agency Southern Region
ACAT	Acquisition Category
ACC	Army Contracting Command
AFMIA	Air Force Manpower and Innovation Agency
AFMS	Air Force Manpower Standard
AMSAA	Army Material Systems Analysis Agency
APDP	Acquisition Professional Development Program
CMMM	Contract Management Maturity Model
DAU	Defense Acquisition University
DAWIA	Defense Acquisition Workforce Improvement Act
DCMA	Defense Contracting Management Agency
DOD	Department of Defense
ePR	Electronic Procurement Request
FAR	Federal Acquisition Regulation
FASA	Federal Acquisition Streamlining Act
FLC	Fleet Logistics Center
FTE	Full-Time Equivalent
GLS	Global Logistics Support
GAO	Government Accountability Office
GS	General Schedule
IDIQ	Indefinite Delivery Indefinite Quantity
KO	Contracting Officer

LPTA	Lowest Price Technically Acceptable
MAJCOM	Major Command
NAVSEA	Naval Sea Systems Command
PALT	Procurement Administrative Lead Time
PAT	Per Accomplishment Time
RFP	Request for Proposal
SAF/FM	Air Force Financial Management
SAP	Simplified Acquisition Procedures
SAT	Simplified Acquisition Threshold
SOW	Statement of Work
SPS	Standard Procurement System
SYSCOM	System Command
TOE	Table of Organization and Equipment
TDA	Table of Distribution and Allowance

I. INTRODUCTION

The Department of Defense (DoD) relies on contracts to procure almost all of the goods and services it uses. Because the DoD does not have its own factories, external suppliers must manufacture everything needed to fight wars. Every agreement made between an external supplier and the DoD is captured in a contract. The history of government contracting dates back to the earliest warfighting efforts. The American Civil War was an early example of large material procurement by U.S. government contracting representatives. Generals of both the Union and Confederate armies directly conducted much of the procurement. Few stated contracting rules were used at that time, and the guidance driving procurement was in the interest of getting the best equipment and getting it fast. Larry Sawers is a professor of economics at the American University College of Arts and Sciences. Sawers (2003) observed,

> Through haste, carelessness, or criminal collusion, the state and federal officers accepted almost every offer and paid almost any price for the commodities, regardless of character, quality, or quantity. … In the purchase of horses and mules … the most unblushing frauds were perpetrated. (p. 2)

It is a safe assumption that the majority of military leaders have wished at some point in their careers to make a phone call and get needed materials from any company determined fit; some officers even act on this impulse. What was once a common practice by generals in the Civil War now has accompanying legal baggage and a name: it's called an *unauthorized commitment*. Throwing aside a general desire for an economy of public resources, legal terminology, and implications of criminal charges, officers entrusted with warfighting should be given authority to procure whatever they need to accomplish their missions. Entrusting warfighters with unlimited procurement authority is often seen as the implied authority of being in command. This logic is drawn from a view that war must be won at any cost and that the fighters of the war should be exhausting all available resources in the effort to win.

Success in modern war is being judged increasingly by its cost in dollars (Depaul, 2011). Additionally, the complexity of requirements for fighting modern war has given rise to the need for contract specialists. Schwartz and Swain (2011) explained how the

increasing complexity of war, together with cuts in logistics and support personnel, have made it impossible for the DoD to fight wars without contractors, saying,

> Advances in warfare and technology have expanded the functions and responsibilities of contractors in military operations. After the Cold War, reliance on contractors further increased when DoD cut logistic and support personnel. As a result of these cuts, DoD lost in house capability and was forced to rely even further on contractor support. (Schwartz & Swain, 2011, p. 5)

A. ALLOCATING RESOURCES FOR MODERN WARFARE

Specific political aims are now connected with every conflict fought. The amount of effort the United States uses to fight a war must be proportionate to the objectives endorsed by the president and approved by Congress. In the case of the 9/11 attacks, a goal of the United States was to remove Osama bin Laden and his network of terrorists. The most efficient effort, if measured by cost, would have been the price of bullets required to dispatch Osama bin Laden and his subordinate leadership. This cost would have made the goal well worth the effort. Unfortunately for taxpayers, the war effort took on a life of its own. If we measure the war effort in terms of dollars spent for both wars in Afghanistan and Iraq, the effort was much greater than originally anticipated (Depaul, 2011). By fiscal measures, the cost of the War on Terror effort has exceeded the war goals.

Contracts for fighting wars in Afghanistan and Iraq are expensive. Compounding this expense is the emphasis on an all-volunteer force. The U.S. relied on drafted personnel to augment its career military for WWI, WWII, Korea, and Vietnam (North, 2003). In 1973, Congress refused to extend the draft law and the authority to draft expired (North, 2003). As a result, the DoD must use more of its personnel in combat roles and outsource the support.

Unintended consequences can come with outsourcing support. Limited oversight has been provided in the execution of contracted work in support of contracts for the wars in Iraq and Afghanistan (Gansler, 2007). Contract specialists, too few in numbers, may not have time to look over the shoulder of a contracted agency.

Limited contractor oversight may not result in big problems when contracting to a company in the U.S. with a solid responsibility determination and success easily measured

by a delivered product. However, when contracting outside of the U.S., unintended outcomes can arise from contracting support and from not closely monitoring the methods of execution. In a Congressional Research Service report dated May 13, 2011, Schwartz and Swain (2011) stated, "There have been allegations that money from U.S. funded contracts has gone to local warlords and the Taliban" (p. 22). Contract management becomes especially critical in the procurement of services and as the complexity of the contract increases.

B. THERE'S MORE TO A CONTRACT THAN THE AWARD

Afghanistan is a land-locked country. To fight wars in a large, land-locked country, supplies must be convoyed over thousands of miles. Much of this terrain extends through large desert regions that are difficult to police due to size. When battles are fought or bases established in the interior of Afghanistan, supporting units are often required in equal ratios to combat troops (Schwartz & Swain, 2011). With finite numbers of personnel available, the most logical way to solve the support problem, short of instituting a draft, is to outsource the shipment of material, that is, to pay private contractors a lot of money to transport the material and assume all the risks of transportation. The benefit is that the military forces can focus on the fighting. The contractors can worry about shipping the material and deal with the risks of highwaymen and regional warlords.

A Government Accountability Office (GAO) High-Risk Series report highlighted several high-risk areas of DoD contracting. One of the areas cited was a potential over-reliance on contractors in situations that would have been better managed by DoD personnel (GAO, 2011). The report stated that the "DoD's reliance on contractors is not yet fully guided by a systematic determination of which functions and activities should be contracted out or by an assessment of the risks that reliance on contractors may pose" (GAO, 2011, p. 125).

The unintended outcome that came with outsourcing the transportation of material in Afghanistan is that large contracts were given to several fledgling trucking companies. Many of these companies are merely a "front" for the various highwaymen who would otherwise be attacking U.S. convoys (Tierney, 2010). So, instead of fighting the attacks, the

U.S. had paid off, directly or indirectly, the attackers with contract dollars. The result is that warlords are now coming to U.S. government representatives in Afghanistan as trucking company owners rather than bandits (Schwartz & Swain, 2011).

Worsening the situation is that many of the strongmen taking the contract dollars to allow passage of supplies also support U.S. enemies in Afghanistan (Tierney, 2010). The warlords are turning the U.S. dollars they get from material transportation contracts into war equipment that they can use to fight U.S. soldiers and perpetuate the war. As Tierney (2010) stated, the result is that the U.S. is effectively funding its own enemy by "injecting a good portion of a $2.16 billion contract into a corruptive environment" (p. 3). It is a cycle that continues in Afghanistan according to the Gansler (2007) report. Gansler (2007) cites the cause of contracting missteps in Afghanistan as being directly related to insufficient post-award management and oversight of deliverables. The implication is that there must be an appropriate number of contract specialists for the administration of a given contracting workload.

Manpower models for operational contracting have existed in DoD contracting previous to the oversight issues addressed by the Gansler (2007) report. However, the output of these models is not always used by decision-makers. The Defense Contract Management Agency (DCMA) staffed its forward contracting billets in Iraq to a level that equaled approximately 10% of the manning required based on its own acquisition manning model (D. Walsh, personal communication, February 8, 2012). The model DCMA was using at the time took into account just the elemental functions of a contract to determine proper workload assignment: number of contracts, type of contracts, and dollar value.

The DCMA Northern Iraq included seven administrative contracting officers (ACOs) and five contracting officer representatives (CORs) to administer over $11 billion in task orders against multiple contracts in direct support of over six major customers including Combined Joint Task Force-7 (the coalition force headquarters and over 150,000 service members deployed at 50-plus locations across all of northern Iraq), the Iraqi Survey Group (a Defense Intelligence Agency activity operating on multiple locations across Iraq searching for weapons of mass destruction), and the Coalition Provisional Authority (CPA—military and civilian government personnel deployed to over 18 locations across

Iraq), as well as multiple smaller contracts providing interpreters, television services, linguists, and protective services to all of the customers above and several more (D. Walsh, personal communication, February 8, 2012). Additionally, several of the assigned DCMA personnel lacked a strong contracting background that is normally required to independently serve as contracting officers (e.g., one was a Navy ensign with no previous contracting experience).

A lack of adequate DCMA personnel necessitated picking and choosing which contracts would get attention. Life support services (i.e., food, water, base housing, electricity, bathing and toilets, etc.) for the soldiers living in containerized housing units got priority. Verifying services, such as having an Iraqi interpreter present in the palaces, fell by the wayside. There was not time for the limited contracting staff to properly administer a basket of service contracts valued at over $11 billion (D. Walsh, personal communication, February 8, 2012). Because there was no contracting workload standard being enforced, checks and balances were insufficient in preventing an overload of contracting work.

Problems in the DoD contracting program have, in fact, been acknowledged by the Office of Federal Procurement Policy and by Congress. The Acquisition Advisory Panel was authorized by section 1423 of the Services Acquisition Reform Act of 2003 (AAP, 2007, p. ix). They were tasked with reviewing laws, regulations, and government-wide acquisition policies. The product of the panel was a formal report titled *Report of the Acquisition Advisory Panel to the Office of Federal Procurement Policy and the United States Congress* (AAP, 2007). The introduction to Chapter 5 of the AAP report stated this observation:

> Based on our experience, we recognize a significant mismatch between the demands placed on the acquisition workforce and the personnel and skills available within that workforce to meet those demands. Accordingly, we believe that there was a serious risk that problems stemming from the shortcomings of the acquisition workforce would be misunderstood as problems with the procurement system. (AAP, 2007, p. 327)

The Acquisition Advisory Panel makes several recommendations, focusing on the problem of how to capture the person-hours required to handle the various types of contracts used by the DoD:

> Finding 3: Even though there are now available a variety of simplified acquisition techniques, the complexity of the federal acquisition system as a whole has markedly increased since the 1980s. …
>
> Finding 5: The federal government does not have the capacity in its current acquisition workforce necessary to meet the demands that have been placed on it. Because of the absence of human capital planning to date, the Panel cannot definitively conclude whether this is the result of a numbers problem, but has received testimony raising serious concerns about the number, skill sets, deployment, and role in the acquisition process of the acquisition workforce. (AAP, 2007, p. 335)

A workload standard could be used to ensure the proper number of contract specialists are employed if the number of person-hours required to complete *all* six processes of a contract could be estimated. The Afghanistan trucking company is an extreme example of the unintended consequences that can arise when the job of contracting is thought to be complete once a contract has been awarded. According to Gansler (2007), the problem with contract workload management is as follows:

> No single person can cover all the various contracting processes nor provide the necessary work products, which include a defined requirement, statement of need, funding certification, a contract, contract modifications, post-award management, oversight of performance/deliverables, and acceptable documentation. Too often, both in peacetime and during expeditionary operations, the focus of the contracting process is on contract award, with post-award management being neglected. (p. 40)

Problems such as trucking-company profiteering in Afghanistan are often mistaken for problems in the procurement system (AAP, 2007, p. 327) when contract specialists are insufficient in number to provide oversight over a contracting workload. The reaction of Congress to these unintended consequences is often to institute new rules, which add even greater complexity to contracting. Managing this complexity requires person-hours. Thus, the go-to solution for the problem with DoD contracts often results in adding to the existing problem. The real solution to fixing DoD contracting is to identify the correct number of contracting professionals required to properly manage the workload.

Timothy Reed (2012) stated in his report titled *Army Contracting Command Workforce Model Analysis* that the Navy is not pursuing a Service-wide standard for its contracting workforce requirements. Interestingly, Navy contracting accounts for 25% of

DoD contracts by dollar value (Ellman, Livergood, Morrow, & Sanders, 2011). Figure 1 illustrates the percent of DoD contract spending by Service between 1990 and 2010.

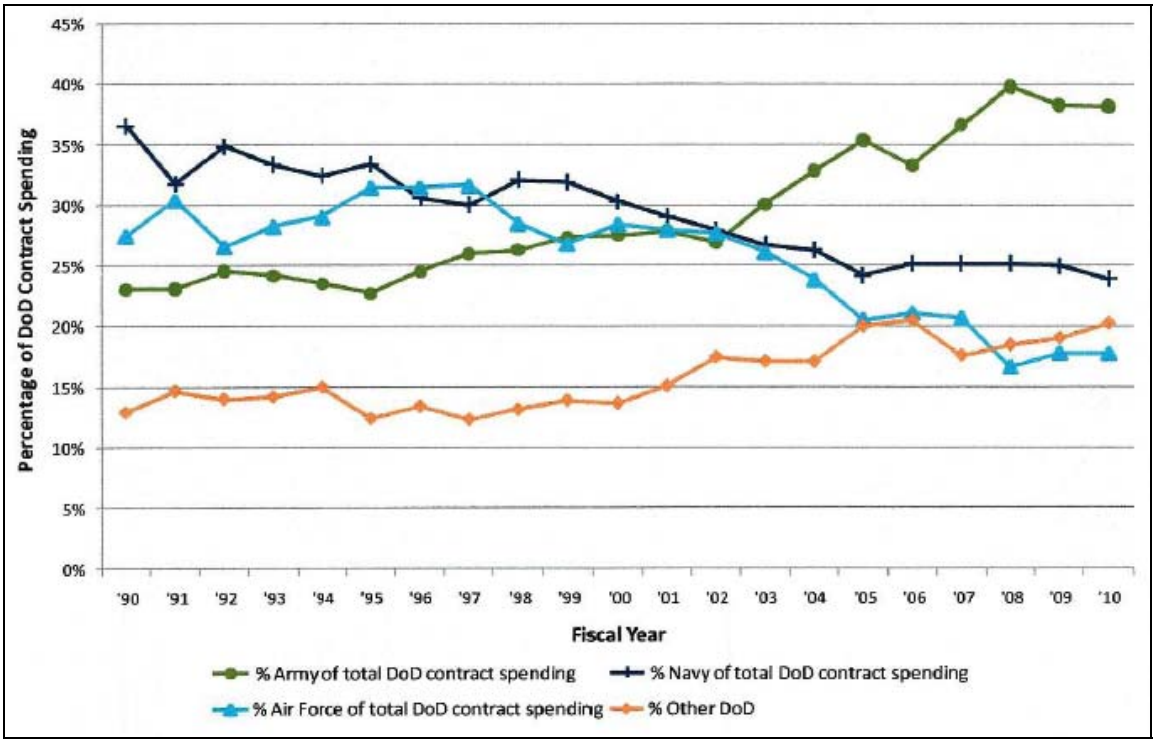

Figure 1. Share of DoD Contract Spending by Component, 1990–2010
(Ellman et al., 2011, p. 17)

In an environment of constrained financial and workforce resources, we hypothesize that the Navy must be doing some sort of workforce management in order to be shouldering 25% of total Service component contracts. In this report, we seek to discover through personal interviews and a review of local instructions if a contracting workforce model is being used by the Naval Sea Systems Command (NAVSEA) and the Naval Supply Systems Command (NAVSUP). We review the contracting professional requirement models used by the Army, Air Force, and civilian industries by conducting a literature review. We then identify the contracting workload estimation tools used by NAVSEA and NAVSUP, especially those used in making manpower decisions. We offer strengths and weaknesses of the tools and make recommendations to improve those methods based on the successful attributes of the Army, Air Force, and civilian industry workload models.

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II. BACKGROUND

A. QUANTIFYING THE CONTRACTING WORKLOAD

In this section, we seek to answer the question of why some contracts require more time to produce and manage than others. We review articles, reports, and books pertaining to quantifying the contracting officer's workload. We show in our descriptions the business that takes up the contracting officer's time.

From this point forward, the term contracting officer will be abbreviated as KO. CO is a widely used acronym for *commanding* officer. KO has become the accepted abbreviation for *contracting* officers in the DoD to avoid confusing references to commanding officers.

1. Contract Processes

The activities that consume the time of a KO both before contract award and after award can be best identified by six key process areas: procurement planning, solicitation planning, solicitation, source selection, contract administration, and contract closeout (Garrett, 2007). The process areas represent baskets of work that must be performed to a satisfactory level for the contract to be considered properly executed.

Gansler (2007) states that post-award actions are often neglected in an overburdened contracting workforce. Contract administration and contract closeout are contract process areas that occur post award. The post-award processes will be the focus of our background review due to the likelihood that they represent the work neglected in an overburdened contracting workforce.

The fifth process area is called contract administration. Contract administration occupies a significant portion of the KO's duties but is often neglected in workload estimations because it occurs after the contract award. Getting to award is just part of the contract process and can be smaller than the post-award work requirements. The contract administration portion of the contracting process changes based on the type of contract and contract complexity. For example, cost type and indefinite delivery, indefinite quantity

(IDIQ) contracts inherently require more post-award contract administration than fixed-price contracts. A fixed-price contract will require more time in the pre-award phases of the contract processes.

The KO spends more time identifying the requirements for fixed-price contracts than for cost-reimbursement-type contracts. Because costs are not easily adjusted once the contract is awarded, misidentification of the requirements in a fixed-price contract becomes very problematic. If the statement of work in a requirement for compact trucks to be used by a DoD public works facility does not specify the color of the truck, then it is assumed that all colors are acceptable. After the contract has been awarded, trucks with purple paint may arrive. Purple is typically not acceptable for utility trucks in a government motor pool. Because it was not specified as a requirement in the contract, the DoD now must re-solicit the contract for trucks with the correct color of paint or award another contract for the delivered trucks to be repainted. The enemy of fixed-price contracts, and identifying requirements in general, is taking for granted that an item will possess certain characteristics.

A cost-reimbursement contract is used for complex contracts. The purpose of this type of contract is to shift some of the contract risk from the contractor to the government. The government agrees to pay for all the allowable costs incurred by the contractor in addition to paying a predetermined fee. Incentives may be added to motivate the contractor to achieve cost, schedule, and/or performance goals.

The KO workload of administering a cost-reimbursement contract is likely to increase the fifth contract process area. Specifically, performance reporting and managing the change control system will be intensive undertakings for complex products that are developed using cost-reimbursement-type contracts.

IDIQ contracts are a relatively new addition to the DoD contracting tool box. First used in the early 1990s, they have become very popular. The government uses IDIQ contracts when the contracting officer cannot determine "above a specified minimum, the precise quantities of supplies or services that the government will require during the contract period" (General Services Administration [GSA], 2011, p. 1). Contracting Officers

essentially take the work of a single contracting office and multiply it. The trade-off with IDIQ contracts is a potential for lack of oversight. The lack of centralized oversight inherent in these contracts makes them a ripe target for abuse. Congressional scrutiny has increased over the use of these contract types in Afghanistan and Iraq. Ashton Carter, former Under Secretary of Defense for Acquisition, Technology, and Logistics, expressed his concern regarding the use of IDIQ contracts in his *Better Buying Power Initiative Three*. The specific concern is that, because the award is multiplied for several requirements using one contracted agency, a small monopoly occurs for the company that gets the initial award (Carter, 2011).

All contracts require some oversight to ensure that material is being delivered on time and as specified in the contract. Often, a contracting professional is needed to interpret the product delivery against the statement of work detailed in the contract to ensure that the contract conditions have been met. Thus, it is easy to multiply contract awards by issuing an IDIQ contract, but it is nearly impossible to multiply responsible contract administration. Because an IDIQ contract results in multiple deliveries under a single award, this type of contract will exponentially increase a contracting officer's workload in the fifth and sixth areas of the contract processes: contract administration and contract closeout. Regardless of the contract type used to make an award, a significant administrative requirement comes with ensuring that contracts are properly executed.

Garrett (2007) defines contract administration as "the process of ensuring that each party's performance meets contractual requirements" (p. 162). Garrett states that a contract is "a mutually binding legal relationship obligating the seller to furnish the supplies or services and the buyer to pay for them" (FAR, 2005, 2.101). The assumption that the relationship between the KO and contractor has ended once the agreement is in place ignores the real-world difficulties of production and delivery. The Afghanistan trucking company is an example of an IDIQ contract that was woefully deficient in proper contract administration. The compact truck is an example of a fixed-price type contract that requires minimal administration due to the simple nature of the product and delivery method: an inspection upon delivery and payment for the unit price times the quantity received. More complex developmental contracts require many more administrative functions be performed

by the KO. Specific examples include monitoring the work performed, reviewing invoices, certifying the accounting system being used, inspecting deliverables, and conducting performance tests.

In total, there are 71 contract administration functions listed in FAR (2011) 42.301, which are intended to capture the most important post-award actions. These contract administration functions are in place to ensure that the contract buyer (government) receives the correct goods or services from the seller (contractor) and that the contractor receives payment once the contract terms are met. Table 1 includes descriptions of duties that a KO typically performs as part of contract administration.

Table 1. Contract Administration Actions
(Garrett, 2007, pp. 167–169)

Contract Administration Actions	Summarized Description
Pre-performance conference	The buyer and seller meet to discuss their joint administration of the contract.
Performance measuring and reporting	Project manager, contract manager, and responsible business managers must observe performance, collect information, and measure actual contract achievement.
Payment system	Every contract must establish a clear invoicing and payment system or process. The buyer and seller must agree to whom invoices should be sent and what information is required.
Change control system	Changes are usually inevitable in contracts for complex undertakings. No one has perfect foresight; requirements and circumstances change in unexpected ways, and contract terms and conditions must often be changed as a result.
Dispute management system	Disputes must be resolved as quickly as possible. If a dispute goes unresolved for too long, one or both of the parties may threaten, or even initiate, litigation. Litigation is time-consuming, costly, and risky.

The contracting workforce requires people to manage contract administration. Because contract workload is primarily managerial and knowledge based (Acquisition and Sustainment Unit [ASU] Capability-Based Manpower Standard (CMS) Study, 2011), the

right people are needed to determine contract type, ensure requirements are specified, and provide administration throughout the contract execution.

The sixth process area is called contract closeout. It is at this point that the work is complete and the obligation that binds the government and contractor is at its end. Contracts end in one of three ways: successful performance, mutual agreement, or breach of contract (Garrett, 2007, p. 185). According to the FAR (2011), a contract is considered physically complete when

> (i) The contractor has completed the required deliveries and the Government has inspected and accepted the supplies;
>
> (ii) The contractor has performed all services and the Government has accepted these services; and
>
> (iii) All option provisions, if any, have expired; or
>
> (iv) The Government has given the contractor a notice of complete contract termination (4.804-4)

Successful performance is the desired state of contract termination because it means the goods or services were delivered or performed to a satisfactory level. The KO prepares a closeout report, a certificate of completion or conformance, and seller's release of claim (Garrett, 2007).

2. Contract Size and its Effect on Workload

Simplified acquisition procedures (SAP) were established to streamline the purchasing process of commercial items for the government. Because the prices of commercial items are assumed to be fair and reasonable due to the pressure of existing market forces, aspects of competition and price analysis are eliminated for those contracts that fall under the SAP dollar threshold.

The drastic reduction in KO workload through the use of SAP is unmatched by any federal authorization that came before it. The specific purpose of SAP is stated in FAR (2011) 13.002. The following is an excerpt citing the specific goals of SAP:

> (a) Reduce administrative costs;

(b) Improve opportunities for small, small disadvantaged, women-owned, veteran-owned, HUB Zone, and service-disabled veteran-owned small business concerns to obtain a fair proportion of Government contracts;

(c) Promote efficiency and economy in contracting; and

(d) Avoid unnecessary burdens for agencies and contractors. (FAR, 2011, 13.002)

More simply stated, SAP allows government contracting officials to avoid much of the workload required when purchasing commercial goods and services under $150,000 in total cost.

An example of a KO workload factor that is eliminated under SAP is cost analysis. For many contract actions above the SAP threshold, KOs are required to conduct cost analysis that requires the contractors to submit volumes of certified cost and pricing data to support every element of cost. The KO must analyze this data to determine that the contract price being quoted by industry is fair and reasonable. Under SAP, the pricing is generally determined to be fair and reasonable by receiving competitive quotes or offers. Here the commercial market pressures determine pricing.

SAP not only reduces the KO's workload, but also decrease the time and resources a contractor must dedicate toward ensuring that its product meets specific government standards. The GAO specifically states that under these procedures, "agency officials may select contractors using expedited evaluation and selection procedures and are permitted to keep documentation to a minimum" (GAO, 2001).

Current SAP implementation authority is given by the Federal Acquisition Streamlining Act (FASA; 1994). In 1994, with the passing of the FASA, the new adjustments to the simplified acquisition threshold (SAT) vastly changed the way the government purchases its commercial items. In effect, the FASA would raise the threshold for the government's use of simplified acquisition procedures from $25,000 to $100,000.

In 1994 this change was substantial; approximately 90% of the annual federal procurement transactions in 1994 were below the $100,000 ceiling. By raising the simplified acquisition threshold to $100,000, the FASA vastly streamlined how the government would procure most of its goods and services (Cohen Seglias Pallas Greenhal

& Furman PC, 2012). Since 1994, the rules and philosophy behind SAP have not changed. However, the SAP threshold has been increased to $150,000 to reflect the increasing cost of commercial items due to inflation.

3. Effect of Acquisition Trends on Workload

Vernon J. Edwards (2001) mentioned in his report "Award-Term: The Newest Incentive" that "government service contracts are becoming more complex as government agencies outsource more of their internal functions" (p. 1). V. J. Edward's opinion mirrors that of Gansler in his 2007 report *Urgent Reform Required: Army Expeditionary Contracting*. In order to explain this phenomenon, we examine the growing use of the best value method of procurement rather than the lowest price technically acceptable (LPTA) method of procurement.

A factor contributing to contract complexity and the increase of workload to the KO is use of the best value procurement method rather than the LPTA method. Best value procurement weighs the product quality using factors revealed in the statement of work. A best value procurement allows the KO to select a source even if it is not the lowest cost. If a Ford Ranger has a cheaper purchase price than a Dodge Dakota but requires more maintenance, the Dodge Dakota may be the better choice because its total life cycle cost would be lower. This trade-off decision illustrates the basic idea behind best value source selection. FAR (2011) 15.101 defines best value procurement as follows:

> An agency can obtain best value in negotiated acquisitions by using any one or a combination of source selection approaches. In different types of acquisitions, the relative importance of cost or price may vary. For example, in acquisitions where the requirement is clearly definable and the risk of unsuccessful contract performance is minimal, cost or price may play a dominant role in source selection. The less definitive the requirement, the more development work required, or the greater the performance risk, the more technical or past performance considerations may play a dominant role in source selection.

Judging the merit of a product is accomplished through the use of an advisory board. The administration involved in assembling the board and recording board considerations and decision trails requires much time and expense. The failure of the board to properly and justifiably select the best value in accordance with a published strategy may result in a

protest. A protest will directly involve the KO as he or she is the one who must explain the source selection process to the GAO. Because there are more choices, considerations, and subjectivity when using the best value procurement method, the KO's workload increases when using this method.

Lowest price technically acceptable source selection is the procurement method that accepts the lowest bid for contract award. As the title suggests, qualifying proposals will need to meet the technical aspects of the requirement to be considered for award. The FAR (2011) 15.101-2 defines LPTA as follows:

> The lowest price technically acceptable source selection process is appropriate when best value is expected to result from selection of the technically acceptable proposal with the lowest evaluated price.

Identifying the lowest cost is an objective determination that takes less time than making a trade-off decision. Its obvious shortcoming is popularly characterized as one of Murphy's Laws of Combat and quoted here from the Military-info.com (2012) website: "Always remember that your weapon was made by the lowest bidder." The truth is that this is no longer the case for a growing portion of government contracts. The trade-off of using fewer LPTA contracts is a lengthy best value determination and KOs spending additional time on source selection.

The GAO (2010) reported that the "DoD chose a best value process for approximately 95% of its new, competitively awarded contracts on which it had obligated $25 million or more in fiscal year 2009" (p. 2). This fact is evidence of an increasing workload for KOs irrespective of the number or dollar value of contracts being awarded. Figure 2 illustrates the use of best value procurement over other procurement methods. The added complexity of best value source selection would indicate an increasing contract load for KOs given a constant rate of contract awards.

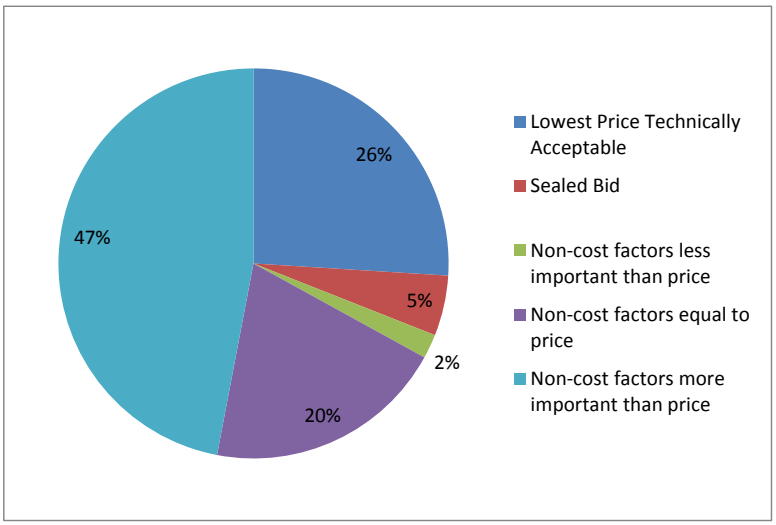


Figure 2. Use of Best Value Procurement
(GAO, 2010, p. 11)

Procurement methods and contract types have developed to support changes in the nature of warfare and advances in technology. This shift has increased the complexity of contracts. The increase of complexity must be captured and quantified in terms of person-hours to ensure that the contract processes are being carried out both efficiently and qualitatively.

B. PREVIOUS RESEARCH

In this section, we examine previous research conducted on the contracting workload. The contracting workload has increased significantly since 1999. Both the number of contracts and complexity of contracts are responsible for this increase. The Acquisition Advisory Panel (AAP) report of 2007 highlighted this fact in its findings, as presented in Table 2.

Table 2. Acquisition Advisory Panel Report Findings
(AAP, 2007, p. 353)

Finding 2-1	The dollar volume of federal government procurement has increased dramatically since 9/11/2001. Procurement obligations have increased 60 percent in the last five years.
Finding 2-2	In the last twelve years the qualitative nature of the procurement activity has also changed, placing markedly greater demands on the Acquisition Workforce for capability, training, time, and sophistication.
Finding 2-2-1	There has been a pronounced shift from acquisition of goods to acquisition of services. Service contracting places additional demands on the acquisition workforce, both in the requirements definition and contract formation process, particularly in the realm of PBA, but also on the contract management side .

The wars in Afghanistan and Iraq have required significant contracting actions in both service and delivery orders. Despite this increase, the contracting workforce has remained relatively unchanged (Reed, 2010). The conclusion is that the contracting workforce had the excess capacity to absorb the additional workload, the productivity of contracting personnel has increased, or some workload functions have been omitted. If workload functions are being omitted, we would expect to see symptoms, such as lack of oversight, in existing contracts.

Researchers have conducted several studies with the hope of quantifying the correct size of the contracting workforce. The problem rests with the inability to measure the workload (Reed, 2011). Because the management requirements for contracts differ by many variables, an easy metric cannot be used to ensure the correct number of contracting personnel is assigned to efficiently manage a given workload. Examples of variables used in model prototypes and considered to be correlated to workload are contract type, solicitation procedure, and specific delivery versus indefinite delivery and quantity (Reed, 2010, p. 40).

Despite the difficulty in quantifying the correct number of required contracting personnel, the Defense Business Board (DBB; 2010) stated that the "DoD will grow its Defense Acquisition Workforce by 20K" (p. 27). Based on the nebulous metric used to calculate the required 20,000-person growth figure, Reed (2010) wrote a report titled *Army Contracting Command Workforce Model Analysis*. In this report, Reed (2010) questioned how the DoD came up with the requirement for an additional 20,000 in workforce personnel given that no standard model is in place to estimate workforce requirements. The DoD does not have direct visibility of the contracting demands placed on the three Services. As Reed (2010) pointed out in his report, there is no central repository of contracting workforce data that can be used to make an accurate determination of workforce manning requirements. Reed's finding was that the Army, Air Force, and Navy each has its own way of calculating or estimating the numbers of contracting workforce personnel (Reed, 2010).

C. WORKFORCE MODELS

The purpose of this section is to identify the value of workforce models and describe models used by the Air Force, Army, and industry.

The goal of an acquisition workforce model is to forecast the contracting person-hours that are expected to be spent over a future period of time. The more predictive of future workload a model is, the more useful it will be to the user (Purkiss, 1981). Because it takes more than a year to receive the training and experience requirements of the most basic Defense Acquisition Workforce Improvement Act certification level, DAWIA Level 1, reactionary hiring is not an option to fill gaps in the acquisition workforce. Table 3 shows the complete timeline for acquisition workforce certification.

Table 3. DAWIA Contracting Career Field Certification Requirements
(DAU, 2011)

Core Certification Standards (required for DAWIA certification)	
Contracting Certification Level 1	
Acquisition Training	None required
Functional Training	◾ **CON 090** Federal Acquisition Regulation (FAR) Fundamentals **(R)** ◾ Personnel serving in a Contracting Coded position on 30 Sep 2010 are exempt from CON 090 through 30 Sep 2012. ◾ **CON 100** Shaping Smart Business Arrangements ◾ **CON 115** Contracting Fundamentals ◾ **CON 170** Fundamentals of Cost and Price Analysis **(R)** ◾ **CLC 033** Contract Format and Structure for DoD e-Business Environment ◾ **CLC 058** Introduction to Contract Pricing
Education	◾ At least 24 semester hours in accounting, law, business, finance, contracts, purchasing, economics, industrial management, marketing, quantitative methods, or organization and management ◾ Baccalaureate degree (Any Field of Study)
Experience	1 year of contracting experience.

Core Certification Standards (required for DAWIA certification)	
Contracting Certification Level 2	
Acquisition Training	**ACQ 101** Fundamentals of Systems Acquisition Management
Functional Training	◾ **CON 200** Business Decisions for Contracting ◾ **CON 216** Legal Considerations in Contracting ◾ **CON 270** Intermediate Cost and Price Analysis **(R)** ◾ **CON 280** Source Selection and Acquisition of Service Contracts **(R)** ◾ **CON 290** Contract Administration and Negotiation Techniques in a Supply Environment **(R)** ◾ **CLC 051** Managing Government Property in the Possession of Contractors ◾ **CLC 056** Analyzing Contract Costs ◾ **CLC 057** Performance Based Payments and Value of Cash Flow ◾ **HBS 428** Negotiating
Education	◾ At least 24 semester hours in accounting, law, business, finance, contracts, purchasing, economics, industrial management, marketing, quantitative methods, or organization and management ◾ Baccalaureate degree (Any Field of Study)
Experience	2 years of contracting experience.

Core Certification Standards (required for DAWIA certification)	
Contracting Certification Level 3	
Acquisition Training	**ACQ 201A** Intermediate Systems Acquisition, Part A
Functional Training	◾ **CON 360** Contracting for Decision Makers **(R)** ◾ 1 additional course from the Harvard Business Management Modules ◾ Additional requirement will be to select one of the below courses: ◾ **ACQ 265** Mission-Focused Services Acquisition **(R)** ◾ **ACQ 370** Acquisition Law **(R)** ◾ **CON 232** Overhead Management of Defense Contracts **(R)** ◾ **CON 235** Advanced Contract Pricing **(R)** ◾ **CON 244** Construction Contracting **(R)** ◾ **CON 250** Fundamentals of Cost Accounting Standards—Part I **(R)** ◾ **CON 334** Advanced Contingency Contracting Officer's Course **(R)**
Education	◾ At least 24 semester hours in accounting, law, business, finance, contracts, purchasing, economics, industrial management, marketing, quantitative methods, or organization and management ◾ Baccalaureate degree (Any Field of Study)
Experience	4 years of contracting experience

1. Air Force Manning Model

The Air Force Manning Standard is applied to initial contract actions anticipated by a given office. The system works for determining whether existing manpower can handle a given workload or for determining how many contracting personnel are needed to fill a contingency workload. What it does not do is reach out to the commands that are generating

the requirement for contracts in an effort to anticipate future contract needs nor account for high variability in the effort required by workforce personnel to complete contract actions.

The Air Force model uses three variables for operational contracts that it has determined to be positively correlated with person-hours needed to complete contract process actions. These values were determined by using regression analysis against process action times (T. Sriver, personal communication, March 10, 2012). The process actions determined for inclusion in the analysis recognized over 150 individual types of activity in the procurement process and at least 50 types of activity in the contingency contracting environment (Air Force Manpower and Innovation Agency [AFMIA], 2001). There is a constant value of 1057 in the regression formula that represents the minimum hours required to operate an office regardless of workload size (T. Sriver, personal communication, March 10, 2012). Examples of significant contract work items not considered in the Air Force model are modifications to contracts, processing orders off of centralized contracts, and awarding or processing utility contracts (Reed, 2012a, p. 19).

The Air Force determined that contract actions exceeding the SAP threshold account for the majority of the KO's consumed hours. This evaluation is not surprising, given that the Federal Acquisition Streamlining Act (1994) eliminated aspects of competition for contracts under the current threshold of $150,000. The administration required to handle contract competition increases the scope of the contracting processes.

Colonel Brian Norman was the commanding officer of the Air Force Manpower Agency in January of 2012. He stated that "the Air Force is currently in the process of revamping its acquisition workforce model" (B. Norman, personal communication, January 20, 2012). The office in charge of the changes is the Air Force Manpower Agency: 5MRS. David Zalinsky (personal communication, January 23, 2012) stated that the reasons for the change are due to changes in the contracting world since the original model was released in 1998. This change has been placed on hold due to funding issues according to Major Kelley Poree, USAF (personal communication, April 9, 2012).

a. Air Force Model Shortcomings

Reed (2010) cited the Air Force Manpower Standard (AFMS) as "one of the most thorough manpower standards produced" (p. 43). Yet, for the accolades Reed gave it in his report, shortcomings remain. The AFMS does not use real-time demand signals from its customers when developing the total amount of workload. The workload estimations are created using historical data or contract requests that the office anticipates. Also, the inputs to the model are rather limited and do not encompass all of the factors that impact workload. The model also does not consider the quality of the output.

b. Air Force Model Data Collection Method

For the workforce models to accurately predict required person-hours, the workload must be correctly quantified. To quantify the workload, data collection of some sort is required. The Air Force uses the term *per accomplishment time* (PAT) to describe its method of data collection (AFMIA, 2001, p. 5). The Air Force created a database of historical PAT measures called the base contracting automated system and the standard procurement system (AFMIA, 2001, p. 5).

The basis of the Air Force data collection method is the same as in the other services: query KOs in the performance of their job and measure the time expended to get through the various contract processes. Because these processes are human driven and have many different forms of output, the times may not be uniform across all KOs.

The Air Force's *Spiral 1 Model Report* (ASU CMS Study, 2011) detailed the new model that is under development and now on hold due to funding issues. This report stated the human factor of contract work completion times as a principal problem in work-hour estimates for acquisition programs: "A typical study would focus on only production-orientated work, or work with a well-defined output. For Acquisition and Sustainment Units, much work does not lend itself to outputs. It is managerial, knowledge-based, or driven by oversight and reporting requirements" (ASU CMS Study, 2011, p. 2).

As previously stated, regression analysis was applied to PATs for development of the formula used in the 2001 model. The final assignment of PATs for contracting actions used in the regression analysis of the formula was created in a workshop

conducted by experienced Air Force contracting officers (T. Sriver, personal communication, March 10, 2012). An example of the data collection worksheet used in the workshop is located in Appendix D of this report.

2. Army Manning Model

The Army Contracting Command (ACC) is a recently established Army Command that has been established to pool all of the subordinate contracting elements of the Army Material Command into one unifying organization. The Army's previous organization operated de-centrally so that each subordinate command would operate under its own internal workload model developed by its respective command. In 2009, Jeffery Parsons, then executive director of the ACC, commissioned Timothy Reed to research potential options for a constant measurement of contracting workloads. Reed stated that "the ACC has the unique opportunity to establish a standard workforce model for the recently amalgamated procurement offices now in the ACC" (Reed, 2010).

Currently, the ACC does not function under a standard workforce model. In fact, it does not base its manning off of workload assessments at all. The driving force of the Army's manning comes from its tables of organization and equipment (TOE) and tables of distribution and allowance (TDA). These documents provide the building blocks or structural guidelines from which a unit is built. The documents contain the units' organization, equipment, and staffing. Rather than conduct workload analysis based off of manpower assessments, the Army "estimates" its staffing based off of the task organization (Reed, 2010).

Since the establishment of the ACC, the Army has been analyzing some of the various models used by its organizations in order to see if there is a "best fit" solution. Though no model has been chosen as the standard workforce model, each possesses some useful measure that has promise for the future. The models analyzed included the following:

- Forces Command/Training and Doctrine Model,
- Army Contracting Agency Southern Region (ACASR) Model,

- Air Force Manpower Standard for Operational Contracting Model (this model was fully discussed in the previous section), and
- Army Material Systems Analysis Agency (AMSAA) Model.

Perhaps the two most promising models utilized were the ACASR and AMSAA models, respectively. The ACASR model utilized six variables consisting of the contracting action type, the solicitation procedure used, specified delivery, contract type, extent of competition, and dollars obligated. The variable complexity may have provided some promising results. However, the model usage was very limited and was not run enough times to form any solid conclusions (Reed, 2010). Similarly, the AMSAA model implemented the variables of contract actions, solicitation, ratio of competitive to non-competitive action, and the number of acquisition systems managed. Reed's assessment of the model suggests that while it does provide actionable information and acknowledge the varying complexities of work, it does not allow for the projection of future workloads. As the model does give some promising results, its last complete run was in 2006 (Reed, 2012a).

3. Industry Manpower Models

Industry manpower models focus on either the demand or supply side of manpower requirements. The demand side refers to the amount of work that a company has available and the number of people required to complete the work. The supply side refers to the number of qualified people in the workforce available to fill positions (Purkiss, 1981). Demand-side models are very specific to a particular industry or company because their inputs are not easily transferable. For instance, a demand-side model that is used by McDonalds to assemble hamburgers would not be applicable to the assembly line of a Ford plant manufacturing Ranger pick-up trucks. The processes are totally different. The similarities are that both require stock (people), both have a flow (promotions, new hires), and both have a degree of wastage (people leaving). Most literature on demand-side manpower models will refer to the personnel movement in those broad-based terms: stock, flow, and wastage. Like the differences between McDonalds and Ford, there are many variations between industry and DoD workforces. The use of manpower models in industry

has evolved over a longer period of time than those of the DoD. An analysis of civilian industry models may reveal pros and cons of managing with models that can be applied to prospective manning models for DoD contracting. One thing that remains constant and lends itself to some comparison is that demand-side manpower modeling is possible in both civilian industry and the DoD.

Manpower models are typically classified as either descriptive or normative. The paragraphs that follow provide a brief overview of descriptive and normative models and describe the pros and cons for each.

a. Types of Models in Industry

Manpower models in industry typically fall into two categories: exploratory and normative (Purkiss, 1981). Each model type utilizes a stock and flow. The stock refers to the workers, and the flow refers to the movement of the workers in and out of various positions of employment.

Exploratory models are used by managers to conduct what-if scenarios. An exploratory model "can give the manager an insight into the way his manpower system works and how it would respond to different stimuli" (J. S. Edwards, 1983). This type of model is also referred to as a descriptive model because its function is to imitate the behavior of the company (Purkiss, 1981). A manager would use an exploratory model to provide insight on how many hires would be needed given an increase in retirements or wastage.

A model that utilizes mathematics and regression to optimize manning is referred to as a normative model. A normative model "can compute an optimal set of personnel decisions (on recruitment, promotion, training, etc.) against goals stated in some form of objective function. These are often tailor-made to represent particular manpower systems" (J. S. Edwards, 1983). These models are also referred to as prescriptive models because their output is based on process input from planners. The prescriptive properties of normative models have historically been a point of aversion for managers (J. S. Edwards, 1983). It is unlikely that managers of any kind desire to have their decision-making ability taken from them. The output of a normative model can be interpreted that way if the results

are not presented properly. J. S. Edwards (1983) asserted words of caution when introducing a manpower model to managers in this quote: "It should again be realized that while this [use of a model] may be second nature to an O.R. worker, it may represent a new departure for a manpower planner; indeed some personnel managers appear to be actively suspicious of models" (J. S. Edwards, 1983).

The Air Force and Army manning standards are normative models. They utilize regression analysis of various work processes to decide on an optimal number of employees.

b. Industry Definition of a Good Model

J. S. Edwards (1983) cited four properties of a good model in his article titled "A Survey of Manpower Planning Models and Their Application." These four properties are described in the following paragraphs and are referenced in Chapter VI of this report.

The first property of a good model is that "it should as far as possible use terms and concepts with which the manpower planner is already familiar. … these must be explained in the planner's own terms" (J. S. Edwards, 1983, p. 1032). The emphasis made by J. S. Edwards is that the model should be seen by the manager as an aid to his or her decision-making process and not an alternative. "Selling the model [to the manager] is most important" (J. S. Edwards, 1983). By reducing the unfamiliar language in a model, the manager will be more comfortable using the data.

The second property of a good model is that the model's output should be "clear and concise, so that the amount of further interpretation required is at a minimum" (J. S. Edwards, 1983). This property is similar to the first in its focus on keeping the model user-friendly for the manager. It is also out of respect for the manager's time to have the model output be easy to understand. Output that requires extensive analysis to understand will likely be disregarded.

The third property of a good model is that its output should be expressed in non-mathematical terms. The logic behind this property is so that underlying assumptions made in the model are expressed in descriptive language. This gives managers an

opportunity to question the model and engage the output in the overall decision-making process.

The fourth property is the hardest of all to achieve in manpower models: "the data required by the model should be available on a practicable time-scale and to a reasonable degree of accuracy" (J. S. Edwards, 1983). Edwards stated that the first stage in setting up a manpower model is establishing a database. Although this property was developed by J. S. Edwards in 1983, it has absolute relevance for present-day contracting manpower models. Ensuring that the data is on a "practicable timescale" was a primary concern of Elliot Branch (2012) in our phone interview. His concern over using a model to estimate contracting workload is that at best the data "will tell us how many people we needed last year" (Branch, 2012). That concern appears to be in line with J. S. Edwards' fourth property of a good model.

This report started with a discussion of the contracting workload. We attempted to examine the work that takes up a KO's time. Measuring that work effectively is cited by J. S. Edwards as being critical for developing a manpower model.

c. Industry Performance Metrics

In this portion of the report, we discuss the use of performance metrics by civilian industry. Although this report is primarily focused on the use of models, we comment on performance metrics used by NAVSUP in Chapter V and draw from industry lessons for that commentary. The inputs of a manpower model are often made with the intent of improving company performance. A company's desired performance is typically captured in a metric of some type. It is important to know how a company evaluates itself in order to understand the logic behind the inputs of their manpower model. For example, if a company is a manufacturer of Ford Ranger pick-up trucks, a performance metric will likely include the process time of installing the engine and transmission with a penalty imposed for rework. The optimal number of employees needed for installing the engine and transmission with the fewest penalties for rework will be the employee demand input for the manpower model. A performance metric used to capture the optimal number of manufacturing employees will be useful to the planner who designs the manpower model.

That person would draw from the performance metric the total personnel that would need to be on station at any given time in order to produce the desired level of product quality. A brief overview of industry performance metrics is presented in this section of the report and attention is given to problems that can arise from managing through metrics.

Andrew Likierman (2009) wrote an article for the *Harvard Business Review* that is particularly useful for identifying problems that can be encountered by managing through metrics. The article is titled "The Five Traps of Performance Measurement." Likierman identified what he considers to be "traps" of performance measurement.

The first trap that Likierman (2009) identified is "measuring against yourself." The implication is that any performance measurement should be based on a comparison from outside of the originating business (i.e., the competition). While it may seem like an achievement for a business to increase its return on investment (ROI) by 5% in a year, that increase becomes a liability if the competition has increased its ROI by 25% in the same time.

The concept of comparing internal numbers to those of competitors or peers has been used in government. Public schools use standardized test scores to rank themselves against other school districts. This has been accepted by many people as a valuable tool in deciding which school is best for their kids. The idea that the performance of DoD contracting offices could be measured against other DoD contracting offices, even intra-service, may be a valuable measure. The benefits cited by Likierman for measuring against the competition are to help "define competitive priorities" and to "reward senior executives for doing better than everybody else" (Likierman, 2009).

The second trap described by Likierman (2009) is "looking backward." It is important for a metric to be indicative of current performance rather than past performance. Likierman advised managers to "look for measures that lead rather than lag the profits in your business". The example given in the article is a hospital that uses preemptive treatment of patients as a measure of cost control. If preemptive treatment can be positively correlated to the high cost of treating late-term illness, then the measure is a leading indicator of cost control (Likierman, 2009).

The third trap is putting too much faith in numbers. “Numbers driven managers often end up producing reams of low-quality data” (Likierman, 2009). The examples given in the article depict the loose use of ROI. It is easy to pick high-performing areas of a company and ignore low-performing areas in order to produce numbers that show ROI success. However, the numbers may lead managers away from the real story, which is that certain work centers may be successful, but the company is losing money overall (Likierman, 2009). For a manager who wishes to avoid the third trap of performance measurement, asking the question “what measure is the right one?” (Likierman, 2009) is more important than assuming any measurement is better than no measurement.

The fourth trap is gaming metrics. “The moment you choose to manage by a metric, you invite managers to manipulate it” (Likierman, 2009). The draw of managing by a metric, according to Likierman’s fourth trap, is creation of a decision-making surrogate. Allowing a conclusion to be drawn from apparently mathematical evidence creates the illusion of credibility. It can also provide a disengagement from personal responsibility for weak managers looking to prove their worth to a company. A way to avoid falling into the fourth trap is to never use metrics as the final authority for decision-making. They should be used as a guide only with ultimate decision authority coming from a person rather than a number.

The fifth trap described by Likierman is “sticking to your numbers too long.” An organization “manages what they measure” (Likierman, 2009). The risk in identifying metrics is that managers will intensely focus on the measured areas and give less attention to other areas of their operation. Managers who want to look good in a company will make sacrifices to keep measured areas of their operation in goal. The way to avoid too much focus on numerical metrics is to diversify the metrics and emphasize that numbers do not make managerial decisions.

Models and metrics used by industry are thought to be good when they play a side role to the managers. There was not a single piece of literature in our review whose authors concluded that a model should be used prescriptively in a workplace. In this quote, Likierman (2009) stated his opinion of the role metrics should play:

> A really good assessment system must bring finance and line managers into some kind of meaningful dialogue that allows the company to benefit from both the relative independence of the former and the expertise of the latter. (Likierman, 2009)

Our take-away from this examination of industry models and metrics is that a model should be used to indicate a rough order of magnitude to managers making manning decisions. A metric should be used to indicate potential problem areas to a manager assessing performance. The final decision is always in the hands of a human. Problems occur when applying too much emphasis on a model or metric, such as using a model to prescribe decisions. A good model or metric is one that plays a support-only role to a manager's decision-making.

D. THE RESEARCH PROBLEM

Reed's 2010 research report titled *Army Contracting Command Workforce Model Analysis* stated,

> The Navy is not pursuing a Service-wide standard for operational contracting workload, but rather is allowing System Commands to develop a standard if they find it to be of use. A lack of a standard model could result in disruptions to contracting workloads for system commands (SYSCOMs) utilizing a substandard model or no model. (p 48)

In Chapter III, we examine the manpower estimation tools currently in use at NAVSEA and NAVSUP, and make recommendations for implementation of a standard model.

III. APPROACH

A. NAVY SYSCOM'S CHOSEN FOR ANALYSIS

There are a total of five Navy system commands (SYSCOMs): Naval Sea (NAVSEA), Naval Supply (NAVSUP), Naval Air, Naval Facility, and Space and Naval Warfare. We chose to analyze NAVSEA and NAVSUP due to the availability of data from these two systems commands. An area of further research would be to analyze the contract manning models and workload assessment tools of the other three Navy SYSCOMs.

1. Naval Sea Systems Command

NAVSEA is the Navy's oldest and largest SYSCOM. The NAVSEA official website links its history back to the origin of the United States Navy in this quote: "The origin of NAVSEA dates to 1794, when Commodore John Barry was charged to oversee the construction of a 44-gun frigate and ensure that all business 'harmonized and conformed' to the public's interest" (Naval Sea Systems Command [NAVSEA]). NAVSEA is responsible for buying the Navy's ships and weapon systems. It operates on a budget of about $30 billion and accounts for a quarter of the Navy's spending. A large portion of NAVSEA's acquisitions are for Acquisition Category 2 or higher items. Acquisition categories (ACATs) are established to determine spending authority for various levels of acquisition programs. Acquisition Category 2 programs are those with research and development costs greater than or equal to $140 million, or procurement costs greater than or equal to $660 million in FY 2009 dollars ("Acquisition Category [ACAT]," 2009).

Because contracts for ship building and major weapon systems are highly complex, NAVSEA uses a milestone process to estimate the contracting workload for new procurement or modifications of large contracts (Branch, 2012). The KO negotiates milestone dates with the program manager to determine a timeline. The estimates that the KO uses are based on experience. The system is strong because it is decentralized in nature. It accommodates the individual complexity of the contracts by instituting maximum participation of the KO. A standardized workload estimation tool falls short of being able to

account for all the complexities of a contract, as opposed to an actual KO conducting a tailored review. The shortcoming is in the time-consuming and tedious nature of individually reviewing each contract and breaking down the expected workload. Table 4 depicts an example of the milestone process worksheet that the KO uses to track the contracting workload and account to the customer (program manager).

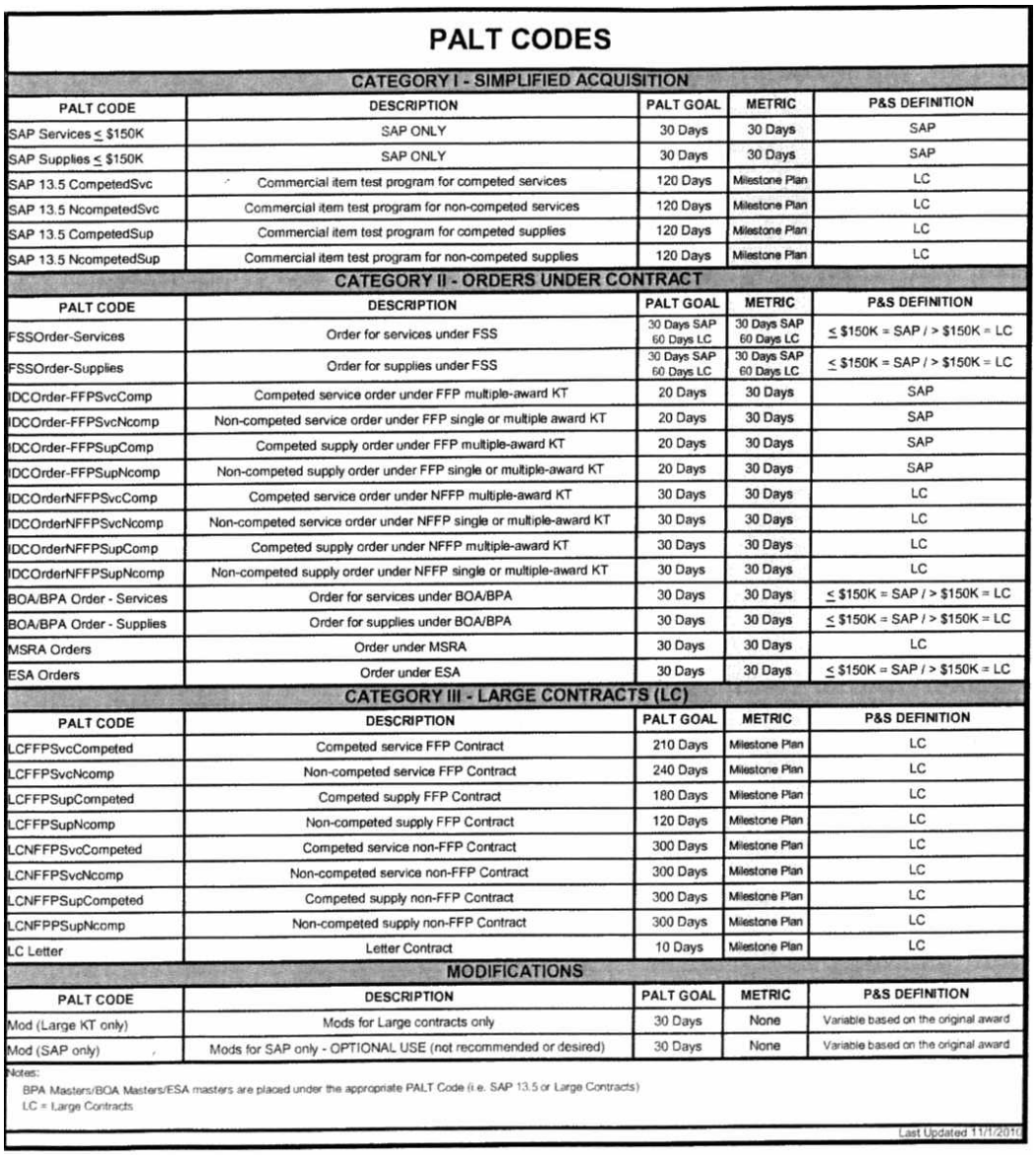
Table 4. Competitive Procurement Milestone Agreement
(NAVSEA, 2007b, p. 9)

MILESTONE	PLAN	ACTUAL	ACCOUNTABLE PERSON	INITIALS
AP/ASR submitted to approving authority				
AP/ASR approved				
PR accepted by SEA-02branch head				
PR assignedtoSEA-02 contract specialist				
PR submitted to SBA rep for concurrence				
SBA rep concurs with PCO's set-a side det.				
Contract spec synopsizes Procurement				
Contract spec submits J&A to approving Authority				
J&A approved*				
Contract spec. issues RFP				
Contract or submits proposal				
Contract spec. requests audits				
Auditor submits report to cont. specialist				
Contract spec. requests TAR				
TAR submitted to contract spec.				
Contract spec. submits pre-BCM to approving authority				
Pre-BCM approved				
Contractor/Govt. begin negotiations				
Contractor/Govt. complete negotiations				
BFM submits Financial Acct'g Data to SEA-01				
SEA-01Releases Financial Acct'g Data to SEA-02				
Subcontracting plan approval received				
Contract spec. submits BCM for approval				
BCM approved				
Contracting officer awards contract				

The milestone process used by NAVSEA is applied to individual actions that have too many complexities to be captured in a manpower model. The discriminator that NAVSEA uses to determine when a contract will require a milestone plan is the SAP threshold (S. J. Rustemier, personal communication, March 12, 2012). For those contracts not requiring a milestone plan, NAVSEA uses an electronic collection base called the electronic procurement request (ePR): "The ePR refers to an electronic document generated in SPS to communicate program contractual requirements electronically to the KO. An ePR

may result in a solicitation, contract, contract modification, or order issued by SEA 02 for Supplies or Services" (NAVSEA, 2007b, p. 7).

The ePR uses PALT codes to assign a time estimate for various contract actions. PALT stands for procurement administrative lead time. Like the Air Force model, the PALT codes use completion time estimates derived from historical data. Also similar to the Air Force model is the method of catagorization: the PALT codes basket contracts by those that are beneath the SAP threshold and those that exceed it. The PALT codes identify firm-fixed price and competed contracts as variables that are indicators of workload. The purpose of using PALT codes at NAVSEA is to provide an estimation of contract completion time for managers to use in milestone tracking. The estimations also allow a timeline to be provided to customers in operational environments. Figure 3 shows a chart detailing various PALT codes and associated completion goals.



PALT CODES

CATEGORY I - SIMPLIFIED ACQUISITION

PALT CODE	DESCRIPTION	PALT GOAL	METRIC	P&S DEFINITION
SAP Services ≤ $150K	SAP ONLY	30 Days	30 Days	SAP
SAP Supplies ≤ $150K	SAP ONLY	30 Days	30 Days	SAP
SAP 13.5 CompetedSvc	Commercial item test program for competed services	120 Days	Milestone Plan	LC
SAP 13.5 NcompetedSvc	Commercial item test program for non-competed services	120 Days	Milestone Plan	LC
SAP 13.5 CompetedSup	Commercial item test program for competed supplies	120 Days	Milestone Plan	LC
SAP 13.5 NcompetedSup	Commercial item test program for non-competed supplies	120 Days	Milestone Plan	LC

CATEGORY II - ORDERS UNDER CONTRACT

PALT CODE	DESCRIPTION	PALT GOAL	METRIC	P&S DEFINITION
FSSOrder-Services	Order for services under FSS	30 Days SAP 60 Days LC	30 Days SAP 60 Days LC	≤ $150K = SAP / > $150K = LC
FSSOrder-Supplies	Order for supplies under FSS	30 Days SAP 60 Days LC	30 Days SAP 60 Days LC	≤ $150K = SAP / > $150K = LC
IDCOrder-FFPSvcComp	Competed service order under FFP multiple-award KT	20 Days	30 Days	SAP
IDCOrder-FFPSvcNcomp	Non-competed service order under FFP single or multiple award KT	20 Days	30 Days	SAP
IDCOrder-FFPSupComp	Competed supply order under FFP multiple-award KT	20 Days	30 Days	SAP
IDCOrder-FFPSupNcomp	Non-competed supply order under FFP single or multiple-award KT	20 Days	30 Days	SAP
IDCOrderNFFPSvcComp	Competed service order under NFFP multiple-award KT	30 Days	30 Days	LC
IDCOrderNFFPSvcNcomp	Non-competed service order under NFFP single or multiple-award KT	30 Days	30 Days	LC
IDCOrderNFFPSupComp	Competed supply order under NFFP multiple-award KT	30 Days	30 Days	LC
IDCOrderNFFPSupNcomp	Non-competed supply order under NFFP single or multiple-award KT	30 Days	30 Days	LC
BOA/BPA Order - Services	Order for services under BOA/BPA	30 Days	30 Days	≤ $150K = SAP / > $150K = LC
BOA/BPA Order - Supplies	Order for supplies under BOA/BPA	30 Days	30 Days	≤ $150K = SAP / > $150K = LC
MSRA Orders	Order under MSRA	30 Days	30 Days	LC
ESA Orders	Order under ESA	30 Days	30 Days	≤ $150K = SAP / > $150K = LC

CATEGORY III - LARGE CONTRACTS (LC)

PALT CODE	DESCRIPTION	PALT GOAL	METRIC	P&S DEFINITION
LCFFPSvcCompeted	Competed service FFP Contract	210 Days	Milestone Plan	LC
LCFFPSvcNcomp	Non-competed service FFP Contract	240 Days	Milestone Plan	LC
LCFFPSupCompeted	Competed supply FFP Contract	180 Days	Milestone Plan	LC
LCFFPSupNcomp	Non-competed supply FFP Contract	120 Days	Milestone Plan	LC
LCNFFPSvcCompeted	Competed service non-FFP Contract	300 Days	Milestone Plan	LC
LCNFFPSvcNcomp	Non-competed service non-FFP Contract	300 Days	Milestone Plan	LC
LCNFFPSupCompeted	Competed supply non-FFP Contract	300 Days	Milestone Plan	LC
LCNFPPSupNcomp	Non-competed supply non-FFP Contract	300 Days	Milestone Plan	LC
LC Letter	Letter Contract	10 Days	Milestone Plan	LC

MODIFICATIONS

PALT CODE	DESCRIPTION	PALT GOAL	METRIC	P&S DEFINITION
Mod (Large KT only)	Mods for Large contracts only	30 Days	None	Variable based on the original award
Mod (SAP only)	Mods for SAP only - OPTIONAL USE (not recommended or desired)	30 Days	None	Variable based on the original award

Notes:
BPA Masters/BOA Masters/ESA masters are placed under the appropriate PALT Code (i.e. SAP 13.5 or Large Contracts)
LC = Large Contracts

Last Updated 11/1/2010

Figure 3. NAVSEA PALT Codes
(NAVSEA, 2007a, p. 10)

In 2011, NAVSEA completed 7,000 contract actions valued at $27 billion (J. G. Lofgren, personal communication, January 11, 2012). Just 400 of the total contract actions completed required milestone plans. Because of their complex nature, the milestone plan contracts do not lend themselves to a fixed manning model. Lofgren pointed out in an email that a substantial workload for NAVSEA occurs in the contract administration phase of the contract processes. Specifically, he mentioned incremental funding, period of performance

extensions, award-fee modifications, and options exercised as activities that make up a significant portion of the KO's workload. Notably, all of these actions occur post award.

2. Naval Supply Systems Command

Naval Supply Systems Command (NAVSUP) Global Logistics Support (GLS) is headquartered in San Diego, CA. The idea behind creating NAVSUP GLS was to implement "structural, functional, and customer alignment initiatives" (NAVSUP). NAVSUP GLS was assigned responsibility for seven fleet logistic centers (FLCs) located in San Diego, CA; Norfolk, VA; Jacksonville, FL; Puget Sound, WA; Pearl Harbor, HI; Sigonella, Italy; and Yokosuka, Japan. NAVSUP GLS is ideally suited for analysis in this report because a key component of their mission is to "broker workload" (NAVSUP) between the seven FLCs. Because workload management is a key element of its command's mission, its workload management techniques are more mature and readily identifiable than those of a SYSCOM that is not actively brokering workload between subordinate commands.

NAVSUP uses performance-based metrics to determine whether contracting workloads are being handled properly. The specific performance areas used in their metrics are as follows:

- Large contract milestones: Seeks to measure the progress of large contract completion against an internally developed milestone plan;
- Simplified acquisition cycle time: Measures the timeliness of SAP awards against a 30-day objective;
- Customer satisfaction: Measures the rating by customers in terms of satisfactory or unsatisfactory;
- Close-outs: Measures all contracts pending award, both large and small, against internally developed milestones;
- Competition: Measures the percent of contracts that are competitively awarded;
- Staffing: Measures the total of full-time equivalents onboard against the budgeted number allowed; and
- Small business: Measures the percent of small business awards against an internally proposed goal.

The metrics NAVSUP uses seek to identify variables in the contracting process that are thought to correlate closely with successful contract outcomes. NAVSUP baskets contracts in terms of size. The discriminator for size is the simplified acquisition threshold of $150,000. Because there are many more contract processes at work to produce a contract above the SAP level, using the SAP threshold as a discriminator is logical and likely predictive of workload. A key point here is that NAVSUP does not use the performance metric as an indicator of workload. The metrics are used primarily to measure year-over-year performance for the individual FLCs and are reported monthly to the contracting directors and deputies (S. M. Pierce, personal communication, January 24, 2012).

Interestingly, the FLCs use customer satisfaction as a measure of contract success. This is a step toward developing a qualitative measurement for contracts. Both Branch (2012) and Reed (2012b) mentioned, during phone conferences, the distinct lack of a qualitative measurement for contracts. They both indicated that any measure of contract workload would be incomplete without a tool to measure the product quality. NAVSUP has initiated a system of measuring contract quality by providing its FLC commanders with customer satisfaction feedback, as shown in Figure 4.

Activity: NAVSUP GLS	FY2012 MONTHLY METRICS											Date:	12/1/2011
Data Source: NAVSUP Customer Satisfaction Website													
Metric:	CUSTOMER SATISFACTION												
	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Year to Date
Jacksonville													
# of Surveys Received	52	54	0	0	0	0	0	0	0	0	0	0	106
# Rated Satisfactory or Above	51	54	0	0	0	0	0	0	0	0	0	0	105
Goal	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Percentage	98.1%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	99.1%
Norfolk													
# of Surveys Received	39	18	0	0	0	0	0	0	0	0	0	0	57
# Rated Satisfactory or Above	39	18	0	0	0	0	0	0	0	0	0	0	57
Goal	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Percentage	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Pearl Harbor													
# of Surveys Received	27	21	0	0	0	0	0	0	0	0	0	0	48
# Rated Satisfactory or Above	27	21	0	0	0	0	0	0	0	0	0	0	48
Goal	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Percentage	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Puget Sound													
# of Surveys Received	29	34	0	0	0	0	0	0	0	0	0	0	63
# Rated Satisfactory or Above	29	34	0	0	0	0	0	0	0	0	0	0	63
Goal	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Percentage	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
San Diego													
# of Surveys Received	7	9	0	0	0	0	0	0	0	0	0	0	16
# Rated Satisfactory or Above	7	9	0	0	0	0	0	0	0	0	0	0	16
Goal	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Percentage	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Sigonella													
# of Surveys Received	15	10	0	0	0	0	0	0	0	0	0	0	25
# Rated Satisfactory or Above	15	10	0	0	0	0	0	0	0	0	0	0	25
Goal	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Percentage	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Yokosuka													
# of Surveys Received	8	9	0	0	0	0	0	0	0	0	0	0	17
# Rated Satisfactory or Above	8	9	0	0	0	0	0	0	0	0	0	0	17
Goal	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Percentage	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
TOTAL NAVSUP GLS													
# of Surveys Received	177	155	0	0	0	0	0	0	0	0	0	0	332
# Rated Satisfactory or Above	176	155	0	0	0	0	0	0	0	0	0	0	331
Goal	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Percentage	99.4%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	99.7%

95% or more surveys received have an overall rating of satisfactory or above

90-94% of surveys received have an overall rating of satisfactory or above

Less than 90% of surveys received have an overall rating of satisfactory or above

Figure 4. NAVSUP Customer Satisfaction
(NAVSUP, 2011)

The heads of contracting at the seven FLCs are responsible for maintaining all of the "dashboard" metrics. NAVSUP GLS headquarters personnel consolidate, analyze, and combine the various performance metrics into an annual staffing report that is presented to the FLC contracting directors and deputies (S. M. Pierce, personal communication, January 24, 2012).

The data are not used for the purpose of determining contracting workload shortfalls. Since the data are similar to the data used by the Air Force Manpower Standard, it is easy to mistake them as a tool used for managing contracting workload. For instance, if the FLC is below goal in large contract processing but is fully staffed with FTE personnel, it could be presumed by a user of the reports that the workload is improperly balanced and should be shifted to another FLC. However, because the reports are not specifically drawn for that purpose, they could lend themselves to bias according to Likierman's fourth trap of performance metrics. The contracting directors of the FLCs are likely conscious of their professional reputation. Because the reports are a reflection of their organization's performance, they will work hard to ensure that the goals are met. In short, the managers will not let their organizations fail in order to show that they need more people. Their effort to keep the FLC within goal may nebulize the excess or shortage of workload in their command.

IV. METHODOLOGY OF ANALYSIS

We discovered that NAVSUP does not use a model to prescribe manning. The question remains, could a model be used to aid in manpower decisions at NAVSUP? To answer this question, we applied contract action data from NAVSUP to the Air Force Manpower Standard and determined if a manning output from the model could be used. We utilized J. S. Edwards' four properties of a good model, statistical analysis, and our opinion to determine if the results are meaningful.

We were unable to secure primary data from NAVSEA in the form of a contract log from its headquarters (HQ) and satellite contracting offices. Although we obtained the approximate contract actions for their HQ activity from fiscal year (FY) 2011, together with dollar value via email, we chose to exclude it from this analysis because we could not positively verify that the reported contract actions represent initial actions.

Although it is unlikely for an acquisition manning model to be accepted as being 100% accurate in capturing the required staffing for handling a given contracting workload, the Air Force Manning Standard is generally regarded as the gold standard. The Air Force Manpower Standard is cited by Reed (2010) as "one of the most thorough manpower standards produced."

A. THE AIR FORCE MANPOWER STANDARD

In this portion of our report, we normalize the data from NAVSUP and apply it to the Air Force Manning Standard described in AFMS 12A0. We explain differences and insight through analysis of the AFMS output and the actual manning at NAVSUP.

The AFMS requires three standard inputs to produce a workload estimate. Specifically, the inputs are as follows:

$$Y2 = X_5\,(0.0000520) + X_6\,(0.3736) + X_7\,(9.7848) + 1057. \qquad (1)$$

In Equation 1, Y is total person-hours and the X variables are defined by the AFMIA (2001) as follows:

X_5 = Centralized Contracting Dollars excluding modifications, adjusted to the Base FY (1998) for Inflation.

X_6 = Centralized Contract Actions Less Than or Equal to $100,000, excluding modifications, Decentralized Blanket Purchase Agreement calls, and summarized reporting (use latest complete FY—Oct through Sep).

X_7 = Centralized Contract Actions Greater Than $100,000, excluding modifications, Decentralized Blanket Purchase Agreement calls, and summarized reporting (use latest complete FY—Oct through Sep). (AFMIA, 2001)

The $100,000 value as an indicator of contract workload was chosen because it represents the SAP threshold in 1998. Contracts awarded under SAP take less time to produce for reasons described in Chapter II of this report. Because the SAP threshold has since increased from $100,000 to $150,000, we use $150,000 for distinguishing between contract actions added to the X_6 and X_7 variables.

1. Inflation Adjustment

Because the data used were drawn from 2011 reports of NAVSUP, the first step in using the AFMS formula was an adjustment to account for inflation that occurred between 1998 and 2011. Paragraph 3.2.1 of the AFMS 12A0 cites use of the SAF/FM Inflation Conversion Program for the purpose of converting current dollars to 1998 dollars. The SAF/FM no longer maintains the calculator mentioned in the AFMS 12A0; therefore, a joint calculator was used. The calculator is provided by the Navy Center for Cost Analysis. The results are shown in Figure 5.

3. Enter Base/Input Year(1985 - 2060) 1998

Generate Inflation Table | Go To SAR Calculator Worksheet

Optional - For Quick Look, complete steps A, B & C below

A. Select Inflation Type from List ⇨ FY/Constant $ to FY/Constant $

B. Enter Output/Target Year ⇨ 2011

C. Enter Starting Values in Input Column (blue cells) Below

Quick Look

Defense Wide Procurement

3/29/2012 Print Quick Look	Input	Inflation Factor	Output/ Result
Years	1998	⇨	2011
Escalation Type	FY/Constant$	⇨	FY/Constant$
Enter starting values in the blue input cells. The inflation factor (based on your selected appropriation, year, and type) is applied and the results given in the output column	1.0	1.5185	1.52
	1.0	1.5185	1.52
	1.0	1.5185	1.52
	1.0	1.5185	1.52
	1.0	1.5185	1.52
	1.0	1.5185	1.52

Figure 5. Joint Inflation Calculator
(Naval Center for Cost Analysis [NCCA], 2012)

The inflation between 1998 and 2011 was 152%, so we divided year 2011 dollar values by 1.52 to get our 1998 dollar value for X_5 in the AFMS formula.

2. Person-Hour Assumption

The AFMS defines a person-hour as

> A unit of measuring work. It is equivalent to one person working at a normal pace for 60 minutes, two people working at a normal pace for 30 minutes, or a similar combination of people working at a normal pace for a period of time equal to 60 minutes. (AFMIA, 2001, p. 17)

To solve for Y, we used the Air Force Instruction 38-201, *Management of Manpower Requirements and Authorizations* (United States Air Force [USAF], 2011). Referencing Attachment 3 of the instruction, we assumed a normal, civilian 40-hour work week and subtracted holidays, sick days, and leave time. The total work hours of an FTE per month and the denominator of our Y calculation was 143.3.

3. Manpower Table Assumption

It is important to note that the AFMS provided for a result that is intended to be applied to their specific manpower table, which is Attachment 3 of the AFMS 12A0 (AFMIA, 2001). Table 5 of this report shows the first page of the manning table from Attachment 3 of the AFMS 12A0. The job descriptions and Defense Acquisition University (DAU) qualifications of the Air Force specialty codes used on the manning table presented in Table 5 are shown in Table 6.

Table 5. AFMS 12A0 Manning Table
(AFMIA, 2001, p. 33)

STANDARD MANPOWER TABLE											
WORK CENTER JFAC Operational Contracting/12AO			APPLICABILITY MAN-HOUR RANGE								
AIR FORCE SPECIALTY TITLE	AFSC	GRADE	MANPOWER REQUIREMENT								
*Contracting	64P3	LtCOL						1	1	1	1
Contracting	64P3	MAJ	2	2	2	2	2	2	2	2	2
Contracting	64P3	CPT	5	5	5	5	5	5	5	5	5
Contracting	64P3	LT	3	3	3	3	3	3	3	3	3
Contracting Manager	6COOO	CMS									
Contracting Supt	6C091	SMS	1	1	1	1	1	1	1	1	1
Contracting Crftmn	6C071	MSG	2	2	3	3	3	3	3	4	4
Contracting Crftmn	6C071	TSG	3	3	3	4	4	4	'4	4	5
Contracting Jrnymn	6C051	SSG	5	5	5	5	5	5	5	5	5
Contracting Jrnymn	6C051	SRA	2	3	3	3	3	3	4	4	4
Contracting Apr	6C031	AIC	2	2	2	2	3	3	3	3	3
TOTAL			25	26	27	28	29	30	31	32	33
AIR FORCE SPECIALTY TITLE	AFSC	GRADE	MANPOWER REQUIREMENT								
*contracting	64P3	LTCOL	1	1	1	1	1	1	1	1	1
Contracting	64P3	MAJ	2	2	2	2	2	2	3	3	3
Contracting	64P3	CPT	5	5	5	5	5	5	5	5	5
Contracting	64P3	LT	3	4	4	4	4	4	4	4	4
Contracting Manager	6COOO	CMS									
Contracting Supt	6C09I	SMS	1	1	1	1	1	1	1	1	1
Contracting Crftmn	6C071	MSG	4	4	4	4	4	5	5	5	5
Contracting Crftmn	6C071	TSG	5	5	6	6	6	6	6	7	7
Contracting Jrnymn	6C051	SSG	6	6	6	6	6	6	6	6	7
Contracting Jmymn	6C051	SRA	4	4	4	4	5	5	5	5	5
Contracting Apr	6C031	AIC	3	3	3	4	4	4	4	4	4
TOTAL			34	35	36	37	38	39	40	41	42

Note that the row marked *total* refers to the total output of the formula in terms of required manpower. The formula output will vary based on the hours in a work day and the number of work days per week. The assumption used in this report is detailed in the section

titled Person-Hour Assumption. Also important to note is that the qualification levels of personnel are factors that are to be interpreted by the user of this formula when applying it outside of Air Force operational contracting environments. Because we applied this formula to a Navy organization with civilian personnel, equivalencies were made in section B to the column marked *grade*. Additionally, paragraph 2 of the AFMS 12A0 cites additional personnel requirements above the requirement for KOs. These additional personnel include a commander, information management and purchase card personnel. The application of these additional personnel requirements to the AFMS output for each FLC can be viewed in Appendix C.

B. EQUIVALENCY ASSUMPTIONS

Because we applied the Air Force model results to a Navy organization, it is important to describe the qualifications for both the Air Force contracting personnel and the Navy contracting personnel. We assumed that pay grade was less relevant than acquisition qualification level. If significant differences are detected in the level of qualification, it may nullify the output of the model.

1. Air Force Contracting Qualifications

The Air Force uses the Acquisition Professional Development Program (APDP) to measure the qualifications of their contracting personnel. The levels of progression are I–III, with III being the highest. The qualification requirements for the APDP intentionally mirror those of the Defense Acquisition Workforce Improvement Act (DAWIA). The following citation is from the USAF (2008) *Acquisition Managers Career Field Education and Training Plan* and shows the link between APDP and DAWIA qualifications:

> DAWIA is implemented in the Air Force through the Acquisition Professional Development Program (APDP). The APDP certification process reflects the education, training, and duty experience gained by the acquisition manager through a formal program. (p. 22)

The qualification requirements for the APDP exceed those of the DAWIA on which they are based. For instance, the APDP Level 1 educational requirements are a mirror of the DAWIA Level II requirements, and the APDP Level II requirements are a mirror of the

DAWIA Level III requirements. APDP Level III incorporates program management courses and systems engineering courses, which are outside of the requirements of DAWIA Level III certification. Figure 6 is the progression chart for APDP levels from the Air Force's *Acquisition Managers Career Field Education and Training Plan* guide.

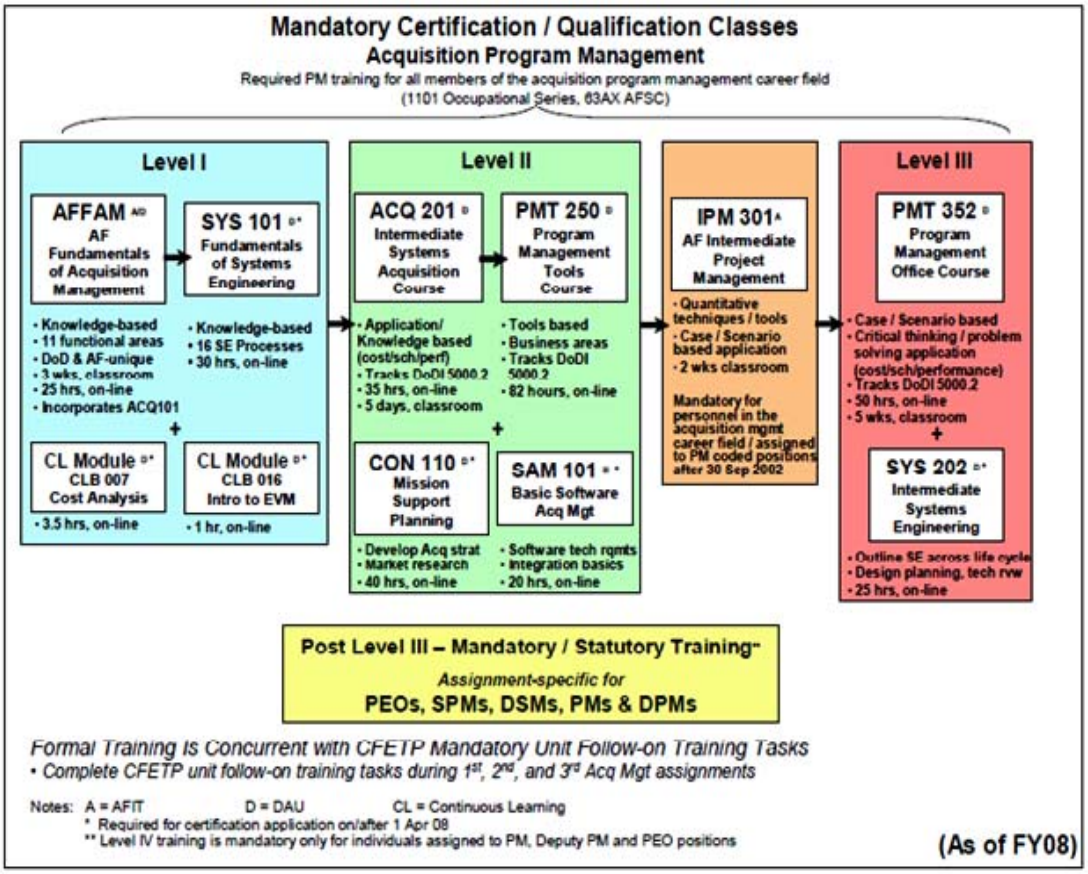


Figure 6. USAF and DAU Program Management Track
(USAF, 2008, p. 23)

Table 6. Air Force Specialty Code Descriptions
(USAF, 2008)

Specialty Code	Specialty Summary	APDP Qualification
AFSC 64P3	Plans, organizes, manages, and accomplishes contracting functions to provide supplies and services essential to Air Force daily operations and war-fighting mission. Included are accomplishing contracting system processes, formulating contracting policy and procedures, coordinating contracting activities, and directing contracting operations. The contracting system includes effective acquisition planning, solicitation, cost or price analysis, evaluating offers, source selection, contract award, and contract administration.	Level I or higher
AFSC 6C0X1	Manages, performs, and administers contracting functions for commodities, services, and con struction using simplified acquisition procedures, negotiation and other approved methods. Uses automated contracting sys tems to prepare, process, and analyze transactions and products. Acts as business advisor, buyer, negotiator, administrator, and contracting officer. Supports all functions of contingency operations	Level I
AFSC 6031		Level I
AFSC 6051		Level I
AFSC 6071		Level II or higher
AFSC 6091		Level II or higher
Source: http://usmilitary.about.com/od/airforceenlistedjobs/a/afjob6c0x1_2.htm		

Figure 7 shows a career progression pyramid of the enlisted Air Force ranks and their associated APDP contracting level. By comparing the lowest stated rank on Table 5 to the qualification level shown in Figure 7, it was determined that all personnel cited on the manning table presented in Table 5 would be at least DAWIA Level I certified.

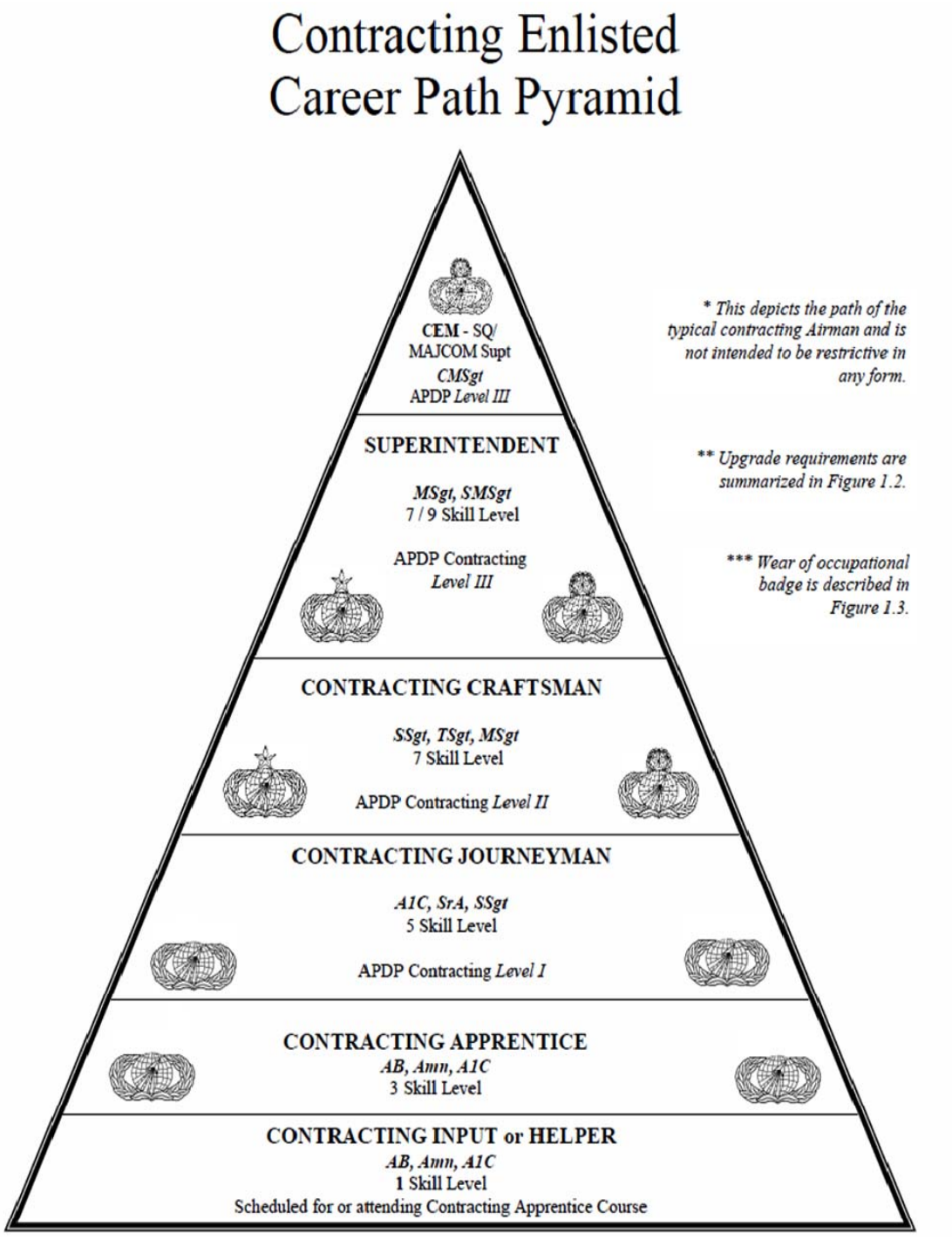


Figure 7. USAF Contracting Enlisted Career Path Pyramid
(USAF, 2012, p. 24)

2. Navy Contracting Qualifications

The Navy contracting specialty codes are 1102 for civilians and 1306 for military officers. There is no designation for enlisted contract specialists. A Navy contracting command may have enlisted personnel assigned but they would not play an active role in the contract process. Rather, they would be assigned to a personnel function such as a yeoman or personnel man.

The job description of a Navy 1102 is as follows:

> Contract Specialist (1102 job series) positions are involved in the acquisition of supplies and services. Assignments may include requirements determination and contract planning, business evaluation and price-cost analysis, negotiation, contract administration, and contract termination. (Department of the Navy Research, Development, and Acquisition, 2012)

Navy 1306 KOs receive training and qualification via Navy contracting internships and also the Naval Postgraduate School. They are generally regarded in the contracting community as being highly effective in their roles as KOs. A Navy 1306 is expected to work seamlessly between contingency environments and major program roles such as those at NAVSEA.

DAWIA qualification requirements from Table 3 of this report are incorporated into the training of both Navy 1102 and 1306 KOs.

3. Determination of Equivalency

Because the Air Force APDP levels are based on the DAWIA (1990) and incorporate all of the same requirements for DAWIA certification, albeit at an accelerated rate, we have concluded that the output of the Air Force model will yield an apples-to-apples comparison to the manning requirements of a Navy contracting command. In other words, if the Air Force would take over a Navy contracting command, they could use personnel with Air Force specialty codes 64PX and 60XX and assume that those personnel would have training at least the equivalent to the Navy personnel who would otherwise be working the contracts.

4. Extraction of Initial Contract Actions

The AFMS requires that initial contract actions and obligations be used in the formula. It was necessary to obtain the contract log from NAVSUP in order to extract all the initial contract actions from NAVSUP's FY 2011 data. The contract log of NAVSUP was placed on a file share website with permission given for a one-time download by LCDR Mellgren. The total contract actions for NAVSUP in FY 2011 total 63,675 line items. This value includes contract actions from contracts awarded in previous fiscal years, contract modifications, and exercised options.

The following steps detail the actions taken to extract the initial contract actions from NAVSUP's FY 2011 contract log:

- Separated the contract actions from the master log into seven categories representing the seven individual FLCs by conducting a sort of the column titled "Subcommand3." Once contract actions from the FLCs were isolated, they were placed onto separate spreadsheets.
- Filtered for contract actions with a modification number of zero to arrive at the list of initial contract actions for FY 2011 by conducting a sort of the column titled "Modification Number" and applying a COUNTIF formula in the bottom cell to arrive at the total number of transactions with zero modifications. This total gave us the total initial contract actions for the FLC.
- Identified the contracts that were equal to or less than the SAP threshold of $150,000. This action was completed by applying a COUNTIF formula to the bottom row of the column titled "Action Obligation" and counting actions with zero modifications and a value equal to or less than $150,000.
- Identified those contracts that were greater than the SAP threshold of $150,000. This action was completed by applying a COUNTIF formula to the bottom row of the column titled "Action Obligation" and counting actions with zero modifications and a value greater than $150,000.

Screen shots of the original contract log and the sort process are in Appendix B of this report. Table 7 shows the initial contract actions and obligations that were extracted from NAVSUP's FY 2011 contract log.

Table 7. NAVSUP Initial Contract Actions

FLC	Initial Contract Actions <$150k	Initial Contract Actions > $150k	Action Contract (Total)	Obligation Dollars
COMFLC	35167	1799	36966	$2,537,926,572.89
Jacksonville	4830	205	5035	$942,542,605.53
Norfolk	7775	941	8716	$898,001,429.57
Pearl	2582	82	2664	$87,029,959.25
Puget	8541	127	8668	$136,264,026.98
San Diego	3906	186	4092	$217,519,446.61
Sigonella	2413	96	2509	$87,561,311.85
Yokosuka	5120	162	5282	$169,007,793.10

V. RESULTS

Table 8 and Figure 8 illustrate the results from running the Air Force model using the contract action data from NAVSUP. We included NAVSUP's actual onboard totals for comparison to the Air Force Manpower Standard output. The onboard totals were drawn from their FY 2011 staffing brief slide and are shown in Appendix A of this report. Screenshots of the actual AFMS formula being applied in Microsoft Excel format are in Appendix C of this report.

Table 8. NAVSUP GLS Manning Compared to AFMS Output

Fleet Logistic Center	Actual Manning	AFMS Output	Over/Under	Percent Manning
COMFLC	743	968	-225	77%
Jacksonville	84	271	-187	31%
Norfolk	269	320	-51	84%
Pearl Harbor	56	51	5	110%
Puget Sound	52	83	-31	63%
San Diego	92	94	-2	98%
Sigonella	76	54	22	141%
Yokosuka	99	81	18	122%

Figure 8 represents the output of the model in graphical form.

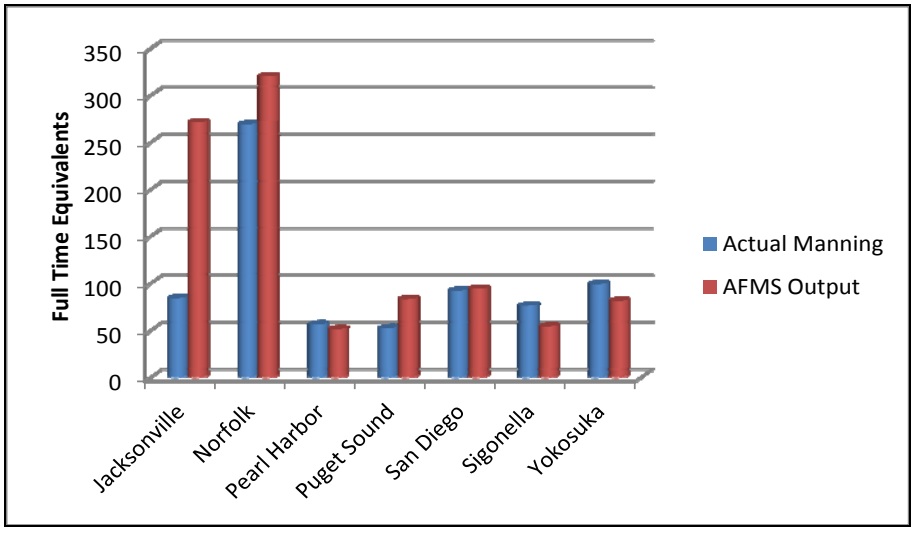


Figure 8. NAVSUP Manning Versus AFMS Output

A. RELEVANCY OF AFMS MODEL

1. Adequacy of NAVSUP's Current Manning

NAVSUP GLS is a mature contracting organization, having been in existence for more than 10 years. Each FLC has a head of contracting to ensure that the staffing levels are sufficient to produce a high-quality product. Further, they use a qualitative measure for their contract products in the form of a customer satisfaction survey, and all FLCs are within the desired level of customer satisfaction as of FY 2011 (see Figure 4). We used NAVSUP's contract log from FY 2011 and can conclude that the contract actions shown in that log were completed to a satisfactory level based on the customer satisfaction surveys. The indication is that the manning levels at NAVSUP are proven suitable for performing their given contracting work load.

2. AFMS Correlation to Current NAVSUP Manning

To determine the relevancy of the AFMS to NAVSUP's manning needs, we started with the assumption that the current manning of the FLCs are at a sufficient level. We applied a coefficient of correlation for the AFMS results to the actual manning of NAVSUP FLCs. Statistically, the results of a coefficient of correlation range from -1 to 1. The result of 1 would indicate total positive correlation or that the exact number of FTEs recommended in the AFMS was present at the FLC. The result of -1 would indicate total negative correlation or that for every FTE recommended in the AFMS, the FTE was absent from the FLC number (not possible in this case). The actual coefficient of correlation for the AFMS output and 2011 manning at NAVSUP GLS was 0.753865, which indicates a strong positive correlation.

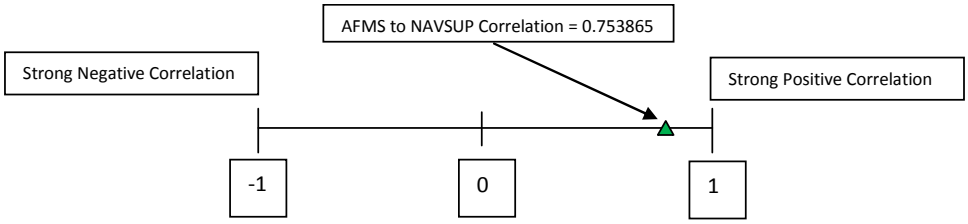


Figure 9. AFMS Output to NAVSUP 2011 Manning Coefficient of Correlation

We conclude that the AFMS is relevant for use at NAVSUP GLS.

VI. SUMMARY, CONCLUSIONS, AND IMPLICATIONS

A. SUMMARY

We started this project by asking a simple question: What model or standard are the Navy SYSCOMs using to manage their acquisition workload? That is, how do they know when they need more people?

We found that Navy SYSCOMs do not use a model that can forecast KO manning requirements. However, a system is being used at both NAVSEA and NAVSUP by senior management to determine when more people are needed. That system is a historical manning chart that is updated as needed by senior management. Because the answer to our question was simple, we focused this project on answering a secondary question: could a model be used to forecast contract workload at Navy SYSCOMs?

To answer this question, we applied the most credible model in use, the Air Force's Manpower Standard, to NAVSUP's FY 2011 contract action data. The AFMS is cited by Reed in his 2012 report as "favored by many non-Air Force DoD Agencies" (2012a, p. 19). The results of applying the AFMS to NAVSUP's contract action data yielded manning requirements that were surprisingly close to the existing manning, showing a general shortage across all FLCs within the continental U.S. and over manning for those FLCs overseas.

The proximity to existing manning numbers indicates that the model may have relevancy to application in Navy SYSCOMs. Modification of the formula to account for present complexities in contracts could yield even more useful output. In the conclusions portion of this report, we criticize the AFMS output for NAVSUP GLS in terms of properties that civilian industry has determined are good. We then focus on the conclusions we were able to draw from the output of the AFMS using NAVSUP's contract action data.

B. CONCLUSIONS

1. Pros and Cons of Using the AFMS

The literature review of this report detailed four properties of a good model as described by J. S. Edwards (1983) in his report titled "A Survey of Manpower Planning Models and Their Application." The application of the Air Force Manpower Standard to NAVSUP's data has pros and cons that can be weighed using J. S. Edwards' four properties with additional reference to Likierman's (2009) "The Five Traps of Performance Measurement."

a. The Pros

The AFMS output is in terms that the managers of NAVSUP would already understand. As demonstrated in Chapter IV, the qualification requirements of the Air Force personnel mirror those of the full-time equivalent contracting staff at an FLC. The output of the model would be manning numbers that directly correlate to the FLC. This makes the model strong in accordance with J. S. Edwards' (1983) first property of a good model.

The output of the AFMS model does not require further analysis refinement. The output clearly states the number of FTEs required for a given contracting workload. This makes the model strong according to J. S. Edwards' (1983) second property of a good model.

The math required for using this model can be accomplished by use of an Excel spreadsheet, as shown in Appendix C of this report. The output is in whole numbers. The non-mathematical nature of interpreting the output makes the model strong according to the third property of a good model (J. S. Edwards, 1983).

The AFMS model was not created at NAVSUP. It utilizes per accomplishment times from Air Force contracts. This gives the models' output an unbiased credibility. Because the measurements of per accomplishment time were drawn from an outside agency, the model is strong in terms of Likierman's (2009) fourth trap, as described in Chapter II of this report.

An additional pro of using the AFMS model is that the data required for input is readily available. Formatting an existing contract log to extract initial contract actions requires minimal administrative burden as opposed to a model that requires the collection of unique primary data.

b. The Cons

The drawback of using the AFMS is that it does not capture real-time contract action times in its estimates of manpower. The estimates were drawn from 1998. Since then, contracting has become more complex (Ganlser, 2007). The model does not consider differences between Air Force and Navy contracting. A contracting office with a higher percent use of IDIQ orders or commercial items will need fewer people than a contracting office procuring complex products and services requiring negotiation. This drawback will likely be inherent in any contract workforce model created and used between DoD MAJCOMs. Because there are innumerable variables that will ultimately affect the completion time of a contract, no model can be looked at as zero defect.

There will always have to be a human decision-maker interpreting the results of the model and tailoring the manning decision based on the needs of the command. The model will never take the place of human decision-makers in manning decisions.

2. What the Model Output Says About NAVSUP

Outliers on the negative side, such as FLC Jacksonville, could be examined to determine how they have managed with just 31% of the manning prescribed by the AFMS. It may be found that they have efficient processes that can be incorporated into the other FLCs. Another potential factor for FLC Jacksonville is that they have a less complex workload—they may be buying more commercial products or awarding more contracts off of established IDIQs.

We performed a basic spend analysis on FLC Jacksonville and found that they are unique in a couple ways. Seventy-five percent of their contract dollars go to one vendor: HP Enterprise Services, LLC. It may have been possible for FLC Jacksonville to generate contract actions and spend contract dollars in 2011 with fewer manpower requirements

relative to the other FLCs given such a large percent of contract actions going to a single vendor.

Additionally, FLC Jacksonville used a source under the 8(a) Business Development (BD) Program, Alaskan Native American Corporation, for nearly 1,700 total contract actions in 2011. This shows that a large amount of their workload for 2011 may have required less manpower than that of an FLC completing contracting actions through several sources.

Outliers on the positive side, such as FLC Sigonella with 140% of the manning prescribed by the AFMS, can be examined for redundant processes or perhaps more complex contract actions relative to the other FLCs. Another consideration is that the foreign economy presents longer contract processing times due to language barriers. Any of these factors may warrant the additional manpower at FLC Sigonella; only FLC management could make a final determination.

The speculation on outliers represents questions that could be asked when reviewing the output of the AFMS. The conclusion that we have drawn here is that use of the model would provide managers with a valuable outside opinion of manning norms. We show that the model could be used at NAVSUP and speculate that it could also be used at other DoD major commands (MAJCOMs).

3. Why the Model Wasn't Applied to NAVSEA HQ

The contracting work at NAVSEA represents system procurement. System procurement is highly complex and is significantly different from the intended application of the Air Force Operational Contracting Model. The Air Force model was designed for use in an "Operational Contracting Environment" (AFMIA, 2001). NAVSEA contracting completed just 400 large contract actions in FY 2011 (J. G. Lofgren, personal communication, January 11, 2012). However, NAVSEA, in terms of dollars, is the largest procurement activity in the federal government. The contract obligation from NAVSEA's headquarters is more than $27 billion per year (Branch, 2012). The explanation for this is that NAVSEA procures the ACAT 1 weapon systems for the Navy. The workload estimates built into the Air Force model did not use contract process times derived from such large,

complex procurement actions. The Air Force has recognized that system procurement is different and has a different model for that application.

A. IMPLICATIONS AND RECOMMENDATIONS

Incorporating the complexities of modern contracts is critical to the success of any contract workload model. All KOs and management officials who we spoke to in the course of this project agreed that contracts today are more complex than in 1998. In the background and literature review of this report, we attempted to identify workload variables that may be positively correlated to a KO's workload. Capturing and quantifying variables that are 100% correlated to contracting workload is the holy grail of contracting workforce manning models.

1. How a 1998 Model May Still Be Relevant

Reed (2010) stated that there are concerns regarding the age of the AFMS and that the output may no longer be relevant to modern contracts that are thought to be more complex. This statement contrasts with our finding that the model is still relevant. Our explanation for this is the increased use of information technology (IT) in contract processing.

The additional complexity of contracts since 1998 has been offset by efficiencies and productivity enhancements gained from modern IT. Table 9 depicts the history of IT improvements in supply chain management.

Table 9. Electronic Supply Chain Management Evolution
(Handfield, Monczka, Giunipero, & Patterson, 2011)

Solution	Time Period	Focus	Primary Use of System
MRP-DRP	1970S	Internal/managing inventory	Inventory planning, inventory control, and distribution efficiencies
EDI	1980s	External	Electronic transmission of purchase of purchase order
ERP	1990s	Internal	Integration of all business functions for processing and reporting
SRM and CRM	2000s	External	Managing and controlling the interface between buyers, suppliers, and customers
Collaboration	2000s	External-internal	CPFR systems permit constant communication within the supply chain via RFID and point of sale systems
Advanced Sourcing Analytics & Social Networking	2010 and beyond	External-internal	Sourcing analytics and computerized negotiations; Social Networks help build relationships

An example of an IT solution that provides remarkable efficiency to the contracting workload is the website FedBizOpps.com. Since 2001, it has been designated as the single

source for federal government procurement opportunities that exceed $25,000. It has streamlined the posting of contract solicitations and modifications (GSA, 2001). FedBizOpps allows KOs to electronically post solicitations and modifications. Before the use of FedBizOpps, KOs had to manually post solicitations in the *Commerce Business Daily (CBD;* Stanberry, 2008).

A request for proposal (RFP) is a document created by the KO that invites bids from prospective contract sellers. The RFP is used by contract sellers to create a proposal. It contains a detailed account of the government's requirements. Before FedBizOpps, any modification to the RFP required reposting in the *CBD* and also notification to companies who had already provided a proposal (Stanberry, 2008). This process was especially cumbersome for developmental contracts with many specifications. If a single specification was changed by an engineer working on the project, the modification would need to be posted in the *CBD*. The modification would be attached to the original hard-copy RFP using different colors of paper as a color-coding system. RFPs with many modifications were referred to as rainbow RFPs (R. Rendon, personal communication, April 6, 2012). The ability to post RFPs and modifications in real time on a website reduces the time required for processing contract actions.

Additional examples of IT solutions that have provided efficiency to the contracting workload are the widespread use of email and spreadsheets. As shown in Figure 7, outside IT communication was in its infancy in 1998. In FY 2011, IT communication was a standard in every DoD office, with Excel spreadsheets and PowerPoint being staples of information exchange. We assert that these IT efficiencies have created efficiencies for contract action processes. These efficiencies may be counteracting the increasing complexities of contracts and may be an explanation as to how a formula from 1998 may still provide relevant output.

2. Recommendations for Use of the Model

The implications of accurately forecasting contract manning requirements through the use of a model could be reduction of oversight issues. Although the ultimate significance of proper manning is just an assertion at this point, having the appropriate

number of KOs to provide contract oversight in the contract administration and contract closeout process areas will certainly be better than having too few.

The proximity of the AFMS output to the actual manning of NAVSUP implies that the model can be used with relative confidence for commands outside of the Air Force. The AFMS could be a partial solution to the oversight problems mentioned in the Gansler (2007) report, the Acquisition Advisory Panel (2007) report, and *Warlord, Inc* (Tierney, 2010). If it is true that the oversight issues are the result of too few contract specialists, the model could be used as a tool for operational commanders in the Army to flag contracting commands that may be at risk of manning shortages.

We recommend that the model's output be included in any Service's discussion about contracting manpower concerns to act as a baseline reference point for decision-makers. Since the contracting workload is managerial and knowledge based (ASU CMS Study, 2011), it would be extremely difficult to calculate manning levels so precisely that each KO would be guaranteed to work 143.3 person-hours a month (reference the person-hour assumption in Chapter IV) on their contract workload, and every contract would be completed on time with the appropriate qualitative output. We can say with confidence that if the model were applied to a projected workload, the output would reflect the approximate manpower that the Air Force and a mature Navy SYSCOM would use to handle the given workload.

B. RECOMMENDATIONS FOR FURTHER STUDY

There are many different areas of research that need to be covered in order to fully explore the use of contract workforce models in DoD MAJCOMs. Our research project uncovered several ideas that were outside the scope of our project but warrant further study. Rather than discard these ideas, we listed them here in bullet format.

- In their report titled *Managing Contracts in Turbulent Times*, Rendon and Garrett (2008) describe a model called the Contract Management Maturity Model© (CMMM). Rendon and Garrett seek to assess an "organization's contract management process ability" (Rendon & Garrett, 2008). The assessed organization is graded using five levels of proficiency with one being the lowest and five being

the highest. An interesting study would be to apply the CMMM© to organizations that assess their contracting workforce requirements using a model, and compare the results against an organization that does not use a model in order to determine the correlation between contract management maturity and the organization's use of workforce planning. A lack of workforce planning may be a precursor to broader management issues within the organization.

- Developing a qualitative measure for contracts is an important element of any workload measurement system. Both Branch (2012) and Reed (2012b) have indicated a need for this measure in order to ensure the success of any type of workload model. The Fleet Logistic Centers of NAVSUP GLS all distribute and collect customer satisfaction surveys. It may be possible to collect the surveys from the most satisfied customers and the least satisfied customers and then analyze the associated contracts. It may be possible to develop a qualitative metric for contracts based on the surveys and associated metrics.
- Utilize completion time estimates from NAVSUP or another SYSCOM and correlate contract process time to the writing background and experience level of KOs in the command. See if there is a positive correlation between experience level and contract completion time. A problem in doing this will be to control for the fact that the most experienced KOs will likely be given the most challenging contracts; thus, it will look like it takes them longer.
- Evaluate the per accomplishment time of various civilian 1102 employees of varying general schedule pay grades and see whether a learning curve exists and whether it can be quantified and predicted. The assumption going in would be that a GS7 is less experienced and would require more time than a GS12 to process a given contract action. Capturing the learning curve of the more experienced GS employee may allow for a variable to be introduced in a manpower formula to account for learning curve. The value of this variable could change based on the experience levels of the KOs present in the office.
- Obtain contract logs from an organization such as the Joint Contingency Acquisition Support Office. Normalize the data in accordance with Chapter IV of this report.

Run the AFMS using the joint contingency contract data. Validate the output of the model using the opinion of decision-makers in the command and J. S. Edwards' (1983) five properties of a good model.

We have shown in this project that the Air Force Operational Contracting Manpower Standard could be used to estimate manning requirements at the Navy's Supply Systems Command. Additional research on workforce models for DoD contracting is a step toward ensuring future manning is adequate across all DoD contracting MAJCOMs. We hypothesize that adequate KO manning is necessary for proper contract oversight and may be the ultimate solution to oversight issues addressed by the AAP (2007) and Gansler (2007).

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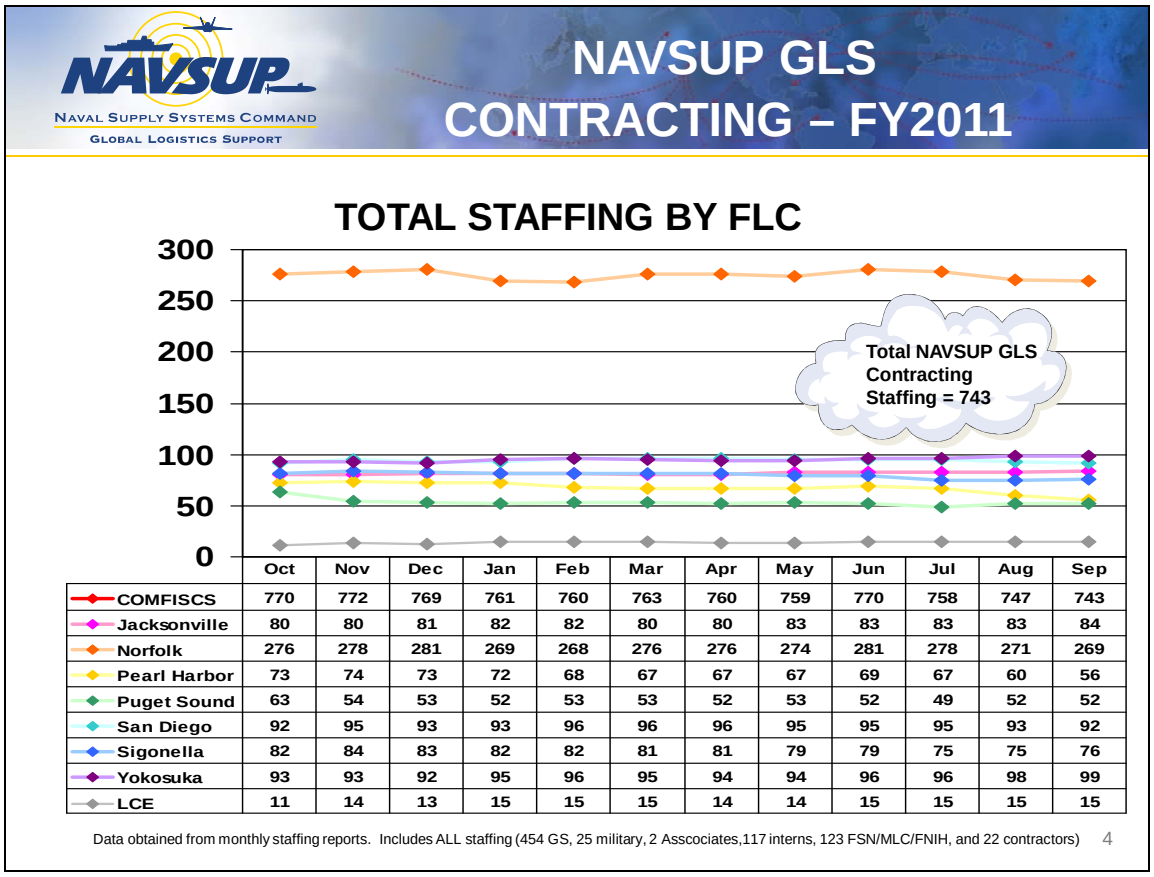
APPENDIX A



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
COMFISCS	770	772	769	761	760	763	760	759	770	758	747	743
Jacksonville	80	80	81	82	82	80	80	83	83	83	83	84
Norfolk	276	278	281	269	268	276	276	274	281	278	271	269
Pearl Harbor	73	74	73	72	68	67	67	67	69	67	60	56
Puget Sound	63	54	53	52	53	53	52	53	52	49	52	52
San Diego	92	95	93	93	96	96	96	95	95	95	93	92
Sigonella	82	84	83	82	82	81	81	79	79	75	75	76
Yokosuka	93	93	92	95	96	95	94	94	96	96	98	99
LCE	11	14	13	15	15	15	14	14	15	15	15	15

Data obtained from monthly staffing reports. Includes ALL staffing (454 GS, 25 military, 2 Asscociates,117 interns, 123 FSN/MLC/FNIH, and 22 contractors) 4

Figure 10. NAVSUP GLS Manning Slide
(NAVSUP, 2011)

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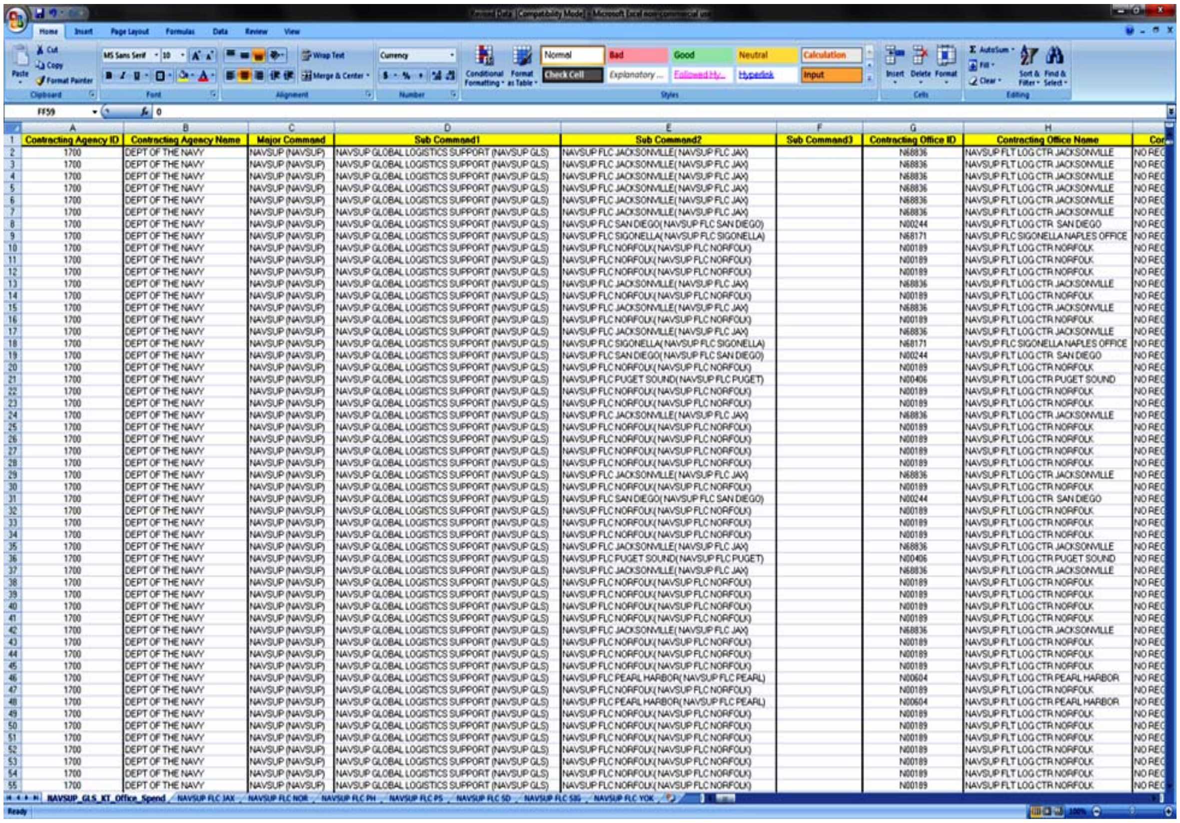
APPENDIX B



	A	B	C	D	E	F	G	H	
1	Contracting Agency ID	Contracting Agency Name	Major Command	Sub Command1	Sub Command2	Sub Command3	Contracting Office ID	Contracting Office Name	Cor
2	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
3	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
4	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
5	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
6	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
7	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
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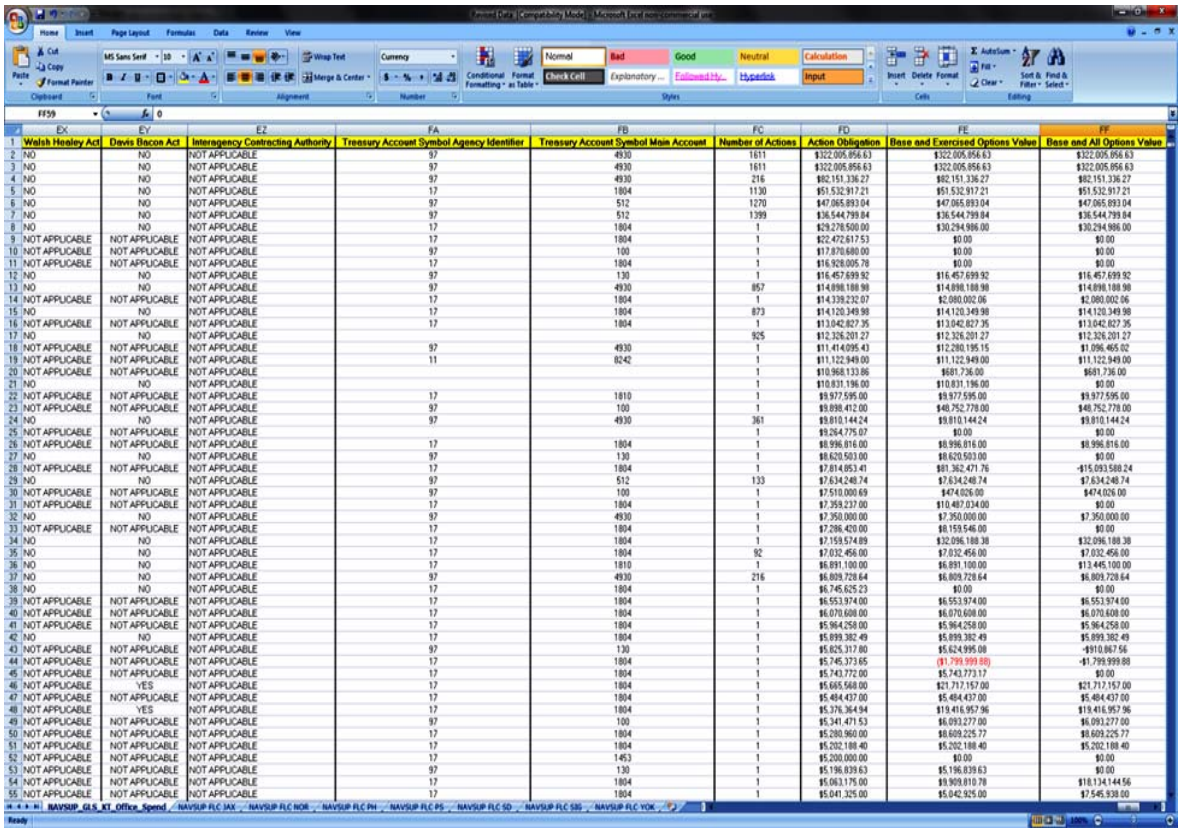
10	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
11	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
12	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
13	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
14	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
15	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
16	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
17	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
18	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC SIGONELLA(NAVSUP FLC SIGONELLA)		N68171	NAVSUP FLC SIGONELLA NAPLES OFFICE	NO REC
19	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC SAN DIEGO(NAVSUP FLC SAN DIEGO)		N00244	NAVSUP FLT LOG CTR SAN DIEGO	NO REC
20	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
21	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC PUGET SOUND(NAVSUP FLC PUGET)		N00406	NAVSUP FLT LOG CTR PUGET SOUND	NO REC
22	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
23	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
24	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
25	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
26	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
27	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
28	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
29	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
30	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
31	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC SAN DIEGO(NAVSUP FLC SAN DIEGO)		N00244	NAVSUP FLT LOG CTR SAN DIEGO	NO REC
32	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
33	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
34	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
35	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
36	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC PUGET SOUND(NAVSUP FLC PUGET)		N00406	NAVSUP FLT LOG CTR PUGET SOUND	NO REC
37	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
38	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
39	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
40	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
41	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
42	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC JACKSONVILLE(NAVSUP FLC JAX)		N68836	NAVSUP FLT LOG CTR JACKSONVILLE	NO REC
43	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
44	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
45	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
46	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC PEARL HARBOR(NAVSUP FLC PEARL)		N00604	NAVSUP FLT LOG CTR PEARL HARBOR	NO REC
47	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
48	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC PEARL HARBOR(NAVSUP FLC PEARL)		N00604	NAVSUP FLT LOG CTR PEARL HARBOR	NO REC
49	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
50	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
51	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
52	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
53	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
54	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC
55	1700	DEPT OF THE NAVY	NAVSUP (NAVSUP)	NAVSUP GLOBAL LOGISTICS SUPPORT (NAVSUP GLS)	NAVSUP FLC NORFOLK(NAVSUP FLC NORFOLK)		N00189	NAVSUP FLT LOG CTR NORFOLK	NO REC

Figure 11. NAVSUP Contract Log Rows A-H



	EX	EY	EZ	FA	FB	FC	FD	FE	FF
1	Walsh Healey Act	Davis Bacon Act	Interagency Contracting Authority	Treasury Account Symbol Agency Identifier	Treasury Account Symbol Main Account	Number of Actions	Action Obligation	Base and Exercised Options Value	Base and All Options Value
2	NO	NO	NOT APPLICABLE	97	4930	1611	$322,005,856.63	$322,005,856.63	$322,005,856.63
3	NO	NO	NOT APPLICABLE	97	4930	1611	$322,005,856.63	$322,005,856.63	$322,005,856.63
4	NO	NO	NOT APPLICABLE	97	4930	216	$82,151,336.27	$82,151,336.27	$82,151,336.27
5	NO	NO	NOT APPLICABLE	17	1804	1130	$51,532,917.21	$51,532,917.21	$51,532,917.21
6	NO	NO	NOT APPLICABLE	97	512	1270	$47,065,893.04	$47,065,893.04	$47,065,893.04
7	NO	NO	NOT APPLICABLE	97	512	1399	$36,544,799.84	$36,544,799.84	$36,544,799.84
8	NO	NO	NOT APPLICABLE	17	1804	1	$29,278,500.00	$30,294,986.00	$30,294,986.00
9	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$22,472,617.53	$0.00	$0.00
10	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	97	100	1	$17,870,680.00	$0.00	$0.00
11	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$16,928,005.78	$0.00	$0.00
12	NO	NO	NOT APPLICABLE	97	130	1	$16,457,699.92	$16,457,699.92	$16,457,699.92
13	NO	NO	NOT APPLICABLE	97	4930	857	$14,898,188.98	$14,898,188.98	$14,898,188.98
14	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$14,338,232.07	$2,080,002.06	$2,080,002.06
15	NO	NO	NOT APPLICABLE	17	1804	873	$14,120,349.98	$14,120,349.98	$14,120,349.98
16	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$13,042,827.35	$13,042,827.35	$13,042,827.35
17	NO	NO	NOT APPLICABLE			925	$12,326,201.27	$12,326,201.27	$12,326,201.27
18	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	97	4930	1	$11,414,095.43	$12,280,195.15	$11,096,465.02
19	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	11	8242	1	$11,122,949.00	$11,122,949.00	$11,122,949.00
20	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE			1	$10,968,133.86	$681,736.00	$681,736.00
21	NO	NO	NOT APPLICABLE			1	$10,831,196.00	$10,831,196.00	$0.00
22	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1810	1	$9,977,595.00	$9,977,595.00	$9,977,595.00
23	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	97	100	1	$9,898,412.00	$48,752,778.00	$48,752,778.00
24	NO	NO	NOT APPLICABLE	97	4930	361	$9,810,144.24	$9,810,144.24	$9,810,144.24
25	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE			1	$9,264,775.07	$0.00	$0.00
26	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$8,996,816.00	$8,996,816.00	$8,996,816.00
27	NO	NO	NOT APPLICABLE	97	130	1	$8,620,503.00	$8,620,503.00	$0.00
28	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$7,814,953.41	$81,362,471.76	-$15,093,588.24
29	NO	NO	NOT APPLICABLE	97	512	133	$7,634,248.74	$7,634,248.74	$7,634,248.74
30	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	97	100	1	$7,510,000.69	$474,026.00	$474,026.00
31	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$7,359,237.00	$10,487,034.00	$0.00
32	NO	NO	NOT APPLICABLE	97	4930	1	$7,350,000.00	$7,350,000.00	$7,350,000.00
33	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$7,286,420.00	$8,159,546.00	$0.00
34	NO	NO	NOT APPLICABLE	17	1804	1	$7,159,574.89	$32,096,188.38	$32,096,188.38
35	NO	NO	NOT APPLICABLE	17	1804	92	$7,032,456.00	$7,032,456.00	$7,032,456.00
36	NO	NO	NOT APPLICABLE	17	1810	1	$6,891,100.00	$6,891,100.00	$13,445,100.00
37	NO	NO	NOT APPLICABLE	97	4930	216	$6,809,728.64	$6,809,728.64	$6,809,728.64
38	NO	NO	NOT APPLICABLE	17	1804	1	$6,745,625.23	$0.00	$0.00
39	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$6,553,974.00	$6,553,974.00	$6,553,974.00
40	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$6,070,608.00	$6,070,608.00	$6,070,608.00
41	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$5,964,258.00	$5,964,258.00	$5,964,258.00
42	NO	NO	NOT APPLICABLE	17	1804	1	$5,899,382.49	$5,899,382.49	$5,899,382.49
43	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	97	130	1	$5,825,317.80	$5,624,995.00	-$910,867.56
44	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$5,745,373.65	($1,799,999.88)	-$1,799,999.88
45	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$5,743,772.00	$5,743,773.17	$0.00
46	NOT APPLICABLE	YES	NOT APPLICABLE	17	1804	1	$5,665,568.00	$21,717,157.00	$21,717,157.00
47	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$5,484,437.00	$5,484,437.00	$5,484,437.00
48	NOT APPLICABLE	YES	NOT APPLICABLE	17	1804	1	$5,376,364.94	$19,416,957.96	$19,416,957.96
49	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	97	100	1	$5,341,471.53	$6,093,277.00	$6,093,277.00
50	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$5,280,960.00	$8,609,225.77	$8,609,225.77
51	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$5,202,188.40	$5,202,188.40	$5,202,188.40
52	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1453	1	$5,200,000.00	$0.00	$0.00
53	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	97	130	1	$5,196,839.63	$5,196,839.63	$0.00
54	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$5,063,175.00	$11,909,810.78	$18,134,144.56
55	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	17	1804	1	$5,041,325.00	$5,042,925.00	$7,545,938.00

Figure 12. NAVSUP Contract Log Rows EX-FF

APPENDIX C

FY2011 COMFLCS WORKLOAD

				X_5	X_6	X_7		
equation	**$Y=X_5(0.0000520)+X_6(0.3736)+X_7(9.7848)+1057$**			**0.000052**	**0.3736**	**9.7848**	**total $ <= 150k**	**$0.00**
							total > $150k	**$1,669,688,534.21**
							actions <= 150k	**35167**
manhours	**124964.0502**						**actions > 150k**	**1799**
civilian manpower	**872.0450117**							

Adjusted to 1998 dollars by dividing by 1.52

7399 is due to the formula constant 1057 x 7 individual offices

see AFI38-201 Attachment 3

FTE Actual	743	**FTE Authorized**	743 + 53
AFMS Output	872		
Additional Personnel	96		
FTE Shortage	**-225**		
% Manning	**77%**		
Additional Positions IAW 12A0 part 2			
Commander		8	
Purchase Card (Table 3)		16	
Electronic Business (Table 3)		41	
Director of Business Operations and Superintendant		16	
Information Management Personnel (Table 1)		15	
Plans and Programs (Para 2.3.4)		N/A	
A-76		N/A	
Fixed Variance		N/A	
Total additional personnel		96	

The Values calculated in these blocks are the sum of (7) individual FLCs plus GLS HQ

Figure 13. AFMS Formula Output for COMFLCS

FY2011 FLC JACKSONVILLE WORKLOAD

				X_5	X_6	X_7		
equation	**$Y=X_5(0.0000520)+X_6(0.3736)+X_7(9.7848)+1057$**			**0.000052**	**0.3736**	**9.7848**	**total $ <= 150k**	**$0.00**
							total > $150k	**$620,093,819.08**
							actions <= 150k	**4830**
manhours	**37112.25059**						**actions > 150k**	**205**
civilian manpower	**258.9829071**							

Adjusted to 1998 dollars by dividing 1.52

see AFI38-201 Attachment 3

FTE Actual	84	**FTE Authorized**	84 + 8
AFMS Output	259		
Additional Personnel	12		
FTE Shortage	**-187**		
% Manning	**31%**		
Additional Positions IAW 12A0 part 2			
Commander		1	
Purchase Card (Table 3)		2	
Electronic Business (Table 3)		5	
Director of Business Operations and Superintendant		2	
Information Management Personnel (Table 1)		2	
Plans and Programs (Para 2.3.4)		N/A	
A-76		N/A	
Fixed Variance		N/A	
Total additional personnel		12	

Figure 14. AFMS Formula Output for FLC Jacksonville

FY2011 FLC NORFOLK WORKLOAD

					X_5	X_6	X_7		
equation	**$Y=X_5(0.0000520)+X_6(0.3736)+X_7(9.7848)+1057$**				**0.000052**	**0.3736**	**9.7848**	**total $ <= 150k**	**$0.00**
								total > $150k	**$590,790,413.82**
								actions <= 150k	**7775**
manhours	**43890.33832**	see AFI38-201 Attachment 3						**actions > 150k**	**941**
civilian manpower	**306.2828913**								

Adjusted to 1998 dollars by dividing 1.52

FTE Actual	269	**FTE Authorized**	269 + 12
AFMS Output	306		
Additional Personnel	14		
FTE Shortage	**-51**		
% Manning	**84%**		
Additional Positions IAW 12A0 part 2			
Commander		1	
Purchase Card (Table 3)		2	
Electronic Business (Table 3)		6	
Director of Business Operations and Superintendant		2	
Information Management Personnel (Table 1)		3	
Plans and Programs (Para 2.3.4)		N/A	
A-76		N/A	
Fixed Variance		N/A	
Total additional personnel		14	

Figure 15. AFMS Formula Output for FLC Norfolk

FY2011 FLC Pearl Harbor WORKLOAD

					X_5	X_6	X_7		
equation	**$Y=X_5(0.0000520)+X_6(0.3736)+X_7(9.7848)+1057$**				**0.000052**	**0.3736**	**9.7848**	**total $ <= 150k**	**$0.00**
								total > $150k	**$57,256,551.97**
								actions <= 150k	**2582**
manhours	**5801.329503**	see AFI38-201 Attachment 3						**actions > 150k**	**82**
civilian manpower	**38.7013309**								

Adjusted to 1998 dollars by dividing 1.52

FTE Actual	56	**FTE Authorized**	56 + 9
AFMS Output	39		
Additional Personnel	12		
FTE Excess	**5**		
% Manning	**110%**		
Additional Positions IAW 12A0 part 2			
Commander		1	
Purchase Card (Table 3)		2	
Electronic Business (Table 3)		5	
Director of Business Operations and Superintendant		2	
Information Management Personnel (Table 1)		2	
Plans and Programs (Para 2.3.4)		N/A	
A-76		N/A	
Fixed Variance		N/A	
Total additional personnel		12	

Figure 16. AFMS Formula Output for FLC Pearl Harbor

FY2011 FLC PUGET SOUND WORKLOAD

									Adjusted to 1998 dollars by dividing 1.52	
				X_5	X_6	X_7				
equation	**$Y=X_5 (0.0000520) + X_6 (0.3736) + X_7 (9.7848) + 1057$**			**0.000052**	**0.3736**	**9.7848**	**total $ <= 150k**		**$0.00**	
							total > $150k		**$89,647,385.53**	
							actions <= 150k		**8541**	
manhours	**10152.25125**	see AFI38-201 Attachment 3					**actions > 150k**		**127**	
civilian manpower	**70.84613571**									
FTE Actual	52	**FTE Authorized**	52 + 3							
AFMS Output	71									
Additional Personnel	12									
FTE Shortage	**-31**									
% Manning	**63%**									
Additional Positions IAW 12A0 part 2										
Commander		1								
Purchase Card (Table 3)		2								
Electronic Business (Table 3)		5								
Director of Business Operations and Superintendant		2								
Information Management Personnel (Table 1)		2								
Plans and Programs (Para 2.3.4)		N/A								
A-76		N/A								
Fixed Variance		N/A								
Total additional personnel		12								

Figure 17. AFMS Formula Output for FLC Puget Sound

FY2011 FLC SAN DIEGO WORKLOAD

									Adjusted to 1998 dollars by dividing 1.52	
				X_5	X_6	X_7				
equation	**$Y=X_5 (0.0000520) + X_6 (0.3736) + X_7 (9.7848) + 1057$**			**0.000052**	**0.3736**	**9.7848**	**total $ <= 150k**		**$0.00**	
							total > $150k		**$143,104,898.68**	
							actions <= 150k		**3906**	
manhours	**11777.70913**	see AFI38-201 Attachment 3					**actions > 150k**		**186**	
civilian manpower	**82.18917747**									
FTE Actual	92	**FTE Authorized**	92 + 9							
AFMS Output	82									
Additional Personnel	12									
FTE Shortage	**-2**									
% Manning	**98%**									
Additional Positions IAW 12A0 part 2										
Commander		1								
Purchase Card (Table 3)		2								
Electronic Business (Table 3)		5								
Director of Business Operations and Superintendant		2								
Information Management Personnel (Table 1)		2								
Plans and Programs (Para 2.3.4)		N/A								
A-76		N/A								
Fixed Variance		N/A								
Total additional personnel		12								

Figure 18. AFMS Formula Output for FLC San Diego

FY2011 FLC SIGONELLA WORKLOAD

Adjusted to 1998 dollars by dividing 1.52

				X_5	X_6	X_7			
equation	**$Y=X_5(0.0000520)+X_6(0.3736)+X_7(9.7848)+1057$**			**0.000052**	**0.3736**	**9.7848**	**total $ <= 150k**	**$0.00**	
							total > $150k	**$57,606,125.66**	
							actions <= 150k	**2413**	
manhours	**5893.356134**	see AFI38-201 Attachment 3					**actions > 150k**	**96**	
civilian manpower	**43.17477021**								

FTE Actual	76	**FTE Authorized**	76 + 9
AFMS Output	43		
Additional Personnel	11		
FTE Excess	**22**		
% Manning	**140%**		
Additional Positions IAW 12A0 part 2			
Commander		1	
Purchase Card (Table 3)		2	
Electronic Business (Table 3)		5	
Director of Business Operations and Superintendant		2	
Information Management Personnel (Table 1)		1	
Plans and Programs (Para 2.3.4)		N/A	
A-76		N/A	
Fixed Variance		N/A	
Total additional personnel		11	

Figure 19. AFMS Output for FLC Sigonella

FY2011 FLC YOKOSUKA WORKLOAD

Adjusted to 1998 dollars by dividing 1.52

				X_5	X_6	X_7			
equation	**$Y=X_5(0.0000520)+X_6(0.3736)+X_7(9.7848)+1057$**			**0.000052**	**0.3736**	**9.7848**	**total $ <= 150k**	**$0.00**	
							total > $150k	**$111,189,337.50**	
							actions <= 150k	**5120**	
manhours	**10336.81515**	see AFI38-201 Attachment 3					**actions > 150k**	**162**	
civilian manpower	**69.37459832**								

FTE Actual	99	**FTE Authorized**	99 + 2
AFMS Output	69		
Additional Personnel	12		
FTE Excess	**18**		
% Manning	**122%**		
Additional Positions IAW 12A0 part 2			
Commander		1	
Purchase Card (Table 3)		2	
Electronic Business (Table 3)		5	
Director of Business Operations and Superintendant		2	
Information Management Personnel (Table 1)		2	
Plans and Programs (Para 2.3.4)		N/A	
A-76		N/A	
Fixed Variance		N/A	
Total additional personnel		12	

Figure 20. AFMS Output for FLC Yokosuka

APPENDIX D

The 1040 worksheet is designed as the main data collection tool for use in the field or in a workshop. Each study participant will fill out a separate 1040 sheet with data pertinent to each location. The following table breaks down the specific data elements.

Table 10. Air Force 1040 Data Collection Form

DATA ELEMENT	USE AND PURPOSE
BASE	Populated from the SIAM Questionnaire worksheet.
UNIT	Populated from the SIAM Questionnaire worksheet.
POC	Populated from the SIAM Questionnaire worksheet.
DSN	Populated from the SIAM Questionnaire worksheet.
E-Mail	Populated from the SIAM Questionnaire worksheet.
Process Number	Numbers the process or process step (i.e. 1.1., 1.1.1., 1.1.2.) for easy reference. Each line item requires its own distinct number. **Populated from the POD sheet in the Analysis Module.**
Process Title	Identifies the process or process step. **Populated from the POD sheet in the Analysis Module.**
Does your work center perform this task?	Identifies processes and steps performed at this specific base or location. **Select "Yes" or "No" from the drop-down box on right side of cell.**

DATA ELEMENT	USE AND PURPOSE
Frequency	
Number of Occurrence	Input a number that represents how often the task happens based on the natural rate of occurrence as defined by the Activity Frequency.
Activity Frequency	Use in conjunction with the Number of Occurrence data. Click on the cell to locate the drop-down arrow on the right-hand side of the cell. Click on the down arrow and select the correct occurrence (i.e., yearly, weekly, daily, etc.). **Number of Occurrence and Activity Frequency must correlate.**
Crew Size	Used to document the number of personnel required to perform a process or process step. Default is set to 1.
Per Accomplishment Time	In Minutes
Optimistic (O)	Used to document the lower end of the scale that a process or process step could be accomplished. Easiest time.
Most Likely (M)	Used to document the most common time or the middle of the scale time that a process or process step could be accomplished.
Pessimistic (P)	Used to document the higher end of the scale time that a process or process step could be accomplished. Most difficult time.
Check	This column simply provides a quick logic check. This cell requires no data input. It will reflect either a TRUE or FALSE based on whether you have correctly input the per accomplishment times. Times must be in a graduated scale. Also, you can fill in only a Most Likely time if the study says it happens the same way all the time. A TRUE statement will also result from only a Most Likely and a Pessimistic time.
Percentage of Occurrence	
Optimistic (O)	Used to document the percentage of time the process or process step is performed the Optimistic time.
Most Likely (M)	Used to document the percentage of time the process or process step is performed the Most Likely time.

DATA ELEMENT	USE AND PURPOSE
Pessimistic (P)	Used to document the percentage of time the process or process step is performed the Pessimistic time.
Check	**This column simply provides a quick logic check.** This cell requires no data input. It will reflect a **% Error** or **O.K** statement depending on whether your inputs equal 100%.
Weighted PAT (In Min.'s)	This cell requires no data input. It contains a formula that calculates the weighted PAT.
Expected Range for PAT time	
Low Range	This cell requires no data input. Lowest PAT identified during the lead team's sample measurement.
High Range	This cell requires no data input. Highest PAT identified during the lead team's sample measurement.
In/Out of Range	This cell requires no data input. Validates whether or not your PAT time falls within the parameters of high or low based on the lead team's sample measurement.
Enlisted & Officer Experience Required	
AFSC	Enter the enlisted or officer AFSC or AFSCs that perform the process.
3 LV, 5 LV, 7 LV, 9 LV, CG, FG	The individual data elements listed here are filled out exactly the same way. Annotate the percentage of time that each skill level or grade is required to perform a process or process step.
Check Column	This column simply provides a quick logic check. This cell requires no data input. It will reflect a % Error or O.K. statement depending on whether your inputs equal 100%.
Comments	Add as needed

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2003 - 2012 SPONSORED RESEARCH TOPICS

Acquisition Management

- Acquiring Combat Capability via Public-Private Partnerships (PPPs)
- BCA: Contractor vs. Organic Growth
- Defense Industry Consolidation
- EU-US Defense Industrial Relationships
- Knowledge Value Added (KVA) + Real Options (RO) Applied to Shipyard Planning Processes
- Managing the Services Supply Chain
- MOSA Contracting Implications
- Portfolio Optimization via KVA + RO
- Private Military Sector
- Software Requirements for OA
- Spiral Development
- Strategy for Defense Acquisition Research
- The Software, Hardware Asset Reuse Enterprise (SHARE) repository

Contract Management

- Commodity Sourcing Strategies
- Contracting Government Procurement Functions
- Contractors in 21st-century Combat Zone
- Joint Contingency Contracting
- Model for Optimizing Contingency Contracting, Planning and Execution
- Navy Contract Writing Guide
- Past Performance in Source Selection
- Strategic Contingency Contracting
- Transforming DoD Contract Closeout
- USAF Energy Savings Performance Contracts
- USAF IT Commodity Council
- USMC Contingency Contracting

Financial Management

- Acquisitions via Leasing: MPS case
- Budget Scoring
- Budgeting for Capabilities-based Planning
- Capital Budgeting for the DoD
- Energy Saving Contracts/DoD Mobile Assets
- Financing DoD Budget via PPPs
- Lessons from Private Sector Capital Budgeting for DoD Acquisition Budgeting Reform
- PPPs and Government Financing
- ROI of Information Warfare Systems
- Special Termination Liability in MDAPs
- Strategic Sourcing
- Transaction Cost Economics (TCE) to Improve Cost Estimates

Human Resources

- Indefinite Reenlistment
- Individual Augmentation
- Learning Management Systems
- Moral Conduct Waivers and First-term Attrition
- Retention
- The Navy's Selective Reenlistment Bonus (SRB) Management System
- Tuition Assistance

Logistics Management

- Analysis of LAV Depot Maintenance
- Army LOG MOD
- ASDS Product Support Analysis
- Cold-chain Logistics
- Contractors Supporting Military Operations
- Diffusion/Variability on Vendor Performance Evaluation
- Evolutionary Acquisition
- Lean Six Sigma to Reduce Costs and Improve Readiness
- Naval Aviation Maintenance and Process Improvement (2)

- Optimizing CIWS Lifecycle Support (LCS)
- Outsourcing the Pearl Harbor MK-48 Intermediate Maintenance Activity
- Pallet Management System
- PBL (4)
- Privatization-NOSL/NAWCI
- RFID (6)
- Risk Analysis for Performance-based Logistics
- R-TOC AEGIS Microwave Power Tubes
- Sense-and-Respond Logistics Network
- Strategic Sourcing

Program Management

- Building Collaborative Capacity
- Business Process Reengineering (BPR) for LCS Mission Module Acquisition
- Collaborative IT Tools Leveraging Competence
- Contractor vs. Organic Support
- Knowledge, Responsibilities and Decision Rights in MDAPs
- KVA Applied to AEGIS and SSDS
- Managing the Service Supply Chain
- Measuring Uncertainty in Earned Value
- Organizational Modeling and Simulation
- Public-Private Partnership
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