



ACQUISITION RESEARCH PROGRAM SPONSORED REPORT SERIES

An Evaluation of Better Pricing Under Competitive Contracting Procedures for NAVWAR and NIWC Pacific Advisory and Assistance Services

June 2022

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Prepared for the Naval Postgraduate School, Monterey, CA 93943

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ABSTRACT

A goal of the Naval Information Warfare Systems Command and the Naval Information Warfare Center Pacific is to acquire advisory and assistance services (A&AS) on time and at fair and reasonable prices. Although these organizations employ a range of competitive and non-competitive contracting procedures, the efficacy is unclear toward this end. This research project uses quantitative data analysis of FY20 and FY21 Federal Procurement Data System outputs totaling \$3.4B, emphasizing Indefinite Delivery/Indefinite Quantity Multiple Award Contracts (IDIQ/MACs). The results indicate that both organizations achieve better pricing under competitive procedures instead of an exception to fair opportunity or when the organizations do not have a reasonable expectation of receiving multiple offers. Recommendations include maximizing competition under MACs, provided multiple offers can be expected and exceptions to fair opportunity are not applicable. In these situations, the government may want to consider single award IDIQ contract vehicles to satisfy procurement requirements. These vehicles may result in better pricing compared to using an exception to fair opportunity under a MAC



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LIST OF ACRONYMS AND ABBREVIATIONS

A&AS	Advisory and Assistance Services
ACC	Army Contracting Command
AFBR	Average Fully Burdened Rate
AI/ML	Artificial Intelligence/Machine Learning
BBP	Better Buying Power
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CICA	Competition in Contracting Act
CPFF	Cost-Plus-Fixed-Fee
DAS	Defense Acquisition System
DIB	Defense Industrial Base
DOD	Department of Defense
DODAAC	Department of Defense Activity Address Code
DON	Department of the Navy
EDA	Electronic Data Access
EO	Executive Order
FAR	Federal Acquisition Regulation
FPDS	Federal Procurement Data System
FY	Fiscal Year
GSA	General Services Administration
GWAC	Government-wide Acquisition Contract
IDIQ	Indefinite-Delivery Indefinite-Quantity
IT	Information Technology
MAC	Multiple Award Contract
MDAP	Major Defense Acquisition Program
NAVWAR	Naval Information Warfare Systems Command
NIWC	Naval Information Warfare Center
NMCARS	Navy Marine Corps Acquisition Regulation Supplement
OMB	Office of Management and Budget



OUUSD(A&S)	Office of the Undersecretary of Defense for Acquisition and Sustainment
PIEE	Procurement Integrated Enterprise Environment
PSC	Product Service Code
R&D	Research and Development
S&E	Supplies and Equipment
SAT	Simplified Acquisition Threshold
STRL	Science and Technology Reinvention Laboratory
SYSCOM	Systems Command
USC	United States Code
USD(AT&L)	Undersecretary of Defense for Acquisition, Technology, and Logistics



I. INTRODUCTION

To fulfill its functions in service of the public, the United States Government enters into contracts with private firms to acquire the goods and services it needs. Competition among suppliers is a fundamental part of the Defense Acquisition System (DAS). This research paper examines the effects of competition, related to pricing, on the acquisition of advisory and assistance services (A&AS) procured by the Naval Information Warfare Systems Command (NAVWAR) and the Naval Information Warfare Center (NIWC) Pacific. The aim is to inform contracting decision makers, such as buyers, contracting officers, and senior organizational leaders, on whether the government realizes pricing benefits by following established competitive processes.

A. BACKGROUND

On July 9, 2021, President Biden issued Executive Order (EO) 14036-Promoting Competition in the American Economy (Executive Order No. 14036, 2021) stating, “Robust competition is critical to preserving America’s role as the world’s leading economy.” The EO required the Secretary of Defense to submit a report on “the state of competition within the defense industrial base, including areas where a lack of competition may be of concern and any recommendations for improving the solicitation process, consistent with the goal of the Competition in Contracting Act of 1984” to the chair of the White House Competition Council.

In its 2022 report on the “State of Competition within the Defense Industrial Base,” the Office of the Under Secretary of Defense for Acquisition and Sustainment (OUSD(A&S)) highlighted several reasons why competition within the Defense Industrial base (DIB) is so crucial to the DOD (Office of the Under Secretary of Defense for Acquisition and Sustainment, 2022). The first reason mentioned on the importance of competition within the DIB is that DOD obtains better cost, schedule, and performance on the products and services it contracts for. Cost, schedule, and performance (i.e., technical) metrics arguably assess the most meaningful indicators of overall success and identify potential risk areas. Cost, schedule, and performance also serve as the main constraints



program/project managers face while executing a project (Rendon & Snider, 2019). Cost, schedule, and performance are addressed in the contracting process for the Department of the Navy (DON) in the Navy Marine Corps Acquisition Regulation Supplement (NMCARS), which requires an assessment of program risks for technical, cost, and schedule during the acquisition-planning phase for services.

The commonly held assumption that the government obtains better pricing when awarding contracts through competition is a major cornerstone in the policies and procedures governing the acquisition of supplies and services for the federal government. Mentioned in President Biden's EO, the Competition in Contracting Act (CICA) of 1984 is one of the most foundational instances of this assumption forming the basis of policy. CICA requires executive agencies comply with full and open competition requirements unless an approved exception applies (Competition in Contracting Act, 1984).

The government acquires a large variety of goods and services across many different organizations. The effects of competition related to specific subsets of acquisitions may diverge from overarching beliefs. Following this logic, is the assumption that the government obtains better pricing when awarding contracts through competition well founded for advisory and assistance service contracts at NAVWAR and NIWC Pacific?

B. PROBLEM STATEMENT

In a resource-constrained environment, acquisition professionals must effectively choose an acquisition strategy that fulfills organizational goals while addressing competition requirements. It is unclear if NAVWAR and NIWC Pacific achieve better pricing for advisory and assistance service contracts under competitive procedures. Understanding this will enable the acquisition team to better develop and execute acquisition strategies for A&AS requirements.

C. PURPOSE

NAVWAR and NIWC Pacific primarily acquire A&AS through indefinite-delivery, indefinite-quantity (IDIQ) contracts, either single or multiple award.



Accordingly, this research seeks to evaluate whether awarding cost-reimbursement task orders competitively versus through negotiations results in better pricing for A&AS for the government. While competition impacts the proposed total contract value and profit, the actual costs incurred and profit margins billed are not evident in fixed-price contracts.

We are concentrating on cost-reimbursement contracts because fee is proposed as a fixed amount, and that amount can be expressed in terms of a percentage of cost. This proposed percentage is a static data point of comparison that takes multiple factors into consideration, such as risk and technical complexity. Additionally, we will evaluate the proposed average fully burdened rate (AFBR) of each contract. This rate represents a data point that can be easily compared across different contract actions that illustrates the total cost, inclusive of indirect costs and profit, for each proposed hour of work. Our research will collect and analyze award data from NAVWAR and NIWC Pacific.

NAVWAR is one of five major acquisition Systems Commands (SYSCOM) within the DON. As a major SYSCOM, NAVWAR operates various internal functional codes and directorates as well as three Echelon III-level activities with over 11,000 civilian, active duty, and reservist personnel across the enterprise (NAVWAR, 2022). The organization's structure is shown in Figure 1.



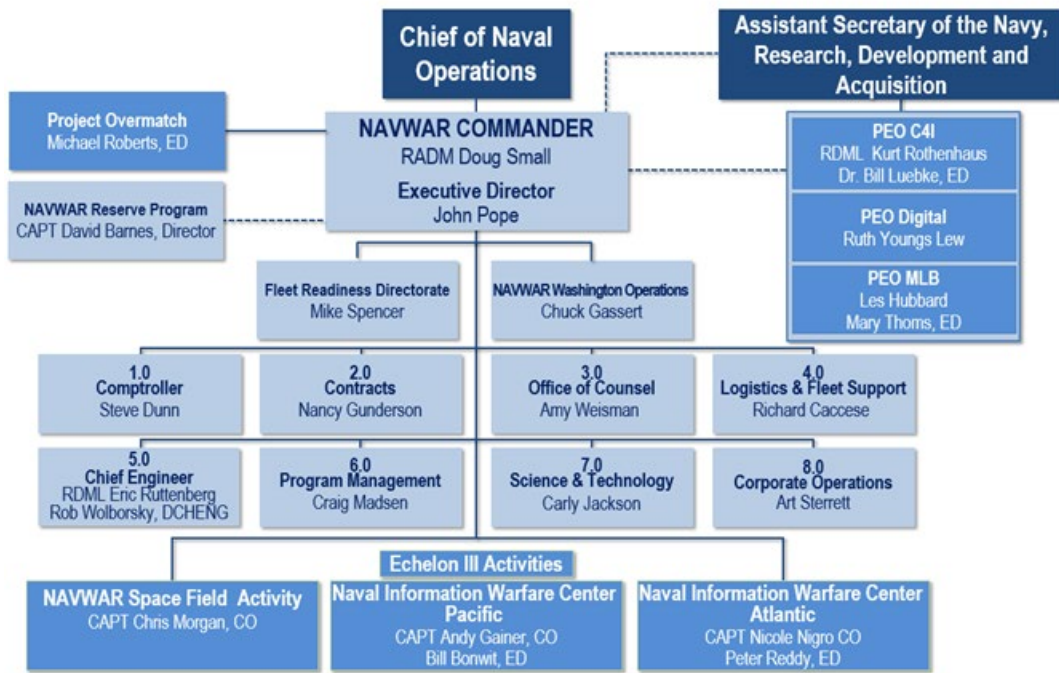


Figure 1. NAVWAR Organization. Source: NAVWAR (2022).

NAVWAR’s mission is “to identify, develop, deliver and sustain information warfare capabilities and services that enable naval, joint, coalition and other national missions operating in warfighting domains from seabed to space; and to perform such other functions and tasks as directed” with a vision to “rapidly [deliver] cyber warfighting capability from seabed to space” (NAVWAR, 2022). In fiscal year (FY) 2021, NAVWAR had \$3.392 billion in obligations with 68% of the dollars obligated competed (System for Award Management, 2022).

As one of the three Echelon III-level organizations within NAVWAR, NIWC Pacific is a Science and Technology Reinvention Laboratory (STRL) comprised of over 5,200 computer scientists, electrical engineers, cyber engineers, artificial intelligence/machine learning (AI/ML) scientists, technical specialists, contract managers and other professionals (NIWC Pacific, 2022). NIWC Pacific’s mission is to conduct research, development, engineering, prototyping test and evaluation, acquisition, installation, and in-service engineering C4ISR, cyber and space integrated across all warfighting domains. In



FY 2021, it obligated \$1.5 billion in contracts and achieved a 79% (dollars) competition rate (Bonwitt, 2021).

D. SCOPE AND LIMITATIONS

As discussed above, the scope of this research focuses on A&AS cost-reimbursement task orders awarded in fiscal years 2020 and 2021 by NAVWAR and NIWC Pacific.

E. RESEARCH QUESTIONS

Given the above scope and limitations, the following primary and secondary questions are the basis of our research:

1. Primary research question

To what extent, if any, does competition result in better pricing for NAVWAR and NIWC Pacific A&AS task orders under IDIQ contracts?

2. Secondary research question

What inferences can be made about the effectiveness of competition when examining data and/or trends of task order awards when:

1. competed under a Multiple Award Contract (MAC),
2. the government receives a single proposal under a MAC,
3. negotiated due to an exception to fair opportunity under a MAC, or
4. negotiated under a single award IDIQ contract.

F. METHODOLOGY

The methodology for this research is primarily a quantitative analysis, which evaluates award data retrieved from the Federal Procurement Data System (FPDS) for actions specified in Section C.

Prior to the quantitative analysis, we present a literature review that pulls from academic articles, government reports and policy, as well as other various resources. The



literature reveals that a gap in the body of knowledge related to the efficacy of competitive contracting procedures for A&AS at NAVWAR and NIWC Pacific.

G. RESEARCH STRUCTURE

This report is comprised of five chapters. Chapter II presents the literature review to include an overview of the Bertrand Model as a theoretical framework, a discussion of competition in acquisition, and contracting procedures. Chapter II also discusses Better Buying Power (BBP), the DOD's Taxonomy of Services, and an overview of A&AS. Chapter III lays out the research methodology to include the data sources and sampling procedures for the quantitative analysis. Chapter IV provides the results of the quantitative analysis with Chapter V serving as the conclusion and presenting the summary, findings, recommendations, limitations and areas for further research.

H. SUMMARY

This chapter discussed background information on the importance of promoting competition in the American economy, why competition is important to DOD, and assumptions related to competition. It also discussed the purpose of the research, scope and limitations, research questions, methodology, and the research structure.



II. LITERATURE REVIEW

A. INTRODUCTION

As previously discussed, the purpose of this research is to evaluate whether awarding cost-reimbursement task orders competitively versus through negotiations results in better pricing for A&AS for NAVWAR and NIWC Pacific. This chapter discusses the relevant literature on competition in acquisition, contracting procedures, BBP, taxonomy of services, advisory and assistance services, and other related research.

B. THEORETICAL FRAMEWORK

Price competition is at the root of many economic theories and is a pillar of the free market. One model, known as the Bertrand Model, states that when firms are in price competition with one another, prices will equal marginal cost (Spulber, 1995). This is because if firms offer homogenous products/services, the only differentiator becomes price. If one firm then lowers its price below its competitor, it will gain the entire market. As this cycle continues, the equilibrium of the market will result in all firms lowering prices to their marginal cost per unit. Bertrand's model begins to illustrate the benefit of competition as it relates to price and validates the assumption that competition in government contracting lowers prices, though not to the point of zero profit. A supplemental model expands on this theory by adding an assumption of unknown rival costs. The supplemental model, known as the Bertrand-Nash Model, finds that the market equilibrium when factoring asymmetric information about rivals costs results in prices above marginal cost (Spulber, 1995). This would result in some profit, which is what is typically experienced in government contracting, but keeping with the notion that competition will result in lower prices.

C. COMPETITION IN ACQUISITION

There are fundamental aspects and elements that impact competition. Highlighted below are key areas that inform overarching acquisition and contracting strategies.



1. Competition in contracting act

CICA is one of the key pieces of legislation governing the acquisition process. Enacted under Title VII of Public Law 98-369, Deficit Reduction Act of 1984, CICA required executive agencies to obtain full and open competition through the use of competitive procedures in accordance with regulation and that are best suited under the circumstances of the procurement (Deficit Reduction Act of 1984, 1984). Amended over the years, CICA is still present in regulation and maintains the same two principles as initially enacted. Currently residing in Chapter 33 of Title 41 of the U.S. Code, CICA requires competition unless a provided exception applies.

2. Pros and cons of competition vs. sole-source

Table 1 demonstrates the importance of competition along with government self-imposed barriers to it. Acquisition professionals should consider the elements below when determining their acquisition strategy and the implications it will have for the government.

Table 1. Pros and Cons of Competition vs. Sole-Source. Adapted from Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (2014).

Importance of Competition	Self-Imposed Barriers to Competition
Incentivize contractors to provide goods/ services at a lower price	Resignation to status quo. Project teams prefer the incumbent and fear losing their contractors or they bypass competition by sending funds to another organization with a contract in place with the desired company.
Propel technological innovations	Accepting arbitrary time constraints and believing that competition takes too long compared to sole-source buys.
Help improve the quality of products/ services acquired	Poor accountability. When it comes to sole-source justification and approvals, the follow-on action does not follow through on the steps taken to ensure future competition.
Allows capable small business to enter new markets	Failure to secure necessary data deliverables/rights to enable future competition.
Enhance/maintain a DIB that is capable of handling operational surge or demand spikes	Allowing or requiring scope creep rather than separating out new work for competition.



Importance of Competition	Self-Imposed Barriers to Competition
Curb fraud through opportunities to reassess sources of goods/services	Lack of experienced resources capable of conducting competitive source selections; sub-optimal evaluation criteria
Reinforce public trust and confidence through transparency of the DAS	Overly restrictive or poorly defined requirements; consolidating requirements

3. Buyer versus seller perspectives

One’s attitude towards competition varies greatly depending on if they are a buyer or seller. Buyers are trained from day one to support competition because it is the rule and not the exception. As a buyer, there are exceptions to the rule of needing competition, but buyer’s regularly favor competition as it can “drive cost savings, improve quality of the product or service, and help ensure best value for money” (Mustafa, Schwellenbach, Pyman, & Wright, 2017, p. 11). Competition also gives buyers more control as the decision-making authority during the source selection process, which helps reduce risk of corruption associated with individuals seeking personal gain by directing work on a sole-source basis.

Seller motivations differ greatly from buyers. Since many sellers to the government are private organizations; their primary goals include maximizing profit, growing market share, and increasing return on equity (Cohen & Eimicke, 2008). If sellers have to compete to win a government contract, it could prevent them from fulfilling those goals as their approach to fee may be more conservative to remain competitively priced. Incumbents have a competitive advantage compared to other sellers since they have the technical experience required to perform the work while also having a cost advantage of knowing true costs to perform and infrastructure in place (Levenson, 2014).

4. Calculating competition

DOD measures competition two ways using contract and order level data from FPDS. This first way of measuring the competition rate is by taking the dollars obligated for competitive contracts, that is those with at least two offers, divided by the total dollars



obligated. Typically, DOD’s competition based on dollars obligated is in the 50–60% range (Office of the Under Secretary of Defense for Acquisition and Sustainment, 2022).

The second way to measure the competition rate is by taking “the number of contract actions for competitive contracts divided by the total number of contract actions” (Office of the Under Secretary of Defense for Acquisition and Sustainment, 2022, p. 3). DOD’s competition based on contract actions is in the 90% range (Office of the Under Secretary of Defense for Acquisition and Sustainment, 2022).

D. CONTRACTING PROCEDURES

Regulations dictate procedures on competitive processes and contract type selection. Facets of these principles are discussed below.

1. Competition procedures

The Federal Acquisition Regulation (FAR) provides two primary methods for agencies to use when fulfilling the requirements of competition: sealed bids and competitive proposals (FAR 6.102, 2022). Sealed bidding involves the submission of competitive bids by contractors in response to an invitation to bid issued by the government, the public opening of bids, and awards (FAR 14.101, 2022). Award decisions are made based on price or other price-related factors when using sealed bidding (FAR 6.401, 2022). Competitive proposals are used when contracting for supplies or services in accordance with FAR Part 15, Contracting by Negotiation. Simply defined, this process begins with the government issuing a request for proposal and receiving responses from contractors in accordance with the solicitation. The proposals are evaluated based on the price and non-price related criteria provided in the solicitation, and the award is made to the vendor whose proposal best satisfied the requirements set forth in the solicitation.

2. Indefinite-delivery indefinite-quantity contracts

FAR Subpart 16.5, Indefinite-Delivery Contracts, implements this statute and provides guidance on IDIQ contracts. The FAR defines a task order contract as “a contract for services that does not procure or specify a firm quantity of services (other than a minimum or maximum quantity) and that provides for the issuance of orders for the



performance of tasks during the period of the contract” (FAR 16.5, 2022). Generally, there are four advantages to using IDIQ contracts for services:

1. Flexibility in both quantities and delivery scheduling
2. [Ability to order] services after requirements materialize
3. [Ability to] limit the government’s obligation to the minimum quantity specified in the contract; and
4. [IDIQ] contracts may provide for any appropriate cost or pricing arrangement under [FAR] Part 16 (FAR 16.5, 2022).

To promote using IDIQ contracts for services, 10 United States Code (USC) 2304a(d)(3)(A) states that task or delivery order contracts exceeding \$100,000,000 (inclusive of options) cannot be awarded to a single source unless the head of the agency determines doing so falls within a narrow set of exceptions. Pursuant to this requirement, many IDIQ contracts for services are awarded as a MAC. The process for ordering under IDIQ contracts is provided for in FAR 16.505, Ordering.

FAR 16.505(b) outlines the procedures for MACs and specifies that the “contracting officer must provide each awardee a fair opportunity to be considered for each order exceeding the micro-purchase threshold issued under multiple delivery-order or multiple task-order contracts.” (FAR 16.505, 2022) There are stated exceptions to this requirement. FAR 16.505(b)(2) states the contracting officer is permitted to provide exceptions to the fair opportunity process for the following reasons:

- The agency need for the supplies or services is so urgent that providing a fair opportunity would result in unacceptable delays.
- Only one awardee is capable of providing the supplies or services required at the level of quality required because the supplies or services ordered are unique or highly specialized.
- The order must be issued on a sole-source basis in the interest of economy and efficiency because it is a logical follow-on to an order already issued under the contract, provided that all awardees were given a fair opportunity to be considered for the original order.
- It is necessary to place an order to satisfy a minimum guarantee.
- In accordance with section 1331 of Public Law 111-240 (15 U.S.C. 644(r)), contracting officers may, at their discretion, set aside orders for any of the small business concerns identified in 19.000(a)(3). When setting aside orders for small business concerns, the specific small business program eligibility requirements identified in [FAR] part 19 apply.



- For DOD, [National Aeronautics and Space Administration] , and the Coast Guard, the order satisfies one of the exceptions permitting the use of other than full and open competition listed in 6.302 (10 U.S.C. 2304 c(b)(5)). The public interest exception shall not be used unless Congress is notified in accordance with 10 U.S.C. 2304(c)(7). (FAR 16.505, 2022)

When these exceptions are not applicable, the requirements of FAR 16.505(b) apply and favor competitive procedures.

E. BETTER BUYING POWER

The BBP initiative was created with the goal of obtaining greater efficiency and productivity in defense spending. Despite shrinking budgets and growing requirements for goods and services, Ashton Carter, then Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)), told acquisition professionals to “DO MORE WITHOUT MORE” (Carter A. B., 2010, p. 1) in BBP 1.0. To work towards this, the guidance had five major areas with 23 different actions to improve efficiency.

The areas of targeting affordability and controlling cost growth, incentivizing productivity and innovation in industry, and promoting real competition influence the commonly held belief that the government receives better prices under competitive contracting procedures. These three areas come into play at inception of requirements and set the tone on what the government will receive (Kendall, 2012).

Under the major area of improving tradecraft in services acquisition, BBP 1.0 directed adopting a uniform taxonomy for different types of services. As service spend increased annually, Carter recognized that DOD’s skills for buying professional services was less mature compared to buying weapons systems. To better collect spend data, evaluate the trends, and ensure consistency across the services, it was mandated to adopt a uniform taxonomy for different types of services based on categories of spend. The categories were derived from “Product Services Code (PSC) categories contained in the PSC manual maintained by the General Services Administration, Federal Procurement Data Center, and Office of Management and Budget (OMB)” (Carter A. B., 2010, p. 11).



F. TAXONOMY OF SERVICES

On August 27, 2012, Mr. Shay Assad, the Director of Defense Pricing, issued a memorandum on the Taxonomy for the Acquisition of Services and Supplies and Equipment (Assad, 2012). In support of the acquisition workforce and customer organizations, the Defense Department organizes its spend for services, supplies, and equipment using a taxonomy that aligns with PSCs. A PCS has four-digits that corresponds to a description of the product, service, or research and development purchased (U.S. General Services Administration Federal Acquisition Services, 2021) as reported in the FPDS. FPDS is a website for collecting spend data by each purchase made (Office of the Under Secretary of Defense for Acquisition and Sustainment, 2021).

By organizing, collecting, and analyzing spend data based on PSC, DOD can establish and promote strategic sourcing contracting efforts and support the BBP initiatives for obtaining greater efficiency and productivity in defense spending (Assad, 2012). The taxonomy is organized into 16 portfolio groups, nine of which are for services while the remaining seven for supplies and equipment. Within the portfolio groups, it is further broken down into 70 portfolios reflected in Figures 2 and 3.

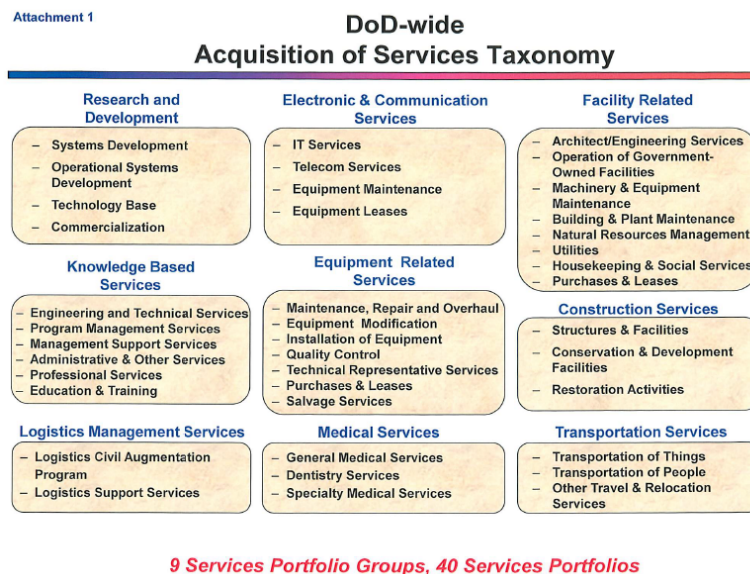
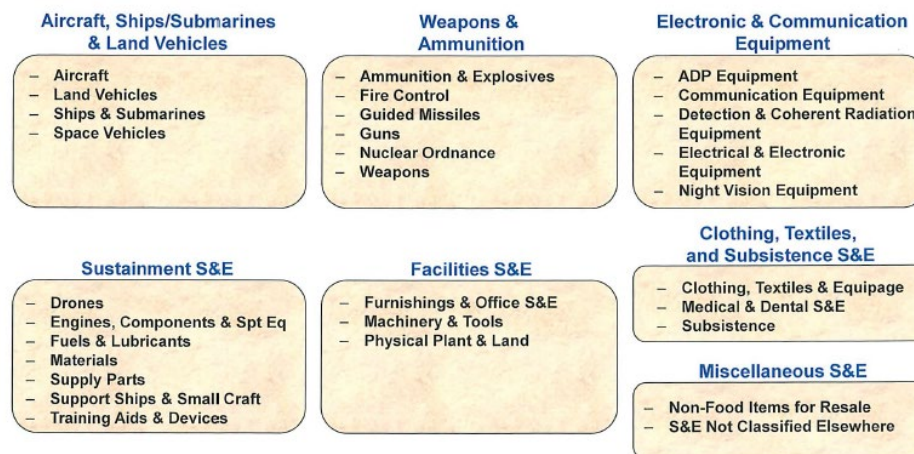


Figure 2. DOD-wide Acquisition of Services Taxonomy. Source: Assad (2012).



DoD-wide Acquisition of Supplies & Equipment (S&E) Taxonomy



7 S&E Portfolio Groups, 30 S&E Portfolios

Figure 3. DOD-wide Acquisition of Supplies and Equipment (S&E) Taxonomy. Source: Assad (2012).

As stated in Chapter I, our research focuses on A&AS. These fall within the Knowledge Based Services portfolio.

G. ADVISORY AND ASSISTANCE SERVICES

The FAR states that advisory and assistance services are “services provided by nongovernmental sources to support or improve organizational policy development; decision-making; management and administration; program and/or project management and administration; or R&D activities. It can also mean the furnishing of professional advice or assistance rendered to improve the effectiveness of Federal management processes or procedures (including those of an engineering and technical nature).” (FAR 2.101, 2022). A&AS are further classified into the following three subdivisions:

- Management and professional support services...that provide assistance, advice or training for the efficient and effective management and operation of organizations, activities (including management and support services for R&D activities), or systems.

- Studies, analyses, and evaluations services...that provide organized, analytical assessments/evaluations in support of policy development, decision-making, management, or administration.
- Engineering and technical services...providing such services as systems engineering and technical direction (see 9.505-1(b)) to ensure the effective operation and maintenance of a weapon system or major system or to provide direct support of a weapon system...or to provide direct support of a weapon system that is essential to research, development, production, operation, or maintenance of the system (FAR 2.101, 2022).

As shown in Figure 4, the DOD obligated \$421.8 billion on contracts with \$203.6 billion for services and \$218.1 billion for supplies in FY 2020. Within the top five categories for total service obligations, “Professional engineering/technical” services were the largest at \$19.2 billion and “Professional: other” were the fourth largest at \$6.9 billion (U.S. Government Accountability Office, 2021). These two categories represent approximately 9.9% of all services-related obligations by the DOD in 2020.

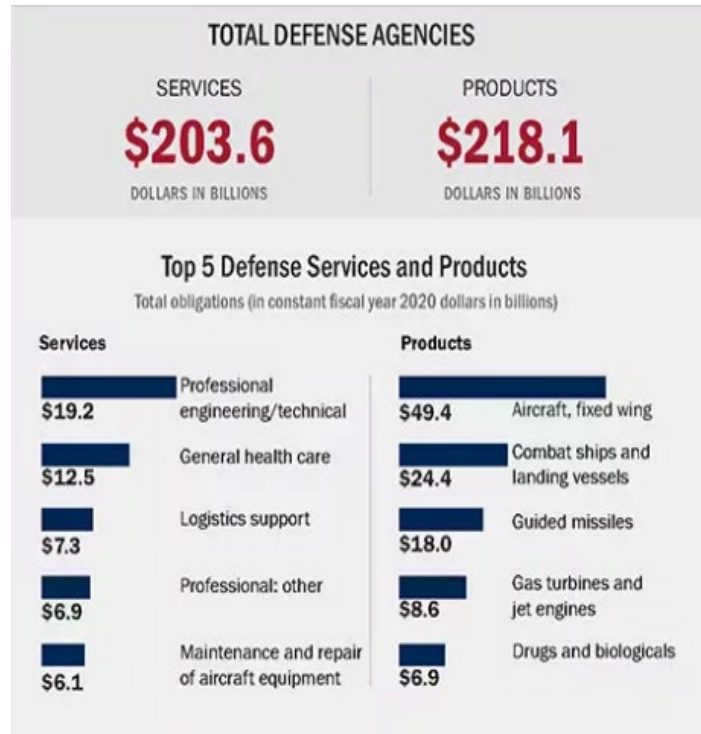


Figure 4. Excerpt from A Snapshot of Government-wide Contracting For FY 2020 Infographic. Source: U.S. Government Accountability Office (2021).



H. REVIEW OF RELATED LITERATURE

The following contains a literature review of relevant prior studies and research examining the effect of competition on pricing. The studies use real-world data and theoretical modeling scenarios.

1. “The Value of Competitive Contracting” (Healy, Sok, & Ramirez, 2014)

Healy et al.’s (2014) research focused on how much cost savings could be achieved through competition. They conducted a comparative analysis using award data from 30 supply contracts and 26 service contracts from an Army acquisition program or the General Services Administration (GSA). Of the 56 sampled actions, 80% were from DOD and the remaining 20% were from non-DOD services. The contracts were for information technology (IT) requirements and posted on Federal Business Opportunities (what is now SAM.gov) as full and open competitive solicitations.

To determine cost savings, the researchers used two different approaches since the sampled contracts were awarded by GSA or Army Contracting Command (ACC) and their access to data was limited in different circumstances. “If the contract was awarded by GSA, the data analyzed was the maximum allowable GWAC contract cost for the specific commodity or service versus the actual award contract after competition. If the contract was awarded by an ACC, the data analyzed was actual quotes from the vendors to determine the highest bid versus the actual contract award.” (Healy et al., 2014, p. 43). Their results demonstrated that 20% was the average cost savings for competed actions in their data set and that supplies produced higher cost savings than services.

While Healy et al.’s (2014) research found an average cost savings of 20% it did not provide detailed information on the actual data set they used. This left gaps and questions for us when determining relevancy for our research. The two methods they used to determine savings made it appear as though all actions were competed on a lowest price technically acceptable basis or were benchmarked against pre-established prices at the contract level.



2. “DOD Acquisition-To Compete or Not Compete: The Placebo of Competition” (Levenson, 2014)

Building on Harrison’s 2012 game theory framework, Levenson’s (2014) analysis used a statistical model to study a set of results for competitive and sole-source acquisitions to determine potential cost savings. Levenson considered “the effects of competitor differences and imperfect knowledge of development and production costs” (Levenson, 2014, p. 437). As part of the DOD’s effort to control and reduce Major Defense Acquisition Program (MDAP) costs, Levenson examined four aspects of competition that impact such efforts. The aspects were 1) Competitive Pressure on Profit Margin, 2) Bidding Accuracy, 3) Innovation, and 4) Incumbent Advantages (Levenson, 2014).

Levenson found that while the already low profit margins for defense companies can be reduced through competition, the cost savings are only a small percent when compared to the cost of sole-source actions (Levenson, 2014). As it relates to bidding accuracy, he found that competition “increases the likelihood and severity of seller losses or cost overruns that could threaten program completion” (Levenson, 2014, p. 435).

The most compelling rationale for competitive actions compared to sole-source came from the innovation in design or production (Levenson, 2014). Rather than being held hostage by a single vendor, competition drives innovation and efficiencies in design or advanced production processes. The cautionary note here is that not all solutions are truly innovative and could lead to an overly optimistic cost estimate to buy-in low and win the contract. In situations where there is a strong incumbent, competition can be costly to the buyer. New entrants tend to underestimate costs given the competitive pressure and desire to win work. Incumbents on the other hand have an advantage knowing the cost and technical inputs necessary to perform. Levenson suggests the cost of competition will likely far exceed the costs compared to a sole-source action unless non-incumbents truly have something innovative and advantageous compared to the incumbent.

Even though Levenson’s (2014) study used a statistical model with hypothetical data, the results indicated that competition does not always offer the best cost savings compared to sole-source awards for MDAPs. Competition appears most effective at reducing costs to the government when companies have something innovative to offer.



Despite drawing conclusions from hypothetical data, Levenson illustrated the possibility of cost savings through direct awards over competition.

I. SUMMARY

This chapter discussed the theoretical framework, competition in contracting, general contracting procedures, the BBP Initiative, the DOD's Taxonomy of Services, A&AS, and a review of related research. The next chapter discusses the methodology used to collect and analyze the data.



III. RESEARCH METHOD

A. INTRODUCTION

This chapter discusses the methodology used to collect and analyze the contract data on orders from NAVWAR and NIWC Pacific for this research. It concludes with limitations of the research based on the data collected.

B. INSTRUMENTS, APPARATUS, AND/OR PROCEDURES

The primary sources of data for this study are FPDS, the Electronic Data Access (EDA) Module in the Procurement Integrated Enterprise Environment (PIEE), and locally managed electronic contract files. FPDS is the Office of Federal Procurement Policy mandated computer-based data system for collecting, developing, and determining procurement data to the Congress, Executive Branch, and private sector (General Services Administration, 2022). The FPDS Government User's Manual states that agencies within the Executive Department are required by the FAR to collect and report data to FPDS (General Services Administration, 2022). Award data for this research was pulled directly from FPDS via its reporting tool. EDA is a web-based module within PIEE that provides secure online access, storage, and retrieval of contract documents (Electronic Data Access - Overview, 2022). The data from FPDS identified NAVWAR and NIWC Pacific awarded contract actions for the researchers to cross-reference in EDA. The combined FPDS and EDA data facilitated the identification of the number of hours procured by the government, contract type, completion versus level-of-effort, and cost and fee amounts for each contract. Finally, locally managed electronic contract files were accessed by the researchers to cross-reference the information collected from FPDS and EDA with proposal data for specific actions, when applicable.

As described above, the data retrieved in support of this research originated from managed government systems containing frequently monitored and retrieved data, ensuring data validity and reliability. The data sources are the same sources informing Congress, the Executive Branch, and the public (General Services Administration, 2022).



C. SAMPLING

The focus of this research is cost-plus-fixed-fee (CPFF) A&AS orders awarded by NAVWAR or NIWC Pacific during government fiscal years 2020 (01 October 2019 to 30 September 2020) and 2021 (01 October 2020 to 30 September 2021). Accordingly, the researchers retrieved the data as described in Section B using the following sampling constraints in order to develop the pool of contracts to be evaluated:

- NAVWAR/NIWC Pacific Orders for Supplies or Services awarded in fiscal year 2020 and 2021 were the basis of the data set.
- Orders awarded solely to satisfy a contractual minimum guarantee were excluded from the data set.
- Orders not funded by NAVWAR/NIWC Pacific (DODAACs N00039 or N66001) were excluded from the data set.
- Orders for services other than those identified by specific PSCs associated with A&AS were excluded from the data set.
- Because procedures differ for orders above and below the simplified acquisition threshold (SAT), orders below the SAT (<\$250,000.00) were excluded from the data set.
- Finally, only orders resulting in a level-of-effort (deliverable of hours) by the contractor were included in the data set.

The resulting sample of contracts included orders awarded against internal agency IDIQ contracts and SeaPort IDIQ MACs.

D. DATA COLLECTION

As discussed above, the researchers retrieved applicable award data from FPDS to identify an initial pool of contract actions. This data was then filtered according to the sampling methods identified to provide a focused sample of level-of-effort, CPFF orders for A&AS awarded by NAVWAR and NIWC Pacific in fiscal years 2020 and 2021. The



resulting data sample was then supplemented with data accessed from the EDA PIEE module to obtain the number of hours associated with each order for services. The combination of the data obtained from FPDS and EDA provided the foundation of the data used by the researchers for evaluation.

E. DATA ANALYSIS

Using the data collected, the researchers established two quantitative methods to evaluate proposed elements resulting in potential prices paid by the government. This first method reviewed the proposed AFBR of the contract. To calculate the AFBR, the researchers summed the total awarded fully burdened costs for all labor contract line item numbers (CLIN) divided by the total number of hours being procured. The researchers calculated the AFBR this way because it includes the total costs, inclusive of general and administrative expenses, fringe, overhead, fee, etc., associated with an hour of work.

$$\frac{\text{Total Fully Burdened Labor Costs (\$)}}{\text{Total Number of Hours}} = \text{Contract Proposed AFBR}$$

The second method reviewed the awarded fixed fee percentage on the first labor CLIN. To calculate this, the researchers divided the fixed fee amount by the total estimated cost amount of the CLIN. The estimated labor cost includes indirect costs, such as general and administrative expenses, fringe, and overhead, but excludes fee. The researchers calculated the awarded fixed fee percentage this way because contractors typically calculate the proposed fixed fee by applying a fee percentage to all fully burdened labor costs.

$$\frac{\text{Fixed Fee (\$)}}{\text{Estimated Labor Cost (\$)}} = \text{Awarded Fixed Fee (\%)}$$

F. DATA SECURITY AND MANAGEMENT

As discussed above, the data used in support of this research originated from managed government databases with no modifications by the researchers. The data obtained was filtered to establish a relevant pool, and the resulting data was used in the analysis.



G. LIMITATIONS OF PREDETERMINED RESEARCH DESIGN

The research was limited to level-of-effort, cost-reimbursement orders for A&AS awarded by NAVWAR and NIWC Pacific in fiscal years 2020 and 2021. It did not take into account orders made outside of the established time constraints or those made by organizations other than NAVWAR or NIWC Pacific. To establish a measurable pricing result, only cost-reimbursement level-of-effort orders were evaluated because the results could be obtained from the available sources (e.g. FPDS, EDA, etc.). The analysis focused on proposed and awarded values and does not consider actuals realized at the completion of a particular order. Given the orders have varying completion dates, the data collected represented proposed values that could be uniformly compared across all sampled orders. Finally, the research results are limited by the accuracy of the data provided in the government reporting systems.

H. SUMMARY

This chapter provided the research methodology for this study. We described the instruments used to obtain the required data, the sampling constraints applied, the methods for data collection and analysis, the reliability and security of the data, and the limitations of the research. The next chapter presents the results of our data analysis.



IV. RESULTS

A. INTRODUCTION

This chapter presents the quantitative results of our data set that resulted from the processes identified in Chapter III.

B. DATA ANALYSIS

The resultant data set from the sampling methodology identified 144 orders issued by NAVWAR and NIWC Pacific in FY 2020 and 2021 with a total contract value of approximately \$3.4 billion. Under this analysis, the orders are categorized as follows: (1) Orders subject to fair opportunity with multiple offers, (2) Orders subject to fair opportunity with only one offer, (3) Orders with exceptions to fair opportunity, and (4) Orders negotiated under a single award contract. The distribution of each category within the data set is illustrated in Figure 5:

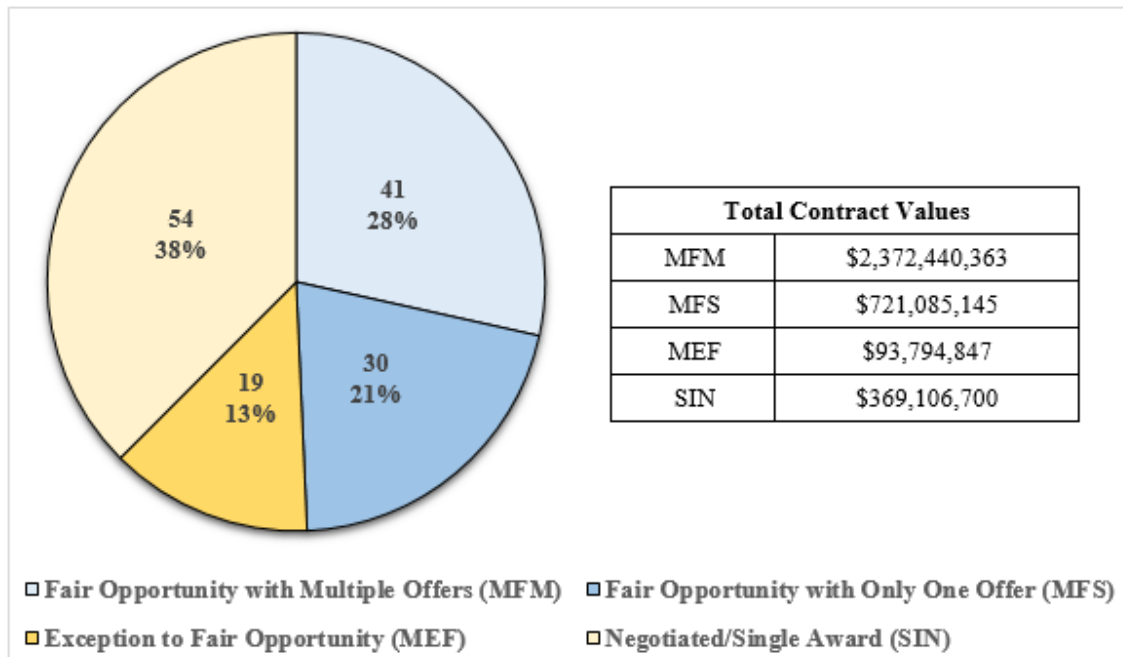


Figure 5. FY 2020 and 2021 NAVWAR and NIWC Pacific Number of Orders for A&AS

The data points extracted from the data set include: (1) the minimum value, (2) the maximum value, (3) the average, and (4) the range. The average was the primary indicator of the effectiveness of competition. Appendices B through E provide the detailed breakouts for each category. To sanitize the data of any proprietary pricing information, contract and order numbers were removed and replaced with unique identifiers. The unique identifiers are also segregated by category as described above, indicated by the prefix within the unique identifier:

- MFM - Orders subject to fair opportunity with multiple offers
- MFS - Orders subject to fair opportunity with only one offer
- MEF - Orders with exceptions to fair opportunity
- SIN - Orders negotiated under a single award contract

As an example, the first order in the series of orders subject to fair opportunity with multiple offers would have a unique identifier of MFM001. The summary for each category is provided in Table 2:

Table 2. Summary Data for NAVWAR/NIWC Pacific A&AS Orders

	MFM		MFS		MEF		SIN	
	AFBR	Fee %	AFBR	Fee %	AFBR	Fee %	AFBR	Fee %
Minimum	\$27.90	1.01%	\$67.11	2.83%	\$55.10	4.20%	\$33.01	2.60%
Maximum	\$217.68	10.24%	\$180.52	8.00%	\$196.09	8.00%	\$202.41	12.29%
Average	\$87.48	6.14%	\$115.50	6.41%	\$128.57	6.90%	\$106.64	6.42%
Range	\$189.78	9.23%	\$113.41	5.17%	\$140.99	3.80%	\$169.40	9.69%

Of the total 144 NAVWAR and NIWC Pacific orders sampled based on the criteria provided in Chapter III:

- 41 were subject to fair opportunity under an IDIQ MAC with multiple offers submitted by vendors. 22 orders were issued by NIWC Pacific and 19 were issued by NAVWAR. A detailed breakout by order can be found in Appendix B.



- 30 were subject to fair opportunity under an IDIQ MAC, with only one offer submitted by a single vendor. 25 orders were issued by NIWC Pacific and 5 were issued by NAVWAR. A detailed breakout by order can be found in Appendix C.
- 19 utilized an exception to fair opportunity under an IDIQ MAC. All 19 orders were issued by NIWC Pacific. A detailed breakout by order can be found in Appendix D.
- 54 were negotiated orders under a single award IDIQ contract. 43 orders were issued by NIWC Pacific, and 11 were issued by NAVWAR. A detailed breakout by order can be found in Appendix E.

C. AVERAGE VALUE FOR ANALYZED ORDERS

As introduced in Chapter I, the proposed AFBR and fixed fee percentage of each order was evaluated to compare the perceived effectiveness of competition on pricing for A&AS. Table 3 illustrates the average AFBR and fixed fee for each of the respective categories discussed above for the 144 sampled orders.

Table 3. Average Values for NAVWAR/NIWC Pacific A&AS Orders

MFM		MFS		MEF		SIN	
AFBR	Fee %	AFBR	Fee %	AFBR	Fee %	AFBR	Fee %
\$87.48	6.14%	\$115.50	6.41%	\$128.57	6.90%	\$106.64	6.42%

D. SUMMARY

This chapter presented the quantitative results of our data set. The next chapter discusses whether the results answer the research questions.



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V. FINDINGS AND RECOMMENDATIONS

A. RESEARCH SUMMARY

This research project began with the problem statement that it is unclear if NAVWAR and NIWC Pacific achieve better pricing for advisory and assistance service contracts under competitive procedures. A presentation of the applicable background information along with a discussion on the relevant literature was provided along with the data collection methodology and a discussion of the resulting data set and analysis. In this chapter, we discuss the recommendations based on the data analyzed to include answers to the original research questions and conclude with the limitations, recommendations, and areas for further research.

B. FINDINGS

As a result of this research, the findings relating to the primary and secondary research questions are as follows:

1. **Competitive contracting procedures result in better pricing for NAVWAR and NIWC Pacific A&AS task orders**

The primary research question asked to what extent, if any, does competition result in better pricing for NAVWAR/NIWC Pacific A&AS task orders under IDIQ contracts. The results of this research confirm the commonly held belief that competitive procedures result in better pricing when acquiring A&AS within NAVWAR and NIWC Pacific when multiple offers are received. This is true for both the AFBR and awarded fixed fee. Specifically, the researchers found that pricing was the best for orders subject to fair opportunity under an IDIQ MAC with multiple offers submitted by vendors. In contrast, pricing was the worst for orders that utilized an exception to fair opportunity under an IDIQ MAC. These orders, for example, showed a 46.97% increase in AFBR and 6.90% increase in awarded fixed fee, compared to awarded orders subject to fair opportunity under an IDIQ MAC with multiple offers submitted. CICA's efficacy is demonstrated within the data sample with orders utilizing exceptions to fair opportunity representing the smallest category of sampled orders.



Since orders subject to fair opportunity under an IDIQ MAC with multiple offers submitted result in the most advantageous pricing for the government, a comparison to the other categories is provided in Table 4.

Table 4. Compared Values for NAVWAR/NIWC Pacific A&AS Orders

MFM		MFS		MEF		SIN	
AFBR	Fee %	AFBR	Fee %	AFBR	Fee %	AFBR	Fee %
\$87.48	6.14%	\$115.50	6.41%	\$128.57	6.90%	\$106.64	6.42%
Delta from MFM		\$28.02	0.27%	\$41.09	0.76%	\$19.16	0.28%
% Delta from MFM		32.03%	4.40%	46.97%	12.38%	21.90%	4.56%

The impact of these results is illustrated in scenario examples in Tables 5 and 6. The examples present the implications effective acquisition planning and market research, to include contract strategy selection, can have on contract pricing outcomes. Based on the AFBR values presented in Table 4, a requirement for 250,000 hours could result in the following differences in total price being realized. The total prices are calculated by multiplying 250,000 hours by the corresponding AFBR from Table 4.

Table 5. AFBR Example

	MFM	MFS	MEF	SIN
Total Price	\$21,870,000	\$28,875,000	\$32,142,500	\$26,660,000
Delta from MFM (\$)		\$7,005,000	\$10,272,500	\$4,790,000
Delta from MFM (%)		32.03%	46.97%	21.90%

Based on the fee percentage values presented in Table 4, a requirement with a total estimated labor cost of \$25,000,000 including indirect costs, such as general and administrative expenses, fringe, and overhead, but excluding fee, could result in the following differences in awarded fee. The total awarded fee is calculated by multiplying \$25,000,000 by the corresponding fee rate from Table 4.



Table 6. Awarded Fixed Fee Example

	MFM	MFS	MEF	SIN
Awarded Fee	\$1,535,000	\$1,602,500	\$1,725,000	\$1,605,000
Delta from MFM (\$)		\$67,500	\$190,000	\$70,000
Delta from MFM (%)		4.40%	12.38%	4.56%

2. Fair opportunity under IDIQ MACs provides better pricing for NAVWAR and NIWC Pacific A&AS task orders

The secondary research question asked what inferences can be made about the effectiveness of competition when examining data and/or trends of task order awards when competed under a MAC, the government receives a single proposal under a MAC, negotiated due to an exception to fair opportunity under a MAC, and negotiated under a single award IDIQ contract.

Orders competed under a MAC resulted in the lowest AFBR and fee. This is likely the result of the maximum amount of competition for the orders within the data set. Levenson’s (2014) research indicated that profit margins are reduced through competition, which appears consistent within this data set. Taking into consideration the limitations of this research, it is unclear if offerors are incentivized to use more inexpensive labor when competing. Another possible reason could be that an offeror bids low to gain a price advantage over competitors with an expectation to overrun costs, which is an inherent risk in CPFF contracting. Though not an ideal scenario, the fixed fee paid by the government would still be lower and more advantageous to the government from a total price perspective.

The third most advantageous pricing to the government for AFBR was realized in orders competed under a MAC but when the government only received one proposal. As discussed in the Bertrand-Nash Model, firms that have homogenous offerings, A&AS in these cases, will lower their prices to just above marginal cost when presented with asymmetrical data (Spulber, 1995). Because offerors are unaware of potential additional bidders, they may be motivated to propose using lower prices than they would if it was known that there was no competition. Additionally, an offeror may have a perceived



competitive advantage, such as being an incumbent, leading them to believe they will win, potentially resulting in them taking a greater risk by proposing higher cost and fee. However, without absolute assurances, proposal strategies could concede to the theory presented in the Bertrand-Nash Model driving prices lower but not to the same extent as with a scenario where multiple offers would be reasonably expected.

The proposed AFBR and fee for negotiated orders due to an exception to fair opportunity under a MAC had the highest averages of all the data groupings. This could be due to offerors proposing higher costs knowing that it directly impacts their fixed fee amount. During contract performance, the government pays actual costs, and if the contractor reaches the estimated cost amount stated in the CLIN, any costs beyond that are treated as a cost overrun that they are still compensated for until work is completed or the hours contracted for are received. However, once the fixed fee amount is reached in a cost overrun situation, the contractor has to continue working without earning additional fee. This implication could incentivize contractors to propose excessively high costs as a way to inflate earnable fee, which aligns with their goal of maximizing profit (Cohen & Eimicke, 2008). Another reason for having higher AFBR and fee on these orders could be due to the work being specialized, necessitating the need for an exception to fair opportunity. As discussed in Chapter II, sellers are motivated to maximize profits and increase return on equity (Cohen & Eimicke, 2008). Provided with a chance to be the guaranteed single offeror, contractors could be incentivized to seize the opportunity to make up for potentially less than ideal profits earned in other competitive ventures.

Similar to orders negotiated due to an exception to fair opportunity under a MAC, orders negotiated under a single award IDIQ contract had higher averages for AFBR and fee compared to orders competed under a MAC with multiple offers. Of note, the averages were lower than those found for orders negotiated due to an exception to fair opportunity under a MAC. This could be due to a desire to establish positive long-term relationships while working within the cost constraints of the government and still attempting to meet their motivations of maximizing profits and increasing returns on equity. Additionally, because multiple orders can reasonably be expected under the IDIQ contract, offerors would not be pressured to make up as much ground in unrealized profits as might be



presented to them in an exception to fair opportunity scenario. One may conclude that the proposed costs affecting AFBR and awarded fixed fee for orders negotiated under a single award IDIQ contract represent the most realistic estimates to perform the work. Offerors are not incentivized to under bid as they might in orders subject to fair opportunity, regardless of the number of proposals (multiple or single). They are also not motivated to inflate their proposed costs as might be encountered with an order awarded under an exception to fair opportunity.

C. RECOMMENDATIONS

The resulting data from the overarching analysis indicates that better pricing, both in regard to AFBR and fee, is achieved through orders awarded subject to fair opportunity with multiple offers and orders awarded under a single award IDIQ contract. NAVWAR and NIWC Pacific experienced the lowest AFBR and fee values when multiple offers were received for orders subject to fair opportunity. Conversely, the highest AFBR and fee values were realized when exceptions to fair opportunity were made. Thus, this research finds the government can maximize competition when acquiring A&AS under an IDIQ MAC. In instances where an exception to fair opportunity is applicable or there is not a reasonable expectation that more than one offer will be received, better pricing could be realized via a single award IDIQ contract. Illustrative command-wide competition data is presented in Tables 7 and 8:



Table 7. NAVWAR and NIWC Pacific Competition Rate Based on Obligations

Organization	Fiscal Year	Dollars Obligated for Competitive Contracts	Total Dollars Obligated	Competition Rate Based on Dollars Obligated
NAVWAR	2020	\$2,244,941,981.57	\$3,456,109,265.22	64.95%
	2021	\$2,307,431,226.70	\$3,392,607,168.20	68.01%
NIWC Pacific	2020	\$1,122,573,399.78	\$1,451,016,351.37	77.36%
	2021	\$1,153,400,955.10	\$1,463,512,824.19	78.81%

Table 8. NAVWAR and NIWC Pacific Competition Rate Based on Contract Actions

Organization	Fiscal Year	Number of Contract Actions for Competitive Contracts	Total Number of Contract Actions	Competition Rate Based on Number of Contract Actions
NAVWAR	2020	1,791	3,191	56.12%
	2021	1,792	3,057	58.61%
NIWC Pacific	2020	3,933	5,183	75.88%
	2021	3,792	5,102	74.32%

Considering the percentages in Tables 7 and 8 and the conclusions of this research, efforts should be made to increase competition. As demonstrated by the evaluated data, competition results in better pricing for the government, provided multiple offers can be expected and exceptions to fair opportunity are not applicable. In these situations, the government may want to consider single award IDIQ contract vehicles to satisfy procurement requirements. These considerations can aid buyers and contracting officers in effectively using competitive procedures to realize better pricing for a given requirement. Senior organizational leaders can consider the results of this study when seeking areas for improvement in competition rates, specifically by service portfolio group within the taxonomy of services.



D. LIMITATIONS AND AREAS FOR FURTHER RESEARCH

As described in Chapter III, the researchers limited their awarded fixed fee percentage calculation to the first labor CLIN, leading the researchers to the following caveats for the fee data. First, many orders contained options periods with labor CLINs or multiple labor CLINs during the same period(s) of the contract. As there is no requirement for offerors to propose the same fee percentage on all labor CLINs, it is possible that the data does not accommodate variations in proposed or awarded fee percentages if different values were applied across various CLINs. Second, the calculated fee percentages might not be representative of what percentage is actually proposed by the awardee, since the fixed fee dollar amount could be a blended percentage if they apply a different fee rate to prime contractor costs versus subcontractor costs within the evaluated CLIN.

Third, there were SeaPort Next Generation (NxG) orders included in the data set. SeaPort NxG imposes a fee percentage cap on CPFF orders and prohibits sole-source work. Since SeaPort MAC holders all have the same fee percentage cap, their decision on what fee to propose may be impacted by this. The researchers investigated this by segregating the non-SeaPort orders from SeaPort ones for the MFM and MFS data sets as shown in Table 9.

Table 9. Data for SeaPort NxG Orders

	MFM		MFS	
	Non-SeaPort	SeaPort	Non-SeaPort	SeaPort
# Orders	19	22	23	7
Avg Fee %	5.81%	6.42%	6.37%	6.55%
Avg AFBR	\$ 79.56	\$ 94.32	\$ 113.85	\$ 120.92

As seen above, it is evident that the proposed average fee percent and AFBR are higher for SeaPort actions compared to non-SeaPort actions based on the current data set. A potential reason for this could be that leveling the playing field by imposing a well-known fee percentage cap emboldens SeaPort MAC holders to propose a fee percentage closer to the stated cap. In instances where there is no contract-specific fee constraint



imposed on offerors, there is less certainty on what other vendors may propose for fee. This could incentivize contractors to reduce their fee percentage to remain competitive from a price perspective, possibly contributing to the delta shown in the data.

A&AS PSCs encompass a wide range of services. Of the 301 A&AS PSCs based on the DOD's Taxonomy of Services, 24 were present in the 144 orders sampled. Based on how the researchers calculated the AFBR as discussed in Chapter III, no consideration was given to the actual labor mix (i.e., labor categories and hours required) and how that might affect the calculated AFBRs. This could result in comparisons of labor mixes that do not have the same realm of skillsets required to perform the work, which subsequently affects the cost. Across the four categories of orders (MFM; MFS; MEF; SIN), the dollar range associated with AFBR was \$113.41-\$189.78. The researchers interpret from the wide range that the labor mixes vary widely. Additional research may want to narrow the data sets further by PSC and like labor mixes to determine if that impacts proposed amounts for AFBR or fee.

The study was limited to A&AS CPFF services acquired through IDIQ contracts by NAVWAR and NIWC Pacific in FY 2020 and 2021. Further research could examine NAVWAR and NIWC Pacific CPFF services with non-A&AS PSCs. Subsequent research could also utilize a similar data set but include actual invoiced fully burdened rate and fee information. This could provide insight as to whether the government realizes the proposed prices and anticipated savings through competition or, instead, pays unanticipated higher costs through overruns. The results could inform contracting decision makers on whether the government realizes pricing benefits by following established competitive processes. Finally, the same, or similar, data sampling approach could be used and expanded upon to include data from other organizations and agencies.



APPENDIX A. PRODUCT SERVICE CODE LIST

PSC	Description
AA11	AGRICULTURE R&D SERVICES; AGRICULTURAL RESEARCH AND SERVICES; BASIC RESEARCH
AA12	AGRICULTURE R&D SERVICES; AGRICULTURAL RESEARCH AND SERVICES; APPLIED RESEARCH
AA13	AGRICULTURE R&D SERVICES; AGRICULTURAL RESEARCH AND SERVICES; EXPERIMENTAL DEVELOPMENT
AA14	AGRICULTURE R&D SERVICES; AGRICULTURAL RESEARCH AND SERVICES; R&D ADMINISTRATIVE EXPENSES
AA15	AGRICULTURE R&D SERVICES; AGRICULTURAL RESEARCH AND SERVICES; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AB11	COMMUNITY AND REGIONAL DEVELOPMENT R&D SERVICES; COMMUNITY DEVELOPMENT; BASIC RESEARCH
AB12	COMMUNITY AND REGIONAL DEVELOPMENT R&D SERVICES; COMMUNITY DEVELOPMENT; APPLIED RESEARCH
AB13	COMMUNITY AND REGIONAL DEVELOPMENT R&D SERVICES; COMMUNITY DEVELOPMENT; EXPERIMENTAL DEVELOPMENT
AB14	COMMUNITY AND REGIONAL DEVELOPMENT R&D SERVICES; COMMUNITY DEVELOPMENT; R&D ADMINISTRATIVE EXPENSES
AB15	COMMUNITY AND REGIONAL DEVELOPMENT R&D SERVICES; COMMUNITY DEVELOPMENT; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AB21	COMMUNITY AND REGIONAL DEVELOPMENT R&D SERVICES; AREA AND REGIONAL DEVELOPMENT; BASIC RESEARCH
AB22	COMMUNITY AND REGIONAL DEVELOPMENT R&D SERVICES; AREA AND REGIONAL DEVELOPMENT; APPLIED RESEARCH
AB23	COMMUNITY AND REGIONAL DEVELOPMENT R&D SERVICES; AREA AND REGIONAL DEVELOPMENT; EXPERIMENTAL DEVELOPMENT
AB24	COMMUNITY AND REGIONAL DEVELOPMENT R&D SERVICES; AREA AND REGIONAL DEVELOPMENT; R&D ADMINISTRATIVE EXPENSES
AB25	COMMUNITY AND REGIONAL DEVELOPMENT R&D SERVICES; AREA AND REGIONAL DEVELOPMENT; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AC11	NATIONAL DEFENSE R&D SERVICES; DEPARTMENT OF DEFENSE - MILITARY; BASIC RESEARCH
AC12	NATIONAL DEFENSE R&D SERVICES; DEPARTMENT OF DEFENSE - MILITARY; APPLIED RESEARCH
AC13	NATIONAL DEFENSE R&D SERVICES; DEPARTMENT OF DEFENSE - MILITARY; EXPERIMENTAL DEVELOPMENT
AC14	NATIONAL DEFENSE R&D SERVICES; DEPARTMENT OF DEFENSE - MILITARY; R&D ADMINISTRATIVE EXPENSES
AC15	NATIONAL DEFENSE R&D SERVICES; DEPARTMENT OF DEFENSE - MILITARY; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AC21	NATIONAL DEFENSE R&D SERVICES; ATOMIC ENERGY DEFENSE ACTIVITIES; BASIC RESEARCH



PSC	Description
AC22	NATIONAL DEFENSE R&D SERVICES; ATOMIC ENERGY DEFENSE ACTIVITIES; APPLIED RESEARCH
AC23	NATIONAL DEFENSE R&D SERVICES; ATOMIC ENERGY DEFENSE ACTIVITIES; EXPERIMENTAL DEVELOPMENT
AC24	NATIONAL DEFENSE R&D SERVICES; ATOMIC ENERGY DEFENSE ACTIVITIES; R&D ADMINISTRATIVE EXPENSES
AC25	NATIONAL DEFENSE R&D SERVICES; ATOMIC ENERGY DEFENSE ACTIVITIES; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AC31	NATIONAL DEFENSE R&D SERVICES; DEFENSE-RELATED ACTIVITIES; BASIC RESEARCH
AC32	NATIONAL DEFENSE R&D SERVICES; DEFENSE-RELATED ACTIVITIES; APPLIED RESEARCH
AC33	NATIONAL DEFENSE R&D SERVICES; DEFENSE-RELATED ACTIVITIES; EXPERIMENTAL DEVELOPMENT
AC34	NATIONAL DEFENSE R&D SERVICES; DEFENSE-RELATED ACTIVITIES; R&D ADMINISTRATIVE EXPENSES
AC35	NATIONAL DEFENSE R&D SERVICES; DEFENSE-RELATED ACTIVITIES; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AF11	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; EDUCATION SERVICES R&D; BASIC RESEARCH
AF12	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; EDUCATION SERVICES R&D; APPLIED RESEARCH
AF13	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; EDUCATION SERVICES R&D; EXPERIMENTAL DEVELOPMENT
AF14	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; EDUCATION SERVICES R&D; R&D ADMINISTRATIVE EXPENSES
AF15	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; EDUCATION SERVICES R&D; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AF21	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; TRAINING AND LABOR R&D; BASIC RESEARCH
AF22	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; TRAINING AND LABOR R&D; APPLIED RESEARCH
AF23	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; TRAINING AND LABOR R&D; EXPERIMENTAL DEVELOPMENT
AF24	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; TRAINING AND LABOR R&D; R&D ADMINISTRATIVE EXPENSES
AF25	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; TRAINING AND LABOR R&D; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AF31	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; SOCIAL SERVICES R&D; BASIC RESEARCH
AF32	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; SOCIAL SERVICES R&D; APPLIED RESEARCH
AF33	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; SOCIAL SERVICES R&D; EXPERIMENTAL DEVELOPMENT



PSC	Description
AF34	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; SOCIAL SERVICES R&D; R&D ADMINISTRATIVE EXPENSES
AF35	EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES R&D SERVICES; SOCIAL SERVICES R&D; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AG11	ENERGY R&D SERVICES; ENERGY SUPPLY; BASIC RESEARCH
AG12	ENERGY R&D SERVICES; ENERGY SUPPLY; APPLIED RESEARCH
AG13	ENERGY R&D SERVICES; ENERGY SUPPLY; EXPERIMENTAL DEVELOPMENT
AG14	ENERGY R&D SERVICES; ENERGY SUPPLY; R&D ADMINISTRATIVE EXPENSES
AG15	ENERGY R&D SERVICES; ENERGY SUPPLY; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AG21	ENERGY R&D SERVICES; ENERGY CONSERVATION; BASIC RESEARCH
AG22	ENERGY R&D SERVICES; ENERGY CONSERVATION; APPLIED RESEARCH
AG23	ENERGY R&D SERVICES; ENERGY CONSERVATION; EXPERIMENTAL DEVELOPMENT
AG24	ENERGY R&D SERVICES; ENERGY CONSERVATION; R&D ADMINISTRATIVE EXPENSES
AG25	ENERGY R&D SERVICES; ENERGY CONSERVATION; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AG31	ENERGY R&D SERVICES; EMERGENCY ENERGY PREPAREDNESS; BASIC RESEARCH
AG32	ENERGY R&D SERVICES; EMERGENCY ENERGY PREPAREDNESS; APPLIED RESEARCH
AG33	ENERGY R&D SERVICES; EMERGENCY ENERGY PREPAREDNESS; EXPERIMENTAL DEVELOPMENT
AG34	ENERGY R&D SERVICES; EMERGENCY ENERGY PREPAREDNESS; R&D ADMINISTRATIVE EXPENSES
AG35	ENERGY R&D SERVICES; EMERGENCY ENERGY PREPAREDNESS; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AG41	ENERGY R&D SERVICES; ENERGY INFORMATION, POLICY AND REGULATION; BASIC RESEARCH
AG42	ENERGY R&D SERVICES; ENERGY INFORMATION, POLICY AND REGULATION; APPLIED RESEARCH
AG43	ENERGY R&D SERVICES; ENERGY INFORMATION, POLICY AND REGULATION; EXPERIMENTAL DEVELOPMENT
AG44	ENERGY R&D SERVICES; ENERGY INFORMATION, POLICY AND REGULATION; R&D ADMINISTRATIVE EXPENSES
AG45	ENERGY R&D SERVICES; ENERGY INFORMATION, POLICY AND REGULATION; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AH11	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; WATER RESOURCES; BASIC RESEARCH
AH12	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; WATER RESOURCES; APPLIED RESEARCH
AH13	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; WATER RESOURCES; EXPERIMENTAL DEVELOPMENT



PSC	Description
AH14	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; WATER RESOURCES; R&D ADMINISTRATIVE EXPENSES
AH15	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; WATER RESOURCES; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AH21	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; CONSERVATION AND LAND MANAGEMENT; BASIC RESEARCH
AH22	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; CONSERVATION AND LAND MANAGEMENT; APPLIED RESEARCH
AH23	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; CONSERVATION AND LAND MANAGEMENT; EXPERIMENTAL DEVELOPMENT
AH24	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; CONSERVATION AND LAND MANAGEMENT; R&D ADMINISTRATIVE EXPENSES
AH25	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; CONSERVATION AND LAND MANAGEMENT; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AH31	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; RECREATIONAL RESOURCES; BASIC RESEARCH
AH32	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; RECREATIONAL RESOURCES; APPLIED RESEARCH
AH33	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; RECREATIONAL RESOURCES; EXPERIMENTAL DEVELOPMENT
AH34	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; RECREATIONAL RESOURCES; R&D ADMINISTRATIVE EXPENSES
AH35	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; RECREATIONAL RESOURCES; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AH41	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; POLLUTION CONTROL AND ABATEMENT; BASIC RESEARCH
AH42	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; POLLUTION CONTROL AND ABATEMENT; APPLIED RESEARCH
AH43	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; POLLUTION CONTROL AND ABATEMENT; EXPERIMENTAL DEVELOPMENT
AH44	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; POLLUTION CONTROL AND ABATEMENT; R&D ADMINISTRATIVE EXPENSES
AH45	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; POLLUTION CONTROL AND ABATEMENT; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AH51	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; OTHER NATURAL RESOURCES; BASIC RESEARCH
AH52	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; OTHER NATURAL RESOURCES; APPLIED RESEARCH
AH53	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; OTHER NATURAL RESOURCES; EXPERIMENTAL DEVELOPMENT
AH54	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; OTHER NATURAL RESOURCES; R&D ADMINISTRATIVE EXPENSES
AH55	NATURAL RESOURCES AND ENVIRONMENT R&D SERVICES; OTHER NATURAL RESOURCES; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT



PSC	Description
AJ11	GENERAL SCIENCE AND TECHNOLOGY R&D SERVICES; GENERAL SCIENCE AND TECHNOLOGY; BASIC RESEARCH
AJ12	GENERAL SCIENCE AND TECHNOLOGY R&D SERVICES; GENERAL SCIENCE AND TECHNOLOGY; APPLIED RESEARCH
AJ13	GENERAL SCIENCE AND TECHNOLOGY R&D SERVICES; GENERAL SCIENCE AND TECHNOLOGY; EXPERIMENTAL DEVELOPMENT
AJ14	GENERAL SCIENCE AND TECHNOLOGY R&D SERVICES; GENERAL SCIENCE AND TECHNOLOGY; R&D ADMINISTRATIVE EXPENSES
AJ15	GENERAL SCIENCE AND TECHNOLOGY R&D SERVICES; GENERAL SCIENCE AND TECHNOLOGY; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AK11	COMMERCE AND HOUSING CREDIT R&D SERVICES; COMMERCE AND HOUSING CREDIT; BASIC RESEARCH
AK12	COMMERCE AND HOUSING CREDIT R&D SERVICES; COMMERCE AND HOUSING CREDIT; APPLIED RESEARCH
AK13	COMMERCE AND HOUSING CREDIT R&D SERVICES; COMMERCE AND HOUSING CREDIT; EXPERIMENTAL DEVELOPMENT
AK14	COMMERCE AND HOUSING CREDIT R&D SERVICES; COMMERCE AND HOUSING CREDIT; R&D ADMINISTRATIVE EXPENSES
AK15	COMMERCE AND HOUSING CREDIT R&D SERVICES; COMMERCE AND HOUSING CREDIT; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AL11	INCOME SECURITY R&D SERVICES; INCOME SECURITY; BASIC RESEARCH
AL12	INCOME SECURITY R&D SERVICES; INCOME SECURITY; APPLIED RESEARCH
AL13	INCOME SECURITY R&D SERVICES; INCOME SECURITY; EXPERIMENTAL DEVELOPMENT
AL14	INCOME SECURITY R&D SERVICES; INCOME SECURITY; R&D ADMINISTRATIVE EXPENSES
AL15	INCOME SECURITY R&D SERVICES; INCOME SECURITY; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AM11	INTERNATIONAL AFFAIRS R&D SERVICES; INTERNATIONAL AFFAIRS; BASIC RESEARCH
AM12	INTERNATIONAL AFFAIRS R&D SERVICES; INTERNATIONAL AFFAIRS; APPLIED RESEARCH
AM13	INTERNATIONAL AFFAIRS R&D SERVICES; INTERNATIONAL AFFAIRS; EXPERIMENTAL DEVELOPMENT
AM14	INTERNATIONAL AFFAIRS R&D SERVICES; INTERNATIONAL AFFAIRS; R&D ADMINISTRATIVE EXPENSES
AM15	INTERNATIONAL AFFAIRS R&D SERVICES; INTERNATIONAL AFFAIRS; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AN11	HEALTH R&D SERVICES; HEALTH CARE SERVICES; BASIC RESEARCH
AN12	HEALTH R&D SERVICES; HEALTH CARE SERVICES; APPLIED RESEARCH
AN13	HEALTH R&D SERVICES; HEALTH CARE SERVICES; EXPERIMENTAL DEVELOPMENT
AN14	HEALTH R&D SERVICES; HEALTH CARE SERVICES; R&D ADMINISTRATIVE EXPENSES
AN15	HEALTH R&D SERVICES; HEALTH CARE SERVICES; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT



PSC	Description
AN21	HEALTH R&D SERVICES; HEALTH RESEARCH AND TRAINING; BASIC RESEARCH
AN22	HEALTH R&D SERVICES; HEALTH RESEARCH AND TRAINING; APPLIED RESEARCH
AN23	HEALTH R&D SERVICES; HEALTH RESEARCH AND TRAINING; EXPERIMENTAL DEVELOPMENT
AN24	HEALTH R&D SERVICES; HEALTH RESEARCH AND TRAINING; R&D ADMINISTRATIVE EXPENSES
AN25	HEALTH R&D SERVICES; HEALTH RESEARCH AND TRAINING; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AN25	HEALTH R&D SERVICES; HEALTH RESEARCH AND TRAINING; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AN31	HEALTH R&D SERVICES; CONSUMER AND OCCUPATIONAL HEALTH AND SAFETY; BASIC RESEARCH
AN32	HEALTH R&D SERVICES; CONSUMER AND OCCUPATIONAL HEALTH AND SAFETY; APPLIED RESEARCH
AN33	HEALTH R&D SERVICES; CONSUMER AND OCCUPATIONAL HEALTH AND SAFETY; EXPERIMENTAL DEVELOPMENT
AN34	HEALTH R&D SERVICES; CONSUMER AND OCCUPATIONAL HEALTH AND SAFETY; R&D ADMINISTRATIVE EXPENSES
AN35	HEALTH R&D SERVICES; CONSUMER AND OCCUPATIONAL HEALTH AND SAFETY; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AN41	HEALTH R&D SERVICES; HEALTH CARE - OTHER; BASIC RESEARCH
AN42	HEALTH R&D SERVICES; HEALTH CARE - OTHER; APPLIED RESEARCH
AN43	HEALTH R&D SERVICES; HEALTH CARE - OTHER; EXPERIMENTAL DEVELOPMENT
AN44	HEALTH R&D SERVICES; HEALTH CARE - OTHER; R&D ADMINISTRATIVE EXPENSES
AN45	HEALTH R&D SERVICES; HEALTH CARE - OTHER; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AR11	SPACE R&D SERVICES; SPACE FLIGHT, RESEARCH AND SUPPORTING ACTIVITIES; BASIC RESEARCH
AR12	SPACE R&D SERVICES; SPACE FLIGHT, RESEARCH AND SUPPORTING ACTIVITIES; APPLIED RESEARCH
AR13	SPACE R&D SERVICES; SPACE FLIGHT, RESEARCH AND SUPPORTING ACTIVITIES; EXPERIMENTAL DEVELOPMENT
AR14	SPACE R&D SERVICES; SPACE FLIGHT, RESEARCH AND SUPPORTING ACTIVITIES; R&D ADMINISTRATIVE EXPENSES
AR15	SPACE R&D SERVICES; SPACE FLIGHT, RESEARCH AND SUPPORTING ACTIVITIES; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AS11	TRANSPORTATION R&D SERVICES; SURFACE TRANSPORTATION, PUBLIC TRANSIT, AND RAIL; BASIC RESEARCH
AS12	TRANSPORTATION R&D SERVICES; SURFACE TRANSPORTATION, PUBLIC TRANSIT, AND RAIL; APPLIED RESEARCH
AS13	TRANSPORTATION R&D SERVICES; SURFACE TRANSPORTATION, PUBLIC TRANSIT, AND RAIL; EXPERIMENTAL DEVELOPMENT



PSC	Description
AS14	TRANSPORTATION R&D SERVICES; SURFACE TRANSPORTATION, PUBLIC TRANSIT, AND RAIL; R&D ADMINISTRATIVE EXPENSES
AS15	TRANSPORTATION R&D SERVICES; SURFACE TRANSPORTATION, PUBLIC TRANSIT, AND RAIL; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AS21	TRANSPORTATION R&D SERVICES; AEROSPACE RESEARCH; BASIC RESEARCH
AS22	TRANSPORTATION R&D SERVICES; AEROSPACE RESEARCH; APPLIED RESEARCH
AS23	TRANSPORTATION R&D SERVICES; AEROSPACE RESEARCH; EXPERIMENTAL DEVELOPMENT
AS24	TRANSPORTATION R&D SERVICES; AEROSPACE RESEARCH; R&D ADMINISTRATIVE EXPENSES
AS25	TRANSPORTATION R&D SERVICES; AEROSPACE RESEARCH; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AS31	TRANSPORTATION R&D SERVICES; WATER TRANSPORTATION; BASIC RESEARCH
AS32	TRANSPORTATION R&D SERVICES; WATER TRANSPORTATION; APPLIED RESEARCH
AS33	TRANSPORTATION R&D SERVICES; WATER TRANSPORTATION; EXPERIMENTAL DEVELOPMENT
AS34	TRANSPORTATION R&D SERVICES; WATER TRANSPORTATION; R&D ADMINISTRATIVE EXPENSES
AS35	TRANSPORTATION R&D SERVICES; WATER TRANSPORTATION; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
AS41	TRANSPORTATION R&D SERVICES; PIPELINES; HAZARDOUS MATERIALS; CROSS-FUNCTIONAL TRANSPORTATION; BASIC RESEARCH
AS42	TRANSPORTATION R&D SERVICES; PIPELINES; HAZARDOUS MATERIALS; CROSS-FUNCTIONAL TRANSPORTATION; APPLIED RESEARCH
AS43	TRANSPORTATION R&D SERVICES; PIPELINES; HAZARDOUS MATERIALS; CROSS-FUNCTIONAL TRANSPORTATION; EXPERIMENTAL DEVELOPMENT
AS44	TRANSPORTATION R&D SERVICES; PIPELINES; HAZARDOUS MATERIALS; CROSS-FUNCTIONAL TRANSPORTATION; R&D ADMINISTRATIVE EXPENSES
AS45	TRANSPORTATION R&D SERVICES; PIPELINES; HAZARDOUS MATERIALS; CROSS-FUNCTIONAL TRANSPORTATION; EXPENSES FOR R&D FACILITIES AND MAJOR EQUIPMENT
B502	SPECIAL STUDIES/ANALYSIS- AIR QUALITY
B503	SPECIAL STUDIES/ANALYSIS- ARCHEOLOGICAL/PALEONTOLOGICAL
B504	SPECIAL STUDIES/ANALYSIS- CHEMICAL/BIOLOGICAL
B505	SPECIAL STUDIES/ANALYSIS- COST BENEFIT
B506	SPECIAL STUDIES/ANALYSIS- DATA (OTHER THAN SCIENTIFIC)
B507	SPECIAL STUDIES/ANALYSIS- ECONOMIC
B509	SPECIAL STUDIES/ANALYSIS- ENDANGERED SPECIES: PLANT/ANIMAL
B510	SPECIAL STUDIES/ANALYSIS- ENVIRONMENTAL ASSESSMENTS
B513	SPECIAL STUDIES/ANALYSIS- FEASIBILITY (NON-CONSTRUCTION)
B516	SPECIAL STUDIES/ANALYSIS- ANIMAL/FISHERIES



PSC	Description
B517	SPECIAL STUDIES/ANALYSIS- GEOLOGICAL
B518	SPECIAL STUDIES/ANALYSIS- GEOPHYSICAL
B519	SPECIAL STUDIES/ANALYSIS- GEOTECHNICAL
B520	SPECIAL STUDIES/ANALYSIS- GRAZING/RANGE
B521	SPECIAL STUDIES/ANALYSIS- HISTORICAL
B522	SPECIAL STUDIES/ANALYSIS- LEGAL
B524	SPECIAL STUDIES/ANALYSIS- MATHEMATICAL/STATISTICAL
B525	SPECIAL STUDIES/ANALYSIS- NATURAL RESOURCE
B526	SPECIAL STUDIES/ANALYSIS- OCEANOLOGICAL
B527	SPECIAL STUDIES/ANALYSIS- RECREATION
B528	SPECIAL STUDIES/ANALYSIS- REGULATORY
B529	SPECIAL STUDIES/ANALYSIS- SCIENTIFIC DATA
B530	SPECIAL STUDIES/ANALYSIS- SEISMOLOGICAL
B532	SPECIAL STUDIES/ANALYSIS- SOIL
B533	SPECIAL STUDIES/ANALYSIS- WATER QUALITY
B534	SPECIAL STUDIES/ANALYSIS- WILDLIFE
B537	SPECIAL STUDIES/ANALYSIS- MEDICAL/HEALTH
B538	SPECIAL STUDIES/ANALYSIS- INTELLIGENCE
B539	SPECIAL STUDIES/ANALYSIS- AERONAUTICAL/SPACE
B540	SPECIAL STUDIES/ANALYSIS- BUILDING TECHNOLOGY
B541	SPECIAL STUDIES/ANALYSIS- DEFENSE
B542	SPECIAL STUDIES/ANALYSIS- EDUCATIONAL
B543	SPECIAL STUDIES/ANALYSIS- ENERGY
B544	SPECIAL STUDIES/ANALYSIS- TECHNOLOGY
B545	SPECIAL STUDIES/ANALYSIS- HOUSING/COMMUNITY DEVELOPMENT
B546	SPECIAL STUDIES/ANALYSIS- SECURITY (PHYSICAL/PERSONAL)
B547	SPECIAL STUDIES/ANALYSIS- ACCOUNTING/FINANCIAL MANAGEMENT
B548	SPECIAL STUDIES/ANALYSIS- TRADE ISSUE
B549	SPECIAL STUDIES/ANALYSIS- FOREIGN/NATIONAL SECURITY POLICY
B550	SPECIAL STUDIES/ANALYSIS- ORGANIZATION/ADMINISTRATIVE/PERSONNEL
B551	SPECIAL STUDIES/ANALYSIS- MOBILIZATION/PREPAREDNESS
B552	SPECIAL STUDIES/ANALYSIS- MANPOWER
B553	SPECIAL STUDIES/ANALYSIS- COMMUNICATIONS
B554	SPECIAL STUDIES/ANALYSIS- ACQUISITION POLICY/PROCEDURES
B555	SPECIAL STUDIES/ANALYSIS- ELDERLY/HANDICAPPED
B599	SPECIAL STUDIES/ANALYSIS- OTHER
DA01	IT AND TELECOM - BUSINESS APPLICATION/APPLICATION DEVELOPMENT SUPPORT SERVICES (LABOR)



PSC	Description
DA10	IT AND TELECOM - BUSINESS APPLICATION/APPLICATION DEVELOPMENT SOFTWARE AS A SERVICE
DB01	IT AND TELECOM - HIGH PERFORMANCE COMPUTING (HPC) SUPPORT SERVICES (LABOR)
DB02	IT AND TELECOM - COMPUTE SUPPORT SERVICES, NON-HPC (LABOR)
DB10	IT AND TELECOM - COMPUTE AS A SERVICE: MAINFRAME/SERVERS
DC01	IT AND TELECOM - DATA CENTER SUPPORT SERVICES (LABOR)
DC10	IT AND TELECOM - DATA CENTER AS A SERVICE
DD01	IT AND TELECOM - SERVICE DELIVERY SUPPORT SERVICES: ITSM, OPERATIONS CENTER, IT PROGRAM/PROJECT MANAGEMENT (LABOR)
DE01	IT AND TELECOM - END USER SUPPORT SERVICES: CONFERENCING, AV, HELPDESK, DESKSIDE SUPPORT, WORKSPACE, PRINTERS, COLLABORATION AND PRODUCTIVITY TOOLS (LABOR)
DE02	IT AND TELECOM - MOBILE DEVICE SUPPORT SERVICES (LABOR)
DE10	IT AND TELECOM - END USER AS A SERVICE: CONFERENCING, AV, HELPDESK, DESKSIDE SUPPORT, WORKSPACE, PRINTERS, COLLABORATION AND PRODUCTIVITY TOOLS
DE11	IT AND TELECOM - MOBILE DEVICE AS A SERVICE
DF01	IT AND TELECOM - IT MANAGEMENT SUPPORT SERVICES (LABOR)
DF10	IT AND TELECOM - IT MANAGEMENT AS A SERVICE
DG01	IT AND TELECOM - NETWORK SUPPORT SERVICES (LABOR)
DG10	IT AND TELECOM - NETWORK AS A SERVICE
DG11	IT AND TELECOM - NETWORK: TELECOM ACCESS SERVICES
DH01	IT AND TELECOM - PLATFORM SUPPORT SERVICES: DATABASE, MAINFRAME, MIDDLEWARE (LABOR)
DH10	IT AND TELECOM - PLATFORM AS A SERVICE: DATABASE, MAINFRAME, MIDDLEWARE
DJ01	IT AND TELECOM - SECURITY AND COMPLIANCE SUPPORT SERVICES (LABOR)
DJ10	IT AND TELECOM - SECURITY AND COMPLIANCE AS A SERVICE
DK01	IT AND TELECOM - STORAGE SUPPORT SERVICES (LABOR)
DK10	IT AND TELECOM - STORAGE AS A SERVICE
G001	SOCIAL- CARE OF REMAINS AND/OR FUNERAL
G002	SOCIAL- CHAPLAIN
G003	SOCIAL- RECREATIONAL
G004	SOCIAL- SOCIAL REHABILITATION
G005	SOCIAL- GERIATRIC
G006	SOCIAL- GOVERNMENT LIFE INSURANCE PROGRAMS
G007	SOCIAL- GOVERNMENT HEALTH INSURANCE PROGRAMS
G008	SOCIAL- GOVERNMENT INSURANCE PROGRAMS: OTHER
G009	SOCIAL- NON-GOVERNMENT INSURANCE PROGRAMS
G010	SOCIAL- DIRECT AID TO TRIBAL GOVERNMENTS (PL 93-638)



PSC	Description
G099	SOCIAL- OTHER
R401	SUPPORT- PROFESSIONAL: PERSONAL CARE (NON-MEDICAL)
R402	SUPPORT- PROFESSIONAL: REAL ESTATE BROKERAGE
R404	SUPPORT- PROFESSIONAL: LAND SURVEYS-CADASTRAL (NON-CONSTRUCTION)
R405	SUPPORT- PROFESSIONAL: OPERATIONS RESEARCH/QUANTITATIVE ANALYSIS
R406	SUPPORT- PROFESSIONAL: POLICY REVIEW/DEVELOPMENT
R408	SUPPORT- PROFESSIONAL: PROGRAM MANAGEMENT/SUPPORT
R410	SUPPORT- PROFESSIONAL: PROGRAM EVALUATION/REVIEW/DEVELOPMENT
R411	SUPPORT- PROFESSIONAL: REAL PROPERTY APPRAISALS
R412	SUPPORT- PROFESSIONAL: SIMULATION
R413	SUPPORT- PROFESSIONAL: SPECIFICATIONS DEVELOPMENT
R414	SYSTEMS ENGINEERING SERVICES
R418	SUPPORT- PROFESSIONAL: LEGAL
R422	SUPPORT- PROFESSIONAL: MARKET RESEARCH/PUBLIC OPINION
R423	SUPPORT- PROFESSIONAL: INTELLIGENCE
R424	SUPPORT- PROFESSIONAL: EXPERT WITNESS
R425	SUPPORT- PROFESSIONAL: ENGINEERING/TECHNICAL
R426	SUPPORT- PROFESSIONAL: COMMUNICATIONS
R427	SUPPORT- PROFESSIONAL: WEATHER REPORTING/OBSERVATION
R428	SUPPORT- PROFESSIONAL: INDUSTRIAL HYGIENICS
R429	SUPPORT- PROFESSIONAL: EMERGENCY RESPONSE/DISASTER PLANNING/ PREPAREDNESS SUPPORT
R497	SUPPORT- PROFESSIONAL: PERSONAL SERVICES CONTRACTS
R498	SUPPORT- PROFESSIONAL: PATENT AND TRADEMARK
R499	SUPPORT- PROFESSIONAL: OTHER
R603	SUPPORT- ADMINISTRATIVE: TRANSCRIPTION
R605	SUPPORT- ADMINISTRATIVE: LIBRARY
R606	SUPPORT- ADMINISTRATIVE: COURT REPORTING
R607	SUPPORT- ADMINISTRATIVE: WORD PROCESSING/TYPING
R608	SUPPORT- ADMINISTRATIVE: TRANSLATION AND INTERPRETING
R609	SUPPORT- ADMINISTRATIVE: STENOGRAPHIC
R610	SUPPORT- ADMINISTRATIVE:- PERSONAL PROPERTY MANAGEMENT
R611	SUPPORT- ADMINISTRATIVE: CREDIT REPORTING
R612	SUPPORT- ADMINISTRATIVE: INFORMATION RETRIEVAL
R614	SUPPORT- ADMINISTRATIVE: PAPER SHREDDING
R615	SUPPORT- ADMINISTRATIVE: BACKGROUND INVESTIGATION
R699	SUPPORT- ADMINISTRATIVE: OTHER



PSC	Description
R701	SUPPORT- MANAGEMENT: ADVERTISING
R702	SUPPORT- MANAGEMENT: DATA COLLECTION
R703	SUPPORT- MANAGEMENT: ACCOUNTING
R704	SUPPORT- MANAGEMENT: AUDITING
R705	SUPPORT- MANAGEMENT: DEBT COLLECTION
R707	SUPPORT- MANAGEMENT: CONTRACT/PROCUREMENT/ACQUISITION SUPPORT
R708	SUPPORT- MANAGEMENT: PUBLIC RELATIONS
R709	ONGOING AUDIT OPERATIONS SUPPORT
R710	SUPPORT- MANAGEMENT: FINANCIAL
R711	SUPPORT- MANAGEMENT: BANKING
R712	SUPPORT- MANAGEMENT: COIN MINTING
R713	SUPPORT- MANAGEMENT: BANKNOTE PRINTING
R799	SUPPORT- MANAGEMENT: OTHER
T001	PHOTO/MAP/PRINT/PUBLICATION- ARTS/GRAPHICS
T002	PHOTO/MAP/PRINT/PUBLICATION- CARTOGRAPHY
T003	PHOTO/MAP/PRINT/PUBLICATION- CATALOGING
T004	PHOTO/MAP/PRINT/PUBLICATION- CHARTING
T005	PHOTO/MAP/PRINT/PUBLICATION- FILM PROCESSING
T006	PHOTO/MAP/PRINT/PUBLICATION- FILM/VIDEO TAPE PRODUCTION
T007	PHOTO/MAP/PRINT/PUBLICATION- MICROFORM
T008	PHOTO/MAP/PRINT/PUBLICATION- PHOTOGRAMMETRY
T009	PHOTO/MAP/PRINT/PUBLICATION- AERIAL PHOTOGRAPHIC
T010	PHOTO/MAP/PRINT/PUBLICATION- GENERAL PHOTOGRAPHIC: STILL
T011	PHOTO/MAP/PRINT/PUBLICATION- PRINT/BINDING
T012	PHOTO/MAP/PRINT/PUBLICATION- REPRODUCTION
T013	PHOTO/MAP/PRINT/PUBLICATION- TECHNICAL WRITING
T014	PHOTO/MAP/PRINT/PUBLICATION- TOPOGRAPHY
T015	PHOTO/MAP/PRINT/PUBLICATION- GENERAL PHOTOGRAPHIC: MOTION
T016	PHOTO/MAP/PRINT/PUBLICATION- AUDIO/VISUAL
T099	PHOTO/MAP/PRINT/PUBLICATION- OTHER



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APPENDIX B. DATA RESULTS: ORDERS SUBJECT TO FAIR OPPORTUNITY WITH MULTIPLE OFFERS

UID	Org.	PSC	Fair Opportunity	No. of Offers	Solicitation Procedures	Labor CLIN \$	Hours	AFBR	Fee
MFM001	PAC	R425	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$278,430.14	1,920	\$145.02	6.15%
MFM002	PAC	R425	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$785,939.00	12,499	\$62.88	6.80%
MFM003	PAC	DA01	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$3,050,720.00	33,494	\$91.08	5.16%
MFM004	PAC	DE01	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$7,317,149.55	99,240	\$73.73	3.52%
MFM005	PAC	DE01	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$1,534,413.19	27,264	\$56.28	6.00%
MFM006	PAC	R425	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$1,920,842.90	23,040	\$83.37	6.50%
MFM007	PAC	R425	Fair Opportunity Given	6	Subj. to Mult. Award Fair Opp.	\$2,460,257.90	30,240	\$81.36	5.00%
MFM008	PAC	R425	Fair Opportunity Given	4	Subj. to Mult. Award Fair Opp.	\$11,356,751.22	147,840	\$76.82	6.00%
MFM009	PAC	DE01	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$12,198,288.90	121,800	\$100.15	7.50%
MFM010	PAC	R499	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$531,459.13	12,000	\$44.29	2.81%
MFM011	PAC	R499	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$803,517.60	28,800	\$27.90	6.85%
MFM012	PAC	DJ01	Fair Opportunity Given	10	Subj. to Mult. Award Fair Opp.	\$7,579,451.54	110,880	\$68.36	1.01%
MFM013	PAC	DG01	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$1,510,811.56	26,780	\$56.42	7.00%
MFM014	PAC	R425	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$322,199.84	8,320	\$38.73	7.00%
MFM015	PAC	AC14	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$984,405.69	11,584	\$84.98	5.00%
MFM016	PAC	AC14	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$326,271.18	3,912	\$83.40	7.50%
MFM017	PAC	AC14	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$1,380,932.16	12,096	\$114.16	7.00%
MFM018	PAC	AJ11	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$4,890,852.95	39,000	\$125.41	7.49%
MFM019	PAC	DA01	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$7,010,988.07	72,000	\$97.37	6.09%
MFM020	PAC	DB02	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$132,191,767.20	1,495,141	\$88.41	7.54%
MFM021	PAC	AC33	Fair Opportunity Given	6	Subj. to Mult. Award Fair Opp.	\$7,313,917.16	33,600	\$217.68	5.27%
MFM022	PAC	DH01	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$36,947,372.38	447,744	\$82.52	6.15%
MFM023	PAC	R408	Fair Opportunity Given	11	Subj. to Mult. Award Fair Opp.	\$10,258,131.33	203,600	\$50.38	4.75%
MFM024	HQ	R408	Fair Opportunity Given	4	Subj. to Mult. Award Fair Opp.	\$71,360,297.46	855,920	\$83.37	3.21%
MFM025	HQ	R710	Fair Opportunity Given	5	Subj. to Mult. Award Fair Opp.	\$11,218,117.65	213,600	\$52.52	8.00%



UID	Org.	PSC	Fair Opportunity	No. of Offers	Solicitation Procedures	Labor CLIN \$	Hours	AFBR	Fee
MFM026	HQ	R710	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$159,909,782.47	1,621,920	\$98.59	7.18%
MFM027	HQ	R408	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$88,520,011.86	717,600	\$123.36	7.67%
MFM028	HQ	R408	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$60,949,089.76	640,000	\$95.23	4.88%
MFM029	HQ	R425	Fair Opportunity Given	4	Subj. to Mult. Award Fair Opp.	\$62,983,300.11	472,800	\$133.21	7.43%
MFM030	HQ	R707	Fair Opportunity Given	17	Subj. to Mult. Award Fair Opp.	\$3,904,979.74	74,000	\$52.77	5.00%
MFM031	HQ	R408	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$2,351,055.56	31,680	\$74.21	7.00%
MFM032	HQ	R425	Fair Opportunity Given	4	Subj. to Mult. Award Fair Opp.	\$70,874,420.42	573,506	\$123.58	8.70%
MFM033	HQ	DA01	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$193,548,180.03	2,050,604	\$94.39	8.00%
MFM034	HQ	R425	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$38,871,123.44	438,775	\$88.59	4.02%
MFM035	HQ	R425	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$175,529,738.73	2,116,328	\$82.94	6.50%
MFM036	HQ	R425	Fair Opportunity Given	2	Subj. to Mult. Award Fair Opp.	\$26,057,710.87	374,400	\$69.60	6.78%
MFM037	HQ	R425	Fair Opportunity Given	4	Subj. to Mult. Award Fair Opp.	\$45,393,591.00	466,080	\$97.39	5.07%
MFM038	HQ	R425	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$73,334,998.44	842,400	\$87.05	10.24%
MFM039	HQ	DJ01	Fair Opportunity Given	8	Subj. to Mult. Award Fair Opp.	\$34,301,010.00	336,000	\$102.09	8.00%
MFM040	HQ	R408	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$71,962,973.33	781,440	\$92.09	7.28%
MFM041	HQ	R408	Fair Opportunity Given	3	Subj. to Mult. Award Fair Opp.	\$48,166,811.76	566,306	\$85.05	2.66%



APPENDIX C. DATA RESULTS: ORDERS SUBJECT TO FAIR OPPORTUNITY WITH ONLY ONE OFFER

UID	Org.	PSC	Fair Opportunity	No. of Offers	Solicitation Procedures	Labor CLIN \$	Hours	AFBR	Fee
MFS001	PAC	R425	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	2,979,847.76	22,360	133.27	8.00%
MFS002	PAC	R425	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	700,402.23	3,880	180.52	2.83%
MFS003	PAC	AC33	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	2,580,629.86	31,520	81.87	6.42%
MFS004	PAC	AC33	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	5,939,655.96	59,240	100.26	6.97%
MFS005	PAC	DA01	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	8,478,040.86	91,680	92.47	7.21%
MFS006	PAC	AC33	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	4,768,467.85	42,720	111.62	6.50%
MFS007	PAC	R425	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	4,680,262.98	44,120	106.08	7.00%
MFS008	PAC	AC34	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	622,460.78	5,210	119.47	8.00%
MFS009	PAC	DA01	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	572,485.47	6,868	83.36	6.00%
MFS010	PAC	R425	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	5,139,501.77	57,120	89.98	6.50%
MFS011	PAC	R425	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	6,672,513.15	66,756	99.95	6.50%
MFS012	PAC	R425	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	9,319,622.28	115,440	80.73	6.50%
MFS013	PAC	R425	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	4,586,534.55	43,800	104.72	6.15%
MFS014	PAC	AC13	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	23,804,391.25	137,903	172.62	7.00%
MFS015	PAC	R425	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	15,684,800.84	163,200	96.11	7.00%
MFS016	PAC	AC33	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	671,050.37	10,000	67.11	4.84%
MFS017	PAC	R425	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	4,521,794.78	39,600	114.19	5.92%
MFS018	PAC	AC14	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	347,054.21	1,970	176.17	7.00%
MFS019	PAC	AC14	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	649,957.66	4,000	162.49	7.00%
MFS020	PAC	AC14	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	295,979.44	1,970	150.24	3.01%
MFS021	PAC	AC14	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	423,307.65	5,910	71.63	5.00%
MFS022	PAC	R429	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	4,509,149.22	40,630	110.98	7.97%
MFS023	PAC	R429	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	41,297,698.54	366,406	112.71	7.25%
MFS024	PAC	AC33	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	9,519,131.39	79,520	119.71	5.79%
MFS025	PAC	AC33	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	13,465,128.87	111,260	121.02	6.45%



UID	Org.	PSC	Fair Opportunity	No. of Offers	Solicitation Procedures	Labor CLIN \$	Hours	AFBR	Fee
MFS026	HQ	R425	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	189,995,555.67	1,545,600	122.93	7.15%
MFS027	HQ	R408	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	59,740,988.00	547,200	109.18	7.24%
MFS028	HQ	R408	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	138,637,341.46	1,139,520	121.66	7.67%
MFS029	HQ	R425	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	68,984,327.88	514,560	134.06	6.40%
MFS030	HQ	R425	Fair Opportunity Given	1	Subj. to Mult. Award Fair Opp.	61,306,346.23	520,000	117.90	5.14%



APPENDIX D. DATA RESULTS: ORDERS WITH EXCEPTIONS TO FAIR OPPORTUNITY

UID	Org.	PSC	Fair Opportunity	No. of Offers	Solicitation Procedures	Labor CLIN \$	Hours	AFBR	Fee
MEF001	PAC	R425	Exc. - Only One Source	1	Subj. to Mult. Award Fair Opp.	\$2,541,105.51	16,451	\$154.47	6.80%
MEF002	PAC	AC33	Exc. - Follow-on Action	1	Subj. to Mult. Award Fair Opp.	\$890,342.02	5,876	\$151.52	7.37%
MEF003	PAC	R425	Exc. - Oth. Stat. Auth.	1	Subj. to Mult. Award Fair Opp.	\$292,615.40	1,808	\$161.84	6.61%
MEF004	PAC	AC13	Exc. - Follow-on Action	1	Subj. to Mult. Award Fair Opp.	\$916,926.30	8,996	\$101.93	4.20%
MEF005	PAC	AC13	Exc. - Follow-on Action	1	Subj. to Mult. Award Fair Opp.	\$419,649.84	3,228	\$130.00	6.78%
MEF006	PAC	DC01	Exc. - Follow-on Action	1	Subj. to Mult. Award Fair Opp.	\$1,771,878.06	14,875	\$119.12	7.65%
MEF007	PAC	DG10	Exc. - Only One Source	1	Subj. to Mult. Award Fair Opp.	\$988,479.00	8,828	\$111.97	7.90%
MEF008	PAC	R425	Exc. - Follow-on Action	1	Subj. to Mult. Award Fair Opp.	\$279,687.28	1,912	\$146.28	8.00%
MEF009	PAC	AC14	Exc. - Only One Source	1	Subj. to Mult. Award Fair Opp.	\$4,768,395.20	39,400	\$121.03	8.00%
MEF010	PAC	AC13	Exc. - Follow-on Action	1	Subj. to Mult. Award Fair Opp.	\$3,063,728.43	24,240	\$126.39	4.65%
MEF011	PAC	DE01	Exc. - Oth. Stat. Auth.	1	Subj. to Mult. Award Fair Opp.	\$339,423.28	6,160	\$55.10	7.00%
MEF012	PAC	R499	Exc. - Only One Source	1	Subj. to Mult. Award Fair Opp.	\$10,124,343.00	51,632	\$196.09	7.00%
MEF013	PAC	R425	Exc. - Only One Source	1	Subj. to Mult. Award Fair Opp.	\$15,274,849.28	128,310	\$119.05	8.00%
MEF014	PAC	AC14	Exc. - Only One Source	1	Subj. to Mult. Award Fair Opp.	\$1,587,338.32	13,302	\$119.33	7.00%
MEF015	PAC	AC14	Exc. - Only One Source	1	Subj. to Mult. Award Fair Opp.	\$6,816,640.64	40,896	\$166.68	7.00%
MEF016	PAC	R425	Exc. - Only One Source	1	Subj. to Mult. Award Fair Opp.	\$15,102,495.55	111,920	\$134.94	6.10%
MEF017	PAC	AC14	Exc. - Only One Source	1	Subj. to Mult. Award Fair Opp.	\$10,649,412.49	126,734	\$84.03	7.00%
MEF018	PAC	AC14	Exc. - Only One Source	1	Subj. to Mult. Award Fair Opp.	\$2,729,170.22	16,445	\$165.96	7.00%
MEF019	PAC	AC14	Exc. - Only One Source	1	Subj. to Mult. Award Fair Opp.	\$5,379,410.77	69,827	\$77.04	7.00%



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APPENDIX E. DATA RESULTS: NEGOTIATED ORDERS UNDER SINGLE AWARD CONTRACTS

UID	Org.	PSC	Fair Opportunity	No. of Offers	Solicitation Procedures	Labor CLIN \$	Hours	AFBR	Fee
SIN001	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$341,902.12	4,373	\$78.18	4.20%
SIN002	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$12,146.10	172	\$70.62	5.00%
SIN003	PAC	AC24	Not Applicable	1	Negotiated Proposal/Quote	\$1,039,811.57	16,256	\$63.96	2.60%
SIN004	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$2,793,652.76	19,419	\$143.86	7.00%
SIN005	PAC	DE01	Not Applicable	1	Negotiated Proposal/Quote	\$4,454,111.78	50,760	\$87.75	5.00%
SIN006	PAC	AC31	Not Applicable	1	Negotiated Proposal/Quote	\$463,460.66	4,774	\$97.08	7.00%
SIN007	PAC	R499	Not Applicable	1	Negotiated Proposal/Quote	\$272,494.00	1,729	\$157.60	6.61%
SIN008	PAC	R499	Not Applicable	1	Negotiated Proposal/Quote	\$714,391.00	6,451	\$110.74	5.51%
SIN009	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$1,205,876.88	9,635	\$125.15	3.97%
SIN010	PAC	DF01	Not Applicable	1	Only One Source	\$410,417.46	8,155	\$50.33	6.00%
SIN011	PAC	AC34	Not Applicable	1	Negotiated Proposal/Quote	\$631,283.68	6,578	\$95.97	6.41%
SIN012	PAC	R408	Not Applicable	1	Negotiated Proposal/Quote	\$1,452,711.35	17,947	\$80.94	6.00%
SIN013	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$322,560.86	4,428	\$72.85	4.45%
SIN014	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$322,560.86	4,428	\$72.85	4.45%
SIN015	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$838,214.34	8,466	\$99.01	3.38%
SIN016	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$1,862,570.68	29,370	\$63.42	7.50%
SIN017	PAC	DE01	Not Applicable	1	Negotiated Proposal/Quote	\$736,036.87	11,431	\$64.39	7.50%
SIN018	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$349,722.75	3,390	\$103.16	9.80%
SIN019	PAC	R425	Not Applicable	1	Only One Source	\$1,113,655.71	6,315	\$176.35	8.00%
SIN020	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$411,789.42	12,476	\$33.01	7.00%
SIN021	PAC	DE01	Not Applicable	1	Negotiated Proposal/Quote	\$653,600.53	9,870	\$66.22	6.17%
SIN022	PAC	DC01	Not Applicable	1	Negotiated Proposal/Quote	\$7,428,231.33	69,892	\$106.28	6.50%
SIN023	PAC	DC01	Not Applicable	1	Negotiated Proposal/Quote	\$4,817,500.59	49,440	\$97.44	6.50%
SIN024	PAC	DE01	Not Applicable	1	Negotiated Proposal/Quote	\$714,367.90	7,328	\$97.48	6.50%
SIN025	PAC	R408	Not Applicable	1	Negotiated Proposal/Quote	\$1,141,711.61	10,752	\$106.19	6.50%
SIN026	PAC	DC01	Not Applicable	1	Negotiated Proposal/Quote	\$538,737.59	6,048	\$89.08	6.50%
SIN027	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$565,743.97	5,013	\$112.86	6.50%



UID	Org.	PSC	Fair Opportunity	No. of Offers	Solicitation Procedures	Labor CLIN \$	Hours	AFBR	Fee
SIN028	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$711,567.05	5,352	\$132.95	6.50%
SIN029	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$282,960.10	4,685	\$60.40	6.00%
SIN030	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$551,603.82	8,670	\$63.62	6.00%
SIN031	PAC	AC13	Not Applicable	1	Negotiated Proposal/Quote	\$10,436,347.32	82,124	\$127.08	7.00%
SIN032	PAC	AC13	Not Applicable	1	Negotiated Proposal/Quote	\$34,198,338.96	222,800	\$153.49	6.48%
SIN033	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$4,620,699.26	39,760	\$116.21	6.06%
SIN034	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$1,830,189.03	16,656	\$109.88	6.12%
SIN035	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$1,949,410.91	16,448	\$118.52	6.11%
SIN036	PAC	R425	Not Applicable	1	Negotiated Proposal/Quote	\$983,518.07	7,200	\$136.60	8.00%
SIN037	PAC	DA01	Not Applicable	1	Only One Source	\$905,484.39	9,600	\$94.32	6.00%
SIN038	PAC	DA01	Not Applicable	1	Only One Source	\$2,327,543.96	40,240	\$57.84	6.00%
SIN039	PAC	DA01	Not Applicable	1	Only One Source	\$283,902.30	5,180	\$54.81	5.82%
SIN040	PAC	DA01	Not Applicable	1	Only One Source	\$324,270.25	5,312	\$61.04	6.00%
SIN041	PAC	DA01	Not Applicable	1	Only One Source	\$307,534.38	4,879	\$63.03	5.55%
SIN042	PAC	DA01	Not Applicable	1	Only One Source	\$350,465.15	4,850	\$72.26	5.28%
SIN043	PAC	AC33	Not Applicable	1	Negotiated Proposal/Quote	\$1,027,990.16	11,119	\$92.45	5.95%
SIN044	HQ	AC32	Not Applicable	1	Only One Source	\$3,797,828.00	21,897	\$173.44	5.00%
SIN045	HQ	AC32	Not Applicable	1	Only One Source	\$873,353.00	4,641	\$188.18	5.00%
SIN046	HQ	DF01	Not Applicable	1	Only One Source	\$8,967,539.88	86,912	\$103.18	12.29%
SIN047	HQ	DF01	Not Applicable	1	Only One Source	\$2,130,135.99	24,000	\$88.76	5.02%
SIN048	HQ	R425	Not Applicable	1	Negotiated Proposal/Quote	\$11,113,245.00	56,251	\$197.57	10.47%
SIN049	HQ	R425	Not Applicable	1	Negotiated Proposal/Quote	\$16,592,263.00	82,788	\$200.42	10.46%
SIN050	HQ	R425	Not Applicable	1	Negotiated Proposal/Quote	\$14,989,559.00	74,056	\$202.41	10.46%
SIN051	HQ	R425	Not Applicable	1	Negotiated Proposal/Quote	\$9,623,745.00	51,336	\$187.47	10.48%
SIN052	HQ	DF01	Not Applicable	1	Only One Source	\$63,194,901.49	371,700	\$170.02	6.00%
SIN053	HQ	DE10	Not Applicable	1	Only One Source	\$5,497,571.65	77,920	\$70.55	3.92%
SIN054	HQ	AC34	Not Applicable	1	Negotiated Proposal/Quote	\$1,249,364.08	8,965	\$139.36	6.18%



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