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**AIR FORCE ACQUISITION: AN EXPLORATION
INTO LEVERAGING THE ORGANIZATION'S
BUYING POWER IN NON-COMPETITIVE ENVIRONMENTS**

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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

MBA PROFESSIONAL PROJECT

AIR FORCE ACQUISITION: AN EXPLORATION INTO LEVERAGING THE ORGANIZATION'S BUYING POWER IN NON-COMPETITIVE ENVIRONMENTS

December 2019

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ORGANIZATION'S BUYING POWER IN NON-COMPETITIVE
ENVIRONMENTS**

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Submitted in partial fulfillment of the
requirements for the degree of

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from the

**NAVAL POSTGRADUATE SCHOOL
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ABSTRACT

Our research studies the ways the Air Force can better leverage its buying power in non-competitive acquisition settings. In particular, we focus on the pre-award and post-award phase for contracts after Milestone B on Major Defense Acquisition Programs (MDAPs). We examine specific factors among a few programs that have contributed to a reliance on sole-source suppliers and review whether it is possible to ease the sole-source constraint. Combining a literature review with acquisition contracting practices, we identify gaps in and provide recommendations on improving contracting in non-competitive settings. The Air Force's main challenges include, but are not limited to, a shrinking supply base; consistent cost, schedule, and performance issues; winner-take-all MDAP awards; lack of technical data rights; congressional and political motivators; and relational contracts with contractors. Through our analysis, we pinpoint gaps that could be mitigated in order to assist the Air Force in leveraging its buying power in current and future acquisitions.

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LIST OF ACRONYMS AND ABBREVIATIONS

AMRAAM	Advanced Medium Range Air-to-Air Missile
AVA	Air Vehicle Availability
CICA	Competition in Contracting Act
DT&E	Developmental Test & Evaluation
DoD	Department of Defense
EMD	Engineering and Manufacturing Development
FAR	Federal Acquisition Regulation
FMC	Full Mission Capable
FPDS	Federal Procurement Data System
FY	Fiscal Year
GAO	Government Accountability Office
ICD	Initial Capabilities Document
LCSP	Life Cycle Sustainment Plan
LRIP	Low Rate Initial Production
MC	Mission Capable
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Program
MDD	Material Development Decision
MSA	Material Solution Analysis
NCMA	National Contract Management Association
O&S	Operations and Support
P&D	Production and Deployment
RDT	Resource Dependence Theory
RFI	Ready for Issue
RFP	Request for Proposal
SOW	Statement of Work
TMRR	Technology Maturation and Risk Reduction
TRA	Technology Readiness Assessment

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—Josh Cissell

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—Allan Cameron

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I. INTRODUCTION

The purpose of this chapter is to provide an introduction to our study. We provide a background, along with the purpose of our research. Next, we examine our research questions. Furthermore, we provide the methodology of our study, followed by benefits and limitations of our research. Lastly, we discuss the scope and organization of our work, and provide a summary of the chapter.

A. BACKGROUND

Since its inception in 1947, the United States Air Force (USAF) has pushed the boundaries of aerospace limits, dominated the airspace above many U.S. conflicts, and maintained the information advantage in support of U.S. military operations around the world (Air Forces Cyber, n.d.). To succeed in the mission of the organization, the Air Force depends on its military and civilian employees, as well as contractors. With regard to contractors, the defense industrial base is large. Many firms can theoretically provide the vast amount of supplies and services sought by the Air Force. Yet, defense industry consolidation has led to less competition in the case of Air Force major weapon system acquisitions.

Current acquisition practices and heavy reliance on original equipment manufacturers for weapon system procurement and sustainment restrict the Air Force to a select group of contractors. The majority of weapon system contract awards to these contractors are non-competitive contract awards. By awarding a great portion of contract dollars to a select group of contractors, we become heavily dependent on an oligopolist group. In fiscal year 2018, the Air Force spent roughly \$71 billion on supplies and services. Of this amount, 41 percent was awarded to four contractors alone, indicating the Air Force's huge dependence on a select proportion of defense contractors (AFBIT Lite). The Air Force's buying power is reduced in these non-competitive contracts due to its dependence on these contractors and misaligned objectives between the Air Force and contractor. Within the contractual relationships with the individual companies of the oligopoly, cost, schedule and performance issues are frequent problems.

B. PURPOSE OF RESEARCH

The purpose of our research is to understand if the Air Force can better leverage its buying power in non-competitive environments, with special emphasis on the pre-award phase as well as the post-award phase for contracts post Milestone B on Major Defense Acquisition Programs. Our study explores economic and management theory, acquisition practices on the F-35 and KC-46 acquisition programs, and Air Force spending to examine how the dynamics involved within our research impact non-competitive acquisition programs. Through highlighting these dynamics, we bring attention to methods that should be considered by acquisition professionals in current and future acquisition programs.

C. RESEARCH QUESTIONS

The dynamics of the non-competitive environment are quite complex. Our research questions are as follows:

- How can the Air Force better leverage its buying power for supplies and services in non-competitive acquisitions?
- How can the Air Force change the non-competitive environment to a competitive environment, in essence changing the environmental construct?

D. METHODOLOGY

We reviewed several Government Accountability Office reports and Department of Defense Inspector General Reports to find common themes across different acquisition programs. We centered our case analysis on the F-35 and KC-46 acquisition programs. We chose these programs because they are high profile acquisitions in the Air Force's portfolio and both are recorded as having cost, schedule, and performance issues.¹ Within each respective acquisition, we highlight practices that potentially enable further cost, schedule, and performance issues rather than prevent them. For the F-35, we analyze concurrent

¹ The F-35 program is a joint acquisition program between the Air Force, Navy, and Marines Corp, as well as international partners.

design and production, as well as supply chain management and incentives. For the KC-46, we examine aircraft production and contract financing. In addition, we conducted a spend analysis of 2018 data to examine where money was spent within Air Force contracting, any centralized recipients of spend, and if the contract awards were competitive or non-competitive.

E. BENEFITS AND LIMITATIONS

Our research benefits acquisition personnel through highlighting aspects commonly found in non-competitive acquisitions. We recognize that some acquisition professionals are aware of such acquisition dynamics. However, our research and analysis may serve for some as an alternative perception to the dynamics. The external validity of our research is perhaps because we are extrapolating findings based on the specific case studies we have analyzed. For example, our programs of analysis consist of aircraft programs, and more specifically issues within these aircraft programs that reflected characteristics of our academic theories. However, we propose that the discussed theories and practices will occur on any major Air Force non-competitive program.

F. SCOPE AND ORGANIZATION

Our research addresses reasons why most major defense acquisition programs become non-competitive and the factors of behavior that can occur within non-competitive programs. Our analysis led us to identify practices that can mitigate a contractor's unwanted behavior while they are acting on behalf of the Air Force. In addition, we provide recommendations that can foster competition in these programs and future programs.

Our paper is comprised of five chapters. Chapter I consists of a background, the purpose of our research and questions we sought to answer, our methodology, and lastly benefits and limitations of our research. Chapters II is an institutional background on acquisition and contracting. Chapter III is a literature reviewing that provides insight to economic and management theories prevalent in non-competitive acquisitions. Chapter IV is our case analysis with supported findings and discussion. We discuss potential pre-award practices to improve the Air Force's buying power and highlight findings of our analysis of F-35 and KC-46's noted issues, making recommendations on practices and procedures

that can help mitigate these issues. Lastly, Chapter V is our summary, conclusion, and provides recommendations for further research.

G. SUMMARY

In summary, this chapter has discussed a background of our research. Additionally, the purpose of our research is to explore non-competitive contracting to answer our research questions. Our methodology consists of analyzing cases within the F-35 and KC-46 programs, researching Government Accountability Office (GAO) and DoD Inspector General reports and other literature, as well as conducting a spend analysis. The benefit of our research highlights common dynamics in non-competitive acquisitions for acquisition professionals to consider when performing their responsibilities. Lastly, we covered the scope and organization of our study. In the next chapter, we discuss an institutional background on acquisition and contracting practices.

II. ACQUISITION AND CONTRACTING INSTITUTIONAL BACKGROUND

A. INTRODUCTION

This chapter discusses two life cycles, the Major Defense Acquisition Program (MDAP) life cycle and the contracting life cycle. This chapter describes regulations and practices that contribute to non-competitive acquisitions from a procurement policy perspective. We are unable to cover every detail of why non-competitive acquisitions occur due to the web of internal and external factors that drive acquisitions to be non-competitive. However, we highlight a number of factors that contribute to the non-competitive environment, including the winner-take-all award process, the proper structuring of the contract, and data rights in particular.

The discussion of the MDAP life cycle outlines the details of each of its phase within the life cycle. There are major defining points within most developmental MDAP life cycles where a competitive environment becomes non-competitive. Typically, this occurs at the Milestone B decision, a decision point that allows an acquisition to continue into the engineering and manufacturing development phase where weapon system designs are further matured and tested. The Milestone B decision point has been a winner-take-all decision point on many MDAP developmental acquisitions, such as the F-22 and F-35 programs. In the winner-take-all scenario, the winning offeror's design is usually proprietary, and thus limits the government's use of the proprietary data in qualifying additional sources to increase competition and strengthen the government's buying power. Since data is typically proprietary, it leads the government to use exemptions to the Competition in Contracting Act (CICA), allowing them to solicit a single source to fulfill requirements instead of soliciting the entire market. Soliciting a single source reduces the buying power of the government. In these situations, it is imperative to perform sound technical evaluation and cost/price analysis to use in negotiation of the contract award. Just as important is the administration of the contract, where both parties perform the terms and conditions of the contract.

Transitioning from competitive to non-competitive results in changes to the acquisition dynamics, more specifically the contract management approach within it, which alters actions within the contracting life cycle. The contracting life cycle is discussed in detail with more emphasis on characteristics akin to non-competitive relationships, rather than breadth on the entire contracting life cycle itself. We begin first with our overview of the MDAP life cycle.

B. MAJOR DEFENSE ACQUISITION PROGRAM LIFE CYCLE

The Department of Defense (DoD) follows DoD Instruction 5000.02 to manage MDAP practices and procedures (Department of Defense, 2017). The MDAP life cycle consists of five phases, from the identification of the needed product to be acquired to the production, deployment, and sustainment of the product. Each phase contains vital steps that contribute to the success or failure of the program. At the end of each life cycle phase, a milestone decision must be approved by the Milestone Decision Authority (MDA) of the program prior to advancing to the next acquisition phase. The decision is a go or no-go type of decision (Department of Defense, 2017). Figure 1 depicts a generic overview of the acquisition life cycle as defined under DoD Instruction 5000.02, Operation of the Defense Acquisition System. We will provide a brief overview of each of the five phases to allow for better comprehension of acquisition practices.

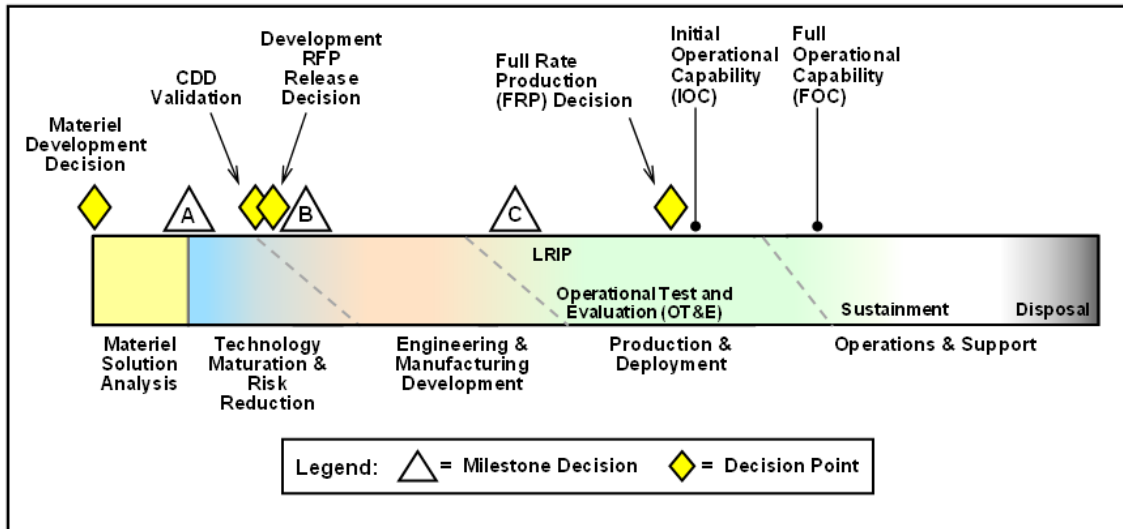


Figure 1. Hardware Intensive Program Generic Model. Source: Department of Defense (2017).

1. Material Development Decision

Prior to starting a MDAP, the MDA makes a material development decision (MDD) based on a validated initial requirements document, known as the Initial Capabilities Document (ICD). This document contains the needs as documented by the end-user of the needed product. The MDD is the decision that a new product is needed, but further analysis of alternative solutions will occur. The analysis of alternatives assesses potential material solutions other than a new development that could potentially satisfy the needed capability described in the ICD (Department of Defense, 2017). An example would be modifying the characteristics of existing weapon systems to meet the required need. Following the MDD, the MDA may tailor their respective MDAP in the most effective and efficient structure possible, to include skipping phases, unless constrained by statute (Defense Acquisition University, 2019). However, each phase of the acquisition life cycle will be discussed in a summary manner to highlight the practices and procedures of the respective phase.

2. Material Solution Analysis

If the MDD is approved, the Material Solution Analysis (MSA) phase is initiated. The MSA is essentially the risk identification and reduction phase. During this phase, the

product's concept is captured through analysis and other activities. An example would be a gap analysis of what is currently capable in terms of design and performance and what is further needed in terms of development. The capability gaps are translated into system-specific requirements to better support decisions in the acquisition strategy. In addition, an analysis of alternatives is conducted, trade-offs between cost, schedule, and performance qualities are generated, as well as risk analysis and mitigation planning (Department of Defense, 2017). When the necessary analysis and activities conducted have been completed, a decision must be made by the MDA to allow the acquisition to continue into a subsequent phase. The decision to exit the MSA phase is known as Milestone A.

3. Technology Maturation and Risk Reduction

The Technology Maturation and Risk Reduction (TMRR) phase includes a mix of activities to reduce technology, integration, engineering, and life cycle cost risks (Department of Defense, 2017). During the TMRR phase, capability requirements are further developed and validated, and affordability caps are finalized (Department of Defense, 2017). Technology Readiness Assessments (TRA) are conducted to set benchmarks on the product's needed performance capabilities, or key performance parameters (KPP). Risk reduction is achieved typically through competitive prototyping of the product between prospective offerors in the TMRR phase.

Three major decisions are needed within this phase to allow for further phases to occur. Once major cost and performance trades are completed and the appropriate risk reduction procedures have taken place, a decision is needed to validate the Capabilities Development Document. This decision point is known as the Requirements Decision Point (Department of Defense, 2017). After the Requirements Decision is approved, the Development Request for Proposal (RFP) Release Decision Point comes next. The Development RFP decision is based on a review of technical requirements, an acceptable level of affordability, and the executability of the acquisition strategy based on a sound business and technical approach (Department of Defense, 2017). Specific attention is given to affordability, competition strategy, framing of performance incentives, source selection evaluation factors as well as other parameters that will influence the overall success of the

program in future phases (Department of Defense, 2017). If the Development RFP decision is approved, the solicitation will be posted for prospective offers to respond to, with the contract typically being awarded to the winning offeror directly after Milestone B decision approval, the last decision in the phase, and entrance into the subsequent Engineering and Manufacturing Development phase. A current example of an Air Force acquisition in the TMRR phase is the Ground-Based Strategic Deterrent program.

4. Engineering and Manufacturing Development

The Engineering and Manufacturing Development (EMD) phase is the phase in which the winning offeror of the Development RFP, in coordination with the government, is tasked to develop, build, and test a product (Department of Defense, 2017). It is at this point, where developmental MDAPs typically become non-competitive due to the winner-take-all approach for these types of programs. After the approval of Milestone B, the EMD contract is awarded, and the acquisition program baseline is established (Department of Defense, 2017). This baseline establishes a benchmark to measure contractor performance in terms of cost, schedule, and performance using data metrics, typically using Earned Value Management. Earned Value Management is a technique that relates actual work costs and schedule to the baseline contract projected cost and schedule.

The EMD phase contains developmental test and evaluation (DT&E) that provides feedback to the program office on progress of the design processes and the product's conformance to contract terms and conditions (Department of Defense, 2017). DT&E also provides insight into if the contractor is able to support initial production and deployment efforts (Department of Defense, 2017). The EMD phase is complete when: the design is constant, the product meets the required capabilities demonstration through prescribed test points, the contractor demonstrates its ability to successfully scale manufacturing through its processes and procedures, and all exit criteria of the phase has been met (Department of Defense, 2017). At this point, a decision must be made at Milestone C to enter low-rate initial production (LRIP) in the Production and Deployment Phase. A recent example of an acquisition in this phase is the Air Force's Combat Rescue Helicopter program (Oakley, 2019).

5. Production and Deployment

The Production and Deployment phase (P&D) is initiated by the MDA through an approval at the Milestone C decision point. During P&D, the product is produced initially in low-rate increments within the LRIP portion of the phase and fielded to end-users for operations (Department of Defense, 2017). LRIP allows for manufacturing processes and procedures to be improved by better learning. Moreover, production rates can be increased incrementally to the desired rate of full-rate production. In addition, it allows for correction of potential discrepancies before going to full-rate production (Department of Defense, 2017). The government conducts further testing to simulate the products capabilities under real world threat scenarios. This testing is known as Operational Test and Evaluation. When validation of manufacturing processes and operational test points have occurred, the MDA will determine whether to proceed to full-rate production (Department of Defense, 2017). Upon approving full-rate production, the contractor will manufacture the product at its full capacity in accordance with contract requirements. The KC-46 program is currently in the P&D phase (Oakley, 2019).

6. Operations and Support Phase

The Operations and Support phase (O&S) is the phase of executing product support, materiel readiness and supporting operational activities by end-users, in essence the sustainment of the product that has been developed and manufactured. The O&S phase begins after the P&D decision and is conducted in accordance with the MDA approved life cycle sustainment plan (LCSP) (Department of Defense, 2017). The LCSP is a living document, meaning that it can be revised to incorporate technology changes, evolving threats, fiscal constraints, new operational uses, and other influences that can occur throughout the life cycle of the weapon system (Department of Defense, 2017). O&S also contains the disposal requirements of the system at the end of the system's useful life (Department of Defense, 2017). Several of the Air Force's legacy weapon systems are in the O&S phase, to include the F-15, F-16, and A-10 aircraft.

7. Acquisition Life Cycle and Competition

As previously mentioned, winner-take-all awards occur on many developmental MDAPs. When soliciting for the latest weapon system need, high-technological programs have significant initial investment costs, limiting the Government from pursuing dual sourcing due to limitations on investment dollars to develop a second source of supply or service (Wydler, Chang, & Shultz, 2012). This results in a winner-take-all situation, usually at the Milestone B decision or the end of the material solution analysis phase; the winning contractor's initial design proposal is chosen for further design, and research and development costs for these products are largely subsidized by the Government (Driessnack & King, 2004). The winner-take-all approach affords a very strong monopolistic power to the winner, due to future contracts resulting in sole-source contract actions. The power endowed to the winning contractor typically lasts throughout the life cycle of the weapon system, which can be decades, largely due to proprietary data, high barriers to entry, and the government's unwillingness to shoulder re-investment costs to another design once a decision has been made on the winning design (Wydler et al., 2012).

An example of a winner-take-all program is the Air Force's F-22 program. During the TMRR phase of the F-22 program, seven contractors competed their advanced airframe and propulsion technologies. The competition was for a 54-month demonstration and validation contract (Heberling, Wagner, & Rendon, 1993). Out of the seven, two went on to receive contracts to further their respective airframe designs and capabilities while still in the TMRR phase. At the conclusion of the phase, the Air Force selected Lockheed Martin's F-22 proposal as the winner of the EMD contract and effectively began sole-source relationship for F-22 aircraft requirements (Heberling et al., 1993).

8. Summary

The acquisition life cycle may seem very rigid based on our summary, but it can be quite fluid. As previously stated, the MDA has authority to tailor the acquisition in the most efficient and effective method as he or she sees fit. Also, the life cycle of an acquisition can span many decades, with phases lasting several years. An example of tailoring can be

found on the F-35 Joint Strike Fighter program. The F-35 program is currently producing aircraft in the LRIP phase, but has not yet had a Milestone C decision approval, thus it is technically in the EMD phase (F-35 Lightning II JSF Program, 2017). Production is running concurrently with engineering and manufacturing development. To illustrate the span of an MDAP, we will use the F-22 Raptor program. Milestone A was approved in October 1986, Milestone B in June 1991, and Milestone C in September 2004 (F-22 Program Office, 2010). The F-22 program is currently in the O&S phase of its life cycle, and the acquisition has been in effect for 33 years (F-22 Program Office, 2010). Both of these programs were winner-take-all approaches, and both have experienced cost, schedule and performance issues. We next explore the contracting life cycle and how actions within the acquisition life cycle affect it.

C. THE CONTRACTING LIFE CYCLE

The contracting life cycle is a tool to progress through phases within a MDAP, as multiple contracts will be awarded within a MDAP's life cycle. Each phase of a MDAP begins with the awarding of a contract after the MDA's decision approval. The contracting life cycle has three distinct phases; pre-award, award, and post-award. The phases exist for all contracts, however the methods used within each phase may differ depending on requirement, market, and customer. We discuss the parameters of the contracting life cycle to better explain how sole-source relationships are formed and managed within the contract.

1. Pre-Award Phase

The pre-award phase begins with acquisition planning. Acquisition planning involves all personnel responsible for one or more elements within an acquisition. These personnel coordinate and integrate their respective elements into a comprehensive plan to allow the end user's need to be satisfied in terms of cost, quality, and schedule (National Contract Management Association, 2017). Within the acquisition plan, there are several inputs to outline the approach to acquiring the need being described. These inputs include what we are buying, potential constraints to consider, estimated life-cycle costs, required

capabilities and performance or delivery period, anticipated risks of the acquisition, and lastly the contract management plan of action (National Contract Management Association, 2017). The contract management plan warrants further discussion, since it takes into consideration all inputs within the acquisition plan and addresses how to approach the inputs within the contract vehicle.

The contract management plan addresses how the acquisition team, more specifically the contracting officer, will address all of the acquisition team's inputs through contracting processes. The contract management plan covers many areas, but we are choosing to cover certain topics in detail rather than covering each respective area. These topics include market research, statements of work, and technical data rights. All three play a pivotal role in maximizing competition when soliciting firms for the government's requirement.

a. Market Research and Statement of Work

Market research is the collection and analyzing of current and relevant information regarding market capabilities to satisfy the agency's need (FARsite, n.d.). Through market research, capable and responsible firms are sought and identified to provide the goods or services needed. Market research will highlight if competition can be conducted between firms in the market, as well as if the agency's need can be satisfied through commercially available goods or services (National Contract Management Association, 2017). The Competition in Contracting Act governs competition in federal procurement contracting (Manuel, 2011). This codified law is referenced as the policy that drives the Federal Acquisition Regulation's (FAR) prescription of policy and procedures for full and open competition (FARsite, n.d.). FAR Part 6, titled Competition Requirements, prescribes that agencies conduct business in a manner that promotes full and open competition and acquire commercial items or nondevelopment items when they are available to meet the needs of the agency (FARsite, n.d.).

According to the National Contract Management Association (NCMA) (2017), the statement of work (SOW) describes the government's needed goods or services in detail. To promote full and open competition, the government must ensure that its SOW is written

in a manner that allows for as many vendors as possible to complete the tasks described within it. If the SOW is written too descriptively in terms of specifications, processes, and/or procedures, it could obstruct competition (National Contract Management Association, 2017). Therefore, NCMA describes SOWs should be general in nature, defining the boundaries of expected actions, performance, or products required, adding that it should be written in a complete, clear manner that will bolster competition. Furthermore, SOWs can incorporate reference documents to further explain the needed requirements expressed in the SOW (National Contract Management Association, 2017). When incorporating reference documents, contracting professionals should ensure the references are free of restrictions that could limit competition as well.

There are instances where market research will indicate only one source is capable to fulfill an agency's need. This exception to full and open competition is allowed under CICA when supplies or services required are provided by a single supplier or only one supplier possesses the capabilities to fulfill the requirement (Manuel, 2011). There are seven exceptions to full and open competition allowed (Manuel, 2011), but we choose to explore the only one source exception as it is the most used exception in non-competitive contracting (Adame & Markling, 2018). This exception usually occurs when specific capabilities are required, and only one firm possesses the technical data rights to the particular product being acquired.

b. Data Rights

The FAR states, "Technical data is recorded information, regardless of the form or method of recording, of scientific or technical nature" (FARsite, n.d.). Technical data can include trade secrets pertaining to items, components, or processes (National Contract Management Association, 2017). Typically, a firm possesses technical data rights because it developed the data using independent funding, not government funding. If technical data is generated during work being performed on behalf of the government, the government's rights to the data will be expressed through a data rights clause (National Contract Management Association, 2017). The government's possession of technical data rights ascertains the right to use said data without limitation and ensure immunity from copyright

infringement or misuse of data lawsuits (National Contract Management Association, 2017).

The data rights of the government are expressed in three types. The first is restricted rights, where the rights of the government are restricted entirely (National Contract Management Association, 2017). The second is limited rights, which permits the government to use the data in a capacity to the extent agreed upon between the parties (National Contract Management Association, 2017). The last is unlimited rights, where the government has the full right to use the data in any manner or purpose, including permitting other parties to use the data (National Contract Management Association, 2017).

For the majority of acquisitions, including MDAP acquisitions in the beginning phase, initial market research will highlight two or more offerors capable of fulfilling the requirement. This results in competition for contract award, which will lead to better overall pricing in the buyer's favor. Competition in MDAP acquisitions will occur during the MSA phase by way of competitive prototyping and demonstrations of conceptual processes and procedures. However, for MDAP development efforts, the awarding of the subsequent development contract at the beginning of the EMD phase is typically a winner-take-all situation based on the high investment costs by the Air Force and contractor to enter development of specialized products. At this point is where many MDAPs become sole-source relationships for the production and sustainment of the product due to the government's limited or restricted rights in using the data produced in the development of the product and its processes. The data rights are retained by the prime contractor or the prime contractor's sub-contractor if the supplier uses independent funding in generating the data for its work on the final product. When the government does not possess permission to use the technical data, it is unable to qualify additional sources of supply in support of producing or sustaining the product. Therefore, the government is limited to contract only with the prime contractor or its sub-contractors directly for support.

2. Award Phase

The award phase involves all work between the government and selected offeror to generate the contract (National Contract Management Association, 2017). Generating the

contract includes multiple efforts in establishing the structure of the agreement, what we will call rules. These rules will structure each contract, and depending on the characteristics of these rules, will result in a simple or complex contract. Our study centers on sole-source contracts. Sole-source contracts can be simple or complex, where complexity depends on the rules defining the agreement. To begin, we start with a general overview of receiving proposals, discuss the rules that structure a contract, and final negotiation during the award phase.

a. Evaluation of Proposal

At the beginning of the award phase of the contract life cycle, the government receives one or more proposals in response to the solicitation. When multiple proposals are received in response to the RFP, it generates competition that exists for the ensuing award. Such is the case when the government receives proposals for competitive prototyping in the TMRR phase or development in response to the EMD RFP at Milestone B. Each proposal will be evaluated against the evaluation factors described in the government's solicitation, which provides industry with expressed factors of what the government deems most important to least important when evaluating proposals. Yet, we are discussing non-competitive contracting, which means only one proposal is provided and considered for contract award, such as proposals received after the initiation of the EMD phase in winner-take-all development MDAPs. With such, evaluation will occur of the single offeror's proposal, but it will consist of a technical evaluation in conjunction with a price analysis and/or cost analysis. The award terms and conditions will be negotiated based on the findings of the technical evaluation and price/cost analysis. But prior to finalizing the contract negotiation, it is paramount that rules are established to give structure to the agreement (Brown, Potoski, & Van Slyke, 2013).

b. Rules Structure

To form a contract, three sets of rules must be established. These three rules are products rules, exchange rules, and governance rules. Each play an important role in executing a contractual agreement between the government and contractor. The nature of the rules will result in contracts that are considered simple or complex (Brown et al., 2013).

Simple and complex contracts require different approaches in contract execution and administration. Contracts are deemed simple when the agreement has clearly understood product, exchange, and governance rules. Complex contract's product, exchange, and governance rules are not clearly understood. Simple contracts allow for an easier achievement of a win-win outcome due to the understanding of the parties and the ease of entering and exiting the transaction (Brown et al., 2013). Complex contracts are more likely to result in losing exchanges due to the incomplete information about the product (Brown et al., 2013). Our overview of these rules is not all encompassing, but serve as a brief overview of each.

The first are product rules, which define the characteristics and capabilities of the requiring product. Products are deemed simple when the required final product's features, qualities, and performance targets are well-defined, while complex products consist of the same but are not defined or are less defined (Brown et al., 2013). Product rules can be defined prior to award or after award, but usually they are defined in some manner within the SOW that accompanies the offeror's proposal. Complex products will exist when the government is not entirely sure of what the exact capabilities need to be, only the outcome they wish to receive with the finished product (Brown et al., 2013).

The second set of rules are exchange rules. Exchange rules specify what is required of both parties in executing the agreement (Brown et al., 2013). Simple exchanges demonstrate high levels of certainty by both parties in understanding the requirement (Brown et al., 2013). Complex exchanges demonstrate low levels of certainty of the requirement, and require a high level of specialized investments by both parties to execute the agreement (Brown et al., 2013). In regard to government contracting, exchange rules can be thought of as contract's terms and conditions, containing the contract's price, how the contractor will be compensated for performance, the required delivery dates or period of performance, as well as other defining attributes such as the contract type being used. Contract type selection is very important in structuring the exchange of the complex contract. Certain types of contracts allow different types of governance rules to be implemented with the contract type chosen. Incentive type contracts allow for governance rules to be structured to promote collaboration between the government and contractor.

The last set of rules are governance rules. Governance rules are mutually agreed upon rules to guide the government and contractor's relationship in the contract's execution (Brown et al., 2013). Governance rules serve to structure incentives so that cooperation becomes both individually and collectively beneficial for both parties, fostering a win-win outcome. Incentive type contracts play a pivotal role in governance rules, as selecting an incentive type contract allows for the government to incentivize areas it seeks to motivate. These areas can be inputs by the contractor, outputs by the contractor, or the outcome desired by the government (Brown et al., 2013). Usually, within government contracting, we incentivize contract cost, schedule, and performance, which are all outputs, and the government typically uses money as an incentive.

Regardless of what the government is choosing to incentivize, it is imperative that the structure of the incentive is clear and unambiguous, even if the product and exchange rules are not. First, successful performance incentives must clearly define standards of behavior so that the government and contractor have a common understanding of what will be rewarded and the dollar amount of the incentive. Second, the desired standards should have the ability to be objectively measured and understood by both parties. Lastly, in order to promote win-win outcomes, performance incentives must be structured so that cooperative behavior is rewarded and uncooperative behavior is sanctioned (Brown et al., 2013). Forming a solid foundation of rules, especially governance rules when product and exchange rules are unable to be defined, will benefit the government in sole-source environments.

c. Negotiation

Now that we have received proposals, and have discussed the inherent characteristics of the rules (the government's requirement, the terms and conditions of the contract, and how the parties will promote collaborative interaction in the agreement) we can complete the negotiation of the contract. Negotiation preparation for the government consists of fully understanding the requirement and the critical points that must be captured in the agreement (National Contract Management Association, 2017). Preparation also includes ensuring the composition of the government acquisition team is tailored to the

acquisition. The acquisition team should be composed of functional representatives who are competent and confident in their respective fields. All objectives should be prepared in guidance with achieving the main goal of the contract, providing the end user with its need, on time and on cost.

Negotiating for the government's objectives consists of more than just conducting cost or price analysis of the proposed price. Many of the details captured during structuring the rules of the contract are negotiable, to include the SOW, delivery terms or periods of performance, and incentives (National Contract Management Association, 2017). However, it is equally important that the government forms a negotiation objective that contains a range of acceptable prices. This range will include the actual objective, with an optimistic and pessimistic cap on the objective value (National Contract Management Association, 2017).

When negotiating in the sole-source environment where an expectation of contract award is over \$2 million, the government will most likely request certified cost and pricing data (FARsite, n.d.). Certified cost or pricing data is required over this threshold when no exceptions apply as expressed by FAR 15.403-1(b). Some exceptions to requesting certified cost and pricing data include adequate price competition exists (more than one firm has proposed), prices are set by law or regulation, or the item being procured is commercially available (FARsite, n.d.). Certified cost or pricing data is cost or pricing data provided by the offeror that states to the best of the party's knowledge, the data is current, accurate, and complete as of a date certain before contract award (FARsite, n.d.). This data, in conjunction with a thorough technical evaluation of the proposal, will help in the conduction of the negotiation.

Lastly, perhaps an overlooked necessity when discussing negotiation is bargaining skills. It is paramount the government acquisition team has competent and confident professionals. Perhaps most important is the principal negotiator being competent or confident in his or her bargaining skills (Defense Acquisition University, n.d.). Many contractors hire personnel who specialize in negotiation. Their experience and expertise can provide perceptions that they are all knowing and in a position of power of the government (Defense Acquisition University, n.d.). However, again with proper

preparation and the right mix of personnel, the government acquisition team will be able to offset this perception of power and level the negotiation playing field. The goal is to reach a consensus that is fair and reasonable to the government and the contractor while fulfilling the end user's need, not to get everything each party desires (National Contract Management Association, 2017).

3. Post-Award Phase

Once the contract award has been made, the post-award phase begins. The purpose of the phase is to execute the contract, which includes a wide swath of activities performed by both the government and contractor (National Contract Management Association, 2017). We will focus on succinctly detailing contract administration and quality assurance, although the post-award phase consists of many other aspects. Contract administration includes tracking and documenting the contractor's performance. Quality assurance is ensuring quality and compliance with contractual terms and conditions (National Contract Management Association, 2017). Contract administration is a shared responsibility of both parties, with the previously structured rules of the contract specifying which party is responsible for duties and obligations (National Contract Management Association, 2017).

Contract administration includes tracking and documenting performance, and monitoring contract compliance with cost, schedule, and performance terms and conditions (National Contract Management Association, 2017). Documentation allows for records of performance in the contract's execution, and will assist in diffusing or arbitrating disagreements that may come up between the government and contractor. Documentation will include written correspondence, e-mails, meeting minutes, and performance reports (National Contract Management Association, 2017). Documentation can also serve as indications of cooperative or uncooperative behavior when adhering to previously agreed upon governance rules. Tracking and documentation are a byproduct of the many functions performed under the contract, especially when ensuring quality conformance.

Ensuring quality requires that the contractor provide products or services that are conforming to the mutually agreed upon contract terms and conditions (National Contract Management Association, 2017). There are many tools that assist both parties in their

respective quality assurance programs, which we will not discuss in depth. These tools include six sigma techniques as well as International Standards Organization quality standards (National Contract Management Association, 2017). The inspection and acceptance process of delivered supplies or services is very important in quality assurance (National Contract Management Association, 2017). The contract expresses what requirements must be met for a product or service to be accepted by the government. The inspection and acceptance process allows for the government to be confident it is receiving what has been paid for, and allows for the government to invoke agreed upon practices and procedures should the product or service provided not meet contract requirements (National Contract Management Association, 2017) These practices and procedures may include not accepting the product, as well as rework or repair of the nonconforming products with rules of how the cost of such should be handled (National Contract Management Association, 2017).

When nonconforming products are of a significant nature, the government can select between two options. The first is the government has the right to reject the product, forcing the contractor to correct deficiencies prior to government acceptance and subsequent payment. The second is the government accepts the product as is and modifies the agreement to provide for an equitable price reduction or other consideration (FARsite, n.d.). If the government accepts nonconforming product without a price adjustment or consideration, it is incentivizing uncooperative behavior in the relationship. This behavior diminishes the government's buying power in the relationship.

4. Summary

The contracting life cycle is filled with many activities that ensure successful acquisitions. Each phase is important for the government, but perhaps the most important are all of the activities that occur prior to contract award. If a solid contract foundation is not formed prior to award, the administration of the contract will not be successful. Unclear and undefined rules occur as every detail of non-competitive complex contracts are impossible to document; however, acquisition professionals should strive to strengthen the foundation as much as possible and invoke solid governance rules to the agreement to

foster contract success. In addition, both parties should be accountable to itself and to each other, and hold each other accountable. The contract is an instrument of fair agreement, and it is the responsibility of both parties to identify and prevent situations that allow perceptions or realizations of unfairness to occur. Failure to prevent these situations will weaken the government's buying power, thus weakening its readiness and lethality. In our next chapter, we discuss economic and management theories that inform contracting in the non-competitive contracting environment.

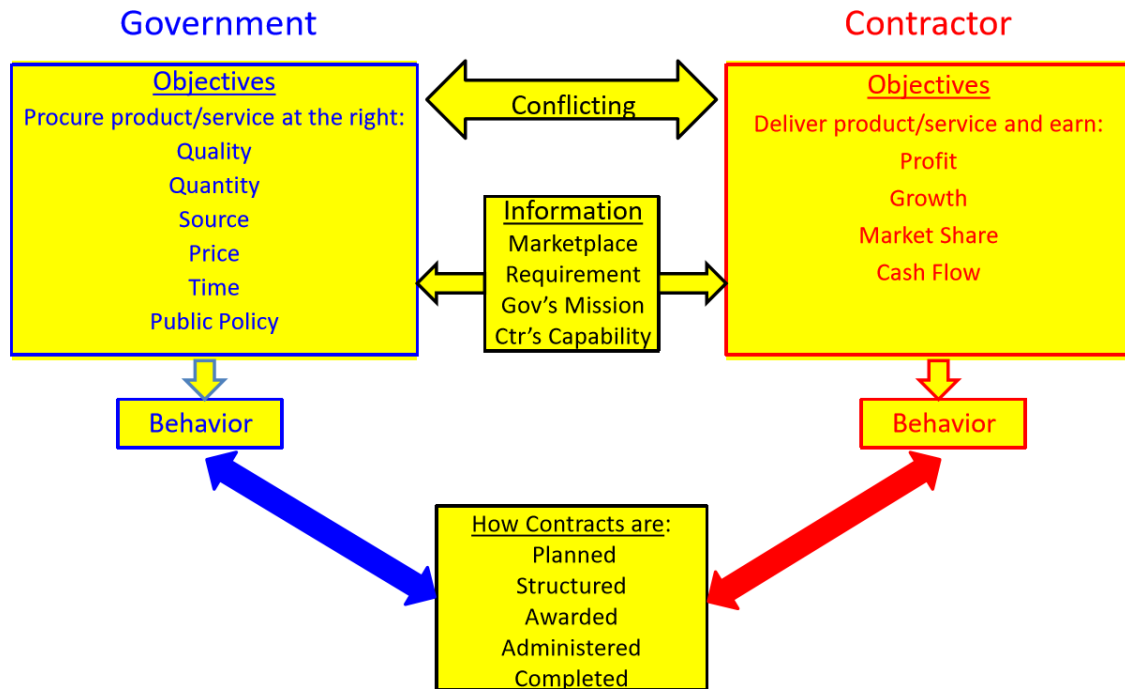
III. THEORY-BASED LITERATURE REVIEW

This chapter examines economic and management theories that inform the dynamics of the Air Force acquisition realm. We have chosen one economic theory and one management theory to explore further. The economic theory we examine is principal agent theory, which emphasizes shortcomings and characteristics of one party acting on behalf of another. The management theory is resource dependence theory, which concentrates on the dependence of interacting organizations and how the dependence interactions drive decisions the organization makes (Pfeffer & Salancik, 1978).

A. PRINCIPAL-AGENT THEORY

Principal-agent relationships translated to a market interpretation can be construed as the relationship between a buyer, acting as the principal, and a seller, acting as an agent of the principal, where a seller is contracted to perform services or perform a task on the buyer's behalf (*Collins Dictionary of Business*, n.d.). In terms of government contracting, the government is the principal, and the contractor is the agent. The theory expands on the dilemma that arises when a principal hires an agent to act on the principal's behalf (Polutnik, 2015). The dilemma implies that a rational principal and agent will act on an assumption of self-interest, therefore an agent will be motivated to serve its own benefit. In the case of the agent, their self-interest is to maximize profitability whereas the principal's desire is to receive a quality product or service. The principal-agent relationship should promote consummate behavior between the parties; however, an outcome of perfunctory behaviors can be exhibited in cases of adverse selection and moral hazard. Figure 2 illustrates examples of conflicting government and contractor objectives within the principal-agent problem (Rendon, 2011).

Agency Theory (The Principal-Agent Problem)



(Rendon, R.G., 2011)

Figure 2. The Principal-Agent Problem. Source: Rendon (2011).

Adverse selection results from information asymmetry, or the hiding of information, between the principal and agent (McAfee & McMillan, 1986). Adverse selection in government contracting is a pre-award risk. An example within government contracting could be an offeror withholding bid information or “low-balling” a bid in attempt to receive the award. However, the prospective agent understands a contract modification will be needed after contract award to incorporate additional work. Should the agent receive the award on account of their low bid, the agent can receive additional money via the needed contract modification while holding substantial negotiation leverage due to the contract now being in a non-competitive environment. Proper market research can mitigate risks of adverse selection.

Moral hazard is essentially the hiding of behavior by the agent due to knowing principals will not approve of such (McAfee & McMillan, 1986). When the agent is motivated by profit optimization, moral hazard becomes an increasingly relevant issue within the principal-agent framework. Moral hazard in government contracting is a post-award risk. A basic example of moral hazard in government contracting is the government not having the ability to perfectly monitor a contractor's production effort. This could potentially allow the contractor to cut corners on processes or not performing all required work, but still charging the government full price for such. Proper incentives must be placed into the contract to motivate consummate behavior and sanction perfunctory behavior (Brown et al., 2013).

In order to alleviate the risk of moral hazard and other negative outcomes within a principal-agent relationship, the principal must understand the primary motivation of the agent. From an economic perspective, the agent is typically motivated by an outcome of increased cash flow, profitability or other forms of equity (i.e., shareholder stake). From a political perspective, the agent (a legislator) would be motivated by his or her constituents or voters, which serves as a basis for political platform development (Holcombe & Gwartney, 1989, p. 669). The principal must understand these drives when developing their relationship so as not to create a moral hazard dilemma or incentivize an undesired behavior.

Another outcome that can be damaging to the principal-agent relationship is known as a "Post-Decisional" outcome. From a theory standpoint, the "Post-Decisional" outcome is where a decision is forced upon the principal without allowing the principal to alter or adjust a decision (Zimm, 2001, p. 25). Such an instance could be from an issued order, a regulation, Congressional milestones or other unavoidable decision-making points. The risk of the "Post-Decisional" outcome is the principal could be motivated to adjust or "spin" any outside influence if the report, study, or regulation is not within their favor (Zimm, 2001, p. 25).

In principal-agent relationships, mitigation of moral hazard is paramount through either risk consideration or strategic planning on long-term contracts. When the principal does not adequately assess their agent's long-term motivation, the reliance on the agent can

lead to increased costs at lower quality. For example, a RAND Report conducted in 2015 on *Identifying and Managing Acquisition and Sustainment Supply Chain Risks* determined that Air Force acquisition personnel do not provide necessary risk consideration to the prime contractor's supply chain upon acquisition of a major weapon system (Moore, Lored, Cox, & Grammich, 2015). The O&S acquisition phase, which contains sustainment operations, is usually many years after development of the major weapon system and the final phase of an acquisition life cycle. The report identified numerous issues with sustainment requirements. By the time the O&S phase is reached, most programs face sole-source contracting environments for specific elements and parts. Therefore, sustaining the product usually facilitates increased risk to the principal in terms of cost and timeliness (Moore et al., 2015). Due to increased outsourcing, just-in-time purchasing and lean inventory requirements, the Air Force does not have a robust supplier base from sub-tier suppliers during O&S phase of a weapon system's life cycle. Major weapon system acquisitions would receive long-term benefits through increased oversight and risk consideration when considering timely logistics and pre-award analysis of an offeror's supply chain capabilities.

B. RESOURCE DEPENDENCE THEORY

Resource Dependency Theory (RDT) provides provocative insight into the dependencies between the government, its relationship with contractors, and the defense industry. The foundational definition of RDT is the relationships between organizations and the interdependencies that stimulate certain decisions based on their resources (Pfeffer & Salancik, 1978). RDT denotes the importance of an organization's survival. For example, (Pfeffer & Salancik, 1978, p. 2) state, "the key to organizational survival is the ability to acquire and maintain resources." If an organization cannot maintain or secure resources through transaction, then the organization is rendered capably ineffective as related to the environment and its subsequent limitations. "Organizational effectiveness is an *external* standard of how well an organization is meeting the demands of the various groups and organizations that are concerned with its activities" whereas efficiency is the *internal* measure of an organization's input to output of resources (Pfeffer & Salancik, 1978, p. 11).

For example, the Air Force's acquisition effectiveness can be evaluated through interest groups such as the taxpayer, Congress, the defense industry, and global influence as compared to its foreign counterparts. However, the Air Force's measure of acquisition efficiency is evaluated internally based on received product (input) to dollars spent (output) or an Independent Government Estimate (input) as compared to the award of the contract valuation (output). Another measure of acquisition efficiency for the Air Force could also be evaluated by its achievement of quality, such as fully mission-capable aircraft within a standardized timeframe after receipt from a contractor, or contracted supplies meeting requirement standards of a product in general. The difficulty in an organization is determining the difference between effectiveness and efficiency.

When evaluating the effectiveness of an organization, a key concept is the environment that influences the organization. For organizations with increased interdependency of many external organizations, such as the Air Force, the visibility of its interdependency can lead to a problem of organizational management and relationships with external organizations (Pfeffer & Salancik, 1978). For an organization to thrive, if not survive, the interdependency of the organization and its environment is critically important. Specifically, from an acquisitional perspective, the mission of Air Force acquisition is to deliver cost effective capability to the warfighter. In order to achieve the Air Force's acquisitional effectiveness, the Air Force must rely on the defense industry, in most cases, to develop and provide the necessary technology in order to stay relevant and promote global influence.

Throughout the acquisition life cycle of many Air Force programs, there are multiple external organizations ranging from the defense contractor to Congress to the taxpayer with equity in the Air Force's decisions. However, the differences of goal alignment for these external organizations can lead to an environment of conflicting interests. "That different groups and organizations have different criteria for evaluating an organization, and consequently make different demands of it, makes the resolution of these conflicts not amenable to maximization or other simple computations." (Pfeffer & Salancik, 1978, p. 93).

In order to better optimize organizational effectiveness, academic researchers recommend multiple strategies to mitigate environmental conflict. The general strategies typically are to either avoid the conflicting environment or change the environmental construct (Pfeffer & Salancik, 1978). For the Air Force, especially within a non-competitive environment, the strategy of avoiding dependence is not feasible with the defense industry as the defense industry and the Air Force are symbiotically intertwined. Therefore, the RDT would lend credence to the assumption that an alteration of the environment would best optimize the effectiveness of the Air Force acquisition life cycle. “If the organization and the environment must be mutually compatible, then either the organization can change or the environment can be changed” (Pfeffer & Salancik, 1978, p. 107). For any acquisition program, a change in the environment could constitute a plethora of different solutions ranging from additional competitors from the initial competition, to renegotiation of the contract type, type of financing payments, incentives, or other forms of consideration. An analysis into these different types of actions can lead to increased effectiveness of the respective program.

C. SUMMARY

Principal agent theory and resource dependence theory are prevalent in the Air Force non-competitive environment. The Air Force must properly incentivize its agent to execute the contract to the required standard, not only through the terms and conditions of the contract but also through its behavior and actions during contract administration. Prior to contract award, the Air Force must take into account its interdependency on specific organizations for specific capabilities. How can it change the environment of the interdependence, and in doing so, can it increase its buying power in the existing relationship? In the remaining chapters, we will look at how the aforementioned theories, as well as contracting practices from Chapter II affect specific Air Force acquisition programs. Additionally, we will examine lessons learned and possible actions/techniques that can lead to increased buying power for the Air Force.

IV. CASE ANALYSIS AND DISCUSSION

A. INTRODUCTION

We have outlined practices and procedures in the acquisition and contracting life cycles. We have discussed two theories that inform contracting within Air Force acquisition programs. This chapter seeks to marry the previously discussed practices and theories with two Air Force acquisition programs, as well as generic acquisitions that have yet to reach a Milestone B decision and entering a non-competitive environment. If you recall from Chapter II, a MDAP non-competitive acquisition program typically begins when the Milestone B decision is approved and the EMD contract is awarded. Our focus is to answer our research questions below:

- How can the USAF better leverage its buying power for supplies and services in non-competitive acquisitions?
- How can the Air Force change the non-competitive environment to a competitive environment, in essence changing the environmental construct?

Through analyzing Oakley (2019), 183 contracts were awarded in 2017 for a total of \$364 billion in support of the 82 programs within the portfolio. The GAO's assessment found 180 were for development and production of supplies or services. Of the 180 contracts, 67 percent were not competed, 31 percent were competed, and 2 percent lacked sufficient information. Furthermore, the GAO assessed that the Air Force awarded 51 contracts for a total of \$132.6 billion. Of the Air Force's 51 contracts, 62 percent were not competed. The majority of the non-competed actions were for production and sustainment efforts, where original equipment manufacturers are heavily relied upon for follow-on procurements and sustainment of their platforms (Oakley, 2019).

Within most major defense acquisition programs, cost, schedule, and performance are measured using Earned Value Management. Cost is measured in terms of comparison to a baseline estimate, and constantly re-evaluated as performance occurs. Schedule is

measured by comparing actual performance progress against proposed schedules to where progress should be at the time of measurement. Performance is measured against specifications written into the contract expressly as well as referenced by governing policy standards and specifications. Cost growth, schedule slippages, and shortfalls in technical performance have remained much the same throughout the past fifty years (Fox, Allen, Lassman, Moody, & Shiman, 2011). Development contracts have averaged 32 percent cost growth since 1993 (not adjusted for inflation) (Schwartz, 2014, p. 5). Our discussion covers methods to consider pre-award to increase the Air Force's buying power. We will then analyze post-award environments of the F-35 and KC-46 programs, as well as the use of incentives on DoD contracts. Different issues arose in these programs with different contractors and at different points. Yet, the end result was the same: higher costs and performance issues.

1. Methods to Increase Buying Power

As previously stated, it is widely documented that MDAP programs continually face cost, schedule, and performance issues. "Since 1997, 31 percent of all MDAPs have had cost growth of at least 15 percent" (Schwartz, 2014, p. 5). MDAP programs are typically technically complex, which triggers high costs and thus identification as an MDAP. However, a program labeled as an MDAP should not automatically insinuate that the program would incur increased costs, untimely schedules, and non-conforming performance issues. Properly incentivizing desired behavior while successfully enforcing the established rules of a contract will decrease instances of increased costs and unwanted performance.

In addition, pushing for relational contracts with contractors can help. A survey with government program managers (PM) found that many of the PMs viewed industry as purely profit-motivated and uncommitted (Goure, 2015). Yet, the two parties are largely dependent on one another, as industry provides specialized products and services and the DoD and its respective services fund the ventures, with the exception of independent research and development efforts undertaken by firms. An essential element of contract execution and administration is establishing and maintaining effective lines of

communication between parties. Productive, two-way communication between contracting parties is imperative for preventing cost, schedule, and performance problems that could result in program failure (National Contract Management Association, 2017). Dr. Ashton Carter referenced the importance of feedback and communication within his Better Buying Power memorandum (Carter, 2010).

a. Industry Consolidation and Technical Data Rights

As of 2009, the defense industrial base has seen many consolidations and mergers, effectively reducing the number of major defense contractors, or firms regarded as prime contractors, from 50 to 6 (Schwartz, 2014). Winner-take-all contracts have contributed to this consolidation (Driessnack & King, 2004). Further complicating the consolidation is the expansive supply chains that support prime contractor performance. These prime contractors depend on their sub-contractors to perform important functions in delivering products and services. The government has restricted access to information and data from the sub-contractors due to privity of contract. In essence, the government has a limited to no relationship with sub-contractors who are performing large portions of work. This limited relationship restricts insight into costs and performance data that would be valuable in contract administration.

Similar to the defense industry in general, the defense aerospace industry is no exception. It has diminished considerably in terms of direct competition of prime contractors in recent decades. At present, it can be argued that three domestic firms are capable of producing defense fighter or bomber aircraft to meet the needs of the Air Force, forming an oligopolistic source of supply for the Air Force. The Air Force spends more on aircraft when evaluating spend under designated product service codes (AFBIT Lite). Centralization of received spending to the previously mentioned oligopoly is illustrated by examining the Air Force's spending for FY18. Figure 3 shows 41 percent of the Air Force's \$71.3 billion spent went to five firms, with two of the five reporting to the same parent corporation (AFBIT Lite).

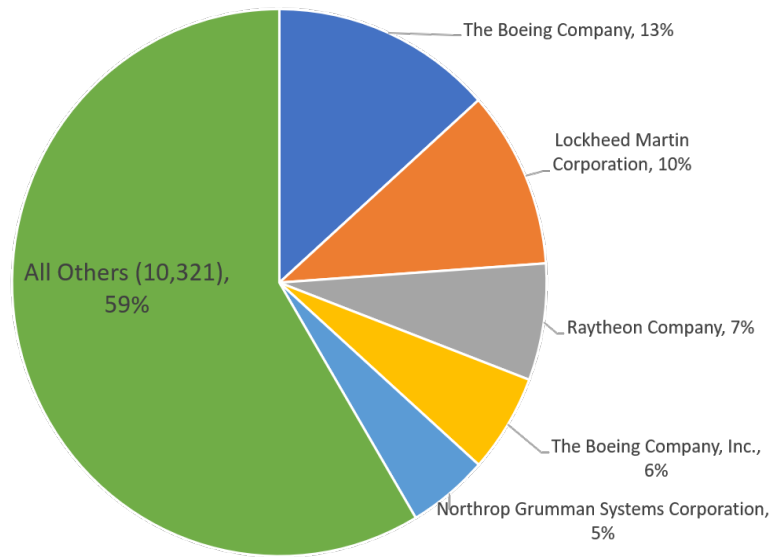


Figure 3. Receipt Percentage of FY18 Air Force Spend.² Adapted from AFBIT Lite (n.d.).

Further evaluation of Air Force spending shows that many of the contract actions comprising the spending were not subject to full and open competition. We calculated using Federal Procurement Data System (FPDS) data that the two largest recipients of FY18 spending, Boeing and Lockheed Martin, received 74 percent and 79 percent, respectively, of their contracts through non-competitive methods. Figure 4 shows competitive data for the four largest recipients of FY18 spending.

² The Boeing Company and The Boeing Company, Inc. are listed due to being subsidiaries to the same parent corporation. Each have their own respective CAGE codes.

FY18 Compete/Non-Compete By Supplier

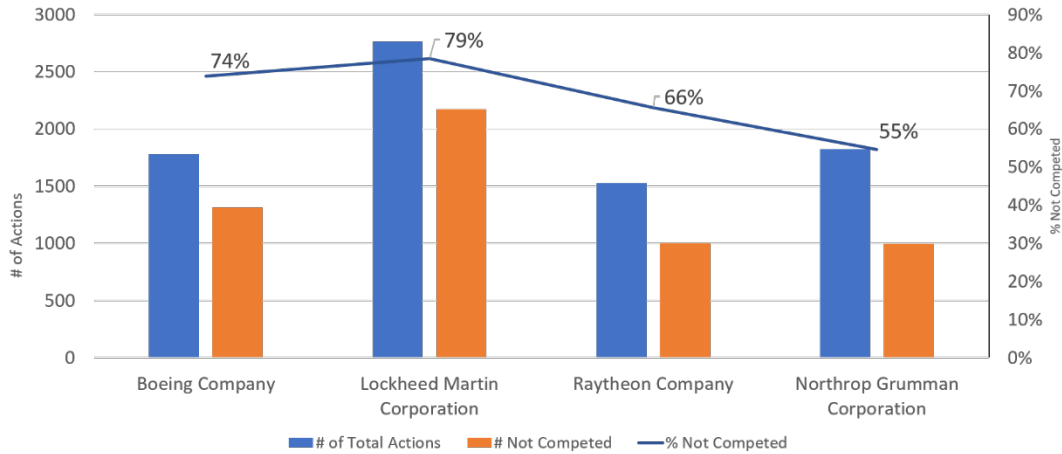


Figure 4. FY18 Compete/Non-Compete by Supplier. Adapted from AFBIT Lite (n.d.).

We argue that this centralized spending is a result of the Air Force’s lack of ability to promote competition within acquisitions on existing programs. We have already mentioned that the level of initial investment needed to dual source programs will not allow for multiple awards on the program, which would produce competition. Another factor influencing no competition is the lack of technical data rights by the DoD. The DoD at large has faced challenges when attempting to secure technical data rights when procuring weapon systems (Maurer, 2019). These challenges include a balancing of the cost to purchase the rights against the data rights needed to perform adequate sustainment in the future (Maurer, 2019). It is hard to predict what data rights will be needed while negotiating pre-Milestone B for activities that can occur many years later in the O&S acquisition phase. Technical data rights affect both hardware and software sustainment within programs. A method to promote future competition is obtaining data rights on programs, which allows for the DoD to operate and sustain weapon systems under evolving technical and operational needs, such as updating maintenance designs, material obsolescence, and diminishing sources of supply (Maurer, 2019). When developing requirements, the acquisition team should perform a cost benefit analysis between procuring data rights or

not and projected sustainment costs with or without access to the data rights. However, we understand that there would be limitations in such analysis, as it would be very difficult to make assumptions on environments well into the future, especially in a world where technology is evolving constantly. A potential solution is to include priced options for data rights in the contract that can be executed later in the program should the government decide they need data rights (Maurer, 2019).

In many existing legacy programs, designs and processes are considered proprietary of the prime contractor or in some cases, its sub-contractors. If the government possessed these technical rights, it would allow the DoD to have the ability to re-compete modernization and sustainment activities to achieve savings in cost (Maurer, 2019). The DoD has begun to take steps to better understand the environments in which technical data rights are an essential need. These steps include the 2016 stand-up of a government-industry advisory panel to review existing regulations on data rights and proprietary restrictions to increase efficiency in government costs, as well as ensure fairness to contractors who have invested resources in the development of the proprietary data (Maurer, 2019). The panel is to deliver a report of recommendations for legislation and policy changes to Congress. The intent of the report and its recommendations is to generate fairness in dealings with government technical data rights and proprietary data. However, this process is ongoing, so we will observe in future scenarios the results gathered through the panel's prospective recommendations.

b. Leader-Follower Contracting

Another method that can instill competition within programs is the concept of leader company contracting, or what we will call leader-follower contracts. The FAR defines leader-follower contracting as an extraordinary acquisition technique that is used only in unique circumstances in accordance with agency procedures (FARsite, n.d.). Leader-follower contracting can occur in situations where a sole-source developer or producer of a product or system is essentially contracted to give assistance and knowledge to a follower company, with the end result being the follower company becoming a secondary source of supply for the product (FARsite, n.d.). Leader-follower contracts can

only be used when no other source can provide the need other than the designated leader company (FARsite, n.d.).

Leader-follower contracting can be considered dual sourcing if prime contracts are awarded to both leader and follower. However, the FAR allows for procedures in which the prime contract can be awarded to the leader, with the exception the leader sub-contracts out a designated portion of the deliverables to the follower company and assist the follower in production (FARsite, n.d.). It can be argued that leader-follower contracting assisted Raytheon in becoming the corporation it has today. In 1982, a leader-follower acquisition strategy was chosen to acquire Advanced Medium Range Air-to-Air Missile (AMRAAM) production (DoD Inspector General, 1992). Hughes Aircraft Company's Missile System Group was the designated leader and Raytheon Company's Missile System Division was chosen as the follower (DoD Inspector General, 1992). The strategy allowed for Raytheon to learn processes for production of the AMRAAM, fostering future competition for the armament between the two companies. Today, Raytheon is a well-known defense corporation that specializes in a host of defense needs, including armament. Through leader-follower contracting, perhaps the Air Force can inject competition into a defense industry that is consistently consolidating.

c. Category Management

Another acquisition concept we wish to cover is category management. The Office of Management and Budget's memorandum on category management describes category management as the business practice of buying common goods and services as an enterprise to remove redundancies, increase efficiency, delivering increased value and cost savings to the government (Weichert, 2019). The concept is centralizing previous decentralized, unaligned spend for commonly procured supplies and services. However, it goes further, as it is just as important to develop relational contracts with contractors to foster cooperation and success in mission support. We feel the definition given by the memorandum is not a complete representation of what category management is. Our definition of category management, by altering the original definition (Weichert, 2019), is the business practice of planning and generating the enterprise's current and future

requirements of goods and services collectively in conjunction with industry capabilities to pursue elimination of “redundancies, increase efficiency, and deliver more value and savings from the government’s acquisition programs.”

Category management is more elaborate than the transactional relationship. Category management involves deep collaboration between end users (stakeholders), purchasing (contracting), and the perspective industry. This combined effort works to understanding the capabilities of industry and government and the risks associated when procuring end item goods and services using certain procurement methods. In essence, a gap analysis is needed between defining the requirement and performing market research. After this collaboration, the government should pursue the best method to obtain needed goods and services using the information gathered.

To illustrate how category management can be effective at the system acquisition level rather than common goods and services, we can analyze our spend data in Figure 5. For example, Lockheed Martin generated roughly \$32 billion in revenue for 2018 from U.S. defense contracts (Lockheed Martin Corporation, 2019). Of that \$32 billion, 23 percent came from the Air Force. Within the Air Force’s portfolio are a number of programs that contribute to that 23 percent, such as the F-35, F-22, C-130, and F-16 programs (Lockheed Martin Corporation, 2019). With the initiation of category management at the Air Force enterprise level in conjunction with Lockheed Martin Aeronautics, perhaps it is possible to find commonality across each program, such as information technology products, special tooling and test equipment, or contractor provided services. The same can be said for each company noted in Figure 5, as each company provides more than one product for the Air Force. Currently, indirect rates are negotiated at the corporate levels by the Defense Contract Management Agency. So why not purchase identified goods and services common within programs at the same level? Through category management, we can identify common goods and services through a collaborative gap analysis between requirement analysis and market research. If these goods and services were purchased at the Air Force enterprise level rather than the individual program level, possible savings and efficiency can be achieved, leveraging the buying power of the Air Force.

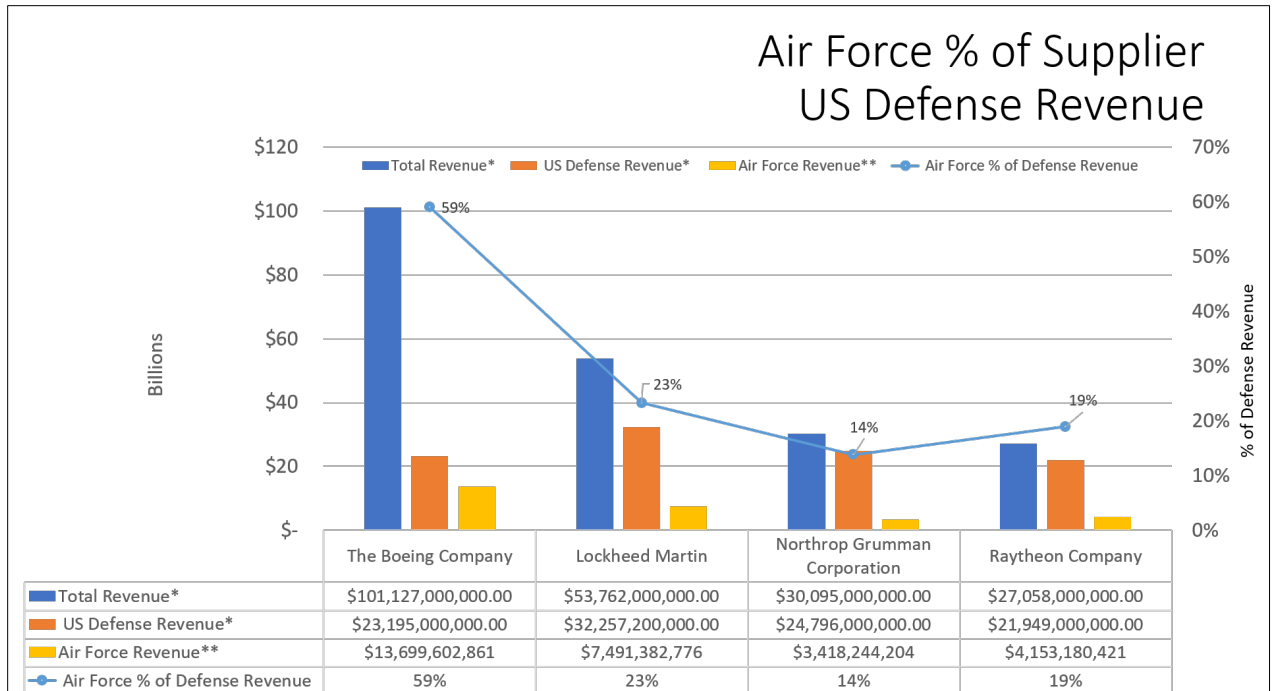


Figure 5. FY2018 Air Force Percentage of Supplier U.S. Defense Revenue. Adapted from AFBIT Lite (n.d.), Lockheed Martin Corporation (2019), Northrop Grumman Corporation (2019), Boeing (2019), and Raytheon (2019).

d. Middle Tier Acquisition

Middle tier acquisition is rapid acquisition activities that include rapid prototyping and rapid fielding of products. The objective is to field a product that can meet operational capability needs within five years of beginning development (Lord, 2018). This is significantly different from traditional major acquisition program deliverables, where operationally capable products can be delivered decades after the program’s initiation. The authority to conduct this method of acquisition was granted through Section 804 of the 2016 National Defense Authorization Act.

Rapid acquisition was mandated for use to the Air Force by William B. Roper, Jr, Assistant Secretary of the Air Force (Acquisition, Technology, and Logistics) (Roper, 2018). For the Air Force, Section 804 is applicable in all Air Force acquisitions, and should be used to the maximum extent practicable when suitable (Roper, 2018). Section 804 acquisitions are exempted from following DoD Instruction 5000.02 except as provided

through Dr. Roper's memorandum or other DoD regulation (Roper, 2018). This exemption facilitates rapid acquisition, in addition to allowing acquisition professionals to tailor their program reviews, processes and assessment to achieve cost, schedule, and performance goals (Roper, 2018). Furthermore, Dr. Roper highlights that rapid acquisition methods of middle-tier acquisition can be tailored to programs ranging from the prototyping phase (akin to TMRR in DoD Instruction 5000.02) through operations and sustainment (akin to Operations and Support in DoD Instruction 5000.02) (Roper, 2018). This method can allow the Air Force to increase its buying power in addition to its readiness and lethality.

These methods are not the all-encompassing answers to the Air Force's buying power problems. They are potential solutions that should be evaluated by acquisition professionals and decided if they can assist in improving the buying power of the Air Force in the subject acquisition. Now that we have discussed some general methods of improving buying power, let us discuss some specific examples found within our case analysis.

2. F-35 Lightning II

The F-35 is a fifth-generation strike fighter integrating stealth technology with advanced sensors and networking capabilities for the fighter aircraft fleet of the Department of Defense (Oakley, 2019). The F-35 program is not uniquely an Air Force acquisition (a joint program office oversees the acquisition on behalf of all customers³); however, the Air Force has much at stake in the program. The F-35 is expected to replace the A-10 and F-16 within the Air Force's tactical aircraft fleet, and complement the F-22's air superiority role (Oakley, 2019). The program's development and procurement costs were estimated to be about \$237 billion (in 2019 dollars) in 2001; however, these costs have increased to \$355 billion in 2019 (in 2019 dollars) (Oakley, 2019). In addition, quantities estimated to be procured have decreased from 2,886 to 2,470 aircraft (Oakley, 2019). This is likely due to the increase in costs. The dollar amount provided does not

³ The Joint Program Office acts on the behalf of the Air Force, Navy, Marines Corps, and international partners.

include sustainment costs, but estimates have placed sustainment costs at \$1.2 trillion (2016 dollars) for the expected 60-year life cycle of the weapon system (Maurer, 2019).

The F-35 program is in a sole-source environment between the government and the contractor. Due to the non-competitive aspect, characteristics discussed of resource dependence theory and principal agent theory can be highlighted on the F-35 program. The government and Lockheed Martin are locked into this relationship, but the objectives each wish to accomplish are not aligned, although the two parties are interdependent on one another.

The government is seeking to exponentially increase its air combat capabilities through the F-35 while fulfilling public policy endeavors. Lockheed Martin is seeking to increase cash flow, market share, and the bottom line of its income statement through the F-35. The principal-agent problem is occurring within the relationship, as illustrated by Figure 2 (Rendon, 2011). Unaligned objectives bring about perfunctory behavior by both principal and agent if the governance rules established within the contract do not properly incentivize consummate behavior, as we discussed in Chapter II (Brown et al., 2013). We can find examples of this by exploring the F-35 acquisition.

The F-35 program is post Milestone B, meaning the program is in the EMD phase of the acquisition, yet it is producing aircraft in LRIP as if it were in the P&D phase. LRIP typically occurs post the Milestone C decision. Yet, on the F-35, LRIP is occurring due to the program's acquisition strategy calling for development, testing, and production overlapping one another, instead of happening in sequential order (Sullivan, 2018). The GAO identifies this concurrency as a major factor in why the F-35 has experienced significant cost and schedule growth in addition to performance issues that have occurred on the program (Sullivan, 2018). This is due to design changes occurring and production processes changing due to the concurrency of the work.

Programs should fully test and demonstrate product capabilities prior to committing to production. DoD history that shows that the more mature technology designs toward the beginning of the program, the more likely the program will be successful (Oakley, 2019). In short, development work should be completed prior to committing to producing aircraft

(Kendall, 2016). The Honorable Frank Kendall (2016), former Under Secretary of Defense for Acquisition, Technology, and Logistics, labeled the F-35 program’s strategy of entering production without fully testing the aircraft prototype “acquisition malpractice.”

For F-35 sustainment, Lockheed Martin has been awarded annual cost-plus-incentive contracts for the sustainment of the F-35 fleet (DoD Inspector General, 2019). Under this arrangement, “Lockheed Martin is responsible for providing sustainment support for all variants of the F-35 aircraft, to include all supply chain, logistics systems, depot maintenance, and pilot and aircraft maintenance training” (DoD Inspector General, 2019, p. 3). The incentives under these contracts are tied to rates of performance metrics collected, calculated, and reported by the prime contractor regarding Air Vehicle Availability (AVA),⁴ Full Mission Capable (FMC),⁵ and Mission Capable (MC)⁶ (DoD Inspector General, 2019). The program office is responsible for monitoring contract performance and evaluate the performance metrics provided by the contractor to determine the award amount of incentive fees. The prime contractor has the opportunity to earn in excess of \$150 million in incentive fees for fiscal years (FY) 2016, 2017, and 2018 sustainment contracts combined (DoD Inspector General, 2019).

Nearly 30 percent of the F-35 fleet was unable to fly due to spare part shortages and other supply chain issues between May and November 2018, thus prompting a review by the DoD Inspector General (DoD Inspector General, 2019). The DoD Inspector General’s review focused on the program’s supply chain. Per the contractual agreement, Lockheed Martin is required to deliver parts that are ready-for-issue (RFI), meaning that parts, when delivered, are ready to install on the aircraft and the part’s electronic files regarding history and remaining life are accurate and complete (DoD Inspector General, 2019). After completion of the review, the IG has stated

⁴ AVA measures number of hours the aircraft are capable of performing at least one of its tasked missions (DoD Inspector General, 2019)

⁵ FMC measures number of hours the aircraft is available for use and capable of performing all tasked missions (DoD Inspector General, 2019)

⁶ MC measures number of hours the aircraft is available for use and capable of performing at least one of its tasked missions (DoD Inspector General, 2019)

The DoD did not receive spare parts in accordance with contract requirements and paid incentive fees on the sustainment contracts based on inflated and unverified F-35A aircraft availability hours. The DoD has potentially overpaid \$10.6 million in performance incentive fees by not independently collecting and verifying aircraft availability hours (DoD Inspector General, 2019, p. 6).

In addition, parts received that are not RFI induce additional labor burden on DoD maintenance and logistics personnel assigned to F-35 operations. The Inspector General estimates up to \$303 million in DoD labor has been spent so far mitigating non-RFI problems and up to \$55 million annually will be spent until the root problem is corrected (DoD Inspector General, 2019).

Incentivizing AVA, FMC, and MC motivates the contractor to perform its responsibilities to increase the rates for each respective metric. Supply chain management has direct impact on all three, as without sound logistics support, all three performance rates would suffer. However, the incentives flowed no further than the performance metrics discussed, treating them as an umbrella for all sustainment needs, and allowed for the contractor to receive inflated incentive payments although it was not meeting contract requirements. The rates were improved due to DoD personnel performing work-arounds when receiving non-RFI parts. Local policy was instituted at a number of DoD F-35 operating sites that allowed for non-RFI parts to be installed on aircraft to allow them to fly (DoD Inspector General, 2019). These operating sites host pilots and maintenance personnel that require training to effectively perform their mission when the situation arises. Therefore, if the aircraft are not flying, training is hindered. With this workaround allowing aircraft to fly, the performance rates incentivized are unintentionally improved, thus not inducing reasons for behavior to change by either the program office or the prime contractor (DoD Inspector General, 2019).

In any reward system (i.e., incentive system), potential reward recipients are particular to accomplishing the criteria set to receive the stated incentive, and then seek to meet the stated criteria, often in exclusion of activities not incentivized. However, there are occasions where the intended reward system does not produce the desired outcomes, sometimes rewarding behaviors that rewarder does not want, a phenomenon defined as

“the folly of rewarding A, while hoping for B” (Kerr, 1975). In the pre-award environment, it is imperative that the principal critically assesses the outcome that is desired, and incentivize the behavior needed to achieve that outcome. We understand that in some instances needed outcomes and behaviors to afford an achievement of objectives involve a complex web of activities. However, in the post-award environment, if unwanted behavior is occurring, which insinuates the incentives are not properly working, then the incentive must be changed. In addition, the rules within the contract must be enforced to promote consummate behavior. In the case of non-RFI sustainment parts for the F-35, the government was essentially paying for a product that was non-conforming, not seeking consideration for additional costs incurred at the behest of the contractor’s performance, as well reinforced the contractor’s behavior through paying incentive fees and creating work-arounds for the problem. The government has placed itself in a resource-dependent relationship, out-sourcing all of the supply chain responsibilities to the prime contractor through a performance-based life-cycle management approach. It must change the environment in which the dependence occurs, which could be the government seeks consideration for non-conformances, and modify performance incentive criteria to promote better performance to warrant better outcomes.

3. KC-46 Pegasus

The KC-46 Program’s total acquisition cost is valued at \$43 billion (GAO, 2019). The contract awarded for the KC-46 development effort is a fixed-price incentive (firm target) contract with a ceiling price of \$4.9 billion. The share ratio for cost underruns is 60 percent for the government and 40 percent for the contractor. The contractor assumes all financial liability for any cost overruns. The Air Force chose a fixed price contract since technology development was deemed to be mature and low-risk (Ludwigson, 2019). The contract type inherently incentivizes the contractor to reduce costs by stating for every dollar saved, the contractor will receive \$0.40. However, a three-year schedule delay is now projected, and \$1.9 billion cost overrun covered by the contractor has occurred due to development issues, yet the Air Force has chosen to conditionally accept aircraft, which

required the Air Force to negotiate minimum specification that could be met in order to do so (Ludwigson, 2019).

The Air Force avoided having to foot additional money for the \$1.9 billion cost overrun through limiting its financial risk by negotiating a fixed-price contract with no share by the government for any cost overruns. Yet, this did not eliminate all risk for the government, in fact, it further complicated existing challenges (Ludwigson, 2019). Firstly, incentives should reward performance. However, production lot incentive awards were not linked to Boeing's performance. They were linked to schedule milestones to reward physical delivery of low-rate production lots (Ludwigson, 2019). In essence, they were incentivized to provide aircraft for inspection and acceptance, not meet steps in successfully producing aircraft such as showcasing capabilities during phased aircraft production.

In addition, contract financing was allowed under the contract due to the contract type being a fixed-price contract. Contract financing allows for disbursement of funds to a contractor prior to acceptance of supplies or services by the government to offset steep capital investments by the supplier. Two types of contract financing are permitted under Part 32 of the FAR, progress payments and performance-based payments. Progress payments are distributed based on costs incurred and work performed by the contractor. Progress payments are allowed to be distributed up to 80 percent of incurred costs (Ludwigson, 2019). Performance-based payments are paid upon completion of a prior mutually agreed milestone, such as completion of test points satisfying contract specifications that are necessary in showing progression of contract performance. Boeing was rewarded with progress payments in the amount of 80 percent of its costs for the developmental aircraft contracted for; however, the firm had only completed 15 percent of the test points (Ludwigson, 2019).

This demonstrates moral hazard under principal-agent theory. The contractor knew that it was not on pace to adequately present acceptable aircraft as the firm knew it was severely behind on successfully completing test points that showcase acceptable contract progression. Yet, the contractor invoiced for financing up to 80 percent of costs incurred. This can be labeled as moral hazard, as the contractor is hiding behavior of underwhelming

performance yet invoicing as if progress is going well. The contractor needed the cash flow, but the cash flow was not commensurate with the scheduled progression of performance. The behavior was allowed because it was permitted through the contract agreement because the government stipulated progress payments would be paid for costs incurred. This occurred due to the government not selecting the correct incentive to promote, or reward, consummate behavior. There are mechanisms in place to allow for the suspension or limitation of progress payments when situations dictate, to include withholding progress payments. However, it seems these mechanisms were not used. Performance based-payments (PBP) financing would have served better in this situation. PBPs would have allowed for financing the work as it progressed, but allowing the contractor to objectively show successful performance through presenting completed work for pre-determined milestones. Two things are achieved with this scenario. First, it dissuades the government from over-financing lack of performance progress and prevents the contractor from receiving cash while not completing progress, as progress here is insinuated based on costs occurred. Second, it incentivizes what the government truly wants, aircraft being developed and delivered on time and financing the actual work progression. Through the progress payment method that occurred, the Air Force was endowed with additional risk to its mission objectives due to the contractor being three years behind schedule and losing money.

4. DoD Incentives

From a DoD enterprise level in relation to incentives, the GAO noted that the DoD spent a total of \$2.3 billion in award and incentive fees during the calendar year of 2007 (Hutton, 2009). However, of key importance, the GAO also indicated that the

DoD was not able to establish metrics to evaluate the effectiveness of award fees in terms of performance. DoD pointed out that the data collected on objective efficiencies do not reflect any consideration of the circumstances that affected performance, a critical element in determining award fees. (Hutton, 2009, p. 29)

Reflective of principal-agent theory, the DoD's inability to correctly evaluate performance parameters through objectifiable data generates a substantial risk for

inefficient and/or ineffective programs through subjective evaluation of the award fee. The Air Force and DoD systemically has difficulty accurately assessing a contractor's appropriate ratings within the award fee environment. Indeed, an Air Force acquisition professional stated, "...the contractor 'has to do a pretty bad job to receive a 'good', a rating that pays in excess of 85 percent of the award fee" (Hutton, 2009, p. 25). By allowing the contractor to receive the majority of their award fee for minimum standard performance, the incentives are rendered ineffective thereby not meeting the intent of the award fee program. In fact, the GAO even states in their report, "These evaluations provide little motivation for improved performance despite fee determination letters that consistently noted that the contractor had room to improve" (Hutton, 2009, p.25).

Performance surveillance is paramount in contract administration. The Air Force depends on prepared written status reports from contractors. Also, the Air Force depends on direct performance operation surveillance by the Defense Contract Management Agency (DCMA), where DCMA personnel physically surveil contractor production facilities to visually monitor performance progress and compare planned performance to actual performance. Lastly, the Air Force depends on organic performance observation such as Contracting Officer Technical Representatives (COTR) who typically validate received performance information on behalf of the Contracting Officer (National Contract Management Association, 2017). These resources are crucial in all contract administration, but even more so in the non-competitive environment, as the Air Force has limited to no ability to seek secondary sources of supply in these relationships. Even with oversight in place, ineffective results can still occur.

As we previously discussed, the DoD Inspector General found that Lockheed Martin received performance incentive fees based on inflated and unverified contractor produced reports. This was due to the government signing off on inflated and unverified performance metric data that triggered Lockheed Martin receiving a potential overpayment of \$10.6 million in unearned performance fees, in addition to historical overspending by the government of \$303 million and subsequent annual spending of \$55 million until the performance-based incentive is effectively managed (DoD Inspector General, 2019). The Air Force could better align their contractor's motivations to optimize Air Force goals

through establishing measurable and usable objective data for desired outcomes in concurrence with administering an effective evaluation program for incentives. However, if we continue to reward unwanted performance while hoping for better outcomes, we will continue to degrade our power in the relationship.

B. SUMMARY

As we have noted, factors limiting the buying power of the Air Force are a network of complex factors in which not one can be labeled as the main cause. In the pre-award environment, a shrinking supply base, lack of technical data and proprietary rights, and the government's fulfillment of public policy in conjunction with business decisions all play a part. We have discussed some acquisition practices that can offset some of the pre-award and post-award factors that lessen the Air Force's buying power. Through sound analysis and budgeting, perhaps the Air Force can better execute negotiations for data rights for modernizing and sustaining its fleet. The government has begun to take more serious steps in this regard. In addition, if the environment and agency procedures allow for it, perhaps leader-follower contracting for certain supplies can increase competition for future programs. Category management at the enterprise level for major weapon systems could bring about better efficiency and cost savings to the Air Force, or even the DoD if established at that level. Lastly, middle tier acquisition could assist in improving the buying power of the Air Force if it can be applied to the respective acquisition.

In the post-award environment, it is imperative the government incentivizes the behavior it truly wants, holding itself and the contractor accountable to the agreed upon rules within the contract. We have discussed pitfalls that can occur when incentives do not bring about the wanted behavior with examples from the F-35 and KC-46 program, but these same types of issues can be found on wide swath of programs. Even our review of leader-follower contracting for the AMRAAM system stated that the government failed to recoup consideration for non-conforming supply deliveries in the 1990s (DoD Inspector General, 1992). This practice has been on-going for some time. In our next chapter, we provide a summary of our research, our conclusions, and areas for further research.

V. SUMMARY, CONCLUSIONS, AND AREAS FOR FURTHER RESEARCH

This chapter summarizes our research, our conclusions, and areas for further research. Our research explored many facets of acquisitions and contracting, showcasing areas that lessen the buying power of the Air Force.

A. SUMMARY

To succeed in its mission, the Air Force depends on its military and civilian employees, as well as its contractors. Yet, defense industry consolidation has led to less competition available in the case of Air Force major weapon system acquisitions. Current acquisition practices and heavy reliance on original equipment manufacturers for weapon system production and sustainment restrict the Air Force to conduct business with a select group of contractors. In addition, the majority of weapon system contracts awarded to this select group are not competed. Our research showed that in 2018, 41 percent of Air Force's \$71 billion in spending went to four contractors alone.

The purpose of our research was to understand if the Air Force could better leverage its buying power in non-competitive environments, with emphasis to avoid non-competition through pre-award methods, as well as create better buying power within non-competitive environments in the post-award phase. We explored economic and management theories, as well as examined acquisition practices on the F-35 and KC-46 programs. We also analyzed Air Force spending to examine our dependence on a select group on contractors. We completed our purpose by answering our research questions.

B. CONCLUSION

Our research sought to understand if the Air Force could better leverage its buying power in non-competitive environments. Our first research question answered is:

- How can the Air Force better leverage its buying power for supplies and services in non-competitive acquisitions?

In existing non-competitive acquisitions, the Air Force can better leverage its buying power through a number of methods. The MDAP acquisition arena is ripe with winner-take-all contract awards. Winner-take-all contracts lead to government dependence placed with a single party. However, properly attaining technical data rights, whether through attaining unlimited rights or licensing, can assist in better cost and performance management in the Air Force's modernization and sustainment of weapon systems in the pre-award and post-award phases.

Also, category management at the corporate level of MDAP suppliers could lead to increasing value and cost savings to the government. Currently within the Air Force, programs are divided by platform, such as fighter/bomber, mobility, and tanker. This means that programs being procured from the same parent company may have different program executive officers responsible for the acquisition of the individual programs. Designating an official to oversee category management at the corporate level may lead to better insight in acquiring goods and services common within the programs at an enterprise level.

Lastly, the proper use of incentives can deliver better buying power to the government. Many of the characteristics that define the relationship between the government and contractor are rooted in theory. Through examination of the principal agent theory and resource dependence theory, we observed how the objectives between the government and contractor are drastically different and the scales of power and dependence within the relationship can be unbalanced. Our research highlighted examples of how the government improperly used incentives on the F-35 and KC-46 programs. It is imperative to set standards of consummate and perfunctory behavior, develop methods for both parties to identify the behaviors, and properly incentivize both parties to behave consummately while sanctioning perfunctory behavior. This will require strong and confident negotiation skills by the government. The contractor's objectives are not in concert with the government's objectives as we described in the principal agent problem. Once reaching mutual agreement on definitions of behavior, proper incentives must be well-developed, and most importantly used correctly. These incentives will help maintain balance in power and dependence, while allowing each party to receive what is actually wanted.

We have discussed our findings in relation to our first research question. Our second research question is:

- How can the Air Force change the non-competitive environment to a competitive environment, in essence changing the environmental construct?

We found methods in changing the non-competitive environment to a competitive environment. This included leader-follower initiatives, which foster future competition when used in applicable circumstances. At present, the Air Force contracts with oligopolistic groups selling technological efficiencies, such as when procuring fixed-wing aircraft. The Air Force's buying power is essentially neutralized in this arrangement (Adams & Adams, 1972). Through developing atypical sources through leader-follower contracting, the government would in turn grow its supply base, achieving future competition while satisfying public policy objectives.

In addition, mid-tier acquisition can help leverage the buying power of the government through different methods, including rapid prototyping and rapid fielding of products. This could create rivalry to long-standing original equipment manufacturer dependent relationships.

There is no single solution that will allow the Air Force to increase its buying power in the non-competitive environment. Many government system acquisitions are quite complex, involving many professionals from different disciplines communicating horizontally, while communicating vertically with many levels of management. Our research has not uncovered anything worthy of declaring a discovery. The methods we have discussed are rooted in academic literature and government policy. Yet for many decades, we have seen the same occurrences of increased cost, schedule, and performance issues occur on non-competitive programs. The acquisition corps of the Air Force must use sound business judgement and critical thinking skills to understand the dynamics of the environments we are operating in. We must understand the differences in goals between the parties, and develop strategies and incentives that will deliver win-win results for each party. We must understand our power and dependence within these relationships, and use

concepts and practices to help balance out the equation of power and dependence. In doing so, we better equip ourselves to achieve our contracting mission of developing and executing “innovative business strategies and cost-effective contracting solutions to enable the global Air Force mission” (Air Force Acquisition, n.d.).

C. AREAS FOR FURTHER RESEARCH

Many topics can be researched in determining practices and procedures to improve the buying power of the Air Force. Below are a few topics that can be considered to research further.

1. Contracting Workforce Perceptions

A survey of Air Force contracting personnel can provide valuable insight. We recommend querying a wide sample of contracting professionals ranging in experience and certification levels. A potential focus of the survey could center on the use of cost analysis, incentives, and occurrences of non-conformance to contract terms and conditions. This could highlight if contracting professionals feel that they are operating in a balanced power and dependence environment. The resulting data could allow for identifying any correlations in perceptions. Any identifications can lead to discovering the need for changes in policy, practices, or perhaps different styles of occupational training.

2. Challenge-Based Acquisitions

Challenge-based acquisition at the basic level is where government agencies present a need or solution, in essence a challenge, and interested providers are free to design solutions that will meet the need (Roe, Arendt, & Novak, 2019). Challenge-based acquisition is best used in simplified settings, but a well-crafted challenge with clear, easily understood, and effective assessment techniques and contracting vehicles can lead to a successful acquisition (Roe et al., 2019). Through further exploration, perhaps some methods discussed under the principle can be identified as methods that can assist in better buying power for the Air Force.

3. Open Systems Architecture

A further exploration on how incorporating open systems architecture into software and hardware development could be beneficial to the Air Force. Through having open system architecture incorporated into weapon systems, we potentially remove our dependence on the designing party and can possibly qualify our own sources of production, modernization, and sustainment. We recommend this research consist of potential uses, why the practice is not commonly used in defense acquisitions, as well as identify the risks involved with using open systems architecture.

4. Middle Tier Acquisition

We briefly discussed Middle Tier Acquisition, rapid prototyping, and rapid fielding earlier in our paper. The use of this technique has been mandated for use to the maximum extent practicable in Air Force acquisitions. Further research on Middle Tier Acquisition and how it can be best utilized in existing and future Air Force acquisition programs would be beneficial to the Air Force.

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