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DEFICIENCIES IN THE REQUIREMENT GENERATION PHASE THAT DELAY THE LEAD TIME OF ARMY CONTRACT ACTIONS

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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

SYSTEMS ENGINEERING CAPSTONE REPORT

DEFICIENCIES IN THE REQUIREMENT GENERATION PHASE THAT DELAY THE LEAD TIME OF ARMY CONTRACT ACTIONS

by

Ena G. Baran, Randy W. Bookwalter, Larry V. Kemp,
Nicolas Villegas, and Paul L. Wolfe III

December 2021

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LIST OF ACRONYMS AND ABBREVIATIONS

ACC	Army Contracting Command
ACC CTRS	Army Contracting Command contracting centers
AFARS	Army Federal Acquisition Regulation Supplement
AI	artificial intelligence
ALT	administrative lead time; Army lead time
ALU	Army Logistics University
ARLT	acquisition requirements lead time
ARP	Acquisition Requirement Package
ASA(ALT)	Assistant Secretary of the Army for Acquisition, Logistics, and Technology
AWF	acquisition workforce
BCT	brigade combat teams
cASM	contingency Acquisition Support Model
CHESS	Computer Hardware Enterprise Software and Solutions
CONUS	continental United States
COR	contracting officer's representative
CTC	combat training center
DA	Department of the Army
DAU	Defense Acquisition University
DAWDF	Defense Acquisition Workforce Development Fund
DAWIA	Defense Acquisition Workforce Improvement Act
DOD	Department of Defense
DODI	Department of Defense instruction
FAR	Federal Acquisition Regulation
FORSCOM	United States Army Forces Command
FPDS-NG	Federal Procurement Data System - Next Generation
FY	fiscal year
GAO	Government Accountability Office
HQ	headquarters

IGE	Independent Government Estimate
IT	information technology
JP	joint publication
JRTC	Joint Readiness Training Center
MICC	Mission Installation Contracting Command
MRR	market research report
NCO	noncommissioned officer
NDAA	National Defense Authorization Act
NMCI	Navy-Marine Corps intranet
NTC	National Training Center
OCONUS	outside the continental United States
OCS	operational contract support
OMB	Office of Management and Budget
OFPP	Office of Federal Procurement Policy
PALT	procurement administrative lead time; procurement action lead time
PCF	Paperless Contract File
PME	professional military education
PR	purchase request
PRS	performance requirement summary
PSC	Product Service Code
PTAI	Periodic Table of Acquisition Innovation
PWS	performance work statement
QASP	quality assurance surveillance plan
RIW	relative importance weight
RPA	Requirements Package Assistant
RSCA	request for service contract approval
SAM	System of Award Management
SAT	simplified acquisition threshold
SAW	Service Acquisition Workshop
SOO	statement of objectives

SOW	statement of work
TOE	table of organization and equipment
TTP	tactics, techniques, and procedures
USD(AT&L)	Undersecretary of Defense Acquisition, Technology and Logistics
USMC	United States Marine Corps
VCE	Virtual Contracting Enterprise
VCE-BI	Virtual Contracting Enterprise-Business Intelligence

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EXECUTIVE SUMMARY

The U.S. Army Contracting Command (ACC) is structured to support contract requirements for U.S. Army Program Executive Offices, Corps, Divisions, and Army installations. Due to the variance in the requirements process that is established in federal regulations, the focus of this study is on the contracting actions and procedures that ACC conducts within the continental United States (CONUS). The functional contract actions that each contracting office conducts have a substantial degree of commonality. For that reason, the Army is implementing a category management effort for procurement actions to gain efficiencies at the service level. Despite this attempt, most mission-oriented organizations do not accept contract requirement packets upon the first submission at the installation support level. Instead, they often return the packet several times to the program offices, mission units, or installation partners for corrections. Thus, inadequate and late requirement packets result in excessive acquisition requirements lead time (ARLT).

A body of knowledge exists on contracting lead time reduction. However, the majority of research focuses on the procurement administrative lead time (PALT) only. PALT is measured by the amount of time it takes a contracting office to transition from an accepted requirement packet to contract award. The time from requirement identification to submission of a requirement packet is both understudied and equally consequential to the overall lead time. For that reason, the research team chose to focus its efforts on the opportunity space presented by the relative lack of research on contributory factors of ARLT and its effects on administrative lead time (ALT). In addition, although there is no standardized training or requirements for individuals and organizations before generating a requirement packet, there is an expectation for requiring activities to have a level of proficiency in critical contract elements such as performance work statement (PWS), quality assurance surveillance plan (QASP), and requirements definition. However, in many cases, the personnel responsible for generating a requirement packet lack the basic training and resources necessary to develop a complete packet that receives first-time acceptance from a contracting agency. These deficiencies delay ARLT and can result in

costly issues during contract award and administration, such as protests and numerous contract modifications.

The research analyzes ARLT by identifying the potential factors contributing to delays during the requirement development phase. This assessment is focused on efficiencies which could reduce the iterative transmission of contract requirements between organizations. In approaching this analysis, the research team hypothesizes that the number of resources and type of training available to requiring activities during the requirement development phase will reduce ARLT. To conduct this analysis, the research team applies a mixed-method approach consisting of quantitative and qualitative data analysis.

The first question the research team explores is: What factors affect ARLT and the quality of requirement packets? Question one consists of statistical analysis on the rate of return for requirement packets and analysis on the utilization of acquisition tools (Acquisition Requirement Roadmap Tool, Virtual Computing Environment, and Acquisition Compass). The second question is: What positions within the operating force should require training focused on requirement generation? To answer this question, the research team uses a qualitative analysis of survey responses to identify which table of organization and equipment (TOE) positions would most benefit from requirement generation training.

The quantitative methodology focuses on categorizing factors applied to contract file data to assess the impacts and influence of those factors on the focal lead time of the team's research. The qualitative methodology administered surveys to acquisition and non-acquisition workforce personnel to identify training and resource concerns during the requirements development phase. In addition, the research team conducted a sample analysis of requirement packets to determine the primary reason for return.

The findings and conclusions of the research support the team's initial hypotheses that resources available to requiring activities during the requirements development and generation phase directly impact the total lead time of a procurement action. The research provides a summary, conclusion, and recommendation for the following areas: requirement

development, training for requirement development generators, and standardization and implementation of generation tools.

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I. INTRODUCTION

ACC is composed of two subordinate organizations responsible for worldwide contracting of supplies, services, and construction in support of the Department of Defense's (DOD) mission. The first organization, the Mission Installation Contracting Command (MICC), is the lead organization in the CONUS to support contracting requirements for the installation readiness of the United States Army. The MICC is headquartered at Fort Sam Houston, Texas, and supports the feeding of over 200,000 Soldiers daily, facilitates student training, and the maintenance of over 14.4 million acres of land and buildings. In total, MICC had over 30,000 contract actions for FY20, with a sum of over $5 billion (MICC 2021,1). Data analyzed from usaspending.gov of fixed price service contracts for MICC offices during the FY20 obligation period indicates that commercial service contracts represent 59% of total actions and $3.2B (67%) of the $5.2B in obligated funds (Department of the Treasury, n.d.). The second organization within ACC includes contracting centers (ACC CTRS) that lead contracting efforts for major acquisition programs supporting Program Executive Offices and Program Managers across the United States. More importantly, contracting for major weapons system production and vital services worldwide support the Soldier's mission and well-being.

According to Army Training Publication (ATP) 4-10 (Department of the Army [DA], 2016), operational contract support (OCS) planning is primarily a requiring activity responsibility (2016, 17). As a result, requiring activities are responsible for developing their contracting requirements to integrate contractor support within their operations. This situation is often problematic due to the specifications and technical knowledge required to develop an effective contracting requirement (Aloise 2006, 29). The DA has also acknowledged difficulties in planning activities and requirements generation (DA 2016, 2-1). Requiring activities can often lack the training or resources to articulate the contracting need to a standard that is acceptable to a contracting agency. Service contract requirements differ from supply contract requirements in that the performance requirements outlined in the contract are completely reliant on the language used in the various types of work statements: PWS, statement of work (SOW), and statement of objectives (SOO).

Requirements for supply contracts require salient characteristics, which are more readily understood and less subject to issues with interpretation or ambiguity. The onus of requirements development is, therefore, more challenging in a service contracting environment.

Purchases of commercial information technology (IT) via Computer Hardware Enterprise Software and Solutions (CHESS), the Army's primary designated source for IT, are reoccurring purchases that share similar trends as service contracts regarding rejected requirement packets. Like service contracts, IT purchases require technical expertise and training on writing technical purchase descriptions, market research reports (MRR), sole source justification letters, and justification and approval documents when needed. Although these documents are less detailed than a PWS for a service contract, they are still critical components of a requirement packet required to procure supplies. Packets that a contracting agency rejects often go back and forth between the mission partner and the contracting agency until the packet is ready for acceptance and processing.

These challenges manifest themselves through a delayed process that increases ALT. The Government Accountability Office (GAO) found that resource and training deficiencies that reside in the customer, or non-acquisition workforce (non-AWF), serve as significant impediments to the effective transition of a requirement from a need to a contracting action, ready for solicitation and ultimately leading to an award of a contract (Aloise 2006, 29). The Army developed and integrated OCS training to prepare military and civilian non-acquisition personnel to develop requirement packets, execute contract management responsibilities, and conduct contracting officer's representative (COR) oversight for basic service and supply contracts (Department of Defense Inspector General 2019, 19). However, consistent integration of OCS training across formations and agencies remains fractional. Furthermore, the responsibility of developing a requirement often changes hands as personnel rotate through installations or move on to different positions within it. This personnel turbulence occurs for various reasons, such as promotion and personnel changes within the requiring activity. Each personnel change generally introduces non-AWF personnel who have a fresh view but are generally less trained and

experienced with the contracting process. All these changes risk increasing the amount of time required to get the contract awarded and the service provided to the requiring activity.

Notwithstanding the volatility in personnel turnover, the needs of an organization remain a relatively stable variable across FYs. As an example, the need for portable latrines in a training area is a requirement that remains constant year after year. Many variations occur, such as quantity, location, duration of use, date of emplacement and pickup, and frequency of cleaning, but the need for the requirement remains constant. The same is true for IT supply buys. Every year across all organizations, customers procure new equipment via CHESS. Yet requirement packets for these types of purchases have a similar rejection rate to service requirement packets. The question then becomes, why does the process get delayed when contracting agencies and requiring activities continue to process contracting actions for the same types of needs year after year?

A. PURPOSE STATEMENT

The purpose of this mixed-methodology study is to identify factors that contribute to extended ALT at ACC CTRS and MICC organizations by studying contract actions from FY19–FY21 and prescribe actions to reduce ALT at these organizations.

B. RESEARCH QUESTIONS AND OBJECTIVES

The GAO (2021) released a report indicating that the AWF had shown significant improvement in experience, education, and training certification (25). However, the OCS segment remains part of the high-risk report due to identified OCS capabilities shortfalls not being addressed and lacking instructions on integrating OCS throughout the department (GAO 2021, 241). For example, OCS is the primary vehicle to train requiring activities on how to generate requirement packets. The lack of training and standardization across mission partners charged with generating requirement packets leads to inefficiencies in the early stages of the acquisition (Murphy and Perrine 2020, v), which guided the research team in establishing the following questions/objectives:

Question 1: What factors affect ALT and the quality of requirement packets?

Deliverable 1a. Statistical analysis based on the rate of return for requirement packets.

Deliverable 1b: Determine the utilization of acquisition tools (Acquisition Requirement Roadmap Tool, Virtual Computing Environment, Acquisition Compass) during requirement generation.

Question 2: What positions within the operating force should require training focused on requirement generation?

Deliverable 2a: Recommendation of which table of organization and equipment (TOE) positions would receive the most benefit from requirement generation training.

C. RESEARCH SCOPE

This research assesses the contracting process to the point of contract award and reviews the body of knowledge relevant to supply and services procurement Army-wide. The research focuses on how requiring activities and contracting organizations conduct contract planning, develop OCS training and perform requirements generation for service and supply contracts under $2M. The research focuses on training, analysis of requirements development, legislation and policy, the definition of the measurement, and available tools and resources.

A systems analysis and systems engineering plan assesses the feasibility and impact of a standardized training and requirements transfer system from mission partners to MICCs and contracting centers in the form of a policy update or process to increase requirement clarity, reduce ALT, and improve its measure of effectiveness.

D. BENEFIT OF STUDY

Survey responses identify training shortfalls and capability gaps that the Army and the contracting enterprise can leverage to improve training on acquisition requirements development, resulting in decreased time to contract award. This study examines quantitative data throughout the ACC enterprise to identify variables that affect ALT

during the early stages of the acquisition process. This research explores a possible opportunity space in the pre-award resource environment that could improve the submittal process of a contract requirement packet. The research findings can improve acquisition planning, facilitate process improvement, and enhance the expeditious delivery of supplies and services to requiring activities. Furthermore, acquisition leaders can apply this study to ACC decisions regarding training requirements for non-acquisition personnel supporting the procurement of supplies and services under $2M.

E. ORGANIZATION OF REPORT

The remainder of this report is organized into four additional chapters as follows:

Chapter II discusses ALT and the main drivers for schedule delays applicable to contracting centers and MICCs. Additionally, this chapter examines the impact acquisition training has on streamlining the requirement generation phase.

Chapter III explains the mixed methodology approach using both quantitative and qualitative data to address the research questions. This chapter describes the sample and data collection procedures, provides an explanation of the operationalization of response and explanatory variables, and specifies the prediction model.

Chapter IV presents the results of the quantitative data collection efforts, including the results of various statistical tests conducted to ensure the model is as robust as possible. Additionally, it presents the results of the qualitative analysis of survey responses and the associated hypotheses.

Chapter V provides a summary of the research conducted as well as the conclusions and recommendations derived from the analysis conducted in Chapter IV. Finally, this chapter addresses the research limitations and provides recommendations for future research.

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II. LITERATURE REVIEW

This chapter examines previous studies and literature on ALT and the main drivers for schedule delays as requirements transfer between the requesting activity, contracting centers, and MICCs. Additionally, the research team examines the impact acquisition training has on streamlining the requirement generation phase. First, the research team introduces and defines the PALT within the critical requirement generation process. Second, the team discusses the various definitions of ALT and current efforts to establish a standardized metric across the DOD. Third, the team analyzes several student theses that provide insight on the causes for prolonged ALT in the requirements development process and their strategies for procedural improvement.

Fourth, the research team identifies the tools and best practices available to the contracting workforce and requiring activities by researching government acquisition policy and directives. Fifth, the team focuses on training and certification efforts affecting the acquisition and non-acquisition community. Lastly, this chapter discusses OCS and its application to the contracting mission.

A. THEORETICAL FRAMEWORK

Organizational learning is a process where individuals extend their knowledge based on past experience and propagate it in ways that improve performance outcomes towards strategic goals (Law and Chuah 2015, 8). Knowledge management, team learning, and continuous improvement are key tenets of the organizational theory framework and are common practices within Army contracting offices (2015, 7). Moreover, Army contracting organizations invest heavily to maintain a highly trained, technically proficient, and adaptable workforce by implementing rigorous individual and collective training requirements. According to the ACC's Strategic Plan, recruiting, developing, and retaining a highly capable contracting workforce is critical to the Army's ability to meet ever-changing world conditions (2020, 2). Contracting offices are predominantly process-oriented, so employee experience and lessons learned drive organizational success across all echelons and enhance contracting policy and internal controls. By applying an

organizational learning approach to our research, we will identify systematic issues during the transition of customer requirements to the contracting agency and provide recommended training solutions for reducing ALT.

Our research will utilize Nonaka's Dynamic Theory of Organizational Knowledge Creation to facilitate research design, analyze results, propose recommendations, and identify topics for further research. The hypertext organization model below is highly relevant to ACC, which combines the efficiency and stability of a hierarchical, organizational structure with the dynamism and flexibility of the flat, cross-functional teams, including the contracting teams and contracting officers that interact directly with the requiring activity (Nonaka 1994, 33). Contracting officers and specialists are responsible for executing day-to-day contracting operations and, therefore, are responsible for knowledge creation and identifying best practices within the organization. The business system layer includes military and DA civilian leadership, who enforce contracting policy and monitor employee performance. Finally, the contracting knowledge base contains federal and department regulations, agency policy, and contracting systems of record used throughout the enterprise.

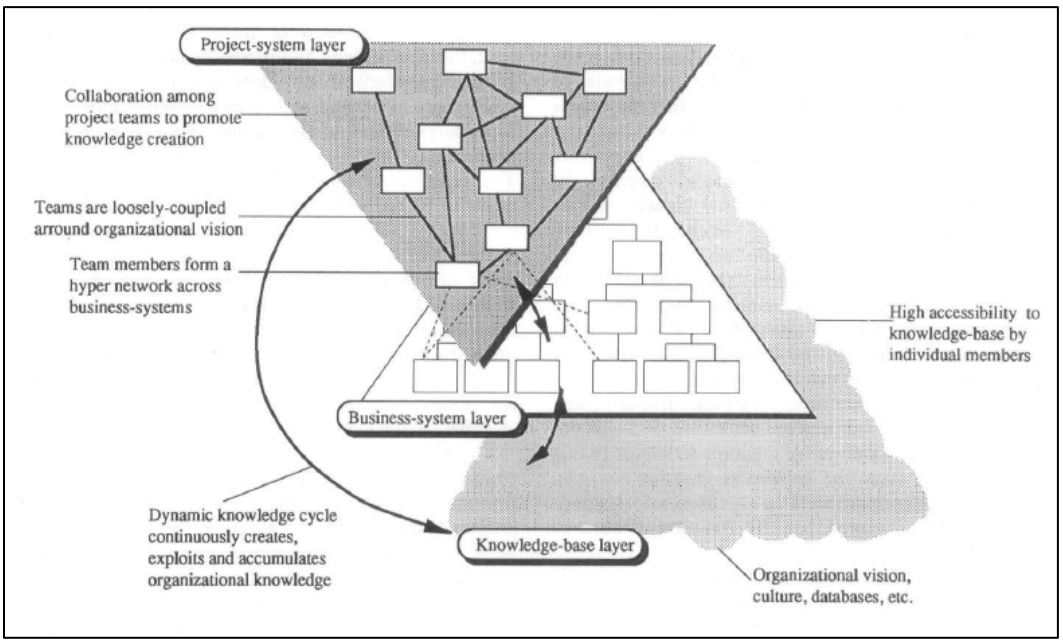

Figure 1. Hypertext Organization Model. Source: Nonaka (1994, 34).

B. ORGANIZATIONAL STRUCTURES

1. Army Contracting Command

ACC provides contracting support in three different operating environments: weapons systems contracting, installation contracting, and expeditionary contracting (ACC 2020, 3). As displayed in ACC Organizational chart, all contracting brigades outside the continental United States (OCONUS) fall under the purview of the ACC Deputy Commanding General of OCONUS operations and are aligned to the Army Service Component Commands. In addition, ACC supports contracts for the Army's defense programs. Finally, the MICC supports installation readiness and expeditionary contracting. Our research examines ALT for mission and installation support contract requirements within the ACC CTRS and the MICC.

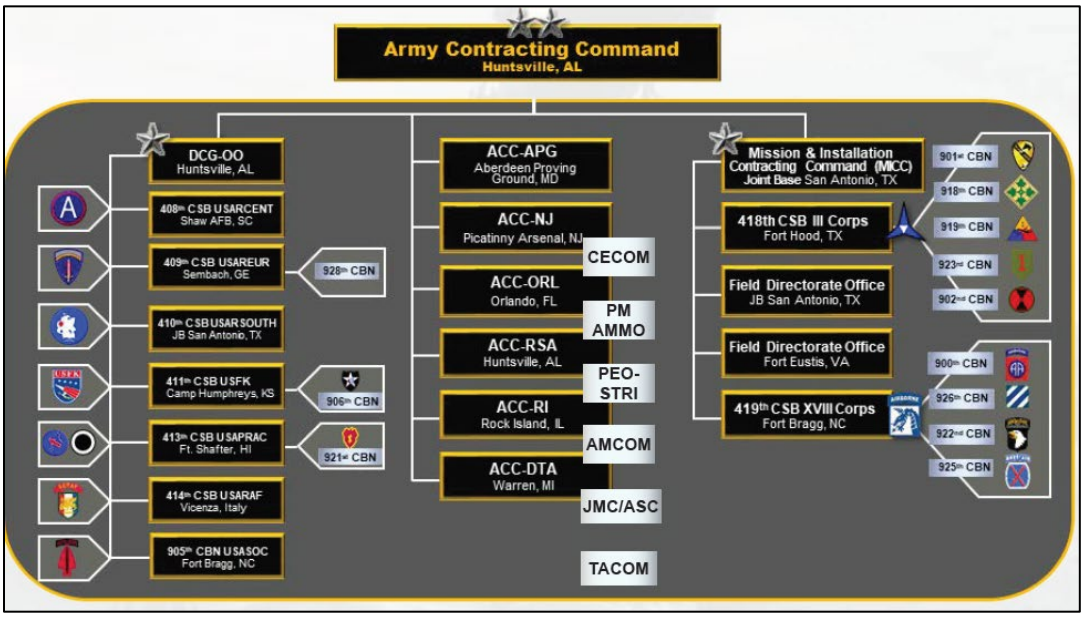

Figure 2. ACC Organizational Chart. Source: Army Contracting Command (2020, 12).

2. Mission Installation Contracting Command

The MICC provides base operation support services for CONUS installations. Two MICC contracting brigades and nine battalions are also aligned to provide contracting

support to United States Army Forces Command (FORSCOM) corps and divisions while deployed, as shown in the MICC organizational chart. Additionally, several MICC agencies exclusively offer support for installation contracting requirements and are not aligned to a FORSCOM unit.

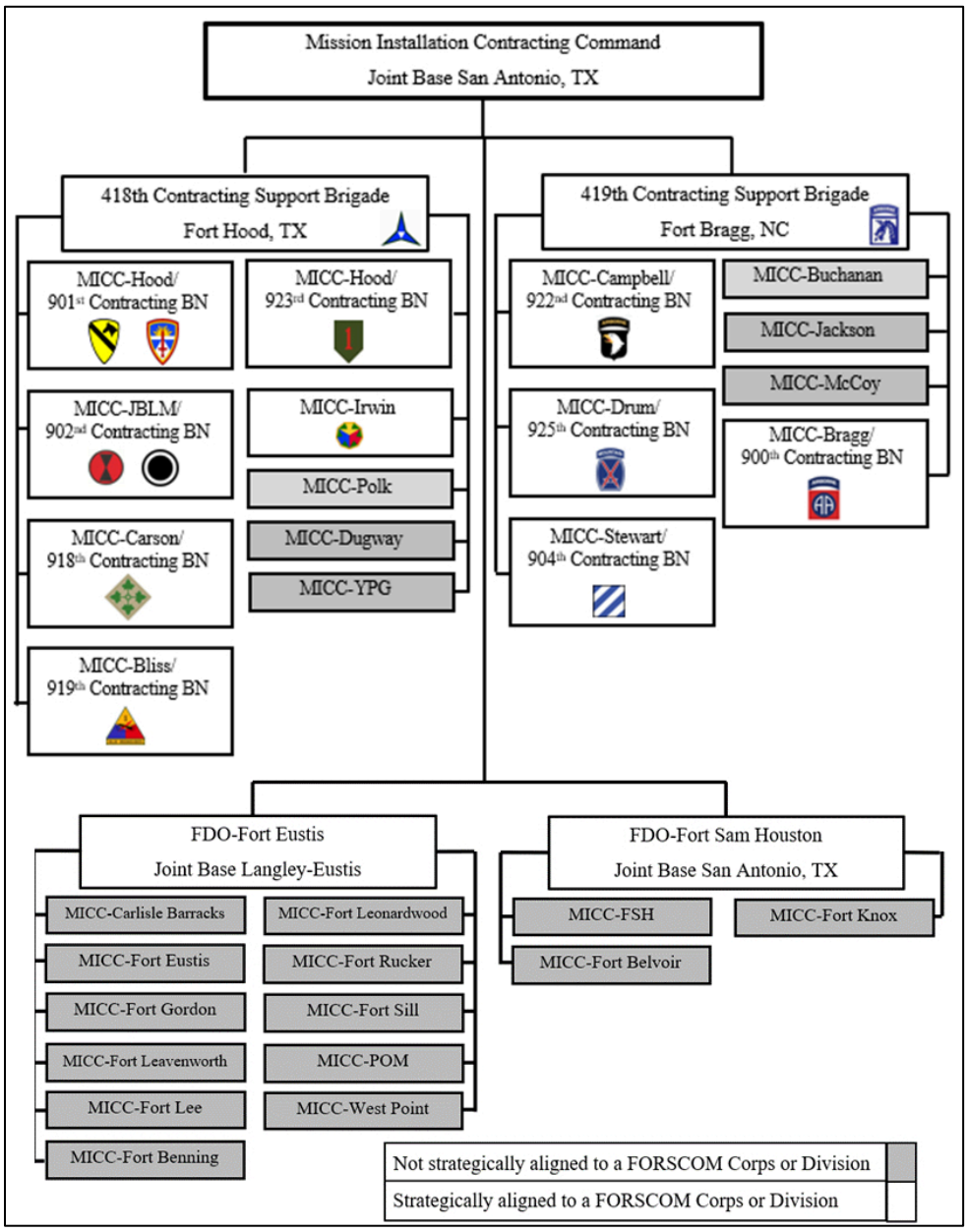

Figure 3. Mission Installation Contracting Command Organizational Chart.

3. Requiring Activities

Army officers and noncommissioned officers (NCO) with the 3C additional skill identifier perform OCS responsibilities in a variety of Army units, from battalion level up to theater level to rapidly acquire commercial supplies and services in support of their operational needs (DA 2016, A-1). According to Army Training Publication 4-10 (DA 2016, A-2), theater and field army headquarters (HQ) are responsible for leading the Army's OCS planning and integration effort, including setting up their own requirements review boards and working groups. Subordinate units at the tactical level, including divisions and brigades, are responsible for requirements development and putting together a contract requirement packet. Once the requirement packet is approved, the customer unit submits its requirement packet to their local contracting agency for review.

C. LEAD TIME

Challenges with consistency exist within the DOD regarding efficiency metrics within the contracting process. The historical terminology for the AWF personnel is PALT. As explored in detail in a later section, the parameters of the PALT metric are ill-defined and even have inconsistencies at the local office level. The DOD uses PALT as the "gold standard" regarding contracting efficiency. The initiation of that timeline as a contract requirement concurrently serves as the initial data point to evaluate contracting offices for proficiency. Therefore, contracting offices are cautious about accepting requirement packets that have not been assessed for quality and would consequently inflate their office PALT metrics. Multiple factors influence the contracting process, which would impact the PALT, and many times these factors are outside of the span of control of the contracting office. These are some reasons why contracting offices establish alternative metrics. One of those metrics is ALT. Administrative lead time has similar challenges with consistency in definition, but common ground lies in the metric concerning the timing of the transition of the requirement. Where PALT commonly refers to those actions performed only by the contracting agency, ALT refers to the requirement as a whole and includes actions at the requiring activity and its approval agencies.

D. DEFINITIONS AND MEASUREMENTS

The variations in terminology and definitions often obfuscate the definition of ALT. The research team found that the ALT for contract award had the following variations: "procurement acquisition lead time," "procurement administrative lead time," and "acquisition lead time." The starting point varied between receipt of requirement, acceptance of a complete requirement packet, and solicitation release. All end dates were consistent with the lead time ending at the award of a contract. This variation in terminology from source documents is the reason for the variability in this research review.

This variation in terms poses a problem for analyses and assessments to reduce the lead time within the acquisition process. The customer and contracting office require a well-defined metric to measure any change to a process. Without a clear definition of administrative lead time, there is no quantitative way to measure it. GAO recognized the need to define this metric across DOD in several reports. In a GAO 2018 report to Congress, it was identified that there was no consistency in the information collected or the definition of critical terms such as PALT. For example, the Army identified the time to award a contract beginning when the contracting office received an "adequate requirements package" (Woods 2018, 7). The Air Force began tracking at the time of the solicitation and ended at the time of contract award (2018, 7). The other branches of the military further obfuscate the tracking of the time frame to contract award. The customer and the contracting office have different perspectives on the PALT timeline (McComas, Oliver, and Harrington 2007, 71). Personnel within the contracting agency begin work once a valid purchase request (PR) and requirement packet enter the system (McComas, Oliver, and Harrington 2007, 71). The contracting office initiates PALT once all requirements documentation is reviewed and approved. Ultimately, Section 886 of the 2018 National Defense Authorization Act (NDAA) states that the Secretary of Defense is responsible for defining PALT, developing a plan for measuring PALT, and making the collected data publicly available (Berteau 2018).

The 2018 NDAA proposed a definition of PALT as beginning on the date the solicitation is issued and ending on the date of contract award. However, examining one PALT metric is not enough to improve contracting processes at the enterprise level.

Brubaker, Posey, and Dean also suggest that standardizing a PALT metric for contracting agencies is impossible, given that contracting agencies have unique customer needs and utilize various contracting methods (2018, 85). The 2020 GAO report to Congress identified several key steps to include within the PALT timeline before releasing the solicitation to industry. Before drafting the solicitation, the customer must develop the requirement, create a cost estimate, and conduct market research (DiNapoli 2020, 9). Moreover, the requiring activity and contracting agency often exchange the requirement packet several times before it is approved and ready for solicitation. The 2018 NDAA fails to capture these pre-solicitation processes that have a significant impact on ALT. Research suggests that developing a standardized PALT metric across DOD's contracting agencies proves challenging, despite the GAO recent recommendation to create a holistic PALT metric.

In addition to defining acquisition lead time, a standard definition for a service contract may assist requirement owners, acquisition professionals, and Congress to delineate the level of oversight and time required to procure a service action. In his study of the process for the acquisition of large-scale services, Rozier claimed that the acquisitions for services are not considered in the same way that acquisitions for major defense systems or major information systems, due to the lack of definition within the DOD (2002, 33) Rozier further explains that the DOD treats service contracts and service acquisitions the same regardless of the critical or non-critical nature of the service (2002, 33). His study focused on the Navy-Marine Corps intranet (NMCI) contract, which was DOD's highest-priced service contract valued at approximately $6.9B (2002, 1). This contract action was unique due to being a stand-alone contract and the comprehensive nature of the acquired service. The Navy and Marine Corps treated this procurement as a performance-based service contract. Still, according to the GAO, the Navy failed to perform an Analysis of Alternatives (AoA) or resolve programmatic issues such as management, funding, and the disposition of the existing technology and information technology personnel (Rozier 2002, 19).

In 2002, the Undersecretary of Defense for Acquisition, Technology and Logistics (USD[AT&L]) directed that all DOD components establish a review that provides for

consistent evaluation and approval of service acquisitions and mandates the creation of a documented acquisition strategy in support of each proposed service acquisition. Service contracts continued to rise, and in FY18, service contracts accounted for 49% of DOD spending. Currently, no written distinction exists between a service contract and the acquisition of services. However, in the *Defense Acquisition Guidebook* a service contract is defined "as a contract for performance that directly engages the time and effort of a contractor, whose primary purpose is to perform an identifiable task rather than furnish an end item or supply" (Defense Acquisition University [DAU] 2020, CH 10-2.1.2).

The new Adaptive Acquisition Framework Pathways created a specific pathway for acquiring services above the simplified acquisition threshold (SAT). Federal Acquisition Regulation (FAR) 37.102 and Public Law 106-398, section 821, mandates performance-based acquisition as the preferred method for acquiring services and further outlines the responsibility of program officials to accurately describe the need to be filled or problem to be solved using performance-based methods. In 2021 Dr. Bruce D. Jette, former United States Assistant Secretary of the Army for Acquisition, Logistics, and Technology [ASA(ALT)], issued a memorandum for guidance outlining the responsibility of requiring activities to translate requirements into actionable work statements and clearly defining their need (2021, 1). Tools such as the Service Acquisition Mall, Contracting Compass, and the Periodic Table of Acquisition Innovation (PTAI) are available for requiring activities and contracting personnel. These websites contain step-by-step guidance and templates on how to create performance-based requirements documents. However, the lack of standardization remains an issue in terms of service contracts, acquisition services, PALT, templates, and tools. Different organizations follow different practices, categorize actions differently, and establish different timeframes that result in a fragmented approach instead of an organized, strategic approach. The lack of definitions, strategy, and approach across the DOD was also identified in a GAO report in 2018, noting the differences between the agencies (Woods 2018, 7).

E. ALT ANALYSIS WITHIN THE REQUIREMENT DEVELOPMENT PROCESS

The time needed to develop the requirement adds more variability and time to contract award. Organizations vary substantially in the time required for requirements development, solicitation, proposal evaluation, and contract award. The requiring activity and the contracting office are the primary stakeholders that impact ALT for service contracts. According to the joint publication (JP) 4-10 Operational Contract Support (Joint Chiefs of Staff 2019, I-5), requiring activities are responsible for all activities necessary to develop and approve contract support requirements. As part of this process, customer activities must identify, define, and codify their requirements before submitting a requirement packet to their local contracting agency. Recent studies examine ALT within the requirements development process and provide insight into the challenges facing contracting personnel and their customers.

Recent studies have examined the interaction between customers and the local contracting agencies in the earliest stages of the acquisition process. During this period, the rapid exchange of requirements documentation between the requiring activity and the contracting agency is imperative to reducing ALT and supporting the requiring activity's immediate needs and tactical operations. McComas, Oliver, and Harrington conducted a multifaceted research approach to determine possible reductions of PALT (2007, V). The research team administered surveys to assess customer satisfaction and monitored the average PALT and the average number of PR returns (2007, 73). The team also performed qualitative analysis by observing all project meetings for ten months (2007, 53). Letterle and Kantner (2019) expanded upon McComas, Oliver, and Harrington's (2007) research using quantitative analysis to identify requirement packet deficiencies and their impact on extending lead time. In addition, Letterle and Kantner studied process improvement techniques to reduce ALT throughout the requirements development process (2019, 37). Finally, Murphy and Perrine (2020) used the DOD-wide Acquisition of Services taxonomy to classify 2,000 service contracts and analyze whether service contract type influenced PALT and purchase request (PR) rejections (2020, 25–27). These three studies are closely

related and utilized similar research designs to examine the influence of several independent variables on PALT.

McComas, Oliver, and Harrington (2007, 59) found that customers experienced frustration due to the lack of familiarization with the software and the lack of hands-on support, which added significant time to the contracting process. Survey feedback suggested that the requiring activity was dissatisfied with the length of time required for data entry, PR approval, and assignment to a contracting specialist (2007, 71). Studies from McComas, Oliver, and Harrington (2007, 73) and Letterle and Kantner (2019, 36) argue that PR returns to the customer were frequent and contributed to higher ALT, especially for complex service requirements. Suppose the customer fails to construct the PR properly. In that case, the contracting agency and vendor must conduct several rounds of communication before the requirement is understood and able to be performed by a potential offeror (Letterle and Kantner 2019, 42). For this reason, the contracting agency often scrutinizes the PWS or SOW, which describes the activities that the contractor must perform within the service contract. Creating this document requires technical expertise rarely available in a combat unit and contributes to unnecessary delays with service contract submission (Letterle and Kantner 2019, 42–43). These findings demonstrate a disconnect between the requiring activity and supporting contracting office on PR expectations. Recommendations within these studies aim to foster a common understanding of the requirement, improve communication, and facilitate acquisition planning between these entities.

Research suggests that the requiring activity and the contracting agency must refine their internal processes to improve PR turnaround time and reduce PALT. McComas, Oliver, and Harrington recommend more active participation among customer units and improving their interface with the PR system to reduce PALT (2007, 73). Murphy and Perrine (2020, 40) add that stakeholders must continue refining and developing measurable requirements to reduce PR returns. In contrast, Letterle and Kantner (2019, 39) believe that the requiring activity and the contracting organization would gain from active engagement from the contracting office, or a dedicated team to provide guidance. An enterprise sourcing solution for general commercial services would also be beneficial to streamline

the contracting process and increase contract management capacity through a procedural approach (Murphy and Perrine 2020, 40).

Opportunities exist to fulfill capability gaps within the requirements development process and expand upon current research. McComas, Oliver, and Harrington's study only included two PALT metrics in their research, limiting their ability to identify root causes and implement system and process solutions. For instance, the authors did not examine the time elapsed between the customer's first submission into PR builder and approval of the requirement packet. Analyzing this variable would improve their understanding of shortfalls within the PR system and produce additional findings to reduce ALT. Letterle and Kantner (2019, 68–69) acknowledged that more advanced software would facilitate analyzing other independent variables such as PR frequency and causes for re-routing contracting requests. Further quantitative research on this subject will help identify the reasons for procurement delays and improve the transition of critical mission requirements from the requiring activity to the contracting office.

F. POLICY

Streamlining acquisition timelines is a priority for the DOD and Congress. Creating a standard definition of PALT, providing guidance for agencies, and incorporating modern business practices are areas of emphasis for the Office of Federal Procurement Policy (OFPP), aiming to reduce the time from the identification of the need to the delivery of the requirement (Wooten 2021, 1). In January 2020, the OFPP published a public notice in the *Federal Register* seeking feedback from the public and industry regarding the proposed definition of PALT (2021, 1). The proposed definition focuses on the time between the issuing of a solicitation and the contract award date. As a result of the newly adopted definition, organizations must report the solicitation issue date in Federal Procurement Data System - Next Generation (FPDS-NG) (Assad 2018, 1). As discussed earlier, this does not capture the time from identifying the need to release of the solicitation. In their study on how long it takes to award a government contract, researchers Gill and Hawkins recommend expanding the definition of PALT to reflect the time from the identification of the need to contract award (2021, 73). To capture this modification in the procurement

timeline, both researchers recommend that the contracting office adds the need identification date to FPDS-NG reporting. Although the need identification date starts the procurement process, it is not included in the official definition. Wooten further expands on the expectation that as the level of technology increases, so will the DOD's ability to track additional data points (2021, 3). Wooten also encourages offices that are already tracking additional data points to continue these efforts, as the additional information benefits management and the evaluation of operations (2021, 3).

Resources such as the PTAI are part of the frictionless acquisition strategies to reduce PALT. The intended purpose of PTAI is to provide a management portal to stakeholders, contracting officers, and program managers (Wooten 2021, 4). However, PTAI does not offer resources for Phase 1, acquisition planning to pre-solicitation. Instead, the frictionless strategy for this phase recommends a facilitated requirements development workshop to create key requirement outputs such as a PWS and performance measurements. The Acquisition Requirement Packages (ARP) handbook offers a similar recommendation for service acquisitions. The handbook outlines that for service acquisitions, a customer can request a Service Acquisition Workshop (SAW) through the MICC office to assist with developing the PWS, performance requirement summary (PRS), and QASP (DA n.d., 3). Although these tools exist to bridge the knowledge gap between the requiring activity and contracting professionals, there is no standardization or process for Phase 1, pre-solicitation. In addition, the workshops are designed at the unit level and not consistent across MICC offices.

In the study conducted by Miranda and McMaster on the Navy's Management and Oversight of Service Acquisitions, both researchers point out that personnel assigned to administer service contracts receive minimal training, resulting in SOW/SOOs not generated at the requirement unit level (2008, V). Based on the data collected in their study, both researchers claimed that the person identifying the requirements does not write the SOW or the SOO, a practice that reflects inadequate requirements management training (2008, 52). A recommendation from their study is that the Navy should mandate the requirement owners to develop their SOW/SOO. Between the lack of emphasis in phase 1 from PTAI, the recommendation for workshops by PTAI and the ARP handbook, and the

findings from Miranda and McMaster, the generation of requirement documents by the end-user is not standardized and lacks emphasis. Further research on the effects of this lack of focus is required to truly measure the time between identifying a need to the award date. Although not included in the official PALT definition, this timeframe is a critical component of the overall procurement timeline.

To correctly track procurement timelines and establish a means for data collection, the Army implemented what is known as Army lead time (ALT), which is the same as acquisition lead time (DA 2018, 1). ALT comprises of ARLT and PALT - Figure 4 (2018, 1). The issuance of a memorandum in June 2018 requiring all Army contracting agencies to use the Virtual Contracting Enterprise (VCE) pushed the effort to more accurately track this new metric defined by the Army. The VCE system delivers the ability to manage and monitor the contracting process from requirements generation through contract administration (Jette and McConville 2018, 1). Within VCE, the Paperless Contract File (PCF) is the contracting file of record that since 2018 includes Requirements Package Assistant (RPA). The RPA tool is a document repository that facilitates the transition of requirements documentation from the requiring activity to the contracting agency, enhancing team collaboration early in the acquisition process. This effort is further reinforced in Army Federal Acquisition Regulation Supplement (AFARS) Subpart 5104.802(f)(i)(5), "where mission partners are required to create cabinets and submit documents to the contracting organization via PCF and contracting officers shall assist requirements owners as necessary to ensure proper utilization of the tool." These efforts spearheaded by the Army are the only resource available that addresses the timeline between need identification and contract award. Gill and Hawkins recommend making prediction models such as the one utilized in their study, machine learning models, available to customers to enable them to forecast needs and track completion dates accurately (2021, 73). The implementation of RPA in PCF is an attempt to provide similar tools to the requirement owner. However, the effectiveness of these tools and their impact on acquisition lead time has yet to be thoroughly studied and remain unknown.

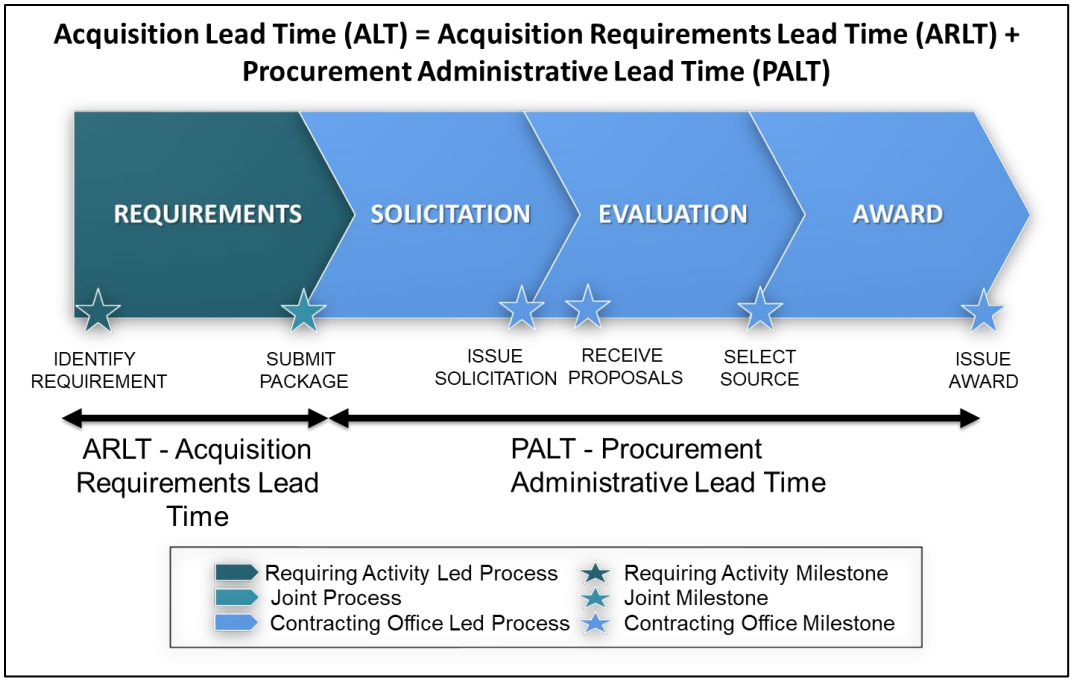

Figure 4. Army Lead Time. Source: DA (2018, 1).

G. TRAINING AND CERTIFICATION

Turbulence in the Defense AWF has harmed recruiting and training efforts over the past 30 years. Total personnel within the Defense AWF decreased from 500,000 in 1990 to 200,000 in 2006, reducing approximately 65% (Rendon, Apte and Apte 2012, 6). Acquisition spending increased by 382% from 1996 to 2006, while acquisition actions increased by 359%, and the AWF decreased by 53 personnel (2012, 6). Efforts to rebuild the AWF began in 2008 because of these shortfalls.

In 2021, GAO's high-risk report found the AWF increased by 57,000 personnel from FY08 to FY20, totaling 183,000 employees, leading to the monumental task of developing the AWF (GAO 2021, 259). Department of Defense instruction (DODI) 5000.66 states that the USD(AT&L) is responsible for establishing accession, education training, and experience requirements (2017, 5). Establishing this responsibility at the strategic level enables DOD to dedicate resources to grow the AWF. Thus, leading to the alignment of training requirements with resources. In recent years, DOD shifted priorities to talent management, emphasizing recruitment, training, and retaining talented

employees. These employees consist of military and civilian personnel, which experience slightly different training plans, cumulating in Defense Acquisition Workforce Improvement Act (DAWIA) level III certification. According to the U.S. Senate Permanent Subcommittee on Investigations, the DAWIA certification is based on a heavy civilian structure through DAU (2014, 28). This situation presents a knowledge management and training challenge that Brigadier General Frank J. Anderson addressed with the below graphic (2014, 7), showing the imbalance of experience regarding the aging workforce nearing retirement. To combat this shortfall, the DOD 2008 NDAA established the Defense Acquisition Workforce Development Fund (DAWDF) that funneled additional resources to support training requirements (2014, 7).

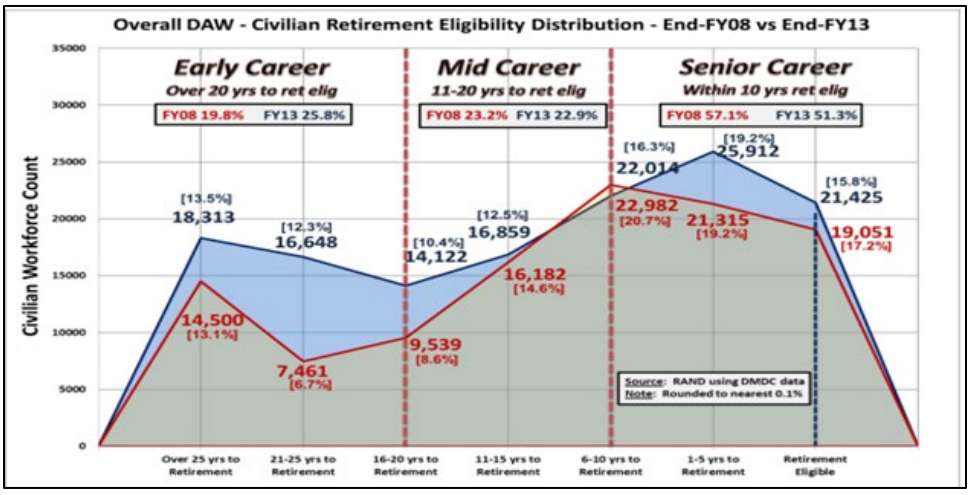

Figure 5. Age of the AWF. Source: U.S. Senate Permanent Subcommittee on Investigations, Committee of Homeland Security and Governmental Affairs (2014, 7).

DODI 5000.66 outlines the certification processes and continuing education requirements. With three levels of certification that coincide with experience. Level one covers fundamental concepts. Level two emphasizes functional specialization. Level three trains advanced acquisition professionals with a high level of knowledge and skills (DOD 2017, 26). Once personnel attain certification, DOD requires continuous learning credits to attain 80 hours every two years to maintain proficiency (2017, 28). This continuous

learning model ensures the AWF stays relevant with policy changes and updates and standardized procedures.

H. ASYNCHRONOUS AND SYNCHRONOUS TRAINING

To meet the training requirement mentioned above, the majority of DAU courses utilize an asynchronous learning model. According to Robey, future contract training will leverage artificial intelligence (AI) due to the pending wave of retirements and loss of institutional knowledge (2016, 36). Another factor in leveraging AI is the current training delivery structure does not challenge millennials (2016, 36). This situation will prompt a training evolution that integrates human instructors and AI to deliver enhanced training to meet emerging AWF needs. The training environment must adapt to evolving requirements to ensure the AWF's application of acquisition concepts to real-world situations.

In addition to training for primary acquisition roles, non-AWF personnel are certified as CORs to manage and oversee contractor performance. COR training occurs through asynchronous and synchronous training courses provided by DAU and the local contracting organization. The COR plays a crucial role in the acquisition life cycle during post-award surveillance, verifying the government receives goods and services per the contract terms and conditions. Currently, COR duties are additional duties. However, the volume of contracts requiring COR support across DOD has led researchers to investigate whether DOD should professionalize CORs (Tatum and Yoder 2019, 28).

Personnel selected for COR duty come from many different military and civilian specialties, which already gainfully employ these individuals, deprioritizing COR surveillance duties. Additionally, Tatum and Yoder found current online and resident COR training efforts are insufficient to provide acceptable COR performance and adequate contract oversight (2019, 32). To combat these shortfalls, researchers proposed training full-time and part-time CORs to ensure a mix of technical and contracting-related skills that they can apply across the continuum of situations (2019, 33). While DODI 5000.72 details COR requirements, it does not fully specify the essential COR functions. The DOD would benefit from adopting a more comprehensive COR model such as the Federal Acquisition Certification for Contracting Officer's Representatives model, "which

incorporates specific technical and professional competencies related to acquisition with performance outcomes aligned to the performance level of the COR" (2019, 33). Another COR training avenue is for DOD to create a COR DAWIA certification (2019, 35). As DOD continues to increase contract awards, COR appointments and training will become a more integrated administrative function due to the COR's role in requirements generation and surveillance.

One of the concerns with the current application of training for non-AWF personnel is the training degradation between the training event and the outcome expected by the organization. When assessing the effectiveness of organizational training, Holton et al. state, "it is critical for an organization to identify competencies in order to obtain the desired vital outcomes by systematically arranging conditions that support the exhibition and development of such stated competencies" (2006, 211). The Army trains non-AWF personnel within the requiring activity by classes included in professional military education (PME) programs, which officers receive at intermittent times throughout their career. These programs are not aligned with specific contractual requirements and lack relevance and sequence to truly obtain desired outcomes. The Army is not the only DOD agency that faces this phenomenon. The way that the United States Marine Corps (USMC) transitions officers into the contracting field reveals a parallel problem within that agency.

The USMC does not have a permanent command structure for contracting officers. The USMC method of filling contracting billets is similar to a utilization tour. An officer receives intensive training on contracting followed by education for a contracting billet, applies that knowledge throughout one assignment, and then transitions back to their former specialty. The USMC uses the terminology of "payback tour" to describe this. Upon completing the standard operational tour within their original functional branch after their contracting payback tour, they reintegrate into the contracting workforce. This process results in contracting personnel who have left the field for an extended period.

In his thesis research regarding restructuring the USMC contracting billets into a permanent command, Corcoran addressed concerns with training atrophy (2000, 48–50). His research indicated a survey pool of USMC contracting officers where most respondents replied that the iterative nature of their assignments meant that they were unable to stay

current with contracting policies and procedures during periods of absence. This finding reveals that even personnel explicitly trained in contracting report a training degradation through atrophy, suppressing much of their valuable knowledge and experience (Corcoran 2000, 26). This loss was further detailed by many interviewees, with one stating that "being away from the contracting spectrum, the officers will then see their contracting skills rapidly deteriorate because it is such a technical field that is continuously changing" (2000, 57).

Upon accession into the contracting field, these officers received an education through a formal and mature contracting program in residence at the Naval Postgraduate School, Monterey, CA. They received a graduate-level education in the contracting field. They then conducted at least one tour as a contracting officer for three years. Even with this education and experience, respondents unanimously reported that the time away from their contracting position significantly impeded their ability to reintegrate into the contracting workforce effectively. Army non-AWF training depth is at most three weeks in duration, typically delivered via blended or strictly online platforms. Compared to the 4.5 years of concentrated academic and on-the-job training that USMC contracting officers receive. A parallel training degradation rate applied to non-AWF personnel in the Army would result in a workforce which is for all practical purposes untrained and unable to achieve the outcomes required by the Army. Numerous services within DOD face challenges on the correct sequencing of institutional training and education for personnel involved in the contracting process.

This steep learning curve creates personnel challenges that require DOD to balance the certification process to select the right people to receive the proper training at the right time. This certification divides into two parts: experience and DAU education. DOD must directly influence the AWF training pipeline by consolidating education requirements into one comprehensive course, such as the 522 curriculum. Contrary to this belief, Carman and Jones's qualitative study found the level of education does not effectively correspond to the level of responsibility (2020, 11). They employed a comprehensive survey of the AWF, which included contracting, program management, and engineering. Additionally, they found that training above level 1 had little to no significant value within the population

with less than two years of experience. Level 1 emphasizes fundamental concepts, competencies, and relationships. Furthermore, findings showed that individuals with greater than three years of experience had the highest knowledge gained from instruction (2020, 14). This accentuates the difference between learning and experience, suggesting training and education must occur at the right time to provide effective results and high performance within the AWF.

Machis recognizes the importance of Carman and Jones's research by emphasizing the importance of experiential learning to enable critical thinking and the application of core acquisition concepts (2015, 33). Experimental learning, otherwise known as on-the-job training, allows contract specialists to understand the nuances of real-world challenges and the application of innovative contracting solutions. Applying this learning model to government contracting requires integrating expert coaching or support to challenge the employee to find the solution based on research and experience (2015, 34). This expert coaching can be in the form of flash mentoring, exchange programs, or industry coaches (2015, 35). Flash mentoring is a one-time discussion with a mentor. Exchange programs focus on rotating employees to different acquisition organizations to experience other technical and organizational challenges. Industry coaches can assist in the acquisition process and may inject innovation into the process (2015, 35). Leading to the conclusion of training factors, including selecting the right person at the right time to receive the proper training, is the formula for success.

According to Bensch (2018, 280), training stimulates policy-compliant behavior and therefore allows DOD to implement policy changes at the speed of relevance. Bensch (2018, 265) employed quantitative and qualitative methods that leveraged multiple regression analysis in combination with surveys. Bensch's study supplemented the study by Carman and Jones, suggesting that DAU training will result in knowledge when given the right personnel/time. Additional findings showed that resident courses provided the most significant learning and behavior changes compared to online classes, attributing the difference to the resident course's collaborative nature (Bensch 2018, 280). The requirement for resident DAU classes for level 2 and level 3 DAWIA certifications showcases these findings.

Carman and Gibson (2016) furthered this research topic by exploring the knowledge, experience, and training in incentive contracting. They employed quantitative and qualitative methods, utilizing the Kirkpatrick evaluation model, which evaluates the reactions, learning, job behavior, and results in a training and work environment (4). They found a strong correlation between training/experience gaps and knowledge, suggesting that reduction in training/experience may affect knowledge (8). In other words, personnel had the training but did not fully understand the conceptual application. They suggested creating a knowledge-sharing portal focused on incentive contracting as a resource to share lessons learned, proven tactics, techniques, and procedures (TTPs), and organizational successes (2016, 14). Expanding the idea of a shared repository of information to all subcomponents of the contract life cycle to include service contracts would streamline the contracting process and reduce ALT.

I. OPERATIONAL CONTRACT SUPPORT

To define the relationship between the requiring activity and the contracting agency, JP 4-10 Operational Contract Support categorizes three functions that the requiring activity must conduct in concert with the contracting agency: contractor management, contract integration, and contracting support. The critical OCS capability gaps also discuss this seam between the requiring activity and the contracting agency. Figure 6, represents the ten prioritized critical OCS capability gaps. According to Kimsey (2015, 35) the list of capability gaps guides the joint force to institutionalize and improve. The two capability gaps from the Operational Contract Support Action Plan FY 2013–2016 (DASDPS, 2013) and analyzed by Kimsey (2015, 35) that coincide with the seam between requiring activity and contracting organization are: priority two, "limited ability to integrate OCS into capability and task planning, operational assessments, force development, training, readiness reporting, lessons learned, and continuous process improvement;" and priority nine, "no common capability to simply, rapidly, and accurately generate and coordinate (including deconflicting and prioritizing) acquisition-ready requirements packages."

Critical OCS Capability Gaps by Priority	
1	Insufficient ability to leverage the full potential of OCS because of insufficient awareness and appreciation for the significance and complexity of OCS.
2	Limited ability to integrate OCS into capability and task planning, operational assessments, force development, training, readiness reporting, lessons learned, and continuous process improvement.
3	Lack of a human capital strategy—recruit, train, track, and retain—for all OCS functions.
4	Lack of personnel, rules, tools, or processes to integrate OCS into theater plans across all phases, all directorates (J-staff functions), and with non-DoD partners.
5	Insufficient ability to visualize, track, and monitor types, location and status of OCS capabilities in theater.
6	Insufficient leadership oversight and awareness to address risk, opportunities, resources, communications, transitions, improvements, and inter-contingency issues associated with OCS.
7	Inability to identify existing contract vehicles and capabilities by region and to direct integration of common contract support.
8	Insufficient capacity to effectively administer, oversee, and close contracts to ensure contractor performance is properly tracked and accessible and desired outcomes are achieved.
9	No common capability to simply, rapidly, and accurately generate and coordinate (including deconflicting and prioritizing) acquisition-ready requirements packages.
10	No common means to identify contractors and control base access.

Figure 6. Identified OCS Capability Gaps. Source: DASDPS (2013) cited by Kimsey (2015, 35)

Joint doctrine is not the only driving force behind training emphasis for OCS. The Army created specific training to designate proficiency in OCS for non-AWF personnel due to the Gansler commission. The Gansler Commission was one of many efforts, "from 2008 to 2014, the vast number of lessons learned, best practices, and the doctrine in use today emerged. At this time, non-acquisition education expanded. The Army Logistics University (ALU) began offering a 2-week focused course designed for officers and non-commissioned officers involved with planning and integrating OCS at a tactical or operational level" (Kimsey 2015, 32). Kimsey further discusses the relationship between agencies and their level of training while describing the contract management maturity model (2015, 40) and three pillars for integrative success:

> In 2003, Dr. Rene Rendon developed the Contract Management Maturity Model © (CMMM) to assess the maturity of contract management processes within an organization (Rendon, 2004). CMMM provides organizational leaders a tool to map and transform a procurement process, like planning for OCS, from tactical to more integrated and optimized levels (Garrett & Rendon, 2005). The author focuses on measuring the maturity of a process in practice within an organization by issuing surveys and measuring the responses. The model used in this project does not administer

> surveys; instead, it measures the available doctrine, personnel structures, and platforms for maturity. (2015, 42)

Kimsey (2015, 42) discusses this model and the three pillars of success as identified by E. Cory Yoder. Kimsey (2015, 42) further states that Yoder's model "incorporates tools designed for analyzing various aspects of contracting processes designed to achieve an efficient and effective mix of resources." This model designates three pillars required for success as personnel, platform, and protocols. Kimsey states:

> This (personnel) pillar recognizes that an organization needs the right mix of credentialed personnel, including the acquisition and non-acquisition workforce. OCS is a spectrum of activities that incorporates more than logistical contracting tasks. Effective OCS planning and supporting OCS plans are developed through non-acquisition personnel integrating the plan throughout each staff section, requiring activity, commander, and engaging the acquisition staff early. Evaluating the pillar means looking at both the skills and mix of both acquisition and non-acquisition personnel. Also, personnel include rating the level of integration of OCS across staffs in the planning process. Finally, personnel consist of all stakeholders influencing the planning process. (2015, 43)

In applying the personnel pillar, Kimsey identifies the organizational demand for the skills, knowledge, and integration of both AWF and non-AWF personnel (2015, 44). Kimsey further explores the joint force OCS metrics by synchronizing the two aforementioned models into a hybrid model- Hybrid Integrative Planning Maturity Model (2015, 45). The table below displays this model.

Table 1. Hybrid Integrative Planning Maturity Model. Source: Kimsey (2015, 46).

Maturity Level	Personnel		Protocols	Platforms
	Acquisition	**Non-Acquisition (NA)**		
5 Optimized	Acquisition member or unit *permanently* assigned to supported unit, and integrated into NA staff during all phases.	NA planner *permanently* assigned to supported unit and integrated into acquisition staff.	Performance metrics as well as planning tasks defined for all staff sections, and external stakeholders identified.	Lessons learned platforms developed and planning platforms integrated into core organizational processes.
4 Integrated	Acquisition staff assigned and integrated into supported unit during all phases.	NA planner integrated into supporting acquisition staff.	Broad planning tasks defined for all staff sections and external stakeholders identified.	Planning platforms required and integrated into organizational processes.
3 Structured	Acquisition staff assigned to support organization staff during all phases.	NA planner assigned but not integrated.	Only logistical and acquisition planning tasks defined.	Planning platforms required and developed.
2 Basic	Acquisition personnel assigned only for contingencies.	NA planner identified only for contingencies.	Only acquisition planning tasks defined.	Planning platforms developed but not required.
1 Ad-Hoc	Acquisition personnel neither assigned nor integrated into supported unit.	NA planner unidentified.	Planning tasks undefined.	No platforms required or developed.

Kimsey (2015, 45) further analyzes Yoder's pillars to argue that the third pillar (protocols) is the doctrinal foundation we use for OCS. By analyzing the task distribution outlined in JP 4-10, Kimsey aligns Yoder's first pillar of success to acquisition personnel. The remaining two pillars are protocols and platforms, as logistical tasks charged to non-

AWF personnel (2015, 45). This alignment is of concern when we apply the training degradation experienced by both the acquisition and non-AWF personnel. The Army's training to supplement the doctrinal framework is through the ALU's 3C OCS officer training program, intended for logistics planners and relevant personnel at the tactical level.

The design of ALU's OCS officer training program develops task proficiency in multiple OCS tasks. Kimsey identifies supported unit functions that are part of the planner's primary duties (2015, 64). Three of these tasks are the focus of our research. The first task, which has a bearing on our study, is to "develop, review: Statements of Work (SOW)/Performance Work Statements (PWSs), Independent Government Estimates (IGEs), requirement justification documentation, and purchase requests" (2015, 64). The second, "participate in unit operational planning teams to apply OCS expertise to the planning process" (2015, 64). And the third, "coordinate staffing and submittal of requirements packages" (2015, 64). Kimsey defines the current state of this training as a "first step to train non-acquisition personnel, at an operational level, to become active and informed OCS participants" (2015, 65). Despite the Army's efforts to resource this problem with relevant task training, there are multiple issues implementing this training at the operational level.

The training audience consists of non-AWF mid-grade staff officers and NCOs on staff who have an additional duty to work as operational-level logistical planners (Kimsey 2015, 63). The frequency with which these personnel turnover is at most every two years. However, the contract duration for a service contract requirement can vary from days up to five years. As a result, inconsistencies occur where personnel in these positions are exposed to the contracts they are trained to support, with some personnel never getting involved in the contracting process. This leads to the more significant issue that the OCS officer training sequencing is not aligned to the organization's outcomes for success. Compounding this problem, the Army has no formal feedback mechanism that would provide units their proficiency status in the OCS tasks that the ALU program intends to develop.

Many brigade combat teams (BCT) send their logistics planners to achieve the OCS officer training as the operational schedule of the brigade allows. As opposed to being

linked to an operational outcome with a focal point in time. BCTs regard their personnel as trained and qualified in OCS tasks due to their completion of training. This could result from the lack of a time-based evaluation on task proficiency for these personnel at the BCT level. Evaluation for most tasks at the BCT level occurs in a culminating rotation at a combat training center (CTC), such as the National Training Center (NTC) or the Joint Readiness Training Center (JRTC). However, evaluation for OCS tasks does not occur at either NTC or JRTC. OCS task evaluation is absent for requiring activities until the division level, where staffs are evaluated by contracting observer controller / trainers from the Mission Command Training Program who specialize in assessing OCS tasks which the division conducts during validation exercises such as "Warfighters." As there is no culminating event through which the BCT can have its task proficiency evaluated, the performance of a BCT's ability to conduct OCS goes unobserved and has no formal measure.

The lack of a measure of effectiveness generates concerns with the validity of training provided to non-acquisition workforce personnel tasked with OCS tasks. Every requirement for a service contract begins with the need of a requirement developed by the requiring activity. As is apparent from the current body of knowledge, no metric or assessment mechanism exists to evaluate how proficient these personnel perform their functions, resulting in an organizational outcome. This void in knowledge and resources represents the research we intend to pursue.

J. SUMMARY

The research supports significant progress is evident across the last 20 years regarding standardization of terms, training, and tools. However, despite the improvements, a lack of integration persists across DOD regarding the acquisition of services. The processes, procedures, personnel, and training categories are improved but not effectively synthesized to create a synchronized practice. As a result, before a solicitation is issued, the lead time remains uncharted, and so does its impact on the overall PALT. Training constraints and lack of standardization are common factors that are

assumed to affect this timeframe. However, there is no research focused on this section of the acquisition lead time to determine its true impact.

III. METHODOLOGY

The methodology chapter provides an explanation of the mixed methodology approach used to conduct the research. This chapter discusses the quantitative and qualitative data collected and analyzed to address the research questions. A further explanation is provided with respect to the research environment, the various contract types, and the research matrix used to frame the analysis.

A. DATA OVERVIEW

First, the research team collected, reviewed and analyzed quantitative and qualitative data to identify what factors influence ALT. ACC provided quantitative data from FY19–FY21 to determine if organization type and contract types (supply, service, construction) influence ALT. The first dataset in this study consists of 34,730 records broken down by FY as follows: 9,796 for FY19; 12,736 for FY20; and 12,198 for FY21. Second, the research team issued a comprehensive survey to AWF, and non-AWF personnel. The survey provided qualitative data to determine if procurement tools and training affect the quality of requirement packets and first-time acceptance by a contracting agency, thus reducing customer ALT. Third, the research team analyzed a sample group that consisted of 35 records to identify the reason for the return of requirement packets.

1. Quantitative Data Summary

This capstone study analyzed 34,730 contract actions from the VCE from FY19–FY21. VCE is the mandatory program of record for agencies within ACC to manage, register, and file contracts using a virtual database. VCE consists of sub-systems to include the PCF and Virtual Contracting Enterprise-Business Intelligence (VCE-BI). The research team used both systems to access the required data for analysis. Within PCF, the RPA function provided pre-award data such as key pre-award dates, average time spent during requirement packet exchange between requiring activity and the contracting agency, and the most common reason for the return or rejection of requirement packets. The VCE-BI data provides the ARLT for individual actions, which the research team aggregates at various levels for analysis.

2. Qualitative Data Summary

The capstone study collected 65 surveys from two sample groups. The first group consists of members responsible for generating a requirement packet from requiring activities such as active Army divisions, brigades, battalions/squadrons, public works and installation management (DPW/IMCOM), combat capabilities development centers (CCDC), program offices, and research labs. The second group consists of contracting members from contracting agencies such as contracting battalions, brigades, MICC, and ACC CTRS. The survey presented each group with a set of tailored questions focused on determining the impact of training, utilization of existing procurement tools, and recommendations for improving ALT. The questions presented did not involve human research; therefore, the survey did not require a formal Institutional Review Board.

In addition, the research team reviewed 135 contract files from MICC Fort Hood, one of the agencies studied during the quantitative data analysis, to identify factors that lead to the contracting agency returning requirement packets to the requiring activity. The 135 contract files consisted of a mixture of contract types to include delivery orders, task orders, and purchase orders. Each contract file was reviewed to identify the use of the RPA tool, primarily the customer rework aspect of the tool that identifies which document needs customer revision. Out of 135 contract files reviewed, 35 were selected for further analysis using Kendal's coefficient of concordance and Pearson Chi-squared distribution to measure agreement among document types and test the null and alternative hypotheses.

B. RESEARCH DEFINITIONS

1. Research Environment

The research team based their research on identifying the contributing factors to ALT in DOD contracting agencies. The literature review was broadly scoped, with the data collection environment more focused on Army contracting and requirements generation agencies. The research team established the parameters of study to those actions occurring in CONUS locations. Though contracting agencies at OCONUS locations are not exceptional in the processes that contribute to lead time related to the rest of the Army, they are operating under conditions that present enough differences within the requirements

handoff phase to be considered substantially different. The research team also limited the study to actions that occur under a $2M threshold. Contracting actions above this threshold generally require organizational warranting procedures that would alter the relationship between requirements generation and contracting beyond the scope of the intended study. The research team also removed contracting requirements and resulting actions using procedures for emergency assistance or disaster relief. The urgent nature and emphasis to which emergency contracting actions are subject result in efficiencies within the window of research that are not found in non-emergency type contracts.

2. Contract Types

The research team developed and categorized contract types from experience within the contracting field combined with relevant literary research. The categories and summaries are in Table 2. An ordinal scale is used to define the complexity of the contract requirement packet, with a value of 1 being the simplest and 5 being the most complex. Variables within the scale were the impact and number of documents required for a requirement packet of that type of contract action.

These variables were defined to generate a general but objective measurement of contract complexity relative to other types of contract actions. These variables should not be used as a sole measure of contract requirement complexity but are focused on a general metric of complexity implemented to compare contract types. Some examples of those variables are the Service Contract Approval Form, the Work Statement, and the Internal Government Cost Estimate. These are variables because they are not required components for all contract actions. The complexity scale in Table 2 is based on these variables within the requirement packet and the amount of training and resources that the requiring activity possesses.

Table 2. Contract Action Complexity Matrix. Adapted from FAR.

Contract Action	Type of Instrument[1]	Summary	Requirement Packet Complexity	Obligation Threshold
Delivery Order	F	Order for supplies placed from an existing contract vehicle or the Federal Supply Schedule[2]	1 Low	As defined in contract vehicle
Task Order	F	Order for services placed from an existing contract vehicle or the Federal Service Schedule[2]	2 Low	As defined in contract vehicle
Purchase Order – Supplies	P	Offer by the Government to buy Supplies upon specified terms and conditions using Simplified Acquisition Procedures[2]	4 Low-Moderate	$250K - $15M[3]
Purchase Order – Services	P	Offer by the Government to buy Services upon specified terms and conditions using Simplified Acquisition Procedures[2]	5 Moderate	$250K - $15M[3]
Contract – Supplies	C	Contracts for supplies, except for Indefinite Delivery type contracts, with award value over the SAT; and cost reimbursable contracts under the SAT not using Simplified Acquisition Procedures	7 Moderate-High	Unlimited
Contract – Services	C	Contracts for services, except for Indefinite Delivery type contracts, with award value over the SAT; and cost reimbursable contracts under the SAT not using Simplified Acquisition Procedures	9 High	Unlimited

[1] IAW FAR 4.1603(a)(3)
[2] IAW FAR 2.101
[3] The simplified acquisition threshold is $250K, except that it is: $500K for humanitarian aid and peacekeeping operations outside the United States; $800K when for supplies and services in support of contingency operations, CNBCR attack, disaster relief within the United States, and $1.5M when for supplies and services in support of contingency operations, CNBCR attack, international and domestic disaster relief outside the United States. Simplified Acquisition Procedures may be used for contract actions not exceeding $7.5M when the contract contains only commercial supplies and services, and $15M when for commercial supplies and services in support of contingency operations, CNBCR attack, international and domestic disaster relief.

3. Research Matrix

The research team used a dendritic approach to decompose the research questions. This dendritic approach assisted the team in ensuring that the data collection techniques would yield an analysis that is directly relevant to a question that helps in the understanding of the problem statement from various perspectives. This approach resulted in a matrix by which the team analyzed the research questions across different elements of the research environment. The team further decomposed the questions for a more in-depth analysis, allowing the team to focus on data collection and categorization. The matrix is located in the Appendix and includes five elements from the research environment for the 13 supporting questions. These five elements are the approach used, the source of the data collected, the field of data within that source, and the analysis that the data was projected to support.

C. QUANTITATIVE DATA

The ARLT measurement is the research team's primary focus. ARLT is the time that has elapsed from the customer's initial submission of its requirement packet to its approval from the local contracting agency. PALT begins when a procurement-ready requirement packet is accepted and ends upon contract award. ALT encompasses the entire duration, from the customer's initial submission of their requirement packet to the contracting agency to contract award. For an example requirement, it takes 100 days from the point the customer begins the work on the contract to when the contract is awarded; the ALT is 100 days. It took 40 days for the contracting office to accept the requirement packet from the customer, establishing the ARLT as 40 days and the PALT as 60 days (100-40). As depicted in Figure 7, calculations for ARLT utilize the following expression: $ARLT = ALT - PALT$.

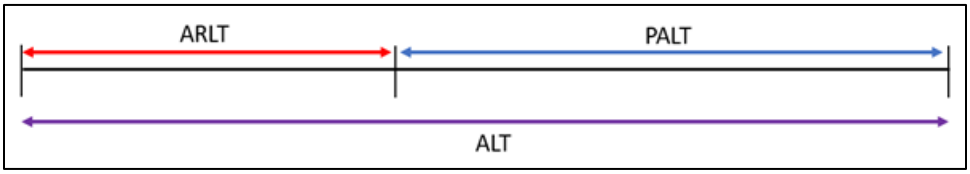

Figure 7. ARLT Measurement.

Quantitative research included data collection and analysis using the VCE tool to identify the root causes of ARLT delays and explored variables that contribute to increased lead time during the requirements process. In addition, examining frequent buys across the ACC organization provided a standard lens for viewing the problem, based upon the Office of Management and Budget (OMB) spending categories. Spending categories are a standard method used by the federal government to classify contracted goods and services. Two of ACC's top spending categories in the data from FY19–FY21 included facilities maintenance and alteration of real property, and information technology procurements.

Comparing four different contracting environments, including ACC centers, installation support within the MICC, expeditionary contract support within the MICC, and the U.S. Army Corps of Engineers, demonstrated how the organizational type influences ARLT. Reviewing several different contract types across ACC organizations helped determine the influence of contract type on requirement lead time. Three contract types were prevalent across all organizations: task orders or delivery orders (F-type), purchase orders (P-type), and definitive contracts (C-type). F-type contracts offer ordering quantities and flexibility in delivery, creating different requirement demands based on the end user's operational needs. Purchase orders and definitive contracts have varying levels of complexity; therefore, ARLT fluctuates widely based on the acquisition cost, complexity, and nature. Product Service Codes (PSC) delineate all products and services procured by the federal government. Therefore, the research team used the PSC to evaluate ARLT variance based on procurement classification as a supply or service requirement. Moreover, the research team analyzed the contract execution profile across PSCs to identify trends and determine ARLT impact.

There are challenges with performing data analysis in the primary contracting system of record, VCE. First, except for the contract award date, almost all data requires manual entry by either the requiring activity or the contracting office. As a result, contracting employees can manipulate contracting milestone dates within VCE-PCF, including the ARLT end date. Second, the funding document frequently serves as the final validation of the requirement packet, which is not always the case. For instance, according to ATP 4-10 (DOD 2016, 3–3), there is additional documentation that the contracting

agency must accept before proceeding with the acquisition of products or services. Finally, the research team conducted thorough data filtering to exclude erroneous data, including numerous records with an ARLT of less than one. Despite these challenges and data cleaning efforts, ample information remained to perform quantitative analysis.

The System of Award Management (SAM) database is the official government system for posting government procurement notices or solicitations to industry. The research team cross-referenced the PCF ARLT end date with the solicitation date posted within the SAM database to validate the accuracy of ARLT in PCF. These dates do not coincide precisely because the contracting team requires additional time to draft the solicitation, conduct review and approval procedures, and publish the solicitation to the government-wide point of entry. However, this comparative analysis will assess the validity of ARLT metrics within VCE. In addition, running a correlation between the PCF ARLT end date and SAM solicitation date enhance the research team's ability to exclude erroneous data points in the quantitative research.

D. QUALITATIVE DATA

The research team leveraged a survey comparing the results with a relative importance weight (RIW), Kendall's Coefficient of concordance, and Pearson Chi-squared distribution to analyze procurement tools and acquisition training factors. The research team collected responses through a digital survey to determine the RIW of the various factors that influence requirement packet acceptance. Respondents of the survey are comprised of the following two groups: AWF personnel and non-AWF personnel. AWF Personnel consists of contracting organization members that are primarily responsible for processing requirement packet to contracts. Non-AWF personnel are requiring activity personnel who are primarily responsible for generating a requirement packet to procure supplies, services, and/or construction. Both groups of surveyed personnel possess a wide range of experience (less than one year to more than four years) and occupation (military officer, military enlisted, and DOD Civilian). The research team identified participants through professional networks such as ACC CTRS and the Office of the Deputy Assistant Secretary of the Army (Procurement), (ODASA[P]).

The survey consisted of focused questions on the following topics: why AWF personnel reject requirement packets, the usage of acquisition tools in the development and submission of requirement packets, the level of training required, and which positions should receive training. First, the team compared the reasons for packet rejection to identify the primary reasons. Subsequently, the question on acquisition tool usage showed the contracting agency's relative familiarity with available contract requirement development aids. The last topic area focused on training, showing which positions gain the greatest benefit from contract-specific training/certification. The survey results can inform organizations and force managers to allocate resources and designate the most beneficial positions to receive requirement generation training.

Furthermore, since the data is ordinal and nonparametric, a minimum sample size of 30 responses is used. In their article, Clowney, Dever, and Stuban (2016, 316) explain why 30 is often used by many statisticians as an appropriate sample size:

> The various works on estimating an appropriate sample size rely on assuming some degree of normality. To be confident in the sample size, but maintain the integrity of the nonnormality of the nonparametric data, a sample size of 30 was an appropriate sample for the three groups.

The survey asked respondents to rank which documents were the reason for requirement packet rejection in order of relative importance. The team differentiated the expert perceptions of the relative importance of packet rejection between the groups by developing and testing two hypotheses:

> **Supports research question/deliverable 1 to identify and evaluate factors that affect the quality of the requirement packet.**
>
> H_0: There is no agreement among groups of the relative importance of factors that influence requirement packet rejection.
>
> H_1: Agreement exists among groups of the relative importance of factors that influence requirement packet rejection.
>
> **Supports research question/deliverable 2 with data that supports which TOE position would receive the most benefit from contract training.**
>
> H_0: There is no agreement among groups on which positions should receive training.

H_1: Agreement exists among groups on which positions should receive training.

To further analyze factors that lead to the return of requirement packets from contracting agency to requiring activity, the research team assessed 35 selected contract files in-depth. Table 3 represents the seven categories used during the review. If the contract file was inactive, did not utilize the RPA tool, or did not use the customer rework tool feature, the file was not considered. The research team analyzed each contract file against the seven categories to identify which factor influenced the return of the requirement packet for customer rework. If a contract file was returned for any of the seven categories, a value of 1 was given under that specific category. If that category did not apply to the contract file as a reason for return, a value of 0 was assessed. The study used Kendal's coefficient of concordance and Pearson Chi-squared distribution to measure agreement among document types and test the null and alternative hypotheses.

Supports research question/deliverable 1 to identify factors that lead to a rate of return for requirement packets.

H_0: There is no agreement among the document types that influence the rate of return of requirement packets.

H_1: Agreement exists among the document types that influence the rate of return of requirement packets.

Table 3. Reasons for Return Categories

Category	Document Type
Requirements Definition	PWS, QASP, Performance Requirements, Project Description
Cost Estimate	Independent Government Estimate (IGE)
Funding Document	Purchase Request (PR)
Research Document	Market Research Report (MRR)
Justification and Approval Document	Sole Source, Limiting Competition
Exhibits	Drawings, Technical Exhibits
Service Document	Request for Service Contract Approval (RSCA)

E. SYSTEM ENGINEERING TOOLS AND ANALYSIS TECHNIQUES

The capstone study utilizes RIW analysis to evaluate the elements of the survey responses. RIW is a weighted measure that compares the importance of differing attributes within respondents. Weights were assigned to a collection of numerical survey responses, with the most frequent response assigned the highest value. The research team calculated the RIW for responses using the following equations (Salunkhe and Patil 2013):

$$RIW_j = \frac{\sum_{i=1}^{5} a_i n_i}{\sum_{j=1}^{N} x_j} \times 100$$

Relative Importance Weight
RIW_j = the relative weight important for document/training position j
a_i = the weight given to response (i=1,2,3,4,5,6,7)
n_i = the number of people who responded "I" for document/training position j
x_j = the sum of all weighted responses for the j^{th} document/training position
N = total number of factors

The team determined a significant difference between the rankings of the two groups' responses by applying the analytic tool Kendal's Coefficient of concordance. The coefficient is a nonparametric statistic appropriate for assessing the degree of agreement among judges. The team also used Kendall's concordance coefficient to identify the level of agreement between the document types of each category and the reason for the return of a requirement packet. This tool has a range of zero to one, with a rating of zero indicating no agreement, and alternatively, a rating of one indicating strong agreement (Grzegorzewski 2006).

$$S = \sum_{i=1}^{n} (R_i - \overline{R})^2$$

$$R_i = \sum_{j=1}^{m} (r_{ij})$$

$$\overline{R} = \frac{1}{n}\sum_{i=1}^{n} R_i$$

S = sum of squared deviations
R_i = rank of given factor
$\overline{R}$ = mean value of the total ranks
r_{ij} = rank given to the i^{th} factor to the j^{th} respondent
n = total number of factors

$$W = \frac{12S}{m^2(n^3 - n)}$$

m = total number of respondents
n = total number of factors
W = 1, then all respondents have been unanimous, and each respondent has assigned the same order to the list of factors.
W=0, then no overall trend of agreement among respondents, making them essentially random.

This study used the Pearson's Chi-squared test to determine the agreement of the factors that influence requirement packet rejection and where to apply training resources. The test allowed the team to identify which requirement packet documents were returned most frequently. This result represents the areas that should receive increased focus during training. Since most requirement packets are rejected the first time due to ill-prepared documents, focused training will directly impact the quality of the documents, passing contract review the first time. If the results are positive, there will be a consensus on which documents resulted in returned packets between the two groups. Additionally, it would show which positions would benefit the most from training. If the results are negative, there is no agreement on the reasons for rejection, leveraged tools, and requiring activity training; more research would be necessary to identify and understand the root causes and training mitigation strategy. To further identify what factors influenced the return of requirement packets, the research team used Pearson's Chi-square test to analyze the 35 contract files to determine agreement among the factors that caused the return of a packet for customer rework. The test results aim to determine if there is an agreement between the document types that influence requirement packet rejection from the two surveyed groups and the analysis conducted on the 35 contract files that determined the reason for return for

customer rework. The Chi-squared equation used in this analysis is as follows (Clowney, Dever, and Stuban 2016, 319):

$$x^2 = m(k-1)$$

k = number of factors
m = number of groups

This study also uses model-based systems engineering tools to map the contracting process for the types of contract actions defined in section III.B.2. The mapping was conducted by use of enhanced functional flow block diagrams, activity diagrams, and sequence diagrams. These diagrams were helpful to establish the flow of labor and activity across organizations and personnel. This process was analyzed and compared with the process outlined in the Contract Management Standard™ from ANSI/NCMA ASD 1-2019 (National Contract Management Association 2019).

IV. ANALYSIS

The analysis chapter presents the results of quantitative and qualitative data analysis. This chapter provides a detailed analysis of the quantitative data collected from FY 19–FY21 to establish a foundation for the research. It also provides conclusions and recommendations based on statistical tests and associated hypotheses conducted on qualitative data. Finally, it summarizes the results observed during the study.

A. QUANTITATIVE FINDINGS

The research team used a quantitative approach to identify the degree to which the acquisition type (service/supply) impacts ARLT. The quantitative analysis establishes this by utilizing three FYs of contract data from ACC. Data analysis occurred against several factors to establish whether the observed phenomenon of increased ARLT for service actions can be explained by differences in organizations, contract types, or time periods. The research team also evaluated the effect of standardized system resources on ARLT.

The first step in analyzing ARLT is related to the categories of contract actions, measuring the requirements lead time for service contracts versus the requirements lead time for supply contracts. The team conducted this analysis since documentation and complexity demands in a requirement packet for a service contract are more intensive than those for a supply contract.

Figure 8 shows that a difference exists in the requirements lead time between service contracts and supply contracts. Although the factors that impact the overall acquisition lead time for services contracts are noteworthy, those factors are not present in the analysis. The data we are analyzing is measuring the process during the early phase of a contract life cycle which occurs before the contracting agency accepts the requirement packet. Measuring the requirements lead time instead of the total lead time allows the team to remove those external factors from our analysis and focus on the requirements generation phase of the contract life cycle.

Supply or Service		Fiscal Year 2019	2020	2021	Grand Total
Service	# of Actions	4,252	6,284	8,209	18,745
	Avg ARLT	33.58	29.77	28.99	30.29
	Median ARLT	16.0	14.0	14.0	14.0
Supply	# of Actions	5,544	6,452	3,989	15,985
	Avg ARLT	26.47	26.64	23.85	25.89
	Median ARLT	14.0	14.0	11.0	13.0
Grand Total	# of Actions	9,796	12,736	12,198	34,730
	Avg ARLT	29.55	28.19	27.31	28.27
	Median ARLT	15.0	14.0	13.0	14.0

Average and Median figures represent days.

Figure 8. Average ARLT for FY19–FY21.

Multiple measures of central tendency were utilized, with both the average and median requirements lead time being higher for services than for supplies, as displayed in Figure 8. At the aggregate level, the data reveals that requirement packets for service contracts generally take about one business week longer to be accepted by the contracting office when using the average as the measure of central tendency and two days longer when using the median. This data indicates that the increased documentation and complexity of a contract requirement during the requirements generation phase extends the requirements lead time, and by inclusion, the overall acquisition lead time.

It is also possible that other factors may impact the average or median requirement lead time. Therefore, the team attempted to isolate these factors as variables to assess if the increased requirement lead time for service contract requirements is persistent and to infer whether or not one of these variables could be causal or explanatory in nature. The first attempt of this effort was to identify whether or not a difference exists among the organizations that decompose the ACC.

The research team aggregated the contracting actions in the quantitative dataset by FY to calculate the average duration for ARLT and the median duration for ARLT. Figure 9 represents the results of the calculated statistics by FY, sub-command, and

procurement type (supply or service). Figure 9 uses the two largest components of ACC. The two components shown are the MICC and ACC CTRS, which are the contracting centers that support systems-level acquisitions and align with Program Executive Offices for the Army. Figure 9 shows that the difference in ARLT between service contract requirements and supply contract requirements does exist regardless of the sub-command.

Awarding Sub Command	Supply or Service		Fiscal Year 2019	2020	2021	Grand Total
ACC CTRS	Service	# of Actions	2,193	3,130	4,289	9,612
		Avg ARLT	41.64	32.56	30.44	33.68
		Median ARLT	22.0	15.5	15.0	17.0
	Supply	# of Actions	4,160	4,863	3,210	12,233
		Avg ARLT	27.26	28.31	24.22	26.88
		Median ARLT	14.0	14.0	11.0	14.0
	Total	# of Actions	6,353	7,993	7,499	21,845
		Avg ARLT	32.23	29.97	27.78	29.87
		Median ARLT	16.0	14.0	13.0	14.0
MICC	Service	# of Actions	2,059	3,154	3,920	9,133
		Avg ARLT	24.98	27.01	27.41	26.73
		Median ARLT	12.0	12.0	12.0	12.0
	Supply	# of Actions	1,384	1,589	779	3,752
		Avg ARLT	24.08	21.56	22.34	22.65
		Median ARLT	13.0	12.0	10.0	12.0
	Total	# of Actions	3,443	4,743	4,699	12,885
		Avg ARLT	24.62	25.18	26.57	25.54
		Median ARLT	12.0	12.0	12.0	12.0
Grand Total		# of Actions	9,796	12,736	12,198	34,730
		Avg ARLT	29.55	28.19	27.31	28.27
		Median ARLT	15.0	14.0	13.0	14.0

Average and Median figures represent days.

Figure 9. Average ARLT for FY19–FY21 by Sub-command.

This data concurs with the aggregate level, with a timeline of one business week longer for service contracts in both ACC CTRS and the MICC when using the average. When using the median, the data for ACC CTRS parallels the aggregate level with a shorter

delay of three days. The data does not reveal a difference in the requirements lead time for service contracts executed by the MICC when using the median as the measure of central tendency.

The second factor the team attempted to isolate was the type of contract vehicle that the requirement utilizes. This effort enables the research team to analyze if the difference in service contract requirements lead time and supply contract lead time exists among all contract types. The contract types analyzed are indicated by C, F, and P type contracts. Details for these contract types are within Table 2 - Contract Types, Section B - Research Definitions, Chapter 3.

Figure 10 displays the average ARLT broken down by contract type. The data shows that the phenomenon that service contracts take longer in the requirements generation phase remains when isolating for most contract types.

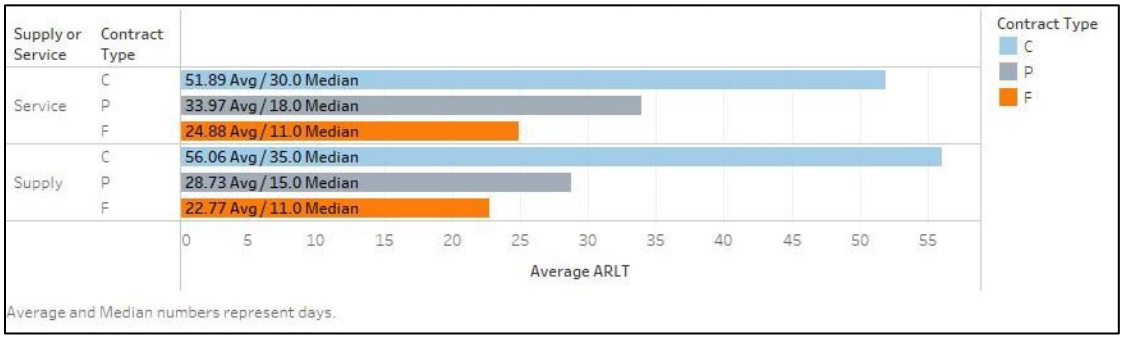

Figure 10. Average ARLT for FY19–FY21 by Contract Type, and Service/ Supply.

Due to their increased complexity, C type contract requirements for supplies are more demanding and time-intensive on requiring activity personnel. It is important to note that although this anomaly to our observed phenomenon does exist, Figure 10 shows that C type contracts for supplies only represent approximately 3% of the contracting actions within our research. Although the anomaly is important to record, its minimal proportionality of utilization led the team to assess that it is not a representative measure of the research object.

Figure 11 also displays that there is a variance in ARLT among contract types as well as between services and supply requirements. This variance indicates that as complexity decreases, requirements lead time decreases. This finding further suggests a relationship between the complexity demand surrounding a contract requirement packet and its associated ARLT. However, the relationship between the documentation demand for a requirement packet and ARLT cannot be assessed for this factor because there is no difference among contract types for the requirement packet documentation demand.

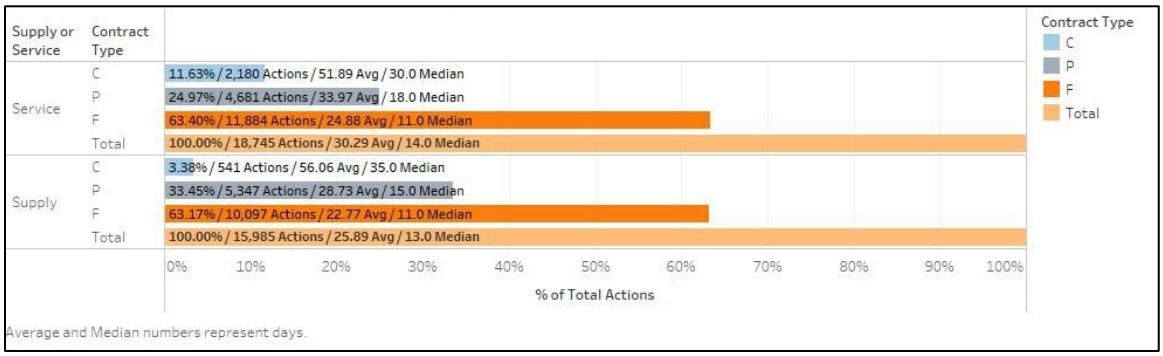

Figure 11. Contract Type as a Percentage Total Supply/Service Actions.

The third factor the research team considered was the period of obligation. Specifically, the team sought to answer if the phenomenon was consistent throughout FYs. Thus, the data analyzed in Figure 12 encompasses FY19–FY21.

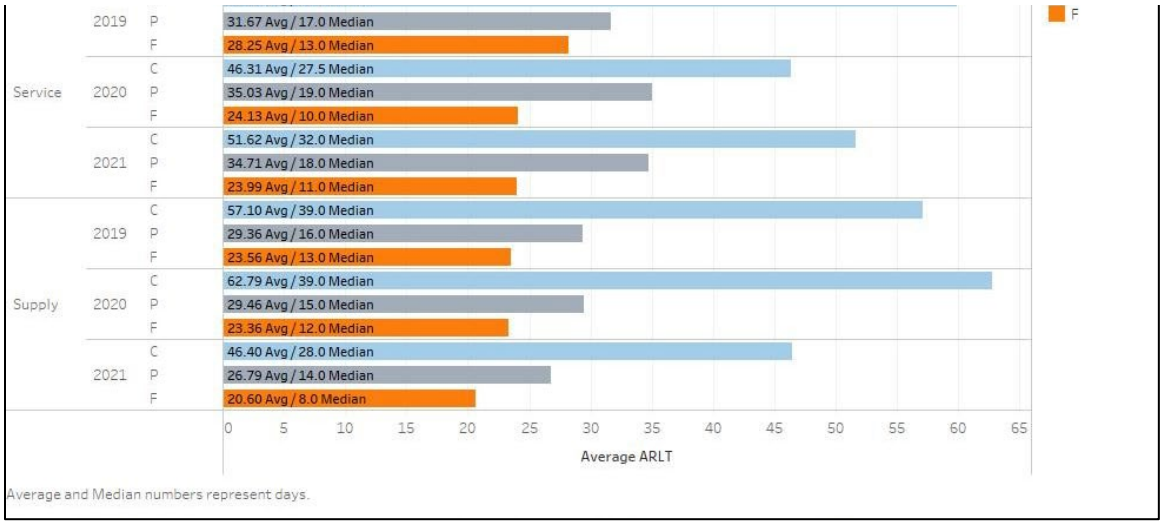

Figure 12. Average ARLT by Contract Type, FY, and Service/Supply.

Figure 12 shows that the phenomenon exists among FYs for contract types F and P, which represent most of the analyzed contract actions. The anomaly that existed for C type contracts at the aggregate level remains without further explanation from the FY isolation. Figure 10 also shows that the phenomenon is prevalent across all examined FYs when analyzed against sub-organizations. The data does not indicate that the period of obligation would impact the ARLT variance between service and supply contracts.

Having assessed the relationships between the projected factors and the variance in ARLT, the research team required a common lens through which to view the data analysis. In order to achieve this perspective, the team sought to identify commonalities among the sub-commands on the procurement types of goods and services. Figure 13 identifies the most frequent OMB spending categories by types and sub-commands.

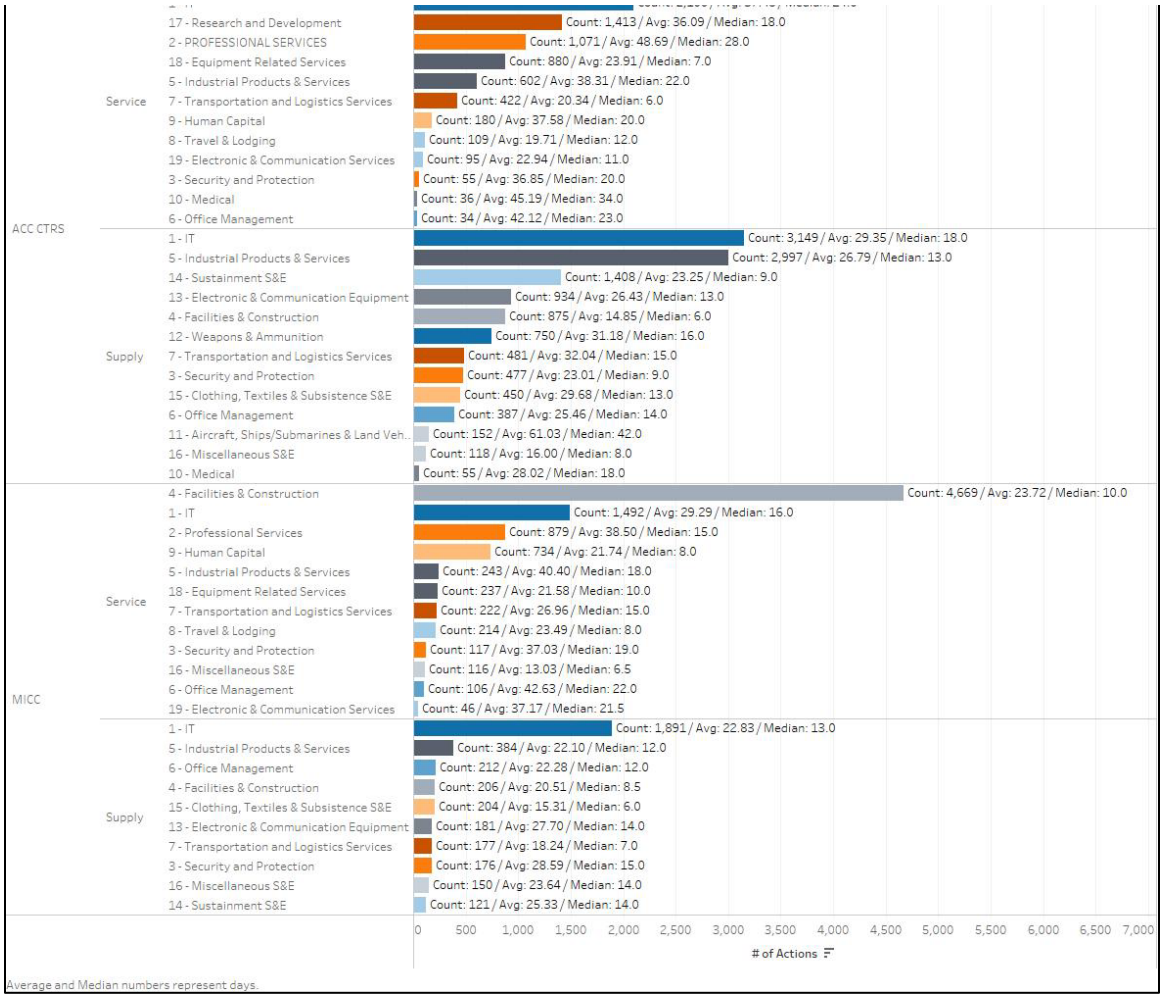

Figure 13. Number of Contract Actions by OMB Spend Category.

When assessing the commonality between sub-commands, the research team analyzed the frequency with which each organization procures goods and services, also known as the contract execution profile. Goods and services are categorized into spend categories by the OMB. Figure 13 shows us that the contract execution profiles of the sub-commands share a common most frequent acquisition of the same OMB spend categories. For example, each sub-command most frequently procures OMB category 4-Facilities and Construction for services contract requirements and OMB category 1-Information Technology for supply contract requirements.

The research team holistically assessed the increased lead time phenomenon, considering all factors influencing the ARLT from a shared perspective for the requirement. The team ultimately wanted to answer, for the most commonly procured goods and services, does the phenomenon continue for each organization utilizing each of the contract types across FYs?

Figure 14 displays the results of the final quantitative analysis for ARLT. The data in Figure 14 is consistent with the findings at the aggregate level. However, inconsistencies from the identified trend exist within the MICC during FY19 and FY20 for the identified spend categories. These inconsistencies primarily exist within the F type contracts, with their variance between services ARLT and supplies ARLT being consistently the lowest. This data indicates that the phenomenon of variance in service requirement ARLT and supply requirement ARLT does exist and is most prevalent in P type contracts executed by the MICC.

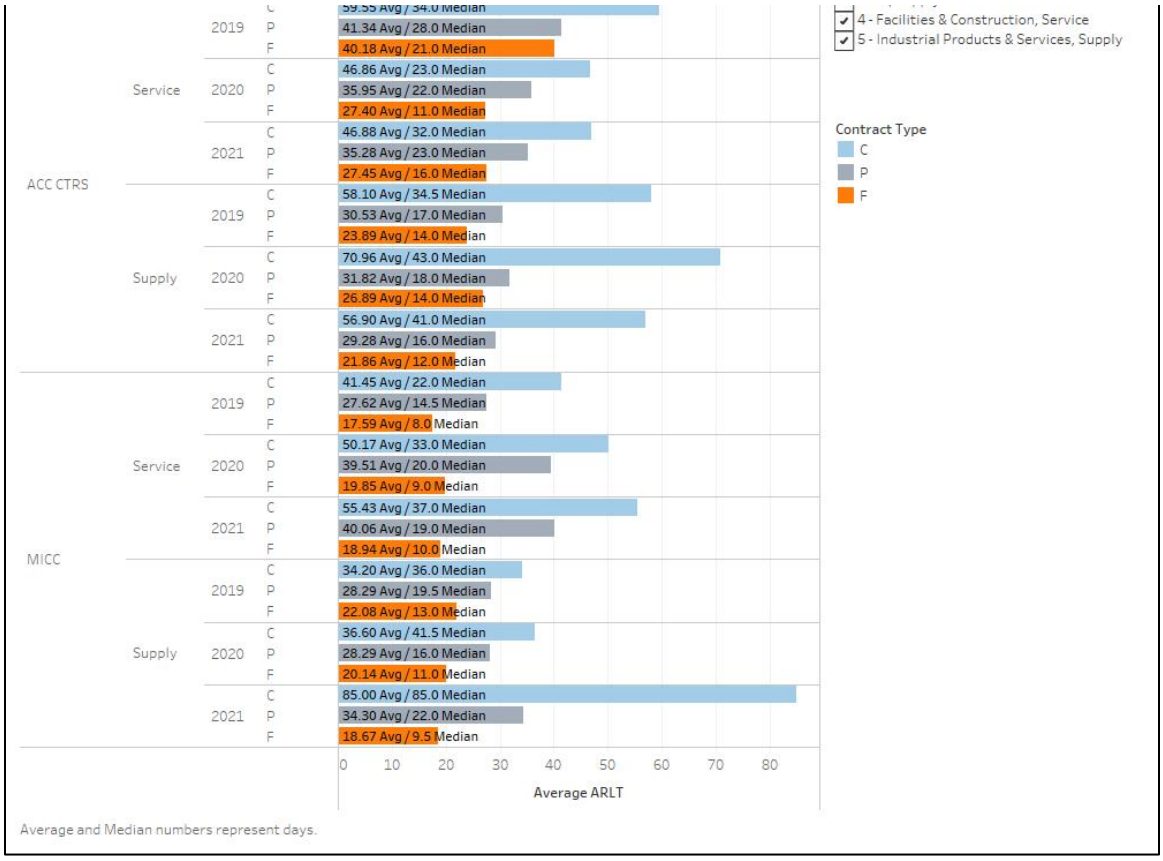

Figure 14. Average ARLT for Top 2 OMB Spend Categories for Supply and Service Contracts.

Due to limitations within the data, the team used some necessary assumptions during analysis of these contracting actions. The team filtered data to include all procurements with an ARLT less than or equal to 305 days. This restriction was used due to the FY cut-off policy instituted by contracting offices, with all requirements being due prior to 60 days from the end of the FY. These actions would be against stated policy and are outliers of the research since the team examined standard practices and procedures within ACC. The team also excluded actions above $2M in obligated funds. The actions above the $2M threshold incur additional approvals that would skew the analysis due to the complexity of higher value obligations, which generate additional time in the requirement definition phase. The team assessed this delay as a causal factor that would generate outliers to our intended scope of research. A further assumption is that the ARLT

metric is accurate. The user generates ARLT data through manual input, and the contracting office only mandated its use during FY19. Moreover, the team had limited access to relevant data within this same time period.

The research team compared ARLTs for service and supply contracts within the ACC CTRS and the MICC, broken down over three FYs. The data indicates that ARLT is higher for service procurements across ACC CTRS and the MICC. The team analyzed data against multiple factors for validation, and no relationship was found to explain another causal element of the observed variance. The data supports the inference that the demands in the complexity and documentation necessary in a contract requirement packet directly impact the ARLT. This finding coincides with our research, which hypothesizes that service requirements result in higher ARLT due to their increased complexity and frequency of returns between the contracting office and requiring activity.

The next research question that the team addressed was also related to ARLT. The team analyzed the utilization rate of the Requirements Package Assistant (RPA) tool. The group sought to determine if training and increased resources provided to requiring activities through the RPA tool had an impact on the ARLT. The team assessed the degree to which ARLT has been affected since the mandatory implementation of the RPA tool. The intent behind implementing the RPA tool was to reduce ARLT and streamline the development of requirements documentation. As a result, the team expected ARLT to decline among both subcommands from FY19–FY21 as customers became familiar with the RPA tool.

Figure 15 displays a histogram showing the ARLT for both service and supply requirements in weekly bins. The rows represent different FYs, with the top row presenting the histogram for FY19, which was the first year of implementation. This data shows a shift to the left in the curve, this change in distribution reveals that the contracting agency accepted more contracts earlier in the requirements process. To further analyze this trend, the team analyzed the utilization rate of the RPA tool for each FY.

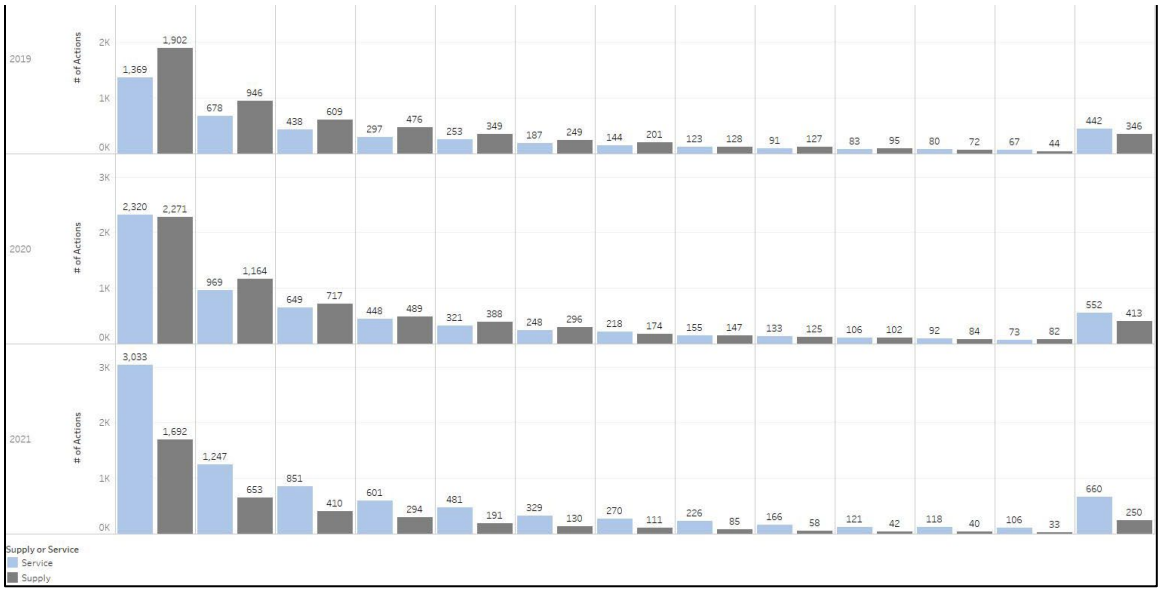

Figure 15. Histogram of # of Actions by ARLT.

Figure 16 shows the RPA utilization rate for a given FY along with the median ARLT. The data is consistent with the trends shown in the histograms from Figure 14, with a reduction in the ARLT over progressive years. Therefore, we infer from this data that as the utilization rate of the RPA tool increases, the median ARLT decreases.

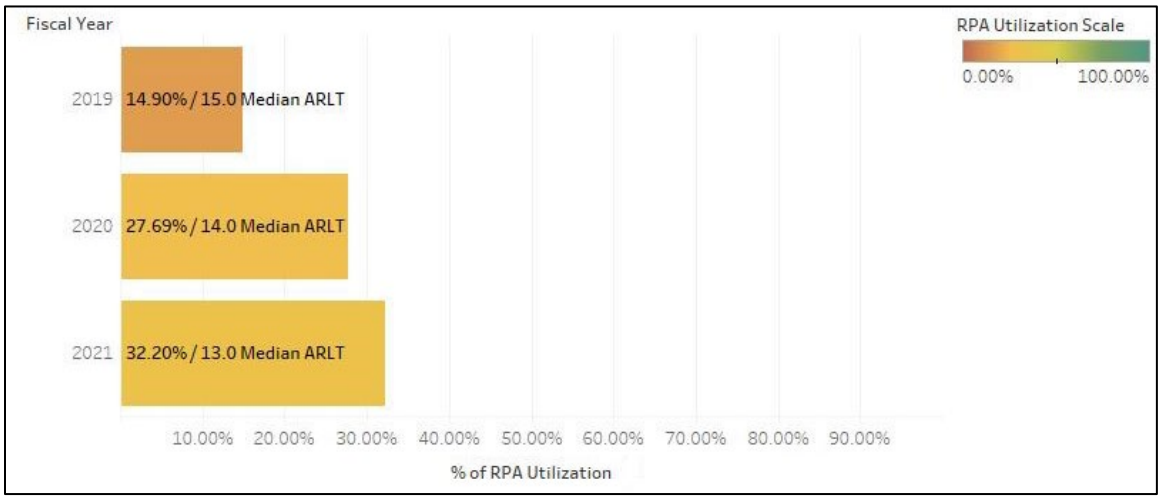

Figure 16. RPA Utilization Rate by Fiscal Year.

This shift is indicative of an effect on ARLT once ACC policy mandated the RPA tool for use. Further research into the use of RPA within ACC CTRS may yield additional quantitative data to determine the level of customer involvement with this tool. This further research could help to assess the correlation between RPA utilization and ARLT.

The quantitative findings and analysis indicate a phenomenon in ARLT between contracts that have different demands in complexity and documentation in the requirements generation phase. The observed phenomenon that requirement packets for services contracts take longer for contracting offices to deem acceptable was revealed in the data by a consistently higher ARLT when compared to supply contract requirements. This phenomenon existed when isolating other variables and remained persistent across the time periods assessed. The type of contract directly impacted ARLT, revealing how resources in the requirements generation phase impact ARLT. Finally, the implementation of standardized system resources was shown to have a reductive effect on ARLT by analyzing the RPA utilization rate.

B. QUALITATIVE FINDINGS

The research team's first qualitative effort was to generate a model of the contracting process using a sequence diagram, shown in Figure 17. A sequence diagram is a modeling tool that can be used to represent the interactions of elements within a system. The elements depicted on the figure are those organizations or individuals who process or generate inputs and/or outputs into a contract or a contract requirement packet. Each of these elements has a lifeline in the model, which extends downwards on the diagram. These lifelines are used to array the sequence of events, allowing this model to represent the flow of effort within a system among its constituent elements. In addition to describing the process over time, this model also displays the frequency of interactions by each element with the overall system through the integration of the lifelines. The model shows that the end user has a limited amount of time to impact ALT and is restricted to the requirement generation phase.

A sequence diagram can also be useful to assess the transition of effort or information among a system and the boundaries of the elements within that system.

Boundaries can be viewed as either horizontal or vertical. A vertical boundary exists between two elements within the same organizational hierarchy that conduct functions at different levels, while a horizontal boundary is between two elements that do not co-exist in one organizational hierarchy. In our diagram, an example of a vertical boundary is one between the end user at the company/battery/troop level and the logistics planner at the Brigade combat team level. An example of a horizontal boundary is the one between the Division Resource Management Office and the MICC Business Operations Division. This model indicates that for a typical contracting process within the MICC, a contract requirement crosses boundaries nine times between the end user who needs the good or service and the industry partner who fulfills that need.

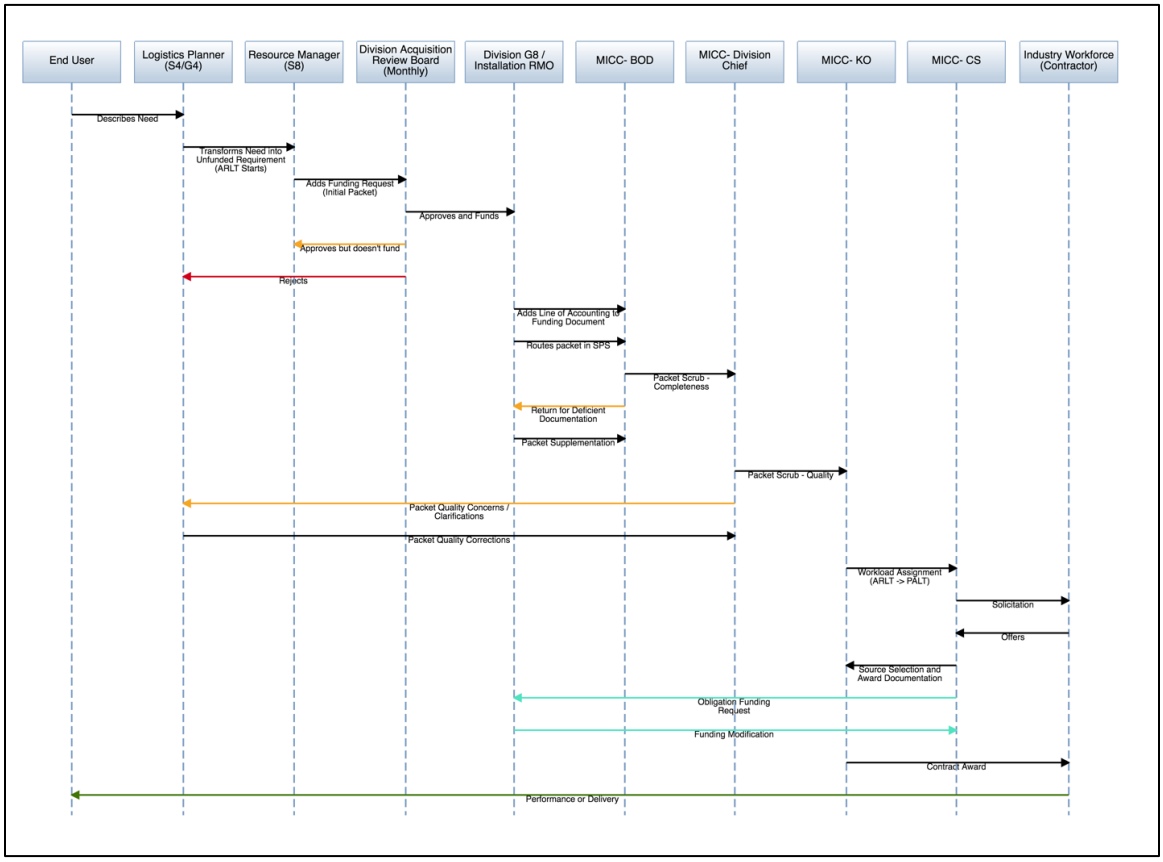

Figure 17. Typical Contracting Sequence (MICC).

Question 1: What factors affect ALT and the quality of requirement packets?

Deliverable Breakdown:

1a. Statistical analysis based on the rate of return for requirement packets.

1b. Determine the utilization of acquisition tools (Acquisition Requirement Roadmap Tool, Virtual Computing Environment, Acquisition Compass) during requirement generation.

Question 2: What positions within the operating force should require training focused on requirement generation?

Deliverable Breakdown:

2a: Recommendation of which table of organization and equipment (TOE) positions would receive the most benefit from requirement generation training.

1. Findings Supporting Research Question 1

The following analysis directly answers research question one, the factors that affect ALT and the quality of requirement packets, primarily deliverable 1a. As seen in Figure 18, the primary reasons for packet return, comparing responses from requiring and contracting organizations. To further analyze this data, the research team developed and tested the following hypothesis to answer the research question.

> H_0: There is no agreement among groups of the relative importance of factors that influence requirement packet rejection.
>
> H_1: Agreement exists among groups of the relative importance of factors that influence requirement packet rejection.

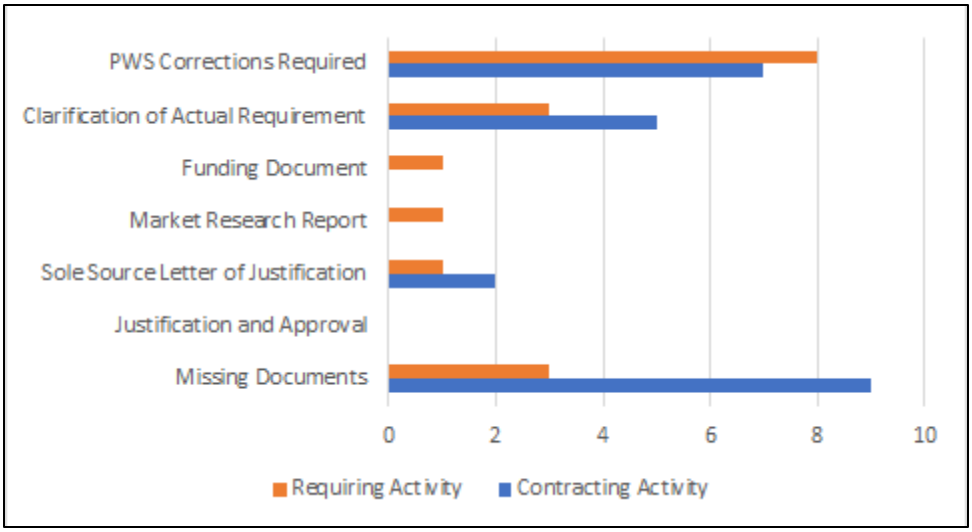

Figure 18. Primary Reasons for Packet Return.

As shown in Table 4, the RIW calculated from the survey question "Primary Reasons for Packet Return," allowed the research team to identify the top two reasons for returns amongst the two groups of respondents. Both groups agreed that PWS Corrections Required, and Clarification of Actual Requirements were the most common reasons for returning a requirement packet. Furthermore, Table 5 reveals Kendall's W showing agreement between the groups and Pearson's Chi-square calculation to determine if the data is significant. The results from these tests reject the null hypotheses and establish a significant level of agreement between the respondents. A Kendall W value of 0.2395 indicates some level of agreement between respondents, although minimal based on the numeric result of the calculation. The calculated Chi-square value of 58.92 is greater than the 12.591 Chi-square critical value calculated at a 0.05 confidence level ($58.92 > 12.591$). Additionally, the calculated p-value of 0.02716 is less than the significance level ($0.02716 < 0.05$), allowing the research team to reject the null hypotheses due to a significant level of agreement between respondents.

Table 4. Primary Reasons for Packet Returns Analysis.

Factors	Requiring Activity		Contracting Agency	
	RIW Score	Rank	RIW Score	Rank
PWS Corrections Required	20.28%	1	23.72%	2
Clarification of Actual Requirement	17.87%	2	23.91%	1
Funding Document	14.45%	3	11.48%	7
Market Research Report	13.24%	4	12.42%	5
Missing Documents	11.24%	5	21.28%	3
Justification and Approval	9.83%	6	12.42%	6
Sole Source Letter of Justification	5.56%	7	16.00%	4

Table 5. Kendall's W and Pearson's Chi-square Calculation for Primary Reasons for Packet Return.

Variables	Value
k	7
m	41
W	0.2395
r	0.2205
c^2	58.92
df	6
p-value	0.02716

Critical value at $0.05 - c^{2(n-1)} = c^{2(6)} = 12.591$

A potential consideration for the minimal level of agreement between the responses is that only 41 out of 65 respondents supplied answers to the associated question. The responses collected were a mix between the two respondent groups, requiring activity and contracting agency. The omission of responses from some participants could be the reason for the low agreement between respondents, as shown with the low Kendall W value.

The following analysis directly answers research question one, the factors that affect ALT and the quality of requirement packets, primarily deliverable 1a. statistical

analysis based on the rate of return for requirement packets. The research team developed and tested the following hypothesis to answer the research and deliverable as stated.

> H_0: There is no agreement among groups for the documents that influence the rate of return of requirement packets.
>
> H_1: Agreement exists among groups for the documents that influence the rate of return of requirement packets.

Table 6 reflects a breakdown of the 35 selected contract files with the associated document type that resulted in return to customer for rework. The 35 contract files were selected out of a pool of 135 contract files originating from MICC Fort Hood. The selection criteria for the 35 contract files consisted of using the RPA tool, primarily the return to the customer for rework feature. Contract files that did not use the return to customer feature were not considered. Table 7 reveals Kendall's W showing agreement between the document types and Pearson's Chi-square calculation to determine if the data is significant. A Kendall W of 0.8844 indicates a high level of agreement between document types. Furthermore, the calculated Chi-square value of 18 is greater than the 12.591 Chi-square critical value calculated at a 0.05 confidence level ($18 > 12.591$). Additionally, the calculated p-value of 0.006232 is less than the significance level of $\alpha = 0.05$ ($0.006232 < 0.05$), allowing the research team to reject the null hypotheses due to a significant level of agreement between document types.

Table 6. RPA Analysis on Document Type Reason for Return to Customer

Contract Type	Requirements Definition (PWS / QASP / Performance Req)	IGE	Funding Document (PR)	MRR	Sole Source / Limiting Competition	Drawings / Technical Exhibit	RSCA
C Type	7	6	1	1	0	5	0
F Type	12	5	4	4	5	1	5
P Type	0	0	0	0	1	0	0
TOTAL	19	11	5	5	6	6	5

Table 7. Kendall's W and Pearson's Chi-square Calculation for Document Type reason for Return to Customer

Variable	Value
k	7
m	3
W	0.8844
r	0.8266
c^2	18
df	6
p-value	0.006232

Critical value at $0.05 - c^{2(n-1)} = c^{2(6)} = 12.591$

Based on these tests, there is an agreement among the document types that influences the return of requirement packets. The data identifies the requirements definition category as the most common reason for returning requirement packets for customer rework. This category consists of PWSs, performance requirements, and QASPs, all of which directly align with the primary reasons for packet returns shown in Table 6. Furthermore, both groups' short answers provided during the survey support the finding of requirements definition is the most common area of mistakes and that training to correct this area of weakness requires emphasis. Therefore, the factors that affect the quality of requirement packets and the reason for the return of requirement packets are the same, requirements definition documents.

The following analysis directly focuses on object 1b, determining the utilization of acquisition tools (Acquisition Requirement Roadmap Tool, Virtual Computing Environment, Acquisition Compass) during requirement generation. The research team generated a survey question to determine the use of existing acquisition tools and the level of use per requiring activity and contracting agency. Figure 19 represents the responses from each respondent group. Based on the responses, there is no agreement between the respondents regarding the use of acquisition tools.

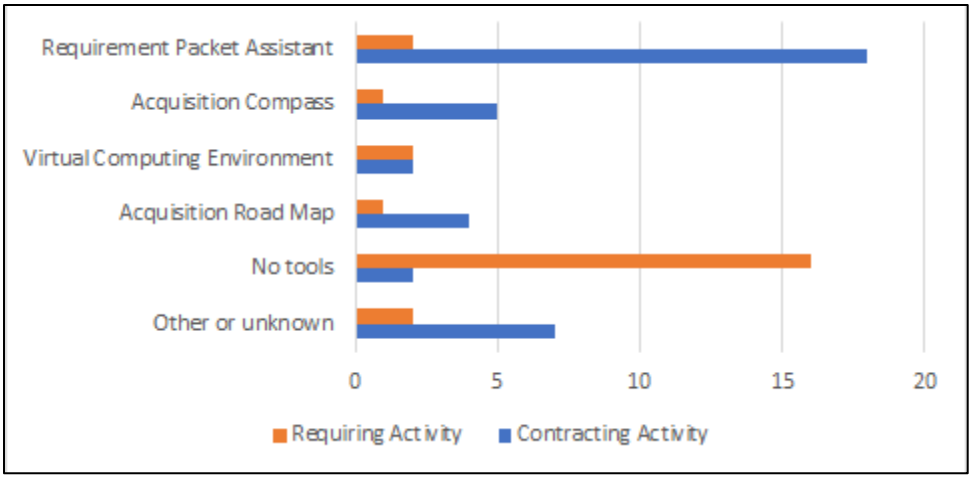

Figure 19. Use of Acquisition Tools.

2. Findings Supporting Research Question 2

The following analysis directly answers research question two, what positions within the operating force should require training focused on requirement generation and deliverable 2a, recommendation of which TOE position would receive the most benefit from requirement generation training. As seen in Figure 20, showing where training has the greatest benefit regarding position, comparing responses from requiring and contracting organizations. To further analyze this data, the research team developed and tested the following hypothesis to answer the research and deliverable as stated.

H_0: There is no agreement among groups on which positions should receive training.

H_1: Agreement exists among groups on which positions should receive training.

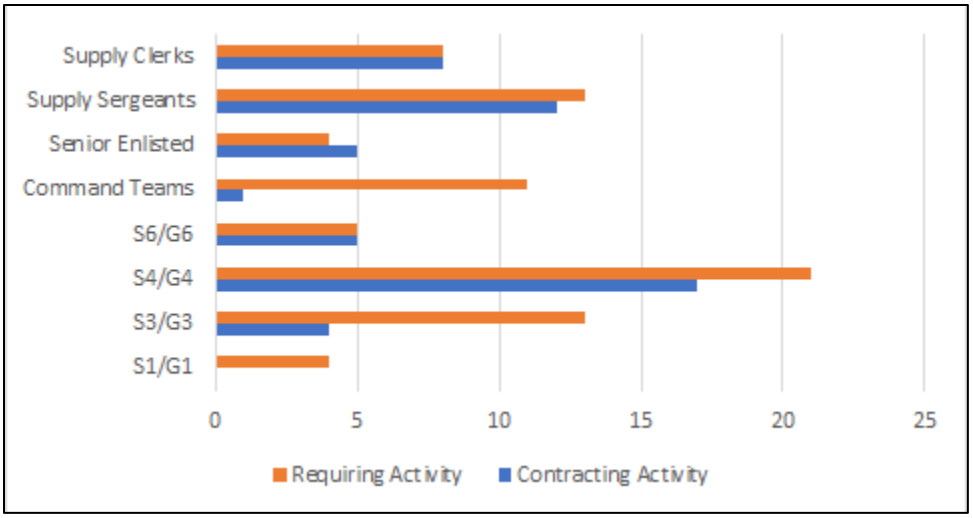

Figure 20. Beneficial Training Effect vs. Position.

The level of agreement shown in Table 8 and Table 9 led the research team to identify requirement definition as a significant area of weakness within the requirements development process. Table 8, represents the calculated RIW score amongst the two respondent groups. Based on the calculations, the research team identified that the top two positions that both the requiring activity and contracting agency perceive as necessary to receive training to achieve acceptance of a requirement packet upon the first submission are the following: S4s/G4s and supply sergeants. Table 9 reveals Kendall's W showing agreement on which positions benefit the most from requirement generation training has the greatest impact and Pearson's Chi-square calculation to determine if the data is significant. A Kendall W of 0.9416 indicates a high level of agreement between respondents. The calculated Chi-square value of 18.833 is greater than the 14.067 Chi-square critical value calculated at a 0.05 confidence level ($18.833 > 14.067$). Additionally, the calculated p-value of 0.008726 is less than the significance level of $\alpha = 0.05$ ($0.008726 < 0.05$), allowing the research team to reject the null hypotheses due to a significant level of agreement between respondents.

Table 8. RIW Training per Position.

Factors	Requiring Activity		Contracting Agency	
	RIW Score	Rank	RIW score	Rank
S4/G4	26.58%	1	32.69%	1
Supply Sergeants	16.46%	2	23.08%	2
S3/G3	16.46%	3	7.69%	6
Command Teams	13.92%	4	1.92%	7
Supply Clerks	10.13%	5	15.38%	3
S6/G6	6.33%	6	9.62%	5
Senior Enlisted	5.06%	7	9.62%	4
S1/G1	5.06%	8	0.00%	8

Table 9. Kendall's W and Pearson's Chi-square Calculation for Document Type Reason for Training Required per Position.

Variable	Value
k	8
m	2
W	0.9416
r	1.6905
c^2	18.8333
df	7
p-value	0.008726

Critical value at $0.05 - c^{2(n-1)} = c^{2(7)} = 14.067$

Figure 21, Level of Training Required and Figure 22, Training per Echelon continue to focus on deliverable 2a, recommendation of which TOE position would receive the most benefit from requirement generation training. Both figures reflect an agreement among both respondent groups inferring that all levels of training are desired, ranging from training that generates a skill identifier to unit-level training. With training provided by the partnering contracting agency ranking the highest. This might be due to institutional procedures having slight changes based on the operational environment. The number of respondents from both groups that selected no training received minimal responses when compared to the number of responses recorded. Figure 22 identifies what echelon should

requirement generation training be required, comparing responses from both groups. Both groups show agreement with many of the responses focusing on battalion and brigade levels. This might be attributed to the TOE structure as these levels possess most of the S4s/G4s and senior supply sergeants.

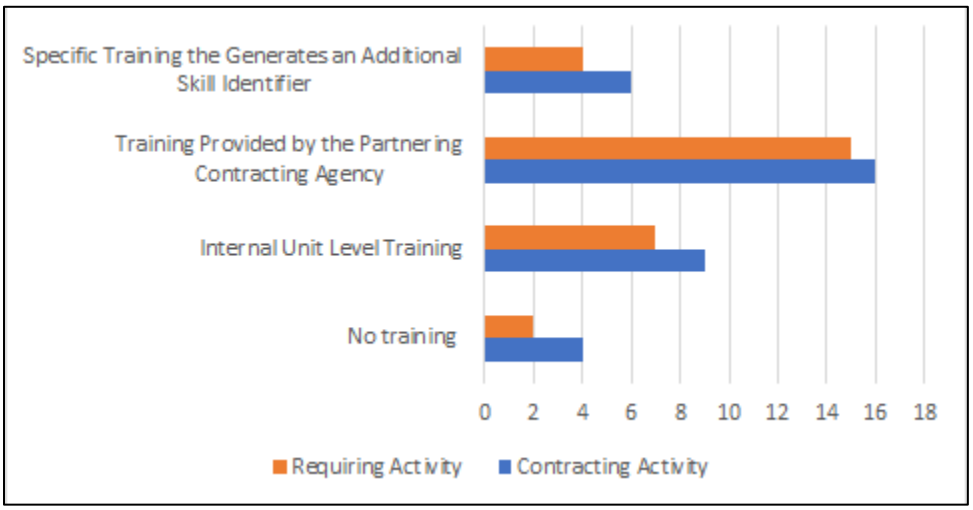

Figure 21. Level of Training Required.

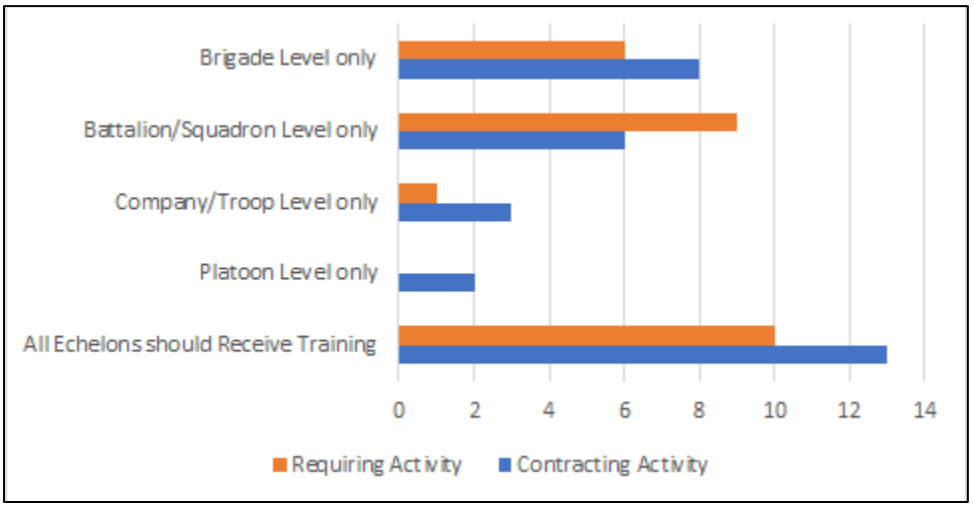

Figure 22. Training per Echelon.

3. Summary

The data suggest agreement between the contracting and requiring activities on the reason for requirement packet returns and which positions should receive training. Requirement's definition generates the most common mistakes. Providing evidence for DASA(P) to emphasize/restructure training to correct this area of weakness requires emphasis. Therefore, there is consensus on factors that affect the quality of requirement packets and the reason for the return of requirement packets are the same, requirements definition documents. Additionally, the research team found the training audience should represent the S4/G4 and Supply Sergeant positions.

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V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter summarizes the research findings, application of Nonaka's Dynamic Theory of Organizational Knowledge Creation, conclusions and recommendations for each research question, and suggestions for further research.

A. SUMMARY

The purpose of this capstone was to identify the factors that influence ALT and originating command level personnel who require training focused on requirements generation. The team employed a mixed-methods approach and conducted a qualitative analysis through surveys and contract file reviews to determine the effects of training and utilization of existing procurement tools to improve ALT. The quantitative analysis supported qualitative findings by isolating variables such as the type of organization, contract type, and time period to determine their effect on ARLT for service and supply requirements. This research highlights valuable insight into the root causes of ALT delay within the Army's requirements development process for service and supply contracts. Moreover, the team's recommendations aim to reduce ALT, identify training gaps, and enhance contracting processes within the Army enterprise.

The research team developed a conceptual framework, based on Nonaka's Dynamic Theory of Organizational Knowledge Creation to display the relationship between the contracting knowledge base, elements within a contracting agency, and requiring activities as identified in Figure 23. Contracting personnel and requiring activities must utilize the same knowledge base to improve collaboration, transfer explicit knowledge, and improve training outcomes. Moreover, the knowledge base contains shared systems of record and knowledge management tools that are integral to completing a requirement packet. The business processes layer serves as an intermediary where tacit and explicit knowledge converges to promote best practices and standard operating procedures within contracting agencies, improving organizational efficiency, adherence to policy, and supporting customers' unique needs. Finally, contracting officers leverage their tacit knowledge to train and mentor contracting personnel to facilitate requirements definition and identify the

best strategy to rapidly procure supplies and services for its customers. The research team's recommendations apply to each level of this framework and fall into the three categories shown in Figure 23: requiring activity and contracting personnel, business processes, and knowledge base.

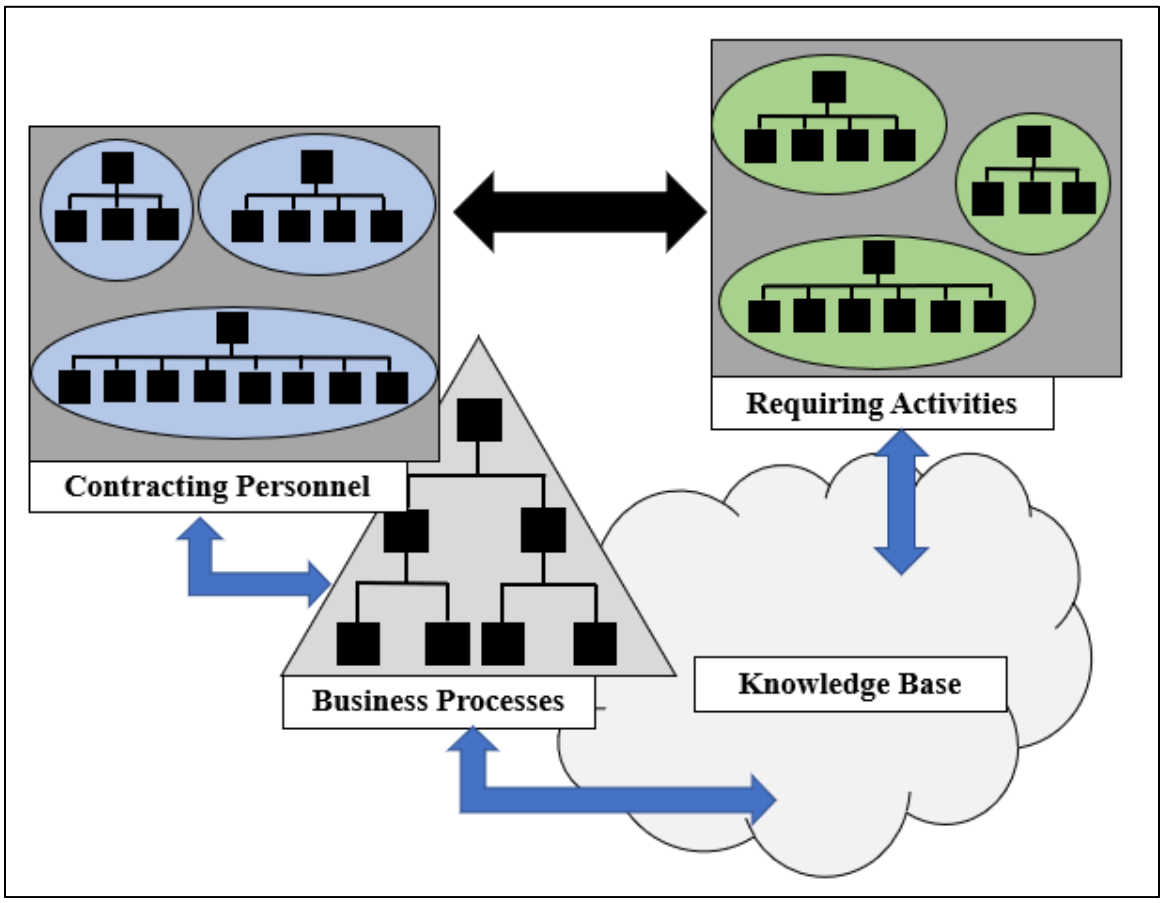

Figure 23. Relationship between a Contracting Agency and Its Requiring Activities. Adapted from Nonaka's Hypertext Organizational Model (1994, 34).

B. CONCLUSIONS AND RECOMMENDATIONS

Contract type, level of training received by requiring activities, and the use of the RPA tool directly impact ALT, specifically ARLT, across ACC CTRS and MICC organizations. The quantitative analysis conducted on contract data from FY19–FY21 found that service contracts have a longer requirements generation phase than supply

contracts. The longer requirements generation phase is associated with the level of complexity and required documentation for each contract action. As complexity decreases, the requirements lead time also decreases. The qualitative analysis demonstrated that the leading factor for returned packets centers on requirements definition and the quality of a requirement packet. Agreeance among the two surveyed groups endorses training focused on positions viewed as requirement generators. The use of the RPA tool increases transparency on reasons for packet returns and provides data to demonstrate the effects of the tool against ARLT. The analysis supports that the tool is an effective transaction conduit between requiring and contracting organizations and a source of data to reflect the increase or decrease of ARLT within individual organizations.

The following addresses each of the research questions with a conclusion and recommendation.

1. Research Question 1: What factors affect ALT and the quality of requirement packets?

a. Conclusion

A qualitative analysis identified that requiring activities must possess a considerable level of proficiency to define requirements. Requiring activities must also develop and maintain a high level of competency to accurately generate requirement documents such as PWSs, performance requirements, and QASPs, which were found to be the leading factors that affect ALT and the return of requirement packets based on the quality of the documents generated.

b. Recommendation

The research recommends ACC to develop and implement a tool similar to the contingency Acquisition Support Model (cASM), that focuses on the requirements generation phase. This tool should consist of copies of existing contracts, copies of approved PWS and SOWs, and examples of other supporting documents such as market research, letters of justifications, and IGCEs. The recommended concept is similar to cASM but not limited to contingency and expeditionary situations.

Instead, the recommended database intends to provide a universal hub for requirement generation both for CONUS and OCONUS. The recommended system should also serve as a routing and communication conduit between requiring and contracting agencies. To maximize the benefits of this tool, it is recommended that TRADOC and ACC modify the content of the training requiring activities receive from a variety of learning institutions such as DAU, ALU, and contracting agencies. Currently, requirements development training is lacking from all training curriculums. The recommended modifications should focus on the requirement development phase, explicitly defining the requirement and creating the supporting documents for a requirement packet. For the system to be effective and not lose funding like the cASM system, the new system must become the primary system of record across all requiring and contracting organizations. Creating and implementing such a system can address the factors that affect ALT and significantly reduce the ARLT of requirements.

The research recommends creating one central hub, or knowledge base, to increase efficiencies and proficiencies across all organizations. The data collected during the study yield that although there are many different existing acquisition tools, there is no agreement between the level of awareness or usage of these tools between the requiring and contracting organizations. Therefore, the research recommends that ACC consolidate all existing tools into one effective universal tool and modify the training curriculum and unit-level policies to support the implementation and use of one tool.

In efforts to improve efficiencies within existing procedural tools such as RPA and VCE, the research team recommends senior leaders within contracting and requiring activities to enforce the use of these systems. These systems, when appropriately used, will encourage collaboration, improve transparency, and reduce the transfer of requirement packets between requiring activities and contracting agencies. The research identified that most dates are user entered, regardless of whether the user is part of the requiring activity or the contracting agency. Based on the human aspect of self-reporting ARLT dates, the research recommends switching to standardized system generated dates only. This way, there is no discrepancy between the start and end of an acquisition phase. The intervention of automation would provide requiring activities and contracting agencies with a definitive

ALT measurement and remove any bias related to user entered data. In addition, automating these inputs will give more insight into contract delays, thus allowing both organizations to tailor training and corrective action to their specific needs and reduce delays in the acquisition process.

2. Research Question 2: What positions within the operating force should require training focused on requirements generation?

a. Conclusion

A qualitative analysis identified that S4s/G4s and supply sergeants are the recommended focus group for the requirement generation training. The qualitative analysis also identified that both requiring and contracting organizations desire all levels of training to include training that generates a skill identifier, partnering contracting agency training, and unit level training. The strong desire for local contracting and unit level training might be due to different institutional procedures that dictate operations within each environment.

b. Recommendation

The research recommends changing TOE positions to require a 3C identifier for all S4s/G4s and supply sergeants at every echelon. The research further recommends that this modification be applied to all types of organizations, not only large organizations such as divisions and BCTs, but also smaller organizations such as Security Force Assistance Brigades, Movement Control Teams, and Special Forces Groups. In addition to modifying TOE positions, the research recommends that requiring activities and contracting organizations establish policy memorandums standardizing requirement generator's training to have both the 3C skill identifier and training provided by the supporting contracting agency before submitting a requirement packet. The increased level of training and the standardization of the training requirement received by requirement generators aim to achieve acceptance of a requirement packet upon the first submission and reduce the ARLT for both requiring and contracting organizations.

C. AREAS IDENTIFIED FOR FURTHER RESEARCH

This capstone focused on CONUS contracts within MICC and ACC CTRS. The research did not focus on OCONUS contracts since the contracting processes and procedures are unique to each respective theater of operation, causing the supporting data to be disparate and difficult to analyze effectively. For instance, OCONUS contracting offers a more streamlined approach by eliminating small business mandates and utilizing other parts of the FAR, including FAR 25, Foreign Acquisitions. Further research into OCONUS requirements may provide insight into additional factors affecting ALT, including the organizational structure of contingency contracting units and their customer's theater support requirements within that area of operation. Lastly, the research team recommends that further studies in contract performance metrics incorporate customer testimonies and challenges faced by the requiring activities to better identify areas of improvement regarding manning and training requirements.

APPENDIX: RESEARCH MATRIX

Research Dendritic	*Approach*	*Data Source*	*Data Field*	*(Projected) Analysis*
1. What impact does acquisition type (service / supply) have on ARLT?	Quantitative	VCE	VCE-mean ARLT for services, mean ARLT for supplies	Is there a difference in ARLT for all of ACC when looking at service buys vs. supply buys
1.a. What impact does category of contract actions have on ARLT?	Quantitative	VCE	VCE-ARLT mean per category	Does a discrepancy (binary) exist among categories when analyzing mean ARLT
1.b. If so, is this impact consistent among PSCs and among organizational types?	Quantitative	VCE	VCE-ARLT for Common PSCs across type and organization	Is this effect isolated to one type of buy, or one organization; or, is it persistent across ACC?
1.c. To what degree does the category of contract action influence the timeline of the requirements generation phase?	Quantitative	VCE	VCE-ARLT mean per category	Variance among categories when analyzing mean ARLT. F type should be lower for services since the requiring activity doesn't need to provide a PWS since that's in the base vehicle- this may help with analysis of the effects of standardized resources
1.d. Is there a trend across organizational types that reveals a density of PSCs over each category of contract?	Quantitative	VCE	VCE-ARLT mean per category for top 5 PSCs (Facilities and IT buys from memory)	Can this data be viewed through a common lens? If so, what does this common perspective reveal about the analysis in 1–1c?
1.e. How does the ARLT impact the PALT (and in effect the ALT) among each type of contract category among PSCs?	Quantitative	VCE	VCE-ALT mean minus ARLT mean per category for top PSCs	Does ARLT impact ALT to a substantial degree? F type does not have as many steps for the contracting office to process, so their ALT-PALT relationship should be lower relative to the relationship of the other categories.

Research Dendritic	*Approach*	*Data Source*	*Data Field*	*(Projected) Analysis*
1.f. Does extended ARLT impact the contracting agency's ability to get customers the product or service they need in the timeline that they need it?	Mixed Methods	VCE / Lit Review	VCE / ACC or MICC publicized award timelines	Does ARLT really matter if agencies are getting the contracts awarded in the timeline that we say that we need to?
2. What training medium(s) and/or resource(s) facilitate the requirements generations phase?	Qualitative	Lit Review	N/A	Revelation of applicable resources for development phase (DOD Guidebook for Acquisition of Services Phase III)
2.a. Is/are this medium(s) utilized?	Mixed Methods	Survey and VCE	Survey - Response | VCE - Customer / Contracting created by	Compare the use of RPA between the requiring activity and contracting office (VCE) | How many resources are known about (Survey response from requiring activity)
3. What are frequent deficiencies that contracting offices perceive as affecting ARLT?	Qualitative	Survey	Response	Causal factors for not accepting a requirement packet.
3.a. Does the training in (2.a.) and (4.) integrate a syllabus inclusive of those factors identified in 3?	Qualitative	DASA(P) OCS Training / DAU Course Catalog / ARRT Tool / Acquisition Gateway	Syllabus	Syllabus / training agenda / enabling and terminal learning objectives review of training content
4. How is the Army resourcing the education of non-AWF personnel assigned to billets who have doctrinal OCS functions?	Qualitative	Lit Review	N/A	What doctrinal training supports those non-Acquisition Workforce personnel who have performance responsibilities in the contracting area?

Research Dendritic	*Approach*	*Data Source*	*Data Field*	*(Projected) Analysis*
5. Is there any policy or regulatory guidance that requires any level of training or education for the submittal of a requirement packet?	Qualitative	Lit Review	N/A	Analysis of AFARS, 4-10 and MICC Desk book

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