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SYSTEMS ENGINEERING CAPSTONE REPORT

**FAR-OUT CONTRACTING FOR THE ARMY FUTURES
COMMAND (AFC)**

by

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ABSTRACT

The purpose of this project is to evaluate alternative contracting practices and approaches the Army Applications Laboratory (AAL) can use to meet the technology development requirements of the Army Futures Command. The Department of Defense operates at a pace that is well behind the commercial high-technology sector, which includes small start-up and nontraditional companies. The U.S. Army has a longstanding reputation for capability overmatch against any potential adversary and therefore must simultaneously preserve and enhance this advantage by continuously developing and adopting the latest technologies for military use at the speed of business-to-business transactions. This project evaluated the efficacy of various contracting practices within the governance of the Federal Acquisition Regulation (FAR), and those instruments outside the FAR to make recommendations for AAL to meet its acquisition requirements. The capstone team conducted a thorough review of possible contracting solutions. Leveraging the proven concepts of the Vee Model, the team completed a requirements analysis, developed evaluation criteria, and generated a contracting decision matrix to determine the best options available. After a thorough analysis, the team made recommendations for methods that could meet AAL's requirements.

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LIST OF ACRONYMS AND ABBREVIATIONS

AAL	Army Applications Laboratory
ACC	Army Contracting Command
ACC-APG	Army Contracting Command – Aberdeen Proving Ground
ACC-NJ	Army Contracting Command – New Jersey
AFARS	Army Federal Acquisition Regulation Supplement
AFC	Army Futures Command
AOI	area of interest
APG	Aberdeen Proving Ground
ARL	Army Research Laboratory
BAA	broad agency announcement
BOA	basic ordering agreement
CDM	contract decision matrix
CFR	Code of Federal Regulations
CGP	Coalition for Government Procurement
CIA	Central Intelligence Agency
CICA	Competition in Contracting Act
CRADA	cooperative research and development agreement
CSO	Commercial Solutions Opening
DARPA	Defense Advanced Research Projects Agency
DAU	Defense Acquisition University
D&F	determinations and findings
DFARS	Defense Federal Acquisition Regulation Supplement
DIU	Defense Innovation Unit
DIUx	Defense Innovation Unit Experimental
DOD	Department of Defense
ENVG	Enhanced Night Vision Goggle
FAR	Federal Acquisition Regulation
FARA	Federal Acquisition Reform Act

FASA	Federal Acquisition Streamlining Act
FIRE	fast, inexpensive, restrained, elegant
FFRDC	Federally Funded Research and Development Centers
FSS	Federal Supply Schedule
FY	fiscal year
GAO	Government Accountability Office
GSA	General Services Administration
HUBZone	Historically Underutilized Business Zone
IDIQ	indefinite-delivery, indefinite-quantity
IP	intellectual property
J&A	justification and approval
MAIDIQ	multiple award indefinite-delivery indefinite-quantity
NDAA	National Defense Authorization Act
NIH	National Institute of Mental Health
NRL	Naval Research Laboratory
OSTP	Office of Science and Technology Policy
OT	other transaction
OTA	Other Transaction Authority
OUSD (A&S)	Office of the Under Secretary of Defense for Acquisition & Sustainment
OUSD (R&E)	Office of the Under Secretary of Defense for Research & Engineering
PALT	procurement administrative lead time
PIA	partnership intermediary agreement
R&D	research and development
RDT&E	research, development, test and evaluation
S&T	science and technology
SAP	simplified acquisition procedures
SAT	simplified acquisition threshold
SBA	Small Business Administration
SBIR	Small Business Innovation Research

SME	subject matter expert
STTR	Small Business Technology Transfer
TIA	technology investment agreement
TINA	Truth in Negotiations Act
UAV	unmanned aerial vehicle
U.S.C.	United States Code
VAi2	Veterans Affairs Innovation Initiative
VAO	Virtual Acquisition Office

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EXECUTIVE SUMMARY

The Army Applications Laboratory (AAL) is a subordinate organization within the recently formed Army Futures Command (AFC) designed to help find innovative solutions for the warfighter. The AAL's primary mission is to explore disruptive technologies to support AFC's objective of modernizing the battlefield. AAL accelerates the discovery, evaluation, and transition of dual-use technology and business practices to help AFC fundamentally reshape how the Army delivers capabilities in support of multi-domain operations. For the AAL to achieve its mission, it must gain access to both traditional and nontraditional contractors to quickly deliver innovative solutions to the warfighter.

The purpose of this capstone project is to evaluate various contracting vehicles and methods that AAL can use when acquiring weapons systems that meet the mission requirements for the AFC. The Army must continuously advance its military technology and deliver capabilities in-line with private sector timelines. The Army is well versed in the procurement of weapons systems from traditional large defense industry companies using the Federal Acquisition Regulation (FAR). However, the use of the FAR in Department of Defense (DOD) acquisitions often comes with time-consuming statutory and regulatory requirements. Therefore, this report provides an evaluation of varying contracting vehicles that AAL can use to acquire technologies based on the four evaluation criteria identified by AAL, which includes (1) the type of end item being sought, (2) the funding threshold, (3) the timeline to award, and (4) whether the contracting method accommodates nontraditional defense contractors.

The authors identified nine contracting methods that meet AAL's acquisition requirements. Four of those methods are FAR-based and include

- (1) Simplified acquisition procedures;
- (2) Small Business Innovative Research/Small Business Technology Transfer (SBIR/STTR);
- (3) Small Business Set-Aside/Direct 8(a); and
- (4) Defense Commercial Solutions Openings (CSO).

The other five methods that meet AAL's needs are not governed by the FAR and include

- (1) Other transactions for research;
- (2) Other transactions for prototype;
- (3) Research and development (R&D) agreements – cooperative research and development agreement (CRADA);
- (4) R&D Agreements—partnership intermediary agreement (PIA); and
- (5) R&D Agreements—technology investment agreement (TIA).

These methods can deliver the end items AAL requires and can be awarded in less than six months for FAR-based vehicles and under three months for those avenues outside the FAR. Each contracting method was evaluated along with its attributes and resulted in a contracting decision matrix (CDM) to aid AAL in determining what contracting method best fits its acquisition needs based on the problem they are trying to solve. It is also recommended that AAL partner with some of the organizations outlined within this research, such as In-Q-Tel, the Defense Advanced Research Projects Agency (DARPA), and the Defense Innovation Unit (DIU), to leverage their expertise in successfully executing agreements outside the FAR.

I. INTRODUCTION

A. PROBLEM STATEMENT

The U.S. Army established the Army Futures Command (AFC) in 2018 with the task of modernizing the Army and a focus on future readiness. Due to the constantly increasing advancements in the development of technology, the objective of maintaining adversary overmatch has to keep pace. Adherence to the conventional acquisition statutory and regulatory requirements takes too long to award a contract in today's environment and unfortunately is often undesirable for potential nontraditional vendors to contract with the federal government. The AFC has been tasked with the expeditious fielding of breakthrough technology or capability improvement; in turn, it has a demand for the ability to execute acquisition programs that maintain pace with technology proliferation in the commercial industry.

The AFC also needs to turn a concept into a prototype; therefore, an improved process is needed to shorten the time it takes to award a contract. The unfortunate fact is that numerous nontraditional small businesses can provide cutting-edge technology to develop a prototype, but due to the traditional requirements of contracting with the Department of Defense (DOD), they do not have the ability to compete. This includes the acquisition of early research and development (R&D) white paper studies and early-level prototypes, with the ability to develop technology into a novel battlefield advantage.

Countless nontraditional small businesses offer game-changing combat technology, but not surprisingly, often lack the resources to administer a typical DOD contract that seems to be geared toward large defense contractors. These small companies can be unfamiliar with the mechanisms of DOD bureaucracies, such as those driven by the Federal Acquisition Regulation (FAR), or cannot staff enough personnel to administer a government contract without outside help. Other limitations require an approved cost accounting system, or companies do not possess the knowledge or experience to offer their solution through the standard FAR-based contracting processes.

To address the concerns of doing business with nontraditional defense companies and reducing the procurement administrative lead time (PALT), the AFC established the

Army Applications Laboratory (AAL) to seek out breakthrough opportunities for acquiring emerging technologies. The AAL has been tasked to explore new capabilities in a timely manner to field those disruptive technologies to the warfighter. This will allow the AFC to strengthen its mission to “deploy, fight, and win our Nation’s wars by providing ready, prompt, and sustained land dominance by Army forces across the full spectrum of conflict as part of the Joint Force” (Army Futures Command [AFC] 2020).

Currently, the AAL primarily relies on contracting vehicles such as broad agency announcements (BAAs) and Small Business Innovative Research/Small Business Technology Transfer (SBIR/STTR) programs to meet their acquisition needs for developing technology. These programs provide funding opportunities with the federal government in the R&D arena to increase the private-sector commercialization of advanced technology for military applications. However, there are limitations to the SBIR/STTR vehicles in that they are accessible to numerous federal agencies, there is a relatively small pool of funding available, or use thereof requires collaboration with a non-profit research institution. While these programs are beneficial, the AFC’s contracting vehicles need to expand the acquisition horizon to the fullest extent to maintain the fast pace of modernizing the Army.

The AAL’s focus is to turn capability concepts into prototypes and have these solutions evaluated in an operational environment for immediate feedback that can help transform a novel idea into a battlefield advantage. This capstone project shall look into not only the traditional FAR-based contracts but other procurement vehicles including Other Transaction Authorities (OTAs) and R&D Agreements. Additionally, avenues such as cooperative technology or investment agreements, and other contractual instruments to acquire and advance the development of concepts and prototype hardware will be considered.

B. REQUIREMENTS

This capstone project provides AAL with a foundation to execute specific contract decisions based on research, analysis, and recommendations of all contracting methods available to DOD. Due to the concerns described in the problem statement associated with acquiring white paper concepts and early prototype hardware in a timely manner, AAL

needs alternative ways of contracting with nontraditional small businesses. Therefore, the primary objective is to address AAL's requirement of needing expedited contracting practices in an effort to reduce the PALT. Whether a company has a unique idea of solving a battlefield necessity, or a working prototype that can be evaluated against mission requirements, companies small and large should be given proper consideration for the benefit of the Army.

During the discussions with AAL, the capstone team developed four evaluation criteria for their contracting requirements, which include the ability to (1) conduct R&D activities and deliver prototypes, (2) award contracts in less than six months, (3) award contracts that range from \$10,000 up to \$10 million in value, and (4) contract with nontraditional defense companies. This often includes start-up businesses working from their garages and basements, but if an innovative product proves beneficial on the battlefield or support thereof, there is no doubt it should be evaluated from an effectiveness and suitability perspective. This can include anything from white paper studies for describing basic concepts, to prototypes with a Technology Readiness Level around five/six and be ready for testing in an operational environment. Contracting for the AAL must therefore be agile, creative, and most important, time-conscious to allow the evaluation of worthwhile investments that can be developed into a useful advantage for American warfighter.

C. RESEARCH QUESTION

What are the contracting methods conducive to nontraditional DOD vendors that meet AAL's requirements for conducting R&D activities and developing prototypes in less than six months when the acquisition is between \$10,000 and \$10 million?

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II. LITERATURE REVIEW

A. INTRODUCTION

Chapter II explores AAL's current process and contracting methods that may that may apply to the research questions presented in Chapter I. Through the examination of prior relevant literature, studies and scholarly articles, illumination of areas where further research is required to expand the overall body of knowledge to a level sufficient to answer the research questions presented in this thesis. This chapter divides the areas of study into three categories: (1) solutions based on traditional contracting within the FAR and its supplements; (2) solutions based on non-FAR authorities; and (3) studies and scholarly articles for consideration.

As a new organization, AAL is still establishing internal and external processes and procedures for their contracting needs. All requirements link back to the Army's modernization priorities through a series of focus areas (Army Applications Laboratory [AAL] 2020). Requirements are generated from the user, and from there AAL will seek out innovative technologies to bridge the gap in developing new capabilities for the warfighter. Figure 1 is a depiction of AAL's process for companies that are looking to do business with the Army to solve modernization issues. After the user's requirements are established, the AAL must determine the most appropriate type of contract method for their acquisition needs. This is where the following research will focus on.



Figure 1. AAL Focus Areas Process Chart. Source: AAL (2020).

B. FAR-BASED SOLUTIONS

The FAR is the primary regulation utilized in government acquisitions for supplies and services using appropriated funding. This section highlights the research completed by the capstone team providing AAL with potential contracting solutions using the requirements within the FAR.

1. Federal Supply Schedule

The Federal Supply Schedule (FSS), a program that is run by the General Services Administration (GSA), is a contracting method outlined in FAR Subpart 8.4, and is intended “to place orders, or establish blanket purchase agreements (BPA)” for the procurement of commercial products (General Services Administration [GSA] 2018, 8.4-1). The FSS enables federal agencies the ability to purchase commercial products and services through a simplified process and using pre-established prices associated with economies of scale (GSA 2018). One of the advantages of using the FSS is the volume pricing that is available due to many government organizations leveraging these services. These schedules include pre-negotiated fixed prices across various contractors that will provide the products and services as outlined in FAR 8.402 (GSA 2018). Since these services, products, and prices are pre-negotiated, they have also determined to be fair and reasonable, along with the vendors being pre-vetted ensuring they are qualified suppliers (Defense Acquisition University [DAU] 2020e).

As specified in FAR 8.405-1(b), “orders at or below the micro-purchase threshold” can be made with any contractor on the FSS that can meet the requirements, and do not require the buying activity to issue a solicitation to industry (GSA 2018, 8.4-4). Orders “exceeding the micro-purchase threshold, but not exceeding the simplified acquisition threshold” (SAT) of \$250,000 must survey a minimum of three contractors or document why they cannot (GSA 2018, 8.4-5). Orders above the SAT (\$250,000+) must be competed, unless there is documented justification for waiving this requirement (GSA 2018).

2. Commercial Items

Commercial items are defined in FAR 2.101 as items that are traditionally used by non-government agencies and available for public usage (GSA 2018). This includes products other than real property, and services such as repair, maintenance and training. The acquisition of these products and services can be performed using the procedures of FAR Part 12 for acquisition of commercial items (GSA 2018). The acquisition of commercial items, however, does not allow for development or customization of the products being sought. The products come with an industry-standard license and associated rights, thereby requiring the government to purchase additional rights if desired to meet their needs. A determination of a commercial item is required before it can be acquired using FAR Part 12. Streamlined procedures, such as the simplified acquisition procedures (SAP), can be used to acquire commercial products, effectively decreasing the PALT. Defense Federal Acquisition Regulation Supplement (DFARS) 212.102(a)(iii) also allows contracting officers to regard products and services from “nontraditional defense contractors as commercial items” (Department of Defense [DOD] 2020, 212.1-1). Conducting this form of procurement “does not require a commercial item determination,” nor does the determination thereof mean the product or service is commercial (DOD 2020, 212.1-2).

3. Simplified Acquisition

FAR Part 13 outlines the usage of SAP for commercial items, R&D, supplies and services, and construction (GSA 2018). Acquisitions of commercial items above the SAT,

but below \$7 million (or \$13 million for limited circumstances) are permitted under FAR Subpart 13.5 (GSA 2018). Simplified acquisitions can be acquired through government purchase cards, purchase orders, BPA, imprest funds, or using a purchase order.

4. Basic Agreements and Basic Ordering Agreements

As identified in the FAR, basic agreements are “negotiated between an agency or contracting activity and a contractor,” and contain “contract clauses applying to future contracts during its term” (GSA 2018, 16.7-1). FAR 16.702(a) states that basic agreements also contemplate separate future contracts that will incorporate the required and applicable clauses that are agreed upon in the agreement, but they are not actual contracts themselves (GSA 2018). Basic agreements are used when the government has experienced significant recurring negotiating problems with a contractor who is expected to receive a substantial number of separate contracts within a specified period as stated in FAR 16.702(b) (GSA 2018).

Basic ordering agreements (BOAs) can “expedite contracting for uncertain requirements for supplies or services when specific items, quantities, and prices are not known at the time the agreement is executed, but a substantial number of requirements for the type of supplies or services covered by the agreement are anticipated to be purchased from the contractor” as identified in FAR 16.703(b) (GSA 2018, 16.7-1). FAR 16.703(b) also states that these types of agreements allow for reduced PALT and can result in economies of scale price benefits for the government (GSA 2018). It is important to note that a BOA is not a binding contract since they are instruments of understanding and does not require the government to place future orders or contracts with that particular vendor (GSA 2018).

Each BOA implemented by a contracting activity shall include the following: all applicable contract clauses, methods for pricing, issuing and delivering orders, and “a description of the supplies and services provided” (AcqNotes 2019a). Each BOA will also list the various government activities that are “authorized to issue orders under the agreement, and shall specify the point” where the agreement becomes a legal, binding contract (AcqNotes 2019a). Nonetheless, all BOAs must comply with competition

requirements stipulated in FAR Part 6, and cannot be used to circumvent competition when it is deemed required as general practice for public spending.

5. Small Business

Government contracting has an emphasis on utilizing small businesses to satisfy agency acquisitions. The encompassing small businesses in government contracts is vital to ensure there is economic growth and diversity of private enterprise in offerors who are capable of being awarded a government contract. This is the basis behind the Small Business Act to support and assist small businesses to increase their ability to compete in government contracting.

a. Small Business Innovative Research/Small Business Technology Transfer

The Small Business Innovative Research (SBIR) program “encourages small businesses to engage in federal R&D activities with the potential for commercialization to stimulate innovation” (DAU 2020l). The Small Business Technology Transfer (STTR) “is [...] [a] program to facilitate cooperative R&D [efforts] between small business concerns and non-profit U.S. research institutions with the potential for commercialization of innovative technological solutions” (DAU 2020l). The portions of R&D budgets that will be allocated to SBIR/STTR programs are determined at the beginning of each fiscal year, and only funding that is allocated for the SBIR/STTR program can be used for these contracts.

SBIR/STTR contracts have three phases used for different aspects of R&D efforts. Phase I is for concept development generally lasting less than six months; Phase II is prototype development lasting for no more than 24 months; and Phase III is for commercialization of a product, which does not have a limit on the duration of performance (DAU 2020l). This small business program provides the opportunity to deliver capabilities quickly, uniquely negotiate terms and conditions, and award sole source contracts, efforts that can help reduce PALT durations (DAU 2020l). The main downside of this program is there are data rights protection measures in place for the company, which can limit the

government's retention of intellectual property (IP) gained through collaborative R&D projects (DAU 2020l).

b. Small Business Set-Asides

As depicted by FAR Subpart 19.5, small business set-asides are a way to reserve some or all of an acquisition requirement strictly for small business entities (GSA 2018). Socioeconomic programs such as these are intended to aid smaller companies by directing business toward them that can help them grow while achieving the mission. Small business set-asides can include one or more of the qualifying business concerns that fall under the small business types listed in FAR Part 19 (GSA 2018). The small business types within FAR 19 include: Small Business, Service-Disabled Veteran-Owned Small Business (governed by FAR 19.14), Historically Underutilized Business Zone (HUBZone) Program (governed by FAR 19.13), Small Disadvantaged Business (8(a) Business Development Program governed by FAR 19.8), or a Women-Owned Small Business (governed by FAR 19.15) (DAU 2020p).

Small business set-asides can be used for a variety of products and services. The use of any of these socioeconomic programs should be considered by a contracting officer first if market research indicates that a small business is capable of fulfilling the government's requirement, or if an agency needs help to attain small business utilization goals. The SAT, currently between \$10,000 and \$250,000 as amended by GSA Class Deviation 2018-01, is a key element in determining what, if any small business set-aside can be anticipated to be used for an acquisition (Koses 2018). Any acquisition below the SAT (\$10,000), but above the micro-purchase threshold, must use a small business "unless there is no reasonable expectation" that two or more small businesses will be capable offerors for the acquisition (DAU 2020p). Any acquisition above the SAT (\$250,000) must contain set-asides if there are two or more small business entities that can perform adequately for the requirement, and the contract "award will be made at fair market prices" (DAU 2020p). Small business set-asides are constrained due to the difficulties of having an unduly elaborate cost accounting system required by certain contract types as well as the complexities of DOD contracting requirements (DAU 2020p).

c. *Direct 8(a) Program*

As identified in the FAR 19.800(a), “[s]ection 8(a) of the Small Business Act (15 United States Code (U.S.C.) 637(a)) established a program that authorizes the Small Business Administration (SBA) to enter into all types of contracts with other agencies and award subcontracts for performing those contracts to firms eligible for program participation” (GSA 2019). Contracts awarded under this program can be on a competitive or sole-source basis. A newly written DOD Class Deviation 2020-O0009 increases the threshold in which a sole source 8(a) award can be made without a justification and approval (J&A) from \$22 million to \$100 million. The deviation also changes the approval authority for awards exceeding \$100 million to the head of procuring activity (DAU 2020o; Herrington 2020). Section 8(a) awards are a component of small business set-asides in which any effort awarded as an 8(a) set-aside has to remain as such until the Small Business Administration (SBA) approves the removal of the requirement from the program (DAU 2020o).

6. *Indefinite-Delivery, Indefinite-Quantity Contracts*

Indefinite-delivery, indefinite-quantity (IDIQ) contracts allow increased flexibility to meet government needs by providing combinations of indefinite elements, especially when there are uncertainties within the program office (AcqNotes 2018b). They can be single award or multiple award IDIQ (MAIDIQ) contracts. Depending on the government’s requirements, a type of IDIQ contract “may be used to acquire supplies or services when the exact times and/or exact quantities of future deliveries are not known at the time of contract award” (AcqNotes 2018b). Existing IDIQ contracts can also be used before applying resources establishing a new single or multiple award IDIQ in an effort to save time generating the procurement package; however, does not readily allow for changes to be made on an already existing contract (DAU 2020f).

a. *Multiple Award Indefinite-Delivery, Indefinite-Quantity Contracts*

MAIDIQ contracts are awarded to multiple vendors and contain a specific scope of products and services that can be ordered against the contract (DAU 2020h). In this scenario, vendors are required to submit a proposal for how they plan to satisfy the

government's requirements, and those successful offerors are awarded a base contract (DAU 2020h). As with any contracting method, there are advantages and limitations for this particular vehicle, and it is up to the acquiring activity to determine if the benefits outweigh the risks. Some advantages of utilizing the MAIDIQ method include reducing the risk of vendor lock through continuous competition, increasing flexibility to meet multiple orders and requirements using one vehicle, and the ability to create streamlined ordering procedures (DAU 2020h). The limitations of this type of contract method include potential issues with integration due to multiple vendor solutions for the same requirement, and there is potential for orders above the FAR threshold to be protested (DAU 2020h). The primary risks associated with MAIDIQ contracts include longer PALT durations for the initial award and subsequent orders placed on the contract, the potential for protest, and an increased administrative burden and contract management complexity (DAU 2020h).

b. Single Award Indefinite-Delivery, Indefinite-Quantity Contracts

Single award IDIQ contracts are awarded to only one vendor and contain a specific scope of products or services that can be ordered (DAU 2020f). A base contract is awarded which contains the terms and conditions applicable to any orders placed against the contract (DAU 2020f). However, there are risks to awarding to a single vendor including having only one source for all supplies/services, increased PALT for the initial award, and potential for increased costs, longer schedules, and risk to performance when in a sole-source environment (DAU 2020f).

7. Staged Contracts and Broad Agency Announcements

In accordance with the Office of Science and Technology Policy (OSTP) “[a] staged contract is an innovative contracting model that follows a three-phase evaluation process consisting of a short concept paper, invite-only full proposal, and subsequent 1–2 year pilot evaluation” (Office of Science and Technology Policy [OSTP] 2014, 7). These types of contracts are traditionally used for requirements that are rapidly evolving and have limited resources. Contractors respond to the staged contract with short information papers on how they will meet the government's requirements through a Broad Agency Announcement (BAA) that has been issued by the government. Upon review of each

vendor's proposal submission, the government provides an invitation-only bid to those contractors to submit a full-scale proposal (OSTP 2014). After reviewing the full proposals, one or more contractors are selected and invited to participate in a pilot program (OSTP 2014). Staged contracts allow the government to communicate evolving requirements to industry with the goal to quickly acquire a solution to satisfy their needs. The benefit to industry is they are able to respond to government inquiries without investing a great deal of time or resources in each project. This is especially inviting for nontraditional contractors or smaller companies that may not have the resources or knowledge to respond to initial government requests with a full-scale proposal (OSTP 2014).

BAAs are the mechanism in which the government can set up a staged contract with industry, and the authority to solicit a BAA falls under FAR 35.016 (OSTP 2014). According to FAR 35.016(a), BAAs may be used for requirements associated with “scientific study and experimentation directed toward advancing the state-of-the-art or increasing knowledge or understanding” of a particular effort (GSA 2018, 35.0-6). The proposals received from industry should be for requirements that are funded using 6.1 to 6.4 research, development, test, and evaluation (RDT&E) appropriations, which can be used for both FAR-based contracts and non-FAR agreements (DAU 2020a).

8. Defense Commercial Solutions Opening Pilot Program

The Defense Commercial Solutions Opening (CSO) program authority was provided in the fiscal year (FY) 2017 National Defense Authorization Act (NDAA), and is effective through September of 2022 to enable the government to obtain solutions that fulfill capability gaps, provide technology advancements, and meet R&D requirements (DAU 2020d). This program has procedures similar to BAAs in which the announcement shall describe the agency's research interests, describe criteria for evaluating proposals, and preparation and submission instructions for how an offeror proposes their solution (GSA 2018). However, unlike a BAA, the CSO program is not restricted to basic and applied research, and instead can be used to acquire products and services that fall under the category of innovation (DAU 2020d).

C. NON-FAR-BASED SOLUTIONS

The utilization of other transaction (OT) agreements is a way for the government to engage in federal acquisitions using contracting methods that are not governed by the FAR. These award methods allow the government to contract for research and development and prototyping with the commercial market. OTs are intended to provide flexibility business arrangements for the acquisition of R&D activities to develop new capabilities, mature technology or to evaluate military utility from nontraditional defense contractors (DOD 2018).

1. Other Transaction Agreements

The use of other transaction agreements offers the flexibility of commercial best business practices which provides greater potential for nontraditional defense contractors to participate in federal acquisitions (DOD 2018). OTs can be especially helpful for seeking advanced technologies or new capabilities from small businesses and other technology companies that do not normally contract with the DOD (DOD 2018). This is accomplished by reducing the barriers to entry for contracting with the government, and OTs waive the requirement for a cost accounting system and other statutory constraints, such as the Competition in Contracting Act (CICA) and the Truth in Negotiations Act (TINA) are not applicable for use of OTs (Smith et al. 2002). OTs have additional benefits in which they are less susceptible to traditional protests, since the Government Accountability Office (GAO) has limited jurisdiction to review OT decisions, unless the application of an OT is challenged to be inappropriate (DOD 2018). This means it is less likely that an award will be protested to the GAO, and any challenge to an OT decision would have to be more substantiated since they would be elevated to the Court of Federal Claims (DOD 2018).

There are two types of OTs which include that for *research* and *prototypes* (DOD 2018). A research OT entails efforts to enhance basic, applied or advanced research activities, and the scope is broadly limited to prohibit duplicative study and requires competition with fifty percent cost share with the government (DOD 2018). A prototype OT advances new technologies and processes by use of modeling and prototyping to assess the feasibility of a new concept or design (DOD 2018). An OT also has the authority to award a follow-on production effort from a prototype OT, provided that competitive

procedures were used in awarding the initial OT, and the follow-on effort is documented in a determinations and findings (D&F) (DOD 2018).

There are three basic requirements for exercising the authority for OT agreements: purpose, prototype, and participation (DOD 2018). OTs have a wide range of applications and broad purpose when considering projects need only be directly related to either enhancing mission effectiveness of existing or proposed technology, or improving upon a current capability used by the warfighter (DOD 2018). The effort under an OT agreement must be for either research, or for prototyping, which can be loosely defined as a proof of concept, pilot, or demonstration of a novel application for military utility of a particular concept or technology (DOD 2018). Lastly, an OT must include participation from at least one small business or nontraditional defense contractor, or non-profit research institution, to a significant extent in the project, or if those particular vendor types are not involved, the other OT requirements such as cost-sharing with large defense contractors are invoked (DOD 2018).

a. Use of Other Transaction Agreements by Other Agencies

While the basic required elements of OT agreements are the same throughout the DOD, several agencies have taken differing approaches in their efforts to leverage the OT authorities that have been made available throughout the department since the 1990s. Three example external agencies were identified in the research for this capstone project, which consisted of the Defense Advanced Research Projects Agency (DARPA), In-Q-Tel as employed by the Central Intelligence Agency (CIA), and the DIU. While there is certainly benefit in reviewing the basic requirements that must be included in a model OT agreement, the capstone team assessed that it is even more illustrative to study how other agencies have successfully used OT authority to accomplish similar goals to those sought by AAL.

b. Use of Other Transactions by the Defense Advanced Research Projects Agency

The first Defense Department agency to utilize OT Authority in its modern form is DARPA, which was first granted the authority in the late 1980s to allow for more rapid development of innovative technologies in cooperation with commercial industry. In order

to do this, DARPA needed a contracting mechanism that more closely reflected the business-to-business transactions that commercial industry considers standard practice, but which do not typically align with the traditional FAR-based contracting practices of the federal government. DARPA's use of OTs is in effort to meet their technology development objectives, namely as a "means to attract and create partnerships with non-traditional defense companies in the R&D environment" (Howell 1997, 61).

DARPA pioneered the use of OTs in their modern form for the development of high technology through collaborative agreements with commercial technology firms. In fact, DARPA played a central part in crafting the OT language that was included in the original statutes that granted OT authority to federal agencies in the late 1980s and early 1990s (Howell 1997).

The effort to find new ways for DARPA to tap into the technological advancements of the commercial industry began when it was apparent that the existing authorities were insufficient for DARPA to accomplish its goal of attracting nontraditional technology firms into contractual agreements that would be of mutual benefit to the DOD and to those businesses. Cooperative agreements required too much administrative burden on both government and industry, and in general, government contracts were not conducive to consortium arrangements which were often necessary for the types of technology development efforts DARPA was pursuing (Howell 1997).

Additionally, it was observed that more flexibility in contractual arrangements was essential to allow DARPA to benefit from the technology development efforts of the commercial sector. In recognition of this, Congress granted DARPA "Other Transaction" authority in 1989 through the enactment of 10 U.S.C. 2371 (Howell 1997). After this authority was granted, DARPA successfully entered into numerous OTs in the ensuing decade with many successful outcomes including early unmanned aerial vehicle (UAV) development (RQ-4 Global Hawk) in the late 1990s, a technology with widespread use on today's battlefield (Howell 1997).

Due to the broad nature of the statutory language granting OT authority, the statute lends itself to a broadened scope of interpretation. DARPA capitalized on this fact and has leveraged a liberal interpretation of the statutory requirements for the use of OTs, which

has allowed them a great deal of flexibility in the use of this authority (Howell 1997). As a result, DARPA has been able to pursue far more technology development opportunities than would otherwise not have been possible. This has allowed DARPA to define more projects as “prototypes” under the Section 845 OT authority, allowing DARPA to fully fund many more technology development agreements than they might otherwise have been able to under a narrower definition of the term (Howell 1997).

c. Use of Other Transactions in the Formation and Operation of In-Q-Tel

With the use of the modern form of OTs pioneered by DARPA as detailed above, other agencies were able to begin capitalizing on this authority that is now available to the DOD and other federal agencies. This was an important development in the effort to achieve meaningful acquisition reform and to support more agile contracting methodologies and practices. Another good example of the use of OT authority for the development of new technologies of interest to federal agencies is that of In-Q-Tel, the non-profit technology development arm created by the CIA (Yannuzzi 2007).

In the 1990s, the CIA began to find that it was increasingly faced with aging information technology systems and falling behind advancements made available in the commercial marketplace (Yannuzzi 2007). They decided it needed to develop a new approach to acquiring innovative technologies the agency could ultimately benefit from (Yannuzzi 2007). In-Q-Tel was formed in 1999 through an OT executed by the CIA to initially establish a five-year Charter Agreement with the newly formed In-Q-Tel corporation. This charter described a broad and flexible framework for In-Q-Tel to operate within in pursuit of CIA’s technology development goals (Yannuzzi 2007).

The use of OT authority in this way allowed the CIA to provide funding for In-Q-Tel and establish general terms, conditions, policies, and guidelines, but avoided the vast majority of the typical FAR-based clauses and other terms that would normally be required. They would also be required to flow down contractual requirements into any subcontract agreement the corporation would make with technology development partners (Yannuzzi 2007). This removal of prescriptive requirements gave In-Q-Tel much greater discretion in their ability to network and coordinate new technology development efforts with private industry partners who would otherwise be reticent to contract with the government.

d. Use of Commercial Solutions Offerings and Other Transactions at Defense Innovation Unit

Since its initial establishment by the Secretary of Defense in 2015, the Defense Innovation Unit (DIU) has been developing and pursuing technology advancement in part through the use of OT authority for prototypes under 10 U.S.C. 2371b, as delegated to their contracting office by the Secretary of Defense and Assistant Secretary of the Army for Acquisition, Logistics, and Technology (Defense Innovation Unit [DIU] 2016). One of the key aspects of DIU's use of OTs is their broad definition of "prototype" as identified in the relevant section of the current OT statute. Their use of a broad definition for prototype allows them to work on projects involving the wide and ever-changing range of technologies that exist in the marketplace today (DIU 2016, 7). For ease of reference, DIU's stated prototype definition is as follows:

A prototype project can generally be described as preliminary pilot, test, evaluation, demonstration, or agile development activity used to assess the viability, technical feasibility, application, or military utility of a technology, process, concept, end item, system, methodology, or other discrete feature. The quantity or tenure should be limited to that needed to effectively assess the prototype (DIU 2016, 7).

This very broad definition of prototype allows DIU to establish and award OTs with few restrictions on the types of technologies or specific project outcomes that are desired to define success for a given technology development effort (DIU 2016). The use of OTs to definitize the terms, conditions, requirements, and deliverables for these development projects allows DIU to attract those nontraditional contractors that tend to have the newest and most advanced technologies, but who are also very resistant to contract with the federal government or DOD for the reasons previously stated (DIU 2016).

Beyond their broad definition of prototype, the biggest difference between the ways other examined external agencies award OTs, and the way DIU does it is through their use of CSOs for the solicitation phase prior to awarding an OT to selected contractors. DIU developed the CSO approach by stacking the traditional BAA solicitation method with the prototype OT authority for the award of the resulting contracts (DIU 2016).

To summarize the CSO process, DIU posts areas of interest (AOIs) on their website, which broadly describe technologies they are seeking to develop, and challenges that DIU

is interested in finding solutions for their needs. These AOIs are usually posted to industry for a period of time from a week to several months, and while they are posted, DIU will reach out directly to nontraditional contractors who may be able to assist with those technology development objectives associated with a particular AOI (DIU 2016). In Phase I of the CSO, vendors are able to respond to AOIs with white papers or solution briefs, DIU then evaluates against four factors: relevance, technical merit, business viability, and innovation (DIU 2016). After this evaluation, responding companies are either invited to move into the pitch phase (Phase II), or provide information as to why they were not selected to move forward. In the pitch phase, companies provide more information on their technology or proposed solution, which is evaluated by DIU on cost, schedule, and data rights issues (DIU 2016). After Phase II, DIU encourages the DOD customer to select several different prototype approaches to allow exploration of the different options in a collaborative design environment. Finally, after all technical and funding aspects have been agreed upon, one or more companies with the most promising technological solutions are invited to provide a formal proposal (Phase III) which is evaluated for fair and reasonable pricing, and to ensure it meets the statutory requirements for the award of an OT. Once these steps have been completed, the companies negotiate the final terms of the OT with the agreements officer and the OT is awarded (DIU 2016).

2. Procurement for Experimental Purposes

Procurement for Experimental Purposes allows the government to obtain systems for the purpose of conducting technical evaluations of operational utility, or to maintain existing capability. This method is authorized under 10 U.S.C. 2373, and is intended for the purchase of emerging capabilities in the nine technology domains of aeronautical supplies, telecommunications, chemical activity, energy, medical, ordinance, signal, space-flight, and transportation, and including parts and accessories, as well as designs thereof (DAU 2020j). These technology domains are broad in scope and most commercially-available devices can likely fit into any of the nine categories. An example is if the Army decides it wants to evaluate an augmented reality goggle system, this could fall under the recently added telecommunications area, but could just as readily include the signal domain, or even aeronautical supplies or medical domains, depending on the need for the

new capability (DAU 2020j). Currently, only the DOD has the authority to acquire supplies using this instrument, but its implementation is similar to that of other transactions or cooperative agreements.

Procurement for Experimental Purposes is an agreement with industry that is not restricted to competitive procedures, so the CICA does not apply, nor is it governed by the FAR or DFARS. The resultant award does not include standard provisions and clauses that typically accompany a procurement contract, therefore the contract or agreement can be written using commercial terms and conditions (DAU 2020j). The primary purpose of 10 U.S.C. 2373 is to test and evaluate new weapons systems for the military, and is a flexible and fast instrument used to procure hardware from domestic or foreign sources. There is no limit to the quantities being sought under this authority, but the acquiring office may not purchase more units than the quantity required for the technical evaluation or assessment of operational utility (DAU 2020j).

3. Research and Development Agreements

R&D Agreements offers the DOD to partner with other federal agencies, local governments, institutions of higher education and non-profit organizations, in addition to the traditional defense industry, to cooperatively work together to develop capabilities (DAU 2020k). Partnering with organizations outside the typical DOD industry for advanced research “creates new technology or demonstrate the viability of applying existing technology to new products and processes in a general way” (DOD 2018). These agreements are flexible, with IP provisions to share or protect a company’s invention. The following subsections focus on the R&D Agreement strategies, including cooperative research and development agreements, partnership intermediary agreements, and technology investment agreements.

a. Cooperative Research and Development Agreement

CRADA authority is provided under 15 U.S.C. 3710b, and is defined as “a written agreement between one or more federal laboratories and one or more non-federal parties” such as state/local government, industry, non-profit, and universities under which the government, through its laboratories, provides personnel, services, facilities, equipment,

IP, or other resources (DAU 2020c; Army Research Laboratory [ARL] 2020). Federal laboratories do not provide appropriated funds to non-federal parties, but a partner willing to collaborate with the government using a CRADA may contribute funding, including services, property and personnel (DAU 2020c).

CRADAs provide an easy way for federal and non-federal partners to exchange technical expertise, and to accept reimbursement for research conducted under the CRADA (DAU 2020c). This contracting method is a primary tool used for research, development and demonstration collaboration, technology advancement efforts, or services to facilitate technology transfer to the private sector (DAU 2020c). Federal laboratories “may seek an industry partner with resources to successfully market or commercialize” an invention, or to “stimulate a market for new technology, and allows non-federal/industry” partners greater access to government laboratories to further their technology development objectives (DAU 2020c).

There are several benefits to using CRADAs including the flexibility “to adapt to a variety of types of collaborative efforts between federal and non-federal organizations, and can be implemented relatively easily within a short time” (DAU 2020c). CRADAs leverage the laboratory R&D resources to acquire expertise and other forms of assistance without any monetary payment to collaborating partners (DAU 2020c). A CRADA is a mechanism in technology transfer that results in the “commercialization of products or processes originating in federal laboratories” (DAU 2020c). There are also financial benefits for the laboratory, since industry partners use laboratory resources and pay royalties from license agreements (DAU 2020c).

b. Partnership Intermediary Agreement

A PIA is a vehicle for a state or local government, or a non-profit entity as defined under 15 U.S.C. 3715 to assist, counsel, advise, evaluate, or otherwise cooperate with small businesses, institutions of higher education, and industry on behalf of the government to accelerate technology transfer and licensing (DAU 2020i). PIAs are authorized as a contract, agreement, or memorandum of understanding between federal laboratories and an intermediary organization that facilitates joint projects, and accelerate technology transfer between the government and private companies (DAU 2020i). A PIA helps

companies to identify federal technologies that can be licensed and commercialized, and performs services to increase the likelihood of successful cooperative activities between the federal laboratory and small businesses, institutions of higher education, and industry (DAU 2020i). This contracting method also facilitates a wide range of licensing and other technology transfer initiatives including CRADA, educational partnership agreements, licensing and commercialization of a product (Griffiss Institute n.d.).

The PIA approach enables the government to pay for services to support technology transfer; however, the authority under 15 U.S.C. 3715 is available only to federal laboratories (DAU 2020i). A PIA “can function as objective third-party brokers between government and industry to increase opportunity for commercialization of new capability” (DAU 2020i). It can also “engage in proactive marketing of lab technologies to industry to enable tech transition/tech insertion” (DAU 2020i).

c. Technology Investment Agreement

A TIA is a contract method that is designed to promote commercial-military integration for developing technology and augmenting the industrial base (DAU 2020q). “TIAs are appropriate when research objectives are unlikely to be achieved using other types of contract instruments” (DAU 2020q). “TIAs may be executed as a cooperative agreement or a type of assistance transaction other than a grant or cooperative agreement, such as a Research Other Transaction (OT)” (DAU 2020q). They are “executed as cooperative agreements in accordance with the DOD Grant and Agreement Regulations 32 CFR Part 21, when the government does not intend to deviate from the Bayh-Dole Act, which permits a university, small business, or non-profit institution to pursue ownership of an invention” created using government-provided funding (DAU 2020q).

TIAs are commonly used to “reduce barriers to allow commercial firms’ participation in defense research to provide access to the broadest possible technology and industrial base” (DAU 2020q). “TIAs permit the involvement of commercial firms or business units of firms that would not otherwise participate in the project” (DAU 2020q). They also “promote new relationships between the federal government and commercial companies, and enable them to pursue new business practices to execute research for new technologies” (DAU 2020q). There is a statutory condition for any TIA under the authority

of 10 U.S.C. 2371 that the “non-federal parties carrying out a research project to provide at least half of the costs of the project” to the maximum extent practicable (DAU 2020q).

D. STUDIES AND SCHOLARLY ARTICLES FOR CONSIDERATION

The utilization of existing commercial contracting methods is a potential solution that is readily available to AAL. The focus of the research is to evaluate opportunities to reduce the barriers to contract with the government in an effort to encourage nontraditional vendors to participate in federal acquisitions. This section will review prior studies and scholarly articles that provide understanding to similar procurement methodologies for the acquisition of goods and services.

1. Solutions Based on Traditional Contracting within the FAR and Its Supplements

The following section outlines the prior studies and scholarly papers reviewed by the capstone team in research for this project. These articles provide valuable insight regarding the traditional federal acquisition methods to award a contract based on the FAR and its supplements.

a. *“Capitalizing on Commercial-item Designation Provisions of FAR 13.5: Getting the Most from Limited Resources” (Johnson et al. 2006)*

“Capitalizing on Commercial-item Designation Provisions of FAR 13.5: Getting the Most from Limited Resources” provides a useful historical background on the intent of the Federal Acquisition Streamlining Act (FASA) and Federal Acquisition Reform Act (FARA) statutes that prompted federal agencies to develop the current commercial contracting regulations incorporated into the FAR, DFARS, and the Army FAR Supplement (AFARS). FASA and FARA were intended to encourage nontraditional contractors who typically only operate in the commercial sector to participate in federal contracting by removing or greatly reducing regulatory compliance requirements (Johnson et al. 2006). The key findings from Johnson’s thesis identified that command agencies historically tend to organize their contracting activities and warrant authorities by dollar thresholds (Johnson et al. 2006). This often creates a situation where contracting professionals at the SAP level do not have the authorization to utilize SAP above the SAP

threshold (currently \$250,000) up to the \$7 million ceiling authority included in FAR 13.5 (Johnson et al. 2006). Among other recommendations, Johnson's thesis emphasized a need to empower contracting officers at the SAP level to make purchases up to the FAR 13.5 limit, which currently stands at \$7 million (Johnson et al. 2006).

In Johnson's thesis, the researchers found that the time to process a SAP buy when compared with above the SAP threshold, large dollar contracting could represent up to a 90% reduction in processing time (Johnson et al. 2006). Additionally, below SAP acquisitions requires very minimal documentation to be reviewed and signed by the procuring contracting officer when awarding to a single offeror below \$150,000 (SAP threshold at the time of this article) (Johnson et al. 2006). Johnson emphasized that the authorities and flexibilities granted in FAR Subpart 13.5 provide an underutilized and potentially powerful tool for contracts for commercial applications with requirements permitting fixed-price contracts that could reasonably be determined to meet the FAR's commercial item definitions (Johnson et al. 2006). Above \$150,000 and up to \$7 million, documentation under this authority is streamlined to encourage nontraditional contractors to participate in and support federal contracting requirements (Johnson et al. 2006). There are, however, some applicable restrictions that must be adhered to when applying FAR 13.5, such as requirements for fixed pricing and commercial products or services as identified above.

b. "Innovative Contracting Case Studies" (OSTP 2014)

"Innovative Contracting Case Studies" is a collection of case studies that provides insight into different FAR-based and other authority contracting methods used by federal agencies to expedite contracting actions with nontraditional government contractors. The focus is to identify innovative tools and solutions to solve the government's complex issues while staying within the confines of contracting regulations and authorities. Utilizing these types of contracts can assist resource-constrained agencies to focus their already limited resources on the acquisition of promising technology (OSTP 2014). It also allows small businesses and nontraditional contractors increased opportunity to contract with the federal government. Table 1 identifies these case studies by the contracting effort, the associated authority, and provides a brief description.

Table 1. Contract Types Researched in the Innovative Contracting Case Study. Source: OSTP (2014).

Contract Type	Authority	Description
Rapid Technology Prototyping Contracts	FAR	Allows government to “try out” inexpensive, innovative, cutting edge but unproven technologies
Staged Contracts	FAR	Rapidly assess existing industry technologies. Identify the most promising technology.
Milestone-Based Competitions	FAR	Selected pool of offerors that have demonstrated technology delivered at agreed upon milestones
Incentive Prizes	America Competes Authorization Act	Promotes innovation by offering reward after completion of specified tasks
Challenge Based Acquisition	FAR	Industry demonstrates solutions meet real-world requirements. Used to meet urgent requirements, small Acquisition Category or non-programs of record.
Other Transactions (OTs)	Subject to fiscal, criminal law. Internal agency regulations	Flexible agreements mostly used for R&D and prototypes for innovative solutions to nontraditional defense companies
Fast, Inexpensive, Restrained, Elegant (FIRE)	FAR - SAP	Provides decision-making framework by identifying constraints. Simplistic approach to complex problems.
Agile	FAR, TechFAR Handbook and Digital Services Playbook,	Iterative approach to software development

Many of these contract methods are attractive to small businesses because they do not follow the traditional bureaucratic processes that can be difficult and costly to employ (OSTP 2014). They are also geared toward reducing the PALT duration, and allows for quick delivery of the solution which is mutually beneficial for government and industry.

Rapid Technology Prototyping Contracts quickly assesses potential technologies without significant investment by the government on the front end. These can be firm-fixed price contracts that use an offeror’s own facilities to minimize the risks associated with

establishing government capacity for development work (OSTP 2014). Businesses are involved and understand the requirements to better meet the needs of the program office. This type of contracting allows nontraditional vendors and small businesses greater opportunity to mature their technology, with minimal expectations and liability due to the low initial investment by the government (OSTP 2014).

Staged Contracts are a three-phased, progressive approach to include a concept paper, submission of a full-scale proposal by invitation only, and then followed by a 12 to 24-month evaluation. A BAA is the procurement tool that is used to communicate to industry to solve a development problem. Potential offerors respond with a short concept paper detailing their approach, and the government evaluates their solutions and invites selected offerors to submit a full proposal. The successful proposals are selected to participate in a one or two-year pilot program to refine their concept based on user needs, and the government can then decide to further pursue or terminate the pilot (OSTP 2014). This contract method focuses on the technology being sought, rather than adhering to complex contracting documents, which encourages small businesses with little to no government experience to participate.

Milestone-Based Competitions avoids entering into long-term commitments, but rather short, defined achievable milestones. Milestones and delivery schedules are pre-determined by the government, including assigned monetary value for each objective achieved (OSTP 2014). These competitions have well-defined requirements and are transparent to industry.

Incentive Prizes attract new ideas and solutions to the government with low upfront development costs. Usually, the problems are complex and challenging, but incentive prizes offer well-structured enticements to attract new ideas (OSTP 2014). This type of contract method encourages creativity and innovative approaches that have not been utilized before. Incentive prizes also drive competition, which results in a potentially lucrative reward for industry. Like many of the other contracts discussed here, incentive prizes are attractive to small businesses and academia because the processes for entry is much more simplified.

The government turns complex requirements into challenge tasks in *Challenge-Based Acquisitions*. The tasks must be well defined and articulated in meeting user requirements and are translated into meaningful events (OSTP 2014). The government must also lay out a plan for the challenge and determine the criteria for a follow-on contract or task order. This form of contracting also encourages creativity from industry and academia in proposing a novel solution to fill a capability gap.

Other Transactions are not governed by the FAR, as they are not a traditional contract, but rather are grants or cooperative agreements. They are arrangements tailored for R&D and prototyping efforts and are used in a wide variety of ways in acquiring lower-level technology products to be developed (OSTP 2014). OTs are also less burdensome than FAR-based contracting methods, and oftentimes nontraditional contractors will partner with larger defense companies to satisfy government requirements, which eliminates the overhead burden for smaller businesses (OSTP 2014).

Fast, Inexpensive, Restrained, Elegant (FIRE) are designed for affordable, simple solutions to complex problems. The solutions do not have to be complicated or take a long time to produce and are often produced by smaller teams who work with short deadlines (OSTP 2014). This is attractive to small businesses because the contractual magnitude and complexity is significantly reduced, therefore, the government benefits from faster delivery at reduced costs (OSTP 2014).

Agile is more of a contracting approach to than it is a contracting method. Agile can be defined in many ways; however, it is typically used to describe an iterative approach to software development (OSTP 2014). It is more transparent and collaborative than software developments of the past, such as the waterfall or spiral development models. It also takes more commitment and understanding from the supplier and acquiring program manager to lead the effort and be responsible for developing the requirements (OSTP 2014). When using an agile approach, government and industry can rapidly adjust to evolving issues or updated requirements due to the continuous development cycle of software.

2. Solutions Based on OT Agreements

The capstone team reviewed several articles on government acquisitions using methods other than traditional FAR-based contracting methods. The utilization of OT agreements increased dramatically in recent years with a greater emphasis on reducing the barriers to entry for contracting with the government, and provide the flexibility of mirroring the business-to-business transactions experienced in the commercial market. Additionally, other federal organizations were evaluated to understand how the use of OT agreements were successfully utilized for the acquisition of R&D activities and capability development.

a. *“Using Other Transactions as an Effective R&D Contractual Vehicle” (Howell 1997)*

“Using Other Transactions as an Effective R&D Contractual Vehicle” provides numerous important insights as it gives detailed background on the use of OTs by DARPA as their preferred contractual mechanism for R&D and technology development programs. There are many valuable findings relating to the use of OTs for R&D in this document, and the basic overview of OT authority in the context of R&D is quite valuable in of itself. The author goes into depth illustrating several examples how DARPA demonstrated the potential for beneficial R&D outcomes utilizing the flexibility of OTs (Howell 1997).

Although the use of OT agreements has been made available since its inception under 10 U.S.C. 2371 for research, and 10 U.S.C. 2371b for prototypes, the Army has not substantially used this acquisition method until only recently. In fact, the DOD has increased the use of OTs almost tenfold in the prior five years leading up to 2019, and between OT agreements and SBIR awards the Pentagon has spent approximately \$9.6 billion of the Defense’s RDT&E budget in that timeframe (Mehta 2020). Specifically, the Army by far leads all services in spending just over \$14 billion on the two contracting methods for OTs and SBIR awards in totality (Mehta 2020).

This increase in the use of OTs was in large part due to the FY2016 NDAA, in which Section 815 of the spending bill added 10 U.S.C. 2371b, authority of the DOD to carry out certain prototype projects. The FY2016 NDAA also authorizes the DOD to transition a prototype OT into a follow-on production effort with the same contractor(s)

without requiring competition, provided that competitive procedures were applied in awarding the original OT. Currently, each military service has authority to award OTs up to \$500 million, and for those projects greater than \$500 million is elevated to the Under Secretary of Defense; however, DOD as a whole does not have a ceiling threshold for executing OTs in the aggregate (AcqNotes 2019b).

OTs are intended to mirror commercial business-to-business transactions, and as a result are largely free from prescription which allows DOD services to craft agreements from a blank slate with the goal of finding a mutually beneficial arrangement for the government and industry with minimal regulatory requirements (Howell 1997). This enables greatly accelerated cycle time to award an OT agreement for developing cutting-edge technologies with companies that might otherwise avoid contracting with the government, or find the prospect thereof unmanageable (Howell 1997).

The findings highlight the fact that companies who are reticent to contract with the government based on IP ownership rights are more willing to enter into OT agreements due to the absence of regulatory mandates regarding government retention of IP rights. Further, OTs allow both parties to work cooperatively from that blank slate to generate the agreement on all relevant terms and conditions to arrive at a mutually agreed upon arrangement in a relatively short amount of time (Howell 1997). This research clearly demonstrates that DARPA's use of OTs provides a powerful mechanism to meet their technology development objectives by providing an effective way "to attract and create partnerships with nontraditional defense companies in the R&D environment" (Howell 1997).

In his thesis, Howell makes it clear that OT agreements, which are much less restrained than FAR-based contracts, allows for accelerated award of agreements to nontraditional defense companies for the development of innovative technologies for DOD. However, the open-ended nature of OTs requires that the agency utilizing the OT authority has professional acquisition teams with the necessary legal and business acumen and judgment to negotiate the key terms with industry partners in a timely manner. As the author pointed out, these business competences are not easily taught, instead are earned through years of experience due to the absence of formal education available within DOD

to enable the acquisition workforce to effectively leverage OT authorities on a widespread basis (Howell 1997). Additionally, Howell's thesis includes DARPA's OT model which, at the time this paper was written in the late 1990s, had allowed DARPA to successfully utilize over 130 individual OT agreements over a period of about eight years from 1989 to 1997, developing several key defense technologies along the way (Howell 1997). This model could be an important reference for other agencies to follow in efforts to develop their own OT-based approach to accelerate technology development and R&D activities.

b. "Assessing the Use of 'Other Transactions' Authority for Prototype Projects" (Smith et al. 2002)

In the RAND National Defense Research Institute report, the authors sought to address four key topics on the use of OTs for prototypes. This includes the general characteristics of typical OT agreements, the observed benefits achieved through the use of OT processes, apparent disadvantages encountered including how well the government's interests were protected, and the net effects after balancing the advantages and disadvantages that were observed (Smith et al. 2002). RAND came to a few important conclusions, namely that OTs were bringing new industry participants into DOD prototyping projects, and the flexibility of OTs allowed better use of industry resources with less effort being devoted to the process, allowing more time to be focused on the product itself (Smith et al. 2002). Overall, RAND found that the rewards to the government outweighed the inherent risks presented by the open-endedness of OTs (Smith et al. 2002).

The RAND report supports the idea that OTs have the potential to be one of the most important tools for awarding a contract for short-turnaround technology R&D objectives with nontraditional industry partners. It also points out that the OT authority effectively provides a blanket waiver for procurement laws such as the TINA, the CICA, and they are not governed by the FAR and DFARS (Smith et al. 2002). The removal of these statutory and regulatory requirements offers greater streamlining process advantages for situations where an agency contemplates contracting with nontraditional defense companies offering to help develop promising technologies for military purposes.

The RAND report also emphasizes that OTs pose risks to the government that stem from the absence of standard auditing and accounting controls, financial reporting, and IP

rights that would otherwise be established and enforced in a standard contract through the FAR, DFARS and AFARS provisions and clauses (Smith et al. 2002). Without the standard regulatory protections in this regard, the government risks overpaying for a given capability, or paying a contractor without much tangible benefit in the end. Without adequate IP protections, the government could be left in a position in which the technology they helped develop is then monopolized by one company, limiting the government's future use of that capability at a reasonable price.

On the other hand, this report asserts that OTs offer potential benefits to both parties of the agreement. This includes the opportunity to bring nontraditional and cutting edge contractors into the defense industry, broader freedom to negotiate and modify agreements as the program evolves, and the potential to reduce transaction costs by eliminating inflexible regulatory requirements that may not be beneficial for a given program (Smith et al. 2002). However, none of these benefits can be realized without a well-managed and thoroughly planned OT program coordinated by experienced acquisition professionals and legal advisors.

c. *“In-Q-Tel: A New Partnership Between the CIA and the Private Sector” (Yannuzzi 2007)*

“In-Q-Tel: A New Partnership Between the CIA and the Private Sector” provides a detailed overview of the formation of In-Q-Tel, the independent and non-profit corporation formed by the CIA to “foster the development of new and emerging information technologies and pursue R&D that produce solutions to some of the most difficult [information technology] problems facing the CIA” (Yannuzzi 2007, 2). The article also explains that In-Q-Tel would achieve these objectives through networking and the building of critical business relationships with industry leaders, venture capital communities and academia (Yannuzzi 2007).

This article identifies that the operational objective for In-Q-Tel is “to operate in the market place on an equal footing with its commercial peers and with the speed and agility that the IT world demands” (Yannuzzi 2007, 2). Given these objectives, it is logical that contracting vehicles utilized by In-Q-Tel to develop information technology capabilities of interest to the CIA presents a clear case study in alternative contracting

solutions for requirements involving the development of new technologies, R&D, and prototyping.

The main contracting method the CIA utilized to establish its partnership with In-Q-Tel was based on OT authority already available at that time to all DOD services (Yannuzzi 2007). This OT agreement between the CIA and In-Q-Tel provides a broad and flexible framework that allows In-Q-Tel the means to negotiate flexible technology development agreements with commercial industry partners to help initiate, develop, and mature information technologies that are determined to be of importance to the CIA (Yannuzzi 2007). Without the typical flow-down requirements that would be applicable in a standard federal government contract, In-Q-Tel can much more effectively engage and collaborate with high-technology industry partners in a way that is timely, relevant, and agile (Yannuzzi 2007). Of particular interest is the fact that the CIA's OT agreement forming In-Q-Tel was based on the DARPA OT agreement model for R&D efforts as previously discussed.

d. "An Analysis of Other Transactions. Have Other Transactions Met the Intent of Congress?" (Hanson 2005)

"An Analysis of Other Transactions. Have Other Transactions Met the Intent of Congress?" provides details of when the OT contracting method was first introduced into the DOD landscape, its intended purpose, and the success of that initiative between the fiscal years of 1997 and 2003 (Hanson 2005). The findings related to the effectiveness of OTs to bring nontraditional defense contractors to contract with the DOD highlight the shortcomings that science and technology (S&T) programs have experienced in the past (Hanson 2005). This paper examined all cooperative and OT agreements submitted to Congress during the period of fiscal years 1997–2003 to determine if the legislation was successful in meeting the proposed goal. (Hanson 2005).

After examining cooperative and OT agreements within the stated timeframe, this thesis determined the underlying intent of the OT Congressional authority was not met. Findings concluded that although OTs did attract nontraditional contractors to defense S&T projects, the majority of contracts were actually awarded to traditional large defense contractors and therefore limiting the diversity of expertise within DOD programs (Hanson

2005). The information provided in this thesis indicated that while the intended audience was for small businesses and nontraditional suppliers, there was essentially no real measures preventing large defense companies from successfully competing for an OT.

e. “An Analysis of the Department of Defense’s Use of Other Transaction Authority (10 U.S.C. 2371)” (Stevens 2016)

“An Analysis of the Department of Defense’s Use of Other Transaction Authority (10 U.S.C. 2371)” provided a more current overview of the Other Transaction Authority (OTA) and builds upon the research provided in prior literature of similar study. This particular paper should serve as an OTA-basics guide that can be easily understood by personnel without a background in contracting or financial management. It also detailed how OTAs were used within the realm of procurement for research and prototyping, and provided opposing viewpoints when it comes to the use of an OTA (Stevens 2016).

The author explained the advantages and disadvantages of using an OTA. Advantages of OTA agreements include flexibility to operate outside of the traditional FAR boundaries, and the ability to utilize a contractor that has little to no experience working with DOD (Stevens 2016). It also fosters an environment that can create innovative business relationships with industry or academia and allows the government to manage risk more effectively (Stevens 2016). The disadvantages evaluated in this thesis are the deficiencies in stability in executing an OT agreement, and safeguards for the government since these agreements are not covered by FAR statutes and regulations. There is also the absence of metrics to measure success since each agreement is created on its own merit without the traditional guidelines to follow (Stevens 2016).

While OT agreements can be beneficial to meeting the government’s requirements for R&D programs, they are not all-inclusive in satisfying all acquisition timelines and budgeting issues. It is important to utilize OT agreements for requirements that can be fulfilled by the commercial sector, and ensure each requirement is evaluated individually to see if an OT agreement would be beneficial in a particular situation (Stevens 2016). While the opportunity to use OT agreements by the DOD has existed for over three decades, there are still very few Subject Matter Experts (SMEs) on OT authority, and this can result in the method not being used to its full potential. (Stevens 2016). Therefore, it is

the responsibility for each program office to ensure they understand the various aspects of the OT approach to satisfy the capability being sought.

f. “Navigating the Rough Seas of Other Transaction Authority” (VAO 2018)

This Virtual Acquisition Office (VAO) *At a Glance* article provides a foundational viewpoint on OTA agreements. The article provides information on what is included in an OT agreement, when it should be used, and the challenges that exist in effectively using OT agreements. The article also details what type of vendor is considered a nontraditional defense contractor, and provides the legal source containing that information.

OTA is the statutory authority that allows organizations to enter into agreements with nontraditional contractors in which are not bound by the traditional FAR guidelines. A nontraditional contractor is defined in 10 U.S.C. 2302(9) as “an entity that is not currently performing and has not performed for at least one year preceding the solicitation of sources by DOD for the procurement or transaction, any contract or subcontract for DOD that is subject to full coverage under [cost accounting standards]” (Virtual Acquisition Office [VAO] 2018). OT agreements can be a valuable resource; however, there are specific conditions that need to be met for them to be used, and those conditions must be considered carefully. Due to the fact an OTA operates outside of the FAR, some inherent risks come with the benefits of using this method since there is no regulatory or precedence to fall back on should an agreement not go according to the original plan (VAO 2018). When utilizing an OTA, it is best to do ample research on this method, including discussions with an SME on OTAs that can provide guidance on the processes and procedures in effort to increase the likelihood of a successful outcome (VAO 2018).

g. “Defense Innovation Unit Experimental (DIUx) Commercial Solutions Opening How-to Guide” (DIU 2016)

This “How-to Guide” describes the approach that DIU (known as DIUx at the time this document was written) had taken when they started in FY2016 in cooperation with their supporting contracting office, Army Contracting Command (ACC) – New Jersey (NJ). This was in effort to combine the Defense CSO Pilot Program with OT authority under 10 U.S.C. 2371b to execute prototype projects in support of the DIU mission (DIU

2016). DIU utilizes the CSO acquisition mechanism to solicit solutions to specific problems faced by the warfighter. After the CSO solicitation is released, select companies are awarded OT agreements for prototype projects to develop and demonstrate their proposed solutions (DIU 2016). According to this guide, between June and September 2016, DIU used this methodology to award twelve OTs totaling approximately \$36 million, with an average of 59 days to award, which is measured from date of a company's proposal submission to OT award (DIU 2016).

This publication provides informative and recent lessons learned from a service within the Defense Department seeking to award flexible agreements with nontraditional contractors within short timelines to develop cutting edge technologies. Through the methodology detailed in this guide, DIU sought to utilize the CSO and OT authorities to “leverage the enormous amount of commercial R&D investment and quickly access cutting-edge technology” through adaptable OT agreements with nontraditional commercial vendors (DIU 2016). This reference, in addition to the many others identified above in relation to OTAs, demonstrates that several DOD and DOD-related organizations have sought to find new and creative ways to quickly establish contractual agreements with high-technology companies outside the traditional defense industry. The operational approach defined by DIU in this publication is a recent example of potential solutions to award technology development contracts or agreements with nontraditional defense contractors on short timelines.

DIU demonstrates that OT agreements offer a very promising method for achieving flexible and short-turnaround agreements with typical commercial-only small businesses outside the defense industry for new technology development. DIU also emphasized that OTs may require more time to set up initially because the agency must assign a team of technical and business experts to consider all aspects of their requirements, then derive and define the essential elements that must be established and codified in the OT agreements to be awarded (DIU 2016). However, once an organization has established an OT process in support of their development objectives, DIU has demonstrated that OTs can be awarded to nontraditional vendors at the speed of business-to-business transactions and with much more flexible terms when compared with traditional FAR-based contracts (DIU 2016).

h. “DOD Should Develop a Strategy for Assessing Contract Award Time Frames” (GAO 2018)

In 2018, GAO evaluated the amount of time it takes to award weapons systems contracts within the DOD (Government Accountability Office [GAO] 2018). GAO found that DOD “has a limited understanding of how long it currently takes and therefore lacks a baseline to measure success” (GAO 2018, 2). Numerous factors were identified that make it challenging for the services to determine how long contract awards will take. These elements identified include the types of contracts being awarded, the dollar amount of the contract, proficiency and knowledge of the contracting official, competition, quality of solicitations, contractor response time, and the priority of award within the contracting office (GAO 2018). All of these factors have the potential to either lengthen or reduce the amount of time it takes to award contracts, making it difficult to predict when the contract will actually be awarded. The contract award times in the study varied from one month to more than four years for weapons systems contracts for dollar values ranging from less than \$10 million to \$1 billion or more. This further demonstrates the complexity of contracting timelines to which the GAO has indicated that the services are measuring time to award in different ways, making it more difficult to achieve a baseline (GAO 2018). GAO recommended that DOD identify and standardize the information that must be collected on contract lead times and determine how the information will be used to assess the time to award.

III. METHODOLOGY

A. INTRODUCTION

This chapter discusses the methods that will be used to develop the contracting decision matrix (CDM) for AAL to determine the most appropriate alternative contracting options based on their capability needs in support of the AFC. The AAL requires the ability to contract with nontraditional defense contractors and other small businesses, ideally within a six month window, for the development of technology into an effective weapons system. The evaluation criteria will be based on the end item deliverable, contract funding threshold, timeline to award, and accessibility to nontraditional vendors.

A three-step process that leverages the concepts of the proven Systems Engineering Vee Model will be used to determine the alternative contracting methods available to AAL. The first step is the Requirement Analysis, which involves identifying and understanding the contracting challenges that AAL has experienced on contracts they have facilitated to date. The approach for this step is to establish a communications channel with AAL to understand and document the contracting methods that AAL is currently using, and analyze the trade space available in order to provide optimal contracting solutions. The second step in the process is the development of the evaluation criteria to be used by AAL when evaluating different contracting vehicles. This step establishes the criteria against which each contracting method will be evaluated to determine the applicability to AAL's needs, and to aid in their contract decision-making process. The third step is the development of the CDM. The matrix will provide a menu of options to assist AAL in selecting the most efficient contracting method based on the established decision criteria to satisfy their acquisition requirements.

B. DEFINING THE EVALUATION CRITERIA

The evaluation criteria will be developed and defined after teaming up with AAL and understanding their acquisition requirements and objectives for supporting the warfighter. These criteria are closely related to the achievement of AAL's mission statement and their anticipated needs. Therefore, the evaluation criteria will be used as a

mechanism to determine the proper contracting methods to be used by AAL. Although the AAL is a relatively new organization and less than two years in existence, they have been able to work with a number of different projects that have awarded varying contracts for white paper concepts and prototype hardware. Analyzing the types of projects the AAL has administered thus far will provide valuable insight into the contracts previously awarded. The analysis will identify the appropriate attributes needed to develop the evaluation criteria. The four main evaluation criteria identified by AAL include (1) type of end items being sought, (2) funding threshold, (3) timeline to award, and (4) whether or not the contracting method is accommodating to nontraditional defense contractors. These evaluation criteria are identified as they are proven effective constraints from an overall quality perspective that an organization can utilize.

The different types of end item deliverables needed by AAL are white paper reports, R&D activities, prototype hardware, and procurement of systems that can be fielded to the warfighter. Where the typical funding values for AAL contracts is anticipated to be in the hundreds of thousands of dollars range, the analysis will identify all limits associated with each contracting method, both within and outside the confines of the FAR. The timeline to award will identify what typical award timelines are based on historical data for both competitive and non-competitive awards, including specific examples as research allows. The evaluation of the ability for nontraditional defense contractors to obtain a contract award is based on AAL's desire to seek novel capabilities and breakthrough technologies, regardless of a company's previous affiliation with the government.

Evaluating various contracting methods and the associated attributes will provide an understanding of how and when they should be applied based on these evaluation criteria. For example, criteria for an acceptable contracting method may only be used if the dollar value of a contract is below a certain threshold. That value representing the cost will be used as a measure to determine if a contracting method is applicable or not. The research will include analyzing existing statutes and regulations but will also include engagements with experienced contracting personnel to fully understand the issues that exist today when an organization wants to use a specific contracting method.

During discussions with AAL, the key attributes they identified associated with the four evaluation criteria are the ability to (1) conduct R&D activities and deliver prototypes, (2) award contracts in less than six months, (3) award contracts that range from \$10,000 up to \$10 million in value, and (4) seek out and identify the innovative potential of nontraditional defense contractors. In order to quickly identify which contracting methods are applicable to AAL based on their requirements, the resulting tables in Chapter V will be color coded to identify the best fit method at a glance. Contracting methods highlighted in green will indicate that the contracting method satisfies AAL's needs for R&D and/or prototypes, able to handle up to \$10 million purchase, provide the ability to award within 6 months, and is accessible to nontraditional defense contractors. Contracting methods will be highlighted in yellow if the method can be used for R&D and/or prototypes, be able to handle up to a \$10 million, provide the ability to award between 6 to 12 months, and is accessible to nontraditional defense contractors. Those contracting methods highlighted in red either cannot be used for R&D and/or prototypes, or cannot handle up to \$10 million purchase, or cannot provide the ability to award under 12 months, or are not friendly to nontraditional defense contractors.

C. CONTRACT DECISION MATRIX

The end product deliverable for AAL will be a CDM that identifies all the various contracting methods available, both within the FAR and outside the FAR, for their use depending on the established evaluation criteria outlined above. The CDM will provide options based on the evaluation criteria that have been determined by AAL. The values in the matrix will highlight the advantages and disadvantages for each contracting strategy, and will provide AAL with a quick reference guide to allow selection of the most suitable contracting method available to the federal government. However, there are several other factors that must be considered in the selection of a specific contracting method for any acquisition need. It is therefore contingent upon many factors outside the four evaluation criteria, including the proficiency of those personnel administering the contract, authority limits of the contracting office, or duration for peer reviews among other dynamics of government spending. Albeit, this research will focus on those evaluation criteria that will

most influence the type of contracting method to be used based on AAL's search for novel ideas that will help the AFC modernize the battlefield.

Table 2 is an example of what the CDM will look like as a result of the research put forth into this capstone project. The CDM is organized to allow AAL to quickly identify what category end item they are looking to acquire, what associated contracting methods are available for that end item, and provide the characteristics of that method based on the evaluation criteria that were selected: end item deliverable, dollar threshold, time to award, and accessibility for a nontraditional defense contractor participate. Using the CDM will allow AAL to assess from a top-level what contracting methods will meet their acquisition needs, and the associated attributes of each method.

Table 2. Sample Contracting Decision Matrix

	<i>FAR Based Methods</i>								<i>Non-FAR Based Methods</i>		
	Simplified Acquisition	Commercial Items	SBIR / STTR	Small Business Set-Aside/ Direct 8A	IDIQ	Staged Contracts	Broad Agency Announcement	Defense Commercial Solutions Opening	Other Transaction Authority	Procurement for Experimental Purposes	Research & Development Agreements
Criteria											
End Item											
Whitepaper	•		•			•	•		•		
R&D	•		•	•	•	•	•	•	•		•
Prototype	•		•	•	•	•	•	•		•	•
Procurement	•	•	•	•	•			•		•	•
Dollar Threshold	Up to \$7M	No Limit	No Limit	Up to \$7M	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
Time to Award	3 - 12 months	6 - 12 months	Up to 6 months	Up to 6 months	3 - 12 months	6 - 12 months	6 - 12 months	Under 3 months	Under 3 months	Under 3 months	Under 3 months
Access to Nontraditional	•	•	•	•		•	•	•	•	Outside U.S. permitted	•

Notional example of what the output could look like to be useful to AAL

IV. ANALYSIS

A. INTRODUCTION

The following section goes into detail about the findings of various contract methods using the evaluation criteria outlined in Chapter III, evaluated in-line with AAL's acquisition needs. The key attributes associated with the four evaluation criteria include the ability to (1) conduct R&D activities and deliver prototypes, (2) award contracts in less than six months, (3) award contracts that range from \$10,000 up to \$10 million in value, and (4) seek out and identify the innovative potential of nontraditional defense contractors. Contract methods that were evaluated were either based on the FAR and its supplements, or those award instruments that operate outside the FAR. This capstone project reviewed each contract or agreement against the acquisition requirements of the AAL, specifically for the type of deliverable, funding threshold, award lead time, and whether or not that method is readily accessible to nontraditional defense contractors. The FAR-based contract vehicles reviewed in this capstone project include (1) Federal Supply Schedule, (2) commercial items, (3) simplified acquisitions, (4) basic agreements and BOAs, (5) small business, (6) IDIQ contracts, (7) staged contracts and BAAs, and (8) Defense CSO Pilot Program. The award vehicles evaluated that are outside the governance of the FAR include (1) other transactions (OTs) for research, (2) OTs for prototype, (3) R&D Agreements – CRADA, (4) R&D Agreements – PIA, and (5) R&D Agreements TIA. Prior to commencing the evaluation, the capstone team will first consider other factors that affect timelines to award which impose inherent limitations on the team's ability to provide definite timeline predictions when discussing contracting methods in general terms. Two primary considerations for award timelines include PALT estimation limitations, and how competitive procedures or sole source strategies can impact overall timelines.

B. AWARD TIMELINE CAVEATS AND CONSIDERATIONS

1. Caveats on PALT Estimations

It is important to state that the timelines to award can vary greatly as laws, regulations (and their interpretations by contracting agencies), policies, administrative

personnel, market conditions, and specific requirements are in a constant state of change. There are countless factors that can impact award timelines and to attempt to assemble a comprehensive list and calculate the effects of each factor on award timelines would be beyond the scope of this capstone project. Additionally, as cited earlier in this capstone project, the definition of PALT and the precise calculation of that metric is still a source of considerable debate throughout the DOD. Therefore, the timelines presented here are for general strategic planning purposes and are based on limited historic PALT data as experienced by this team. This information was generated through the decades of combined professional experience of the members of the capstone team, and various Army contracting SMEs that the team has discussed this question with from various contracting offices.

The absence of a baseline definition for PALT activities to awarding DOD contracts was also audited by the GAO as outlined in Chapter II where they were tasked to evaluate the length of time to award weapons systems contracts. GAO analyzed the time from when a program office issues a solicitation to the time it makes award for 129 programs across the DOD, and found PALT durations ranged anywhere from less than a month to over four years for contracts valued between \$10 million or below to greater than \$1 billion (GAO 2018). There are numerous elements that can affect the PALT, and the GAO recommends DOD develop a comprehensive strategy regarding contract award times in order to consistently track contributing factors, identify best practices, and measure progress toward goals of reducing the time to award contracts (GAO 2018). Therefore, as a general rule, the timeline to award will be shorter using simpler procedures, well-defined requirements, and awards valued below the SAP threshold. The inverse holds true in which the time to make an award will be longer with more complex procedures, poorly defined requirements, and contracts valued above the SAP threshold.

To further elaborate on the variability of how contracting is dependent on numerous direct and indirect factors, the following contract metrics are included for the same requirement for a program called the Enhanced Night Vision Goggle (ENVG). Experience from the capstone teams has shown these procurements were administered from the same Army program office and using the same contracting command. Additionally, each

contract was for the production of ENVG systems, and were individually awarded on a sequential basis throughout the program's acquisition life cycle. The PALT durations noted for each effort includes the time between the issuance of the solicitation to the date the award was made. The first three contracts were FAR-based IDIQ awards using competitive procedures, with a respective PALT of 101 days, 168 days, and 330 days. The next subsequent ENVG contract was authorized through a Directed Requirement, and was awarded through Alpha Negotiations with a PALT of 125 days. The last ENVG acquisition was made using the authority under 10 U.S.C. 2371b for OT agreements with a PALT of 81 days.

2. Competitive versus Sole Source Considerations

When discussing the PALT associated with FAR-based contract awards, it is also important to distinguish between the timelines associated with a competitive procurement and those associated with a sole source procurement. As stated in FAR 6.101(a), "10 U.S.C. 2304 and 41 U.S.C. 3301 require, with certain limited exceptions...that contracting officers shall promote and provide for full and open competition in soliciting offers and awarding Government contracts" [when utilizing the FAR and its supplements] (GSA 2018). FAR 6.302-1 through 6.302-6 outlines the seven statutory exceptions that permit the use of other than full and open competition for FAR-based contracts:

(-1) only one responsible source and no other supplies or services will satisfy agency requirements, (-2) unusual and compelling urgency, (-3) industrial mobilization, engineering, developmental, or research capability, or expert services, (-4) international agreement, (-5) authorized or required by law, (-6) national security, or (-7) public interest (GSA 2018, 6.3-1 – 6.3-5).

Pursuing any of these exceptions requires the acquiring activity to rationalize a potential purchase with a J&A that is to be sanctioned by an authorized official as identified in FAR 6.304 (GSA 2018).

Since individual contracting agencies utilize local policy to set the specific requirements associated with the J&A to award a contract through other than full and open competition, it is incumbent upon the buying office to generate and staff the necessary justifying documentation to be approved. If a requiring activity believes that a specific

requirement may meet the standards outlined in the above FAR exceptions, the acquisition strategy should be discussed with the assigned contracting agency to determine what steps are necessary to obtain approval to pursue a sole source award.

Upon approval of a J&A, the PALT for a given requirement can be reduced to a certain extent due to the reduction in the administrative steps associated with a competitive source selection. Key solicitation and evaluation steps are streamlined, and the need to maintain formal and regimented communications amongst all offerors is essentially eliminated. Conversely, in a sole source environment, more time is often necessary for negotiations since the contract pricing must be scrutinized more deeply due to the absence of competition. Therefore, the option for a sole source acquisition is not a panacea for PALT reduction, and should only be pursued when it is the best interest for a given requirement.

Additional analysis was garnered from a memorandum generated by ACC in 2018, which reported on the observed PALT data for actions executed in 2017 for differing tiers of requirements at set dollar thresholds and competition statuses. This memorandum compared PALT durations for competitive and non-competitive acquisitions in similar categories, and the timelines can be seen in Table 3. Based on this data, it was found to have mixed results in the effects on PALT reductions associated with sole source requirements, observing that PALTs were actually increased for actions below \$100 million when non-competitive procedures were used. Overall, the information provided by ACC tended to show an increased PALT across the spectrum of requirement values from \$25,000 to above \$100 million when non-competitive procedures were used. Above \$500 million, the PALT duration was slightly reduced when non-competitive procedures were used.

It is important to note that the ACC memorandum did not distinguish as to whether the PALT durations for non-competitive actions included the time to obtain J&A approval or not. The time necessary to get a J&A approved is highly variable and subject to the specific facts and market conditions associated with a given requirement, and at any given point in time. Local contracting command policies and interpretations applied to a given request for a sole source award also play into effect when utilizing one of the exceptions

to the competition requirements of CICA as outlined in the FAR 6.302 (GSA 2018). Further compounding this issue is the absence of standardized PALT metrics across the Army or DOD as a whole, making it difficult to reliably understand historical PALT data. While DOD services are making efforts to track PALT, each agency is taking a different approach and there is an absence of coherence across the DOD on how PALT durations are calculated, tracked, and assessed (GAO 2018). This is likely due to the wide range of requirements that DOD contracts for, the inherent complexity in the contracting process regardless of service, and the many different stakeholders and interests that must be addressed regarding the procedures to awarding a contract.

Illustrated in Table 3 are the simple PALT tabulations based on the information provided in the ACC memorandum. Major categories of the same dollar threshold were compared based on the competitive and non-competitive PALT durations that were calculated using actual milestone dates entered into the ACC Virtual Contracting Enterprise database by ACC personnel in FY2017. Time penalties for the use of non-competitive procedures are identified in the red cells, while green cells identify timeline benefits from the use of non-competitive procedures. Based on this limited data, the use of non-competitive procedures shows only modest benefits to PALT for requirements with contract values above \$100 million, and penalties to PALT for requirements valued below \$100 million.

Table 3. PALT Comparison for Competitive versus Non-Competitive Acquisitions. Source: Simpson (2018).

Dollar Value	Acquisition Type	PALT (Days)	Sole Source Difference in Days: Penalty (+) or Benefit (-) to PALT
>\$25K- <\$1M	Competitive	65	+25
>\$25K - <\$1M	Non-Competitive	90	
\$10M - <\$50M	Competitive	190	+10
\$1M - <\$50M	Non-Competitive	200	
\$50M - \$100M	Competitive	400	+75
\$50M - \$100M	Non-Competitive	475	
\$100M - \$250M	Competitive	425	-25
\$100M - \$250M	Non-Competitive	400	
\$250M - \$1B	Competitive	575	-25
\$250M - \$500M	Non-Competitive	550	
>\$500M	Non-Competitive	550	

C. FAR-BASED SOLUTIONS

There are various traditional contracting options that operate within the FAR that can support certain types of procurements. This section will review the details of each option and determine if the particular method will be applicable for AAL to consider in order to meet their contracting requirements. While this section provides details from the FAR on how and when certain types of actions should and can be used, it is nonetheless always recommended that the requiring activity check the FAR and appropriate statutes to ensure procurement of their requirements are in line with federal regulations.

Eight FAR-based contract methods were reviewed which include (1) Federal Supply Schedule, (2) commercial items, (3) simplified acquisitions, (4) basic agreements and BOAs, (5) small business, (6) IDIQ contracts, (7) staged contracts and BAAs, and (8) Defense CSO Pilot Program. Each of those vehicles was then analyzed against the four evaluation criteria. First, each contract type was evaluated to determine what they could be used for in terms of end item deliverables to see if it is applicable to AAL's requirements.

Next, the average timeline to award was evaluated to determine if a contract awarded using a particular method would be quick enough to make it a viable option for AAL. After deliverables and average PALT had been reviewed, each method was evaluated to determine if any dollar thresholds existed order to utilize a contracting vehicle. Lastly, each of the FAR-based contract options were evaluated to determine their accessibility to nontraditional vendors given that this was a requirement for AAL.

1. Federal Supply Schedule

The policies and procedures for utilizing the FSS program are detailed in FAR Part 38. The FSS program provides the government with a process of obtaining goods and services through a simplified process (GSA 2018). Agencies can procure varying quantities while benefiting from volume discounts through economies of scale as depicted in FAR 38.101(a) (GSA 2018). FAR 38.101(b) states that depending on the type of good or service being procured, an agency may be required to utilize a contract that has previously been awarded under the FSS, and each schedule identifies which agencies are required to use that contract as the primary source of supply (GSA 2018).

a. End Item Deliverable

As described in FAR 38.101, FSS contracts serve to provide a simplified process for acquiring supplies and services for the government. Through GSA, more than 11 million commercial supplies and services are available that cover a wide range of product types (GSA 2020a). Examples of the product types covered on the various GSA schedules include, but are not limited to, office supplies, apparel, hospitality services, furniture, human resources services, and industrial items (GSA 2020c). All of the items listed on FSS contracts are bought as-is and are not tailorable to a specific application through product development. Due to the nature of FSS contracts, the types of commercial products that are offered, and the fact that the items and services are not tailorable to specific requirements or acquisitions, this approach would not be appropriate for technologically complex actions such as major weapons systems acquisitions, R&D services, prototype development, or any other situation that has unique requirements.

b. Timeline to Award

According to FAR 8.404, orders placed against FSS contracts are considered to be issued using full and open competition, which results in timelines for FSS actions being shorter when compared to other methods for the government to acquire supplies and services (GSA 2018). Additionally, “the GSA schedule contracting officer determines the pricing to be fair and reasonable before awarding the contract”; therefore, the ordering activity does not have to expend extra resources to make a separate price determination (GSA 2020a). Due to the structure of FSS purchases, and the removal of some of the typical barriers to entry, the timeline to award will be significantly faster than using other methods to acquire comparable items. According to the collective experience of the capstone team, awards under the FSS can generally be accomplished within 1 to 6+ months.

c. Dollar Thresholds

There are no funding thresholds identified in the FAR for using the Federal Supply System as a buying vehicle.

d. Accessibility to Nontraditional Vendors

The FSS is a wide-ranging program that allows government agencies and authorized contractors to purchase a wide variety of supplies and services through streamlined methods. However, FSS contracts come with many of the same contractor administrative burdens associated with working with the government (GSA 2020b). For example, before being eligible for a contract, a company must have a two-year history of operation, and be able to provide two years of financial statements, in order to be a vendor within the FSS (GSA 2020b). Additionally, the vendor must have measurable past performance information available in the Contractor Performance Assessment Reporting System that shows historical experience with executing three or more federal contracts (GSA 2020b). Lastly, there are minimum sales and compliance requirements that must be met to maintain a schedule contract (GSA 2020b). Therefore, while these contracts provide a worthwhile platform for contractors who have the experience and resources to perform, the FSS is still a cumbersome contract method and not attractive to nontraditional vendors for obtaining and maintaining a schedule contract. For these reasons, it is unlikely AAL

will be able to utilize the FSS to partner with nontraditional vendors for the latest breakthrough technologies in support of the warfighter.

e. Example

PM Consulting Group was awarded an OASIS Small Business Pool 1 and OASIS 8a Pool 1, five-year base contract and five one-year options, utilizing an MAIDIQ contract vehicle that enables federal agencies to acquire a wide array of professional services (Globe Newswire 2020). The specific contracting vehicles include OASIS Small Business/8a Pool 1 (47QRAD-20-D-1060), GSA Information Technology Schedule 70 (47QTCA-20-D-002J), and GSA Professional Services Schedule (GS-00F-166GA).

2. Commercial Items (Non-Simplified Acquisition Procedure)

As stated in FAR Part 12, the use of commercial items was originally intended to encourage the acquisition of commercial items and components by providing for acquisition policies and procedures that closely resemble the commercial marketplace (GSA 2019). This contract method also allows a quicker PALT if used in conjunction with streamlined acquisition procedures under FAR Part 13, but does not allow the acquisition of white papers, prototypes, R&D, or technology maturation of a product or service. However, the authority under DFARS 212.102(a)(iii) does permit the DOD to obtain items that are otherwise not available in the commercial market in an effort to enhance defense innovation and investment. This authority for contracting officers to treat supplies and services provided by nontraditional defense vendors as commercial items is also in conjunction with 10 U.S.C. 2380a. The permissive authority within DFARS 212 is not intended to re-categorize existing non-commercial items, but does create an incentive for nontraditional defense suppliers to contract with the DOD, and can be utilized by AAL in their efforts to support the AFC with novel products that cannot be obtained through traditional commercial acquisitions.

a. End Item Deliverable

Commercial item procurement can ultimately lead to the acquisition of a variety of end products. This can include a simple item such as a computer or can be for a far more

complex item such as a helicopter. The caveat using this contracting method is that the product must be determined to be a commercial item in order to be treated as a commercial procurement, which rules out pre-production items such as white papers, R&D projects and prototypes. The standards for this determination are outline in FAR Part 12 and can be utilized by any supplier wishing to sell their product to the government.

b. Timeline to Award

The size of the anticipated award will dictate how quickly a contract for commercial items can be awarded. For commercial actions that cannot utilize SAP (either over \$7 million or over \$13 million see “Dollar Thresholds” below) the timeline is expected to be up to 6 to 12+ months (Simpson 2018).

c. Dollar Thresholds

For purchases of commercial items greater than the simplified acquisition thresholds of \$7 million, more complex acquisition procedures, such as sealed bidding or contract by negotiation, must be utilized as required by FAR 12.102 (GSA 2018). As discussed in the next section, in accordance with FAR Part 13, commercial items under \$7 million (\$13 million for efforts such as supporting a contingency operation, or to provide support in response to an emergency or disaster) are able to utilize SAP for the purchase of goods, services and construction (GSA 2018).

d. Accessibility to Nontraditional Vendors

Setting aside the exception for contracting with nontraditional vendors utilizing commercial items and conditions permitted by DFARS 212.102(a)(iii), commercial item procurements above SAP follow many of the same concepts and processes as normal acquisition procedures, and are not likely to be accessible to nontraditional vendors. The primary advantage of commercial item procurement is that it offers an avenue for the government to procure supplies or services from a nontraditional vendor without the vendors themselves having to do the work that traditionally entails contracting with the government.

e. Example

Commercial items are defined in FAR 2.101, and include any item, other than real property, that is typically used by the public sector (GSA 2018). Additionally, as identified in FAR 2.101, any item that evolved from an item meeting the commercial item description through advances in technology that “will be available in the commercial marketplace in time to satisfy the delivery requirement under a Government solicitation” may also be considered a commercial item (GSA 2018, 2.1-4). Specific examples of commercial items that exist include computers and office supplies, medical supplies, fuel, communications equipment, or anything else that can be purchased by the general public.

3. Simplified Acquisition Procedures

Simplified acquisition provides the ability for an organization to enter into R&D, prototype, or procurement contracts by maximizing the streamline procedures currently available. They provide “contracting officers with additional procedural discretion and flexibility, so that commercial item acquisitions in this dollar range may be solicited, offered, evaluated, and awarded in a simplified manner” (DAU 2020m). Simplified acquisitions, however, must fall below the SAT identified in the Dollar Threshold section below.

BPA, purchase orders and micro-purchases are the three primary strategies that fall within FAR Part 13 for SAP (GSA 2018). BPA procedures are described within FAR 13.303, and are used when there is a recurring need for the government to obtain open market supplies and services that fall below the SAT (GSA 2018). A purchase order is used when the government has a one-time requirement for open market supplies that fall below the SAT as described in FAR 13.302 (GSA 2018). Lastly, micro-purchases provide a mechanism for organizations to use their government purchase card rather than a written contract to execute small purchases of supplies and services below the micro-purchase threshold (Koses 2018).

a. End Item Deliverable

SAP can be used for a variety of contracting methods assuming they fall below the dollar threshold limit determined by the FAR and current statutes. This contracting method

can be used to acquire a variety of supplies and services including construction, commercial items, and R&D efforts such as white papers, capability development and prototyping (DAU 2020m).

b. Timeline to Award

SAP eliminates or greatly reduces a significant amount of the formalized solicitation, proposal and regulatory compliance requirements associated with traditional FAR contracting methods under FAR Parts 14 or 15, which streamlines the procurement process significantly (Johnson et al. 2006). Therefore, the general timeline to award for acquisitions that meet the dollar threshold requirements to qualify for simplified acquisitions is 1 to 6 months. This information is based on the collective professional experience of the authors of this paper in awarding similar type contracts.

c. Dollar Thresholds

Simplified acquisition can be used for supplies and services that fall under \$250,000 as amended in the FY2018 NDAA. If a product or service meets the qualifications of a commercial item, and is over the SAT, FAR Subpart 13.5 provides authority to procure those items as long as they fall below \$7 million (GSA 2018). Limited circumstances as described under FAR 13.500(c) allow SAP to be used for commercial items up to \$13 million for efforts such as supporting a contingency operation, or to provide support for responding to an emergency or major disaster (GSA 2018).

d. Accessibility to Nontraditional Vendors

SAP aims to “promote efficiency and economy in contracting,” avoid “unnecessary burdens for agencies and contractors,” and improve opportunities for small businesses as stated in FAR 13.002 (GSA 2018, -1). Johnson’s thesis, described in Chapter II, states that FAR 13.5 reduces burdens and barriers of entry for nontraditional vendors (Johnson et al. 2006). Based on this research, the capstone team has assessed that the use of SAP up to \$7 million for select commercial requirements will decrease barriers to entry and reduce the administrative burden for small businesses and nontraditional vendors. These relaxations include the elimination of certified cost and pricing data requirements, reducing

requirements for specialized technical proposals, and eliminating the applicability of the many statutes that would otherwise be applicable above the SAT of \$250,000. Additionally, for purchases below \$250,000, those burdensome requirements do not apply, thereby making simplified acquisitions more advantageous for nontraditional vendors. FAR 13.005 and FAR 13.006, respectively, detail the laws and provisions that are not applicable to SAP contract actions (GSA 2018). Ultimately, the less specialized documentation, reports, and compliance needed for contracts awarded under simplified procedures greatly reduce administrative burdens and make it more accessible to nontraditional vendors.

e. Example

Supplies and services, including construction, R&D, and commercial items, are typical uses for simplified acquisitions. A wide range of products and services can be purchased through SAP under the SAT, and anything meeting the definition of a commercial item or service can be purchased using SAP up to the thresholds identified above.

4. Basic Agreements and Basic Ordering Agreements

Both types of agreements, basic agreements and BOAs, described in this section are not contracts but rather written instruments of understanding between the government and industry that provide a framework for award of future contracts. The type of supply or service the government is acquiring will determine if a basic agreement or a BOA should be used as the foundation for contract award. These two contracting methodologies were evaluated because they assist the government in completing the objective of awarding a FAR-based contract even though they are not contracts themselves.

a. End Item Deliverable

Basic agreements are used for supplies or services provided to the federal government and require the general types of contractual activities to be unknown at the time the agreement is written. These types of agreements are used when there have been significant issues during negotiations with a particular contractor in the past (DAU 2020b).

Alternatively, a BOA is utilized to show there is an understanding between the government and industry of the products and services that may need to be procured in the future. A BOA lays out terms and conditions that will be applied when a formal contract is ready to be negotiated (Public Spend Forum, n.d.). A BOA can also be helpful when there is a tentative requirement that is likely to be finalized later, and can help expedite the contracting process.

The FAR does not restrict the type of products and services that can be obtained under a basic agreement or BOA. An agency could utilize these agreements to obtain R&D services, production efforts, or any other service as long as the agreement includes a specific description of the requirement, describes the method for determining prices to be paid to the vendor, the delivery terms and conditions and the government agencies that are authorized to use the agreement (AcqNotes 2019a).

b. Timeline to Award

The average timeline to award a contract utilizing a basic agreement or BOA is roughly 6 to 12+ months based on discussions with ACC SME and personal acquisition experiences from this capstone team (ACC SME 1, personal communication, July 2020). This timeline allows for the contracting officer to determine what type of contract is appropriate, that sufficient funds are available, and the required supplies or services that the government is requesting are adequately covered under the agreement being used to issue the contract award.

c. Dollar Thresholds

In accordance with FAR 16.703, there are currently no specified dollar limitations for a basic agreement or BOA (GSA 2018). This means that the dollar amount will directly depend on the type and amount of supplies or services anticipated to be ordered over the life of the agreement at the time of award. For DOD, the only limitation provided on a BOA is a maximum period of performance of no more than five years as identified in DFARS 216.703(c) (DOD 2020).

d. Accessibility to Nontraditional Vendors

The capstone team did not find any discriminating factors to preclude nor promote the use of basic agreements and BOAs toward nontraditional vendors. These methods do have a prerequisite for a contractor to have some history with previously meeting government requirements as previously described. However, it is unlikely that a nontraditional contractor will be included on a basic agreement or BOA due to the fact both avenues require proven history with previously meeting government requirements (GSA 2018). By definition, nontraditional contractors have not performed on a government contract for at least one year preceding a potential contract action, and usually do not have the level of experience contracting with the government on prior efforts that is required for this type of award (DOD 2018).

e. Example

BOA N68335-16-R-0075H provides the Naval Air Systems Command Cyber Warfare Detachment with “resilient and full-spectrum cyber warfare capabilities for naval aircraft, weapons, and related naval aviation systems” (GovTribe 2017).

5. Small Business

The following contracting methodologies are geared towards vendors that fall into the category of a small business. Many of the nontraditional vendors that AAL will be working with are likely to fall into one of these categories based on this capstone team’s collective knowledge and past experiences.

a. Small Business Innovative Research/Small Business Technology Transfer

SBIR/STTR programs are specifically designed to help foster and promote small businesses that may be able to support the government’s requirements in the areas of technology innovation, federal R&D needs, and transitioning R&D efforts into impactful solutions (Small Business Administration [SBA], 2020f). These awards are broken down into three phases for (1) concept and development, (2) prototype development, and (3) commercialization (SBA 2020f). The SBIR/STTR program is a gated process that is often executed through BAA contracts, grants or agreements (DAU 2020l).

(1) End Item Deliverable

The SBIR/STTR contracting method aligns well with the four end items identified as critical to AAL, including white papers, R&D activities, prototyping and procurement. As identified by the SBA, the following are conditions and characteristics of SBIR/STTR awards. A Phase I SBIR/STTR contract deliverable comes in the form of a proof of concept written paper or progress report. The deliverables anticipated at the end of Phase II includes technology demonstration or prototype hardware, and the technical merit that warrants a Phase III award. Phase III contract deliverables include production or commercialization of the technologies proven to be successful during Phase I and II (SBA 2020b). The focus of SBIR/STTR contracts is the performance of R&D efforts and to stimulate technological innovation in the private sector (SBA 2020b).

(2) Timeline to Award

Generally, Phase I and II SBIR/STTR contracts can be awarded in less than 6 months because technology development requirements are funded from a specific pool of RDT&E funding which is exclusively set aside for small business applicants, and does not require the same competition requirements as a typical competitive solicitation based on the capstone team's collective experience. Phase III awards must be awarded competitively to a contractor that had a previous SBIR/STTR contract, and can generally take longer than a Phase I or II award due to the added requirements for including competitive procedures based on the capstone team's collective experience.

(3) Dollar Thresholds

SBIR/STTR contracts in Phase I and II are funded with RDT&E appropriations that are set aside at the beginning of each fiscal year specifically for these types of awards. Phase I contracts are typically awarded with a value of \$250,000 or less, while Phase II contracts are generally awarded with a value between \$500,000 and \$1.5 million (SBA 2020b). Phase III contracts do not have a dollar threshold associated with them, but they must be a direct result of a Phase I and II effort and cannot be funded with SBIR/STTR dollars (SBA 2020b).

(4) Accessibility to Nontraditional Vendors

Based on experience with SBIR/STTR contracts at the Army Research Laboratory (ARL), it is likely that a nontraditional contractor could obtain a SIBR/STTR award due to the R&D nature of these contracts, and the types of requirements that lead to these awards based on the team's collective experience. The eligibility requirements for the SBIR/STTR programs are limited in order to encourage participation from small and nontraditional businesses to participate in contracts with the Federal Government in R&D contracts with the potential to eventually be commercialized (SBA 2020a). These requirements are set aside specifically for small businesses, and as such, the award requirements tend to be less burdensome than traditional full and open competition contracts. The capstone team's collective experience has shown that when contract awards are set aside for certain types of businesses in a limited competition setting, the barriers to entry are reduced similar to when SAP is used.

(5) Example

Phase I: contract DE-AR0001243 valued at \$250,000 was awarded to Noon Energy for a rechargeable carbon-oxygen battery, which is a new class of ultra-low-cost, lightweight energy storage technology that will turn solar and wind electricity into on-demand power (SBA 2020e). Phase II: firm fixed price contract 80NSSC-20-C-0008 valued at \$739,431.00 was awarded to Hinetics LLC for basic research on an integrated high frequency electric propulsor for turbo-electric aircraft (SBA 2020c).

b. Small Business Set-Aside/Direct 8(a) Program

As identified in FAR Subpart 19.8, small business set-asides and direct awards under Section 8(a) of the Small Business Act are used for a variety of applications, and can be awarded on either a sole source or competitive basis (GSA 2018). These contracts are often used to acquire R&D efforts to mature initial capabilities into systems that can be fielded in an operational environment. The acquiring activity conducts market research to determine if a small business is able to satisfy the government's requirements, and then in coordination with their contracting officials determines if a small business set-aside is the best course of action (SBA 2020d).

(1) End Item Deliverable

Small business set-asides and Direct 8(a) awards are used for all types of supplies and services (DAU 2020o). This can range from R&D efforts, prototype developments, consulting services, engineering studies and even production requirements (DAU 2020o).

(2) Timeline to Award

Based on the collective experience from this capstone team, small business set-aside and sole source contracts can generally be awarded within 3 to 6 months because they either fall below SAP thresholds, or are sole source, therefore are not required to follow the same competition requirements as a standard full and open acquisition.

(3) Dollar Thresholds

In accordance with FAR 19.502-2(a), all requirements that are valued less than the SAT of \$250,000 are exclusively reserved for small business concerns and are automatically categorized as a small business set-aside (GSA 2018). Currently no upper limit exists on small business set-asides except for the case of one of the special socioeconomic sole source award authorities in which the purchase must be under \$7 million for manufacturing, and under \$4 million for all other requirements as identified in FAR Part 19 (GSA 2018). The newly written Class Deviation 2020-O0009 increases the threshold in which a sole source 8(a) award can be made without a J&A from \$22 million to \$100 million (Herrington 2020). The class deviation also changes the approval authority for 8(a) sole source awards exceeding \$100 million to the head of the procuring activity (DAU 2020o).

(4) Accessibility to Nontraditional Vendors

Nontraditional vendors are likely to meet the government's requirement to be classified as a small business, and could fall into one of the aforementioned small business categories because they are usually smaller companies that meet the size and requirement standards for small business awards as experienced by the capstone team's collective experience. Contractor eligibility is determined by the SBA where such regulations can be found in the 1999, 13 C.F.R. § 124.101 through 124.112.

(5) Example

According to the experience of this capstone team, contract W911QX-18-F-0009 was awarded to company TISTA Science and Technology Corporation in the amount of \$3.9 million. This contract provides technology applications and support services for the ARL.

6. Indefinite-Delivery, Indefinite-Quantity Contracts and First Task Order

IDIQ contracts allow increased flexibility to meet government acquisition needs by providing combinations of indefinite elements, especially when there are uncertainties within the buying office (AcqNotes 2018b). Depending on the government's requirements, a single award or multiple award type IDIQ contract "may be used to acquire supplies and/or services when the exact times and/or exact quantities of future deliveries are not known at the time of contract award" (AcqNotes 2018b). Based on the capstone team's experience, IDIQ contracts can be used by organizations other than the host organization that awarded the base IDIQ. Existing IDIQ contract vehicles from other organizations can be used to save time in the procurement process; however, this approach does not offer flexibility of a stand-alone contract and have to work within the framework of the existing IDIQ.

Many aspects of an IDIQ contract make it an attractive contracting method and should be considered carefully when reviewing future acquisition strategies. IDIQ contracts allow the government to establish prices up front, can decrease the PALT on subsequent delivery orders, and can streamline the PALT for future requirements (DAU 2020f). The flexibility of awarding an agency-wide IDIQ contract allows an organization to provide a single ordering mechanism to meet their mission needs (DAU 2020n). Single vendor IDIQ awards can reduce the risk on the government when it comes to integration; however, it increases the risk of being locked into a single vendor which can significantly impact price and schedule if the contractor is unable to perform (DAU 2020f). While the primary advantage of a MAIDIQ is allowing for continuous competition, which can reduce the unit price each subsequent buy, and minimize the risk of being obligated to use only one vendor. MAIDIQs also offer the opportunity for multiple vendors to propose a solution,

which allows the government a higher probability the requirement will be satisfied (DAU 2020h).

a. *End Item Deliverable*

IDIQs are contract vehicles awarded to one or more vendors that are intended to award additional delivery orders for a variety of supplies or services using the base contract (DAU 2020f; DAU 2020n). Based on conversations with an ACC SME, an IDIQ itself does not have a specific end item, but rather can be used for any acquisition purpose as appropriate and in scope with the base contract (ACC SME 2, personal communication, July 2020). Based on the capstone team's collective experience, there are many IDIQ contracts that exist provide contract vehicles for task orders or delivery orders for R&D services, prototype development, or logistics support, and the requirements outlined within a particular IDIQ will determine what kind of supplies or services that can be awarded through the contract vehicle.

b. *Timeline to Award*

The establishment of an IDIQ will typically take between 6 to 12+ months based on the capstone team's experience. According to an ACC SME and team's collective contracting experience, it has shown that the timeline to award an IDIQ can vary significantly due to the vastly differing scope of any particular IDIQ (ACC SME 2, personal communication, July 2020). Additionally, these contract types can potentially include hundreds of contractors and can be extremely large from a total cost perspective exceeding billions of dollars, especially with an MAIDIQ, which makes the timeline to award range anywhere from a few months to more than a year or more (ACC SME 2, personal communication, July 2020). Since performance on contract cannot begin until the first task order is awarded, all IDIQ timelines discussed include the time to award the first task order after establishment of the IDIQ.

c. *Dollar Thresholds*

According to the research into IDIQs and the capstone team's personal experience, these contracts can be large dollar actions and do not have a stated threshold for making an

award. Although an IDIQ itself would typically be a high dollar contract, the subsequent contracts awarded off of the IDIQ to individual companies can be much smaller in size, and will vary depending on the specific requirement.

d. Accessibility to Nontraditional Vendors

The effort involved with becoming a prime contractor on an IDIQ can be a significant undertaking even for a traditional large defense contractor, depending on the nature of the IDIQ according to an ACC SME that has worked on IDIQ awards (ACC SME 2, personal communication, July 2020). These type of awards have large scope performance work statements that can make writing a technical proposal challenging, usually require certified cost and pricing data, and often require relevant past performance that is relatable to the scope of the new requirement (ACC SME 2, personal communication, August 2020). For this reason, it is unlikely that a nontraditional vendor would have the resources and experience required to be awarded an IDIQ.

e. Example

An MAIDIQ performance-based services contract was awarded to support the DOD Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance integrated capabilities mission requirements (Army Contracting Command [ACC] 2020). The contract's "primary service areas include but are not limited to Engineering; Research, Development, Test and Evaluation (RDT&E); Logistics; Acquisition and Strategic Planning; Education and Training Services" (ACC 2020). The Responsive Strategic Sourcing for Services contract was awarded to 261 vendors with a ceiling of \$37.4 billion and spans a ten-year ordering period (Perspecta 2020; ACC 2020).

A firm-fixed price, single award IDIQ was awarded to BAE Systems Information and Electronic Systems Integration Inc. valued at \$618,343,700 for the procurement for Advanced Precision Kill Weapon System II full-rate production lots 5–7 on contract N00019-17-D-5517 over a three-year period (DOD 2016).

7. Staged Contracts and Broad Agency Announcements

A BAA is a mechanism in which the government can set up a staged contract with industry partners and nontraditional vendors (OSTP 2014). As identified in FAR 35.016(a), BAAs may be used for “requirements for scientific study and experimentation directed toward advancing the state-of-the-art technology or increasing knowledge or understanding” of a particular effort (GSA 2018, 35.0-6). The proposals received from industry should be for requirements that are typically funded using 6.1 to 6.4 RDT&E funding, and can be used for both FAR-based contracts and non-FAR grants and agreements (DAU 2020a).

The primary challenges that exist with utilizing staged contracts is the agency’s requirements must clearly articulate the problem statement, scope of work, and types of solutions sought in a way that is understandable and actionable to industry (OSTP, 2014). The requiring agency must keep in mind that many of the respondents to these types of solicitations may not have familiarity with government contracting, and are unable to understand what is required as do traditional defense vendors are accustomed to supporting (OSTP, 2014). While the government should give as much latitude as possible to the vendor when crafting the requirement, it should be noted that the solution space needs to be constrained enough to allow the government to receive useful prototypes at the end of the pilot program (OSTP, 2014). This type of solicitation method is beneficial when the stated requirements are not fully defined, and has enough latitude to allow industry to offer innovative solutions for a given need (OSTP, 2014).

a. End Item Deliverable

According to a study published by OSTP, end items that can be obtained under this solicitation methodology range from concept white papers to full-scale R&D pilot programs (OSTP 2014). Staged contracts can be used for any R&D requirement that falls under the categories of “basic and applied research, advanced technology development, and advanced component development and prototypes” (DAU 2020a). The reason that the requirement must fall within those categories is the instrument used to solicit proposals from industry will be through a BAA, which are constrained to those specific R&D activities (DAU 2020a).

b. Timeline to Award

Staged contracts awards generally fall within 6 to 12 months in order to allow sufficient time for each phase of the solicitation to be executed based on the capstone team's experience with utilizing BAAs for contract award. According to the team's personal experience, and the study published by OSTP, the contract process necessitates the following aspects. First, the BAA will require a sufficient amount of time to be posted and receive industry responses. Next, the government will evaluate each of the white papers submitted and send out an invitation to select vendors requesting full-scale proposals, and allow for enough time for industry to adequately respond. Once those proposals are received the, government will need time to evaluate each and award contract(s) to the selected vendor(s).

c. Dollar Thresholds

This solicitation method is currently not held to any dollar threshold according to FAR 35.016, which describes the use of BAAs during the acquisition process (GSA 2018). This means they can be used for any level of funding for a requirement that falls within the R&D activities previously specified. One item to note concerning overall value is contracts awarded under this type of instrument are likely to be firm-fixed price in accordance with FAR Part 35, which can sometimes have higher dollar values when compared to cost-type contracts due to the risk residing mostly with the contractor rather than the government. The second stage of solicitation, formal proposals, requires technical and cost data evaluation which will allow the government to adequately plan and select proposals that fit within their budgetary limitations, should such a limit exist (OSTP 2014).

d. Accessibility to Nontraditional Vendors

Staged contracts are attractive to innovative small businesses and companies that are new to government contracting due to the modular nature of the solicitation approach (OSTP 2014). Companies are able to review the government's requirement and submit a white paper proposal on how they plan to meet those requirements to be evaluated for technical merit (OSTP 2014). This allows the vendor the opportunity to respond to a government need without investing significant time and resources the vendor simply may

not have available (OSTP 2014). A full-scale proposal with cost and technical information will only be required after the government has reviewed all white papers, and extends invitations to a subsequent group of viable offerors (OSTP 2014). Furthermore, this process opens the lines of communication between vendors and the government to ensure that the requirements are communicated clearly, and that the solution being proposed meets the intent of the end user's needs (OSTP 2014).

e. Example

One of the more successful examples of a staged contract implementation is the Veterans Affairs Innovation Initiative (VAi2) Industry Innovation Competition. As stated by OSTP, “[t]he VAi2 Competition staged contracts followed a three-phase process consisting of an eight-page concept paper, 50-page invite-only full proposal, and 1–2 year pilot evaluation” (OSTP 2014, 8). From a 22-page BAA for the VAi2 competition, over 135 solutions worth a combined \$102.5 million have been awarded across eight topic areas (OSTP 2014).

8. Commercial Solutions Offering Pilot Program

The CSO Pilot Program is commonly used for R&D studies for commercial capabilities and technology maturation (DAU 2020d). CSO programs have been implemented successfully within DIU and GSA (DIU 2020; Fedsim 2020). If the requirements put forth by AAL could be satisfied by commercial products or services, this program would only be a viable option for AAL through the end of FY2022, unless the authority is extended by Congress. In order to award a contract under the CSO program efficiently, it is advised that AAL work through GSA or DIU to understand their contracting processes. Based on both the GSA and DIU websites, each of these agencies has experience awarding contracts under this authority and can reduce the PALT associated with this requirement when compared to a traditional contracting process (DIU 2020; Fedsim 2020). Both organizations have established procedures in place where other agencies and organizations can reach out to determine whether their requirement can be awarded through an existing program with DIU or GSA (DIU 2020; Fedsim 2020).

a. *End Item Deliverable*

Contracts awarded under this program can span multiple categories including prototype agreements, follow-on research agreements, or follow-on production contracts to name a few that would be applicable for AAL (DAU 2020d). The only constraint is that the product or service being acquired needs to be categorized as innovative (DOD 2017). Under these restrictions, innovations is defined as:

Any technology, process, or method, including research and development, that is new as of the date of submission of a proposal; or [a]ny application that is new as of the date of submission of a proposal of a technology, process, or method existing as of such date (DOD 2017, 16).

b. *Timeline to Award*

The CSO Pilot Program is known for its speed and flexibility based on the information provided by GSA and DIU (DIU 2020; Fedsim 2020). According to DAU and other sources, contracts can be awarded in under 3 months in most instances (DAU 2020d). The reason these contracts can be awarded so quickly is that each proposal is evaluated on its own individual merit rather than on a competitive basis, which provides the government considerable latitude in determining which proposal is selected for contract award (DOD 2017). Lastly, the process used to award contracts under this program is similar to a BAA, differing in that it is not held to the restriction of only being able to be used for basic and applied research efforts (DAU 2020d).

c. *Dollar Thresholds*

According to the FAR there are no dollar thresholds associated with the CSO Pilot Program as long as the proper approvals are obtained for requirements greater than \$100 million (GSA 2019). Contracts awarded using this acquisition methodology are limited to \$100 million per transaction without written determination from the Office of the Under Secretary of Defense for Acquisition and Sustainment (OUSD A&S) or the relevant Service Acquisition Executive (DOD 2017, 16).

d. Accessibility to Nontraditional Vendors

Based on the capstone team's research of the CSO Pilot Program, this contracting method is readily accessible to nontraditional defense contractors. The program was initiated in order to facilitate the DOD in acquiring technologies that close capability gaps, fulfill requirements, and advance technologies in a streamlined fashion (AcqNotes 2018a). The focus for this program is providing an avenue for suppliers that have not traditionally contracted with the government in the past, and allow for new ideas and approaches to meet an agency's requirements (AcqNotes 2018a). Organizations such as DIU and GSA have had substantial success in awarding CSO contracts to nontraditional vendors, and currently work with other federal agencies that are looking to adopt this type of contracting methodology. A significant constraining factor for this acquisition strategy is that the FY2017 NDAA that created the program is only authorized through FY2022, unless it is extended by Congress.

e. Example

An example of the type of contract that is awarded under this acquisition authority is contract W15QKN-19-9-0001 for prototypes that falls under the CSO area of interest for Space Situational Awareness (GovTribe 2020). The contract was awarded to company LeoLabs, Inc., as a prototype OTA, and had a total dollar value of \$4,094,000 (GovTribe 2020). While it is possible to award an OTA utilizing this contracting method, as seen above, FAR-based contracts awarded under this program are usually fixed-price contracts.

D. NON-FAR-BASED SOLUTIONS

1. OT Agreements for Research and Prototypes

Other transactions (OTs) are flexible contracting instruments that operate outside the FAR in the form of grants or cooperative agreements, and are used to acquire R&D activities to advance new capabilities, or to acquire prototypes for evaluation of technical feasibility. OTs were first pioneered by the National Aeronautics and Space Administration in 1958, and Congress codified its authority in 10 U.S.C. 2371 in 1989 permitting DARPA to contract with OTs. 10 U.S.C. 2371 was later amended under the 1994 NDAA to expand the authority to other DOD agencies to carry out OTs for prototype projects (DOD 2018).

One of the more attractive aspects of contracting with OT agreements is that most laws and regulations governing federal contracts do not apply, such as the CICA and TINA. Additionally, GAO has limited jurisdiction to review OT decisions, decreasing the likelihood an award will be protested other than if it were used in the appropriate manner.

a. End Item Deliverable

As detailed in Chapter II, the purpose of OT authority in its current form is to mirror commercial business-to-business transactions, and allows for broad interpretation thereof, as demonstrated by DIU's definition of "prototype" defined in Chapter II. Agency employment of a definition of prototypes for the purposes of executing an OT agreement creates many opportunities for the use of OTs to develop promising technologies on relatively short timelines to address capability gaps faced by the AFC. Additionally, the use of OTs can take many different forms as outlined in the examples of the use of OTs by other agencies in Chapter II.

b. Timeline to Award

OTs can be awarded in less than 3 months when optimizing the benefits of its authority, with 59 days observed as the average by DIU in 2016 from initial solution brief submission (Phase I) to awarded OT agreement (Phase III) (DIU 2016, 2). In terms of timelines for the use of OTs, the most significant challenge is the time necessary to identify, recruit, train, and develop the in-house expertise (DOD 2018). However, these efforts are necessary to properly structure requirements, build area of interest (AOI) announcements, develop requirements, and negotiate OT agreements that are effective in accomplishing the goals of AAL while also meeting the business objectives of commercial industry partners. Once this organic expertise is in place, and a set of basic tailorable OT agreement structures have been established, the process to develop and award an OT from the point of having defined requirements can be faster than if using a traditional FAR-based vehicle as realized by DIU, and demonstrated by the experiences of other agencies assessed in this capstone project (DIU 2016).

c. Dollar Thresholds

When the appropriate approvals can be obtained, there are no dollar limits for transactions under authority 10 U.S.C. 2173 (DOD 2018). Funding thresholds up to \$100 million can be executed without additional special approvals, assuming the other agency conditions have been met. Between \$100 million and \$500 million requires Senior Procurement Executive Approval. Requirements above \$500 million requires approval from the Office of the Under Secretary of Defense for Research & Engineering (OUSD(R&E)) or from OUSD for Acquisition & Sustainment (A&S) (DOD 2018).

d. Accessibility to Nontraditional Vendors

OT agreements are one of the best vehicles for contracting with nontraditional vendors due to significantly reduced administrative and financial reporting requirements, and flexibilities on IP rights (Smith et al. 2002; Howell 1997; DOD 2018). While there are ways to award research or prototype OTs without involving nontraditional or small defense contractors, one of the qualifying conditions for use of this authority explicitly includes the use of at least one nontraditional defense contractor will need to perform a significant amount of work in the agreement.

e. Example

According to the experience of this capstone team, OT W15QKN-17-9-5555, project numbers C5-19-2001A and C5-19-2001B, for prototype hardware is an agreement that was administered using the Consortium for Command, Control and Communications in Cyberspace for the acquisition of the Enhanced Night Vision Goggle – Binocular weapons system. This OT was awarded under authority 10 U.S.C. 2371b using competitive procedures to vendors L3Harris Technologies and Elbit Systems of America for a value of \$16,597,809.79 and \$29,403,502.73, respectively according to this capstone team’s collective experience. This approach will allow for follow-on production award(s) to be made to one or both companies on a non-competitive basis, and only a D&F is required to document this acquisition strategy.

2. Procurement for Experimental Purposes

There are several benefits to using the Procurement for Experiment Purposes contracting method, including the expediency of not requiring a J&A if competitive procedures are not used (DAU 2020j). However, a determination and findings is needed as the rationalization for sole source, and the overall value of the purchase requires signature authority from the contracting officer or senior contracting official, depending on the authority threshold levels. This method can also be used in conjunction with an R&D or prototype OT, thus allowing further militarization of a particular product that was deemed beneficial to the user in an operational environment as a result of using this approach.

The authority within 10 U.S.C. 2373 does not limit sources to either traditional or nontraditional contractors, or small business concerns, and can even purchase supplies from sources outside the United States (DAU 2020j). Procurement for Experimental Purposes also does not have to involve competitive procedures, further streamlining the award process by only requiring a D&F to document the acquisition strategy.

The associated nine technology domains within the authority of 10 U.S.C. 2373 include aeronautical supplies, telecommunications, chemical activity, energy, medical, ordinance, signal, space-flight, and transportation, and including parts and accessories, as well as designs thereof. These domains are also wide-ranging enough to offer near unlimited applications when considering use of this authority for test and experimental purposes. An example is if the Army decides it wants to evaluate an augmented reality visual system, this could fall under the recently added telecommunications domain, but could also be included in the signal area, or even in medical or aeronautical supplies domains, depending on the need for the new capability (DAU 2020j).

There are no stated limitations on what type of deliverable can be sought, and can be used in conjunction with another award instrument such as an OT. This contract method can be used to buy commercially-available equipment, from any supplier foreign and domestic, to be further developed for military use when coupled with an OT for research or prototype. Similarly, there are no prescribed funding limits so long as the quantities being purchased are the minimum necessary for evaluation; however, the contracting office

requires the appropriate warrant authority to issue a 10 U.S.C. 2373 award (DAU 2020j). Therefore, increased funding thresholds and elevated peer reviews for the required D&F will be the primary driving factors for increased PALT durations when applying streamlined procedures to make the award. Conversely, unfamiliarity with this authority at the buying office may also increase administrative lead times by adding customary contract regulations, or requiring source selection procedures found in FAR Part 15, or imposing a J&A when not required.

a. *End Item Deliverable*

The technology domains under 10 U.S.C. 2373 are quite vague and can be applied to almost any application, so long as the purpose is to evaluate the equipment for operational utility. These nine domains include ordinance, signal, chemical activity, transportation, telecommunications, energy, medical, space-flight, and aeronautical supplies (DAU 2020j). Another benefit to using Procurement for Experimental Purposes is the end item to be evaluated can be obtained from foreign suppliers.

b. *Timeline to Award*

While this contract method does not have a lot of use-cases, awarding a contract can be completed in as little time it takes to get a D&F approved, provided the potential vendor(s) have the supplies readily available for purchase (DAU 2020j; Tedder 2018). However, due to the limited information available of applying this authority for government purchases, there is not enough data to substantiate identifying a timeframe for awarding an agreement using this method. Nonetheless, the acquiring office can tailor their requirements toward a specific product, thereby reducing the timeframe for pre-award activities aligning a potential vendor with a program's stated requirements. Additionally, a lengthy J&A is not required even if pursuing a sole source award which also helps reduce PALT activities, regardless if competitive procedures are pursued.

c. *Dollar Thresholds*

Procurement for Experimental Purposes is not restricted by the type of appropriations, but typically RDT&E or Operations and Maintenance funding will be used

with this contracting instrument (DAU 2020j). Nonetheless, there are no funding limits under this authority, provided the quantities obtained using 10 U.S.C. 2373 do not exceed that required for evaluation of the technology being sought.

d. Accessibility to Nontraditional Vendors

The use of 10 U.S.C. 2373 should be very friendly to nontraditional suppliers since the stated authority is very broad in scope, is not governed by the FAR, and an agreement can therefore be awarded to any company willing to sell their product. As further incentive to a potential vendor, Procurement for Experimental Purposes can be used in conjunction with an OT to further develop a capability for military use on the battlefield (DAU 2020j).

e. Example

Procurement of ordinance-related equipment to evaluate if two different manufacturing methods can yield similar results as produced by the current vendor to determine if a new method can be of similar strength at cheaper cost. Equal quantity procured from two different suppliers for the purpose of evaluation against existing manufacturing methods.

3. R&D Agreements

R&D agreements are a different type of contracting strategy that provides AAL the opportunity to partner with other federal agencies, local and state agencies, industry, non-profits and educational institutions, and they enable collaboration in order to develop solutions and mature technology. The agreements outlined in this section are flexible and allows for IP to be shared and to be protected. AAL should consider that R&D agreements are generally awarded to an organization that is known or can prove that the organization is competent in the subject area to be successful. This section will look into three different types of R&D agreements, specifically for a CRADA, PIA, and TIA. These agreements will be evaluated against the stated four evaluation criteria identified in Chapter III, and provide an example of each type in how they are used.

a. *Cooperative Research and Development Agreement*

A CRADA is an agreement commonly used by DOD to evaluate new capabilities and services from commercial companies before committing to buying them, and is commonly used for R&D demonstration collaboration and advancing technology (Erwin 2020). The CRADA allows the government to negotiate rights to the invention that is created, which is typically done prior to the start of work. The CRADA allows the government to add expertise without providing the funding (National Institute for Mental Health [NIH] n.d.). Using a CRADA also requires knowledgeable and skilled contracting personnel to understand the attributes of the contract method, and the “high risk/high reward environment reduces [the] opportunity for technology transition to [a] program of record” (DAU 2020c).

(1) End Item Deliverable

In a CRADA, a federal government laboratory utilizes government-owned facilities, IP, and expertise available for collaboration on R&D purposes that lead to a useful, marketable technology, or inventions that result in the right for licensing of patents (NIH, n.d.). The use of a CRADA results in new capabilities that lead to the license of patent rights, or provisions to protect IP developed through CRADAs, or other inventions that may be voluntarily assigned to the government as identified in 15 U.S.C. 3710a. The deliverables as a result of utilizing a CRADA include white papers, R&D reports, or other artifacts as specified in the statement of work.

(2) Timeline to Award

An agreement can take up to 3 months to prepare and approve, from receipt of the CRADA questionnaire to contract execution (Naval Research Laboratory [NRL] 2020; Rogers et al. 1998). The timeline can vary considerably depending on the complexity of the CRADA, and additional approvals are required if working with a foreign entity, or if a CRADA company is using SBIR/STTR funding. The duration of a CRADA award is primarily determined by the level of detail required in the statement of work, and usually covers one to three years of collaborative research (NRL 2020). If the work is not complete

at the end of the original agreement timeline, the CRADA term can be renewed for up to two additional years with a J&A.

(3) Dollar Thresholds

In a fully executed CRADA, all participating parties' contributions can take the forms of funds, personnel, facilities, equipment, and other resources (NIH n.d.). Under the authority of 15 U.S.C. 3710a that authorizes CRADAs, the government may contribute a wide variety of resources, such as personnel, services, equipment and facilities, but may not provide funding to support the CRADA effort. Therefore, the dollar threshold is not applicable in a CRADA. However, the government laboratory may receive royalty payments from industry partners as the resulting of the commercialization of inventions.

(4) Accessibility to Nontraditional Vendors

CRADAs are intended to facilitate technology development with commercial industry, so nontraditional defense contractors may participate if all requirements are met. Potential nontraditional defense vendors may first contact a federal laboratory with a letter of intent for the purpose of collaboration on an R&D effort (NIH n.d.). Alternatively, government scientists may choose a CRADA collaborator from any nontraditional vendors including start-up companies and small businesses to develop technology that is mutually beneficial to the public sector and for military applications (NIH n.d.). A competitive process is not required to award a CRADA, except under limited circumstances based on an agency's internal guidelines (NIH n.d.).

(5) Example

The Army signed a three-year CRADA with company SpaceX to test the use of their wireless broadband called Starlink in an effort to enhance current satellite communication (Erwin 2020). The Army and SpaceX signed a CRADA on May 20, 2020 to give the Army three years to experiment with the Starlink broadband to move data across military networks (Erwin 2020). The project is overseen by the Combat Capabilities Development Command center based located at Aberdeen Proving Ground, Maryland (Erwin 2020).

b. *Partnership Intermediary Agreement*

A PIA is a contract or a memorandum of understanding that also allows the contractor to perform the services they are contracted for at a federal laboratory, and allows the payment of federal funds to support the technology transfer (DAU 2020q). AAL would be able to implement a PIA with small businesses, non-profits or educational institutions at a government facility and pay for costs associated with research, in turn allowing for SME access to facilities and funding for research (DAU 2020q). PIAs have the potential to help seek out innovative ideas by allowing a company access to the technological and knowledge-based resources available in government laboratories.

(1) End Item Deliverable

A PIA is an agreement between the government and an intermediary organization, and is designed to advance technology from a non-profit organization, and can be used to conduct R&D activities, acquire white paper concepts, capability demonstrators or for technology maturation to accelerate capabilities or licensing transfer to the private sector (Howieson et al. 2013).

(2) Timeline to Award

Many federal laboratories have PIAs with organizations that facilitate joint projects and accelerate technology transfer or technology insertion between the laboratory and private sector. These were well established DOD partnership intermediaries such as TechLink, MilTech and FirstLink. The establishment of a PIA depends on the complexity to negotiate and execute the agreement of the laboratory. The estimated timeframe to establish a PIA is up to 3 months (Stutrud 2007).

(3) Dollar Thresholds

Although there is no specified funding level for PIA, organizations are usually funded by DOD, or state and local governments. As identified in 15 U.S.C. 3715, the director of federal laboratories may enter into a PIA and pay for the services using funding available to support its technology transfer programs. For example, the “Department of Navy Technology Transfer Program Office funds Navy laboratories to conduct pilot

projects” and the “funding amounts vary from \$5,000 to \$50,000 for each project” (Howieson et al. 2013, iv).

(4) Accessibility to Nontraditional Vendors

DOD laboratories have used PIA as one of three technology advancement mechanisms, including educational partnership agreements and OT agreements, to partner with outside organizations (Howieson et al. 2013). PIAs are defined in 15 U.S.C. 3715 and “provide DOD laboratories support with various technology transfer activities” such as identifying patentable technologies, written invention disclosures, marketing laboratory capabilities, and connecting DOD laboratories with nontraditional defense, academia and the private sector (Howieson et al. 2013).

(5) Example

Company Newcomer Arms LLC was awarded a PIA for two licensing agreements under contract 18-046-RH-02PLA to help the company grow their product line while providing needed technology to the battlefield (Air Force Technology Transfer Program 2018). Newcomer Arms also developed a licensed technology into a product that benefits anyone who wears a heavy backpack, and was able to make this product available to any warfighter, firefighter or hiker as a result of a technology transfer program.

c. Technology Investment Agreement

A TIA would be an additional contract vehicle if no other instrument meets the government’s research objectives. A TIA would be used if the government does not intend to pursue its own patent, but would share in half of the cost for funding the research (DAU 2020q). As defined in 32 C.F.R. § 37.215 (2018), TIAs are used to create a partnership between the government, commercial entities and non-profits in a way that would allow the resulting invention or product to be used in the commercial market. TIAs are designed to reduce barriers to small businesses and provide DOD access to advance new technologies, promote new relationships between the government and private industry, and stimulate nontraditional vendors to develop, use and disseminate improved practices as stated in 32 C.F.R. § 37.115 (2018).

(1) End Item Deliverable

TIAs are contract instruments that can provide white papers and other R&D activities, and be executed as cooperative agreements or as research OTs, where a project is used to support or stimulate research of technologies for current and future military purposes (DAU 2020q). TIAs are executed as cooperative agreements, which is a type of contracting instrument used in defense research programs, seeking to invent new technologies or products as a result of the research that can be used in the commercial market, for licensing of patents, or to further mature capabilities for future defense needs as identified in 32 C.F.R. § 37.210 (2018). TIAs can also be executed as an OT agreement under the authority in 10 U.S.C. 2371b to carry out prototype projects that provide the ability to conduct additional R&D projects for future military applications.

(2) Timeline to Award

TIAs require delegation of the authorities in 10 U.S.C. 2371, as well as 10 U.S.C. 2358 to award an agreement, and require knowledgeable and proficient contracting officers to negotiate and execute which depends on the complexity of the TIA, participation of federal partners, and terms and conditions that may increase time to establish an agreement. When TIAs are executed as a cooperative agreement in accordance with 32 C.F.R. § 21 (2018), the time to award can take up to three months and will vary depending on the complexity of the agreement, and if additional time is required to negotiate terms and conditions (NRL 2020; Rogers et al. 1998).

(3) Dollar Thresholds

Funding levels are not specified due to its structure of how TIAs are implemented within a federal organization. However, government funding cannot exceed the total amount provided by non-federal parties under the agreement, and a 50/50 cost share arrangement must be considered in a TIA under the authority of 10 U.S.C. 2371. A TIA can be either expenditure-based or a fixed-support agreement as per 32 C.F.R. § 37.300 (2018). An expenditure-based TIA is where the award amount is based on the funding levels the recipient expends on the project. In the case where the recipient completes the project before the expenditure of the agreed-upon DOD funding amount has been

expended, DOD “may recover its share of the unexpended balance of funds or, by mutual agreement with the recipient, amend the agreement to expand the scope of the research” effort as determined by 32 C.F.R. § 37.300 (2018). In contrast, 32 C.F.R. § 37.560 (2018) states that funding level for a fixed-support TIA is established at the time of award and is not meant to be adjusted, and the recipient is responsible for the outstanding costs required to complete the research project.

(4) Accessibility to Nontraditional Vendors

TIAs help reduce the barriers to contracting with the government, and provides access to nontraditional vendors in a wide range of possible technology domains, and permits involvement of commercial companies that would not otherwise participate in the project (DAU, 2020q). TIAs are intended to establish new relationships between federal agencies and the commercial industry and enables a company to pursue new business in the research for advancing technologies (DAU 2020q). TIAs can be awarded to all types of organizations, “including established technology companies, technology start-ups, universities, other non-profit research institutions, and state and local governments” (Burgett et al. 2005, 4–029-778-9). According to the DOD policy, TIAs can be awarded “only when one or more for-profit firms are to be involved either in the performance of the research project or the commercial application of the research results” as stated in 32 C.F.R. § 37.210 (2018). TIAs can also be awarded using a consortium which permits one or more agencies from the state or local government, for-profit firms, institutions of higher education, or other non-profit organizations as identified in 32 CFR § 37.210 (2018).

(5) Example

In February 2018, the Army awarded a \$19 million TIA to company Locust USA, Inc., to “collaborate in [the] development of an efficient and reliable/durable small turboprop gas turbine engine for propulsion in the unmanned aerial vehicle (UAV) arena” (Unmanned Aerial Vehicle [UAV] Turbines 2018). “This initiative is part of the Army’s Reliable Advanced Small Power Systems Technology Demonstration program [and the] development goals encompass engine capabilities beneficial to both military and commercial market” (UAV 2018).

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V. CONCLUSIONS AND RECOMMENDATIONS

The prior four chapters of this capstone project have examined numerous potential contracting methods and approaches in attempt to find the best path for the AAL to contract with nontraditional defense companies to develop and advance cutting edge technologies on short timelines of six months or less. As detailed below, this examination has yielded findings that lead to the recommendation of a select few promising avenues falling within the FAR and its supplements, and others outside the FAR in the form of OT and R&D agreements as granted to DOD agencies by federal statute. AAL's key requirements as presented in their problem statement for this capstone project consist of four evaluation criteria that include the ability to (1) conduct R&D activities and deliver prototypes, (2) award contracts in less than six months, (3) award contracts that range from \$10,000 and up to \$10 million in value, and (4) seek out and identify the innovative potential of nontraditional defense contractors. As outlined in Chapter III, and evaluated in Chapter IV, the capstone team has assessed the viability of all examined contracting approaches utilizing an analysis framework based on these criteria. Tables 4 and 5 summarize the results of this assessment for FAR-based contracts, and outside the FAR agreements, respectively, into a quick-reference Contracting Decision Matrix to facilitate strategic planning for the AAL in future acquisition requirements.

A. CONCLUSIONS

1. FAR-Based Contracts

Table 4 illustrates a matrixed summary of the findings the capstone team has gathered through the analysis conducted in Chapter IV, coupled with the literature outlined in Chapter II. The capstone team has bucketed the various methods from most to least promising to meet the needs identified by AAL utilizing the ranking technique identified in Chapter III. In order to quickly identify which contracting methods are applicable to AAL based on their requirements, the resulting tables in this chapter will be color-coded to identify the best fit methods at a glance. Contracting methods highlighted in green will indicate that the contracting method satisfies AAL's needs for R&D and/or prototypes, able to handle up to \$10 million purchase, provide the ability to award within 6 months,

and is accessible to nontraditional defense contractors. Contracting methods will be highlighted in yellow if the method can be used for R&D and/or prototypes, be able to handle up to a \$10 million, provide the ability to award between 6 and 12 months, and is accessible to nontraditional defense contractors. Those contracting methods highlighted in red cannot be used for R&D and/or prototypes, or cannot handle up to \$10 million purchase, or cannot provide the ability to award under 12 months, or are not friendly to nontraditional defense contractors. As noted in Chapter IV, the timelines to award identified throughout this capstone are general guidelines only and can vary greatly from one requirement to another based on many disparate factors.

Table 4. Summary of Findings—FAR-Based Contracting Approaches

	Whitepaper	R&D	Prototype	Procurement	Dollar Threshold	Time to Award*	Non-Traditional Friendly
<i>FAR Based Methods</i>							
Federal Supply Schedules				●	No Limit	1-6+ months	
Commercial Items (Non-SAP)				●	>\$7M or >\$13M**	6-12+ months	
Simplified Acquisition Procedures (SAP)	●	●	●	●	\$7M or \$13M**	1-6 months	●
Basic Agreements/Basic Ordering Agreements		●			No Limit	6-12+ months	
SBIR/STTR	●	●	●	●	No Limit	Up to 6 months	●
Small Business Set-Aside (SBSA)/ Special Socioeconomic Sole Source (4S)/ Direct 8(a)		●	●	●	No Limit for SBSA; <\$4M or <\$7M for 4S; Up to \$100M for Direct 8(a)	3-6 months	●
IDIQ + First Task Order		●	●	●	No Limit	6-12+ months	
Staged Contracts & BAAs	●	●	●	●	No Limit	6-12 months	●
Defense Commercial Solutions Opening		●	●	●	No Limit	Under 3 months	●

* Based on the collective experience from the capstone team, actual PALT is dependent on numerous specific requirement details and many other variables. Generally, PALT will be shorter with simpler, better defined requirements with values estimated below the SAP threshold, and PALT durations will be longer with complex requirements and values estimated above the SAP threshold. See also Chapter IV discussion on PALT.

** FAR 13.500(c) permits use of SAP for commercial items up to \$13 million in limited circumstances, e.g., supporting a contingency operation, or recovery from a major disaster. See also Chapter IV discussion on specific circumstances for use of SAP between \$7 million and \$13 million.

a. *Most Promising FAR-Based Methods*

As shown in Table 4, SAP, SBIR/STTR awards, Small Business Set-Asides, direct awards under Section 8(a) of the Small Business Act, and awards made in conjunction with the relatively new Defense CSO authority are the most promising for AAL's problem set, as they offer relatively streamlined award timelines of 6 months or less. These methods carry dollar thresholds that accommodate all or a large proportion of AAL's requirements, are attractive to nontraditional defense contractors due to the reduced reporting requirements, and can accommodate the deliverable types of end items identified by AAL to be of interest.

b. *Moderately Promising FAR-Based Methods*

Staged Contracts and BAAs are identified in the midrange of the FAR-based solutions in terms of suitability for the evaluation criteria identified for AAL. This rating is based on the general timelines to award these contracting methods within in the 6 to 12 month range based on historical experience of contracting professionals queried in the course of the capstone team's analysis, and the fact that these methods are friendly to nontraditional defense contractors and small businesses.

c. *Least Promising FAR-Based Methods*

Non-SAP acquisitions, BOAs, and IDIQ contracts are identified as the least promising FAR-based acquisition methods for AAL's acquisition requirements. This rating is primarily due to the fact these contracting methods require significant time to plan and award contracts, often ranging from 6 to 12 months or more, and require significant contractor administrative resources for compliance to statutes and regulation requirements. Proposal requirements and contract award administration of multiple individual task orders and task order competitions under multiple-award arrangements also drive PALT durations to a contract award. Additionally, the ability for the government to award multiple contract types such as fixed-price or cost reimbursement contracts under a single ordering agreement or IDIQ would pose significant challenges to the resources and accounting systems of small businesses or nontraditional vendors.

While some FAR-based methods have been identified as potentially supportive of AAL’s buying objectives, it is important to note that each of the most promising FAR-based contracting methods identified here are intended for the acquisition of commercial items and services. It is the capstone team’s assessment that the majority of AAL’s requirements would face challenges with meeting the definition of commercial items or services based on the non-commercial military orientation of the mission, and technologies that AFC will typically be pursuing. Therefore, the team concludes that the FAR offers only limited ability to respond to the fast-moving, technology proliferation capabilities that AAL is pursuing in support of AFC’s mission to modernize the battlefield, and that AAL must look beyond the FAR to obtain the most responsive and fitting capability solutions for the warfighter.

2. Non-FAR-Based Solutions

Table 5 illustrates a matrixed summary of the non-FAR based findings the capstone team has gathered through the analysis conducted in Chapter IV. Using the evaluation criteria and ranking methodology identified in Chapter III, and reproduced earlier in this chapter, the capstone team ranked the evaluated non-FAR based methods from most to least promising to meet the needs identified by AAL.

Table 5. Summary of Findings—Non-FAR-Based Contracting Approaches

	Whitepaper	R&D	Prototype	Procurement	Dollar Threshold	Time to Award*	Non-Traditional Friendly
Non-FAR Based Methods							
Other Transactions for Research & Prototypes	●	●	●	●	No Limit	Under 3 months	●
Procurement for Test and Experimental Purposes		●	●	●	No Limit	Insufficient Data	●
R&D Agreements - CRADA	●	●			Not Applicable	Under 3 months	●
R&D Agreements - PIA	●	●			No Limit	Under 3 months	●
R&D Agreements - TIA	●	●			No Limit	Under 3 months	●

* Actual PALT is dependent on specific requirement details and many other variables. Generally, PALT will be shorter with simpler, better defined requirements with values estimated below the SAP threshold, and longer with complex requirements values estimated above the SAP threshold (based on the experience of the authors). See also Chapter IV discussion on PALT.

As shown in Table 5, all of the non-FAR based methods are rated as most promising to meet the AAL's key criteria for seeking out innovative concepts from nontraditional vendors. The exception is Procurement for Experimental Purposes, for which the capstone team was unable to find sufficient reference for timelines to award, and therefore cannot make a determination as to the applicability of this method to meet AAL's criteria.

All key activities identified by AAL in their problem statement can be obtained through the competent use of OT agreements, including R&D, prototypes, and technology maturation. All of the non-FAR based methods assessed by the capstone team have the potential to get from initial requirement announcement to award of a new OT agreement within 3 months as substantiated by the experiences documented by other agencies such as DARPA and DIU outlined in Chapters II and IV. Use of OTs are facilitated by the "clean sheet of paper" concept offered by its authority, which does not constrain or prescribe the terms that the parties entering into the OT agreement must abide by to meet the stated objectives of an agreement. This flexibility is provided that so long as both parties are competent, have a good understanding of the objectives, and have sufficient areas of overlapping interest, an agreement can be made rather quickly that is beneficial to both parties.

Similar to OTs, R&D agreements offer additional authorities outside the traditional FAR channels to coordinate with nontraditional contractors, non-profits, and other government agencies on a collaborative basis to develop, leverage, and advance new and cutting-edge technologies without the restrictive requirements of the FAR. This removal of the FAR prescriptions can result in timelines as short as 3 months as demonstrated by the CRADA experiences of the Naval Research Laboratory cited in Chapter IV.

Based on the findings for non-FAR based contracting approaches detailed in Chapter IV and summarized above, the capstone team concluded that authorities outside the FAR offer the majority of the most promising solutions for AAL to meet their technology development needs in support of the warfighter.

B. RECOMMENDATIONS

1. FAR-Based

As identified above, AAL and nontraditional defense contractors may have difficulty utilizing the FAR to meet their stated needs described in Chapter I, especially considering the resources that are required to administer a typical FAR-based contract. However, as identified in Chapter IV, AAL will have some requirements that are appropriate for FAR-based procurements, and therefore use of the FAR should still be considered depending on the type of end item deliverable being sought. While the FAR is more restrictive in many ways previously discussed in this capstone project, use of the FAR and its requirements also protects the interests of the government and accomplishes a significant number of beneficial objectives such as prioritizing certain awards to small business concerns, which helps to grow the defense industrial base.

Within the FAR realm, the capstone team recommends that AAL pursue awards under SAP, Defense CSO, BAAs, staged contracts, SBIR/STTR, small business set-asides and direct awards under section 8(a) of the Small Business Act, as the team believes these are the FAR-based contracting methods that are most likely to work for AAL. In summary, for FAR-based solutions, the capstone team recommends that AAL work through their strategic objectives with AFC to identify technologies and requirements that could readily fit into the definition of a commercial item, and where market research demonstrates there are a large number of small-business defense contractors able to satisfy those requirements. These recommended contract types generally have shorter timelines to award when compared to other acquisitions within the FAR and are more accessible to small businesses and nontraditional defense suppliers as discussed in Chapter IV.

2. Non-FAR-Based

The capstone team recommends that AAL investigate OT agreements awarded through the process of CSO AOI announcements with phased evaluations and collaborative requirements development as DIU has pioneered. Based on the findings of this project, the capstone team believes this is the most fitting OT methodology for AAL to address their objectives as described in the given problem statement. This combination of the CSO

process with an OT award seems to be the closest match for the agile capability development efforts that AAL has presented to the capstone team. AAL can use these non-FAR based instruments to capitalize on their approach to advancing technologies through user evaluations in the intended operating environment, and in cooperation with nontraditional contractors specializing in cutting-edge technologies. Additionally, the capstone team believes it would be greatly beneficial for AAL to collaborate with other federal and DOD agencies currently using OTs who can share best practices and lessons learned. Doing so would accelerate AAL's mastery of the tools and techniques that are key to the effective use of OTs for the development of new and cutting-edge technologies as required by the Army.

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APPENDIX A. ACCREDITATION OF SUBJECT MATTER EXPERTS FROM THE ARMY CONTRACTING COMMAND

The following list of SMEs from the ACC were consulted by the capstone team for research into this thesis:

- ACC SME 1: Contracting Specialist with 10 years of experience assisting on the award of various contract types including: IDIQ awards, cost-type and fixed-price contracts and GSA schedule awards.
- ACC SME 2: Contract Cost Price Analyst with 7 years of experience evaluating contract proposals of various types including small business awards, MAIDIQs, competitive cost-type and fixed-price contracts, and sole source contracts.
- ACC SME 3: Contracting Officer with 4 years of experience awarding various contract types including cost-type and fixed-price contracts, small business set-asides, IDIQ task order awards and contracts resulting from a BAA.

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APPENDIX B. BIOGRAPHIES OF THE CAPSTONE TEAM

The following provides the capstone team's biographies in support of this thesis:

CHAD M. CLAUSSEN is currently an Associate Director at the Software Engineering Center (SEC) under the Communications-Electronics Command (CECOM) at Aberdeen Proving Grounds, MD. He has 18 years of experience in the Department of the Army. Five years performing R&D in the tactical communications discipline, ten years of C5ISR acquisition experience, and three years of software sustainment experience. He graduated from the University of Maryland with a B.S. in Information Systems Management.

ELIZABETH R. FORINO is a Program Analyst with the Army Research Laboratory (ARL). She has a total of 13 years of experience in Business and Financial management. She has 10 years of experience as a Contracting Officer's Representative on multiple contracts. She has two years of experience preparing documentation to award sole source task orders through Defense Information Technology Contracting Organization worth \$250 million. She has also been the lead on contract awards, which were awarded out of two different branches of the ACC (ACC-NJ and ACC-APG). She has participated in a Source Selection Evaluation Board, placed multiple orders through MAIDIQ contracts through PM CHEMA, and multiple orders against single award IDIQ contracts through NSA. She graduated from Towson University with a B.S. in Business Administration.

NICHOLAS T. KALINOWSKI is a Senior Test Officer for Aberdeen Test Center (ATC), Army Test and Evaluation Command (ATEC). He has 11 years of experience in planning, budgeting and executing developmental testing on a wide variety of acquisition programs for the warfighter. He has 3 years of experience in assisting in the development of Purchase Description requirements for acquisition efforts. He graduated from Wilkes University with a B.S. in Electrical Engineering.

SHARON LAVERTY is the Project Management Division Chief for the Logistics Modernization Program under Program Executive Office Enterprise Information Systems (PEO EIS). She has 21 years of experience in information assurance, cybersecurity, and financial auditing. She graduated from Centenary University with a B.S. in Business Administration and Management.

ROBB MIKOLAJKO is an Assistant Product Manager with Program Executive Office Soldier at Fort Belvoir, Virginia. He has 15 years of experience in acquisition planning, managing and executing cost, schedule and performance objectives. Within this time, he also has 10 years of experience as a Contracting Officer's Representative working directly with IDIQ-type contracts and OT agreements for the Enhanced Night Vision Goggle (ENVG) Program. He graduated from State University of New York (SUNY) Fredonia with a B.S. in Physics, and SUNY Buffalo with a B.S. in Mechanical Engineering.

AERIK T. NGUYEN is a Systems Engineer for the USARMY Information Systems Engineering Command (USAISEC) under AMC/CECOM. He has 6 years of experience as a software engineer for 402nd Maintenance Wing/Software Development under Air Force Materiel Command, and 8 years of experience as a Systems Engineer for USAISEC providing engineering and associated support of Information Technology (IT) projects at Army posts, camps, and stations. He graduated from the University of South Florida with a B.S. in Computer Engineering.

ALEXANDER S. OBRIWIN is a Contracting Officer with an unlimited warrant for Army Contracting Command – Aberdeen Proving Ground (ACC-APG). He began his contracting career at the National Geospatial-Intelligence Agency in Springfield, Virginia, and has 10 years of experience in various types of federal services contracting in several categories including Information Technology, base and mission installation support, auditing and finance, federally funded research and development centers (FFRDCs), headquarters staff support, and business analytic support. He has contracting experience that includes pre-

award contracting ranging from small buys under SAP through large negotiated awards above \$100 million, and post-award administration of large complex services contracts above \$100 million. He graduated from Villanova University with a B.S. in Finance.

JENNIFER O'HARA is an Acquisition Program Integrator for the Deputy Assistant Secretary of the Army for Plans, Programs and Resources in Washington, D.C., She has over 13 years of experience including 6 years of planning, programming, budgeting and execution experience for acquisition programs. She previously worked for Tobyhanna Army Depot in the Strategic Initiatives Office. She graduated from the University of Scranton with a B.S. in Operations Management.

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