Other Transaction Authority (OTA) Cost Impact

David A. Pinckley

Defense Acquisition University (DAU)
Senior Service College Fellowship 2018-2019
Huntsville, Alabama

25 March 2019

This research paper presented to the Defense Acquisition University for partial fulfillment of the academic requirements for the Army's Senior Service College Fellowship (SSCF) under the direction of SSCF Director, William A. Colson, and Research Advisor Dr. Robert Lord.

Approval Page

Title: Other Transaction Authority (OTA) Cost Impact

Author: David A. Pinckley

Organization: Defense Acquisition University (DAU) – Senior Service College Fellowship

Date of Paper: 25 March 2019

Informed Consent Forms: Not required

Research Advisor [Dr. Robert Lord] Approval Date: 4 April 2019

Second Reviewer [Dana Stewart] Approval Date: 29 April 2019

Third Reviewer [Thomas D. Byrd] Approval Date: 13 May 2019

SSCF Director [William A. Colson] Approval Date: 14 May 2019

OPSEC [Misty Privett, ASE PMO] Approval Date: 13 June 2019

PAO [Brandon Pollachek, PEO IEWS] Approval Date: 3 July 2019

Acknowledgements

I would like to thank my wife for her unwavering support of my academic efforts on this research paper, my master's degree, and the Senior Service College Fellowship (SSCF) program. Throughout these efforts, she has embodied the concept expressed in Ecclesiastes 4:9-12 demonstrating without doubt that "Two are better than one". Her unfaltering devotion was and continues to be a substantial source of strength to me in all of my endeavors.

I would also like to thank my parents. Every positive thing I have accomplished in life is a result of their actions, the love and understanding they provided to me, and the patience they had with a headstrong son who thought he knew much more than he actually did.

In addition, I would like to thank the Defense Acquisition University staff for their mentoring, coaching, and instruction through this program, and to thank my SSCF Fellows for their words of encouragement, their friendship, and their comradery. Likewise, I want to thank all of the highly committed acquisition professionals throughout the Army and the Department of Defense who work diligently to provide the best possible capabilities to our joint forces.

Finally, I would like to thank our military service members and their families for their steadfast dedication to our nation, and the sacrifices they routinely make to keep our nation safe, strong, and free.

Table of Contents

List of Figures

List of Tables

Abstract

Typical Department of Defense (DOD) acquisition contracts comply with the Federal Acquisition Regulation and are burdened by government unique regulatory compliance cost (Coopers and Lybrand \ TASC, 1994), government-induced overhead cost, and DOD regulatory cost premiums (Barry, 1995). This bureaucratic and administrative cost (BAC) burden increases the cost of defense acquisition programs. Other Transaction Authority (OTA) agreements are not subject to the FAR, thus have potential to reduce the BAC burden, and lower the cost to the US taxpayer.

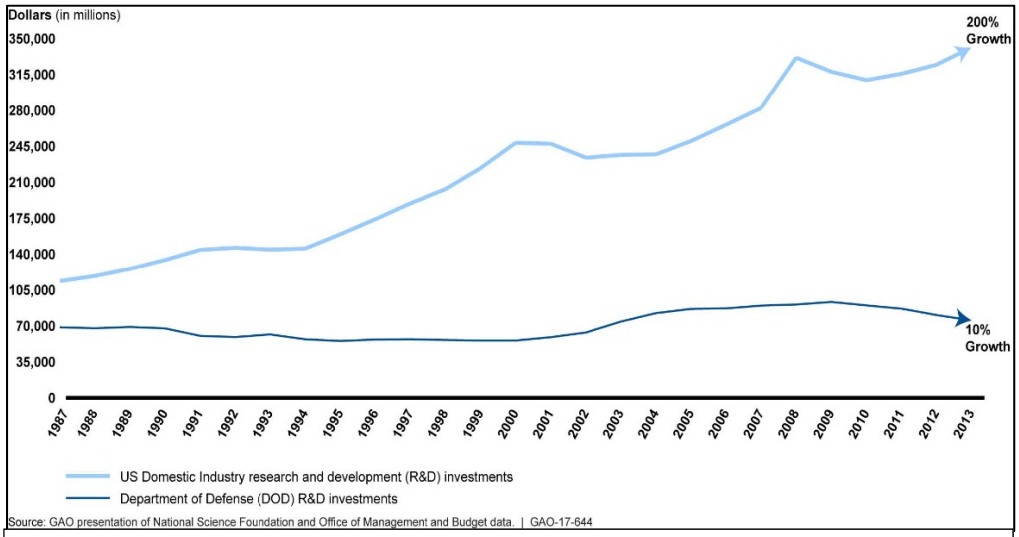
The goal of this research was to investigate the predictability of any cost impact with utilizing OTA agreements for Defense Acquisition Programs. Understanding the predictability of associated cost impacts could assist in making budgetary and programmatic decisions.

The research method employed was a literature review of unclassified open source documentation. This literature review resulted in a better understanding of the BAC burden associated with FAR based contracts, the 60-year history of Acquisition reform, and past success of innovation under OTAs.

The results of this research project suggest OTAs are better, faster, and cheaper than FAR based contracts, but insufficient quantitative data exists to determine the predictability of the magnitude of any cost impact from utilizing OTAs. The conclusions and recommendations of the literature review are provided on pages 50 and 51.

Introduction

Both the 2017 National Security Strategy (NSS) and the 2018 National Defense Strategy (NDS) emphsize the need to utilize innovative technologies and non-traditional sources in order to deliver advanced military capabilities more rapidly. This need for innovation is driven in part by the fact that US Government funding for research and development (R&D) is no longer a driving source for basic research. Commercial non-defense related R&D expenditures far exceed that spent by the US government (Mervis, 2017) except in extremely narrow technological areas that only have military application. Figure 1 shows the contrast in Department of Defense (DOD) and Commercial research and development spending in recent years. (GAO, 2017)



Note: Expenditures have been adjusted for inflation in accordance with DOD National Defense Budget Estimates for Fiscal Year 2017. Industry research and development spending may include funding provided by DOD for research performed by industry.

Figure 1. DOD and Commercial Research and Development Spending (GAO, 2017, p. 6)

In the 2017 NSS and the 2018 NDS, both the President and the Secretary of Defense recognized the need to move faster and increase innovation of our defense acquisition programs.

Congress has also recognized the need for streamlined innovation, and the benefit of working with innovative non-traditional defense contractors in order to capitalize on commerical R&D efforts. Congress first granted OTA authority to the National Aeronautics and Space Administration (NASA) in 1958. Since then, congress granted statutory authority to use other transaction agreements to at least ten additional agencies (GAO, 2016).

While OTAs are not new, Congress has clarified and expanded DOD's authorities related to utilizing OTAs over the past few years as a way to utilize innovative technologies and non-traditional sources in order to deliver advanced military capabilities more rapidly. To this end, DOD is increasingly utilizing OTAs. The purpose of this paper is to determine if there are predictable cost implications of utilizing OTAs in lieu of Federal Acquisition Regulation (FAR) based contracts. The literature review employed in this research project will look at open source published data relevant to DOD programs, as well as other agency programs that utilized OTAs. If this research project identifies a predictable cost implication associated with utilizing OTAs, this information could enable DOD Program Managers so they can make better-informed decisions regarding OTA vs FAR based contracting. Additionally, more effective budget development is possible based on a predictable cost implication. Other audiences that might be interested in the results of this research could include other federal agencies outside of DOD, as well as the Legislative Branch and perhaps the US taxpayer.

Background

The 2017 NSS states that the US military must maintain overmatch in order to strengthen our diplomacy and permit us to shape the international environment to protect our interests. It further states the DOD should seek new capabilities that create clear advantages for our military. DOD must work with industry to experiment, prototype, and rapidly field new capabilities. DOD must harness innovative technologies that are developing outside of the traditional defense industrial base (National Security Strategy, 2017)

The 2018 National Defense Strategy (NDS) states the United States has enjoyed uncontested or dominant superiority in every operating domain for decades. "Today, every domain is contested—air, land, sea, space, and cyberspace" (National Defense Strategy, 2018, p. 3). The NDS further states we must "organize for innovation" (National Defense Strategy, 2018, p. 10). In their 1986 paper *An Overview of Innovation,* Kline and Rosenberg described innovation as being "complex, uncertain, somewhat disorderly, subject to change … difficult to measure, demanding close coordination… and a series of changes in a complete system" (Kline & Rosenberg, 1986, p. 275). Kline and Rosenberg further state, "The outcome of innovation is a highly uncertain process, thus an important and useful way to consider the process of innovation is as an exercise in the management and reduction of uncertainty" (Kline & Rosenberg, 1986, pp. 275-276).

The 2018 NDS states "current processes are not responsive to need… we will prioritize speed of delivery, continuous adaptation, and frequent modular upgrades … Delivering performance means we will shed outdated management practices and structures while integrating insights from business innovation" (National Defense Strategy, 2018, p. 10) in order to "deliver

performance at the speed of relevance" (National Defense Strategy, 2018, p. 10). The 2018 NDS further discusses the management and reduction of uncertainty, the DOD will "realign incentive and reporting structures to increase speed of delivery, enable design tradeoffs in the requirements process, expand the role of warfighters and intelligence analysis throughout the acquisition process, and utilize non-traditional suppliers" (National Defense Strategy, 2018, p. 11). Efficient, fast, iterative approaches from development to fielding will allow the DOD to respond quickly to changes in the security environment (National Defense Strategy, 2018).

According to the 2017 NSS, "the United States must develop new concepts and capabilities to protect our homeland, advance our prosperity, and preserve peace" (National Security Strategy, 2017, p. 26). The creativity and talent of dedicated Americans are more powerful than bureaucratic inertia. Our Military has transformed the way we fight with new advances in automation, manufacturing and computing. Fielding an unmatched joint force is possible by aligning our public and private sector efforts. This advantage will grow as we couple the strength of our partners and allies. By doing so, the future is ours to win, or to lose (National Security Strategy, 2017).

When used for the progression of research and development, Other Transaction Authority supplies a formidable instrument to attract companies who were previously reluctant to working with the government. This allows government and non-traditional industry to work cooperatively to advance the technology that will have an enormous impact on national security (Stevens, 2016). As a result, "the Department of Defense (DoD) has emphasized its willingness to engage with commercial companies and other non-traditional contractors to try to expedite and simplify its procurement of innovative technologies" (Cassidy, Plitsch, & Evans, 2018, p. 1).

The Research Questions

1. Can the Bureacratic and Administrative Cost (BAC) burden of FAR based contracts be quantified?

2. Is there a quantifiable and predictable cost attribute to the use of OTA vice FAR based contracts?

Research Methodology

Literature Review and Approach

The research method for this effort was a Literature Review. The literature review focuses on published open source documents that address the need for innovation and prototyping, the science of innovation, utilization and benefits of OTAs, as well as the BAC burden of FAR based contracts.

Significant research exists on the utilization of OTAs vice FAR based contracts from the perspective of both speed and innovation. This project will attempt to fill a research gap by looking for cost implications associated with the use of OTAs.

This literary review groups relevant sources by similarity of source. Based on this review, the researcher will attempt to determine the cost attributes of OTAs in order to provide additional information to decision makers across the DOD.

Limitations and Recommended Areas of Additional Research

Two primary constraints limit this research. The first is the time available to devote to the research during the Defense Acquisition University (DAU) Senior Service College Fellowship (SSCF). The second constraint, also driven by the SSCF schedule, is the limitation of only utilizing published data and information.

One possible area for follow on research would be to conduct surveys and interviews at agencies that have employed numerous OTAs. This data would assist in the determination of the predictability of the associated cost implication.

Literature Review

The purpose of this review is to research relevant literature associated with FAR based contracts and OTAs being used in the Department of Defense. This research will potentially provide insight into cost implications associated with the use of OTAs as well as the "regulatory cost" of FAR based contracts. In order to do this, the research will also delve into the topic of innovation, and the national level strategic guidance that is driving the need to increase innovation. The literature review is divided into the following six categories: National Strategic Documents, Independent Studies, Independent Agency Reports, DOD Documents and Testimony, Academic Reports, and Other Published items. The following is a brief review of 31 pertinent documents associated with this research.

National Strategic Documents

2017 National Security Strategy (NSS)

The 2017 NSS provided the President's National Security Concerns and how the executive Branch intends to address them. Though an extremely high-level document, the NSS specifically speaks to actions that are congruent with the use of OTAs when it discussed aligning our public and private sector efforts in order to field an unmatched Joint Force. Specifically: "By seeking out new capabilities that create clear advantages for our military", and "by harnessing innovative technologies that are developing outside of the traditional defense industrial base," we can "experiment, prototype, and rapidly field new capabilities". (National Security Strategy, 2017, p. 29)

2018 National Defense Strategy (NDS)

The 2018 NDS provided a strategic framework for how the Department of Defense will implement national defense in accordance with the President's National Security Strategy. The NDS clearly stated we must organize for innovation and prioritize speed of delivery by integrating insights from business innovation in order to deliver performance at the speed of relevance (National Defense Strategy, 2018). The 2018 NDS further states that we must use "streamlined, rapid, iterative approaches from development to fielding" (National Defense Strategy, 2018, p. 11) to allow the Department to respond quickly to changes in the security environment. (National Defense Strategy, 2018) These principles of speed and innovation are harmonious with the use of OTAs, which enable speed and flexibility.

Independent Studies

The Weapons Acquisition Process

In 1962, the Harvard Business School published this report on Acquisition Reform by Merton J. Peck and Frederic M. Scherer. This report was the culmination of a 3-year research project. This study is one of the earliest studies on Acquisition reform that have continued for 60 years (Peck & Scherer, 1962).

Report to The President and The Secretary of Defense on the Department of Defense by the Blue Ribbon Defense Panel

In 1969, President Richard Nixon commissioned this Blue Ribbon Panel. This July 1970 report, also known as the Fitzhugh report, was the result. The panel was commissioned to make recommendations on:

> "(1) The organization and management of the Department of Defense, including the Joint Chiefs of Staff, the Defense Agencies and the Military Services, as it affects the Department's mission, performance, decision-making process, the command and control function and facilities, and the coordination with other governmental departments and agencies, with emphasis on the responsiveness to the requirements of the President and the Secretary of Defense. (2) The Defense research and development efforts from the standpoints of mission fulfillments, costs, organization, time and interrelation with the scientific and industrial community. (3) The Defense procurement policies and practices, particularly as they relate to costs, time and quality. (4) Such other matters as the Secretary may submit to it from time to time" (Blue Ribbon Defense Panel, 1970, p. v)

The executive summary of the Fitzhugh Report stated, among other things,

> "The policies of the Department on development and acquisition of weapons and other hardware have contributed to serious cost overruns, schedule slippages and performance deficiencies. ...Procurement procedures do not sufficiently reflect the national need to maintain an adequate, but not excessive, industrial base" (Blue Ribbon Defense Panel, 1970, p. 2).

Packard Commission Report

In 1985, President Ronald Reagan appointed a Blue Ribbon Commission on Defense Management, informally known as the Packard Commission. The final report, published in 1986, emphasized the use of commercial technology, and stressed that development of military specific items should only occur when commercial items are insufficient to meet military

requirements. The report also emphasized building prototype systems to demonstrate and test new technology that can significantly improve military capability, and stressed the need for streamlined procurement processes that employ informal competition during this phase of research and development (Packard Commision, 1986).

Coopers & Lybrand / TASC Project Report

In December 1994, the TASC Project report delivered to Secretary of Defense William J. Perry as the final report for a study project conducted by a joint Coopers & Lybrand / The Analytical Services Company (TASC) Project Team. This study was to assess only the industry cost impact of DOD acquisition regulations and oversight. The report did not assess DOD's direct cost associated with the acquisition regulations and oversight. The study found that DOD's acquisition environment imposed an average of 18% cost increase. The study also found that the DOD acquisition environment imposes substantially greater compliance costs on those contractors that develop and manufacture products based on unique military designs, in comparison to facilities that produce items with a strong commercial orientation. Throughout this report, the authors use various terms to describe the cost impact. They include: direct compliance costs of DOD regulatory environment, costs of compliance and oversight, cost of regulatory compliance, DOD cost premium, cost impact of DOD acquisition regulations and oversight, and cost impact of the regulatory environment (Coopers and Lybrand \ TASC, 1994).

Rand Study: Assessing the Use of Other Transactional Authorities for Prototype Projects

This 2002 RAND study states:

> "The flexibility of the OT process has been used to: (a) achieve better use of industry resources through innovative business arrangements and project designs; (b) improve management of risks and uncertainties through freedom to modify the program as it evolves; and (c) achieve better value through cost sharing and reduction of transaction costs. Overall, more effort is being devoted to product and less to process." (Smith, Drezner, & Lachow, 2002, p. viii)

The RAND study also asserts that another major benefit of OTAs is the enhanced ability to deal with the risks and uncertainties that are intrinsic in any development project. This ability is due to the malleable nature of OT agreements where DOD and industry managers amend advantageous project objectives through mutual agreement, as long as the change does not affect the stated program goals or the total cost. This flexibility provides a powerful ability to deal with problems that occur when developing new systems. (Smith, Drezner, & Lachow, 2002)

The 2002 RAND study asserts that the OTA process is potentially one of the most powerful acquisition reforms in recent history, and that OTAs are providing improved access to commercial technologies and improved efficiencies in conducting technologically challenging prototype projects. (Smith, Drezner, & Lachow, 2002)

IDA Study: Acquisition Policy, Cost Growth, and Cancellations of Major Defense Acquisition Programs

The Institute for Defense Analysis (IDA) study, published in 2018, highlights over 60 years of history of OTAs, which were first granted to NASA in 1958 in the legislation that created NASA. DOD became interested in OTA some 20+ years later due to supposed advantages of attaining cutting-edge technology from corporations with little or no familiarity

with DOD. The Defense Advanced Research Projects Agency (DARPA) obtained OT Authority in 1989 and DOD as a department received OT Authority in 1994 (McNicol, 2018).

The IDA study looked at several OTAs with funding greater than $100M, which were similar to Major Defense Acquisition Program (MDAP) programs in size, scope, and complexity. The conclusion implied by the data is that the regulatory relief provided by OTA programs do not show lower cost growth. (McNicol, 2018). However, these "OTA projects had little or no commercial potential and to a substantial extent, used technology developed under previous DOD contracts" (McNicol, 2018, p. 96).

Section 809 Panel Volume 1 Report – Revised

The Section 809 Panel identified five crucial elements that should be characteristic in the future acquisition system. They are: "Competitive and collaborative, Adaptive and responsive, Transparent, Time sensitive, and Allows for trade-offs." (Section 809 Panel, 2018, p. 7).

One avenue for systemic change could be changing DOD's competitive procedures to compete solutions to problems, rather than assess a company's ability to meet specifications. With this approach, DOD could rapidly develop and field innovative capabilities. To prove adaptability and responsiveness, DOD must produce an organization that is flexible and distributed, where leaders and workers are authorized and believed. Regulations and methods must continually advance, and incentivized cross-functional teams must collaboratively solve problems (Section 809 Panel, 2018, pp. 7-10).

Translucence in DOD acquisition is vital to ensuring the trust of the American people and for promoting competition and collaboration. Businesses unfamiliar with DOD grapple to find

distinct points of entry into the defense market, and pertinent information is difficult to recognize through most government websites. It is the era to use transparent, widely-used social media to post and publicize DOD's needs. Time must be valued to balance speed with the due diligence. Without as much regulation and oversight, U.S. antagonists can deliver capability to the field much more quickly. The future acquisition system must permit DOD to deliver capability rapidly in order to maintain the dominance necessary to deter prospective adversaries. While it is not always feasible to implement all of the above attributes simultaneously, trade-offs empower informed acquisition decision-making to use flexibility to obtain optimal results (Section 809 Panel, 2018, pp. 7-10).

Section 809 Panel Volume 3 Report

Volume 3 of the Section 809 Panel Report recommends (Recommendation #81) the expansion of the Other Transaction Authorities (OTAs) for production. The panel states, "The current statutory authorities do not adequately allow use of Other Transaction agreements (OTs) for follow-on production and use of OTs for rapid fielding existing technologies when necessary" (Section 809 Panel, 2019, p. 440). The report elaborates by discussing the congressionally imposed limitations on follow-on production, and by stating the benefits of additional opportunities to use OTAs for production in order to address the current threat environment and make purchases in a manner consistent with the private sector. The report also discusses the primary objectives of leveraging OTAs. OTAs attract innovative ideas and solutions from non-traditional defense contractors. OTAs leverage private-sector investments in research and development that has military utility thereby lowering DOD's required investment

and reducing lead-time and cost of fielding capabilities. OTAs encourage DOD contractors to invest in innovation in those areas that have application beyond the defense market, and they allow for highly flexible and creative contract arrangements (Section 809 Panel, 2019, pp. 440-441).

Independent Agency Reports

Congressional Research Service Report on Other Transaction (OT) Authorities

A July 2011 Congressional Research Service report on OT Authorities provides the following definition: "An *other transaction* (OT) is a special vehicle used by federal agencies for obtaining or advancing R&D or prototypes. An OT is not a contract, grant, or cooperative agreement, and there is no statutory or regulatory definition of "other transaction." (Halchin, 2011, p. Summary). Halchin (2011) goes on to discuss the challenges of evaluating OTAs and their use, due in part to the difficulty in evaluating the types of efforts associated with other transactions. Halchin's research in 2011 did not discern a "reliable method for conducting an evaluation that would yield quantifiable, objective data on the use of OTAs". (Halchin, 2011, p. Summary) Halchin also references the 2001 RAND report on OTAs citing the flexible use of OTAs that have achieved enhanced use of resources through innovative business agreements and development models (Halchin, 2011). "The freedom OTAs provide to modify the program as it evolves in order to improve ambiguity and risk management, as well as, the increased value of OTAs through cost sharing and reduction of transaction costs" (Halchin, 2011, pp. 26-27).

Government Accountability Office Report –Acquiring Research by Nontraditional Means

In this 1994 report, The Government Accountability Office (GAO) stated, "other transactions appear to have provided DOD a tool to leverage the private sector's technological know-how and financial investment" (GAO, 1996, p. 3). The report further stated that DOD had partially offset its own costs by sharing the costs of projects. In the sample projects reviewed, for each dollar provided by DOD, recipients planned to contribute approximately $1.40 in cash or in-kind contributions. Table 1 below provides a breakout of these contributions. However, as allowed under the FAR, some of the recipients allocated some of their contributions to their overhead costs as independent research and development (IR&D) expenses and therefore, be eligible for reimbursement by DOD. Further, about 10 percent of the recipients' contributions was attributable to the value of past research efforts. Approximately 11% of the sample projects allocated more than 20% of their contributions from past research efforts. These practices increase DOD's actual share of project costs (GAO, 1996).

Dollars in millions

Source and type of contribution	Amount	Percent
DOD[a]	**$ 710.0**	**41.8**
Participant	**990.3**	**58.2**
Cash	780.0	45.9
In-kind	205.5	12.1
Undetermined	4.8	0.3
Total[b]	**$ 1,700.2**	**100.0**

[a]Does not include DOD in-kind contributions, which include work performed under separate memoranda of understanding, cooperative research and development agreements, or other agreements.

(GAO, 1996, p. 10)

Table 1. Planned Cost-Sharing Commitments (GAO, 1996, p. 10)

GAO Report: Use of 'Other Transaction' Agreements Limited and Mostly for Research and Development Activities

In this January 2016 report, GAO provides a list of the agencies with Other Transaction Authority (See Figure 2 below). It further states that the Department of Homeland Security, Department of Energy, and Health and Human Services OTA statutory language was modeled on DOD's Other Transaction Authority, with minor variations. Each of these require a cost sharing arrangement when using OTAs for Research Development and Demonstration (RD&D) projects (GAO, 2016).

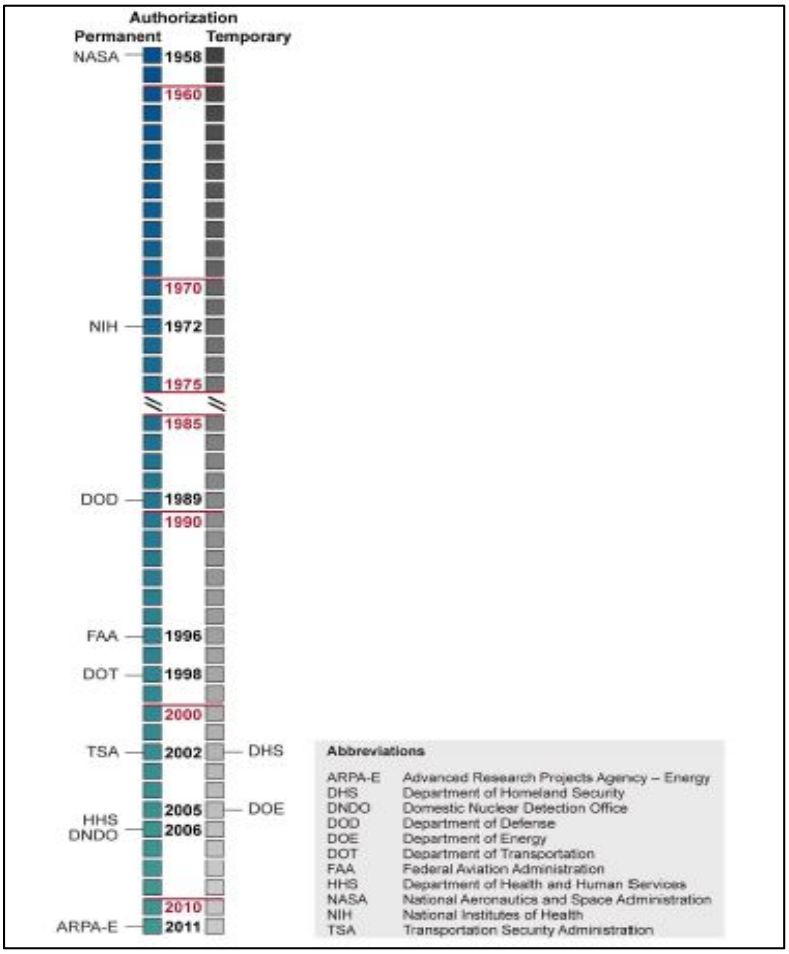


Figure 2. Agencies with Other Transaction Authority and Year Granted (GAO, 2016, p. 7)

GAO Report: DOD Is Taking Steps to Address Challenges Faced by Certain Companies

This GAO 2017 report asserts that DOD acquires numerous commercially developed products to enable the warfighter. Before DOD acquires a product, it determines the product type that is most suitable. As shown in figure 3 below, the degree to which the product is commercially available and the risks associated with developing or producing the product will influence the type of contract used.

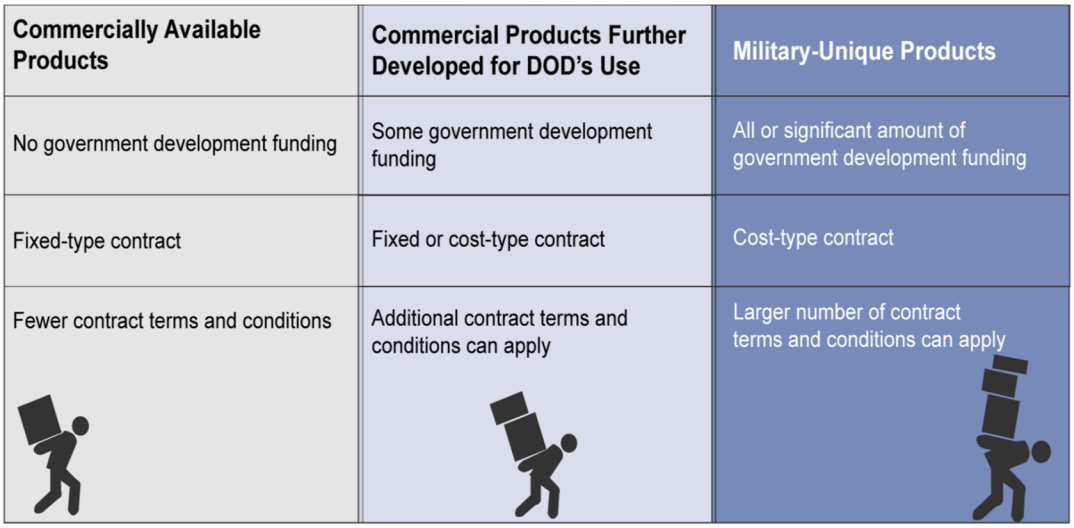


Figure 3. Characteristics of the Three Types of Products Procured by DOD (GAO, 2017, p. 4)

The report also states that Congress has provided DOD with Other Transaction Authority (OTA) that allows agreements with businesses for research and development and prototype efforts. OTAs are flexible agreements that include very few standard terms and conditions and instead allow the parties to negotiate terms and conditions specific to the project. This flexibility allows agencies to attract and collaborate with entities that have not previously done business

with the Federal Government due to concerns about standard government contract requirements. (GAO, 2017, pp. 3-5)

In May 2016, former Secretary of Defense Ashton Carter appointed new leadership for the Defense Innovation Unit Experimental (DIUx) and assigned contract award authority to the organization. The DIUx office reports directly to the Office of the Secretary of Defense. The office utilizes OTAs to enter into agreements with industry. The office solicits through an online portal known as the Commercial Solutions Opening (CSO) and then, with the assistance of the Army Contracting Command-New Jersey (ACC-NJ), awards OTAs to prototype commercial technology. Figure 4 below, illustrates the CSO process. DIUx uses commercial contracting practices with a target completion period of 60 days or less (GAO, 2017).

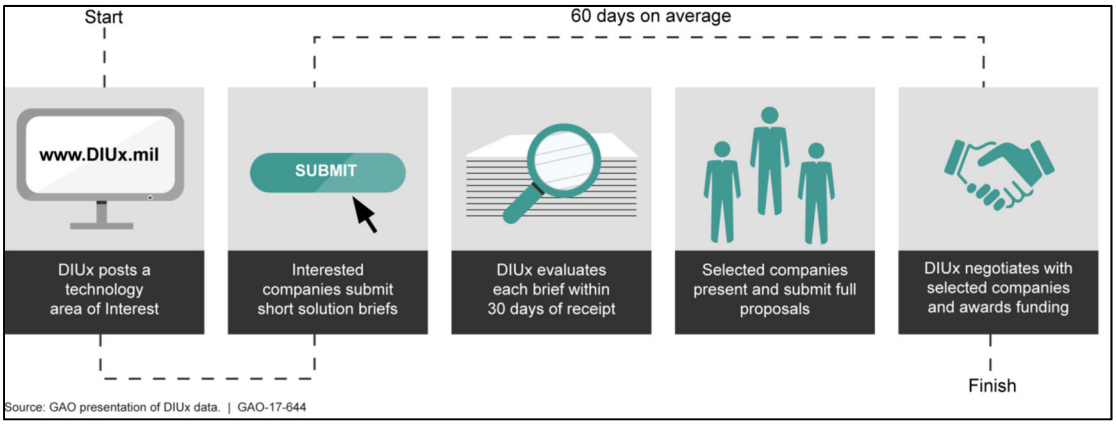


Figure 4. Depiction of the DIUx CSO Process to Award OTAs (GAO, 2017, p. 28)

The CSO process is as follows:

> "DIUx posting technology areas of interest on its website. Interested companies submit a short briefing online describing the proposed technology and information about the company. DIUx evaluates the briefs and if DIUx is interested in learning more, it may invite companies to pitch their products in person and then submit a full proposal. After a merit-based evaluation, DIUx

> officials select proposals to pursue and negotiate the terms and conditions of proposed projects, and, through the Army Contracting Command-New Jersey, awards OTAs. (GAO, 2017, p. 28)

DOD Documents and Testimony

Ellen M. Lord, USD(A&S) Testimony Statement to the Senate Armed Services Committee

In December 2017, the Under Secretary of Defense (Acquisition and Sustainment), Ellen Lord, informed Congress: "…the current pace at which we develop advanced capability is being eclipsed by those nations that pose the greatest threat to security, seriously eroding our measure of overmatch" (Lord, 2017, p. 2). Lord also stated,

> "At the same time, however, Congress has provided broad authorities and tools to expand our sources of supply beyond the traditional defense industrial base to leverage the innovation and competitive potential offered by commercial technologies and small businesses. Though we are yet in the early stages of implementing the range of tools provided for this purpose, I am committed to accelerating their practice throughout the Department and will keep the Committee apprised of our progress with these important initiatives." (Lord, 2017, p. 5)

DOD "Other Transactions" (OT) Guide for Prototype Projects

The 2001 DOD OT guide for Prototype projects states, "This acquisition authority**,** when used selectively, is a vital tool that will help the Department achieve the civil and military integration that is critical to reducing the cost of defense weapon systems" (Under Secretary of Defense for Acquistion, Technology, and Logistics, 2001, p. 8). The document further discusses cost

sharing between federal and non-federal entities and states that the DD2759 and DOD's annual report to Congress will delineate both the federal and non-federal funding amounts. Furthermore, if the OTA is justified by cost sharing, vice participation by a non-traditional defense contractor, a minimum of one-third of the total cost of the project must be from non-federal sources. Additionally, OTA users are encouraged to define and track other metrics that capture the cost, schedule, performance and supportability benefits attributable to the use of the OTA (Under Secretary of Defense for Acquistion, Technology, and Logistics, 2001). The guide also addresses recovery of funds from industry. "The intent of the authority to recover and reinvest funds is to provide the Federal government an opportunity to recoup some or all of its investment when government funds were used to develop products that have applications outside the government" (Under Secretary of Defense for Acquistion, Technology, and Logistics, 2001, p. 22).

DOD Report to Congress: An Assessment of Cost-Sharing in Other Transactions Agreements for Prototype Projects

In this 2017 Report to congress, DOD stated that "cost-sharing as a condition for appropriate use of OT authority only applies to four agencies. When the condition applies, its application is limited to R&D and prototype projects, all of which occur early in the technology development process" (Under Secretary of Defense for Acquistion, Logistics, and Technology, 2017, p. 4).

Additionally, DOD's awards OTAs for R&D projects as technology investment agreements (TIA). TIAs require at least half the cost of a project be funded from non-federal sources, unless DOD makes a determination that this is unfeasible This cost sharing ensures that the recipient has a vested interest in the project's realization . (Under Secretary of Defense for Acquistion, Logistics, and Technology, 2017).

Prototype OTA projects require at least a third cost-share, unless other conditions are met. "This structure creates a dynamic that affects how entities interact with each other before bidding on a prototype project. In some situations, this may mean that an entity's participation can depend on tradeoffs made to satisfy a statutory condition" (Under Secretary of Defense for Acquistion, Logistics, and Technology, 2017, p. 4).

OTA Cost sharing is where funds provided by organizations other than the Federal Government partially pay the cost of the project. "Payments can be in cash or non-cash form as long as cost payments are appropriate and reliably accounted for by the non-federal organization. These contributions may include labor, materials, equipment, and facilities costs, as well as independent R&D" (Under Secretary of Defense for Acquistion, Logistics, and Technology, 2017, p. 8).

Academic Reports

Using "Other Transactions" as an effective R&D Contractual Vehicle, by Robert E Howell

In this 1997 Naval Postgraduate School (NPS) thesis, Howell purports that OTA "cost sharing can be regarded as a test of commitment on the part of industry participants. Companies that envision future markets in a technology development will be willing to invest their capital jointly with the Government" (Howell, 1997, p. 55). This inspires OTA members to put forth their greatest efforts in the project and its objectives as they hope to realize future profits. This allows gaining the benefit of R&D at half-price while it simultaneously provides the motivation needed for reducing overall costs. (Howell, 1997, p. 55). Howell further states "This is an OT feature is particularly attractive, especially in a period of declining budgets" (Howell, 1997, p. 55).

Later in this report, Howell discusses the Arsenal Ship OTA. He highlights a significant outcome of the OTA regarding the vertical launch systems (VLS). The OTA partners were

designing both the hull structure as well as the weapon systems for Arsenal Ship. New VLS designs resulted which opened a market previously controlled by Lockheed-Martin (Howell, 1997). “As a result, a 40% decrease in price of the Mark-41 was achieved in addition to reductions in life cycle costs for VLS. This created the possibility for incorporating these lower cost items on future Navy ships” (Howell, 1997, p. 63).

Howell states, OTAs are a beneficial acquisition instrument for R&D projects as they “significantly reduce the cycle time that is traditionally associated with weapon system development … reduction in the time cycle … is conducive to cost savings in the overall project” (Howell, 1997, pp. 66-67). Additionally, Howell does propose analysis be done to determine “How has the role of the Government as a partner versus an oversight administrator increased productivity and reduced the overall costs of an R&D effort when using an OT as the contractual mechanism as opposed to a standard contract” (Howell, 1997, p. 69).

Decision Model for Using Other Transactions at DOD Buying Commands by William P. Hayes

This 1998 NPS thesis on using OTAs addresses, among other things, concerns regarding DOD operating in an ecosystem characterized by a decreasing or uniform defense budget, unknown antagonists, and fast technological advancements. In order to function successfully in such an ecosystem Hayes asserts, “DoD must recognize the changes and adapt to them. The source for technical innovation is the commercial sector. To maintain technical superiority over its potential adversaries and do it affordably, DoD must find access into the commercial industrial base” (Hayes, 1998, p. 29). Hayes further expands by saying, “The use of OTs provides one solution into the commercial industrial base. Congress established OTA to provide DARPA and the

Services maximum flexibility to pursue research and development efforts with commercial industry without the traditional Government contracting rules and regulations (Hayes, 1998, p. 30). With this autonomy, the Government has been able to guide for-profit prototype and R&D endeavors into dual-use technologies, which provides the warfighter better performance at diminished cost. Hayes' (1998) research indicated the greatest common reason for using OTAs was that it was a beneficial business decision; with 63% of respondents citing this reason (Hayes, 1998). Hayes' further states, "There is no simple formula for determining a good business decision …. the determination relies heavily on the judgment of decision-makers. Decision-makers must identify and understand their objectives; identify and evaluate alternatives to achieve their objectives and select the best" (Hayes, 1998, p. 60) In the DOD, a beneficial business decision studies what the customer desires and picks the best, or most suitable mechanism to achieve that objective. The use of OTAs allows DOD increased flexibility to apply discernment in structuring a business arrangement (Hayes, 1998, pp. 56-60). When discussing cost sharing, Hayes states, "Firms have to use their own capital toward the project to demonstrate their commitment to the success of the project" (Hayes, 1998, p. 75).

Injecting New Ideas and New Approaches in Defense Systems: Are 'Other Transactions' an Answer? By Richard L. Dunn

In the proceedings of the NPS annual Acquisition Research Program May 13-14 2009, Dunn references an Arsenal Ship Lessons Learned report and states the OTA "process being followed by Arsenal Ship demonstrated a 50% reduction in acquisition time for the design portion of the ship compared to the traditional approach" (Dunn, 2009, p. 36). Dunn (2009) also proposed that

the Arsenal Ship program transformed the way the Navy thinks about warship development and design. Dunn (2009) also discussed how the program "left many other legacies, including a more affordable and more capable Mark 41 Vertical Launch System (Dunn, 2009, p. 37). Dunn also references the OTA project Joint Unmanned Combat Air Systems (JUCAS), which achieved cost reductions with Boeing investing $300M, and by reducing material rates, eliminating G&A expenses, cost of money, and profit, and reducing labor rates by approximately 15%. Additional unquantified cost savings were due to streamlining management and change order processes, which resulted in a year plus schedule reduction (Dunn, 2009).

Dunn referenced a Logistics Management Institute (LMI) study where almost 75% of respondents credited cost reductions to the use of OTAs. The primary causes provided for reduced cost were: "tradeoffs allowed better use of available funds … shortened cycle-times reduced overall cost … fewer non-value added activities … and the use of cost sharing" (Dunn, 2009, p. 43).

In his conclusions, Dunn states "OTs have demonstrated that they can be a better, faster, cheaper way to conduct defense research, development and prototype projects compared to using procurement contracts" (Dunn, 2009, p. 46). Dunn further elaborates that OTs are suitable as an alternate methodology for many of the DOD's science, technology and prototype projects, and are more than a niche authority. He further states that OTAs "have demonstrated outstanding utility and benefit to DOD projects in basic, applied and advanced research; prototype projects relevant to weapons and weapons systems and, in distinctively innovative transactions" (Dunn, 2009, p. 46)

Analysis of Other Transaction Agreements to Acquire Innovative Renewable Energy Solutions for the Department of the Navy by Ryan Tobin, Josh Millner, and Casey Gillette

This 2016 professional report published by the Naval Post Graduate School asserts:

> "Defense acquisition reform" is a catchphrase among congressional leaders, acquisition officials, and senior military officers. Acquisition reform is not a new phenomenon. In fact, a history of defense acquisition reform efforts, from former Secretary of Defense Melvin Laird's Blue Ribbon Defense Panel in 1969 to Secretary of Defense Ash Carter's Defense Innovation Advisory Board in 2016, suggests a continuous effort to ensure that U.S. armed forces operate with best-in-class technology." (Tobin, Milner, & Gillette, 2016, p. 1).

The report further expands that through the Army Contracting Command–New Jersey (ACC-NJ), DIUx has the ability to award R&D efforts using other transaction authorities (OTAs) as the principal mechanism of business arrangement. In order to accomplish the mission, DIUx transitioned to using the Commercial Solutions Opening (CSO) in June 2016. Superior flexibility includes the time it takes to award a contract. By using its innovative CSO approach, DIUx has significantly reduced its award timeline (Tobin, Milner, & Gillette, 2016). DIUx Pathways Director Lauren Schmidt described the innovative CSO process by stating, "The CSO has changed the way the department does business. The process is much faster" (Tobin, Milner, & Gillette, 2016, p. 42).

Tobin, Et al. stated the following as one of the findings in their research, "OT agreements offer a more efficient and effective means of acquiring innovative renewable energy solutions" (Tobin, Milner, & Gillette, 2016, p. 53). Figure 5 shows OTA Notional Operating Procedures.

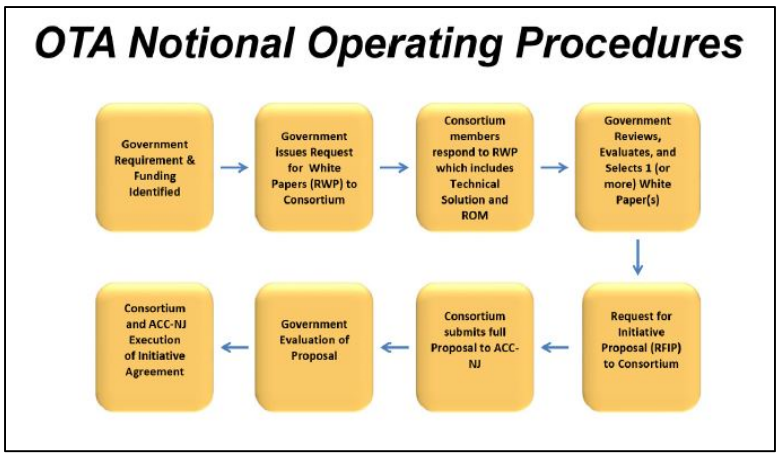


Figure 5. ACC-NJ OTA Notional Operating Procedures (Tobin, Et al, 2016, p. 21)

An Analysis of The DOD's Use of Other Transaction Authority (10 U.S.C. 2371) by Catherine L. Stevens

In this 2016 NPS Joint Applied Project report, Stevens states, "Upon examination of Section 10 of U.S.C. 2371, one will not find an affirmative definition of OTs. Rather, OTs are generally defined by what they are not" (Stevens, 2016, p. 1). Stevens also discusses that OTAs are "exempt from many of the traditional procurement laws and regulations, thus becoming an attractive arrangement for commercial entities previously not inclined to do business with the Government (Stevens, 2016, p. 3). Stevens (2016) elaborates that "Commercial firms are wary of working with the federal government for a host of reasons … guarding intellectual property, the requirement to comply with regulations such as the FAR and DFARS … FAR Part 31 and cost accounting standards" (Stevens, 2016, pp. 11-12). Stevens (2016) further asserts, "there are hundreds of clauses … the quantity and kind depend upon an assortment of factors. There are different clauses for commercial versus non-commercial contracts … nuances in clause selection dependent upon dollar value and contract type" (Stevens, 2016, p. 16). Stevens further elaborates

that over years the creation of a superfluity of clauses resulted in extreme complexity. "Having to adhere to the Government's cost accounting standards is a real concern for many companies … OT authority has provided a means to address this concern with many companies being allowed to adhere to Generally Accepted Accounting Principles (GAAP)" (Stevens, 2016, p. 15).

Organized for Innovation: An Empirical Observation of Innovation Adoption within Defense Organizations by Christopher A. Lynn

In this 2018 NPS professional project report on Innovation, Lynn states:

> "Educating future military leaders to better understand the nature of innovation (as well as to become innovative in their thinking) is essential for our military organizations to be able to continue to adapt in the future. Continuously integrating the topic of innovation within military education as well as recognizing those who lead with innovation may help improve its application" (Lynn, 2018, p. 6)

While further discussing innovation in DOD, Lynn states, "An organization's environment and operational context will naturally influence the various decisions and behaviors affecting its means and rate of innovation adoption. Military institutions face unique challenges which can be specifically attributed to its operational context and environment" (Lynn, 2018, p. 8)

Lynn observes that after almost 60 years after the introduction of Other Transactions, the DOD continued the search for innovative and new methods to gain access to commercial technologies by establishing the Defense Innovation Unit Experimental (DIUx). In keeping with its intent, DIUx began the undertaking to foster credibility and formulate new relationships within a global start-up hub. By the end of June 2016, the newly formed team administered the

development of a new business method that would leverage its granted authority to create imaginative agreements with likely companies. The CSO, principally created by DIUx's Pathways team, was a sleek and user-friendly mechanism for the DOD to become an investor in innovative and promising technologies. The CSO provided a business understanding that was both recognizable and well suited to the start-up community of Silicon Valley. Twelve CSO agreements had been reached by the end of the first year. The CSO, authored by the DIUx Pathways team, is DIUx's business process used to deliver innovation technologies to meet mission-critical needs of DOD's warfighters (Lynn, 2018).

Other Transaction Agreements for Basic, Applied and Advanced Research in the DOD by Byron K Manley

In his 2018 DAU SSCF report, Manley provided Table 2 below from the Director, Defense Pricing/Defense Procurement and Acquisition Policy website, which describes briefly the statutory changes to Other Transactions between 1958- 2015. Manley further stated, "Many of these changes are identified in the National Defense Authorization Act over the years" (Manley, 2018, p. 20).

Year	Congressional Authorization
1958	OTA authority originated with the passage of the National Aeronautics and Space Act
1989	OTA authority is codified for Defense Advanced Research Project Agency (DARPA)
1993	Sec 845 of NDAA FY94 expands DARPA's authority to include "prototyping"
1996	Sec. 804 of NDAA FY97 authorizes OTAs for others in DoD
1997	Sec 832 of NDAA FY98 added subsection (i) for protection from information disclosure

2000	Sec 803 of NDAA FY01 introduces cost-sharing and nontraditional defense contractors
2001	Sec 822 of NDAA FY02 created follow-on production authority
2002	"Nontraditional defense contractor" is defined in NDAA FY03
2003	NDAA for FY04 removes requirement for submitting annual reports to Congress after FY 2006
2008	Sec 823 of NDAA FY08 extends DoD's OT authority through September 30, 2013
2013	Sec 863 of NDAA FY13 extends DoD's OT to September 30, 2018
2014	Sec 812 of NDAA FY15 broadens scope and exempts small business from cost sharing
2015	Sec 815 of NDAA FY16 codifies 10 U.S.C. 2371b and rescinds authority under Sec 845

Table 2. Statutory Changes to DOD's Other Transaction Authorities (Manley, 2018, pp. 20-21)

Manley further states that OTAs "promote innovation, streamline acquisition timelines and increase access to the commercial market place. The Department of Defense has not utilized the OTAs to the full potential primarily because there is a lack of understanding of the authority" (Manley, 2018, pp. 44-45).

Other Published Items

AN OVERVIEW OF INNOVATION by Stephen J. Kline and Nathan Rosenberg

In this 1986 paper, Kline and Rosenberg wrote:

> "Commercial innovation is controlled by two distinct sets of forces that interact with one another in subtle and unpredictable ways. On the one hand are market forces … (that) produce continual changes in commercial opportunities for specific categories of

> innovation. On the other hand, the forces of progress at the technological and scientific frontiers often suggest possibilities for fashioning new products, or improving the performance of old ones, or producing those products at lower cost. Successful outcomes in innovation thus require the running of two gauntlets: the commercial and the technological. Since innovation, by definition, involves the creation and marketing of the new, these gauntlets, singly and in combination, make the outcome of innovation a highly uncertain process. Thus, an important and useful way to consider the process of innovation is as an exercise in the management and reduction of uncertainty." (Kline & Rosenberg, 1986, p. 275)

Kline and Rosenberg then discuss the cost variable as it relates to innovation by saying:

> "If one were indifferent to cost considerations … one could devise a large number of technically feasible alternatives … but technical success (or any purely mechanical measure of performance) is only a necessary and not a sufficient condition in establishing economic usefulness. Indeed, it is obvious from a casual examination of the proceedings in our bankruptcy courts that an excessive or exclusive preoccupation with purely technical measures of performance can be disastrous." (Kline & Rosenberg, 1986, p. 276)

Kline and Rosenberg postulate that for innovation to be successful "requires a design that balances the requirements of the new product and its manufacturing processes, the market needs, and the need to maintain an organization that can continue to support all these activities effectively" (Kline & Rosenberg, 1986, p. 277). They further state for innovation to have a significant impact:

> "it must combine design characteristics that will match closely with the needs and tastes of eventual users, and it must accomplish these things subject to basic constraints on cost (and frequently other, legally mandated requirements). Commercial success turns on the attainment either of cost levels that are below available substitutes or creation of a superior product at a cost that is at least not prohibitively expensive in comparison with lower-performance substitutes. Higher performance is commonly attainable at a higher price. However, to choose the optimal combination of price and performance at which a firm should aim calls for considerable knowledge of market conditions, as well as a high order of business judgment in making decisions with respect to timing. Success demands not only selecting the right cost and performance combination, but also judging just when the timing is right for the product's introduction." (Kline & Rosenberg, 1986, p. 277)

Kline and Rosenberg make a formidable statement regarding innovation when they state, "The operating systems of concern in innovation are not purely technical in nature; they are rather strongly intertwined combinations of the social and the technical—"sociotechnical systems" is a useful descriptor and a useful way to think about such institutions. (Kline & Rosenberg, 1986, p. 278)"

Kline and Rosenberg assert that considering innovation as a precise homogeneous event, which became obtainable at a specific point in time is a serious mistake. While that notion may be encouraged by the Patent Office,

> "inventions as economic entities are very different from inventions as legal entities. The fact is that most important innovations go through rather drastic changes over their lifetimes—changes that may, and often do, totally transform their economic significance.

> The subsequent improvements in an invention after its first introduction may be vastly more important, economically, than the initial availability of the invention in its original form. (Kline & Rosenberg, 1986, p. 283).

In the conclusion of their report, Kline and Rosenberg state:

> "In the early stages of a product's life cycle, major changes in product design are occurring rapidly, and the key problem of management is to find dominant successful designs and to organize stable production and marketing around them. In the later stages of the product's life cycle, innovations typically are more concerned with process changes that reduce production costs." (Kline & Rosenberg, 1986, p. 303)

The Federal Acquisition Reform Act of 1994

This Defense Institute of Security Assistance Management (DISAMS) Journal article by Charles Barry discusses the Federal Acquisition Streamlining Act (FASA) of 1994, signed by President Clinton on October 13, 1994. In the article, Barry states, The FASA:

> "represents the culmination of four years of cooperative bipartisan activity. It includes the Section 800 Panel review of over 600 procurement-related laws, the adoption of many of the panel's recommendations by the Office of Federal Procurement Policy (OFPP), the President and Vice President, the DOD, the defense industry, and the six committees in Congress that reviewed and refined the legislation. . . . The need to reduce the enormous cost of government procurement, especially as incurred by contractors carrying an inordinate amount of government-induced overhead costs, has been well documented by

> two recent studies. These overhead and regulatory cost studies underscore the need for major procurement reform." (Barry, 1995, p. 124)

Barry goes on to detail two 1994 studies that suggest the DOD unique requirements add 18 to 20% to the cost to DOD contracts. The first is a US Army Material Command sponsored study conducted by the CPA firm Klynveld Peat Marwick Goerdeler (KPMG) and titled "Activity Based Cost Management Study of DOD-Unique Requirements" which found DOD unique requirements add approximately 20% to government contracts. The second was the Coopers & Lybrand \ TASC study discussed previously. Throughout the article, the additional cost of DOD unique requirements is described with various terms. They include: overhead and regulatory cost, DOD regulatory cost premium, compliance costs, government-induced overhead costs, and regulatory compliance and overhead costs just to name a few (Barry, 1995).

Carter opens DIUx-Boston and reveals latest tech sector outreach efforts by Tony Bertuca

This 2016 *Inside Defense* online news article by Tony Bertuca, covers the opening ceremony for DIUx in Boston, where Secretary of Defense Ash Carter mapped out the organization's new configuration and its latest projects. During his presentation Secretary Carter said,

> "The most important metric (for DIUx) will be how much new technology is delivered into the hands of our troops," Carter further stated, "I created DIUx last year because one of my core goals as secretary of defense has been to build, and in some cases rebuild, bridges between our national security endeavor at the Pentagon, and America's wonderfully innovative and open technology community." (Bertuca, 2016, p. 1)

DIUx Releases Guide for Faster, Less-Costly Technology Acquisition by Rick Docksai

This 2016 DOD press release by Rick Docksai states, “Bringing vital technology innovations from commercial developers to fighting forces more quickly is a challenge that the Defense Department’s Defense Innovation Unit Experimental, or DIUx, has been working to solve since its inception” (Docksai, 2019, p. 1). To that end, DIUx released its Commercial Solutions Opening guidebook “describing how other federal agencies can create “innovative contracting vehicles” to bring technological innovations to practical use in less time and at lower cost (Docksai, 2019, p. 1). Docksai quotes DIUx pathways director Lauren Schmidt saying, “We have to be able to change our business practices in order to be able to access these phenomenal technologies” (Docksai, 2019, p. 2) The CSO process allows DIUx to solicit private-sector developers who are creating relevant new technology products and services that stand to benefit U.S. military operations. DIUx receives developers’ proposals, awards “Other Transactions,” … and fast-tracks prototypes … to defense units or departments that will deploy them (Docksai, 2019, p. 2) Docksai further quotes pathways director Schmidt saying, “Not only do we get a better outcome and better project, but it also saves a lot of time and money. We’ve demonstrated through the CSO that DOD can move at the speed of business and be attractive to these companies.” (Docksai, 2019, p. 2)

Later in the article, Docksai again quotes Schmidt on why DIUx was making this information available, “so that others can hopefully build on our success with the CSO and really help to build the acquisitions process. We’re hoping that by spreading this across the department, that we can really drive innovation throughout DOD” (Docksai, 2019, p. 3).

Speed Contracting by Michael Bold

In this 2016 Army AT&L Magazine article, Bold states DIUx with help from Army Contracting Command – New Jersey (ACC-NJ) came up with the CSO as a way to get DOD up to Silicon Valley's "Speed of Business." DIUx's CSO is a mechanism that allows for the rapid award of other transaction agreements (OTAs). Bold quotes DIUx Pathways Director Lauren Schmidt saying, "The time from when a Silicon Valley entrepreneur with a promising company or technology first responds to a DIUx proposal to when a contract is signed has averaged 59 days and the fastest contact-to-contract was 31 days" (Bold, 2016, p. 2). Schmidt was formerly the Special Assistant to the Principal Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology. Schmidt stated:

> "Our goal from DIUx is that more organizations in DOD can use this type of authority and design particular processes that meet their particular needs. It doesn't have to be exactly the way that we did the CSO. There's lots of ways you can design a process so it meets the needs of your particular organization." (Bold, 2016, p. 2)

Later in his article, Bold quotes Paul Milenkowic, ACC-NJ executive director saying:

> "Flexibility is the key to the CSO's speed. OTAs have greater flexibility than the FAR, the FAR is going to define steps and timeframes—a lot of them are dictated by the regulation. With that flexibility in the commercial solutions opening, we have created efficiencies in the process that we would not otherwise have the ability to do under the FAR. … The FAR is more rules-oriented versus the other transaction authority."

Milenkowic also emphasized that moving quickly does not mean being sloppy, "We're not doing speed at the expense of quality. …We have a mature staff here that we've developed … there's a higher level of engagement, communication and interaction required and one has to feel comfortable taking this additional responsibility on" (Bold, 2016, p. 3).

Data check: U.S. government share of basic research funding falls below 50% by Jeffrey Mervis

In this 9 March 2017 ScienceMag.org article, Mervis discusses the downward trend in the percentage of basic research in the USA funded by the federal government. He points out that federal government funded basic research fell below 50% in 2013, and continued to decline to 44% in 2015. He contrasts this with historical data where federal spending on basic research topped 70% in the 1960s and '70s, and was 61% in 2004. Mervis credits the quick decrease in recent years as the result of two distinct trends, "a flattening of federal spending on basic research over the past decade and a significant rise in corporate funding of fundamental science since 2012" (Mervis, 2017, p. 1). Figure 6 below shows a comparison of funding for basic science for the 40-year period from 1975 to 2015.

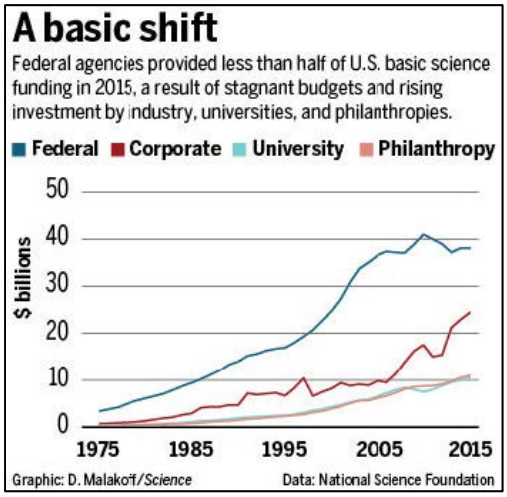


Figure 6. Comparison of Basic Science Funding (1975 - 2015) (Mervis, 2017, p. 3)

DOD Seeks Streamlined Procurements of Innovative Technologies – Other Transaction Agreements and the Commercial Solutions Opening Pilot Program

In this online news article, Cassidy, Plitsch, and Evans (2018) opine, "The Department of Defense (DoD) has once again emphasized its willingness to engage with commercial companies and other non-traditional contractors to try to expedite and simplify its procurement of innovative technologies" (Cassidy, Plitsch, & Evans, 2018, p. 1). They go on to further state, "the continued promotion of OTA agreements by DoD's Defense Innovation Unit Experimental organization (DIUx), provide commercial companies with additional incentives to enter into creative collaborations with the U.S. Government" (Cassidy, Plitsch, & Evans, 2018, p. 1).

"Section 879 of the National Defense Authorization Act for Fiscal Year 2017 represents another congressional push for DOD to use non-traditional process to pursue cutting-edge technologies" (Cassidy, Plitsch, & Evans, 2018, p. 3). In response to Section 879:

> "DOD issued a class deviation for a pilot program that allows contracting officers to use a simplified CSO process for standard procurement contracts to acquire innovative commercial items, technologies or services. The deviation permits DOD components to award traditional procurement contracts through a peer-reviewed process deemed competitive without head-to-head competition between proposals." (Cassidy, Plitsch, & Evans, 2018, p. 3)

Cassidy et al. state, "Much like the (DIUx) CSO process… the pilot program allows DoD contracting officers to select proposals received in response to a general solicitation that is similar to a broad agency announcement without being limited to basic or applied research projects (Cassidy, Plitsch, & Evans, 2018, p. 3). Cassidy et al. further elaborate that instead of

being limited, “eligible projects only need to be innovative, covering completely new technologies, processes, or methods—including research and development—in addition to new applications of technologies, processes, or methods that are already in existence (Cassidy, Plitsch, & Evans, 2018, pp. 3-4).” The authority given by this pilot program will terminate at the end of Fiscal Year 2022, although contracts in progress will endure until concluded (Cassidy, Plitsch, & Evans, 2018).

Analysis & Findings

This section of the report provides a summary of the analysis and findings based on the research done with the literary review.

Finding 1. FAR based contracts have a definable DOD unique cost burden

In 1994, two independent studies showed DOD unique requirements add 18 to 20% cost to DOD Contracts. Throughout the literature review, various terms described this cost burden. They include: direct compliance costs of DOD regulatory environment, costs of compliance and oversight, cost of regulatory compliance, DOD cost premium, cost impact of DOD acquisition regulations and oversight, cost impact of the regulatory environment (Coopers and Lybrand \ TASC, 1994), overhead and regulatory cost, DOD regulatory cost premium, compliance costs, government-induced overhead costs, and regulatory compliance and overhead costs (Barry, 1995) just to name a few. This cost burden is attributable to requirements in the Federal Acquisition Regulation. (Barry, 1995)

Finding 2. Acquisition Reform has been needed \ sought for decades

Politicians, acquisition officials, and senior military officers have used the phrase "Defense Acquisition Reform" for many years (Tobin, Milner, & Gillette, 2016). From the 1959 Peck and Scherer Weapons Acquisition Process study, to the 1969 Blue Ribbon Defense Panel, to the 1986 Packard Commission, to the 2019 Section 908 panel, 60 years of studies and panels have all said the Defense Acquisition System needs to be reformed.

Finding 3. OTAs allow Innovative R&D, Rapid Prototyping, and Limited Production

The OTA process is one of the most powerful acquisition reforms to date. OTAs are providing improved access to commercial technologies and a rapid prototyping capability. Congress has expanded DOD' OT authority from Research and Development, to Prototyping, and recently to limited production.

Finding 4. OTAs used for Innovation for Decades – Better than FAR

Beginning with NASA in 1958 and continuing for over 60 years, the Federal Government has been using OTAs to infuse cutting-edge innovative technologies into programs. Even the recent Section 809 panel discusses the advantages of OTAs relating to innovation and the highly flexible nature of OTA agreements. Both the 2017 NSS and the 2018 NDS recognize the need to increase innovation. Kline and Rosenberg (1986) discuss the uncertainty associated with innovation and state that innovation is as an exercise in the management and reduction of uncertainty. Furthermore, "Educating future military leaders to better understand the nature of innovation (as well as to become innovative in their thinking) is essential for our military organizations to be able to continue to adapt in the future." (Lynn, 2018, p. 6) From the space program of the 1960s to the advanced technologies developed at DARPA, OTAs have successfully increased innovation in federally managed acquisition programs.

Finding 5. DIU Demonstrated Successful OTA Implementation with CSO – Faster

Through their CSO OTA, the Defense Innovation Unit has demonstrated OTAs are faster than FAR based contracts. In a 2017 report, GAO commented on DIU mirroring commercial contracting practices to achieve a 60-day award goal.

Finding 6. OTAs are cheaper than FAR based contacts due to reduced costs

A study conducted by the RAND Corporation drew the conclusion that in comparison to FAR based contracts, OTAs provide better value through cost sharing and reduction of transaction costs results in more effort devoted to the product and less to the process. (Smith, Drezner, & Lachow, 2002) Similarly, a 2011 Congressional Research Service report concludes that OTAs have an increased value through cost sharing and reduction of transaction costs, and a 1994 GAO report states OTA provide DOD a tool to leverage Private sector's financial investment and partially offset its own cost by sharing cost of projects. In 2001, DOD published a guide for OTAs for Prototype projects that stated OTAs are a vital tool that is critical to reducing cost of defense weapon systems. Howell (1997) purported that cost sharing in OTAs is a measure of commitment of industry participants. Similarly, "Firms have to use their own capital toward the project to demonstrate their commitment to the success of the project" (Hayes, 1998, p. 75). Tobin et al, conclude OT agreements offer a more efficient and effective mechanism for acquiring innovation.

Finding 7: Qualitative Data Shows OTAs reduce costs, limited Quantitative Data available

While there is little dispute OTAs reduce DOD costs there is very limited quantitative data to determine the magnitude of this cost avoidance or to determine its predictability. Howell (1997) references a 40% decrease in price of the MK-41 due to an OTA for Arsenal Ship. Howell also references a significant reduction in time in the design phase, which he also equates to an undetermined cost savings. Similarly Dunn (2009) cites a 50% reduction in Design Time on Arsenal Ship, as well as, a $300M Boeing Investment, and a 15% Labor \ Material reduction on the Joint Unmanned Combat Air Systems (JUCAS), as well as unquantified cost savings due to streamlined management of the change order process. Dunn also referenced a LMI Study where 75% of respondents attributed cost reductions to utilization of OTAs.

Conclusions & Recommendations

Conclusions

This research has determined that DOD Acquisition Reform initiatives have a 60-year history. Most if not all of the studies having common themes around reducing cost, increasing speed and improving innovation. Prior research has shown there is an 18-20% cost burden in FAR based contracting. Since they are not subject to the FAR, OTA's can eliminate or minimize this Bureaucratic and Administrative Cost (BAC) burden.

This research has also shown that innovation deals with high levels of complex uncertainty. The prescriptive nature of FAR based contracts is not conducive to managing that level of uncertainty, but the flexibility inherent in OTAs has proven successful in producing innovation.

This research has also shown when compared to FAR based contracts, OTA's: provide innovative solutions (Better), are quicker to award and execute (Faster), and reduce DOD Cost through cost sharing and reduced BAC burden (Cheaper). This re-affirms Dunn's (2009) conclusion that OTAs can be a "better, faster, and cheaper" way to administer Defense research, development and prototyping activities.

This research has also determined that limited quantitative data exists regarding the cost savings associated with OTAs vice FAR contracts, and due to the limited data available, it is not possible to determine if there is a predictable cost impact when using OTAs.

Recommendations

Recommendation 1: OSD should commission a formal study to collect or generate quantitative cost data and comparisons for OTA vs FAR in order to better understand the predictability of the cost differential. This data, if better understood, could assist decision makers in budgeting for and utilizing OTAs.

Recommendation 2: Expand OT Authorities to include full production for High Priority programs. Note this recommendation is congruent with Recommendation 81 from the Section 909 Panel.

Recommendation 3: Commission a study to determine what other areas of Defense Acquisition would be appropriate for Other Transactions and request Congress grant those additional authorities to DOD.

Recommendation 4: Increase Military and Civilian Acquisition Education in the science of innovation and in creative thinking to enable future innovation efforts.

REFERENCES

Barry, C. B. (1995, Spring). The Federal Acquisition Reform Act of 1994. *The DISAMS Journal, 17*(Spring), 124-130.

Bertuca, T. (2016, July 26). *Carter Opens DIUx Boston and Reveals Latest Tech Sector Outreach Efforts*. Retrieved 3 21, 2019, from Inside Defense: https://insidedefense.com/daily-news/carter-opens-diux-boston-and-reveals-latest-tech-sector-outreach-efforts

Blue Ribbon Defense Panel. (1970). *Report to The President and The Secretary of Defense on The Department of Defense.* Washington DC: Department of Defense.

Bold, M. (2016, December 1). *Speed Contracting.* Retrieved 3 2019, from Army ALT Magazine, Contracting: https://asc.army.mil/web/news-alt-jfm17-speed-contracting/

Cassidy, S. B., Plitsch, J., & Evans, T. (2018, 7 3). *DoD Seeks Streamlined Procurements of Innovative Technologies – Other Transaction Agreements and the Commercial Solutions Opening Pilot Program.* Retrieved 3 2019, from National Law Review: https://www.natlawreview.com/article/dod-seeks-streamlined-procurements-innovative-technologies-other-transaction

Coopers and Lybrand \ TASC. (1994). *The DOD Regulatory Cost Premium: A Quantitative Assessment.* DTIC.

Docksai, R. (2019, November 30). *DIUx Releases Guide for Faster Less Costly Technology Acquisition.* Retrieved 3 2019, from DoD News, Defense Media Activity:

https://dod.defense.gov/News/Article/Article/1016994/diux-releases-guide-for-faster-less-costly-technology-acquisition/

Dunn, R. L. (2009). Injecting New Ideas and New Approaches in Defense Systems: Are 'Other Transactions' an Answer? *Annual Acquisition Research Program.* Monterey, CA: Naval Post Graduate School.

GAO. (1996). *Acquiring Research by Nontraditional Means.* Washington DC: Government Accountability Office.

GAO. (2016). *Use of 'Other Transaction' Agreements Limited and Mostly for Research and Development Activities GAO-16-209.* Washington DC: Government Accountability Office.

GAO. (2017). *DOD Is Taking Steps to Address Challenges Faced by Certain Companies GAO-17-644.* Washington DC: Government Accountability Office.

Halchin, L. E. (2011). *Other Transaction (OT) Authorities.* Washington DC: Congressional Research Service.

Hayes, W. P. (1998). *DECISION MODEL FOR USING OTHERTRANSACTIONS AT DOD BUYING COMMANDS.* Monterey, CA: Naval Post Graduate School.

Howell, R. E. (1997). *USING "OTHER TRANSACTIONS" AS AN EFFECTIVE R&D CONTRACTUAL VEHICLE.* Monterey, CA: Naval Post Graduate School.

Kline, S. J., & Rosenberg, N. (1986). *AN OVERVIEW OF INNOVATION in The Positive Sum Strategy: Harnessing Technology for Economic Growth.* Washington DC: National Research Council THE NATIONAL ACADEMIES PRESS.

Lord, E. M. (2017, 12 7). *Testimony Statement before the Armed Services Committee of the United States Senate.* Retrieved from Armed Services Committe United States Senate: https://www.armed-services.senate.gov/imo/media/doc/Lord_12-07-17.pdf

Lynn, C. A. (2018). *ORGANIZED FOR INNOVATION: AN EMPIRICAL OBSERVATION OF INNOVATION ADOPTION WITHIN DEFENSE ORGANIZATIONS.* Monterey, CA: Naval Postgraduate School.

Manley, B. K. (2018). *Other Transaction Agreements for Basic, Applied and Advanced Research in the Department of Defense.* Huntsville, AL: Defense Acquisition University.

McNicol, D. L. (2018). *Acquisition Policy, Cost Growth, and Cancellations of Major Defense Acquisition Programs.* Alexandria VA: Institute for Defense Analysis.

Mervis, J. (2017, 3 9). *Data Check US Government Share of Basic Research Funding Falls Below 50%.* Retrieved 3 2019, from ScienceMag.org: https://www.sciencemag.org/news/2017/03/data-check-us-government-share-basic-research-funding-falls-below-50

National Defense Strategy. (2018). *2018 National Defense Strategy.* Washington DC: US Government.

National Security Strategy. (2017). *National Security Strategy.* Washington DC: US Government.

Packard Commision. (1986). *A Quest for Excellence Final Report to the President by the President's Blue Ribbon Commission on Defense Management.* Washington DC: US Government.

Peck, M. J., & Scherer, F. M. (1962). *The Weapons Acquistion Process.* Boston: Havard Business School.

Section 809 Panel. (2018). *Volume 1: Report of the Advisory Panel on Streamlining and Codifying Acquisition Regulations (Revised).* Arlington VA: Section 809 Panel.

Section 809 Panel. (2019). *Volume 3: Report of the Advisory Panel on Streamlining and Codifying Acquisition Regulations.* Arlington VA: Section 809 Panel.

Smith, G., Drezner, J., & Lachow, I. (2002). *Assessing the Use of Other Transactions Authority for Prototype Projects.* Arlington, VA: RAND.

Stevens, C. L. (2016). *AN ANALYSIS OF THE DEPARTMENT OF DEFENSE'S USE OF OTHER TRANSACTION AUTHORITY (10 U.S.C. 2371).* Monterey, CA: Naval Post Graduate School.

Tobin, R., Milner, J., & Gillette, C. (2016). *ANALYSIS OF OTHER TRANSACTION AGREEMENTS TO ACQUIRE INNOVATIVE RENEWABLE ENERGY SOLUTIONS FOR THE DEPARTMENT OF THE NAVY.* Monterey CA: Naval Post Graduate School.

Under Secretary of Defense for Acquistion, Logistics, and Technology. (2017). *DOD Report to Congress An Assessment of Cost-Sharing in Other Transactions Agreements For Prototype Projects.* Washington DC: Department of Defense.

Under Secretary of Defense for Acquistion, Technology, and Logistics. (2001). *DOD "OTHER TRANSACTIONS" (OT) GUIDE FOR PROTOTYPE PROJECTS.* Washington DC: DOD.

APPENDIX A: Acronyms

ACC-NJ	Army Contracting Command - New Jersey
BAC	Bureaucratic and Administrative Cost
CPA	Certified Public Accountant
CSO	Commercial Solutions Opening
DARPA	Defense Advanced Research Projects Agency
DAU	Defense Acquisition University
DFARS	Defense Federal Acquisition Regulation Supplement
DISAMS	Defense Institute of Security Assistance Management
DIU	Defense Innovation Unit (Formerly DIUx)
DIUx	Defense Innovation Unit Experimental
DOD	Department of Defense
FAR	Federal Acquisition Regulation
FASA	Federal Acquisition Streamlining Act
GAAP	Generally Accepted Accounting Procedures
GAO	Government Accountability Office
IDA	Institute for Defense Analysis
IR&D	Independent Research and Development
JUCAS	Joint Unmanned Combat Air Systems
KPMG	Klynveld Peat Marwick Goerdeler

LMI	Logistics Management Institute
MDAP	Major Defense Acquisition Program
NASA	National Aeronautics and Space Administration
NDAA	National Defense Authorization Act
NDS	National Defense Strategy
NPS	Naval Post Graduate School
NSS	National Security Strategy
OFPP	Office of Federal Procurement Policy
OPSEC	Operational Security
OT	Other Transaction
OTA	Other Transaction Authority
R&D	Research and Development
RAND	Research and Development Corporation
RD&D	Research Development and Demonstration
SSCF	Senior Service College Fellowship
TASC	The Analytical Services Company
US	United States
VLS	Vertical Launch System

Disclaimer

The views and opinions expressed or implied in this research paper are those of the author; no agency or department of the United States Government has officially sanctioned any of these view and opinions.