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The Effect of Defense-Sponsored Innovation Programs on the Military's Industrial Base

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PROCEEDINGS
OF THE
SEVENTEENTH ANNUAL
ACQUISITION RESEARCH SYMPOSIUM

**Acquisition Research:
Creating Synergy for Informed Change**

May 13–14, 2020

Published: April 13, 2020

Approved for public release; distribution is unlimited.

Prepared for the Naval Postgraduate School, Monterey, CA 93943.

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ACQUISITION RESEARCH PROGRAM:
CREATING SYNERGY FOR INFORMED CHANGE

The research presented in this report was supported by the Acquisition Research Program of the Graduate School of Defense Management at the Naval Postgraduate School.

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ACQUISITION RESEARCH PROGRAM:
CREATING SYNERGY FOR INFORMED CHANGE

The Effect of Defense-Sponsored Innovation Programs on the Military's Industrial Base

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Abstract

The Department of Defense (DoD) spends billions of dollars annually to fund innovation programs, rapid acquisition programs, and small business outreach programs ("innovation initiatives") with the stated or implicit objective of attracting innovative commercial companies outside of the traditional defense industrial base. However, by analyzing publicly-available DoD contract award data from 2010 through 2019 and government records for thousands of participants in DoD innovation initiatives, this paper demonstrates that the majority of companies that participated in innovation initiatives over the last decade had existing ties to the defense market. In addition to quantitatively analyzing the types of companies that leveraged these programs, this paper also explores the history of the DoD's innovation initiatives, how the department markets these programs, and why these programs have largely benefited firms already entrenched in the federal market. We also make a series of concrete recommendations for how the DoD can better market and structure these programs to attract and engage new, innovative companies.

Introduction

The rapid pace of technological development in the private sector, coupled with today's threat environment, has forced the Department of Defense (DoD) to rethink how it sources and funds new technologies. While policies of containment and counterterrorism dominated military and foreign policy post-9/11, over the last five years, the United States has reoriented its national security and defense strategies toward an explicit focus on exigent threats posed by China and Russia. Whereas in decades past, the DoD was at the forefront of technological innovation and exported its technologies to the commercial sector, today that paradigm has shifted to a point where many companies outside of the military's traditional suppliers increasingly drive advancements in areas of critical importance to national defense.

It is vital for the DoD to attract and integrate the technological innovations emanating from the private sector not only to preserve our own military superiority, but also as a proactive measure to slow the flow of these technologies overseas, particularly to China. China has prioritized gaining access to promising American dual-use technology companies as part of its multifaceted plan to displace the United States and has employed a variety of nefarious strategies to do so. As one such example, China has made it easy and financially attractive for these companies to transact with investors and/or customers tied directly or indirectly to the Chinese Communist Party, with the purpose of stealing their intellectual property and exploiting their capabilities for military and economic gain. While the U.S. government has recently taken measures to curb China's predatory behavior, the DoD is uniquely positioned to support these efforts. To the extent that the military can leverage its own resources, buying power, and



legitimate need for innovative new technologies to make it easier and more appealing for these companies to do business with the DoD, these companies would have less of a need to seek capital and/or customers from China—or from any overseas partners. As the DoD evolves its strategies in response to present realities and risks, it must take these factors into consideration and make a concerted effort to engage companies that have not previously worked with the DoD.

Over the years, the DoD has tried to accelerate the adoption of innovative commercial technologies through continuous investment in dozens of innovation programs, rapid acquisition programs, small business outreach programs and accelerators (“DoD innovation initiatives” or “initiatives”). However, limited scholarship exists to determine whether these initiatives have proven effective at attracting newcomers with no prior DoD experience into the defense market, versus the extent to which they are leveraged by existing DoD vendors. Our research aimed to fill this gap by evaluating the number and composition of new vendors that have entered the defense market annually, along with the number and composition of new versus existing vendors that have participated in different DoD innovation initiatives over the last decade.

Sizing the Defense Industrial Base

To analyze the effectiveness of innovation initiatives as a means of attracting new vendors into the DoD, we explored the composition of the defense industrial base, in general, over the last decade. We focused our research on the period from 2010 through 2019 because it encompassed the recent shifts in military strategy described previously. This 10-year period was also one of relative economic stability and excluded the substantial outlying factors we would have had to consider using data from 2008–2009. Furthermore, USASpending data became more complete around 2010.

First, we sought to determine the overall size of the DoD’s supplier base in each of the last 10 years. Then, we could analyze how many vendors in each year were doing business with the DoD for the first time, compared to the number of vendors with existing DoD revenue. We began by acquiring publicly available data on government expenditures from 2010 through 2019 from the Federal Procurement Data System (FPDS) and USASpending. We then isolated the data for contracts awarded by the DoD.¹ Next, we filtered the data by fiscal year (FY) and, for each year, isolated the total number of contract actions, or instances in which the DoD is required to enter an action into FPDS (“DoD contract actions”).² Annually, the number of DoD contract actions is significantly higher than the number of vendors because many vendors win multiple contracts. Therefore, we needed to determine the number of unique vendors associated with the overall number of contract actions. To do so, we grouped each contract action by its associated Data Universal Numbering System (DUNS) number and calculated the tally of unique DUNS numbers contained in the data each year.³ For companies with multiple vendor DUNS numbers, we resolved back to the parent DUNS number.⁴ The total count of distinct DUNS numbers each year became our parent universe of DoD vendors, which can also be understood as the DoD’s annual base of suppliers. *As demonstrated in Figures 1 and 2, the*

¹ Contracts awarded by the DoD include contracts awarded and funded by the DoD and contracts awarded by DoD with other funding partners. DoD awards are categorized with CGAC code 097 or 97.

² Contract events include a broad range of activities, including instances in which the government awards a new contract, funds a new or existing contract or modifies a contract (https://www.fpds.gov/wiki/index.php/FPDS-NG_FAQ February 25, 2020).

³ Every contract action in FPDS contains a field for the DUNS number.

⁴ The exception was for government entities such as state universities, where we kept vendor DUNS numbers independent of the parent.



number of suppliers to the defense department over the last decade has declined dramatically, even as the number of DoD contract actions has grown.

Budget Year	DOD Contract Actions	Unique DOD Vendors
2010	1,525,150	79,993
2011	1,506,404	77,195
2012	1,419,824	71,884
2013	1,299,282	64,685
2014	1,317,268	62,080
2015	2,985,513	61,095
2016	3,417,134	59,101
2017	3,430,958	57,165
2018	4,490,945	54,535
2019	4,315,586	51,239

Figure 1: Count of DOD Contract Actions & Unique DOD Vendors by Year
(PW Communications, n.d.)

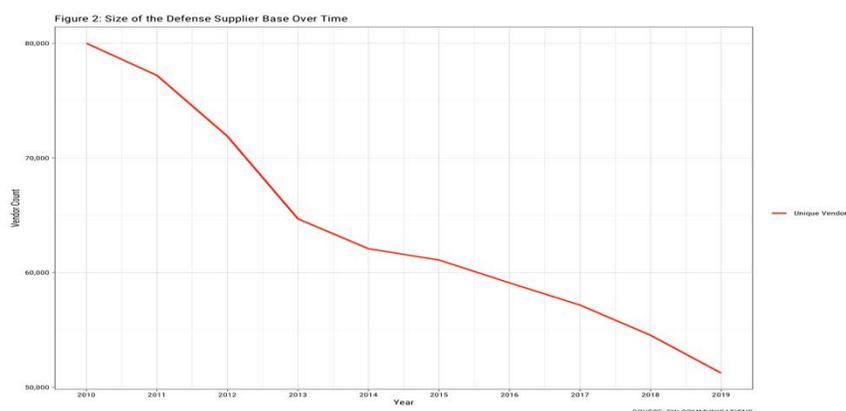


Figure 2: The Shrinking Defense Industrial Base

Right-Sizing the Defense Industrial Base

A number of factors have contributed to the consolidation of the DoD supplier base, which began in the early 1990s, including uncertainty in government spending and procurement, a shortage of skilled labor, and a desire among the largest prime contractors to achieve greater economies of scale (Tirpak, 2008). Furthermore, as noted in *Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States*, prepared by the Office of the Under Secretary of Defense for Acquisition and Sustainment in 2018, “Many of the current policies and practices of the U.S. Government, and DoD in particular, strain the industrial base and reduce incentives to supply to DoD” (p. 32). There are advantages and disadvantages to a smaller supplier base. It potentially affords the customer with more leverage, better pricing, and fewer suppliers to manage. Conversely, it may increase risks as the operational health of the military becomes dangerously intertwined with the health and performance of a small number of companies. We recognize that the overall size of the



defense supplier base should reflect a balance between these pros and cons. However, strategic consolidation in certain categories should be offset by the introduction of new vendors in areas where the commercial sector drives technological leadership—the ostensible purpose of DoD innovation initiatives. As such, we were interested in understanding how many companies entered the defense market for the first time each year (“first time vendors”), what capabilities these first time vendors possessed, and the extent to which innovation initiatives helped the DoD attract innovative commercial firms with no prior defense experience.

Calculating First Time Vendors

To calculate the number of first time vendors that entered the defense market each year, we isolated the year in which each unique DUNS number contained in our total universe of DoD vendors had its first recorded DoD contract action, dating back to the 1950s.⁵ If the first recorded contract action for a given DUNS number was 2010, the entity associated with that DUNS number was classified as a “first time vendor” in 2010. Conversely, if a DUNS number contained in the 2010 vendor data was associated with a DoD contract action in an earlier year, it was classified as an existing vendor. Likewise, for 2011, DUNS numbers that were not contained in DoD contract data in 2010 or earlier were classified as first time vendors, and the remaining DUNS numbers were classified as existing vendors, and so forth. *Figure 3 shows the breakdown of existing versus new vendors in each year, demonstrating a substantial decline in new vendors year to year over the last decade. Additionally, as demonstrated in Figure 4, in seven of the last 10 years, the number of first time vendors relative to total vendors each year experienced an even sharper decline.*

Budget Year	Unique Vendors	Existing Vendors	New Vendors
2010	79,993	64,761	15,232
2011	77,195	66,356	10,839
2012	71,884	63,466	8,418
2013	64,685	58,382	6,303
2014	62,080	55,726	6,354
2015	61,095	54,898	6,197
2016	59,101	53,270	5,831
2017	57,165	51,792	5,373
2018	54,535	49,634	4,901
2019	51,239	46,981	4,258

Figure 3: Composition of the Defense Industrial Base, By Year
(PW Communications, n.d.)

⁵ USASpending data begins in 2001. The FPDS contains partial data dating back to the 1950s and substantial data dating back to the 1970s.



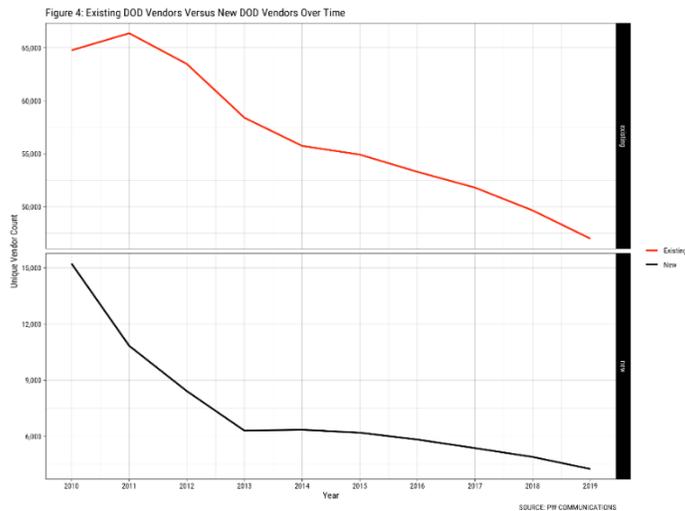


Figure 4: Dramatic Decline in New Vendors Over Time

As stated in a 2014 Defense Business Board (DBB) report, “considerable technology leadership critical to our nation’s defense has moved from within the Department and the Defense Industrial Base to companies outside the traditional base” (p. 9). Because the DoD can no longer rely on its traditional suppliers to deliver the innovation required to preserve America’s military superiority, the number of new vendors entering the defense market should be rising accordingly. Consequently, a decline in new vendors may suggest the DoD is not accessing the innovative capabilities it needs to remain competitive.

Composition of New Vendors

The implications of this downward trend are considerably greater, given that first time DoD vendors are not strictly innovative commercial technology companies. For example, contracting with a new hotel for overnight travel, buying commodities from a new supplier, or leasing a new building from 2010 through 2019 counted in our data as a new first time vendor. *By linking detailed records from USASpending and FPDS about the first time vendors in our data set and analyzing the Product and Service (PSC) codes associated with their initial contract actions, we determined that the majority of first time vendors over the last decade were not innovative commercial technology companies.*⁶

Categorizing a PSC as unlikely to be associated with an innovative nontraditional supplier is subjective. However, by taking into consideration only the most obvious “non-innovative” PSCs represented in our first time vendors’ initial contract actions, it was clear that over 50% of first time vendors were contracted for goods or services unrelated to commercial innovation. For instance, 5.5% of first time vendors corresponded to the code for “Utilities and Housekeeping.” Another 4.9% of first time vendors corresponded to “Maintenance, Repair, Rebuild - Equip;” 1.5% corresponded to “Lease/Rent Equipment” or “Lease/Rent Facilities;” and 4.9% corresponded to “Transport, Travel, Relocation.” Many other first time vendors corresponded to PSC codes such as “Medical Services,” “Social Services,” “Construction of Structures/Facilities,” and “Musical Instruments.” The composition of first time vendors indicated not only that the number of new vendors has declined year to year, but also that the majority of these new vendors were not innovative commercial technologies.

⁶ The government uses thousands of PSC codes to describe the goods and services it procures.



Joint Ventures/Special Purpose Vehicles

As we continued to explore the features of first time vendors' initial contract actions, we also noticed that 40 first time vendors had initial contract awards in excess of \$100 million. Looking at the contract action details more closely, we realized that an existing government supplier can form a Joint Venture (JV) or Special Purpose Vehicle (SPV) and register it as a completely independent entity.

For example, one company in our 2018 new vendor data set was Fluor Marine Propulsion, with an initial contract of more than \$1.2 billion. While Fluor Marine Propulsion is not linked to Fluor Corporation's parent DUNS number, we were able to determine through additional research, including verifying that the two entities share the same mailing address, that Fluor Marine Propulsion is a subsidiary of Fluor Corporation, a large legacy government contractor. Despite Fluor Marine's relationship to Fluor Corporation, based on our computational approach, it was counted as a new vendor. Another example was a first time vendor with an initial contract of \$479,000,000 that, upon further analysis, corresponded to "Balfour Beatty/DPR/Big-D, A Joint Venture." Based on records in the FPDS, individually Balfour Beatty, DPR, and Big-D have each been contracting with the government for more than a decade. Their collective JV, however, registered in our system as a new entity.

Our research is concerned with understanding how the DoD attracts and engages companies with no prior defense experience. It is clear that JVs and SPVs can create the appearance of a new vendor entering the supply chain, while in fact serving as a tool for legacy contractors to gain additional market share. The majority of these 40 outliers appeared to correspond to a JV/SPV; however, for this research, we were unable to analyze each arrangement individually to determine if it involved one or more existing DoD vendors. Likewise, we were unable to identify and resolve other instances in which an entity appeared to be a first time vendor but was affiliated with an existing government contractor through a JV/SPV. This research limitation caused some degree of inflation to our count of first time vendors and suggests that an even smaller share of them were innovative commercial technology companies.

Research Limitations

Our macroeconomic analyses, as well as our forthcoming analyses of innovation initiatives, are subject to two additional research limitations. First, we had no access to classified contract data. If we had the ability to consider classified vendors, the overall size of the DoD's supplier base and the number of new vendors annually might change. However, we do not believe this limitation substantially impacted our results because contractors that performed on both classified and unclassified DoD contracts were counted. Additionally, we had no access to subcontracting data. We recognize that innovative commercial companies may engage with the DoD for the first time through a subcontracting arrangement with an existing prime contractor. While these instances are excluded from our data, we do not feel that this limitation materially impacts the efficacy of our findings given the starkness of the trends we identified.

Defense Innovation Initiatives: A Source of New Suppliers?

Based on our analyses of the overall composition of the defense industrial base over the last decade, we concluded that the total size of the DoD supplier base has been shrinking year to year, and the number of new vendors entering the defense market has been shrinking year to year. Furthermore, most new vendors over the past decade were not innovative commercial technology companies. In the face of these concerning trends, we sought to determine if, at the microeconomic level, DoD innovation initiatives have proven more effective at attracting new vendors into the defense market versus the extent to which they have benefited existing DoD



suppliers. Our research focused on three DoD tools/initiatives: the Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) program, Other Transaction Agreements/Other Transactions (OTAs or OTs), and Prize/Challenge Competitions. We selected these three because they consume billions in DoD funding annually and they share a set of fundamental objectives: to help the DoD stimulate innovation and research and development (R&D), to engage innovative nontraditional or small businesses to help solve critical national security and defense challenges, to accelerate the identification and adoption of leading commercial technologies forcewide, and to help the DoD appeal to innovative commercial companies that, historically, have been deterred from working with the government (AcqNotes, 2019; General Services Administration [GSA], n.d.; SBIR, n.d.).

SBIR/STTR

SBIR and STTR are among the government's oldest and most well-funded innovation programs. The Small Business Administration (SBA) launched SBIR in 1977 to "support innovation through the investment of federal research funds in critical American priorities to build a strong national economy"—specifically, by investing these funds into small businesses with dual-use potential (SBA, n.d.-a). In 1992, it established STTR as an identically-structured sister program designed to help further scientific research with potential for broader commercial benefit. The SBIR/STTR program is divided into three phases. In Phase I, companies are awarded funding to establish the technical merit, feasibility, and commercial potential of their project. In Phase II, companies are awarded funding to continue the efforts initiated in Phase I (SBIR, n.d.). Solutions with commercial potential can proceed to Phase III, which "refers to work that derives from, extends, or completes an effort made under prior SBIR funding agreements, but is funded by sources other than the SBIR Program" (Boyer, 2017). Because Phases II and III are generally limited to companies that previously won a Phase I, we focused our analyses on Phase I recipients.⁷

SBIR/STTR awards are explicitly identified in contract data. Therefore, to determine how many new vendors entered the DoD through the SBIR/STTR program, we returned to our data set containing all first-time vendors from 2010 through 2019 and their corresponding initial contract actions. We then isolated instances in which initial contract actions indicated a DoD-sponsored SBIR/STTR Phase I award. *Figure 5 shows the count of first time vendors that leveraged a Phase I SBIR/STTR award to enter the defense market, annually, over the last 10 years ("SBIR/STTR gateway vendors").*

⁷ In 2011, SBIR/STTR initiated a "Direct to Phase II" program that allowed the DoD and other agencies to award Phase IIs to companies that had not completed a Phase I. The pilot program expired in FY2017 and was relaunched in 2019 (<https://www.sbir.gov/tutorials/program-basics/tutorial-4>). We excluded this data to keep our analyses consistent.



Budget Year	Gateway SBIR/STTR Vendors
2010	223
2011	176
2012	148
2013	123
2014	112
2015	115
2016	109
2017	128
2018	122
2019	408

Figure 5: First Time Vendors that Leveraged SBIR/STTR to Enter the Defense Market, By Year
PW Communications (n.d.)

Comparing the count of SBIR/STTR gateway vendors to the total number of first time DoD vendors each year, as shown in Figure 6, it is clear that the vast majority of new vendors over the last decade did not leverage the SBIR/STTR program to enter the defense market. This finding is consistent with our previous analyses, insofar as the vast majority of new vendors were not innovative commercial companies with dual-use potential—the stated audience of the DOD SBIR/STTR program.

Budget Year	Total New Vendors	Gateway SBIR/STTR Vendors	% New Vendors that Leveraged SBIR/STTR
2010	15,232	223	1.46%
2011	10,839	176	1.62%
2012	8,418	148	1.76%
2013	6,303	123	1.95%
2014	6,354	112	1.76%
2015	6,197	115	1.85%
2016	5,831	109	1.87%
2017	5,373	128	2.38%
2018	4,901	122	2.49%
2019	4,258	408	9.43%

Figure 6: Share of New Vendors that Entered DOD Through SBIR/STTR
PW Communications (n.d.)

Total Universe of DoD SBIR/STTR Companies

Next, we sought to evaluate the overall composition of the SBIR/STTR program, namely, to what extent SBIR/STTR has benefited companies with no previous defense experience versus experienced DoD suppliers. To do so, we first needed to determine the total number of companies awarded DoD-sponsored Phase I SBIR/STTRs annually. Then, for each year, we could subtract the number of gateway SBIR/STTR vendors from the total and compare the results. To establish the total number of DoD-sponsored Phase I SBIR/STTR companies, we aggregated complete historical SBIR award data from USASpending and filtered the data to isolate Phase I SBIR/STTR awards that were funded and awarded by the DoD from FY2010 through FY2019. We then filtered the award data to isolate unique DUNS numbers, resolving to a parent DUNS number as needed. **Figure 7 shows the total number of DoD Phase I SBIR/STTR participants by year.**



Budget Year	Count of Phase I Companies
2010	1287
2011	1262
2012	1158
2013	1045
2014	1014
2015	991
2016	973
2017	983
2018	949
2019	1354

Figure 7: Total Unique Phase I DOD SBIR/STTR Participant Companies, By Year
PW Communications (n.d.)

For each year, we then subtracted the gateway SBIR/STTR vendors from the total to calculate the number of SBIR/STTR participants that had existing defense business (“existing SBIR/STTR vendors”). As shown in Figure 8, the vast majority of SBIR/STTR participants every year had existing defense business.

Budget Year	Total DOD Phase I SBIR/STTR Companies	Count of Existing Vendors	Count of Gateway Vendors	% Existing Vendors	% Gateway Vendors
2010	1287	1064	223	82.67%	17.33%
2011	1262	1086	176	86.05%	13.95%
2012	1158	1010	148	87.22%	12.78%
2013	1045	922	123	88.23%	11.77%
2014	1014	902	112	88.95%	11.05%
2015	991	876	115	88.40%	11.60%
2016	973	864	109	88.80%	11.20%
2017	983	855	128	86.98%	13.02%
2018	949	827	122	87.14%	12.86%
2019	1354	946	408	69.87%	30.13%

Figure 8: Gateway Versus Existing SBIR/STTR Vendors, By Year
PW Communications (n.d.)

Next, we linked the award values into our data set to explore how the funding was distributed between gateway and existing vendors. As shown in Figure 9, SBIR/STTR participants with existing defense business received the vast majority of DoD Phase I SBIR/STTR funding.



Budget Year	DOD Phase I SBIR/STTR \$	\$ to Existing Vendors	\$ to Gateway Vendors	% Existing Vendors	% Gateway Vendors
2010	\$255,683,405	\$232,785,007	\$22,898,397	91.04%	8.96%
2011	\$264,218,019	\$244,559,237	\$19,658,782	92.56%	7.44%
2012	\$259,796,590	\$240,817,498	\$18,979,092	92.69%	7.31%
2013	\$231,966,167	\$216,416,149	\$15,550,018	93.30%	6.70%
2014	\$229,929,835	\$215,293,300	\$14,636,535	93.63%	6.37%
2015	\$213,344,281	\$197,160,681	\$16,183,600	92.41%	7.59%
2016	\$191,459,321	\$177,139,330	\$14,319,991	92.52%	7.48%
2017	\$219,760,816	\$202,491,532	\$17,269,285	92.14%	7.86%
2018	\$188,905,420	\$171,659,902	\$17,245,518	90.87%	9.13%
2019	\$278,207,223	\$241,677,692	\$36,529,531	86.87%	13.13%

Figure 9: Share of DOD SBIR/STTR Phase I Funding Allocated to Existing vs. Gateway Vendors
PW Communications (n.d.)

The SBIR/STTR Program: Big Business

Analyzing the details of the contract actions associated with the universe of existing SBIR/STTR vendors, we recognized that some vendors won hundreds of Phase I SBIR/STTR awards worth tens of millions of dollars over the last decade. In other words, rather than deriving substantial defense revenue by transitioning their products or services into programs of record, they derived it from continuously winning SBIR/STTRs. **Figure 10 highlights the four companies that won the greatest number of SBIR/STTR Phase I awards over the last decade.** These findings suggest that, despite its stated objective, SBIR/STTR has largely failed to serve as a gateway for new vendors to enter the DoD, has disproportionately benefited companies with existing defense business, and permits serial usage.

Vendor	Total Count of Phase I Awards	Total Value of Phase I Awards
PHYSICAL OPTICS CORPORATION	472	\$62,310,358
INTELLIGENT AUTOMATION, INC	288	\$40,134,060
PHYSICAL SCIENCES INC	238	\$34,729,760
CHARLES RIVER ANALYTICS INC	228	\$32,065,168

Figure 10: Summary of SBIR/STTR Awards for the 4 Largest Serial Winners, 2010-2019
PW Communications (n.d.)

2019 SBIR/STTR Analysis

Despite these overall trends, for 2019, we noticed a significant increase in the number of gateway SBIR/STTR vendors, along with a relative increase in the share of funding allocated to gateway SBIR/STTR vendors. *Isolating the 2019 gateway SBIR/STTR vendor data and exploring the features in more detail, we found that approximately 85% were sponsored by the Air Force, as shown in Figure 11.*



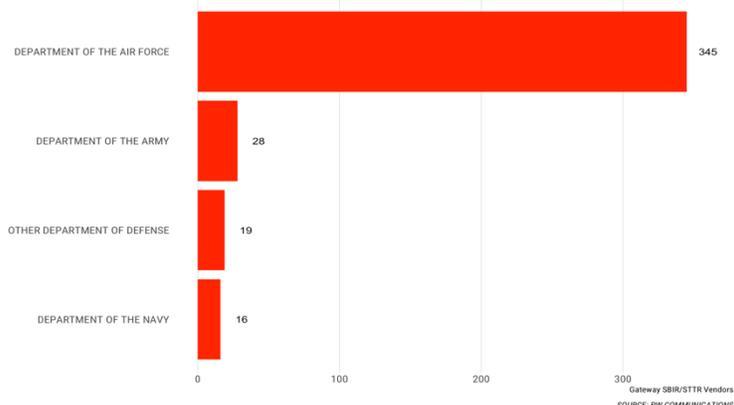


Figure 11: 2019 SBIR/STTR Gateway Vendors, by Branch Sponsor

In 2019, the Air Force’s innovation team (AFWERX) launched two new initiatives within the framework of the Air Force SBIR/STTR program: the SBIR/STTR Open Topic model and Pitch Days. Both initiatives modify certain aspects of the traditional SBIR/STTR program with the goal of making it easier, faster, and more appealing for innovative technology companies to engage with the Air Force (AFWERX, n.d.). We were interested in exploring whether these initiatives caused the spike in gateway SBIR/STTR vendors in 2019, but due to limitations in the data, we were unable to quantitatively distinguish between traditional Air Force SBIR/STTR awards and Open Topic/Pitch Day awards. The SBIR/STTR data does not explicitly indicate whether an award corresponded to Pitch Day/Open Topic, and the Air Force has not published a list of Open Topic and Pitch Day participants. Furthermore, many contract identification numbers and DUNS numbers were omitted or reported incorrectly in the 2019 Air Force SBIR/STTR data. Nevertheless, we manually explored the project descriptions associated with the 2019 Air Force gateway SBIR/STTR vendors, searching for the terms “Open Topic,” “Special Topic,” and “Pitch Day.” At least 25% of Air Force gateway SBIR/STTR vendors appeared to be associated with Pitch Day or Open Topic. While we cannot conclusively attribute the growth in new vendors to these AFWERX initiatives, based on these general findings and the timing of the rise, we can infer that they had some effect.

SBIR/STTR Conclusions

It could benefit other DoD stakeholders to study and consider adopting AFWERX’s approach. In fact, other branches have launched Pitch Days and the Open Topic model for 2020. However, we recommend that the DoD consider the number of awards made to companies with no previous DoD experience as one explicit measure of success for Pitch Days and Open Topic. Otherwise, these initiatives risk becoming channels for existing DoD suppliers to expand their DoD market share. Likewise, we recommend that all DoD SBIR/STTR programs require a minimum number of Phase Is be awarded to companies with no prior defense business annually. Further research is required to determine the appropriate number. We also recognize that the commercial market is more robust in certain fields of interest to the DoD than others—for example, cyber security versus hypersonic missiles. It would be appropriate to vary the allocation of awards to new vendors, depending on the field.

Other Transaction Authority

After completing our SBIR/STTR analysis, we next analyzed how many new vendors entered the DoD through OTAs. An OTA is a legally binding contract generally exempt from some of the most onerous aspects of traditional federal procurements (Schwartz & Peters,



2019). OTAs first appeared in 1958, when the United States established the National Aeronautics and Space Administration (NASA). The intention at the time was to provide NASA with the “necessary freedom to carry on research, development, and exploration ... to insure the full development of these peaceful and defense uses without unnecessary delay,” specifically by granting them the authority to “enter into and perform such contracts, leases, cooperative agreements, or other transactions as may be necessary” (Schwartz & Peters, 2019, p. 1). Authority to use OTAs expanded to the DoD over the course of FY1990 and FY1991, and this authority was expanded further in the 2016 National Defense Authorization Act (DiNapoli, 2019). Richard Dunn, former general counsel for the Defense Advanced Research Projects Agency (DARPA), championed the efforts to allow defense agencies to utilize OTAs and ultimately wrote the statute that expanded OTA authority to the DoD in the early 1990s. He explained to us in an interview on March 9, 2020, that the intention had been to help the DoD overcome its prevailing “costs too much, takes too long” system, to in turn increase efficiency, better attract nontraditional innovators that would otherwise be unwilling or unable to comply with traditional procurement regulations, and create a more open system (R. Dunn, personal communication, March 9, 2020).

In order to explore the degree to which OTAs attracted new vendors into the DoD over the last decade, we first needed to isolate contract actions from 2010 through 2019 that corresponded to an OTA. While USASpending data does not contain a field for OTAs, OTAs are designated in FPDS data through a field called “Nontraditional Government Contractor participation” (NGC).⁸ As such, we aggregated FPDS data from 2010 through 2019, filtered the data to include transactions classified as NGC, and isolated NGCs funded and/or awarded specifically by the DoD. To determine the number of unique vendors represented in the OTA data, we filtered and grouped the transactions by DUNS number, resolving back to a parent DUNS number as needed. *Figure 12 shows the count of unique OTA vendors by year.*

Budget Year	Total Unique OTA Vendors
2010	22
2011	33
2012	42
2013	36
2014	41
2015	39
2016	54
2017	123
2018	221
2019	420

Figure 12: Unique OTA Vendors By Year
PW Communications (n.d.)

To determine how many OTA vendors each year had no prior defense business, we searched each OTA vendor’s DUNS number in our FPDS/USASpending database to identify its

⁸ We concluded that NGC corresponds to OTAs by analyzing the features of NGC contracts. We determined that they align with the requirements of an OTA, as all NGC transactions contained additional fields to denote which OTA requirements were satisfied, such as if the transaction was associated with a prototype, whether there was cost sharing, and/or whether the recipient was a nontraditional or not-for-profit entity.



first DoD contract action. Entities with no DoD contract actions prior to their first DoD OTA between 2010 and 2019 were classified “gateway OTA vendors,” and entities with DoD contract actions prior to their first OTA award between 2010 and 2019 were classified as “existing OTA vendors.” As shown in Figure 13, more than 75% of OTAs were awarded to existing OTA vendors every year, and even as use of OTAs expanded, the majority of contracts were awarded to companies with existing defense business.

Budget Year	Total OTA Vendors	Gateway OTA Vendors	Existing OTA Vendors	% Gateway Vendors	Distinct OTA Contracts	# of Contracts Awarded to Gateway Vendors	% of Contracts to Gateway Vendors
2010	22	5	17	22.73%	23	5	21.74%
2011	33	4	29	12.12%	36	4	11.11%
2012	42	7	35	16.67%	46	8	17.39%
2013	36	5	31	13.89%	39	5	12.82%
2014	41	4	37	9.76%	47	4	8.51%
2015	39	7	32	17.95%	47	7	14.89%
2016	54	11	43	20.37%	68	11	16.18%
2017	123	32	91	26.02%	148	36	24.32%
2018	221	33	188	14.93%	296	33	11.15%
2019	420	84	336	20.00%	685	93	13.58%

Figure 13: Gateway Versus Existing OTA Vendors By Year
PW Communications (n.d.)

Next, we linked in the contract values to explore the amount of funding that was allocated to gateway versus existing OTA vendors. As demonstrated in Figure 14, nearly all DoD OTA funding was awarded to existing OTA vendors over the last decade, and even as the number of gateway OTA vendors increased year to year, existing OTA vendors continued to receive the vast majority of OTA funding.

Budget Year	Total OTA Obligations	Obligations to Existing OTA Vendors	Obligations to Gateway OTA Vendors	Share of Funding to Existing OTA Vendors	Share of Funding to Gateway OTA Vendors
2010	\$201,449,780	\$192,409,666	\$9,040,114	95.51%	4.49%
2011	\$371,869,569	\$362,413,408	\$9,456,161	97.46%	2.54%
2012	\$467,005,596	\$452,882,912	\$14,122,684	96.98%	3.02%
2013	\$340,559,773	\$307,429,862	\$33,129,910	90.27%	9.73%
2014	\$522,839,408	\$521,082,772	\$1,756,636	99.66%	0.34%
2015	\$694,883,318	\$683,122,982	\$11,760,336	98.31%	1.69%
2016	\$1,432,545,330	\$1,410,981,232	\$21,564,098	98.49%	1.51%
2017	\$2,096,054,328	\$1,901,940,280	\$194,114,048	90.74%	9.26%
2018	\$4,031,138,879	\$3,984,702,929	\$46,435,949	98.85%	1.15%
2019	\$7,385,238,011	\$7,158,073,697	\$227,164,313	96.92%	3.08%

Figure 14: Share of OTA Funding Awarded to Existing vs. Gateway Vendors by Year
PW Communications (n.d.)



Large Primes Leveraging OTAs

One potential explanation of these findings is the fact that the DoD has authority to award OTAs to large legacy government contractors if at least one nontraditional defense contractor is participating in the project to a significant extent or if there is a cost sharing arrangement in which at least one-third of the cost of the OTA comes from non-federal sources (AcqNotes, 2019). As shown in Figure 15, by linking the vendor names into the data set, we found that the five largest DoD contractors have derived millions of dollars in OTA revenue over the last decade.

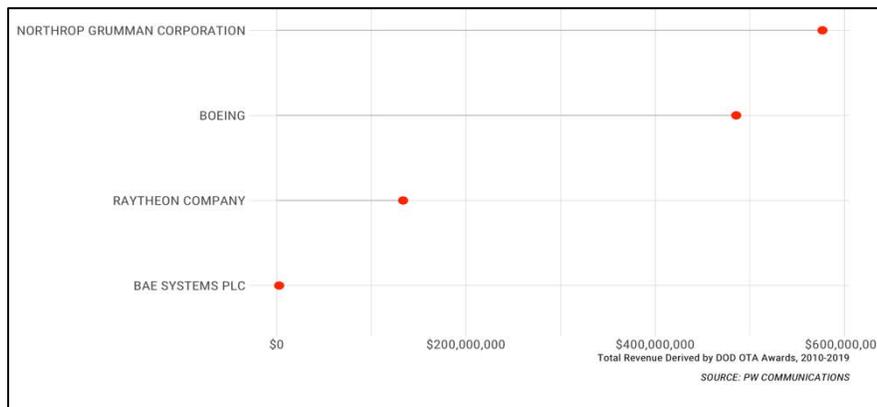


Figure 15: DOD OTAs Awarded to the 5 Five Largest DOD Contractors, 2010-2019

It is important to note that the statutory definition of “nontraditional defense contractor” is “an entity that is not currently performing and has not performed, for at least the one-year period preceding the solicitation ... any contract or subcontract for the Department of Defense that is subject to the full coverage under the cost accounting standards prescribed pursuant to Section 1502 of title 41 and the regulations implementing such section” (AcqNotes, 2019). Small business exemptions from CAS are irrespective of the share of revenue these businesses derive from the government (GSA, 2020). Thus, requiring nontraditional participation does not guarantee that the arrangement provides the government access to innovative capabilities that have previously remained out of their reach.

Given the implications of this arrangement on how OTA funds have been used, we recommend that the government modify the definition of nontraditional participation for OTAs to mean companies that have derived no revenue from the defense market in the previous five years. Doing so would put the onus on large legacy contractors to enhance outreach efforts in commercial communities of interest, beyond the scope of the traditional defense industrial base. Furthermore, the policy would be enforceable: as demonstrated through this research, sufficient publicly available data exists to easily determine if a firm has previous defense business.

Consortium Management Firms: The Multibillion-Dollar Black Box

OTAs can also be structured in a variety of different ways, including as joint ventures or partnerships, with multiple agencies joining together to fund an agreement encompassing multiple providers, or, as is most common, through a consortium (Schwartz & Peters, 2019). A consortium is an organized group of companies, academic organizations, or nonprofits that specialize in a particular technology area. They pay membership fees to join the consortium, which is typically managed by a not-for-profit consortium management firm (CMF) that serves as the intermediary between the members and the government. Although our data treats each CMF as a unique vendor, the CMF does not actually conduct the research or prototyping; it



administers subcontracts to its members, much like a traditional prime contractor–subcontractor relationship. CMFs operate in a black box because they are not required to report which members receive the subcontract awards. While they claim to serve as a “single entry point to hundreds of innovative organizations, many that traditionally do not do business with the government,” due to the lack of transparency in the data, we could not verify this claim (Dolan, 2019).

To gauge the potential implications of this lack of transparency on our results, we isolated the OTAs associated with CMFs in our data and calculated the share of total OTA funding they represented. To do so, we searched the features of our OTA data to identify mentions of “consortium” in the vendor name or the contract action description and cross referenced a publicly available list of CMFs from the MITRE website (AiDA - MITRE Corporation, 2020). We determined that 14 of the unique vendors in our OTA data set were CMFs. As shown in Figure 16, by linking the contract values associated with these 14 CMFs, we concluded that 67% of the total DoD OTA dollars over the last decade were allocated through a consortium. The fact that the majority of OTA dollars were funneled through CMFs meant we had no ability to audit the recipients of the majority of OTAs.

Type	Total OTA Funding	Unique Contracts
Consortium Management Firm	\$11,738,265,037	165
Non-Consortium Management Firm	\$5,805,318,954	712

Figure 16: OTA Funding Awarded to CMF vs. Non-CMF Vendors, 2010-2019

PW Communications (n.d.)

Consortia: Redundant Technological Priorities

A lack of transparency was not our sole concern regarding consortia. Reviewing the list of consortia and their priority technology areas on the MITRE website, we also found that many CMFs share many of the same priority technology areas (AiDA - MITRE Corporation, 2020). For example, Figure 17 provides a snapshot of consortia that listed *Artificial Intelligence/Machine Learning, Sensors, and/or Analytics* as technological priorities as of February 20, 2020.

Topic Area	Supply Chain Consortium Initiative (SCCI)	Consortium for Command, Control, and Communications in Cyberspace (CS)	Naval Surface Technology and Innovation Consortium (NSTIC)	Undersea Technology Innovation Consortium (UTIC)	Sensors, Communications and Electronics Consortium (SCEC)	Space Enterprise Consortium (SpEC)	Engineer, Research, and Development Center (ERDC) Consortium	Information Warfare Research Project (WRP)
Artificial Intelligence/ Machine Learning	X	X	X	X				
Sensors		X		X	X	X	X	
Analytics	X	X	X				X	X

Source: MITRE

Figure 17: Redundant Technological Priorities in Consortia

This redundancy raises questions. If an innovative commercial company sees that its capabilities align with multiple consortia, how does it decide which to join? Is it expected to join multiple, which requires both money and time? Commercial companies outside of the traditional defense ecosystem are largely unfamiliar with how the government conducts market research in general; why does the DoD assume that the nuances of the consortium process are somehow better understood? Furthermore, membership in a consortium does not guarantee a company



will be awarded government funding; the company is still required to bid on opportunities made available through the CMF. Even to the extent innovative commercial companies are aware of the consortium process, can the DoD assume that the opportunity is appealing, particularly for companies with robust private sector revenue streams?

Consortium Conclusions

We recommend the DoD revises the consortium model. First and foremost, CMFs must be required to report how funds are awarded. In the absence of this transparency, it is impossible to evaluate the extent to which CMFs facilitate government access to the best and brightest innovative technology firms versus the extent to which they simply benefit firms affiliated with a CMF who may or may not possess the most applicable or advanced capabilities. The intended purpose of OTAs is to make it faster, easier, and less cumbersome for companies to do business with the government, yet the majority of OTAs were funneled through bureaucratic entities that essentially levy a tax on the innovator. To ensure OTAs achieve their primary objectives, until the composition of CMF members can be verified, we recommend the DoD requires that the majority of OTAs awarded annually are awarded to non-CMF entities.

Non-CMF OTAs

Our research did reveal a substantial increase in non-CMF OTA vendors, both gateway and existing, from 2017 through 2019. Non-CMF OTA award data is far more transparent than CMF data, as it includes the names of specific vendors performing the work as well as a description of the intended purpose of the project. *To explore factors that may have contributed to the rise, we began analyzing the contracting office codes and contracting office names associated with the OTAs awarded to non-CMF vendors from 2017 through 2019, as shown in Figure 18.*

Contracting Office ID	Contracting Office Name	Total Non-CMF OTA Vendors	Non-CMF Existing OTA Vendors	Non-CMF Gateway OTA Vendors
W15QKN	W6QK ACC-PICA	196	142	54
HR0011	DEF ADVANCED RESEARCH PROJECTS AGENCY WASHINGTON	142	127	15
HQ0034	HEADQUARTERS SERVICE	47	36	11
W911QY	W6QK ACC-APG NATICK	43	40	3
FA8649	USAF SBIR STTR CONTRACTING	35	24	11
N00014	OFFICE OF NAVAL RESEARCH	21	17	4
W52P1J	W4MM USA JOINT MUNITIONS CMD	20	16	4
M67854	COMMANDER	15	13	2
W900KK	W6QK ACC – ORLANDO	15	14	1
FA8650	WSAF AFMC AFRL PZL RAK RXK	9	4	5
W909MY	ACC-ABERDEEN PROVIDNG GROUNDS CONT C	8	6	2
S2206A	DCMA BOSTON	7	7	0

Figure 18: Non-CMF OTA Awards by Source, 2017-2019

PW Communications (n.d.)



While the vast majority of vendors from 2017 through 2019 continued to be those with existing defense business, we noticed that the greatest number of non-CMF OTAs were awarded by two offices: W15QKN/W6QK ACC-PICA, and HR0011/Defense Advanced Research Projects Agency (DARPA). We could explicitly see from the contracting office name that the second-largest source of non-CMF gateway OTA vendors entered the DoD through DARPA, which suggests that DoD stakeholders could benefit from learning more about, and potentially adopting features of, DARPA’s approach to marketing and administering OTAs. To better understand the gateway OTAs that correspond to W15QKN/W6QK ACC-PICA, we linked and explored the contract requirement descriptions. *As highlighted in Figure 19, these contract descriptions referenced “Defense Innovation Unit” (DIU), formerly known as the Defense Innovation Unit Experimental (DIUx).*

Contracting Office	Contract Description
W6QK ACC-PICA	PROJECT AWARD IN SUPPORT OF THE DIUX CSO PROGRAM IS ENTITLED AUTONOMOUS TACTICAL AIRBORNE DRONE.
W6QK ACC-PICA	BASE OTA AWARD FOR SAILDRONE, INC IN SUPPORT OF DIUX AND NAVAL SPECIAL WARFARE. SUPPORTING R&D EFFORTS FOR UNMANNED MARTITIME SURFACE VESSEL RELEVANT TO ENHANCING THE MISSION EFFECTIVENESS OF MILITARY PERSONNEL
W6QK ACC-PICA	PROJECT AWARD IN SUPPORT OF DIUX PROGRAM ENTITLED US NAVY EXPLOSIVE ORDNANCE DISPOSAL
W6QK ACC-PICA	OPEN ARCHITECTURE DATA MANAGEMENT AND ADVANCED ANALYTICS IN SUPPORT OF DIUX
W6QK ACC-PICA	AWARD UNDER DIUX AOI HARDWARD TO SOFTWARE TRANSFORMATION
W6QK ACC-PICA	THE PURPOSE OF THIS ACTION IS TO AWARD AN OTHER TRANSACTION AGREEMENT OTA, W15QKN-18-9-2002, BETWEEN THE UNITED STATES ARMY CONTRACTING COMMAND – NEW JERSEY PREVALENT, INC. IN SUPPORT OF THE DEFENSE INNOVATION UNIT DIU
W6QK ACC-PICA	THE PURPOSE OF THIS ACTION IS TO AWARD AN OTHER TRANSACTION AGREEMENT OTA, W15QKN-18-9-2002, BETWEEN THE UNITED STATES ARMY CONTRACTING COMMAND AND STRATEGY ROBOT, INC. IN SUPPORT OF THE DEFENSE INNOVATION UNIT DIU
W6QK ACC-PICA	THE PURPOSE OF THIS MODIFICATION IS TO PROVIDE CLARIFICATION TO THE DIU STRATEGY ROBOT SOW. THE VALUE AND PERIOD OF PERFORMANCE REMAIN UNCHANGED.
W6QK ACC-PICA	AWARD OF DIU PROTOTYPE PROJECT TO AIRMAP UNDER GROUP 1 UNMANNED ARCHITECTURE
W6QK ACC-PICA	THE PRINCIPLE PURPOSE OF THIS OTA IS TO PROVIDE DRAGONEYE STABILIZED MICRO EO/IR CAMERA SYSTEMS FOR ALL UNMANNED AERIAL SYSTEMS SUAS IN SUPPORT OF THE DEFENSE INNOVATION UNIT DIU
W6QK ACC-PICA	AWARD OF SHORT RANGE RECON PROTOTYPE PROJECT IN SUPPORT OF DIU AND PEO AVIATION
W6QK ACC-PICA	PROTOTYPE PROJECT UNDER THE DEFENSE INNOVATION UNIT DIU SMALL RESPONSIVE LAUNCH SRL
W6QK ACC-PICA	EXTEND POP TO OTA WITH SRI INTERNATIONAL IN SUPPORT OF DIU AOI HARDWARD TO SOFTWARE TRANSFORMATION
W6QK ACC-PICA	MODIFICATION TO OTA TO VOLANS-I IN SUPPORT OF DIU AOI CRITICAL SUPPLY DELIVERY – PHASE 4 AND OPTION PHASE 5

Figure 19: Snapshot of Contract Description, W15QKN/W6QK ACC-PICA
PW Communications (n.d.)

DIU Microanalysis & OTA Conclusions

DIU was established in 2015 with a stated mission similar to that of AFWERX: to strengthen national security “by accelerating the adoption of leading commercial technology



throughout the military and growing the national security innovation base” (DIU, n.d.). According to its website, DIU utilizes Other Transaction authority to award prototype contracts in 90 days or less. Prototype projects typically run from 12–24 months, and upon completion, successful prototypes may transition to follow-on production OTAs or FAR-based contracts (DIU, n.d.). While W15QKN appeared to correspond to DIU, DIU does not publicly report its award data. Consequently, we were unable to verify if all W15QKN vendors in fact participated in the DIU program, or if DIU administered OTAs through other contracting offices. Nevertheless, we could infer that W15QKN corresponded to DIU and based on that assumption, concluded that DIU was the largest source of non-CMF gateway OTA vendors from 2017 through 2019. While DoD stakeholders might benefit from studying and potentially adopting aspects of DIU’s approach, it is important to consider that, when comparing the share of W15QKN vendors that were gateway versus existing vendors, only 28% of DIU vendors from 2017 through 2019 had no prior defense business. These findings suggest that if the DoD keeps expanding the use of OTAs without adjusting how they are marketed and administered, they will continue to be disproportionately leveraged by existing DoD suppliers.

Prize Competitions & Challenges

In addition to the SBIR/STTR program and OTAs, the DoD also uses Prize Competitions/Challenges to incentivize innovation and to engage problem solvers (Gallo, 2020). Congress provided DARPA with Competition authority in FY2000 and extended it to other military departments in FY2007 (Gallo, 2020). The authority states that the DoD can award monetary prizes “in basic, advanced, and applied research, technology development, and prototype development that have the potential for application to the performance of the military missions of the Department of Defense” (Gallo, 2020, p. 5). As a result of the America COMPETES Reauthorization Act, which expanded the authority for agencies including the DoD to conduct Prize Competitions, use of Prize Competitions has grown substantially since 2010 (Gallo, 2020). According to a White House Report on Federal Prize implementation, DoD prize investment increased from \$6.75 million in 2016 to \$18.8 million in 2018 (White House Office of Science and Technology Policy, 2019).

Although we were interested in evaluating the extent to which Prizes attracted new vendors into the defense market, the government classifies them as grants rather than procurements. As a result, they are not subject to consistent reporting requirements, and we were precluded from obtaining a comprehensive data set of participants. While we could not analyze Prizes at scale over the 2010–2019 period, we elected to conduct a microanalysis of one DoD Prize initiative, the Army’s Expeditionary Technology Search Prize, or xTechSearch. We selected xTechSearch because we were able to acquire a list of 24 xTechSearch finalists from 2019 through the xTechSearch website (xTechSearch, n.d.). Additionally, the Army website describes xTechSearch as a “contest for small businesses to develop and demonstrate new and emerging technologies that will help solve the Army’s modernization challenges,” launched as a way to transform how “the Army attracts and encourages innovation.” It was our intention, through this microanalysis, to determine whether the Army had met this objective.

A Note About the Microanalysis

The small sample size of the xTechSearch participant data set allowed us to explore features of xTechSearch companies that we were unable to consider in our broader quantitative analyses. Specifically, when we analyzed the overall DoD supplier base, SBIR/STTR participants, and OTA recipients, the size of the data sets precluded us from considering a company’s previous contracts from government customers outside the DoD. Additionally, we only considered a company’s prior *contract* awards; we could not explore non-contract federal funding (known as federal assistance), which includes federally-funded research and



development grants, prize awards, and non-DoD SBIR awards. Excluding these features from our broader analyses, we could not distinguish between companies that were truly engaging with the DoD for the very first time from companies that had not received a previous DoD contract or DoD-sponsored SBIR, but had received prior DoD grant/assistance funding. Furthermore, the essence of our research sought to better understand how the DoD attracts companies that have remained out of reach. There is a difference between a company that does business with the DoD for the first time but has years of experience supporting other federal customers compared to a company with no prior government experience whatsoever.

With 24 companies, we could consider whether a company had received any previous federal funding, including non-DoD contracts and/or federal assistance. While doing so introduced some inconsistencies between how we analyzed xTechSearch data relative to the other innovation program data, it allowed us to more comprehensively evaluate the program's ability to attract new vendors. It also allowed us to test an approach that could be replicated across the broader data in conjunction with follow-on research at a future date.

xTechSearch

To analyze the composition of the xTechSearch participants, we identified and linked the DUNS numbers for each of the 24 companies. We then searched each DUNS number against our FPDS and USASpending data to identify all related contract actions, regardless of the contracting agency. Lastly, we linked Assistance data from USASpending and searched the DUNS numbers for prior Assistance awards.

We found that 13 of the 24 companies had prior government business. Two of the companies had been doing business with the government for more than 10 years, five had generated more than \$10 million in government revenue, and an additional four had generated between \$1 million and \$9.9 million in government revenue. Three of the 24 companies had initial contract actions in 2019, and the features of these contracts align with the terms of the xTechSearch prize (dollar amount and date of award). Therefore, we could infer that these three companies had no prior defense or government business before participating in xTechSearch. For eight of the 24 companies, we found no records of them in FPDS or USASpending. In other words, according to publicly available data, these companies had received no funding from the federal government. This finding contradicts the list of finalists on the xTechSearch website and is likely the result of the inconsistent and/or nonexistent reporting requirements for prize awards. Although we could infer that they had no prior government contract awards, as those would have produced DUNS matches in FPDS or USASpending, we were unable to ascertain whether or not they had previous grants or assistance.

While further research is required to determine if the composition of xTechSearch participants is consistent with other DoD prize initiatives, these results, while limited, indicate that despite their stated mission, Prizes, like the SBIR/STTR program and OTAs, have disproportionately benefited existing vendors. Additionally, these results indicate that it is critical for the government to implement consistent reporting standards for prize/challenge data to ensure that program outcomes can be tracked and that recipients of grant funding, in general, can be included in analyses of the government's industrial base.

Conclusions & Recommendations

Despite the fact that DoD leadership has articulated an urgent need to engage commercial technology companies outside of the traditional defense industrial base, the macroeconomic data demonstrates a continuous decline in new vendors year to year. While further research is required to analyze the composition of other DoD innovation initiatives including Army Futures Command, SOFWERX, and an expanded data set of AFWERX and



Prize participants, our analyses of SBIR/STTR, OTAs and the xTechSearch prize yielded conclusive results. Rather than expanding the defense industrial base, the DoD's continuous investment in innovation initiatives has enabled entrenched defense suppliers to expand their market share. In addition to the program-specific recommendations offered previously, we suggest the DoD takes the following measures to improve its ability to attract new vendors:

- **Add a “First Time Vendor” field to SAM profiles.** DoD stakeholders cannot be held accountable for increasing the number of first time vendors they engage if they have no easy way to determine if a company has previous DoD experience. As demonstrated through our analyses, the DoD already collects much of the data required to distinguish a company as new versus existing. As such, we recommend that a company's SAM profile automatically update to indicate the date it first receives federal funding and the date it first receives DoD funding, and update two “First Time Vendor” fields accordingly—one to indicate companies with no prior federal business, and one to indicate no prior defense business.
- **Require consistent reporting standards for assistance/grant data and consortium data, as discussed previously.**

New Vendor Gateway

As demonstrated in our research, efforts to streamline the regulatory requirements and accelerate award timelines fail to mitigate the underlying factors that have thwarted the growth of the defense industrial base. We strongly recommend that the DoD establishes a “New Vendor Gateway”—a single gateway for innovative commercial technology companies with no prior defense business—that, if structured appropriately, would allow the DoD to better attract, access, and integrate the technologies of innovative new suppliers. Companies with no previous DoD experience are largely unfamiliar with how the government posits demand, and despite some media buzz related to AFWERX and DIU, information about the DoD's innovation initiatives rarely reaches audiences with no previous connection to the DoD market. As a result, these firms remain unaware that there may be demand for their products/services in the public sector. The new vendor gateway would allow disparate DoD stakeholders with similar requirements to pool their marketing resources/efforts and direct potential vendors to a single initial resource.

If and when an innovative technology company becomes aware that demand for its products or services exists in the defense market, it faces additional obstacles—including the number of disparate and seemingly redundant DoD innovation initiatives. There are no clear instructions for how companies should determine whether to join a consortium related to their technology, apply for a SBIR/STTR related to their technology, or apply for a DoD Prize related to their technology. Out of sheer frustration and confusion, companies will abandon the defense market altogether, in which case the fact that one program offered a streamlined submission process or an accelerated award timeframe had no bearing. The New Vendor Gateway would allow DoD stakeholders to help direct a company to the most appropriate opportunity using a variety of criteria. Additionally, a chat-bot system would allow the companies to ask clarifying questions.

Furthermore, even for the DoD's newest innovation initiatives that boast streamlined submission processes, the application process remains complex, confusing, and time-consuming. For instance, PW Communications undertook the Phase I and Phase II AFWERX submission processes and encountered multiple inconsistencies in the proposal instructions, delays in the timelines, and a general lack of clarity on expectations of the project. These issues dissuade companies, particularly those with robust private sector opportunities, from pursuing



business with the DoD. The New Vendor Gateway could include additional support tools/resources for companies in certain technology areas deemed critical to the DoD to help them navigate the submission process.

Because the process of identifying a relevant opportunity and successfully submitting a proposal is complicated, the programs ultimately favor companies that have already gone through the process. In other words, the more familiar a company is with the process, the more they can take advantage of these opportunities. A company's institutional knowledge of the process therefore becomes more relevant than the innovativeness of their solution. As mentioned previously, the DoD must institute minimum new vendor requirements for innovation initiatives, and the New Vendor Gateway will be a valuable tool to help the DoD achieve these thresholds.

Conclusions

It is more essential than ever for America's economic and national security that the DoD has access to the most state-of-the-art technologies. With strong leadership and a well thought-out restructuring of its resources and approaches, we believe the DoD can become "the customer of choice" among the nation's leading commercial innovators.

Reference List

- AcqNotes. (2019, August 15). Other transaction authority. Retrieved from <http://acqnotes.com/acqnote/careerfields/other-transaction-authority-ota>
- AFWERX. (n.d.). What is AFWERX? Retrieved April 7, 2020, from <https://www.afwerx.af.mil/faq.html>
- AiDA - MITRE Corporation. (2020, February 20). Existing other transaction (OT) consortia. Retrieved from <https://aida.mitre.org/ota/existing-ota-consortia/>
- Boyer, L. (2017, April 3). *SBIR/STTR phase III contracting—What you need to know* [Presentation slides]. Retrieved from <https://business.defense.gov/Portals/57/Documents/SBIR%20Phase%20III%20Contracting.pdf>
- Defense Business Board (DBB). (2014). *Report to the secretary of defense. Innovation: Attracting and retaining the best of the private sector*. Retrieved from [https://dbb.defense.gov/Portals/35/Documents/Reports/2014/DBB-FY14-02-Innovation%20report%20\(final\).pdf](https://dbb.defense.gov/Portals/35/Documents/Reports/2014/DBB-FY14-02-Innovation%20report%20(final).pdf)
- Defense Innovation Unit (DIU). (n.d.). Defense Innovation Unit (DIU). Retrieved April 7, 2020, from <https://www.diu.mil/about>
- DiNapoli, T. (2019). *Defense acquisitions: DoD's use of other transactions for prototype projects has increased* (GAO-20-84). Retrieved from <https://www.gao.gov/assets/710/702861.pdf>
- Dolan, M. (2019, January 1). *Consortia-based OTAs* [Presentation slides]. Retrieved from <https://abrl.psu.edu/wp-content/uploads/2019/01/ATI-Consortia-Based-OTAs.pdf>
- Gallo, M. (2020). *Federal prize competitions* (R45271). Retrieved from <https://fas.org/sgp/crs/misc/R45271.pdf>
- GSA. (n.d.). About challenge.gov. Retrieved April 7, 2020, from <https://www.challenge.gov/about/>



- GSA. (2020, March 30). Federal Acquisition Regulation: 52.230-1 Cost accounting standards notices and certification. Retrieved from <https://www.acquisition.gov/content/52230-1-cost-accounting-standards-notices-and-certification>
- Schwartz, M., & Peters, H. (2019). *Department of Defense use of other transaction authority: Background, analysis, and issues for Congress* (R45521). Retrieved from <https://fas.org/sqp/crs/natsec/R45521.pdf>
- Small Business Innovation Research (SBIR). (n.d.). About SBIR. Retrieved April 7, 2020, from <https://www.sbir.gov/about/about-sbir>
- Tirpak, J. (2008, July 16). The distillation of the defense industry. Retrieved from <https://www.airforcemag.com/article/0798industry/>
- White House Office of Science and Technology Policy. (2019). *Implementation of federal prize and citizen science authority: Fiscal years 2017–18*. Retrieved from <https://www.whitehouse.gov/wp-content/uploads/2019/06/Federal-Prize-and-Citizen-Science-Implementation-FY17-18-Report-June-2019.pdf>
- xTechSearch. (n.d.). Past competitions. Retrieved April 7, 2020, from <https://www.arl.army.mil/xtechsearch/past-competitions.html>





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