

APRIL 2019

# Acquisition Trends, 2018

## *Defense Contract Spending Bounces Back*

PROJECT DIRECTORS

Rhys McCormick  
Andrew P. Hunter

AUTHORS

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Samantha Cohen  
Gregory Sanders  
Andrew P. Hunter

A Report of the  
CSIS DEFENSE-INDUSTRIAL INITIATIVES GROUP &  
CSIS INTERNATIONAL SECURITY PROGRAM'S DEFENSE OUTLOOK SERIES

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# Executive Summary

There have been substantial shifts in the defense acquisition system over the past two years as it begins to rebound after sequestration and the defense drawdown.<sup>1</sup> At a most basic level, defense contract obligations have grown in each of the past two years after a trough in defense contract spending in Fiscal Year (FY) 2015. Beyond topline contract growth, the administration change naturally brings new priorities and policies to the Department of Defense (DoD). For example, the 2018 National Defense Strategy's heavy emphasis on great power competition will influence the types of weapon systems and capabilities that DoD develops and purchases going forward.

Shifts in the defense acquisition system have incentivized a variety of changes in the industry that supports it. Mergers and acquisitions (M&A) in the defense sector have increased in the last two years, and at the same time, the corporate strategies pursued by different companies in the industrial base have greatly diversified after an extended period of near-uniform conformity.<sup>2</sup> While almost every significant player in the defense industry was focused on cutting costs and increasing international sales during the downturn, very different strategies have emerged in the current upswing. Some companies have focused on DoD's call for technological innovation, others have focused on capturing increased revenues from existing product lines by expanding into services, while still others have sought to shift out of what they perceive to be low-margin services in order to focus on integration and high-margin subsystems. But changes within the defense industry have not, as of yet, been matched by changes in what companies are joining the defense industry. There is little to no evidence of recovery from the significant decline in defense contracting participation that occurred as a result of sequestration, and the rate of new entrants into the defense industry remains at extremely low levels.<sup>3</sup>

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1. Portions of this report have been adopted from "Defense Acquisition Trends 2017: A Preliminary Look" first presented at the 15th Annual Acquisition Research Symposium hosted by the Naval Postgraduate School. For the full paper see: Rhys McCormick, Gregory Sanders, and Andrew P. Hunter, *Defense Acquisition Trends 2017: A Preliminary Look*, in *Proceedings of the Fifteenth Annual Acquisition Research Symposium*, (Monterey, CA: Naval Postgraduate School, 2018), [https://www.researchsymposium.com/conf/app/researchsymposium/unsecured/file/352/SYM-AM-18-075-017\\_McCormick.pdf](https://www.researchsymposium.com/conf/app/researchsymposium/unsecured/file/352/SYM-AM-18-075-017_McCormick.pdf).

2. PricewaterhouseCoopers, *PWC Deals: Global Aerospace and Defense Deals Insights Year-End 2017*, (PWC: 2018), <https://www.pwc.com/us/en/industrial-products/publications/assets/pwc-aerospace-defense-industry-mergers-acquisitions-q4-2017.pdf>.

3. Rhys McCormick, Andrew P. Hunter, and Gregory Sanders, *Measuring the Impact of Sequestration and the Defense Drawdown on the Defense Industrial Base* (Washington, DC: Center for Strategic and International Studies, December 2017), <https://csis-prod.s3.amazonaws.com/>

This report analyzes the current state of affairs in defense acquisition by combining detailed policy and data analysis to provide a comprehensive overview of the current and future outlook for defense acquisition. The data used in this report is primarily derived from the Federal Procurement Data System (FPDS) and is supplemented with other open-sourced data. This analysis provides critical insights into understanding the current trends in the defense industrial base and the implications of those trends on acquisition policy.

This report discusses our findings on the key issues facing the defense acquisition system in 2018 and are organized into five main sections:

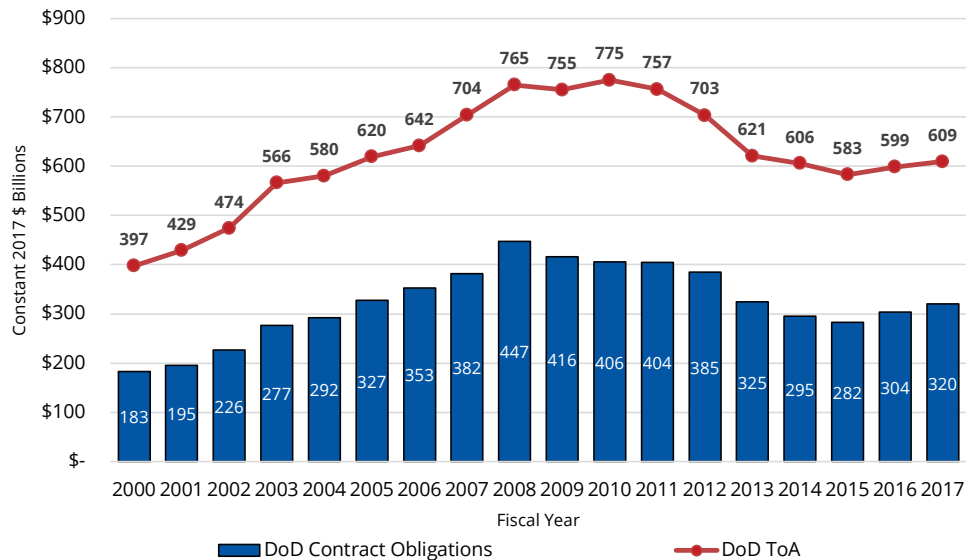
1. DoD Spending in a Budgetary Context
2. What is DoD Buying?
3. Whom is DoD Buying From?
4. How is DoD Buying It?
5. What Are the Defense Components Buying?

## DoD Spending in a Budgetary Context

Growth in defense contract obligations has outpaced the growth in DoD Total Obligation Authority (TOA) over the past two years. Between FY 2015 and FY 2017, DoD TOA increased from \$582.9 billion to \$609.3 billion, a 5 percent increase. As shown in Figure I, defense contract obligations have grown at over twice the rate over that FY 2015 to FY 2017 period, increasing from \$282.5 billion to \$319.8 billion, a 13 percent increase. In FY 2016, defense contract obligations increased by 8 percent but slowed to a 5 percent growth rate in FY 2017. As a share of DoD TOA, defense contract obligations have risen from 48 percent in FY 2015 to 52 percent in FY 2017, a figure in-line with the recent historical average of defense contracts as a share of DoD TOA (52 percent).



Figure I | Defense Contract Obligations and Total Obligational Authority, 2000–2017



Source: FPDS; Department of Defense, “National Defense Budget Estimates for Fiscal Year 2019 (Green Book),” Office of the Under Secretary of Defense (Comptroller), April 2018; CSIS analysis

Defense contract obligations increased at a rate of 13 percent, faster than non-defense contract obligations, which increased by a rate of 10 percent between FY 2015 and FY 2017. However, while the defense contracting rebound did not begin until FY 2016, non-defense contract obligations began rebounding in FY 2015. Measuring non-defense contract obligations by first year of rebound (FY 2015) to FY 2017, non-defense contract obligations have increased by 12 percent, a figure closer to the total defense contracting rebound.

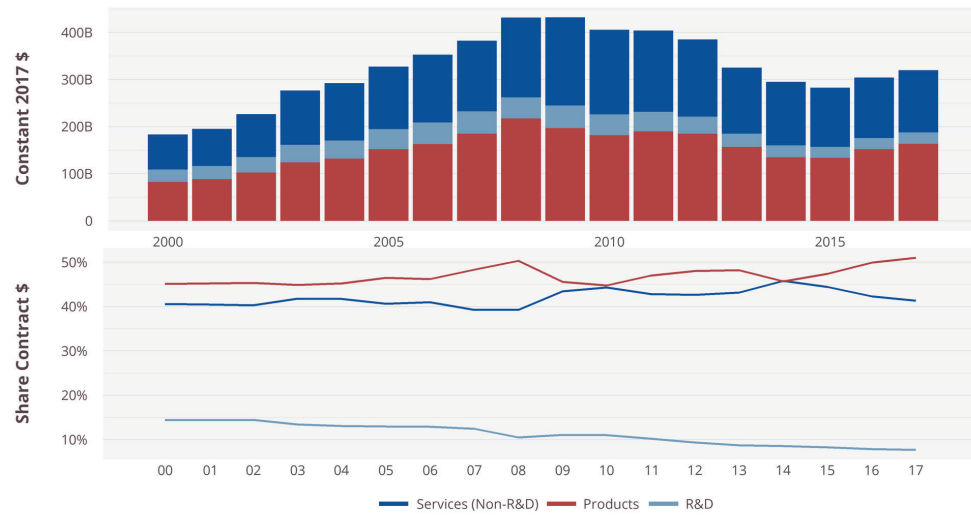
## What Is DoD Buying?

The defense contracting rebound has not been uniform across what DoD is procuring and has been most concentrated in defense products. As shown in Figure II below, between FY 2015 and FY 2017, defense products contract obligations increased 22 percent, while defense services contracting grew by 5 percent and defense research and development (R&D) contracting grew by 6 percent. As a share of total defense contract obligations, defense products contract obligations rose from 47 percent in FY 2015 to 51 percent in FY 2017, defense services contract obligations fell from 44 percent to 41 percent, and defense R&D contract obligations remained at a steady 8 percent. While this shift in the share of defense contracting spending on products and services spending may reflect a return to longer term averages,

the R&D share of the contract spending remains depressed compared to its long-run average.

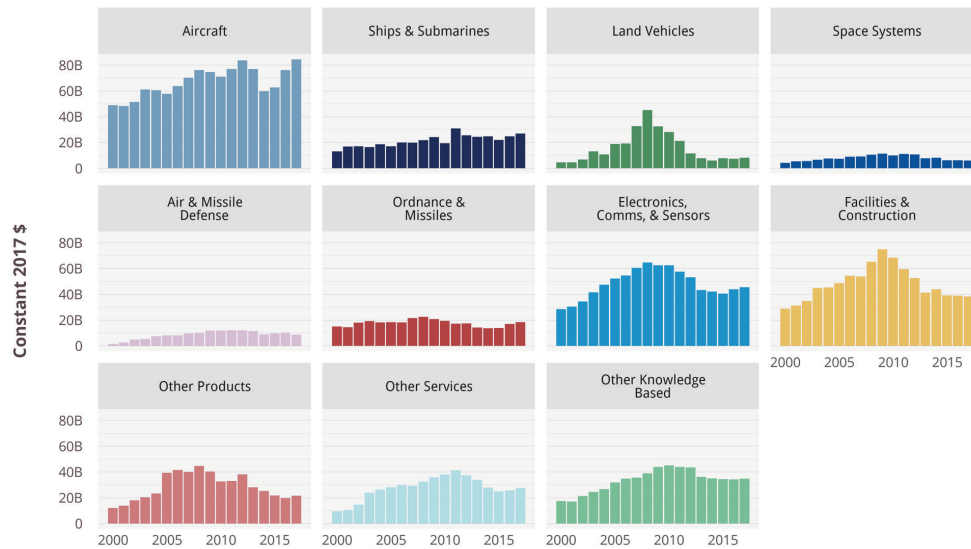
The defense contracting rebound was similarly uneven across the different sectors of the defense industrial base.

Figure II | Defense Contract Obligations by Area, 2000–2017



Source: FPDS; CSIS analysis

Figure III | Defense Contract Obligations by Platform Portfolio, 2000–2017



Source: FPDS; CSIS analysis

The defense contracting rebound was similarly uneven across the different sectors of the defense industrial base. As shown in Figure III above, between FY 2015 and FY 2017, contract obligations for some platform portfolios like Aircraft (34 percent), Ordnance and Missiles (32 percent), and Ships & Submarines (22 percent) all increased at rates larger than overall defense contract obligations (13 percent). At the same time, other platform portfolios like Air and Missile Defense (-11 percent) and Space Systems (-1 percent) fell despite the increased defense budget. The Land Vehicles platform portfolio, one of the platform portfolios most heavily affected by sequestration and the defense drawdown, started bouncing back in FY 2017 by increasing 10 percent, which is double the growth in overall contract obligations that year.

#### UPDATE ON DOD INNOVATION EFFORTS

The four major defense innovation efforts and offices created during the last administration—Defense Innovation Unit Experimental (DIUx), the Strategic Capabilities Office (SCO), the Third Offset Strategy, and the Defense Innovation Board—have all been continued to varying degrees by former Secretary of Defense Jim Mattis and the new administration.

“The defense contracting rebound was similarly uneven across the different sectors of the defense industrial base.

DIUx has fared best of these efforts, even making the transition to a permanent office last month and dropping the “experimental” designation from its title, becoming simply the Defense Innovation Unit. Beyond dropping the experimental title, over the past two years, DIUx has been extended several

new hiring and contracting authorities,<sup>4</sup> achieved buy-in from the military services and Secretary Mattis and received a \$41 million budget increase in FY 2019.

SCO’s fortunes have been more mixed, and the future of the office is still uncertain. The house subcommittee on emerging threats and capabilities proposed eliminating SCO in the FY 2019 National Defense Authorization Act (NDAA), but that provision was later weakened in the final conference report to only requiring the Secretary of Defense to prepare a report on whether to eliminate the office, transfer its responsibilities elsewhere, or

---

4. Some of these hiring and contracting authorities include hosting prize competitions, entering into cooperative research and development agreements, and rapid-hiring authorities. These authorities are not novel, but rather an extension of existing DoD authorities to DIUx.



keep it. The recent nomination of Chris Shank to replace Dr. Will Roper as SCO director (after Roper left to become Assistant Secretary of the Air Force for Acquisition) may indicate that Mattis intended to recommend keeping SCO in that report.

The term Third Offset itself has fallen out of favor in DoD, but many of its ideas still linger in the National Defense Strategy's reorientation to great power competition as well as in the talk surrounding the National Security Innovation Base. The new administration put its own stamp on these ideas when it broadened its list of priority capabilities from Third Offset's human-machine collaboration and combat teaming to a list of capabilities ranging from hypersonics to trusted microelectronics.

Conceptualized near the end of the Obama administration, the Defense Innovation Board continued its work under then-Secretary Mattis, issuing 16 recommendations in 2017 on how DoD can better access and implement innovation across the department. In 2018, the Defense Innovation Board, responding in part to a requirement in the FY 2018 NDAA, significantly sharpened its focus on software development. First, the Defense Innovation Board issued a set of 10 guiding principles, Ten Commandments of Software, and second, a series of metrics for software development that are not simply counting lines of software code as a metric.

#### **IMPLEMENTATION OF THE SPLIT OF UNDER SECRETARY OF DEFENSE FOR ACQUISITION, TECHNOLOGY, AND LOGISTICS**

The division of the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) into the two new offices—Under Secretary of Defense for Research and Engineering (USD(R&E)) and Under Secretary of Defense for Acquisition and Sustainment (USD(A&S))—was made official on February 1, 2018. However, the structure of the two new offices continues to evolve as subordinate offices are renamed, created, and eliminated and carryovers from the previous USD(AT&L) workforce are reassigned or retired. Several aspects of the implementation plan released July 13, 2018, such as the reporting structure for several organizations, differed from the plan previously submitted to Congress on August 1, 2017.

In the USD(R&E) some of these changes included, but are not limited to:

- Making SCO, DIUx, and the Defense Advanced Research Projects Agency (DARPA) report directly to the USD(R&E);
- Creating nine new Assistant Directors for key capabilities like hypersonics and quantum science that report to two new Directors (Research and Engineering; Advanced Capabilities);

- Eliminating the proposed Deputy Assistant Secretary of Defense (DASD) for Experimentation and Prototyping and added a Deputy Director for Development Test and Evaluation (DT&E).

In the USD(A&S), some of these changes and resolution of decisions were left undecided by the August 2017 plan. These unresolved decisions included, but are not limited to: making the DASD for Industrial Policy report directly to the USD(A&S), splitting the Manufacturing Technology office from the Industrial Base Policy office and sending it to the USD(R&E), creating a DASD for Services & Business Systems (DASD(S&B)), and eliminating the Assistant Secretary of Defense (ASD) for Energy, Installations, and Environment and rolling those offices into the ASD for Sustainment.

Overall, the latest implementation plan provided a much more clearly defined structure than the original August 2017 plan, but the long-term success of the USD(A&TL) division will remain unknown for some time. The final implementation plan's best decisions were changing DIUx, SCO, and DARPA's reporting, creating the DASD(S&B), and making the DASD (Industrial Policy) a direct USD(A&S) report. The decisions to split manufacturing technology and industrial policy and eliminate the DASD (Experimentation & Prototyping) were more questionable, as they weaken sources of real organizational strength. Finally, there are unanswered questions about how these two offices ultimately end up working together given the alignment of duties and authorities. How do the USD(R&E), USD(A&S), and Under Secretary of Defense for Policy work together on establishing and managing international R&D efforts? What is the relationship between the USD(R&E) and the military services? Who will coordinate the funding that DASD (Emerging Capability & Prototyping) used to control? How do the USD(R&E) and USD(A&S) coordinate on common issues like professional workforce development? These are just a few of the questions that will remain unanswered until the offices have had the time to resolve them.

#### **R&D CONTRACTING DURING THE BUDGET DRAWDOWN**

As Figure IV on the next page shows, the eight-year trough in major weapon systems development pipeline appears to have bottomed out but does still exist in some stages of R&D, and it will still be some time before DoD fully recovers.

After taking the brunt of the R&D cuts during the eight-year trough, System Development & Demonstration (6.5) contract obligations increased 11 percent in FY 2017 but are still less than half of historical average this century.

“System Development & Demonstration (6.5) contract obligations increased 11 percent in FY 2017 but are still less than half of historical average this century.

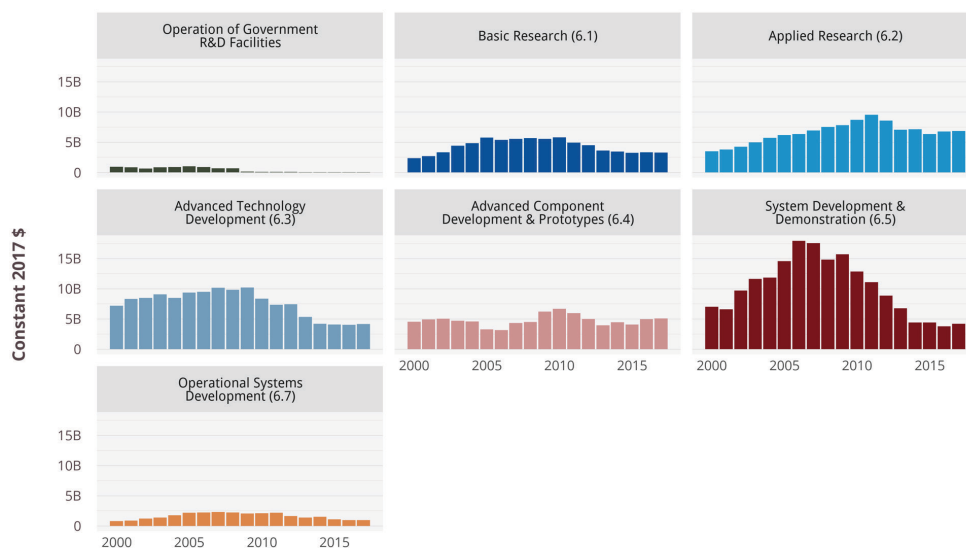
Advanced Technology Development (6.3) and Operational Systems Development (6.7) contract obligations have been slower to recover, increasing just 3 percent and 1 percent, respectively, in FY 2017.

DoD Advanced Component Development & Prototypes (6.4) contract obligations surpassed historical averages in FY 2016 and FY 2017. DoD Advanced Component

Development & Prototypes (6.4) contract obligations totaled \$4.9 billion in FY 2016 and 5.1 billion in FY 2017, surpassing the \$4.7 billion annual average this century.

The two seed-corn categories, Basic Research (6.1) and Applied Research (6.2), were relatively protected during sequestration and the drawdown, but between FY 2015 and FY 2017, Applied Research (6.2) contract obligations increased 8 percent while defense Basic Research (6.1) contract obligations increased 2 percent.

Figure IV | Defense R&D Contract Obligations by Stage of R&D, 2000–2017



Source: FPDS; CSIS analysis

## Defense Services

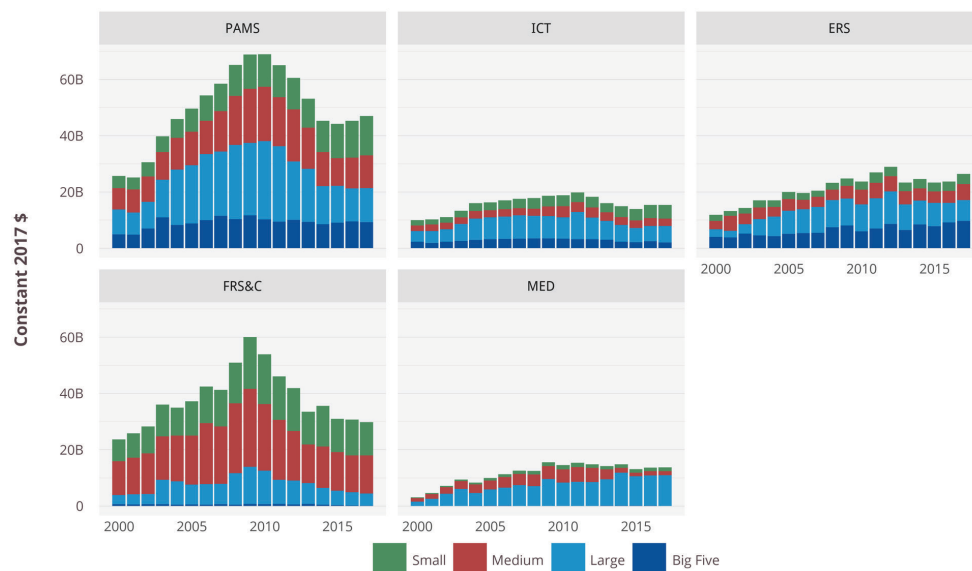
Although Major Defense Acquisition Programs (MDAP), primarily acquired using product and R&D contracts, draw most of the public attention on



defense acquisition, 42 percent of DoD's contracting obligations since FY 2000 went to services. These services vary from maintaining infrastructure and equipment to administrative and medical work. In recent years, defense services contract obligations increased from \$125.5 billion in FY 2015 to \$132.1 billion in FY 2017, a 5 percent increase. As growth in defense services contract obligations has lagged topline growth, defense services have fallen as a share of defense contract obligations from 44 percent in FY 2015 to 41 percent, slightly below historical averages.

In recent years, there have been significant shifts in the defense services trends, shown in Figure V. Small vendors have increased as a share of both Professional, Administrative, and Management Support services (PAMS) contract obligations, and Information and Communications Technology services (ICT) contract obligations. Simultaneously, the Big Five have focused their growth on Equipment-related services (ERS), which covers much of the operations and maintenance work for MDAPs. Services spending is proving resilient despite policy guidance aimed at curtailing that spending across DoD, especially in the Navy. The resilience of services spending is not that shocking, however, when you consider both the fact that increasingly aging fleets facing readiness shortfalls lead to higher ERS spending and that medical costs are increasing across the entire U.S. economy, not just DoD.

Figure V | Defense Services Contract Obligations by Size of Vendor, 2000–2017



Source: FPDS; CSIS analysis

## How Is DoD Buying It?

### REFORMING THE DEFENSE ACQUISITION SYSTEM

Priorities for acquisition reform are undergoing a major shift. In the first half of this decade, cost control was the major imperative . . . Today, however, the predominate push . . . is for greater speed . . . and halting the erosion of DoD's technical edge.

Priorities for acquisition reform are undergoing a major shift. In the first half of this decade, cost control was the major imperative for most acquisition reform efforts. Today, however, the predominate push from both DoD leadership and Congress is for greater speed in defense acquisition and to put a halt to the erosion of DoD's technical edge over competitors. This shift manifests itself in a range of acquisition reform efforts that are currently underway. Examples include: the delegation of milestone decision authority to the military services, the FY 2018 NDAA's focus on reforming software acquisition and establishing an online marketplace for commercial technology purchases, the Joint Enterprise Defense Infrastructure (JEDI) Cloud effort, the emerging recommendations of the Section 809 panel, and new policy priorities like increasing DoD's usage of Other Transaction Authority (OTA) to spur innovation.

The acquisition reforms in the FY 2018 NDAA were more targeted than the sweeping changes in the FY 2016 and FY 2017 NDAA, where the latter aimed to shift DoD's priorities from focusing on cost controls during the 2008 to 2014 cost-control era to speeding up acquisition processes by removing decision-making steps. The two most controversial provisions of the NDAA were the House Armed Services Committee's proposal to create a singular online DoD marketplace and the Senate Armed Services Committee's creation of a range of new DoD software development requirements (although both were scaled back in the final bill). The DoD online marketplace was expanded to include multiple, government-wide marketplaces, but their creation was delayed by two years. Meanwhile, DoD's software requirements were weakened from strict requirements to preferences for DoD to obtain technical data to the maximum extent possible.<sup>5</sup>

Congressional focus on information technology-related acquisition issues is likely to be a continuing theme. DoD's request to vendors for bids on a commercial-solutions JEDI Cloud contract operated by a single vendor

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5. National Defense Authorization Act for Fiscal Year 2018, Public Law 115-91, 115th Cong., Sec. 2439, (2017), <https://www.congress.gov/115/plaws/publ91/PLAW-115publ91.pdf>.

has come under intense scrutiny by industry, but DoD has stuck with its single-vendor offering plan in the final JEDI request for proposal. However, Congress has restricted DoD's JEDI funding by 15 percent in the FY 2019 NDAA until DoD delivers a report to Congress providing a detailed JEDI acquisition strategy and justification.<sup>6</sup>

The Section 809 Advisory Panel on Streamlining and Codifying Acquisition Regulation created in the FY 2016 NDAA has issued two of three planned volumes of recommendations for streamlining acquisition, most of which are focused on obtaining better access to commercial technologies for DoD. Some of these recommendations were included in the FY 2019 NDAA, and the full recommendations will likely be a source of debate throughout the FY 2020 NDAA process.

“Priorities for acquisition reform are undergoing a major shift. In the first half of this decade, cost control was the major imperative . . . Today, however, the predominate push . . . is for greater speed . . . and halting the erosion of DoD's technical edge.

Finally, DoD usage of OTA's has increased in recent years, particularly under the new administration.<sup>7</sup> DoD OTAs obligations have increased 195 percent between FY 2015 and FY 2017 after Congress included several statutory changes in the FY 2015 and FY 2016 NDAA's to incentivize their usage. However, despite just recently giving DoD the authority to transition prototypes to full-rate production under an OTA, Congress has already started pushing back on OTAs. Both the House FY 2019 NDAA and Defense appropriations bills

contained provisions creating new DoD OTA Congressional notification requirements for follow-on production awards over \$5 million, but both provisions were struck down during conference with the Senate in favor of other new reporting requirements.<sup>8</sup>

6. John S. McCain National Defense Authorization Act for Fiscal Year 2019, 115th Cong., Sec. 1064, (2018), <https://www.congress.gov/115/bills/hr5515/BILLS-115hr5515enr.pdf>.

7. OTAs are an acquisition mechanism intended for the DoD to access innovation outside of the traditional acquisition system through prototyping. The benefit of OTAs is that they are neither contracts, grants, nor cooperative agreements and are not subjected to the Federal Acquisition Regulations, Defense Federal Acquisition Regulations, or other statutes, policies, and regulations.

8. Justin Doubleday, "Authorizers Leave OTA Untouched; DoD Heeds 'Warning Shot'," Inside Defense, August 1, 2018, <https://insidedefense.com/inside-pentagon/authorizers-leave-ota-untouched-dod-heeds-warning-shot>; Justin Doubleday, "Spending Bill Increases Reporting Requirements for OTAs," Inside Defense, September 17, 2018, <https://insidedefense.com/daily-news/spending-bill-increases-reporting-requirements-otas>.

## PERFORMANCE OF THE DEFENSE ACQUISITION SYSTEM

While it is straightforward to describe policies, new acquisition approaches require patience, because to properly gauge them, we must look at how inputs—such as trends in contract spending—determine outputs—such as acquisition system performance. Past CSIS research has found that major reforms often take two years to show notable affects.<sup>9</sup> As a result, evaluations of the performance of the system primarily tell us about the effects of the final years of the Better Buying Power initiative rather than give us insight into the new administration’s policies.

Based on reporting from the Government Accountability Office (GAO)—as well as the Defense-Industrial Initiative Group’s (DIIG) own analysis of contracting outcomes—it appears that the last round of acquisition reform achieved its primary goal of reducing cost growth. The GAO found that congressional and executive reform efforts could be tied to programs better staying within cost targets, although new progress was tapering off. More meaningfully, this finding could not just be attributed to more conservative cost estimation, which could obscure performance stagnation where cost growth was reduced but underlying costs were not. The GAO also observed a new crop of programs that are comparably more affordable than their predecessors, indicating that Better Buying Power did generate increased program affordability in absolute terms.<sup>10</sup>

Sadly, DoD’s series of reports on the performance of the defense acquisition system have not been continued by the new administration, but DIIG was able to replicate the findings asserted in these reports on decreases in cost growth with our own analysis of contract level outcomes. The results were not uniformly good, as the past two years of data include some spikes in terminations and ceiling breaches, but overall, the trend has been positive.

Finally, acquisition reform requires tradeoffs, and measuring acquisition performance in terms other than cost can throw this into stark relief. The GAO caveated their good news findings on cost by noting that schedule growth continues to mount. A RAND study on cost and schedule estimation found that further improvements in estimation may be hard, as many popular theories about what drive these phenomenon fail to effectively predict cost

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9. Rhys McCormick, Samantha Cohen, and Maura Rose McQuade, *Measuring the Outcomes of Acquisition Reform by Major DoD Components* (Washington, DC: Center for Strategic and International Studies, 2015), [https://csis-prod.s3.amazonaws.com/s3fs-public/legacy\\_files/files/publication/150930\\_McCormick\\_MeasuringOutcomesAcquisitionReform\\_Web.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/150930_McCormick_MeasuringOutcomesAcquisitionReform_Web.pdf).

10. Government Accountability Office, *Weapon System Annual Assessment: Knowledge Gaps Pose Risks to Sustaining Recent Positive Trends* (Washington, DC: GAO, 2018), 2, <https://www.gao.gov/products/GAO-18-360SP>.

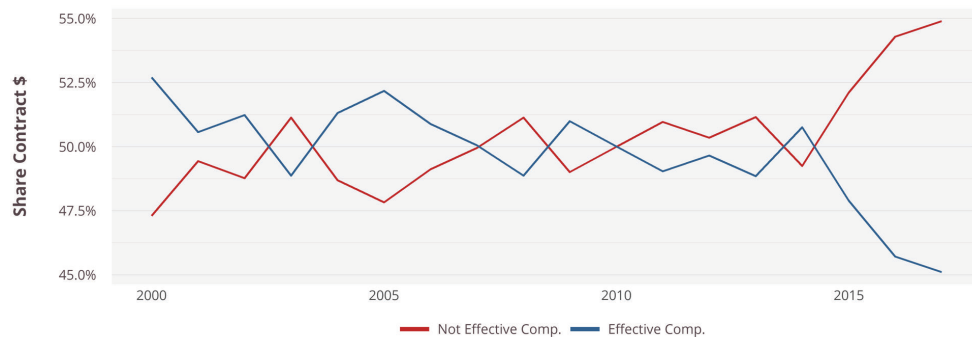


growth.<sup>11</sup> However, the Institute for Defense Analysis has found support for the idea that schedule estimating is bad because schedules are often based on external deadlines as opposed to a realistic look at past cycle times for similar programs in a series of reports.<sup>12</sup> Regardless of who is right on this question, the challenges of schedule estimation casts a fog over reformers attempts to achieve a faster acquisition process.

## COMPETITION FOR DEFENSE CONTRACTS

Up until recent years, DoD's overall rate of effective competition had seemed impervious to change despite policy guidance and changes in what DoD purchased, as shown in Figure VI below. However, there has been a sharp decline in the rate of effective competition for defense contract obligations over the past two years. The share of contract obligations that was awarded after effective competition fell to 44 percent in FY 2017, well below the historical average of 49 percent between FY 2000 and FY 2015.

Figure VI | Level of Competition for Defense Contract Obligations, 2000–2017



Source: FPDS; CSIS analysis

Although the overall rate of effective competition for defense contract obligations declined sharply, the data show that the declines were largely concentrated in a limited number of platform portfolios, as shown in Figure VII. DoD's overall decline in effective competition is being heavily driven by the trends in the Aircraft platform portfolio. Aircraft, already one of the least competitive sectors, became even more non-competitive during the defense contracting rebound. As Aircraft obligations increased 34 percent

11. Thomas Light, et al, *Quantifying Cost and Schedule Uncertainty for MDAPs*, (Santa Monica, California: RAND Corporation, 2017), 44, [https://www.rand.org/pubs/research\\_reports/RR1723.html](https://www.rand.org/pubs/research_reports/RR1723.html).

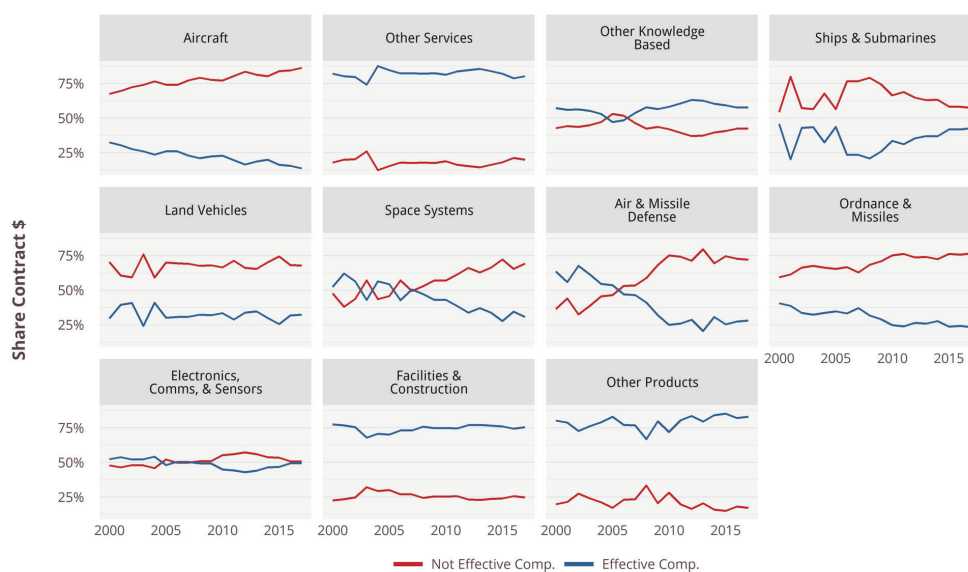
12. David M. Tate, *Acquisition Cycle Time: Defining the Problem*, (Alexandria, Virginia: Institute for Defense Analyses, 2016), 6, [https://www.ida.org/idamedia/Corporate/Files/Publications/IDA\\_Documents/CARD/2016/D-5762.ashx](https://www.ida.org/idamedia/Corporate/Files/Publications/IDA_Documents/CARD/2016/D-5762.ashx).

“There has been a sharp decline in the rate of effective competition for defense contract obligations over the past two years.

between FY 2015 and FY 2017, the rate of effective competition fell from 16.7 percent to 13.9 percent. The only other platforms experiencing sizable decline in the rate of effective competition were “Other Products,” “Other Services,” and “Other Knowledge Based.”

Simultaneously, the rate of effective competition increased in a number of platform portfolios that are commonly thought of to be non-competitive, but those gains did not offset the Aircraft trends. For example, the rate of effective competition for Ships & Submarines contract obligations increased from 41.9 percent in FY 2015 to 42.9 percent in FY 2017.

Figure VII | Defense Contract Obligations by Platform Portfolio by Level of Competition, 2000–2017



Source: FPDS; CSIS analysis

## From Whom Is DoD Buying?

The last two year’s defense contracting rebound most benefited the Big Five, but Small and Medium vendors have also benefited, while Large vendors fared the worst.

Big Five defense contract obligations far outpaced the topline growth in defense contract obligations, where Big Five defense contract obligations increased by 33 percent between FY 2015 and FY 2017, resulting in their share of defense contract obligations increasing from 30 percent to 35 percent. Big Five contract obligations grew more than twice the overall

rate in all three categories—products (43 percent), services (10 percent), and R&D (12 percent).

Large vendors contract obligations declined 1 percent between FY 2015 and FY 2017, falling as a share of defense contract obligations from 31 percent to 27 percent. Large vendors' contract obligations increased in products (6 percent) but declined in services (-4 percent) and R&D (16 percent).

Small (10 percent) and Medium (9 percent) vendors grew at nearly equivalent rates between FY 2015 and FY 2017. Both categories increased in products, services, and R&D, but Small vendors' R&D growth (14 percent) outpaced their growth in services (9 percent) and products (9 percent), while Medium vendors' services growth (11 percent) outpaced products (8 percent) and R&D (7 percent).

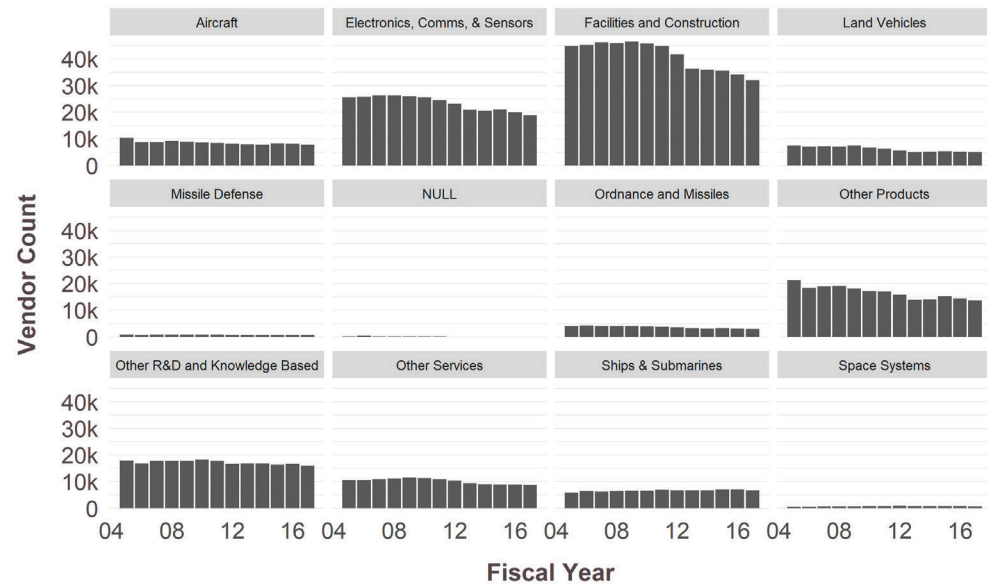
#### VENDOR COUNT

Figure VIII shows that despite defense contract obligations increasing by 13 percent between FY 2015 and FY 2017, the number of unique prime vendors doing business with DoD declined by 9 percent. The continuing decline in total prime vendors is of potential concern, especially given the emphasis in the National Security Strategy and the National Defense Strategy on strengthening the industrial base and expanding access to a broader swath of potential suppliers in the National Security Innovation Base. It is also important to note that the dynamics in industry are different today than they were during the defense drawdown. The largest contract obligations increases have gone to procuring legacy weapon systems in the Aircraft, Ships & Submarines, and Ordnance and Missiles platform portfolios, significantly limiting the pool of potential prime vendors. Given these platform portfolios' more limited prime vendor base, the trends in the lower tiers of the supply chain are of more interest regarding the health of the industrial base. Unfortunately, the subcontracting data available from the Federal Funding Accountability and Transparency Act Subaward Reporting System (FSRS) is unreliable, which limits its analytical use. Additionally, there has been a large uptick in M&A activity across the broader economy in recent years, but especially in the aerospace and defense sector, which can also serve to put downward pressure on vendor counts.<sup>13</sup>

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13. Greg Roumeliotis and Pamela Barbaglia, "Global Mergers and Acquisitions Reach Record High in First Quarter," Reuters, March 30, 2018, <https://www.reuters.com/article/us-deals-review/global-mergers-and-acquisitions-reach-record-high-in-first-quarter-idUSKBN1H60EC>.

Figure VIII | DoD Vendor Count by Platform Portfolio, 2005–2017

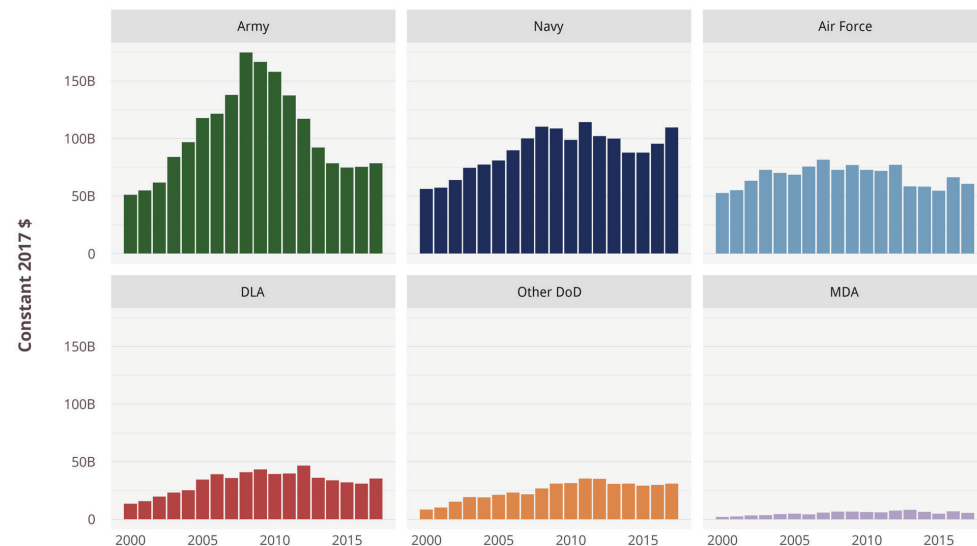


Source: FPDS; CSIS analysis

## What Are the Defense Components Buying?

As shown in Figure IX below, defense contract obligations increased in each major DoD component between FY 2015 and FY 2017. However, the trends within each of the major DoD components differed significantly.

Figure IX | Defense Contract Obligations by Component, 2000–2017



Source: FPDS; CSIS analysis

## ARMY

Army contract obligations increased 5 percent between FY 2015 and FY 2017, primarily in products (13 percent), with only minimal growth in R&D (2 percent) and no growth in services (0 percent). Army Aircraft (20 percent) and Ordnance and Missiles (74 percent) contract obligations increased the most amongst platform portfolios, while Facilities & Construction (-5 percent) and Air and Missile Defense (-40 percent) declined the most. In the last two years, the rate of effective competition for Army contract obligations decreased from 51.2 percent to 49.5 percent. Finally, General Atomics replaced United Technologies (UTC) in the 10 Army vendors in FY 2017 as a result of UTC's fall from the fourth largest Army vendor in FY 2015 to outside the top 100 after selling Sikorsky to Lockheed Martin

## NAVY

Navy contract obligations increased 25 percent between FY 2015 and FY 2017, primarily in products (38 percent) but with more modest growth in R&D (5 percent) and services (6 percent). Navy Aircraft contract obligations increased 58 percent between FY 2015 and FY 2017, significantly higher than the 21 percent in Navy Ships & Submarines contract obligations. The rate of effective competition for all Navy contract obligations declined from 34 percent in FY 2015 to 31 percent in FY 2017, but in-particular, it plummeted in Navy R&D falling from 49.1 percent to 40.5 percent. Finally, there were no changes in vendors comprising the top 10 Navy vendors by contract obligations between FY 2015 and FY 2017, but Huntington Ingalls Incorporated rose from seventh in FY 2015 to third in FY 2017, its highest ranking since Northrop Grumman spun off its shipbuilding sectors to form Huntington Ingalls in 2011.

## AIR FORCE

Air Force contract obligations increased 11 percent between FY 2015 and FY 2017 but whipsawed between a 22 percent increase in FY 2016 and 9 percent decrease in FY 2017. Air Force services and R&D were relatively unaffected by the topline whipsaw, but Air Force products went from a 54 percent increase in FY 2016 to a 28 percent decrease in FY 2017. The whipsaw also only primarily affected the Aircraft platform portfolio, which increased 33 percent in FY 2016 but decreased 18 percent in FY 2017. During a period when overall DoD effective competition sharply declined, the increase in Air Force's overall rate of effective competition is somewhat surprising, especially given the Air Force's historically low levels of effective competition. Notably, the Air Force increased its rate of effective competition for products



from 19 percent to 28 percent and slightly reversed the previous trend of declining competition for services. Finally, Small vendors rose as a share of Air Force contract obligations from 15.6 percent in FY 2016 to 17.8 percent in FY 2017.

## Final Thoughts

The defense acquisition system currently sits at an inflection point that will likely transform the defense acquisition system and supporting defense industrial base over the next 10 to 20 years. Defense contracting has rebounded these past two years, but there are unanswered questions about continued defense budget growth and the long-term effects of the last few years' acquisition reform efforts. Furthermore, the current administration's decisions on balancing competing readiness and modernization priorities will inform U.S. force construct planning for the next 30 years. Cumulatively, these decisions will inform the likely transformation of the U.S. defense acquisition system.

Defense acquisition reform efforts may have slowed down last year compared to the past few years, but the efforts in Congress to fundamentally restructure the defense acquisition system are the biggest changes to the defense acquisition system since the changes post-Packard Commission and Goldwater Nichols. Compared to the 1990s streamlining emphasis and the 2008–2014 cost-control era, the recent Congressional reforms seek to fundamentally change DoD's program management and decision-making structures for developing and procuring MDAPs.<sup>14</sup> The division of USD(AT&L) and delegation of greater acquisition decision-making authority to the military services could fundamentally alter which capabilities DoD develops and procures, while the recent program management changes designed to divorce many technology development efforts from platform development efforts could spur the end of MDAPs as we have known them.<sup>15</sup> It will not be known whether these changes ultimately accomplish Congress' goals to speed up defense acquisition and spur technological advancement until the years to come, but whether or not these reforms accomplish those goals, they will transform the nature of the defense acquisition system.

DoD's current challenge to balance competing readiness and modernization priorities, as well as find the proper balance within DoD's modernization

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14. Andrew P. Hunter, "The Cycles of Defense Acquisition Reform and What Comes Next," *Texas A&M Journal of Property Law*, (2019: Forthcoming).

15. Andrew P. Hunter, *Moving Away from Traditional Major Defense Acquisition Program Structure* (Washington, DC: Center for Strategic and International Studies, 2016), [https://csis-prod.s3.amazonaws.com/s3fs-public/publication/160902\\_Moving\\_Away\\_Traditional\\_Major\\_Defense\\_Acquisition.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/publication/160902_Moving_Away_Traditional_Major_Defense_Acquisition.pdf).

investment portfolio, will reverberate in U.S. force construct planning for the next 30 years, which will only further compound the likely forthcoming transformation of the defense acquisition system. The contract data show that during the defense contracting rebound, DoD has prioritized more immediate and longer-term (10–15 years) challenges over more intermediate-term challenges in the next 5 to 10 years, and the recent large increases in products contract obligations and composition of its R&D portfolio balanced towards Basic (6.1) and Applied (6.2) research further supports that assertion. This balancing act only becomes more challenging in the coming years as DoD seeks to increase both investments in emerging technologies like hypersonics and access to innovations from non-traditional suppliers while simultaneously seeking to prevent parts of the current force that are sitting at inflection points, like the F-18 inventory, from tipping over and entering a death spiral.

Any of these issues by themselves would likely transform the defense acquisition system, but combined, they could bring some of the most radical changes to the modern defense acquisition system since its inception at the end of World War II. Whether such radical change accomplishes what the reformers set out to achieve will not be answered in the immediate future, but today's decisions will inform the trajectory of this transformation for the years to come. When making the difficult decisions about how to implement the recent reforms—or when choosing between competing investment priorities—decisionmakers need to pay heed to emerging data about the performance of the acquisition system and ensure that the coming transformation of the defense acquisition systems is one for the better.

# Introduction

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**There have been substantial shifts** in the defense acquisition system over the past two years as it begins to rebound after sequestration and the defense drawdown. Defense contract obligations have grown in each of the past two years after hitting bottom in Fiscal Year (FY) 2015. Beyond topline contract growth, the change in administration naturally brings new priorities and policies to the Department of Defense (DoD). For example, the 2018 National Defense Strategy's heavy emphasis on great power competition will influence the types of weapon systems and capabilities DoD develops and purchases going forward.

This report analyzes the current state of affairs in defense acquisition by combining detailed policy and data analysis to provide a comprehensive overview of the current and future outlooks for defense acquisition. This analysis will provide critical insights into what DoD is buying, how DoD is buying it, from whom is DoD buying, and what the different defense components are buying. This information is informed by data from the Federal Procurement Data System (FPDS), and this analysis provides critical insights into understanding the current trends in the defense industrial base and the implications of those trends on acquisition policy.<sup>16</sup>

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16. Portions of this report have been adopted from *Defense Acquisition Trends 2017: A Preliminary Look* first presented at the 15th Annual Acquisition Research Symposium hosted by the Naval Postgraduate School. For the full paper see: Rhys McCormick, Gregory Sanders, and Andrew P. Hunter, "Defense Acquisition Trends 2017: A Preliminary Look," in *Proceedings of the Fifteenth Annual Acquisition Research Symposium*, (Monterey, CA: Naval Postgraduate School, 2018), [https://www.researchsymposium.com/conf/app/researchsymposium/unsecured/file/352/SYM-AM-18-075-017\\_McCormick.pdf](https://www.researchsymposium.com/conf/app/researchsymposium/unsecured/file/352/SYM-AM-18-075-017_McCormick.pdf).

## 1.1 | Report Organization

This report is organized into the following chapters:

### CHAPTER 2: DOD CONTRACT SPENDING IN A BUDGETARY CONTEXT

How has the defense contracting topline responded to the recent increases in the defense budget? How does the growth in defense contract obligations compare to broader federal contracting landscape?

### CHAPTER 3: WHAT IS DOD BUYING?

How has the defense contracting rebound changed what DoD is purchasing? What is the status of the innovation initiatives in the new administration? Has the trough in the development pipeline for major weapon systems continued in FY 2017? What is DoD spending on services?

### CHAPTER 4: HOW IS DOD BUYING IT?

What major acquisition reform efforts are currently underway? How have DoD contracting approaches changed over time? What performance metrics can be derived from publicly available DoD contract data?

### CHAPTER 5: WHOM IS DOD BUYING FROM?

How has the composition of prime vendors changed during the drawdown and what causes can be identified? Who are the top vendors, and what do they tell us about industrial base consolidation?

### CHAPTER 6: WHAT ARE THE DEFENSE COMPONENTS BUYING?

How has the defense contracting rebound affected contract spending within the major DoD components? What are the specific sources of any increases or declines in contract obligations within the major DoD components?

### CHAPTER 7: CONCLUSION

This chapter summarizes the major findings of this report.

## 1.2 | Methodology

This report uses the methodology used in CSIS reports on federal contracting. For over a decade, the Defense-Industrial Initiatives Group (DIIG) has issued a series of analytical reports on federal contract spending for national security by the government. These reports are built on FPDS data, which is downloaded in bulk from USAspending.gov. DIIG now maintains its own

database of federal spending, which includes data from FY 1990 to FY2017. This database is a composite of FPDS and DD350 data. For this report, the study team relied on FY 2000 to FY 2017 data. All dollar figures are in constant FY 2017 dollars, using the latest Treasury deflators.

For additional information about the CSIS contracting data analysis methodology, see Appendix A: Methodology.

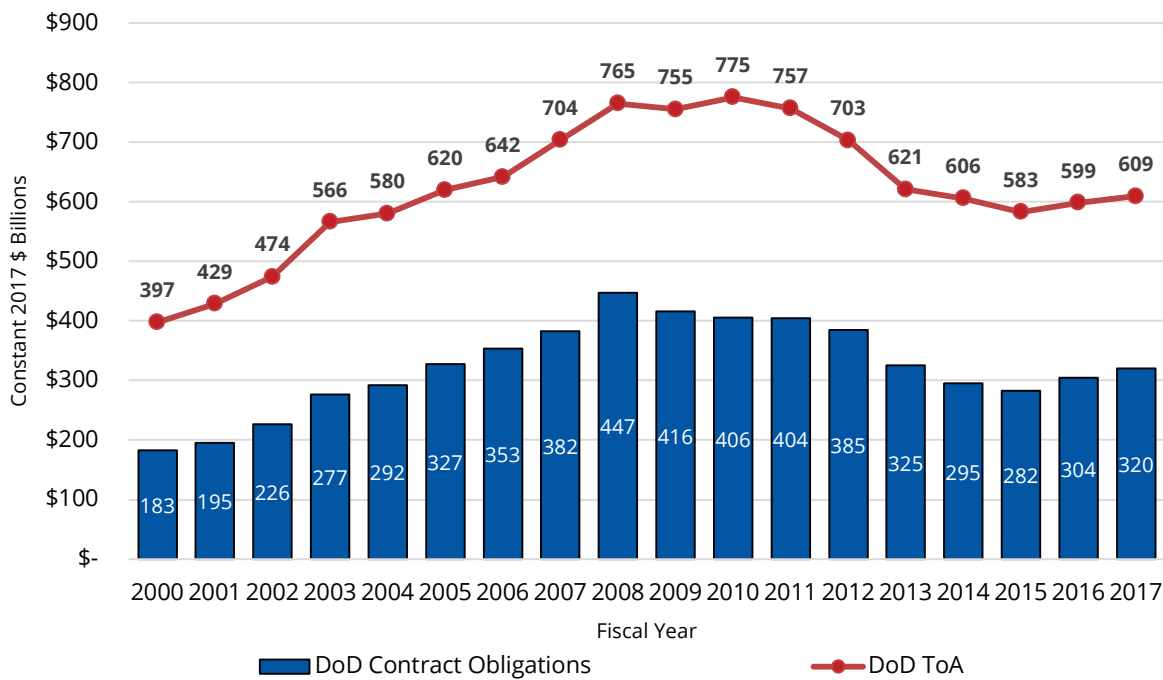


## DoD Contract Spending in a Budgetary Context

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**Total DoD contract obligations increased** from \$304.1 billion in FY 2016 to \$319.8 billion in FY 2017, a five percent increase. Since DoD contracting obligations bottomed out in FY 2015, overall DoD contract obligations have increased by 13 percent over the past two years. Total DoD contract obligations have increased as a share of DoD Total Obligation Authority (TOA) over the past two years, going from 48 percent in FY 2015 to 51 percent in FY 2016 and then 52 percent in FY 2017, a figure in-line with the recent historical average of defense contracts as a share of DoD TOA (52 percent). With the defense budget set to increase in FY 2018 and FY 2019, defense contract obligations are likely to continue to grow in the future. Figure 2-1 shows that overall DoD contract obligations continued to grow in FY 2017 as the overall defense budget increased.

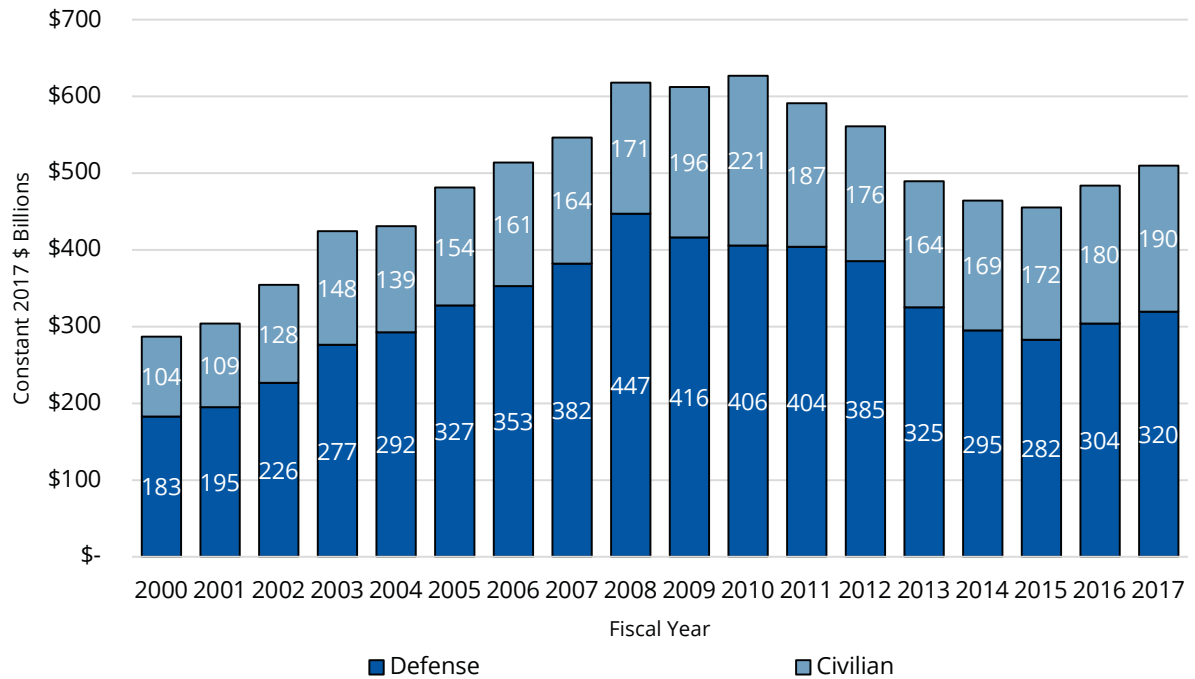
Figure 2-1 | Defense Contract Obligations and Total Obligational Authority, 2000-2017



Source: FPDS; Department of Defense, “National Defense Budget Estimates for Fiscal Year 2019 (Green Book),” Office of the Under Secretary of Defense (Comptroller), April 2018; CSIS Analysis

Figure 2-2 shows that DoD contract obligations have grown faster than civilian contracts since FY 2015. From FY 2015 to FY 2017, civilian contract obligations have increased 10 percent compared to the 13 percent growth in defense contract obligations. Although civilian contract obligations began rebounding in FY 2014, a year sooner than DoD (FY 2015), annual growth has been more gradual than defense. In FY 2016 and FY 2017, civilian contract obligations grew 4.4 percent and 5.6 percent, respectively.

Figure 2-2 | Civilian v. Defense Contract Obligations, 2000–2017

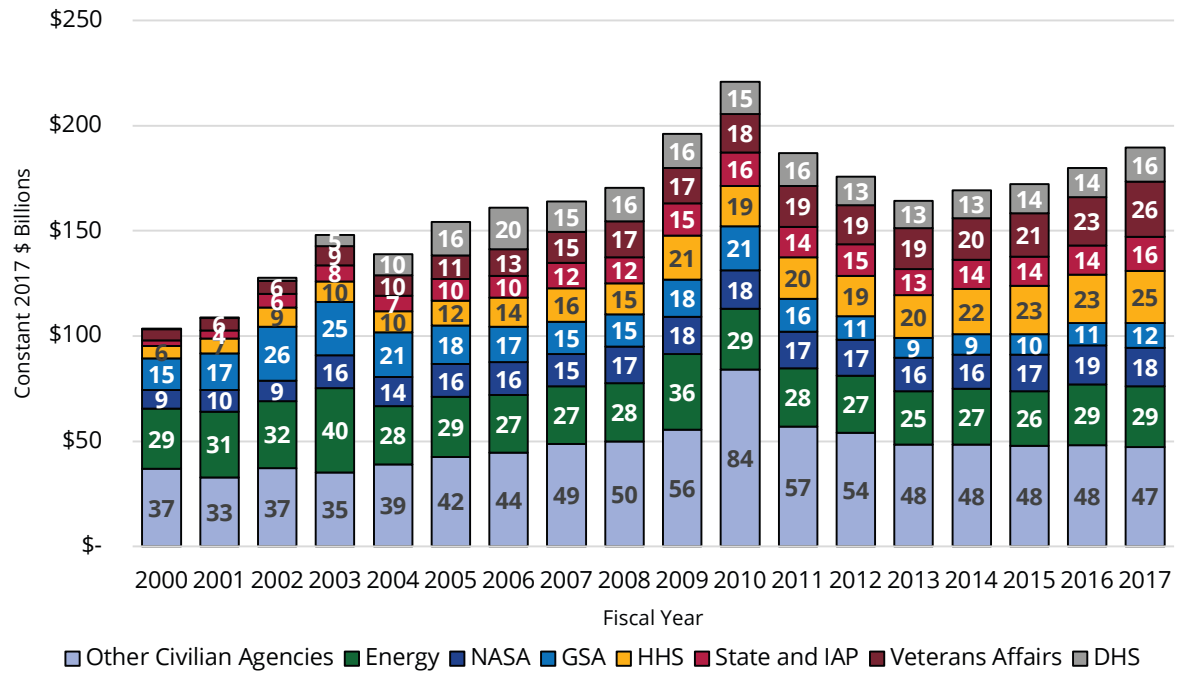


Source: FPDS; CSIS analysis

“DoD contract obligations have grown faster than civilian contracts since FY 2015.

Figure 2-3 illustrates that since FY 2015 the Department of Veteran Affairs and the State Department/International Assistance Programs contract obligations have grown 26.2 percent and 18.8 percent respectively. These two contracting components constitute the largest source of civilian contract increases in FY 2015.

Figure 2-3 | Civilian Contract Obligations by Agency, 2000-2017



Source: FPDS; CSIS analysis

## What is DoD Buying?

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**Major Defense Acquisition Programs (MDAP)** like the F-35 and Ford-class carrier are what most people think of when discussing what DoD buys, but MDAPs are just one portion of a larger defense contracting portfolio. Given their costs, MDAPs are a sizable share, but DoD's contracting portfolio also includes other goods and services that include landscaping services, medical research, and purchases of food and clothing for military service members. This chapter explores the trends in what DoD is buying, which can provide key insights into what DoD is currently prioritizing.



This chapter begins by analyzing DoD spending by area (products, services, and research and development (R&D)) and platform portfolio to see whether the defense contracting rebound changed what DoD is purchasing.<sup>17</sup> Next, it examines DoD's innovation efforts, specifically exploring how the status of the innovation efforts that were stood up by the previous administration has been affected by the new administration as well as whether the seven-year trough in the development weapon systems pipeline continued in FY 2017. Third, it examines DoD contracting by budget account. This chapter concludes by providing an in-depth analysis of the trends in services acquisition across DoD.

“The overall DoD contracting portfolio, contract obligations for products has increased faster than either services or R&D.

Within the overall DoD contracting portfolio, contract obligations for products has increased faster than either services or R&D. In 2017, overall DoD products obligations increased by 8 percent, a number well above the 3 percent growth in both services and R&D. Since 2015, overall DoD products contract obligations

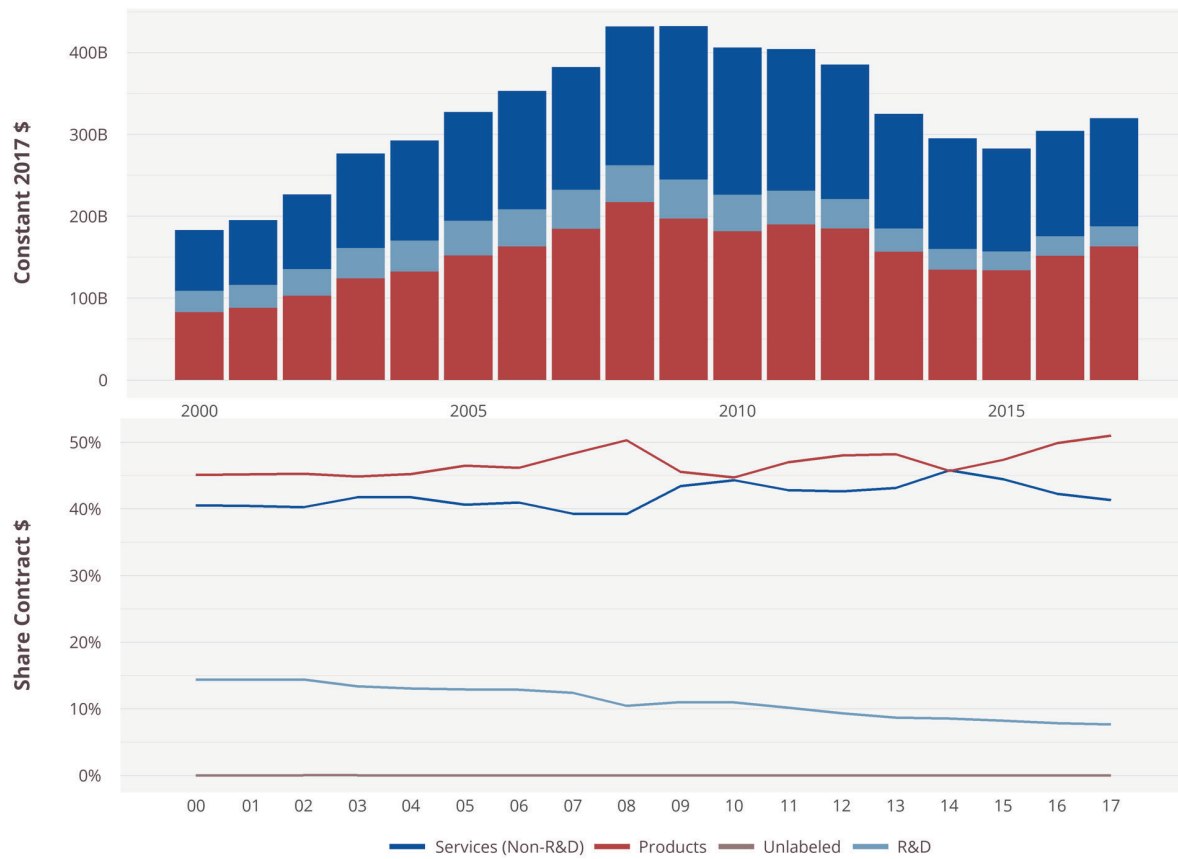
have increased by 22 percent compared to the 6 percent increase in overall DoD R&D contract obligations and the 5 percent increase in overall DoD services contract obligations. Over the past two years, there have been notable shifts in the overall DoD contract portfolio as a share of overall DoD contract obligations. Across DoD, the share of average contract obligations going to products increased to 50 percent in FY 2016 and 51 percent in FY 2017. Previously, products had averaged 46 percent of overall DoD contract obligations since FY 2000. Meanwhile, the share of overall DoD contract obligations for services declined from 44 percent in FY 2015 to 41 percent in FY 2017. Over the past two years, the share of overall DoD R&D contract obligations held steady at 8 percent. Figure 3-1 shows defense contract obligations by area from FY 2000 to FY 2017.<sup>18</sup>

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17. CSIS defines platform portfolios as a combination of system equipment codes, product service codes, and claimant program codes from the Federal Procurement Data System (FPDS) in a common platform category. In other words, platform portfolios aggregate all product, service, and R&D contracts by the type of platform the contracts are associated with. See A.1.6 Platform Portfolio for the complete CSIS platform portfolio methodology.

18. McCormick, et al., "Defense Acquisition Trends 2017: A Preliminary Look."

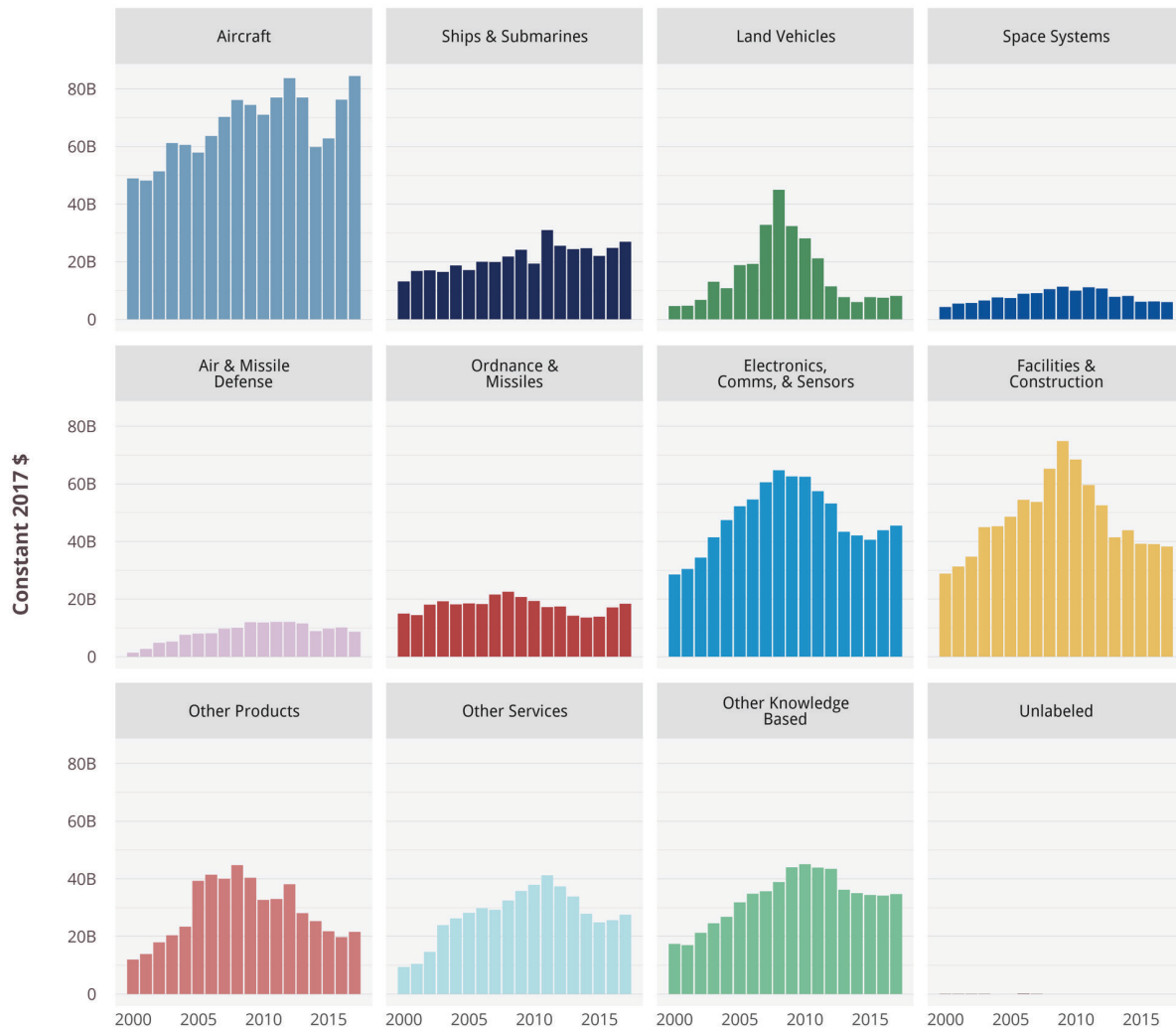
Figure 3-1 | Defense Contract Obligations by Area, 2000–2017



Source: FPDS; CSIS analysis

Contract obligations increased all platform portfolios except for Air and Missile Defense, Facilities and Construction, Other Products, and Space Systems between FY 2015 and FY 2017. Figure 3-2 shows Defense contract obligations by platform portfolio from FY 2000 to FY 2017.

Figure 3-2 | Defense Contract Obligations by Platform Portfolio, 2000–2017



Source: FPDS; CSIS analysis

Land Vehicles contract obligations increased 10 percent in FY 2017 after suffering ‘catastrophic’ declines during sequestration and the defense drawdown.<sup>19</sup> Land Vehicles contract obligations rose from \$7.5 billion in FY 2016 to \$8.2 billion in FY 2017. The 10 percent increase was slightly offset by the 3 percent decline in FY 2016, but Land Vehicles contract obligations are up 7 percent from their low point in FY 2015, though they are still well below historical averages.

19. Rhys McCormick, Andrew Hunter and Gregory Sanders, *Measuring the Impact of Sequestration and the Drawdown on the Defense Industrial Base* (Washington, DC: Center for Strategic & International Studies, December 2017), [https://csis-prod.s3.amazonaws.com/s3fs-public/publication/180111\\_McCormick\\_ImpactOfSequestration\\_Web.pdf?A10C65W9Qkx07VajqYcJguCH.7EL3O7W](https://csis-prod.s3.amazonaws.com/s3fs-public/publication/180111_McCormick_ImpactOfSequestration_Web.pdf?A10C65W9Qkx07VajqYcJguCH.7EL3O7W).

Ships & Submarines and Air and Missile Defense saw the smallest decline in contract obligations during sequestration and the defense drawdown but have faced very different trajectories since. Over the past two years, Ships & Submarines have grown at a steady rate, increasing by 13 percent in FY 2016 and 8 percent in FY 2017. Since FY 2015, Ships & Submarines contract obligations increased from \$22.2 billion to \$27.2 billion in FY 2017, a 22 percent increase. Comparatively, Air and Missile Defense contract obligations grew 5 percent in FY 2016 before declining 15 percent in FY 2017. Total Air and Missile Defense contract obligations fell 11 percent from \$9.7 billion in FY 2015 to \$8.6 billion in FY 2017.

The Aircraft and Ordnance and Missiles platform portfolios have both grown at a significantly higher rate than topline growth. Aircraft contract obligations increased to \$77.2 billion in FY 2016 from \$63.2 billion in FY 2015, a 22 percent growth. Aircraft contract obligations then grew an additional 10 percent in FY 2017 to \$85.3 billion, a historic high. Ordnance and Missiles contract obligations increased 23 percent in FY 2016 and then an additional 7 percent in FY 2017. In total, Aircraft and Ordnance and Missiles contract obligations have grown 34 percent and 32 percent respectively since FY 2015.

Space Systems and Facilities and Construction have seen slight declines even as overall defense contract obligations grew. After increasing by 1 percent in FY 2016, Space Systems contract obligations declined 2 percent in FY 2017. In total, Space Systems contract obligations have fallen from \$6.1 billion in FY 2015 to \$6.0 billion in FY 2017, a 1 percent decline. Facilities and Construction contract obligations remained relatively steady in FY 2016 (-0.3 percent decline), before falling 2 percent in FY 2017.

Electronics, Comms, & Sensors grew at nearly the same rate as the overall defense rate of growth over the past two years. In FY 2016, both Electronics, Comms, & Sensors and overall defense contract obligations increased by 8 percent. In FY 2017, Electronics, Comms, & Sensors, increased 4 percent, just slightly less than the 5 percent overall growth.”<sup>20</sup>

### 3.1 | Innovation, R&D, and Technological Superiority

At the start of the new administration, there were many unanswered questions as to whether, and to what extent, the new DoD leadership would prioritize “innovation.” Throughout the 2016 presidential campaign and the transition period, the new administration spoke broadly about

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20. McCormick et al., “Defense Acquisition Trends 2017: A Preliminary Look.”

rebuilding the military, but offered few specifics as to how they would go about it or what that meant for DoD innovation efforts such as Defense Innovation Unit Experimental (DIU(x)) and Strategic Capabilities Office (SCO). Additionally, one of the first tasks facing the incoming DoD senior leadership was developing an implementation plan for splitting the office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) into two offices: the Office of the Under Secretary of Defense for Research and Engineering (USD(R&E)) and the office of the Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)). After almost two years, the new DoD leadership has largely continued the innovation efforts started during the Obama administration, although with slightly different priorities.

“The new DoD leadership has largely continued the innovation efforts started during the Obama administration, although with slightly different priorities.

At the start of Secretary Mattis' tenure, he emphasized that his priorities were improving warfighter readiness, followed by increasing capacity and lethality of the force.<sup>21</sup> The FY 2018 President's Budget submission reflected these priorities, requesting increased funding for efforts associated with readiness in FY 2018.<sup>22</sup> Mattis' vision on his second priority, increasing the force's capacity and

lethality, was more clearly articulated in the 2018 National Defense Strategy (NDS) and its emphasis on great power competition. In the NDS, Mattis rearticulated his previous priorities as a singular priority, “rebuilding military readiness as we build a more lethal Joint Force,” and added two new priorities: “strengthening alliances as we attract new partners” and “reforming the Department's business practices for greater performance.”<sup>23</sup> Additionally, Secretary Mattis emphasized the importance of accessing innovation from both non-traditional partners and the broader National Security Innovation Base.<sup>24</sup>

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21. James Mattis, statement before the House Armed Services Committee, *Hearing on The Fiscal Year 2018 National Defense Authorization Budget Request from the Department of Defense*, 115th Cong., 1st sess. (June 12, 2017), <https://docs.house.gov/meetings/AS/AS00/20170612/106090/HHRG-115-AS00-Bio-MattisJ-20170612.pdf>.

22. Sydney J. Freedberg Jr., “Mattis Puts Readiness First, Modernization Later In Budget,” *Breaking Defense*, February 1, 2017, <https://breakingdefense.com/2017/02/mattis-puts-readiness-first-modernization-later-in-budget/>.

23. U.S. Department of Defense, *Summary of the 2018 National Defense Strategy of The United States of America: Sharpening the American Military's Competitive Edge* (Washington DC: Department of Defense, January 19, 2018), <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>.

24. U.S. Department of Defense, “Remarks by Secretary Mattis on the National Defense Strategy,” January 19, 2018, Johns Hopkins University School of Advanced International Studies, transcript,



Since the last CSIS Acquisition Trends report, DIU(x) has ramped up contract awards and has utilized DoD's new authority to transition programs from prototypes to production using an Other Transaction Authority (OTA) agreement for the first time. The following sections examines what's changed under the new administration, explores the status of the USD(AT&L) restructure, and provides an update on the various innovation efforts originating in the last administration.

### PERSONNEL IS POLICY: MEET THE NEW ACQUISITION TEAM

Changes in administrations nearly always change priorities across the defense acquisition system, as the new administration brings in its own leadership team. Although there are often degrees of continuity between administrations, the new leadership team likely has their own priorities that differ from their predecessors. These differences can range from different R&D priorities to reversals in policies. This section discusses the new senior acquisition leadership team with a focus on their personal priorities and what implications those have for innovation.

After some delay, then-Secretary Mattis finally had his senior acquisition team in place by March 2018.<sup>25</sup> Deputy Secretary Bob Work initially stayed on into the new administration to assist the transition before being replaced by Boeing executive Patrick Shanahan in July 2017. Ms. Ellen Lord, formerly-Chief Executive Officer (CEO) of Textron Systems, replaced Frank Kendall as USD(AT&L). When USD(AT&L) was disestablished, Secretary Lord transitioned to becoming the USD(A&S). Dr. Michael Griffin was chosen to serve as the first USD(R&E) in the newly re-created office. Finally, the three recently empowered service acquisition executives (SAE), Dr. Will Roper, Assistant Secretary of the Air Force Acquisition; James "Hondo" Geurts, Assistant Secretary of the Navy for Research, Development, and Acquisition; and Bruce Jette, Assistant Secretary of the Army for Acquisition, Logistics and Technology round out Secretary Mattis' senior acquisition team.

On December 20, 2018 Secretary Mattis submitted a letter of resignation after several policy disputes with the president stating that "Because you have the right to have a Secretary of Defense whose views are better aligned with yours on these and other subjects, I believe it is right for me to step

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<https://dod.defense.gov/News/Transcripts/Transcript-View/Article/1420042/remarks-by-secretary-mattis-on-the-national-defense-strategy/>.

25. The senior acquisition team is defined as the Deputy Secretary of Defense, Under Secretary of Defense for Research and Engineering, Under Secretary of Defense for Acquisition and Sustainment, and the Navy, Air Force, and Army service acquisition executives. Although the senior acquisition is in place as of August 2018, there are critical open acquisitions positions at the Deputy Under Secretary, Assistant Secretary and Deputy Assistant Secretary levels.

down from my position."<sup>26</sup> Mattis announced his Intention to leave at the end of February in his resignation letter, but was ultimately forced out at the end of December by the president. In the same declaration announcing Mattis' early departure, it was announced that Deputy Secretary of Defense Patrick Shanahan would serve as the acting Secretary of Defense until a permanent replacement is named.<sup>27</sup> Shanahan's selection as acting Secretary of Defense suggests that there will be continuity between the forthcoming FY 2020 budget and the approaches and policy of Mattis' tenure as Secretary of Defense, but there is more uncertainty long-term.<sup>28</sup>

#### **PATRICK SHANAHAN: DEPUTY SECRETARY OF DEFENSE**

Compared to his predecessor, Deputy Secretary of Defense Patrick Shanahan took less of a vocal public interest in defense innovation efforts. Instead, Shanahan has initially focused his efforts more on reforming DoD business practices<sup>29</sup>, preparing for the DoD audit<sup>30</sup>, and space reorganization.<sup>31</sup> These activities all affect defense innovation, but they focus more on the "how" compared to Bob Work's focus on the "what."

#### **ELLEN LORD: USD(AT&L) AND USD(A&S)**

Ellen Lord, the former CEO of Textron Systems, was confirmed as the final USD(AT&L) in August 2017 with the understanding that she would become the USD(A&S) upon AT&L's dissolution on February 1, 2018. Since Congress had largely left the actual details of how to split the AT&L offices to DoD, Secretary Lord's first priority was overseeing the reorganization process. Prior to Secretary Lord's confirmation, DoD had already delivered a plan to Congress for the reorganization, but Lord, in coordination with USD(R&E)

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26. Helene Cooper, "Jim Mattis, Defense Secretary, Resigns in Rebuke of Trump's Worldview," *New York Times*, December 20, 2018, <https://www.nytimes.com/2018/12/20/us/politics/jim-mattis-defense-secretary-trump.html>.

27. Philip Rucker, Dan Lamothe, and Josh Dawsey, "Trump Forces Mattis Out Two Months Early, Names Shanahan Acting Defense Secretary," *Washington Post*, December 23, 2018, [https://www.washingtonpost.com/politics/trump-forces-mattis-out-two-months-early-names-shanahan-acting-defense-secretary/2018/12/23/b78a0478-06d2-11e9-a3f0-71c95106d96a\\_story.html?utm\\_term=.9d9d04346215](https://www.washingtonpost.com/politics/trump-forces-mattis-out-two-months-early-names-shanahan-acting-defense-secretary/2018/12/23/b78a0478-06d2-11e9-a3f0-71c95106d96a_story.html?utm_term=.9d9d04346215).

28. Mark F. Cancian, Todd Harrison, Andrew P. Hunter, "The Mattis Resignation: What Does It Mean for the Future of National Security?," Center for Strategic and International Studies, December 21, 2018, <https://www.csis.org/analysis/mattis-resignation-what-does-it-mean-future-national-security>.

29. Aaron Mehta, "Unwinding Bureaucracy: Start of 2018 to See Major Pentagon Reform," *Defense News*, December 28, 2017, <https://www.defensenews.com/pentagon/2017/12/28/unwinding-bureaucracy-start-of-2018-to-see-major-pentagon-reform/>.

30. Tony Bertuca, "Pentagon No. 2 Focused on Fiscal Accountability," *Inside Defense*, March 29, 2018, <https://insidedefense.com/insider/pentagon-no-2-focused-fiscal-accountability>.

31. Sandra Erwin, "Deputy Defense Secretary Shanahan to Take Over Duties of Principal Space Adviser," *Space News*, January 18, 2018, <https://spacenews.com/deputy-defense-secretary-shanahan-to-take-over-duties-of-principal-space-advisor/>.

Griffin and Deputy Secretary Shanahan, has since made several changes to the final plan.<sup>32</sup>

In addition to her reorganization work, Secretary Lord has several other priorities that include streamlining the acquisition process, moving most of the MDAPs oversight to the services, and focusing on reducing sustainment costs. As part of her streamlining effort, Lord has focused on removing unnecessary regulations, with the ultimate goal of reducing contract delivery time by 50 percent.<sup>33</sup> Secretary Lord transferred milestone decision authority for 73 of the 84 MDAPs from the Office of the Secretary of Defense (OSD) to the military services in accordance with recent Congressional direction.<sup>34</sup> Secretary Lord will only retain oversight of a limited number of programs, such as the F-35 and “exceptionally high-risk and high-stakes programs.”<sup>35</sup>

Since entering the Pentagon, Secretary Lord has pushed DoD to take a more commercial business approach, consistent with the recommendations she made while in industry. As USD(A&S), Lord has pushed for monthly financial statements and human capital inventories similar to those seen in the private sector.<sup>36</sup> Of potential interest, Ms. Lord called for DoD to use more firm-fixed price contracts while Textron Systems CEO.<sup>37</sup> Secretary Lord has not yet translated her previous suggestion into DoD policy or included it in her public comments, but this is worth watching given the uproar at recommendations for increased use of fixed price in Better Buying Power 1.0.<sup>38</sup>

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32. Aaron Mehta, “This is the Pentagon’s New Acquisition Structure,” *DefenseNews*, August 2, 2017, <https://www.defensenews.com/breaking-news/2017/08/02/this-is-the-pentagons-new-acquisition-structure/>; Aaron Mehta, “The Pentagon’s Acquisition Office is Gone. Here’s What the Next 120 Days Bring,” *DefenseNews*, February 1, 2018, <https://www.defensenews.com/pentagon/2018/02/01/the-pentagons-acquisition-office-is-gone-heres-what-the-next-120-days-bring/>.

33. Scott Maucione, “DoD Wants to Cut Contracting Time by 50 Percent as Part of AT&L Split,” *Federal News Radio*, October 11, 2017, <https://federalnewsradio.com/defense/2017/10/dod-wants-to-cut-contracting-time-by-50-percent-at-part-of-atl-split/>.

34. Ellen M. Lord, statement before the Senate Armed Services Committee, *Hearing on The Current State of Defense Acquisition and Associated Reform*, 115th Cong., 1st sess. (December 7, 2017), <https://docs.house.gov/meetings/AS/AS00/20170612/106090/HHRG-115-AS00-Bio-Mat-tisJ-20170612.pdf>.

35. Aaron Mehta, “Pentagon to Shift ‘Bulk’ of Major Defense Programs to Services, and People May Go, Too,” *DefenseNews*, October 11, 2017, <https://www.defensenews.com/digital-show-dailies/ausa/2017/10/11/pentagon-to-shift-bulk-of-major-defense-programs-to-services-and-people-may-go-too/>.

36. Marjorie Censer, “Lord Promises More Commercial Approach to Managing Pentagon,” *Inside Defense*, October 11, 2017, <https://insidedefense.com/daily-news/lord-promises-more-commercial-approach-managing-pentagon>.

37. Marjorie Censer, “Defense Executives Urge DoD To Take More Commercial Approach,” *Inside Defense*, November 19, 2014, <https://insidedefense.com/daily-news/defense-executives-urge-dod-take-more-commercial-approach>.

38. Andrew Hunter, Greg Sanders, Rhys McCormick, Samantha Cohen and Maura Rose McQuade, *Measuring the Outcomes of Acquisition Reform by Major DoD Components* (Washington, DC: Center for Strategic & International Studies, September, 2015), [https://csis-prod.s3.amazonaws.com/s3fs-public/legacy\\_files/files/publication/150930\\_McCormick\\_MeasuringOutcomesAcquisitionReform\\_Web.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/150930_McCormick_MeasuringOutcomesAcquisitionReform_Web.pdf).

## DR. MICHAEL GRIFFIN: USD(R&E)

Dr. Michael Griffin was confirmed to lead the newly recreated USD(R&E) office in February 2018. Prior to serving as USD(R&E), Dr. Griffin served as the 11th National Aeronautics and Space Administration (NASA) Administrator from 2005 to 2009. In accordance with the new office's focus on ensuring U.S. technological superiority, Secretary Griffin has set about creating a more agile development across the DoD research and engineering enterprise as well as focusing on the critical future capabilities that are outlined in the NDS. In going about creating a more agile development culture, Griffin has scorned DoD's review process as overly-cumbersome and repetitive and has sought to remove some layers and expedite the process.<sup>39</sup> In going about creating this more agile development culture, Undersecretary Griffin made several changes to the USD(R&E) organizational structure from the August 2017 interim plan. Most notably, Griffin changed SCO and DIUx's reporting from Assistant Secretaries of Defense (ASD) to the USD(R&E) directly.<sup>40</sup>

In addition to his work on developing an agile development culture across the R&E enterprise, Griffin is focusing on capabilities like artificial intelligence, directed energy, and hypersonics. However, Griffin has made it clear that hypersonics is his top capability priority, stating: "I'm sorry for everybody out there who champions some other high priority, some technical thing. It's not that I disagree with those, but there has to be a first, and hypersonics is my first."<sup>41</sup>

## IMPLEMENTATION OF THE USD(AT&L) RESTRUCTURING

On February 1, 2018, the office of the Under Secretary of Defense (OUSD) (AT&L) was officially divided between the OUSD(R&E) and OUSD(A&S) in accordance with the FY 2017 National Defense Authorization Act (NDAA) requirements. In Congress's view, AT&L had structurally grown too large to focus on both delivering "game changing" technology and management of the defense acquisition system. To that end, Congress mandated that AT&L be devolved into two separate, but connected, organizations with the OUSD(R&E) focused on pioneering and prototyping new technologies, while the OUSD(A&S) focused more on the management and sustainment

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39. Sandra Erwin, "Griffin Rails at DoD Procurement Culture: 'We Make Things Expensive that Don't Need to Be,'" *Space News*, March 6, 2018, <https://spacenews.com/griffin-rails-at-dod-procurement-culture-we-make-things-expensive-that-dont-need-to-be/>.

40. Mehta, "The Pentagon's Acquisition Office is Gone."

41. Mitch Ambrose, "New DoD R&D Chief Outlines Vision for Jumpstarting Military Innovation," *American Institute of Physics*, April 25, 2018, <https://www.aip.org/fyi/2018/new-dod-rd-chief-outlines-vision-jumpstarting-military-innovation>.

of the defense acquisition system and sustainment.”<sup>42</sup> Although AT&L was officially disestablished on February 1, the structures of the two new office was only loosely specified at first, partly for administrative transition issues and partly to give Secretary Griffin the opportunity to implement his own vision on the R&E structure.<sup>43</sup>

On July 13, 2018, Deputy Secretary Shanahan issued a memorandum, Establishment of the Office of the Under Secretary of Defense for Research Engineering and the Office of the Under Secretary of Defense for Acquisition and Sustainment, formally defining the structure and duties for the two new offices. DoD will not make all of these changes required to establish the new structure overnight but will instead phase them in over a two-year timeframe. This delayed approach gives DoD the time necessary to get the proper personnel in place.<sup>44</sup> The following sections examines the restructure, the changes from the initial August 2017 plan, and potential future implications.

#### **UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING (USD(R&E))**

Under Secretary Griffin and the AT&L reorganization team made several changes to OUSD(R&E) from the initial DoD outline. Most notably, SCO, DIUx, and DARPA have become USD(R&E) direct reports instead of reporting to ASDs as in the originally proposed structure. Of technical note, the final plan changed the titles of the two ASDs, and their subordinates, to directorates. According to Pentagon spokeswoman Lt. Col. Michelle Baldanza, the “two offices are equivalent to assistant secretary levels, but...do not need to be confirmed by the Senate.”<sup>45</sup> Finally, across the OUSD(R&E), Griffin created nine new “Assistant Directors” for “key technologies” who report directly to their respective Director and his or her principal deputy director.

Figure 3-3 shows the initial August 2017 OUSD(R&E) organizational structure. Figure 3-4 shows the final OUSD(R&E) outlined in Deputy Secretary Shanahan’s July 2018 memorandum.

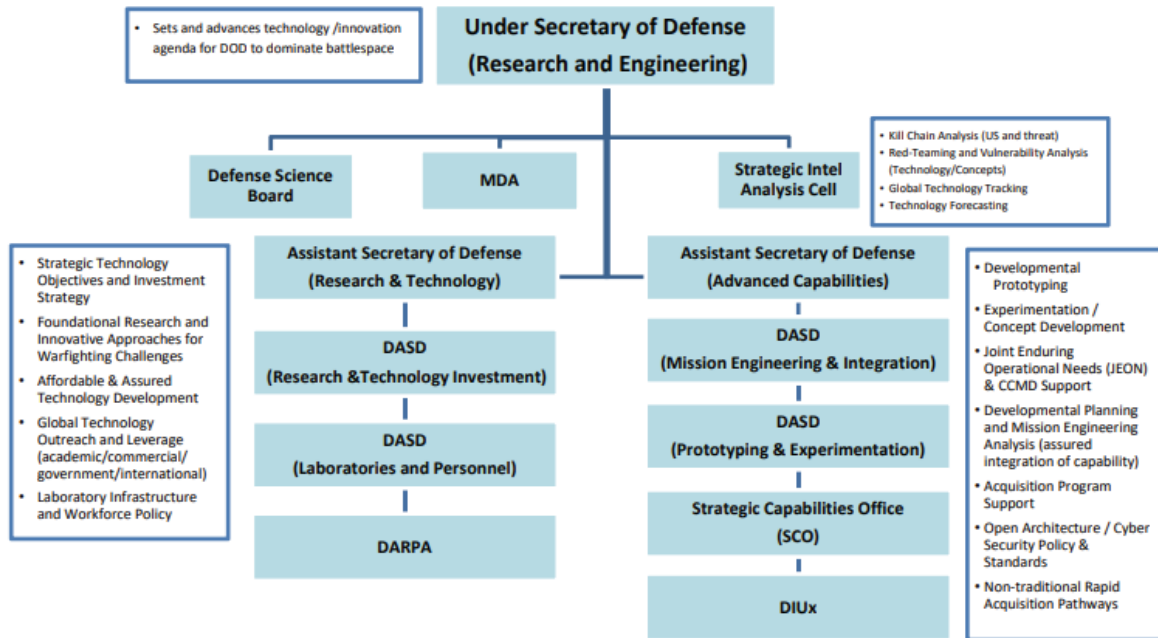
42. Rhys McCormick and Andrew Hunter, “Reorganizing the Defense Acquisition System,” Center for Strategic and International Studies, August 3, 2017, <https://www.csis.org/analysis/reorganizing-defense-acquisition-system>.

43. Mehta, “The Pentagon’s Acquisition Office is Gone.”

44. Aaron Mehta, “AT&L Reorganization Will Take Two Years to Complete,” *DefenseNews*, December 3, 2017, <https://www.defensenews.com/digital-show-dailies/reagan-defense-forum/2017/12/03/atampl-reorganization-will-take-two-years-to-complete/>.

45. Aaron Mehta, “Revealed: The New Structure for the Pentagon’s Tech and Acquisition Offices,” *DefenseNews*, July 17, 2018, <https://www.defensenews.com/pentagon/2018/07/17/revealed-the-new-structure-for-the-pentagons-tech-and-acquisition-offices/>.

Figure 3-3 | August 2017 Proposed OUSD (R&E) Organizational Structure

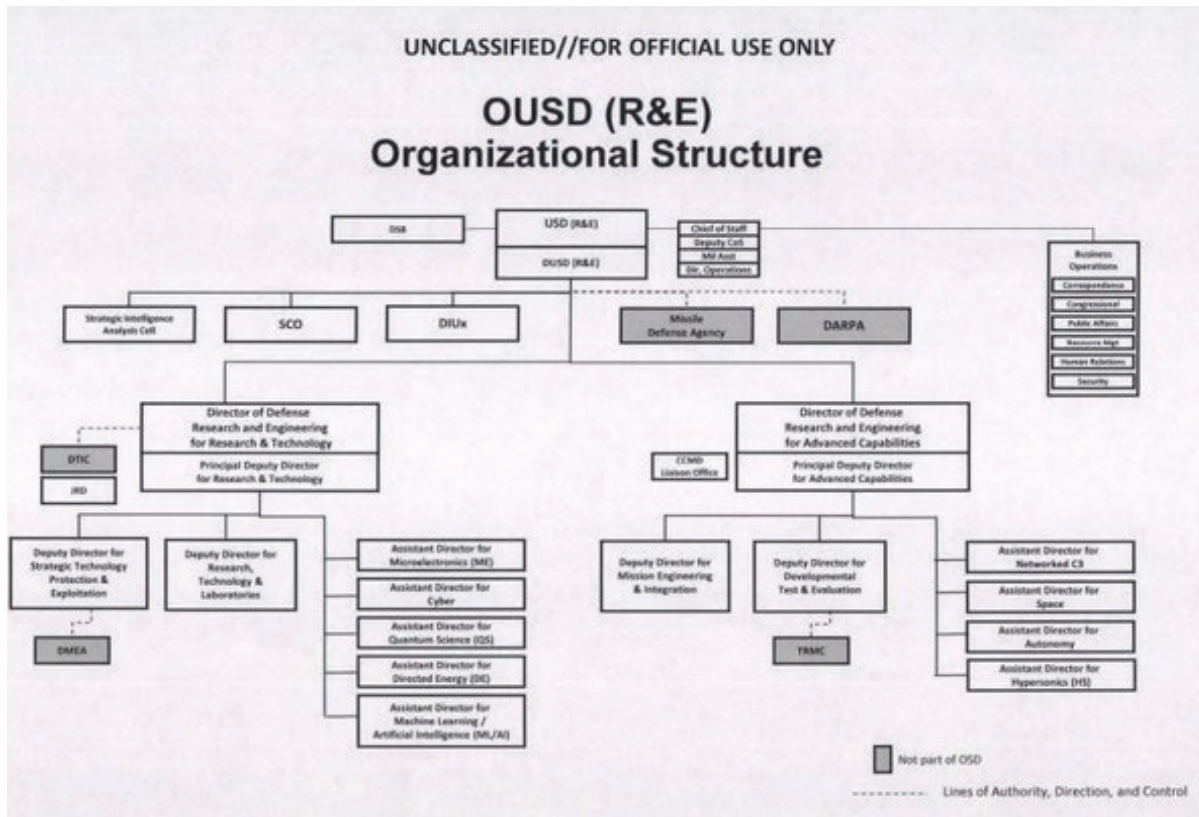


Source: Report to Congress Restructuring the Department of Defense Acquisition, Technology and Logistics Organization and Chief Management Officer Organization In Response to Section 901 of the National Defense Authorization Act for Fiscal Year 2017 (Public Law 114 - 328)<sup>46</sup>

46. U.S. Department of Defense, "Report to Congress Restructuring the Department of Defense Acquisition, Technology and Logistics Organization and Chief Management Officer Organization," *Military Times*, August 8, 2017, 9, <https://ec.militarytimes.com/static/pdfs/embargoed-section-901-fy-2017-ndaa-report.pdf>.



Figure 3-4 | Final OUSD (R&E) Organizational Structure



Source: Deputy Secretary Shanahan July 13 memorandum, obtained by Defense News<sup>47</sup>

#### *Director of Defense Research and Engineering for Research and Technology*

Under the Director of Defense Research and Engineering for Research and Technology, the final plan combined two Deputy Assistant Secretaries of Defense (DASD) (Research & Technology Investment) and DASD (Laboratories and Personnel) into a singular Deputy Director for Research, Technology & Laboratories and created a new Deputy Director for Strategic Technology Protection & Exploitation.<sup>48</sup> Finally, five of the nine new capability assistant directors report to the Director of Defense Research and Engineering for Research and Technology: microelectronics (ME), cyber, quantum science (QS), directed energy (DE), and machine learning/artificial intelligence (ML/AI).

#### *Director of Defense Research and Engineering for Advanced Capabilities*

The DASD (Prototyping & Experimentation) under the ASD (Advanced Capabilities) in the August 2017 report was eliminated in the final USD(R&E)

47. Mehta, "Revealed: The New Structure for the Pentagon's Tech and Acquisition Offices."

48. The Defense Microelectronics Activity office reports to the Deputy Director for Strategic Technology Protection & Exploitation.



restructure. Additionally, the final restructure formalized the Deputy Director for Development Test & Evaluation under the Director of Defense Research and Engineering for Advanced Capabilities. Finally, the other four new capability assistant directors were placed under Advanced Capabilities: networked command, control, and communications (C3); space; autonomy; and hypersonics (HS).

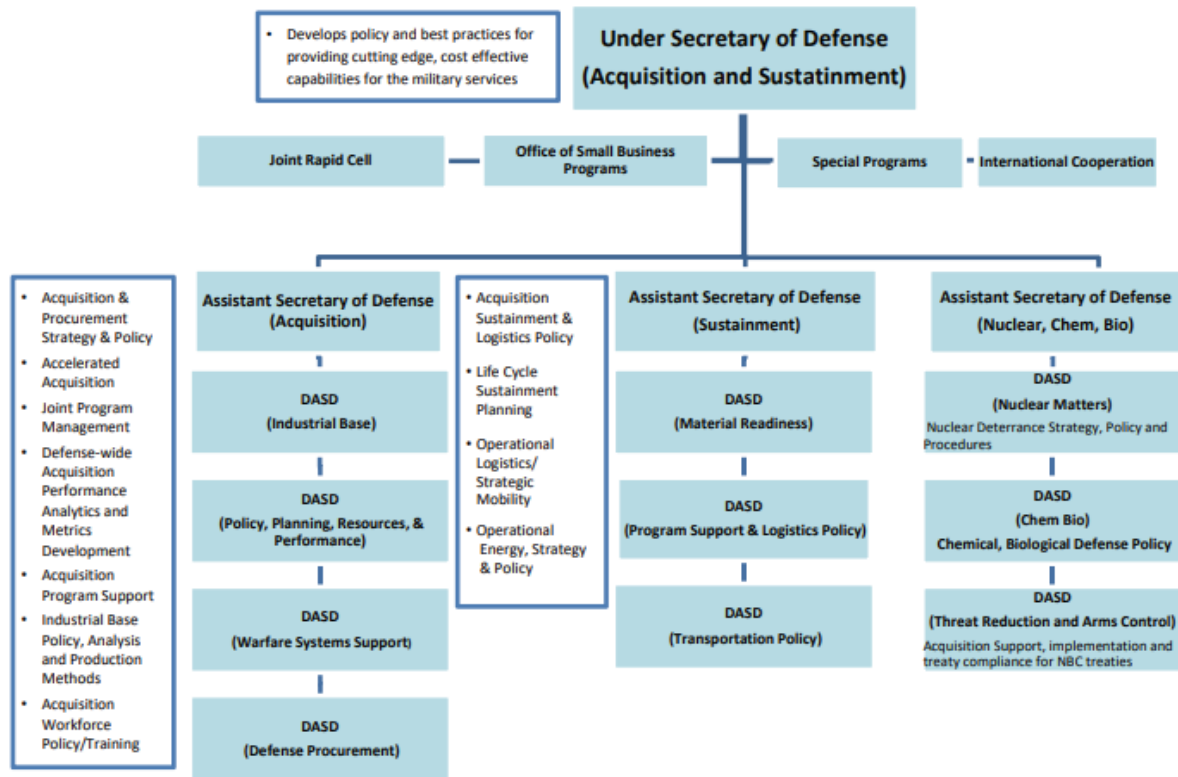
#### **UNDER SECRETARY OF DEFENSE FOR ACQUISITION AND SUSTAINMENT: USD(A&S)**

OUSD(A&S) largely retained the topline structure from the initial plan but with numerous changes at the DASD level. First, at the topline, the 2018 restructuring modified the DASD for Industrial Base to now include the Director of Small Business Programs and changed it from reporting to the ASD(Acquisition) to the USD(A&S) directly. Second, in the original August 2017 plan, DoD was still determining whether ASD for Energy, Installations, and Environment (ASD(EI&E)) functions should reside under the USD(A&S) or with the Chief Management Office. DoD elected to keep these functions under the USD(A&S) in the final restructuring, but they eliminated the ASD(EI&E) and consolidated its offices under the new ASD for Sustainment (ASD(S)). Third, Secretary Lord created a new office, Director of Strategy, Data, and Design, reporting directly to her. Finally, there were indications earlier this year that Defense Acquisition University (DAU), Defense Logistics Agency (DLA), and the Defense Threat Reduction Agency (DTRA) would be changed to report directly to USD(A&S) Lord, but this change was not reflected in the Shanahan memorandum.<sup>49</sup>

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49. Mehta, "The Pentagon's Acquisition Office is Gone."

Figure 3-5 | August 2017 Proposed OUSD (A&S) Organizational Structure

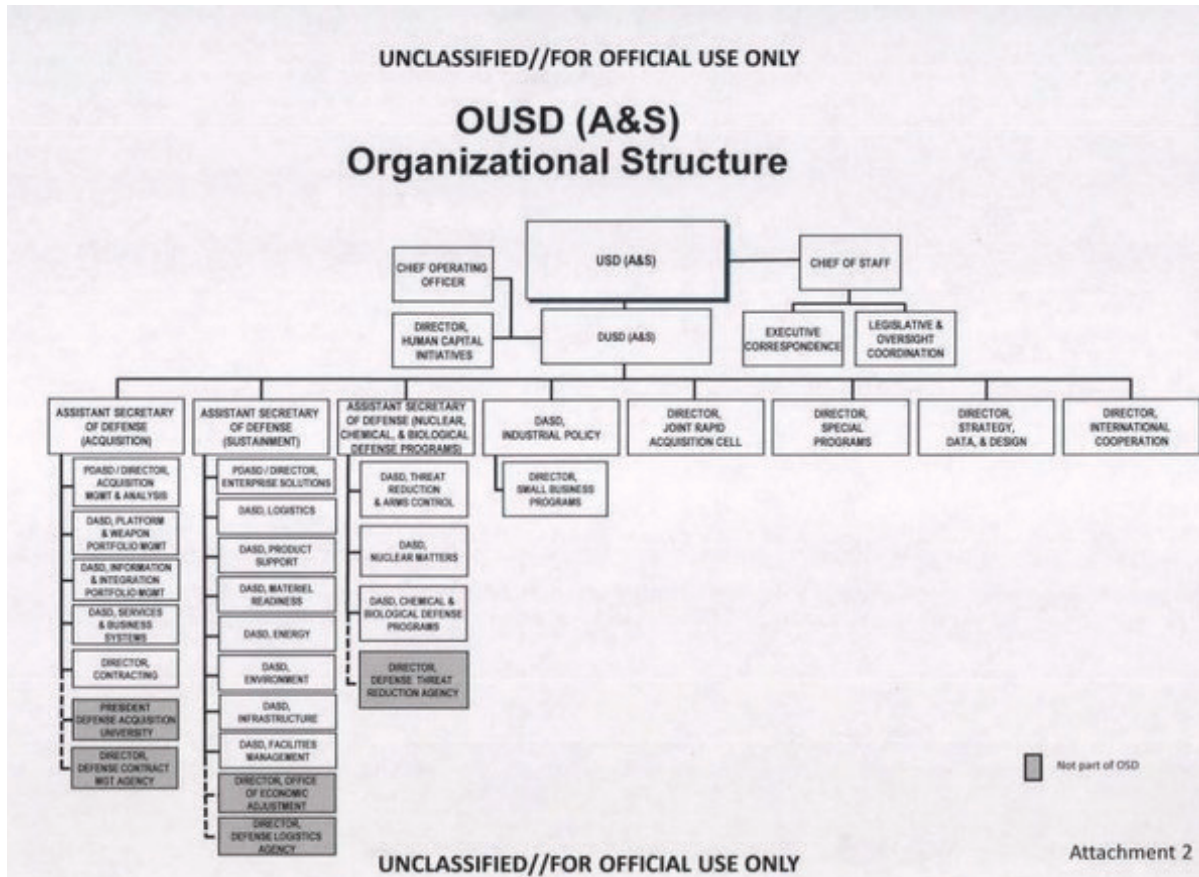


Source: Report to Congress Restructuring the Department of Defense Acquisition, Technology and Logistics Organization and Chief Management Officer Organization In Response to Section 901 of the National Defense Authorization Act for Fiscal Year 2017 (Public Law 114 - 328)<sup>50</sup>

Figure 3-5 above shows the initial August 2017 OUSD(A&S) organizational structure, while Figure 3-6 below show the final OUSD(A&S) outlined in Deputy Secretary Shanahan's July 2018 memorandum.

50. U.S. DoD, "Report to Congress Restructuring the Department of Defense Acquisition, Technology and Logistics Organization and Chief Management Officer Organization," 9.

Figure 3-6 | Final USD(A&S) Organizational Structure



Source: Deputy Secretary Shanahan July 13 memorandum, obtained by Defense News<sup>51</sup>

#### *Assistant Secretary of Defense for Acquisition: ASD(A)*

Nearly every DABD under the ASD(A) changed from the initial 2017 plan. As previously mentioned, the DABD (Industrial Base) was moved out of ASD (Acquisition) and made a USD(A&S) direct report. The previous DABDs were replaced by the following:<sup>52</sup>

- Principal DABD/Director (Acquisition Management & Analysis)
- DABD (Platform & Weapon Portfolio Management)
- DABD (Information & Integration Portfolio Management)
- DABD (Services & Business Systems)
- Director, Contracting

51. Mehta, "Revealed: The New Structure for the Pentagon's Tech and Acquisition Offices."

52. The August 2017 plan included the following DABDs: DABD (Policy, Planning, Resources, & Performance), DABD (Warfare Systems Support), and DABD (Defense Procurement).

Although there is some overlap between these new positions and the previous positions, others like the DASD (Services & Business Systems) are nearly wholly new. Although not clearly outlined, it is likely the Office of Performance Assessments and Root Cause Analyses (PARCA) falls somewhere under the USD(A&S). Finally, the Defense Contract Management Agency (DCMA) was changed from reporting to the DASD (Procurement) to reporting to the ASD(A) directly.<sup>53</sup>

#### *Assistant Secretary of Defense for Sustainment: ASD(S)*

Except for the integration of the ASD (EI&E) offices, there were more minimal changes to ASD(S) compared to ASD(A) from the initial August 2017 plan. The DASD (Transportation) was eliminated from the previous plan and the DASDs were added. Of the old ASD (EI&E) offices, the DASD for Operational Energy and DASD for Installation Energy were combined into the DASD for Energy; the DASD for Environment, Safety, and Occupational Health became the DASD Environment; and the DASD for Basing became the DASD for Infrastructure.

#### *Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs: ASD(NCB)*

There were no changes in Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs offices in the final AT&L restructuring from the initial plan.

### **THE AT&L RESTRUCTURE: THE GOOD, THE BAD, AND THE UNKNOWN**

The final AT&L restructuring implementation is a marked improvement over the August 1 plan, but it is not without its problems and areas of potential future concern. Furthermore, it will be some time before it's clear whether the dissolution of AT&L achieved the Senate's goals. This section examines the good, the bad, and the unknown of the AT&L restructuring process.

#### *AT&L Restructure: The Good*

First, the best part of the final implementation plan compared to the August 1 report was making SCO, DIUx, and Defense Advanced Research Projects Agency (DARPA) report directly to the USD(R&E) instead of an ASD. Although this is still a downgrade for SCO and DIUx, who currently report directly to the Secretary of Defense and Deputy Secretary of Defense respectively, this change ensures that these critical innovation organizations continue to report to and engage directly with the senior most acquisition officials. Second,

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53. U.S. Department of Defense, "Report to Congress Restructuring the Department of Defense Acquisition, Technology and Logistics Organization and Chief Management Officer Organization," 11.

the creation of a DASD for Services & Business Systems in USD(A&S) is a welcome change given that services account for approximately 42 percent of DoD contract obligations since FY 2000. Third, given the administration's emphasis on the defense industrial base, making the DASD for Industrial Base report directly to the USD(A&S) is a smart change. Finally, although the Strategic Intel Analysis Cell inside OUSD(R&E) didn't change from the initial plan, the creation of this type of office can provide critical insights that form the foundational assumptions for future technology development.

#### *AT&L Restructure: The Bad*

First, although making the DASD for Industrial Base an office that directly reports to the Under Secretary was good, the splitting of manufacturing technology and industrial policy is regrettable. Advanced manufacturing techniques are an important way to improve and sustain the industrial base, and there is no clear home for these programs in the USD(R&E) structure. Second, the elimination of the DASD/Deputy Director for Prototyping and Experimentation under the Director of Defense Research and Engineering (DDR&E) for Advanced Capability in favor of a Deputy Director for Developmental Test & Evaluation (DT&E) is disappointing. By definition, DT&E is more focused on ensuring that developmental systems meet technical requirements prior to production than it is on exploring the potential of new systems and capabilities through prototyping and experimentation.<sup>54</sup> This doesn't dismiss the importance of DT&E, which is essential and provides critical insights before production, but the loss of the DASD for prototyping and experimentation is disappointing given the increased emphasis on prototyping and wargaming across DoD. Whether another office or organization, perhaps SCO, takes on increased prototyping responsibilities remains to be seen, but if that comes to fruition, that would offset some of the loss of the DASD Prototyping and Experimentation.

#### *AT&L Restructure: The Unknown*

The broader point regarding whether dissolving AT&L was worth it will remain unknown for the years to come, but there are specific details in the implementation plan that will likely only be worked out through growing pains. First, how do the USD(R&E), USD(A&S), and USD(P) work together on establishing and managing international R&D efforts? The Shanahan memorandum says, "[The USD(A&S)] in consultation with the USD(P)... [shall] promote the establishment of mutually beneficial international

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54. Steve Hutchison, "What Happened to DT&E?", Defense Acquisition University, April 4, 2014, <http://dau.dodlive.mil/2014/04/20/what-happened-to-dte/>.

cooperation R&D programs[.]”<sup>55</sup> Although the memo language is clear, what happens when a capability falls under the purview of the USD(R&E) where the United States has existing international cooperation agreements, such as hypersonics? Also, what happens if there’s a disagreement between the USD(A&S) and USD(R&E) on these types of capabilities? For now, these types of issues will largely depend on the relationship between USD(A&S) Lord and USD(R&E) Griffin, but this area of overlap highlights some of the numerous unknowns that didn’t exist when these all fell under one office.

## “The splitting of manufacturing technology and industrial policy is regrettable.

Second, what is the relationship between the USD(R&E) and the services given the recent changes empowering the SAEs? One of the key assumptions in creating the USD(R&E) is that the military services will want to procure the systems and

capabilities developed by USD(R&E), but what happens when they do not? Prior to the recent milestone decision authority changes, OSD had more options to influence the service’s decisions. Now, OSD influence is at that level on just a few joint or “high-stakes” programs.

Third, how do the two offices work on common issues like professional workforce development? Under the reorganization guidance, DAU reports to the USD(A&S) through the ASD(A), but “oversee[ing] and manag[ing] annual curriculum review, development and certification for the [Science & Technology Management] STM, [Engineering] ENG, [Production, Quality, and Manufacturing] PQM, and [Test and Evaluation] T&E Career Fields for all DAU related courses and Continuous Learning Modules,” falls to the USD(R&E).<sup>56</sup> The relationship and processes that these two offices develop for resolving this and other similar issues are critical, as this is certainly not the only area of overlapping interests. Other areas where these two offices have closely overlapping interests include, but are not limited to, small business participation, rapid acquisition, acquisition policies, and manufacturing issues.

### UPDATE ON DOD INNOVATION EFFORTS

Throughout the Obama administration, DoD stood up several offices and efforts aimed at ensuring continued U.S. technological superiority. However,

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55. Patrick Shanahan, “Establishment of the Office of the Under Secretary of Defense for Research Engineering and the Office of the Under Secretary of Defense for Acquisition and Sustainment,” Inside Defense, July 13, 2018, [https://insidedefense.com/sites/insidedefense.com/files/documents/2018/aug/08072018\\_acq.pdf](https://insidedefense.com/sites/insidedefense.com/files/documents/2018/aug/08072018_acq.pdf).

56. Shanahan, “Establishment of the Office,” 6.



given the change in administration, the future of these efforts was uncertain following the departure of key personnel like Secretary Carter and Deputy Secretary Work for whom these efforts were top priorities. The following sections update the status of the four most prominent DoD innovation efforts: DIUx, SCO, the Third Offset Strategy, and the Defense Innovation Board.

#### DEFENSE INNOVATION UNIT EXPERIMENTAL

There were questions about the long-term future of DIUx at the beginning of the new administration, but those questions have largely been quelled for now. This is somewhat surprising given that there was a sense that DIUx was amongst the innovation efforts most likely to be eliminated following the departure of its creator and champion, Secretary Carter, since there were significant Congressional reservations regarding DIUx. In an August 2017 interview, House Armed Services Committee (HASC) Chairman Mac Thornberry stated, “The question is: What is this office doing that’s different from what others are doing?”<sup>57</sup> Yet, DIUx not only survived, but thrived, having been embraced by Secretary Mattis and achieved buy-in within the services. In a recent trip to Silicon Valley, Mattis said, “I don’t embrace it [DIUx]; I enthusiastically embrace it . . . There is no doubt in my mind that DIUx will not only continue to exist, it will grow in its influence and its impact on the Department of Defense.”<sup>58</sup>

DIUx performance and successes since relaunching in May 2016 has helped lead to buy-in from Mattis and the military services. Since its relaunch, DIU(x) has awarded “roughly \$184 million for 59 pilot contracts and two follow-on production contracts in the areas of autonomy, artificial intelligence, human systems, information technology, and space.”<sup>59</sup> According to DIUx, the private sector has complimented DoD’s spending, investing nearly \$1.8 billion in the DIUx-supported companies.<sup>60</sup> Furthermore, the military services have turned to DIUx to help solve their existing problems. Last year, the Air Force canceled its existing air mission planning acquisition program of record, electing

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57. Philip Marcelo, “Experimental Defense Unit Funds New Tech but Faces Skeptics,” *AP News*, August 11, 2017, <https://www.apnews.com/8b8a367c39224354a3d072ab87379ed9>.

58. Phil Goldstein, “The Future of the Pentagon’s DIUx Unit Seems Bright,” *FedTech*, August 30, 2017, <https://fedtechmagazine.com/article/2017/08/future-pentagons-diux-unit-seems-bright>.

59. DIUx, “DIUx Quarterly Results: Q4 2017,” *Inside Defense*, October 26, 2017, [https://insidedefense.com/sites/insidedefense.com/files/documents/oct2017/10262017\\_diux.pdf](https://insidedefense.com/sites/insidedefense.com/files/documents/oct2017/10262017_diux.pdf); Justin Double-day, “DoD innovation insurgents gain footing in Pentagon bureaucracy,” *Inside Defense*, November 29, 2017, <https://insidedefense.com/daily-news/dod-innovation-insurgents-gain-footing-pentagon-bureaucracy>.

60. Aaron Mehta, “DIUx Reports Surge in Pilot Program Funding,” *DefenseNews*, August 10, 2017, <https://www.defensenews.com/pentagon/2017/08/10/diux-reports-surge-in-pilot-program-funding/>.



instead to work with DIUx to help them procure a new system.<sup>61</sup> Finally, DIUx recently transitioned a cybersecurity monitoring pilot program to an Army program of record.<sup>62</sup>

DIUx has gained a spate of new contracting and hiring authorities over the past two years. In a July 14, 2017 memorandum, then-Deputy Secretary Work renewed section 1105 of the FY 2017 NDAA, which gave DIUx and SCO the authority to hire staff non-competitively for another 18 months.<sup>63</sup> DIUx and SCO's hiring authorities were further expanded in section 1111 of the FY 2019 NDAA, which broadened Title 10 section 1599h regarding personnel management authority. This expansion was intended to attract experts in science and engineering by giving SCO and DIUx the same authorities that allow DARPA to "rapidly hire for long-term positions."<sup>64</sup> The July 14, 2017 Deputy Secretary Work memorandum also expanded DIUx's contracting authorities to permit them to hold prize competitions, convene professional conferences up to \$500,000, enter into Cooperative Research and Development Agreements (CRADA), and publicly advertise its activities.<sup>65</sup>

Over the past year, DIUx has become an even more important part of DoD's innovation ecosystem. In the FY 2019 President's Budget, DoD requested \$71 million in FY 2019 for DIUx, a \$41 million increase from FY 2018.<sup>66</sup> Additionally, earlier this year, DIUx stood up a training program, HACQer, to help train acquisition professionals across the broader DoD workforce in rapid acquisition. Selected participants will spend four-months detailed to DIUx's headquarters in California, where they will immerse themselves in DIUx's mission and how they work. Although the initial HACQer class is limited to just four participants, DIUx doesn't expect HACQer to be a one-off event. Instead, it will take the initial classes findings and figure out how best to tweak or scale the program.<sup>67</sup> Reflecting DIUx's importance

61. Sydney J. Freedberg Jr., "DIUx Is Here To Stay: Mattis Embraces Obama Tech Outreach," *Breaking Defense*, August 11, 2017, <https://breakingdefense.com/2017/08/diux-is-here-to-stay-mattis-embraces-obama-tech-outreach/>; Michael Hoffman, "Mattis plans to bolster DIUx," *Defense Systems*, August 31, 2017, <https://defensesystems.com/articles/2017/08/31/mattis-diux.aspx>.

62. Aaron Mehta, "In First, DIUx Hands Off Cyber Pilot Project to Army," *C4ISRNet*, October 26, 2017, <https://www.c4isrnet.com/2017/10/26/in-first-pentagons-silicon-valley-office-transitions-program-into-service/>.

63. Aaron Mehta, "DIUx, SCO Given Special Hiring and Contracting Authorities," *DefenseNews*, August 10, 2017, <https://www.defensenews.com/pentagon/2017/08/10/diux-sco-given-special-hiring-and-contracting-authorities/>.

64. John S. McCain National Defense Authorization Act for Fiscal Year 2019, 115th Cong., Sec. 1111, (2018), <https://www.congress.gov/115/bills/hr5515/BILLS-115hr5515enr.pdf>; Mehta, "DIUx, SCO Given Special Hiring and Contracting Authorities."

65. DIUx, "DIUx Is Here to Stay: New Authorities Accelerate the Innovation Mission," *Inside Defense*, August 11, 2017, [https://insidedefense.com/sites/insidedefense.com/files/documents/aug2017/08112017\\_diux2.pdf](https://insidedefense.com/sites/insidedefense.com/files/documents/aug2017/08112017_diux2.pdf)

66. Lauren C. Williams, "DIUx Gets a Big Boost in FY19 Budget," *FCW*, February 12, 2018, <https://fcw.com/articles/2018/02/12/budget-williams-dod.aspx>.

67. Samantha Ehlinger, "New DIUx Program to Give Acquisition Professionals a Crash Course in

across DoD, in August, Deputy Secretary Shanahan announced that DIUx would become a permanent organization and drop the experimental tag, becoming just the Defense Innovation Unit.<sup>68</sup>

### THIRD OFFSET STRATEGY: WHAT IS DEAD MAY NEVER DIE

The Third Offset Strategy has fallen out of favor in DoD, but many of the ideas behind it have survived in similar terms derived from the NDS such as “shifting focus to great power competition.”

Under the new administration, the term Third Offset Strategy has fallen out of favor in DoD, but many of the ideas behind it have survived in some form. Instead of talking about DoD innovation while ubiquitously using the Third Offset Strategy terminology, defense officials now largely talk using similar terms derived from the NDS such as “shifting focus to great power competition” or accessing innovation from the National Security Innovation Base. DoD has also since expanded its R&D priorities, compared to Third Offset’s emphasis on “human-machine collaboration and combat teaming.” Autonomous systems, broadly defined, remains a top R&D priority, but DoD has expanded its list of capability priorities to also include hypersonics, missile defense, modern strategic deterrent, space-based systems, trusted microelectronics, future computing capabilities, and dual-use technologies.<sup>69</sup> Although the terminologies and capabilities might have shifted, the fundamental impetus behind the Third Offset Strategy remains: ensuring continued U.S. technological superiority.

“The Third Offset Strategy has fallen out of favor in DoD, but many of the ideas behind it have survived in similar terms derived from the NDS such as “shifting focus to great power competition.”

Despite the major elements of the Third Offset Strategy largely surviving, just in different terminology, there is still much work to be done before the effort can be determined a success. First, although DoD Research, Development, Test, and Evaluation (RDT&E) funding has increased 23 percent since FY 2017, funding for prototyping and operational systems development has lagged.<sup>70</sup>

Rapid Procurement,” FedScoop, April 23, 2018, <https://www.fedscoop.com/diux-hacqer-acquisition-procurement-military-defense/>.

68. Aaron Mehta, “Experiment over: Pentagon’s Tech Hub Gets a Vote of Confidence,” *DefenseNews*, August 9, 2018, <https://www.defensenews.com/pentagon/2018/08/09/experiment-over-pentagons-tech-hub-gets-a-vote-of-confidence/>.

69. Mick Mulvaney, *FY 2019 Administration Research and Development Budget Priorities* (memorandum, Washington, DC: Executive Office of the President, August 17, 2017), <https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2017/m-17-30.pdf>.

70. Mackenzie Eaglen, *Defense Budget Peaks in 2019, Underfunding the National Defense Strategy*

Science & Technology (S&T) funding is critical for future capabilities, but DoD needs to translate technologies and ideas into fieldable capabilities in the near-term, not just 10–20 years from now.<sup>71</sup> There was a 14 percent increase in funding for Defense Advanced Component Development and Prototypes (6.4) in the final FY 2019 defense appropriations (double the total growth in RDT&E funding, a 6-percent increase), but given the timing, it will be difficult for new technology priorities to display the services' existing priorities.<sup>72</sup> If the recent defense budgets are the higher water points that many defense analysts are predicting, the services will fight like hell to ensure that their existing priorities push out new priorities for a shrinking pool of money. Additionally, the recent defense budgets are likely to be a highwater mark, raising questions about future RDT&E funding. Second, DoD still needs to adapt its force structure, concept of operations (CONOPS), and doctrine to implement these innovative technologies. The Army has made some progress on this front with its Multi-Domain Operations concept and has achieved some buy-in from the Air Force and Marine Corps, but it is still a work in progress.<sup>73</sup> Further field-test exercises like the Army's recent participation in a sinking exercise at [Rim of the Pacific Exercise] RIMPAC will be critical for continuing to evolve and refine the Multi-Domain Operations concept.<sup>74</sup> Ideally, Multi-Domain Operations will become a fully joint CONOPS, likely managed by the Joint Staff.<sup>75</sup>

### STRATEGIC CAPABILITIES OFFICE

Compared to DIUx's fortunes, SCO's have been mixed. Although the office survived the transition in administrations, there are significant questions about the office's long-term future. On Capitol Hill, the HASC emerging threats and capabilities subcommittee introduced language to the House's FY 2019 NDAA that called for eliminating SCO, or transferring its responsibilities to another organization, by October 1, 2020.<sup>76</sup> This direction

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(Washington, DC: American Enterprise Institute, 2018), 18-19, <https://www.aei.org/wp-content/uploads/2018/05/2019-Defense-Budget.pdf>.

71. DoD S&T is defined as R&D Activities 6.1 through 6.3: Basic Research (6.1), Applied Research (6.2) and Advanced Technology Development (6.3).

72. John F. Sargent Jr., *Federal Research and Development (R&D) Funding: FY2019* (Washington, DC: Congressional Research Service, October 2018), 18-19, <https://fas.org/sgp/crs/misc/R45150.pdf>.

73. Stephen Townsend, "Accelerating Multi-Domain Operations: Evolution of an Idea," Modern War Institute, July 23, 2018, <https://mwi.usma.edu/accelerating-multi-domain-operations-evolution-idea/>.

74. Todd South, "Not Just for the Navy: Army Uses RIMPAC to Give This New Task Force its First Real-World Tryout," *ArmyTimes*, August 7, 2018, <https://www.armytimes.com/news/your-army/2018/08/07/not-just-for-the-navy-army-uses-rimpac-to-give-this-new-task-force-its-first-real-world-tryout/>.

75. Sydney J. Freedberg Jr., "Services Debate Multi-Domain: 'Battle' Or 'Operations'," *Breaking Defense*, April 10, 2018, <https://breakingdefense.com/2018/04/beyond-multi-domain-battle-services-brainstorm-broader-concept/>.

76. Aaron Mehta, "House Committee Explores Ending Strategic Capabilities Office," *Defense-*

was later scaled back in conference but was not fully eliminated. Instead, section 217 of the FY 2019 NDAA required the Secretary of Defense, acting through the USD(R&E), to submit a report to Congress on SCO's future by March 1, 2019.<sup>77</sup>

Within DoD, there were questions about the office's future given the USD(AT&L) reorganization and the departure of its director, Dr. Will Roper. As part of the final USD(AT&L) reorganization, SCO lost some of its preeminence, because it no longer reports directly to the Secretary of Defense and, instead, now reports to the USD(R&E).<sup>78</sup> Then in January 2018, Dr. Roper, SCO's director since its 2012 creation, was tapped to become the assistant secretary of the Air Force for acquisition.<sup>79</sup> Finding the right replacement would be critical for SCO's future, as Roper had been instrumental in championing the office and providing the organization's vision. In August 2018, it was announced that Chris Shank would replace Dr. Roper at SCO. Prior to coming to SCO, Shank has previously served as director of strategic investment at NASA, policy director for the House Science, Space, and Technology committee, and as an advisor to Secretary of the Air Force Heather Wilson.<sup>80</sup>

#### **DEFENSE INNOVATION BOARD**

Established in the last year of the Obama administration by Secretary Carter, the Defense Innovation Board has continued its work in the new administration. Chaired by Eric Schmidt (executive chairman of Alphabet Inc.) and featuring influential Silicon Valley technologists and other experts, such as Marne Levine (Chief Operating Officer of Instagram) and Neil DeGrasse Tyson, the Defense Innovation Board has since issued a series of recommendations.<sup>81</sup> In January 2017, the Defense Innovation Board issued

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*News*, April 25, 2018, <https://www.defensenews.com/congress/2018/04/25/house-committee-ex-plores-ending-strategic-capabilities-office/>.

77. John S. McCain National Defense Authorization Act for Fiscal Year 2019, Sec. 217.

78. Eaglen, "Defense Budget Peaks in 2019, Underfunding the National Defense Strategy," 17-18.

79. Aaron Mehta, "Future of Strategic Capabilities Office Uncertain, as Director Lands Air Force Nomination," *DefenseNews*, January 3, 2018, <https://www.defensenews.com/air/2018/01/03/sco-head-roper-nominated-for-air-force-job/>.

80. Aaron Mehta, "Meet the New Head of the Pentagon's Strategic Tech Office," *DefenseNews*, August 2, 2018, <https://www.defensenews.com/pentagon/2018/08/02/meet-the-new-head-of-the-pentagons-strategic-tech-office/>.

81. When the Defense Innovation Board was first created, it was announced that Jeff Bezos, CEO of Amazon, would be a board member. Although Jeff Bezos was invited, he never officially joined the Defense Innovation Board "due to the Board's travel schedule and unique approach to its work, and the variety of security, legal, and ethical obligations of serving on a federal advisory committee." Although Jeff Bezos did not officially join the Defense Innovation Board, he has still provided informal advice to Secretary Mattis and hosted him at Amazon in August 2017. See: Christian Davenport and Dan Lamothe, "How Jeff Bezos was selected, but never joined, the Defense Innovation Board," *SFGate*, February 23, 2018, <https://www.sfgate.com/news/article/How-Jeff-Bezos-was-selected-but-never-joined-12704495.php>.

its first 11 recommendations<sup>82</sup> and one interim recommendation for how DoD can better access and implement innovation:<sup>83</sup>

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### **Defense Innovation Board's Initial Recommendations**

#### ***People & Culture:***

- Recommendation 1: Appoint a Chief Innovation Officer and Build Innovation Capacity in the Workforce
- Recommendation 2: Embed Computer Science as a Core Competency of the Department through Recruiting and Training
- Recommendation 3: Embrace a Culture of Experimentation

#### ***Technology & Capabilities:***

- Recommendation 4: Assess Cyber Security Vulnerabilities of Advanced Weapons
- Recommendation 5: Catalyze Innovations in Artificial Intelligence and Machine Learning
- Recommendation 6: Expand Use of Available Acquisition Waivers and Exemptions
- Recommendation 7: Increase Investment in New Approaches to Innovation

#### ***Practices & Operations:***

- Recommendation 8: Improve DoD Access to Code
- Recommendation 9: Establish Software Development Teams at Each Major Command
- Recommendation 10: Make Computing and Bandwidth Abundant
- Recommendation 11: Reward Bureaucracy Busting and Lower Barriers to Innovation

#### ***New Recommendation:***

- Interim Recommendation 12: Establish Global and Secure Repository for Data Collection, Sharing, and Analysis<sup>84</sup>
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82. Lisa Ferdinando, "Advisory Board Approves 11 DoD Innovation Recommendations," U.S. Department of Defense, January 9, 2017, <https://dod.defense.gov/News/Article/Article/1045458/advisory-board-approves-11-dod-innovation-recommendations/>.

83. U.S. Department of Defense, "Defense Innovation Board Fact Sheet on Recommendations for the Public Meeting on January 9, 2017," January 6, 2017, [https://dod.defense.gov/Portals/1/Documents/pubs/DIB\\_Recommendations\\_Executive\\_Summary\\_170106.pdf](https://dod.defense.gov/Portals/1/Documents/pubs/DIB_Recommendations_Executive_Summary_170106.pdf).

84. This recommendation later became: "Forge New Approach to Data Collection, Sharing, and Analysis." See: U.S. Department of Defense, "Recommendations," n.d., <https://innovation.defense.gov/Recommendations/>.

In October 2017, the Defense Innovation Board then issued an additional four new recommendations:<sup>85</sup>

- Recommendation 13: Develop an accelerator to help the department move faster, make decisions quicker and reduce the time it takes to adapt to adversary moves, emerging technologies and surprises.
- Recommendation 14: Elevate new ideas in DoD, so that people who have great ideas receive executive sponsorship and go through a process that gives them the ability to put the ideas to work.
- Recommendation 15: Create a new career field focused on innovation, rapid capability development and acquisition data science and science, technology, engineering and math skill sets.
- Recommendation 16: Establish a training program to increase the effectiveness and velocity of technology adoption and integration within DoD.

In 2018, the Defense Innovation Board heavily focused its effort on software development across DoD. In April, the Defense Innovation Board released the Ten Commandments of Software, a set of draft recommendations intended to guide DoD software acquisition efforts.<sup>86</sup>

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#### **Defense Innovation Board's Ten Commandments of Software:**

1. Make computing, storage, and bandwidth abundant to DoD developers and users.
2. All software procurement programs should start small, be iterative, and build on success or be terminated quickly.
3. Budgets should be constructed to support the full, iterative life-cycle of the software being procured with amount proportional to the criticality and utility of the software.
4. Adopt a DevOps culture for software systems.
5. Automate testing of software to enable critical updates to be deployed in days to weeks, not months or years.

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85. Cheryl Pellerin, "Defense Innovation Board Chair: Recommendations Making an Impact," U.S. Department of Defense, October 25, 2017, <https://dod.defense.gov/News/Article/Article/1353822/defense-innovation-board-chair-recommendations-making-an-impact/>.

86. U.S. Department of Defense, "Defense Innovation Board Ten Commandments of Software," Defense.gov, April 20, 2018, [https://media.defense.gov/2018/Apr/22/2001906836/-1/-1/0/DEFENSE-INNOVATIONBOARD\\_TEN\\_COMMANDMENTS\\_OF\\_SOFTWARE\\_2018.04.20.PDF](https://media.defense.gov/2018/Apr/22/2001906836/-1/-1/0/DEFENSE-INNOVATIONBOARD_TEN_COMMANDMENTS_OF_SOFTWARE_2018.04.20.PDF).



6. Every purpose-built DoD software system should include source code as a deliverable.
  7. Every DoD system that includes software should have a local team of DoD software experts who are capable of modifying or extending the software through source code or API access.
  8. Only run operating systems that are receiving (and utilizing) regular security updates for newly discovered security vulnerabilities.
  9. Data should always be encrypted unless it is part of an active computation.
  10. All data generated by DoD systems – in development and deployment – should be stored, mined, and made available for machine learning.
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The Defense Innovation Board expanded on the Ten Commandments of Software at its next meeting in July, proposing a series of draft metrics for software development. Instead of measuring software using the traditional source lines of code (SLOC), the Defense Innovation Board proposed that DoD measure software acquisition by using various metrics across four categories: deployment rate; response rate; code quality; and program management, assessment, and estimation.<sup>87</sup>

#### **R&D CONTRACTING TRENDS DURING THE BUDGET DRAWDOWN**

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Technological superiority has been a central pillar of U.S. strategy in the post-World War II era. It has allowed the United States to deter and, when necessary, defeat numerically superior forces of potential or actual adversaries. But with other nations rapidly developing their capabilities and infrastructure, it is not safe or wise to assume that U.S. technological superiority is a foregone conclusion. Furthermore, as the defense budget drawdown that lasted from FY 2009 to FY 2015 was underway, numerous analysts and policymakers had expressed concern regarding the ability of the United States to retain its technological superiority, particularly given how R&D contracting declined. Even during the initial year of the contracting upswing in FY 2016, R&D contracting showed only a very modest recovery.

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87. U.S. Department of Defense, "Defense Innovation Board Metrics for Software Development," Defense.gov, July 9, 2018, [https://media.defense.gov/2018/jul/10/2001940937/-1/-1/0/DIB\\_METRICS\\_FOR\\_SOFTWARE\\_DEVELOPMENT\\_V0.9\\_2018.07.10.PDF](https://media.defense.gov/2018/jul/10/2001940937/-1/-1/0/DIB_METRICS_FOR_SOFTWARE_DEVELOPMENT_V0.9_2018.07.10.PDF).



The concern about depressed—levels of R&D contracting takes on increasing urgency given the emphasis on preparing for peer competition in the 2018 NDS. Several of the capabilities prioritized in the NDS will require significant R&D to develop into operational capabilities, including advanced computing, hypersonics, directed energy, artificial intelligence, and robotics. Broadly speaking, the concern is that the future technological breakthroughs will be undermined by the failure to move technology from laboratories to production lines. Prototyping is one way to try and recover some of the technology development lost during the contracting drawdown, but it is likely that rapid prototyping will lend itself better to making progress in certain technologies than others. In certain technologies, leap ahead designs may require more time and investment than a rapid prototyping approach can provide.

As documented in several previous CSIS reports, the FPDS data showed a seven-year trough in the development pipeline for major weapon systems.<sup>88</sup> From those previous reports, CSIS developed a methodology that “categorizes R&D contracts by stage of R&D that roughly corresponds to the commonly used DoD R&D Budget Activity Codes (BACs)”:<sup>89</sup>

- Basic Research (6.1)
- Applied Research (6.2)
- Advanced Technology Development (ATD) (6.3)
- Advanced Component Development & Prototypes (ACD&P) (6.4)
- System Development & Demonstration (SD&D) (6.5)
- Operational Systems Development (6.7)
- Operation of Government R&D Facilities (GOCO)<sup>90</sup>

Total DoD R&D contracts have grown 6 percent since FY 2015. The 2 percent increase in FY 2016 and 3 percent increase in FY 2017 were the first increases in total defense R&D contract spending since FY 2009. Defense R&D contract obligations grew from \$23.2 billion in FY 2015

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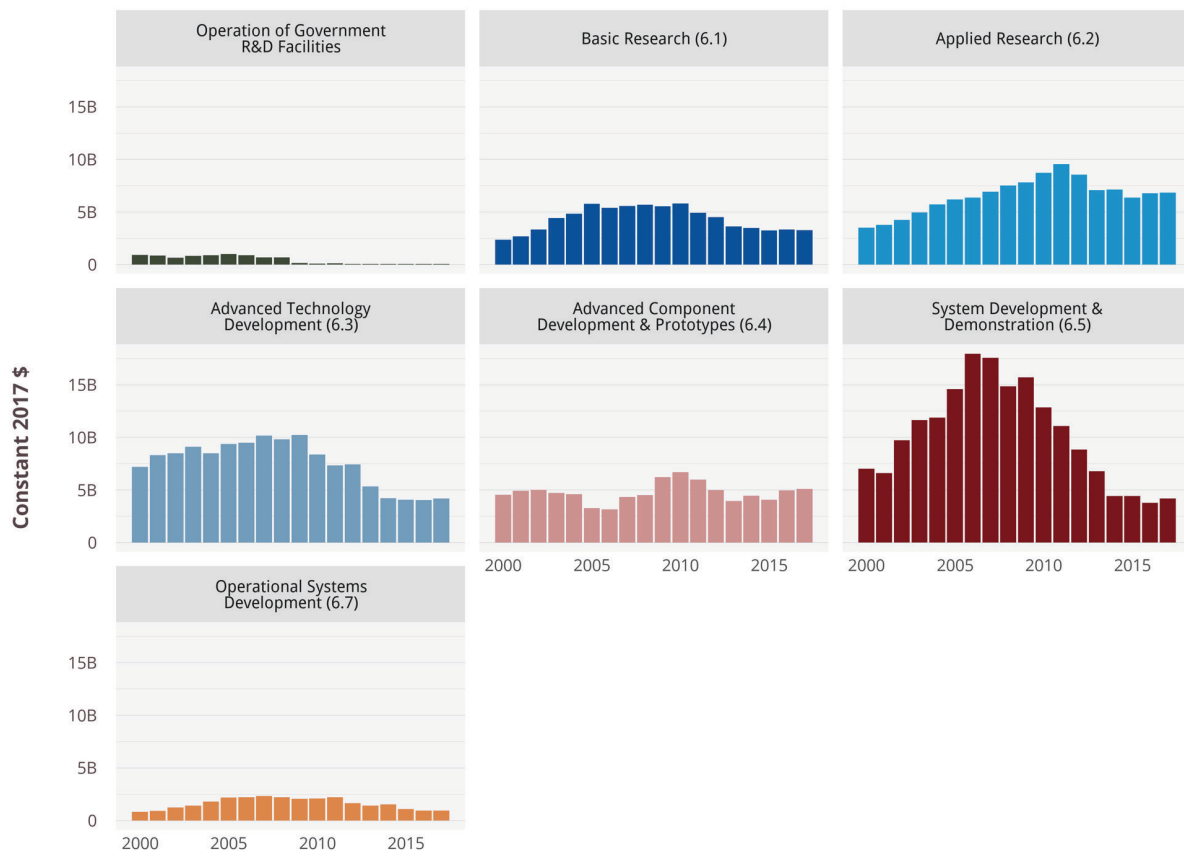
88. Jesse Ellman, Samantha Cohen, Andrew Hunter, Kaitlyn Johnson, Rhys McCormick and Gregory Sanders, *Defense Acquisition Trends, 2016: The End of the Contracting Drawdown* (Washington, DC: Center for Strategic & International Studies, April 5, 2017), <https://www.csis.org/analysis/defense-acquisition-trends-2016>.

89. Andrew Hunter, Greg Sanders, Kaitlyn Johnson and Jesse Ellman, *Federal Research and Development Contract Trends and the Supporting Industrial Base, 2000-2015* (Washington, DC: Center for Strategic & International Studies, September 14, 2016), <https://www.csis.org/analysis/federal-research-and-development-contract-trends-and-supporting-industrial-base-2000-2015>.

90. Though not classified as R&D in FPDS, CSIS includes the codes for management/operation of federal R&D facilities in its R&D category, as a significant amount of R&D activity in the broader federal government is structured in this manner.

to \$24.6 billion in FY 2016. Although defense R&D contract obligations have grown 6 percent since FY 2015, DoD is still spending slightly less on R&D contracts than it was in FY 2013 and approximately \$10.8 billion less than the historical average since the turn of the century. Figure 3–7 shows defense R&D contract Obligations by stage of R&D from FY 2000 to FY 2017.

Figure 3–7 | Defense R&D Contract Obligations by Stage of R&D, 2000–2017



Source: FPDS; CSIS analysis

The eight-year trough in the development pipeline for major weapon systems continued into FY 2017, but there are signs that the trough might have bottomed out. For the first time since FY 2005, defense SD&D (6.5) contract obligations grew from the previous year. Defense SD&D (6.5) contract obligations grew 11 percent in FY 2017, increasing to \$4.2 billion from \$3.8 billion in FY 2016. Defense ATD (6.3) contract obligations increased 3 percent from \$4.04 billion in FY 2016 to \$4.17 billion in FY 2017. Although Advanced Technology Development (6.3) and System Development & Demonstration (6.5) contract obligations are still at near-historic lows, the

respective 3 percent and 11 percent growths in FY 2017 are positive signs that the bleeding has stopped for now.

Advanced Component Development & Prototype (6.4) contract obligations in FY 2017 grew 25 percent from FY 2015. This rate constitutes a significantly higher rate of growth than the 6 percent overall growth of defense R&D between FY 2015 and FY 2017. ACD&P (6.4) grew 3 percent in FY 2017—a significantly lower rate of growth when compared to the 22 percent increase in FY 2016. As a share of the defense R&D portfolio, ACD&P (6.4) rose from 17 percent in FY 2015 to 21 percent in FY 2017 and is now the second largest R&D category after Applied Research (6.2).

“The eight-year trough in the development pipeline for major weapon systems continued into FY 2017, but there are signs that the trough might have bottomed out.

As overall DoD R&D contracting increased from FY 2015 to FY 2017, defense contract obligations for the two seed-corn categories, Basic Research (6.1) and Applied Research (6.2), increased by 2 and 8 percent, respectively. Contract obligations for Basic Research grew from \$3.2 billion in FY 2015 to \$3.3 billion in FY 2017, while Applied Research grew from \$6.4 billion to \$6.8 billion. As a

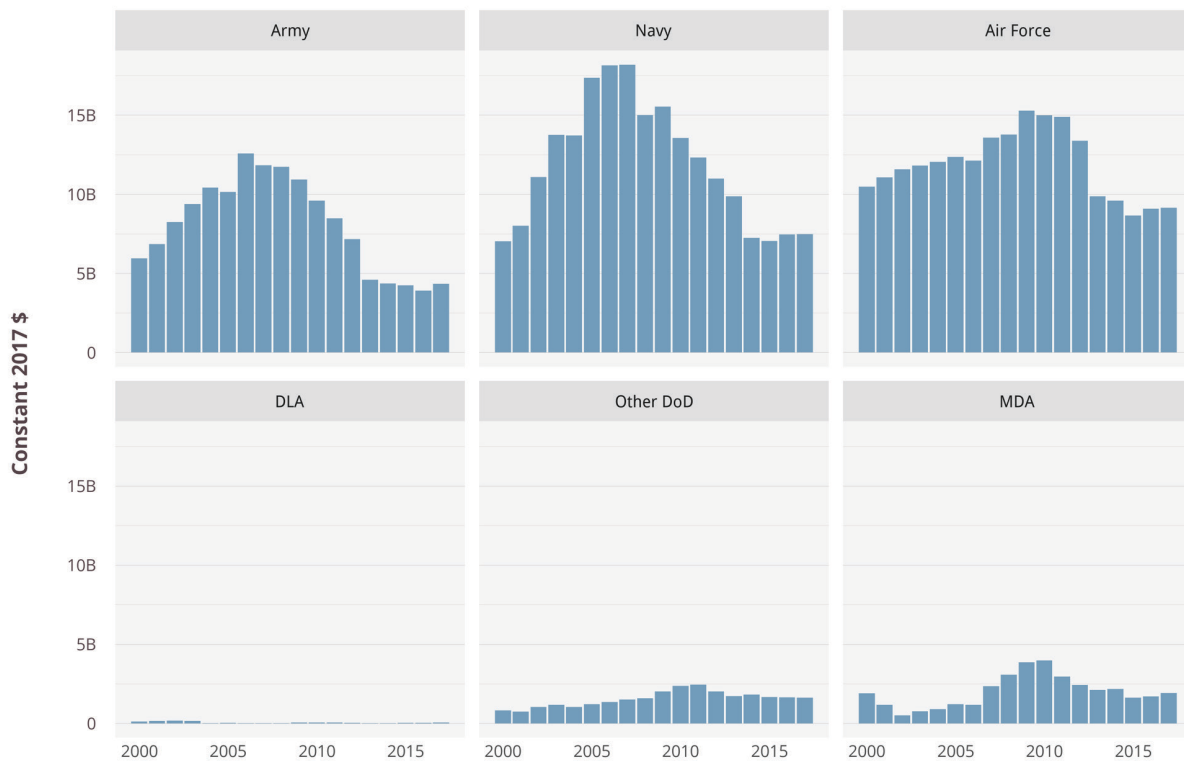
share of overall defense R&D, these two-seed corn categories fell slightly from 42 percent to 41 percent but remained well above the historical average of 32 percent.

Operational Systems Development (6.7) contract obligations grew 1 percent in FY 2017 after declining 13 percent in FY 2016.

#### R&D BY COMPONENT

The defense R&D contracting trends varied by DoD component as shown in Figure 3-8:

Figure 3-8 | Defense R&D Contract Obligations by Component, 2000-2015

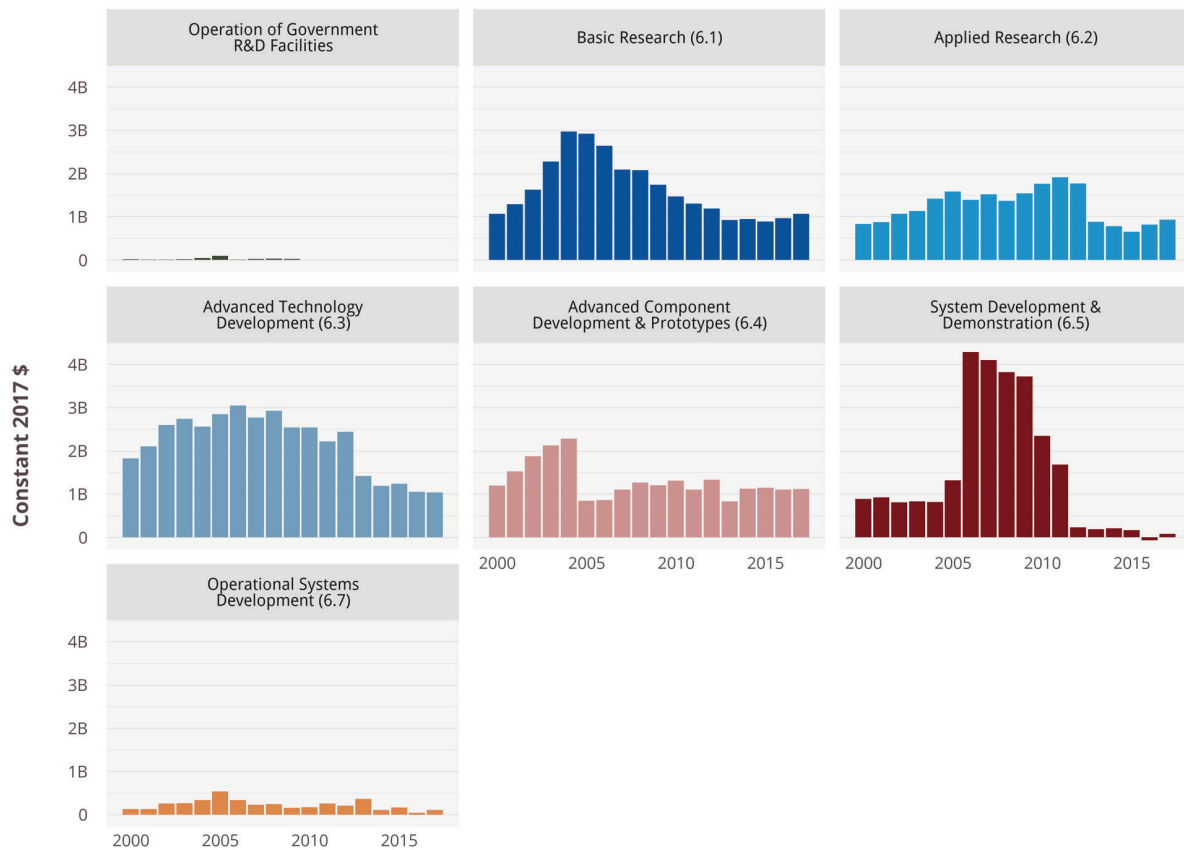


Source: FPDS; CSIS analysis

*Army R&D: Seed-Corn Increasing; Weapon Systems Development Pipeline Continues*

After continuous catastrophic declines from FY 2006 to FY 2016, Army R&D contract obligations grew 2 percent from FY 2015 to FY 2017. Army R&D contract obligations continued to decline in FY 2016 but began to rebound slightly in FY 2017, growing from \$3.9 billion in FY 2016 to \$4.3 billion in FY 2017, an 11 percent increase. Figure 3-9 shows Army R&D contract obligations by stage of R&D from FY 2000 to FY 2017.

Figure 3-9 | Army R&D Contract Obligations by Stage of R&D, 2000-2017

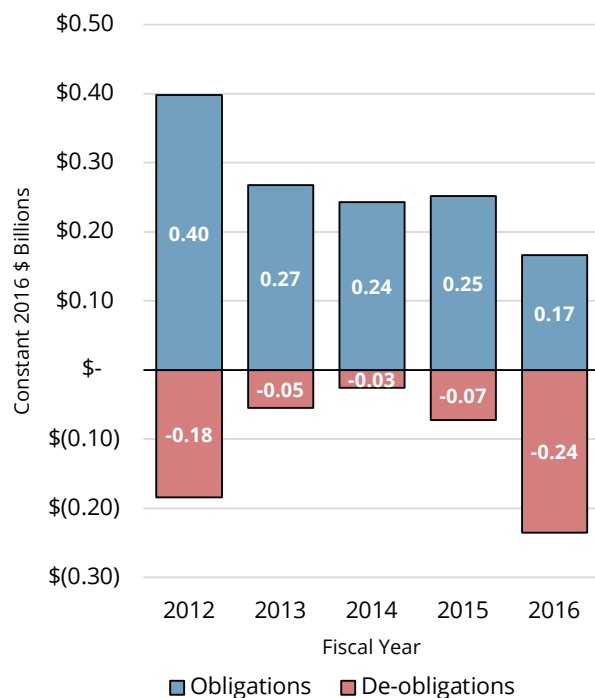


Source: FPDS; CSIS analysis

The two seed-corn categories, Basic Research (6.1) and Applied Research (6.2) were the two largest sources of the Army's 2 percent increase in R&D contract obligations from FY 2015 to FY 2017. Army Basic Research contract obligations grew at a consistent rate over the past two years, increasing by 9 percent in FY 2016 and 10 percent in FY 2017. Comparatively, Army Applied Research contract obligations grew at differing rates over the past two years. After growing 25 percent in FY 2016, Army Applied Research growth slowed down to 14 percent in FY 2017. As a share of total Army R&D contract obligations, the two seed-corn categories rose sharply, going from 36 percent in FY 2015 to 46 percent in both FY 2016 and FY 2017.

The Army's SD&D (6.5) pipeline remained empty over the past two years as SD&D contract obligations declined 51 percent from FY 2015 to FY 2017. The Army's SD&D pipeline bottomed out in FY 2016 when the Army de-obligated more money than it obligated. In FY 2016, the Army obligated in \$0.17 billion for SD&D contracts but de-obligated \$0.24 billion, resulting in a net -\$0.07 billion in Army SD&D contract obligations in FY 2016.

Figure 3-10 | Army SD&D Contract Obligations and De-Obligations, 2012-2016



Source: FPDS; CSIS analysis

As shown in Figure 3-10, the Army de-obligated more than normal in FY 2016, but also spent less than in previous years. After bottoming out in FY 2016, Army SD&D contract obligations grew to \$0.08 billion in FY 2017. While, at this point, any annual growth is a positive sign for Army SD&D contract obligations, Army SD&D contract obligations remain at historic lows after being completely hollowed out from FY 2009 to FY 2016.

Compounding the Army's weapon systems pipeline troubles, Army ATD (6.3) contract obligations declined 16 percent from FY 2015 to FY 2017 as overall Army R&D grew 2 percent. Army ATD contract obligations declined 1 percent despite Army R&D topline growth. As a share of Army R&D, ATD fell from 29 percent in FY 2015 to 24 percent in FY 2017.

After a massive decline in FY 2016, Army Operational Systems Development (6.7) contract obligations rebounded in FY 2017. In FY 2016, Army Operational Systems Development contract obligations fell from \$0.16 billion to \$0.04 billion, a 74 percent decline. In FY 2017, Army Operational Systems Development contract obligations largely recovered from the previous year's decline, totaling \$0.11 billion, a 161 percent increase.

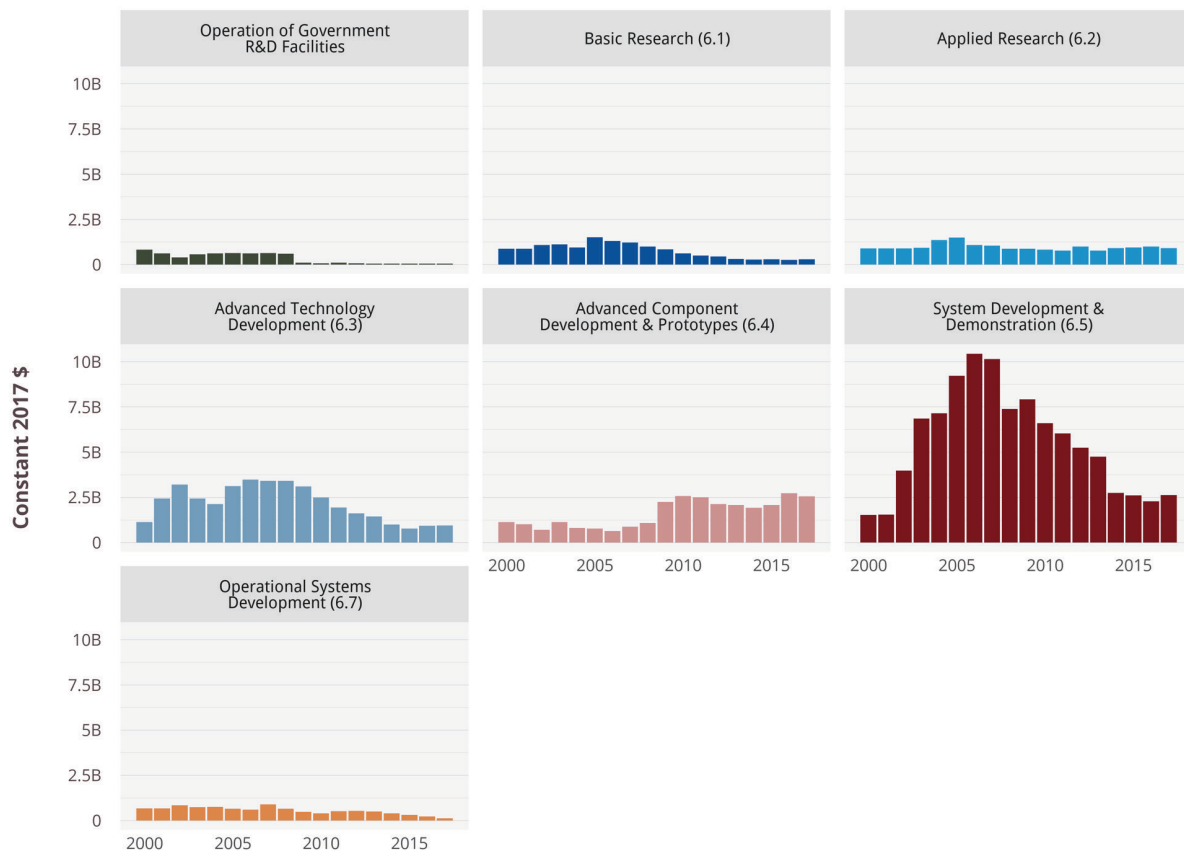
Army ACD&P (6.4) contract obligations remained relatively steady compared to the other R&D categories, declining just 2 percent from FY 2015 to FY 2017.

#### *Navy: Growth in the Mid-Stage R&D; Operational Systems Development Falls Off*

Navy R&D contract obligations grew from \$7.0 billion in FY 2015 to \$7.5 billion in FY 2017, a 6 percent increase. Although Navy R&D contract obligations are up 6 percent since FY 2015, the trends within the Navy's R&D contracting portfolio have been volatile.

Figure 3-11 shows Navy R&D contract obligations by stage of R&D from FY 2000 to FY 2017.

Figure 3-11 | Navy R&D Contract Obligations by Stage of R&D, 2000-2017



Source: FPDS; CSIS analysis

Contract obligations for the Navy's two seed-corn categories have declined since FY 2015, but only slightly. Navy spending on Basic Research (6.1) and Applied Research (6.2) has declined 1 percent and 3 percent since FY 2015 respectively. However, over the past two years there was a significant reversal in fortunes for both Basic and Applied Research. In FY 2016, Navy spending on Basic Research contracts declined 11 percent, while spending on Applied Research increased 6 percent. In FY 2017, both R&D accounts saw shifting trends as Navy Basic Research contract obligations increased 12 percent and Applied Research fell 9 percent.

Over the past two-years, there have been significant increases in mid-stage Navy R&D. From FY 2015 to FY 2017, Navy contract obligations for ATD (6.3) and ACD&P (6.4) grew 20 percent and 23 percent respectively. Even though there was significant total growth in the mid-tier R&D accounts, there was a whipsaw effect in both R&D stages just as was the case for the two seed-corn categories. Navy ATD contract obligations grew 19 percent



in FY 2016 but slowed to 1 percent growth in FY 2017. Navy ACD&P contract obligations grew 32 percent in FY 2016 but declined by 7 percent in FY 2017. Of note, the current share of Navy R&D contract obligations going to ATD and ACD&P is historically abnormal. Since FY 2000, the Navy has historically spent 18 percent on ATD and 16 percent on ACD&P compared to the 13 percent and 34 percent share for ATD and ACD&P respectively today.

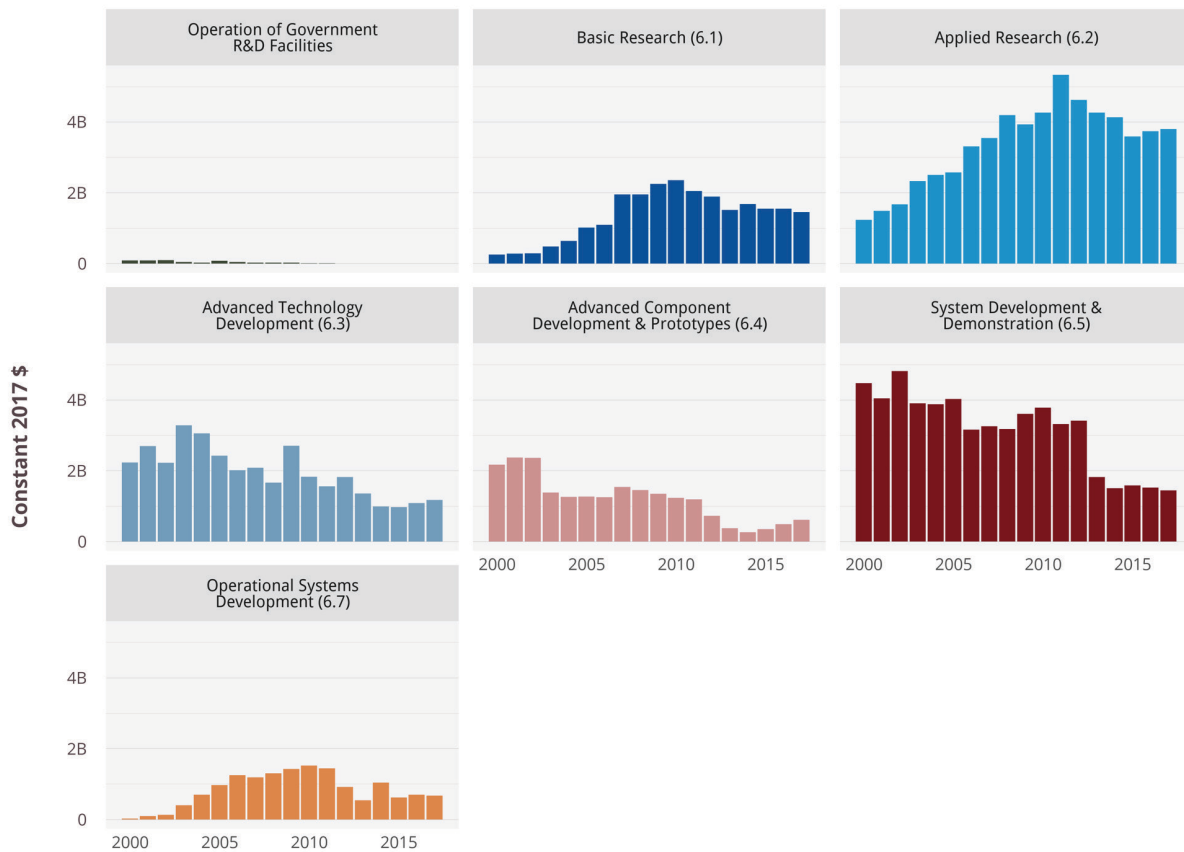
Navy SD&D (6.5) contract obligations remained relatively steady compared to the other R&D categories, increasing by 2 percent from FY 2015 to FY 2017.

Finally, Navy Operational Systems Development (6.7) contract obligations declined significantly from FY 2015 to FY 2017. Contract obligations fell from \$0.3 billion in FY 2015 to \$0.1 billion in FY 2017, a 64 percent decline. As a share of Navy R&D contract obligations, Operational Systems fell from 4 percent in FY 2015 to 1 percent in FY 2017.

#### *Air Force—Growth in the Mid-Tiers, SD&D Continues Declines Hitting Historic Lows*

Air Force R&D contract obligations have grown each of the past two years. Air Force R&D contract obligations increased 5 percent in FY 2016 and 1 percent in FY 2017. Overall, Air Force R&D contract obligations grew from \$8.7 billion to \$9.2 billion between FY 2016 and FY 2017, a 6 percent increase. Contract obligations for all Air Force R&D categories except Basic Research (6.1) and SD&D (6.5) increased from FY 2015 to FY 2017. Figure 3-12 shows Air Force R&D contract obligations by stage of R&D from FY 2000 to FY 2017.

Figure 3-12 | Air Force R&D Contract Obligations by Stage of R&D, 2000-2017



Source: FPDS; CSIS analysis

After remaining level in FY 2016, Air Force Basic Research contract obligations declined by 6 percent in FY 2017. In FY 2015 and FY 2016, Air Force Basic Research contract obligations totaled \$1.55 billion, but they fell to \$1.45 billion in FY 2017. As a share of Air Force R&D contract obligations, Basic Research fell from 18 percent to 16 percent over the past two years.

Air Force spending on Applied Research (6.2), the other seed-corn category and largest source of Air Force R&D, grew at a rate (6 percent) similar to the overall rate of growth for Air Force R&D contract obligations (5 percent). Air Force applied research contract obligations increased 4 percent in FY 2016 and 2 percent in FY 2017. As a share of Air Force R&D contract obligations, Applied Research remained steady at 41 percent.

Like the Navy, the largest percentage increases in Air Force R&D contract obligations increased in the mid-stages- ATD (6.3) and ACD&P (6.4). From FY 2015 to FY 2017, Air Force ATD and ACD&P contract obligations increased 21 percent and 76 percent respectively. As shares of Air Force R&D contract

obligations, ATD increased from 11 percent in FY 2015 to 13 percent in FY 2017, while ACD&P rose from 4 percent in FY 2015 to 7 percent in FY 2017.

Air Force SD&D contract obligations (6.5) declined 9 percent from FY 2015 to FY 2017. There was a consistent gradual decline over the past two years as Air Force SD&D contract obligations declined 4 percent in FY 2016 and 5 percent in FY 2017. This continued the trend in declining Air Force SD&D contract obligations that was ongoing since FY 2010. Since FY 2010, Air Force SD&D contract obligations are down 62 percent. As a share of Air Force R&D contract obligations, SD&D fell to 16 percent, the lowest share seen this century.

Air Force Operational Systems Development (6.7) SD&D (6.5) contract obligations grew 9 percent from FY 2015 to FY 2017.

### 3.2 | Defense Contract Obligations by Budget Account

Historically, it was near-impossible for researchers to fully track defense contracts to budget accounts because FPDS lacked the necessary data fields. Researchers could sometimes track individual or select small groups of contracts to budget accounts, but doing so was cumbersome, and tracking anything larger was extremely difficult. However, provisions in the American Recovery and Reinvestment Act of 2009 (ARRA) required FPDS to begin including the critical Treasury account information. Thanks to these provisions in the ARRA, it is now possible to track contract obligations to budget accounts from FY 2012 onwards. Tracking defense contracts to budget accounts provides important insights into how the money's being spent in the budget accounts. These insights might seem obvious at first, but they can often be surprising with more detail. For example, historically, only about half of the contracts funded out of RDT&E actually go to R&D.<sup>91</sup> The decline in the quality of data over the past two years, however, is troubling. Between FY 2012 and FY 2015, less than one percent of DoD contracts were "unlabeled" due to missing data. In FY 2016, "unlabeled" contracts rose to 2 percent, and, in FY 2017, they rose to a worrisome 11 percent.

The significant leap in unlabeled budget account codes may reflect a shift in how the accounting is managed, a change that originated in the Digital Accountability and Transparency Act of 2014. That approach mandated additional reporting, which, when fully in place, should break down the proportion of each contract by funding account beginning in the second quarter of fiscal year 2017.<sup>92</sup> However, the Department of Defense has not

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91. Ellman et al., *Defense Acquisition Trends*, 2016, 29.

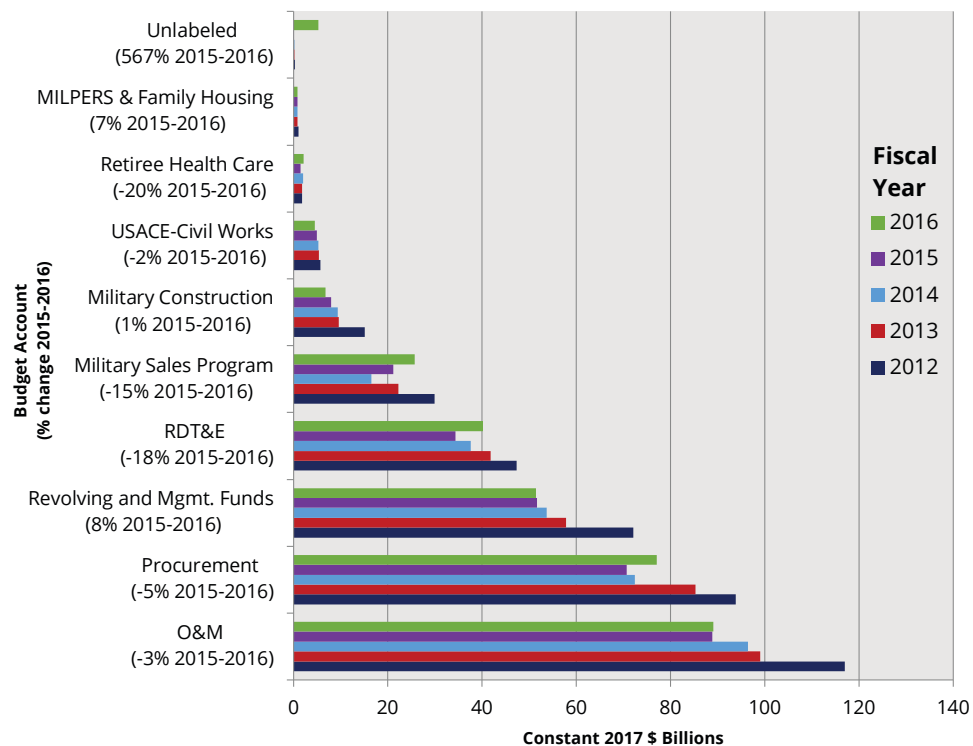
92. In the current system, if a contract draws funding from multiple funding accounts, it is labeled

yet submitted data in support of this new mechanism. In addition, the treasury agency codes previously available through the USAspending bulk download were excluded from the newly updated site. The catastrophic 31844 percent rise in unreported data in FY 2017 appears to be a part of this larger pattern, with the Department of the Navy being the worst offender. The upgrade to USAspending offers considerable improvements and should provide additional functionality going forward, at least for data from FY 2017 quarter 2 and beyond. Nonetheless, failures to report by DoD have compounded an already difficult transition. CSIS will continue to track these issues and work on alternate approaches to overcome these limitations.

Given the sizable increase in unlabeled contracts, the following sections only analyze the FY 2016 trends.

Figure 3-13 shows defense contract obligations by major DoD budget accounts between FY 2012 and FY 2016.

**Figure 3-13 | Defense Contract Obligations by Budget Account, 2012-2016**



Source: FPDS; CSIS analysis

according to whichever funding account is larger. For example, an R&D contract that is 60 percent Navy and 40 percent Air Force, would be classified as a Navy contract under the current system. In the new system, that same contract would be reported as 60 percent Navy and 40 percent Air Force.

As overall DoD contract obligations increased 7 percent in FY 2016, that gain came out of four budget accounts: Procurement (9 percent), RDT&E (17 percent), Military Sales (22 percent), and Retiree Health Care (43 percent). Three budget accounts remained steady even as overall DoD contract obligations grew 6 percent. These were: Operations & Maintenance (O&M), Revolving and Management Funds, and Military Personnel (MILPERS) & Family Housing. Finally, contract obligations funded out of Military Construction (-14 percent) and Corps of Engineers – Civil Works (-9 percent) declined as defense contracting rebounded in FY 2016.

Unlike the FY 2012 to FY 2015 period, the shares of contract obligations funded out of one of the budget accounts changed by more than two percentage points.<sup>93</sup> As a share of overall DoD contract obligations, defense contracts funded out of O&M fell from 32 percent in FY 2015 to 29 percent in FY 2016.

The following section examines the FY 2016 trends for the five largest DoD Budget Accounts: O&M, Procurement, Revolving and Management Funds, RDT&E and Military Sales.

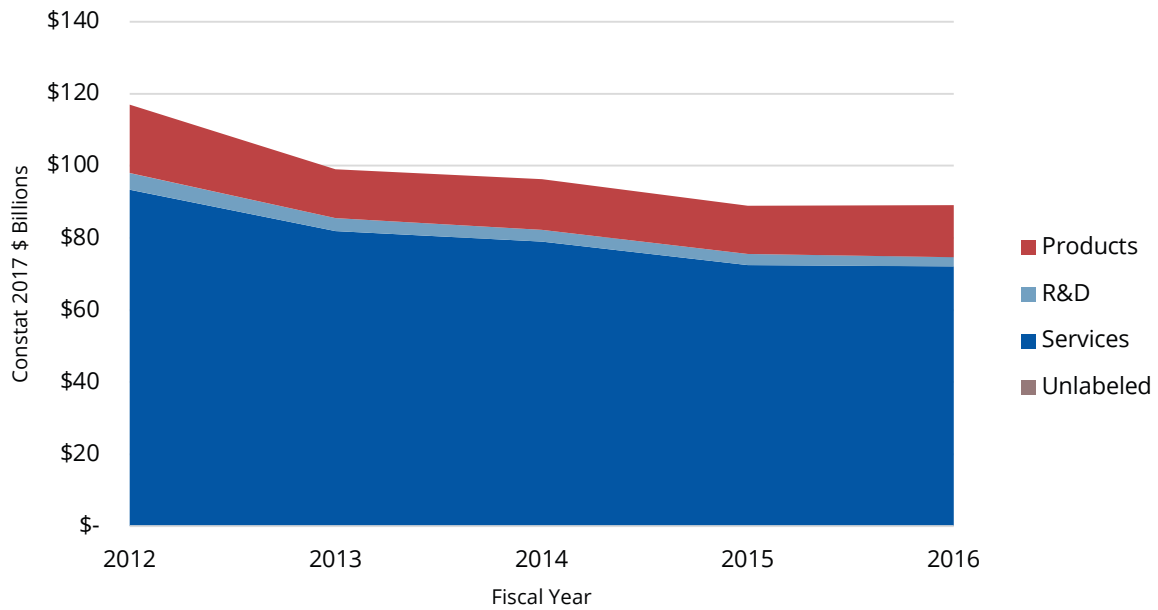
#### OPERATIONS & MAINTENANCE

Just as in previous years, over 80 percent of contract obligations funded out of O&M in FY 2016 were for services, while 16 percent were for products and 3 percent were for R&D. Although services remained consistent as a share of O&M contracts, services contract obligations funded out of O&M declined 1 percent, while overall defense services increased 2 percent. Products contract obligations funded out of O&M (16 percent) grew faster than overall products (13 percent). O&M R&D contract obligations (3 percent) grew in parallel with overall DoD R&D contract obligations.

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93. Ellman et al., Defense Acquisition Trends, 2016, 28.

Figure 3-14 | Contract Obligations Funded Out of O&M by Area, 2012-2016



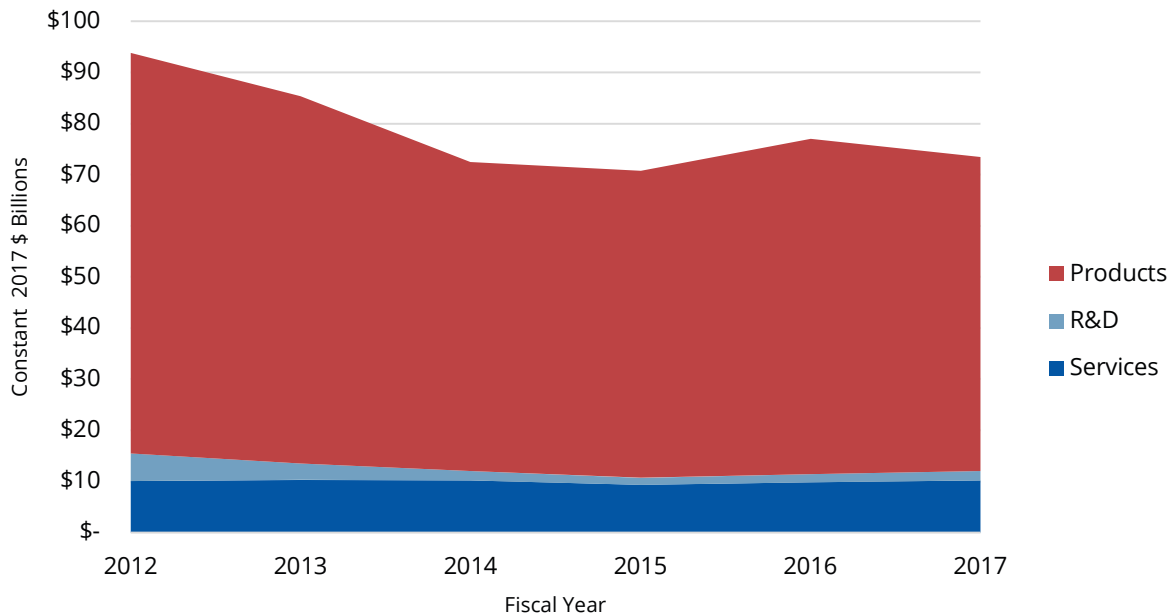
Source: FPDS; CSIS analysis

### PROCUREMENT

Contract obligations funded out of procurement grew 9 percent in FY 2016, but the share of products, R&D, and services funded out of procurement remained steady.



Figure 3-15 | Contract Obligations Funded Out of Procurement by Area, 2012-2016



Source: FPDS; CSIS analysis

In FY 2016, products contract obligations funded out of Procurement (9 percent) grew at rates below overall defense products growth (13 percent). Services contract obligations funded out of Procurement (5 percent) increased at twice the rate of overall defense services (2 percent). R&D contract obligations funded out of Procurement (17 percent) increased significantly sharper than overall DoD R&D growth (3 percent).

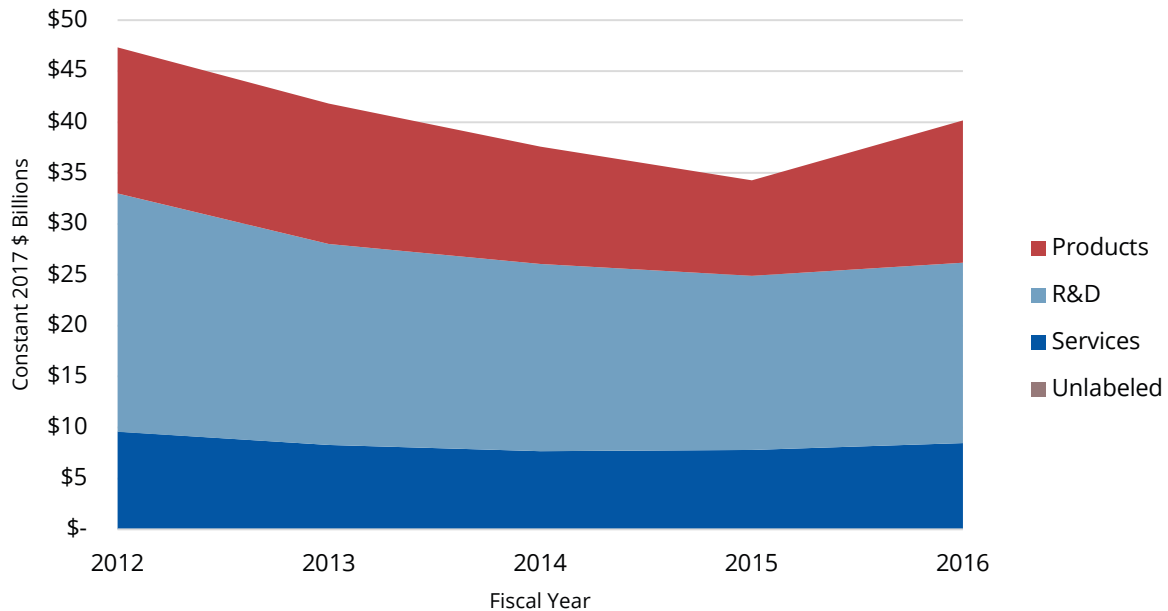
#### RESEARCH, DEVELOPMENT, TEST, AND EVALUATION

Although there was a 17 percent increase in contract obligations funded out RDT&E in FY 2016, the data show that relatively little of that increase went to R&D. Instead, most of the increase went towards products. RDT&E products contract obligations increased from \$9.4 billion in FY 2015 to \$14 billion in FY 2016, a 49 percent increase. Additionally, services contract obligations funded out of RDT&E increased by 9 percent. There was a 3 percent increase in R&D contract obligations funded out of RDT&E in FY 2016, but the more modest increase (compared to products and services) meant that relatively little of the RDT&E increase went to R&D activities.

In terms of market share, the share of R&D contract obligations funded out of RDT&E fell from 50 percent in FY 2015 to 44 percent in FY 2016, the lowest levels since the introduction of budget account data in FY 2012. RDT&E products increased its market share from 27 percent to 35 percent.

Finally, despite growing 9 percent in FY 2016, services fell as a share of contract obligations funded out of RDT&E from 23 percent to 21 percent.

Figure 3-16 | Contract Obligations Funded Out of RDT&E by Area, 2012-2016

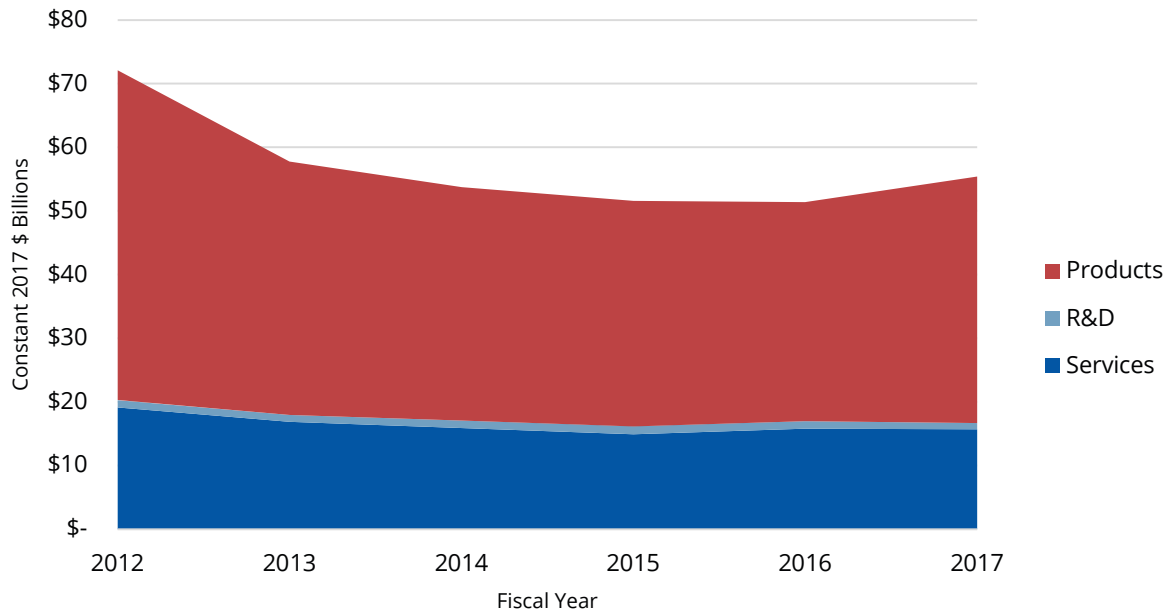


Source: FPDS; CSIS analysis

### REVOLVING AND MANAGEMENT FUNDS

There was a slight uptick in services' share of contract obligations funded out of Revolving and Management Funds and downturn in products in FY 2016.

Figure 3-17 | Contract Obligations Funded Out of Revolving & Management Funds by Area, 2012-2016



Source: FPDS; CSIS analysis

In FY 2016, products contracts obligations funded out of Revolving and Management Funds (-3 percent) declined even though overall DoD products grew sharply (13 percent). R&D contract obligations funded out of Revolving and Management Funds (-4 percent) also declined, while the overall defense R&D contracting increased (3 percent). Unlike products or R&D, services contract obligations funded out of Revolving and Management Funds (6 percent) increased at three times the rate at which overall defense services grew (2 percent).

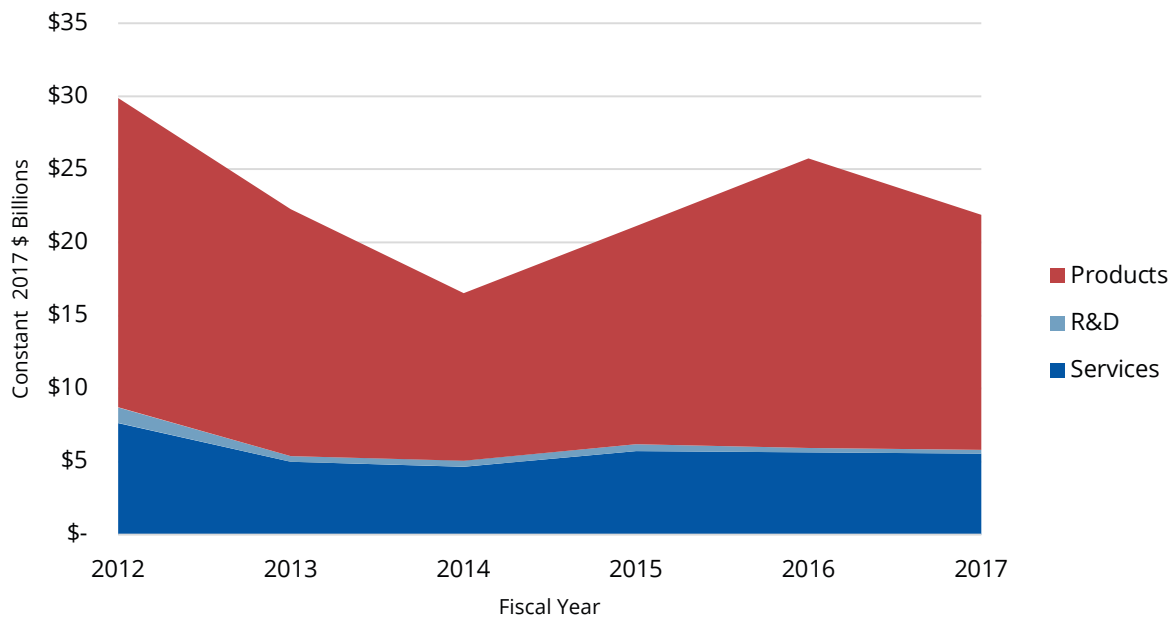
#### MILITARY SALES PROGRAM

Products has always accounted for the predominant share of contract obligations funded out of the Military Sales Program, but it further increased its market share in FY 2016. In FY 2016, products accounted for 77 percent of contract obligations funded out of the Military Sales Program compared to 71 percent in FY 2014. Services fell as a share of Military Sales from 27 percent to 22 percent, offsetting products' increase in share of the Military Sales Program contract obligations.

Furthermore, there were notable differences in the trends for the Military Sales Program compared to the rest of DoD. Products contract obligations that were funded out of the Military Sales Program (32 percent) grew sharper than the already substantial increase in defense products contract

obligations (13 percent). Services contract obligations that were funded out of the Military Sales Program (-2 percent) declined despite modest increases in services spending across DoD. Finally, R&D—already a marginal portion of the contracts funded out of the Military Sales Program—plummeted (-27 percent) compared to the modest growth in total defense R&D spending (3 percent).

Figure 3-18: Contract Obligations Funded Out of the Military Sales Program by Area, 2012-2016



Source: FPDS; CSIS analysis

### 3.3 | Defense Services

The enormous costs of procuring products and weapon systems like the Joint Strike Fighter or a Ford-class aircraft carrier often draw public attention, as well as analysis from government agencies and private think tanks. In contrast, far less research investigates DoD’s spending on services, despite DoD spending relatively equal amounts on services as it does products. These services range from maintaining infrastructure and equipment to administrative and medical work. Although these services are often overlooked in discussions of DoD spending, they are as important as MDAPs in ensuring that DoD fulfills its missions. To gain an overall understanding of DoD acquisition trends, it is essential to understand Defense Service spending trends.

In recent years, there have been significant shifts in the defense services trends. Small vendors have increased as a share of both Professional,

Administrative, and Management Support services (PAMS) contract obligations and Information and Communications Technology services (ICT) contract obligations, while the Big Five have focused their growth on Equipment-related services (ERS). Despite policy guidance aimed at curtailing services spending across DoD (but especially the Navy), services spending is proving resilient.<sup>94</sup> However, the resilience of services spending is not that shocking when you consider the fact that increasingly aging fleets that are facing readiness shortfalls lead to higher ERS spending, and medical costs are increasing across the entire U.S. economy, not just DoD.

This section investigates various questions surrounding DoD contract spending for services. The chapter begins by analyzing how much DoD spends on services in comparison to other spending priorities. Next, it provides a spending breakdown of the services spend by category of service. This explanation is then followed by an analysis of Defense services spending disaggregated by DoD component. Finally, the critical question of as to whom DoD is contracting these services from is investigated and analyzed.<sup>95</sup>

#### DEFENSE SERVICES RELATIVE TO PRODUCTS AND R&D IN THE DOD CONTRACTING PORTFOLIO

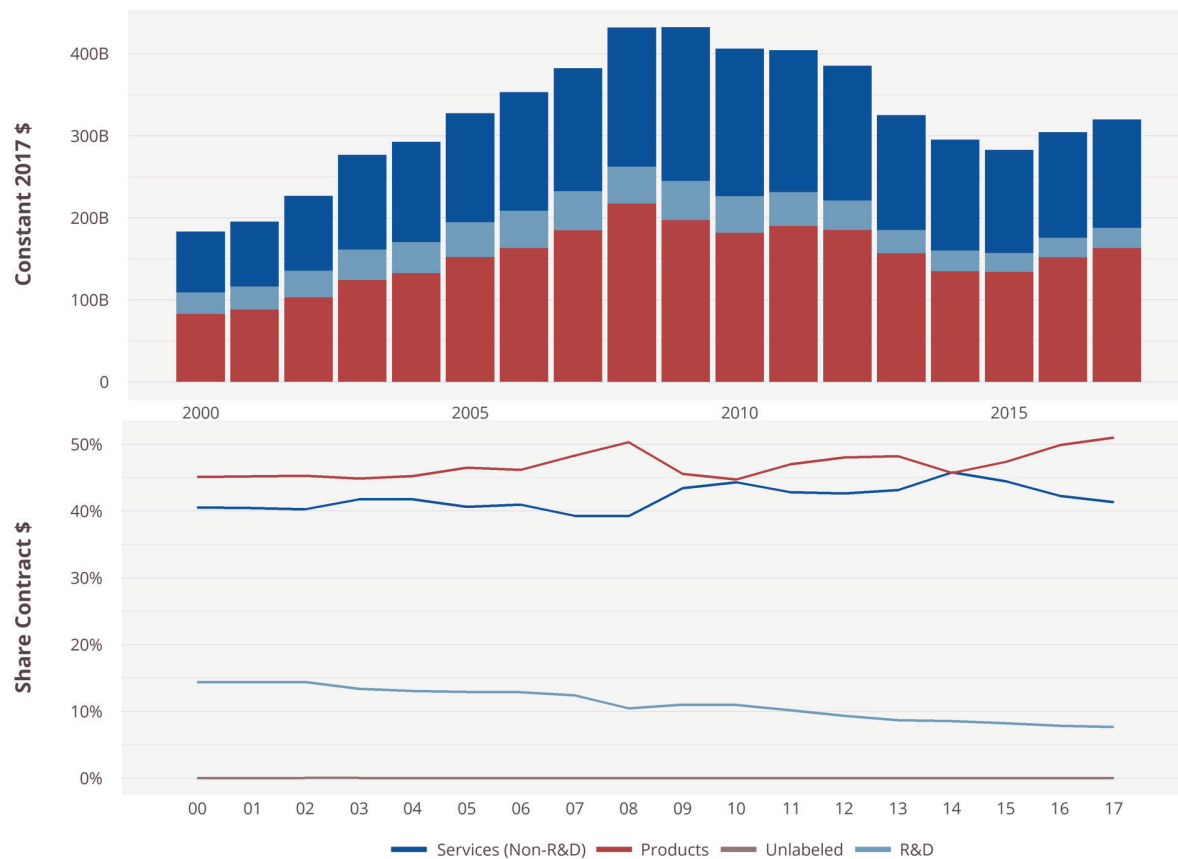
As previously discussed in Chapter 3, the share of DoD contract obligations going towards services has fallen since FY 2015 despite a 5 percent growth in defense services contract obligations. Even though DoD services contract obligations have increased 5 percent since FY 2015, overall defense contract obligations have grown 13 percent, which is largely the result of the 22 percent increase in products contract obligations. As a share of defense contract obligations, services fell from 44 percent in FY 2015 to 41 percent in FY 2017. Although defense services have fallen as a share of defense contract obligations, the recent declines represent a slight return to historical averages. Since FY 2000, DoD has spent on average 42 percent of its contracting portfolio on services.

Figure 3-19 shows defense contract obligations by area from FY 2000 to FY 2017.

94. U.S. Department of Defense, *2014 Quadrennial Defense Review* (Washington DC: Department of Defense, March 2014), 30, [http://archive.defense.gov/pubs/2014\\_quadrennial\\_defense\\_review.pdf](http://archive.defense.gov/pubs/2014_quadrennial_defense_review.pdf).

95. Although DoD classifies R&D as a Service, CSIS excludes R&D from services and treats it as its own category.

Figure 3-19 | Defense Contract Obligations by Area, 2000–2017



Source: FPDS; CSIS analysis

### WHAT SERVICES IS DOD CONTRACTING FOR?

Since FY 2000, DoD has spent an average of \$135.8 billion annually on services, but what services are they receiving for those dollars? Over the past decade, CSIS has created and refined a methodology that categorizes services contracts into five unique services categories.<sup>96</sup> Though these categories generally align with DoD’s own services categorization, “they do not fully overlap.”<sup>97</sup>

96. CSIS’ services categorization methods have been adopted by other organizations like the Congressional Budget Office. See: Douglas W. Elmendorf, “Federal Contracts and the Contracted Workforce,” Congressional Budget Office, March 11, 2015, <https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/49931-FederalContracts.pdf>.

97. David Berteau, Guy Ben-Ari, Greg Sanders, David Morrow and Jesse Ellman, “U.S. Department of Defense Services Contract Spending and the Supporting Industrial Base, 2000-2011,” in *Proceedings of Ninth Annual Acquisition Research Symposium* (Monterey, CA: Naval Postgraduate School, April 30, 2012), 48, <https://my.nps.edu/documents/105938399/108629261/NPS-AM-12-C9P16R01-074.pdf/319eb8c4-fa29-47d8-b556-23ab483bba2f?version=1.0>.

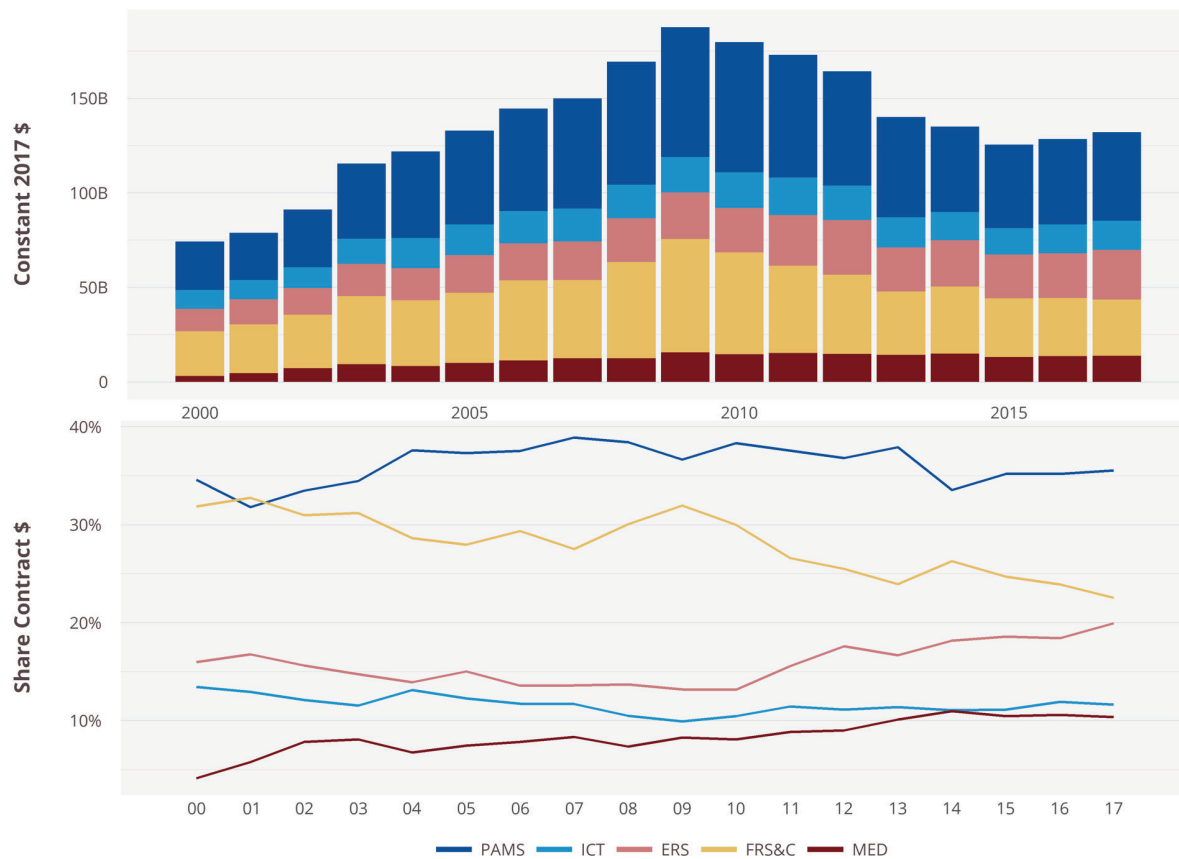


The five services categories created by the CSIS study team are:<sup>98</sup>

- Information and Communications technology (ICT) services
- Professional, Administrative, Management services (PAMS)
- Equipment-related services (ERS)
- Facility-related services & Construction (FRS&C) services
- Medical (MED) services:

Figure 3-20 shows defense contract obligations by services category from FY 2000 to FY 2017.

Figure 3-20 | Defense Contract Obligations by Services Category, 2000-2017



Source: FPDS; CSIS analysis

Except for two years (FY 2001 and FY 2008), PAMS are the largest source of DoD services contract spending, averaging 36.2 percent of annual DoD

98. CSIS' complete FPDS ProductOrServiceCode classification schema can be found at: <https://github.com/CSISdefense/Lookup-Tables/blob/master/ProductOrServiceCodes.csv>.

services contract obligations. Between FY 2015 and FY 2017, PAMS contract spending grew at a rate (6 percent) relatively equal to the overall DoD services growth rate (5 percent).

FRS&C is the second largest source of DoD services contract obligations but has been trending downward since the start of the defense drawdown. Whereas FRS&C accounted for 30 percent of DoD services contract obligations from FY 2000 to FY 2010, it has only accounted for 25 percent from FY 2011 to FY 2017. Between FY 2015 and FY 2017, FRS&C was the only services category to decline, falling 4 percent. In FY 2017, FRS&C contract obligations only accounted for 22.5 percent of DoD services contract obligations, a new low.

ERS is the next largest source of DoD services contract obligations and have been trending upwards since FY 2010. Prior to FY 2010, ERS accounted for 14 percent of DoD services contract obligations. After FY 2010, ERS has accounted for 18 percent of DoD services contract obligations. Over the past two years, ERS has grown faster than any other services category and at a significantly higher rate than the overall rate of services growth. ERS contract obligations went from \$23.3 billion to \$26.4 billion, a 13 percent increase. In FY 2017, ERS accounted for 20 percent of total DoD services contract obligations, a study-period high.

ICT is the fourth-largest services category and averagely accounts for 11.6 percent of DoD services contract obligations. From FY 2009 to FY 2017, ICT contract obligations, as a share of total DoD services contract obligations, have stayed relatively the same, plus or minus one percentage point. In FY 2016, ICT contract obligations increased 10 percent when overall DoD services contract obligations only increased 2 percent but then remained flat in FY 2017.

Although MED might be the smallest DoD services category, it is also the fastest growing category over the past 18 years. Since FY 2000, MED contract obligations have grown 347 percent, while overall DoD services contract obligations grew 78 percent. Comparatively, ERS, the second quickest growing category, has only grown 122 percent since FY 2000. MED went from accounting for 7 percent of DoD services contract obligations from FY 2000 to FY 2010 to accounting for 10 percent from FY 2011 to FY 2017. Over the past two years, MED contract obligations increased at a rate (4 percent) just below the overall rate of growth (5 percent).

#### **DEFENSE SERVICES: VENDOR SIZE**

The data show that the previously existing trends in the composition of defense services largely continued between FY 2015 and FY 2017.

Although Large vendors remained the largest share of defense services contract obligations, their market share and total contract obligations continued trending downwards as they were the only vendor size whose defense contract obligations declined between FY 2015 and FY 2017. Large vendors' defense services contract obligations fell from \$42.1 billion in FY 2015 to \$40.5 billion, a 4 percent decrease. The share of defense services contract obligations fell from 33.5 percent in FY 2015 to 30.7 percent in FY 2017.

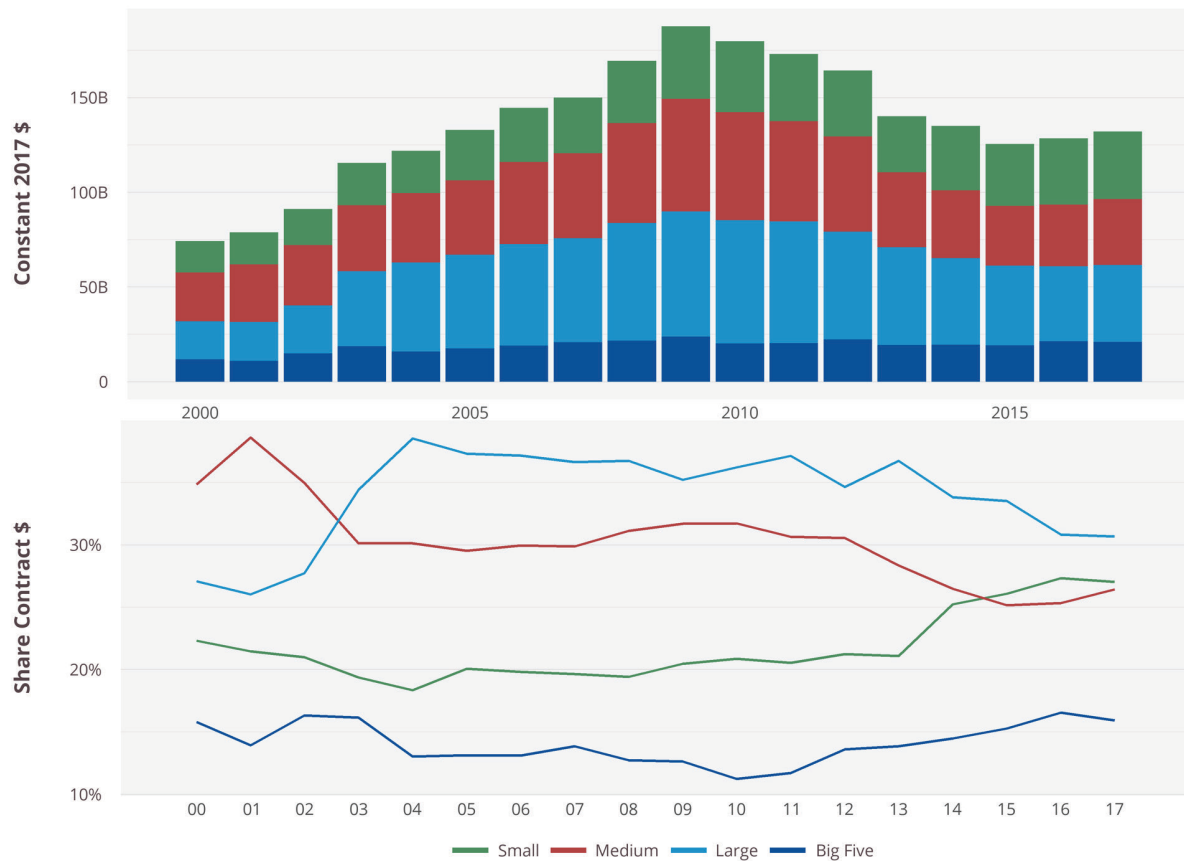
Small vendors contract obligations grew 9 percent between FY 2015 and FY 2017. In FY 2016, Small vendors defense services contract obligations (7 percent) grew at over twice the overall rate of growth (2 percent). However, in FY 2017 Small vendors contract obligations growth (2 percent) slowed to a rate just below the overall growth rate (3 percent).

After six-years of decline, Medium vendors grew the most between FY 2015 and FY 2017. Medium vendors FY 2017 defense services contract obligations totaled \$34.9 billion compared to \$31.6 billion in FY 2015, an 11 percent increase. As a share of defense services contract obligations, Medium vendors rose from a historic low of 25.1 percent in FY 2015 to 26.4 percent in FY 2017.

Overall Big Five services contract obligations grew 10 percent between FY 2015 and FY 2017, yet, there was a whipsaw effect between FY 2016 and FY 2017. Big Five services contract obligations increased 11 percent in FY 2016, but then declined 1 percent in FY 2017.

Figure 3-21 shows defense contract obligations by services category from FY 2000 to FY 2017.

Figure 3-21 | Defense Services Contract Obligations by Size of Vendor, 2000-2017



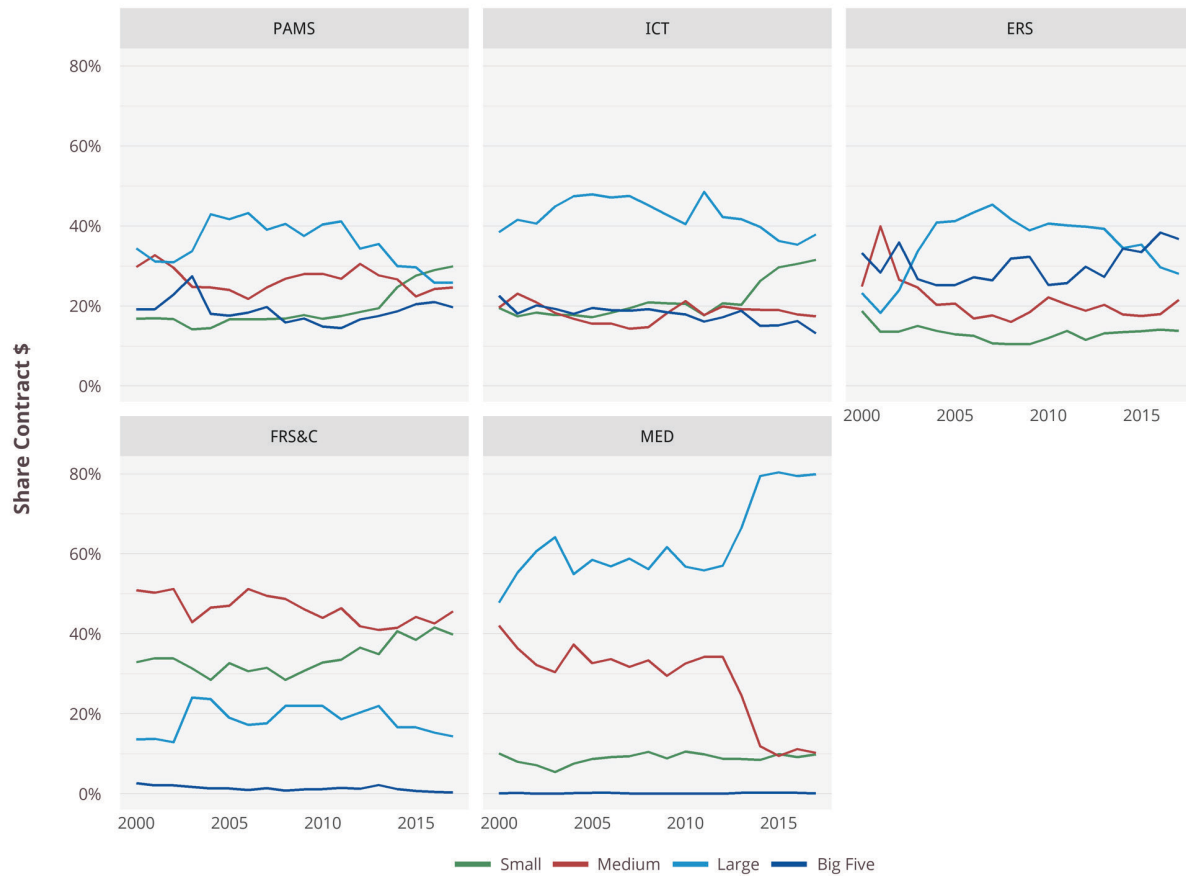
Source: FPDS; CSIS analysis

#### Defense Services Categories by Vendor Size

Beyond the topline defense services vendor size trends, the data show that there are key insights available looking at the vendor size data trends within the different defense service categories.

Figure 3-22 shows defense contract obligations by services category by size of vendor from FY 2000 to FY 2017.

Figure 3-22 | Defense Contract Obligations by Services Category by Size of Vendor, 2000-2017




Source: FPDS; CSIS analysis

PAMS, the largest defense services category, has the most even distribution of contract obligations between all four vendor types. Although the Big Five vendors receive the smallest share of PAMS contract obligations, they still account for nearly one-fifth of total PAMS contracting since FY 2000. Between FY 2015 and FY 2017, Small vendors contract obligations increased 15 percent, overtaking Large vendors as the largest share of defense PAMS contract obligations.

No vendor category was spared from the 4 percent decline in FRS&C contract obligations between FY 2015 and FY 2017, but Medium and Small vendors fared better than Large vendors and the Big Five. Whereas Medium and Small vendors each only declined 1 percent between FY 2015 and FY 2017, Large vendors declined 17 percent. The Big Five vendors declined 60 percent, but they only accounted for less than 1 percent of total defense FRS&C contract obligations.

Whereas in most other services categories the Big Five have relatively smaller portfolios, the Big Five have overtaken Large vendors as the biggest provider of ERS in recent years. In FY 2015, the Big Five overtook Large vendors as the biggest ERS providers and remained at the top spot during the past two years. Large vendors have subsequently continued to tumble since FY 2015, losing market share to not only the Big Five, but also Medium-sized vendors whose growth (39 percent) has outpaced all other vendors, including the Big Five (24 percent).

 **The Big Five have overtaken Large vendors as the biggest provider of ERS in recent years.**

In recent years, Large vendors remained the largest provider of ICT services in terms of contract dollars, but Small vendors have made significant gains. Between FY 2015 and FY 2017, Small vendors (17 percent) and Large vendors

(15 percent) ICT contract obligations grew at rates above the overall ICT rate of growth (10 percent). Although Medium vendors grew at rates well below the overall rate of growth, they did grow 1 percent from FY 2015 to FY 2017, whereas the Big Five contract obligations declined 5 percent.

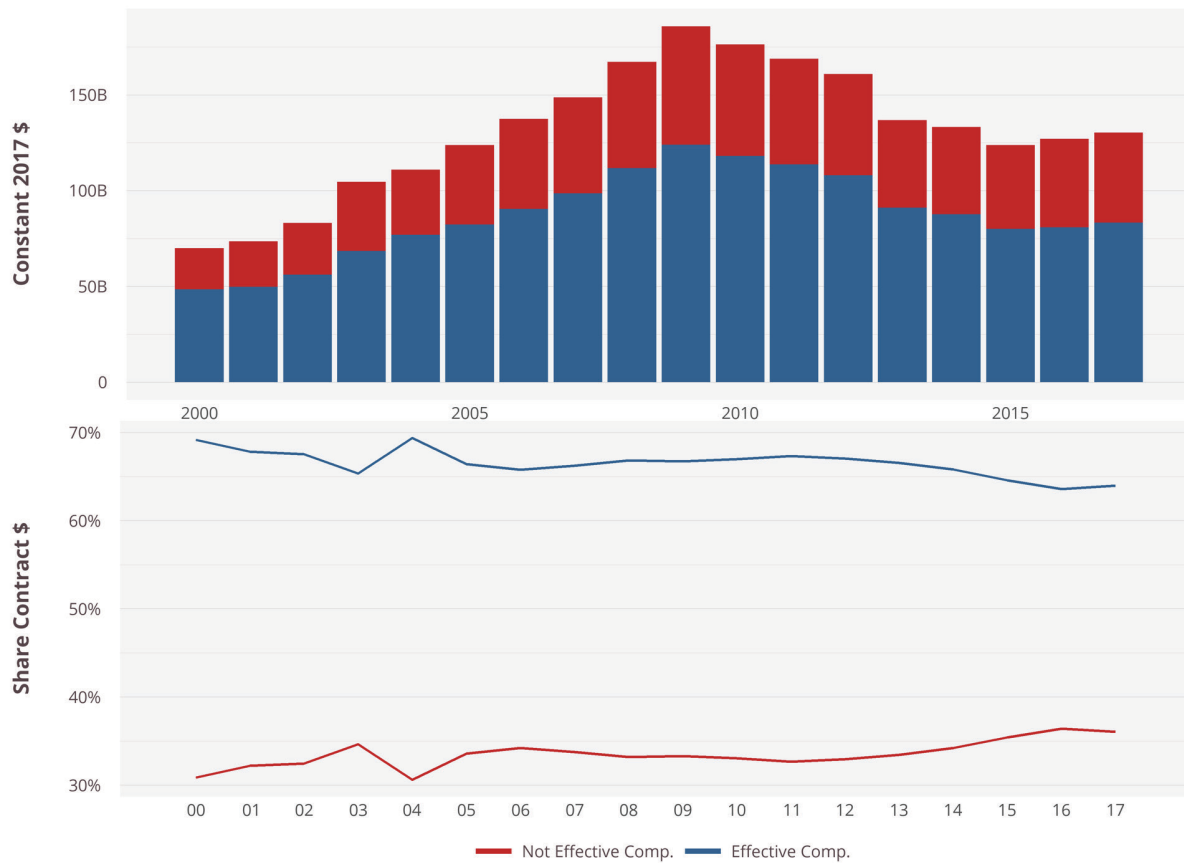
Finally, the MED marketplace remains dominated by Large vendors who have accounted for 80 percent of defense MED contract obligations since FY 2014.

#### DEFENSE SERVICES: COMPETITION

The rate of effective competition for defense services significantly outpaces competition for both products and R&D. Between FY 2000 and FY 2017, 64 percent of defense services contract obligations were awarded after effective competition, significantly above the 35 percent and 45 percent market share for products and R&D respectively. Furthermore, between FY 2015 and FY 2017, the topline defense services competition trends remained steady with minimal changes. This trend runs counter to the overall decline in effective competition for defense contract obligations over the past two years. Figure 3-23 shows defense services contract obligations by level of competition from FY 2000 to FY 2017.



Figure 3-23 | Defense Services Contract Obligations by Rate of Effective Competition, 2000-2017

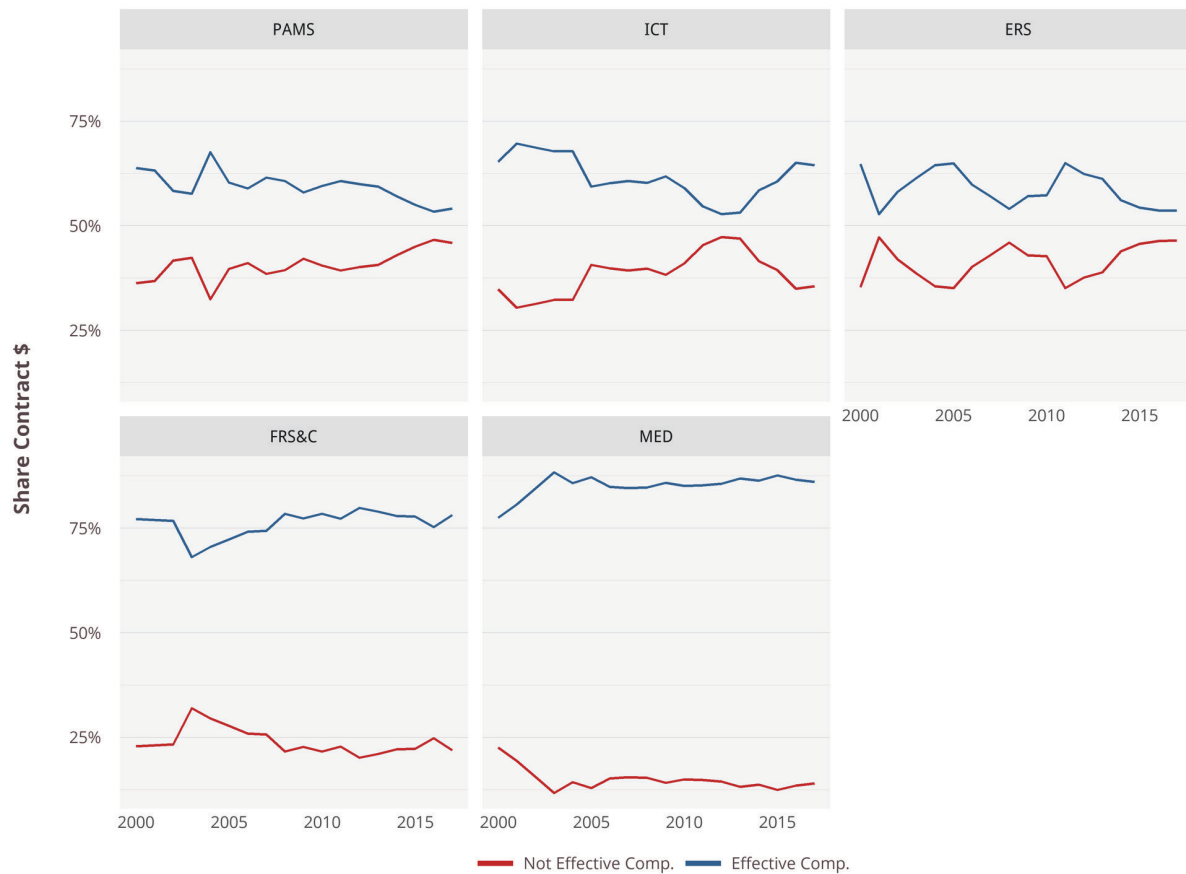


Source: FPDS; CSIS analysis

#### *Defense Services: Effective Competition by Services Category*

However, while the overall rate of competition for defense services contracts stays relatively stable, breaking down competition rates by services category reveals some variation. Figure 3-24 shows defense contract obligations by services category and level of effective competition from FY 2000 to FY 2017.

Figure 3-24 | Defense Contract Obligations by Services Category by Rate of Effective Competition, 2000-2017



Source: FPDS; CSIS analysis

The data show that the rate of effective competition differs significantly between some services category. Between FY 2000 and FY 2017, FRS&C and MED rate of effective competition averaged 74 percent and 85 percent respectively. In contrast, the rate of effective competition for PAMS, ERS, and ICT services between FY 2000 and FY 2016 averaged 57, 57 and, 56 percent respectively. Interestingly, FRS&C and MED, the two services categories where the Big Five have a negligible market share, are also the two most competitive marketplaces. Additionally, a more even distribution of contract obligations seemingly correlates with a less competitive marketplace. For example, despite Large vendors accounting for 80 percent of MED contract obligations since FY 2015, between FY 2015 and FY 2017, only 13 percent of MED contract dollars were awarded without effective competition. Comparatively, PAMS, the most evenly distributed services category, 45 percent of contract obligations awarded without effective competition between FY 2014 and FY 2017.

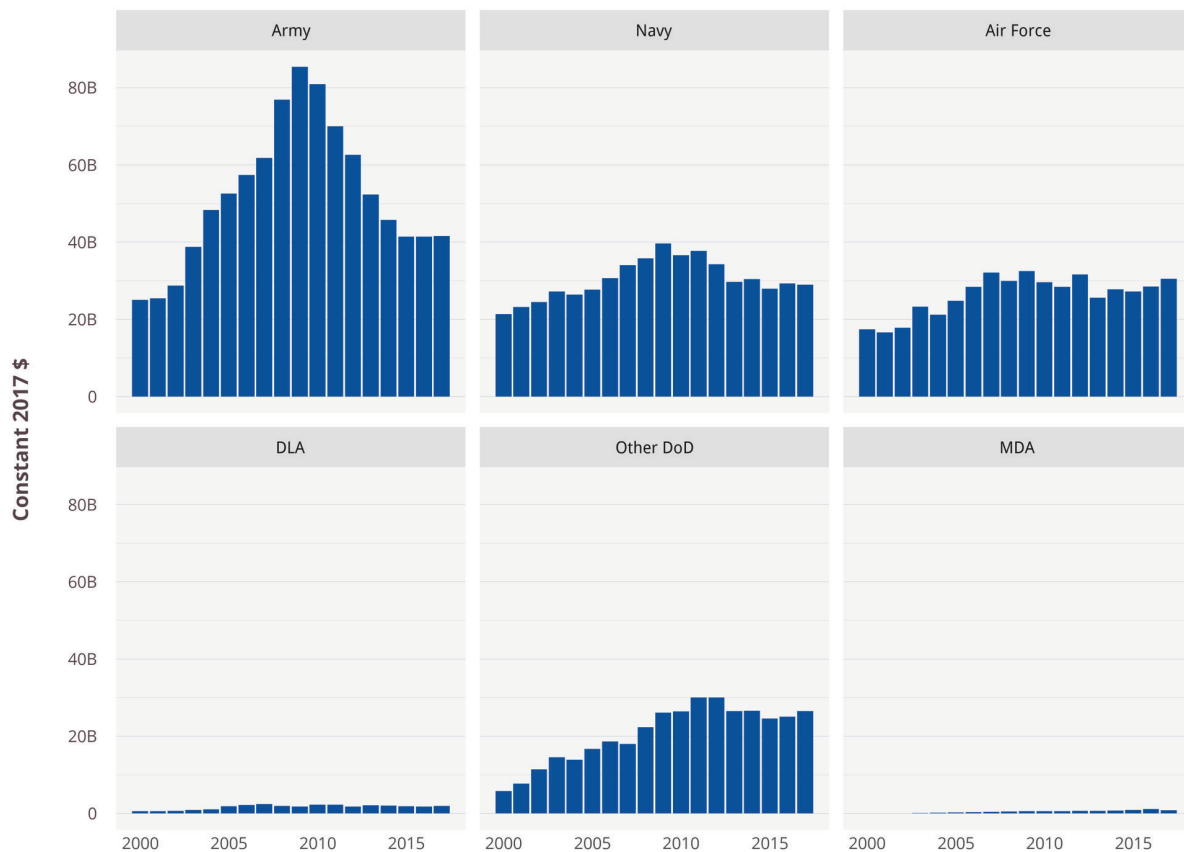
Finally, except for ICT, the rate of effective competition within services categories has remained relatively steady in recent years. However, ICT has seen an increase in its rate of effective competition, going from 52 percent in FY 2013 to 62 percent in FY 2017.

#### **DEFENSE SERVICES CONTRACT OBLIGATIONS BY COMPONENT**

The previous sections analyzed the trends in defense services across all of DoD. That analysis provides critical understanding of the scope and characteristics of the defense services marketplace, but not the necessary insights into the organizations that are purchasing these services. DoD is not a monolithic organization, and decisions about which goods and services, particularly for services, are made across various DoD components, not by OSD or the Joint Staff. The following section provides an initial overview of the scope of the services marketplace within the six largest DoD components. Chapter 6: What are the Defense Components Buying? will provide a more granular analysis of the services contracting trends within each component, specifically analyzing components services contract spending trends by services category.

Figure 3-25 shows services contract obligations by component from FY 2000 to FY 2017.

Figure 3-25 | Services Contract Obligations by Component, 2000-2017



Source: FPDS; CSIS analysis

Historically, the Army has spent more on services (both in total dollars and as a percentage of their total contracting obligations) than either the Air Force or the Navy. Since FY 2000, the Army has spent 52 percent of its total contracting obligations on services, significantly more than the Navy and Air Force who spent 35 percent and 41 percent, respectively. Only Other DoD spent more as a percentage of its total contracting on services than the Army, spending on average \$20.9 billion of its \$24.8 billion annual contracting portfolio on services (83 percent). Despite having a budget roughly one third of the size of the Navy and Air Force, Other DoD only spent approximately \$8 billion less on services than the two components.<sup>99</sup>

Of note, between FY 2015 and FY 2017, defense services contract obligations grew at unequal rates amongst the three military components. Army defense services contract obligations remained flat between FY 2015 and FY 2017,

99. Other DoD includes all other DoD components including but not limited to the Military Health Program, U.S. Transportation Command, DARPA, and U.S. Special Operations Command.

even as overall defense services grew 5 percent. In the Navy, defense services grew at the same 5 percent growth rate as the overall defense services sector. Defense services growth in the Air Force (13 percent) outpaced the overall growth rate. Amongst the three smaller components, contract obligations for defense services between FY 2015 and FY 2017 increased 8 percent in Other DoD but declined 1 percent in DLA and 11 percent in the Missile Defense Agency (MDA).

## How Is DoD Buying It?

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**Having extensively analyzed what DoD is buying,** this chapter focuses on questions of how DoD procures goods and services. It begins by discussing recent reforms to the defense acquisition system, looking at both the recent efforts by Congress and policy changes in the new administration. Next, it looks at the performance of the defense acquisition system as measured by contract terminations and cost growth by using FPDS data. Third, it looks at the trends in level of competition for DoD contract obligations broken down by platform portfolio. It concludes by looking at the Performance Based Logistics (PBL) contracting mechanism, specifically the incentives for DoD to use PBL and their current usage across DoD.

## 4.1 Reforming the Defense Acquisition System<sup>100</sup>

The acquisition reforms in the FY 2018 NDAA were more targeted than the sweeping changes in the FY 2016 and FY 2017 NDAA that aimed to shift DoD's priorities from cost control, which was predominant from 2008 to 2014, to a priority on speeding up acquisition decision making by removing decision-making layers. Efforts to change the acquisition of information technology (IT) accounted for much of that energy in acquisition reform. From general matters of software acquisition and development, to online marketplaces, to cloud computing and artificial intelligence, acquisition of IT is energizing the discussion of the need for accelerated acquisition processes and access to commercial technology in military applications.

“The acquisition reforms in the FY 2018 NDAA were more targeted than the sweeping changes in the FY 2016 and FY 2017 NDAA.

The most controversial debate of the FY 2018 NDAA was HASC Chairman Mac Thornberry's proposal to provide DoD with the authority to establish one or more online marketplaces to facilitate the kind of business to business purchases that are increasingly prevalent in the private sector.<sup>101</sup> For example, a DoD buyer would potentially be able to use such an

online marketplace to purchase commercial artificial intelligence applications for use with sensitive military data or to acquire commercially-available tools for the repair of military aircraft. The proposal somewhat resembled an existing online marketplace the Central Intelligence Agency (CIA) created for the intelligence community.<sup>102</sup> The proposed marketplace would be designed to ease DoD's access to commercial products and technology, a partially-realized goal of the Federal Acquisition Streamlining Act of 1994 (FASA). Under the proposal, once an online marketplace was certified for the program, buying from that marketplace would: satisfy the requirement for competition; meet the definition of purchasing a commercial item; and ease the process of determining fair and reasonable pricing, domestic

100. This section has been adapted from a journal article, “The Cycles of Defense Acquisition Reform and What Comes Next” by Andrew Hunter, published in an upcoming issue of the *Texas A&M Journal of Property Law* (Forthcoming early 2019).

101. Jake Jedlicka, *NDAA Commercial Marketplace Proposal Could Herald Big Changes to Procurement Landscape*, FedBid (Aug. 11, 2017), <http://www.fedbid.com/blogs/ndaa-commercial-marketplace-proposal-could-herald-big-changes-to-procurement-landscape> [https://perma.cc/YKM9-4UUD]; see also section 801 <https://docs.house.gov/billsthisweek/20170710/BILLS%20-115HR2810-RCP115-23.pdf>.

102. For a description of the CIA's online marketplace, see Frank Konkel, “CIA is bringing Amazon's Marketplace to the Intelligence Community,” Nextgov.com, February 10, 2015, <https://www.nextgov.com/it-modernization/2015/02/cia-bringing-amazons-marketplace-intelligence-community/104937/>.



content, and fulfillment of small business standards.<sup>103</sup> During the debate of the FY 2018 NDAA on the House floor, the proposal was expanded to offer an online marketplace for the entire federal government, which was to be administered by the General Services Administration (GSA), an organization that already serves as a central hub for acquisition of commercial items through a mechanism known as the Federal Supply Schedule.<sup>104</sup>

Chairman Thornberry's online marketplace proposal proved controversial because of a perception that the comprehensive nature of the marketplace, as well as the streamlined process advantages it offered, could compromise opportunities for competition in federal acquisition. In other words, many feared that the marketplace itself would become a monopoly provider of commercial products and services for the government.<sup>105</sup> Further, concerns existed that the company operating the marketplace could use the knowledge gained—such as information on pricing and government customer interests—to its advantage in other areas of government acquisition. Additionally, a handful of existing online markets that provide similar services to the federal government, though on a smaller scale, were concerned that the new marketplace would take away their businesses, which did not benefit from the process-streamlining authorities that were provided in Chairman Thornberry's proposal. The final legislation addressed all of these concerns by deferring the program by two years; mandating that the program include multiple marketplaces operated by more than one provider; using the two-year delay to let the Director of the Office of Management and Budget (OMB) and GSA develop an implementation plan for the online marketplace; and requiring the Comptroller General of the United States to review and comment on the implementation plan. Some of the lessons of this debate are that the process of creating large federal online marketplaces for commercial products and services will continue; the controversies surrounding this proposal will be litigated again as

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103. These government requirements and certifications can add complexity to acquiring commercial products and services. For an overview of competition requirements under the Competition in Contracting Act, see: AcqNotes, "Competition in Contracting Act (CICA)," July 9, 2018, <http://www.acqnotes.com/acqnote/careerfields/competition-contracting-act-cica>. For a discussion of domestic content requirements, see: Kate M. Manuel, Alissa Dolan, Brandon Murrill, Rodney Perry and Stephen Mulligan, *Domestic content Restriction: The Buy American Act and Complementary Provisions of Federal Law* (Washington, DC: Congressional Research Service, September 12, 2016), <https://fas.org/sgp/crs/misc/R43354.pdf>. For an overview of small business contracting requirements, see: [https://www.sba.gov/sites/default/files/files/Size\\_Standards\\_Table.pdf](https://www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf).

104. The Federal Supply Schedule, often referred to as the GSA schedule, is available for use by any federal agency for the acquisition of commercial supplies and services with pre-evaluated commercial pricing that includes volume discounts. See 48 C.F.R. §§38.000-38.201 for a description of the GSA schedule.

105. Many explicitly feared that Amazon Web Services (who operates the CIA's online marketplace) was likely to control that monopoly. See Timothy Cooke, "When Amazon Meets Defense Acquisition," *Defense One*, August 14, 2017, <https://www.defenseone.com/business/2017/08/when-amazon-meets-defense-acquisition/140233/>.

the implementation plan is developed and reviewed; and addressing the complexities of government procurement that are associated with small business contracting, competition requirements, and security are not easily eliminated by use of more commercial mechanisms.

Another central controversy in the debate over acquisition provisions in the FY 2018 NDAA related to a series of proposals by the Senate Armed Services Committee (SASC) to modify DoD's approach to software acquisition.<sup>106</sup> These provisions were designed to direct DoD to obtain access to original source code and related technical data when funding the development of software; pilot the use of agile development approaches for both major software development programs and some software-intensive warfighting systems; use open source approaches to developing government-funded software and attempt to reverse engineer legacy source code; and commission the Defense Innovation Board to do a year-long study on software acquisition.<sup>107</sup> Much of the controversy over these provisions was related to the hard mandates they established for DoD and defense contractors, such as requiring them to always deliver the original source code to the government as part of the government's statutory rights in technical data or mandating that all unclassified government-funded software must be included in a public open-source repository.

The final legislation retained the basic thrust of these provisions, generally modifying the language from strict mandates to preferences, guidelines, or criteria for consideration in contract negotiations. It is notable that these provisions focused on government-funded software development and not the acquisition of commercially-developed software. This may be somewhat counter-intuitive given the generally accepted notion that the commercial sector is well ahead of the government sector when it comes to IT and software. These provisions, however, have more application to commercial software than meets the eye, since, in many cases, government-funded software builds upon the foundation of commercially-developed software. This complexity fuels intense debate over intellectual property rights in software and open-source requirements because discriminating between government-funded and truly commercial software remains challenging.

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106. National Defense Authorization Act for Fiscal Year 2018, Public Law 115-91, 115th Cong., Sec. 2439, (2017), <https://www.congress.gov/115/plaws/publ91/PLAW-115publ91.pdf>.

107. The Defense Innovation Board is a federal advisory committee created under the leadership of former Secretary of Defense Ash Carter that advises the Department of Defense on issues of innovation. See Chapter 3: What Is DoD Buying in Hunter, "Defense Acquisition Trends, 2016" for a discussion of the Defense Innovation Board's activities over the past two years.

## SEND IN THE CLOUD

A closely-related controversy emerged over DoD's plans to purchase cloud computing capability after the FY 2018 NDAA debate concluded. One of the signature initiatives of the new leadership team at DoD is a plan to transition the Department to a cloud computing environment. They established a Cloud Executive Steering Group, led by most of DoD's senior leadership, with the intention of accelerating the adoption of "cloud architecture and cloud services with a focus on commercial solutions."<sup>108</sup> The group developed a plan known as the Joint Enterprise Defense Infrastructure (JEDI) Cloud, under which DoD will enter into an open-ended contract arrangement with a cloud provider, using a competitive contract process.<sup>109</sup>

The JEDI Cloud contract demonstrates the propensity for DoD's commercial IT acquisition to cause controversy. One central focus of the controversy has been DoD's intention to select a single provider for JEDI Cloud. Many in the industry have argued that the cloud contract should be awarded to multiple vendors. Echoing the controversy over the proposed online marketplace, this intent to award to a single provider has raised concerns that the JEDI Cloud will establish a monopoly within DoD for cloud computing, extending major advantages to the winner in the broader government IT market.<sup>110</sup> The JEDI Cloud would be available to every DoD organization that is interested in making the transition to the cloud, meaning that JEDI could and likely would develop into the largest cloud provider across the Department.

DoD has argued that it is more efficient to consolidate services on a single cloud platform—a fairly common practice in the commercial sector. Additionally, it argues that there are already existing cloud contracts at DoD that will be left in place, and future cloud initiatives could be carried out independent of the JEDI Cloud. Thus DoD believes that concerns about a monopoly environment are misplaced.<sup>111</sup>

These and related concerns about the structure of the JEDI Cloud acquisition led Congress to require DoD to provide two reports on the topic in the

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108. U.S. Department of Defense, "Accelerating Enterprise Cloud Adoption," February 15, 2018, <https://www.defense.gov/News/News-Releases/News-Release-View/Article/1442705/accelerating-enterprise-cloud-adoption/>.

109. DoD has indicated that it intends to award an indefinite delivery vehicle contract to a single provider using full and open competition. See Frank Konkel, "Pentagon Releases Second Draft RFP for Multibillion Dollar JEDI Cloud," Nextgov.com, April 16, 2018, <https://www.nextgov.com/it-modernization/2018/04/pentagon-releases-second-draft-rfp-multibillion-jedi-cloud/147471/>.

110. Billy Mitchell, "DoD's JEDI cloud acquisition gets its first protest," FedScoop, August 7, 2018, <https://www.fedscoop.com/oracle-jedi-protest-pre-award/>.

111. JEDI Chief Management Officer, "Combined Congressional Report: 45-Day Report to Congress on JEDI Cloud Computing Services Request for Proposal & 60-Day Report to Congress on a Framework for all Department Entities to Acquire Cloud Computing Services," *Inside Defense*, July 26, 2018,

first half of 2018.<sup>112</sup> This controversy illustrates that while Congress and others have urged DoD to adopt commercial practices (especially for IT), many complications that have traditionally dogged the defense acquisition system—but are largely inapplicable to commercial concerns—continue to remain prominent. For example, it remains imperative for DoD to balance its contract awards so that long-term supplier relationships and strategic partnerships do not preclude the ability to have competition in the future.

As the controversy over JEDI Cloud continued raging, on February 7, 2018, another controversy over cloud computing arose as a result of the announcement of an OTA agreement with REAN Cloud, a commercial cloud provider. This OTA was initially described as being open to all DoD users and potentially valued at \$950 million, a number based upon an expectation of widespread use of the OTA throughout DoD.<sup>113</sup> This led to some initial confusion as to whether the award to REAN Cloud was related to the JEDI Cloud effort or had effectively preempted it. As a result, the OTA with REAN Cloud was quickly revised, limited to users of the United States Transportation Command (TRANSCOM), and descoped to have an expected total value of \$65 million.

In fact, the REAN Cloud OTA originated separately from the JEDI Cloud. It was a follow-on agreement to an initial prototype agreement that was established with help from DoD’s Silicon Valley office—DIUx. DIUx facilitated a relationship between TRANSCOM and REAN Cloud through a limited prototyping OTA. TRANSCOM awarded the follow-on “production” OTA without further competition, pursuant to authorities provided in the FY 2017 NDAA.<sup>114</sup> The Government Accountability Office (GAO) has subsequently questioned whether using the follow-on production authority was justified, arguing that the follow-on production OTA agreement with REAN Cloud did not meet the requirements of the statutory authority provided in the NDAA.<sup>115</sup>

### **A CONTINUED FOCUS ON COMMERCIAL TECHNOLOGY IS IN THE FORECAST**

The current acquisition policy cycle will continue to focus on acquisition of

9, [https://insidedefense.com/sites/insidedefense.com/files/documents/2018/jul/07262018\\_jedi9.pdf](https://insidedefense.com/sites/insidedefense.com/files/documents/2018/jul/07262018_jedi9.pdf).

112. Consolidated Appropriation Act, 2018, Public Law 115-141, 115th Cong. (2018), <https://www.congress.gov/bill/115th-congress/house-bill/1625/text>.

113. Frank Konkel, “Defense Department Drastically Cuts Nearly \$1 B Cloud Contract,” Nextgov.com, March 5, 2018, <https://www.nextgov.com/it-modernization/2018/03/defense-department-drastically-cuts-nearly-1b-cloud-contract/146416/>.

114. National Defense Authorization Act for Fiscal Year 2017, Public Law 114-328, 114th Cong. (2016), Section 2447d of Title 10 U.S. Code as added by Section 806, <https://www.congress.gov/114/plaws/publ328/PLAW-114publ328.pdf>.

115. “Press Statement on Bid Protest filed by Oracle,” U.S. Government Accountability Office, May 31, 2018, [https://www.gao.gov/press/oracle\\_bid\\_protest.htm](https://www.gao.gov/press/oracle_bid_protest.htm).

commercial technology because an important Congressionally-mandated study on streamlining the acquisition process recommends extensive changes in the way the government approaches competition and commercial technology. The project is known as the Section 809 Advisory Panel on Streamlining and Codifying Acquisition Regulations, and it has issued two volumes of a planned three-volume set of recommendations for streamlining acquisition.<sup>116</sup> The Panel's recommendations are detailed and extensive, but perhaps their most meaningful recommendations relate to the acquisition of commercial technology. Conceptually, the Panel calls for a major shift in how DoD approaches the marketplace on the front end of the acquisition process. The recommendations are designed to facilitate increased considerations for using commercial technology solutions to meet military needs.

Today's defense acquisition process tends to begin with extensive internal analysis of military needs, such as repurposing existing assets and analyzing alternative approaches to acquiring new systems. This analysis is used to define a detailed statement of DoD's requirements, which is then sent out to industry. While there are often discussions with industry during these early phases of the acquisition process, the request for proposals (RFP) to meet DoD's detailed requirements is what industry is formally asked to respond to. These RFPs are usually issued on a federal-acquisition-only portal known as FedBizOps, which is inattentively monitored by suppliers who seldom do government work. Further, the large quantity of mandatory DoD requirements in these RFPs significantly narrows the potential competitors to a handful or less. The Section 809 Panel argues for "changing DoD's competitive procedures to compete solutions to problems, rather than assess a company's ability to meet detailed technical specifications," thereby shifting "away from spending extensive time defining and validating requirements, to using more challenge-based competitions or taking advantage of available market solutions to quickly develop and field new capabilities."<sup>117</sup>

Described as "the dynamic marketplace," this approach would encourage a broader range of companies to engage with DoD to offer solutions to military problems regardless of whether an offering is a purpose-built

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116. The Section 809 Advisory Panel on Streamlining and Codifying Acquisition Regulations was established pursuant to Section 809 of the FY 2016 NDAA for the purpose of reviewing defense acquisition regulations, and the statutes on which they are based, to develop detailed recommendations for streamlining the acquisition process. For more detail on the Section 809 Panel, visit <https://section809panel.org/>.

117. Section 809 Panel, *Report of the Advisory Panel on Streamlining and Codifying Acquisition Regulations, Volume 1 of 3* (Arlington, VA: Section 809 Panel, January 2018), 8, [https://section809panel.org/wp-content/uploads/2018/04/Sec809Panel\\_Vol1-Report\\_Jan18\\_REVISIED\\_2018-03-14.pdf](https://section809panel.org/wp-content/uploads/2018/04/Sec809Panel_Vol1-Report_Jan18_REVISIED_2018-03-14.pdf).

military system or not. The current acquisition system's emphasis on evaluating companies' offerings on their ability to meet precise, tightly defined technical requirements pre-disposes the system towards purpose-built military systems. Instead, under this "dynamic marketplace" approach, offerings would be evaluated on their ability to best solve the actual military problem at hand, not whether they meet certain tightly defined technical requirements. Although not stated explicitly, the Section 809 Panel's recommended approach could facilitate an existing statutory preference for the procurement of commercial items, that which has been in federal regulation since FASA's passage but may have been a preference in name only for most defense contracting purposes.<sup>118</sup>

The Section 809 Panel also recommends that the government should significantly streamline the transaction rules in the acquisition process that apply to existing products and services and those that require customization short of significant new development.<sup>119</sup> This will further incentivize commercial sector firms and other non-traditional suppliers to participate more broadly in defense acquisition. The specific measures that the Section 809 Panel recommends for implementing its dynamic marketplace approach will be included in the yet-to-be-issued third volume of its recommendations. That said, one of the points of congressional interest in the Panel's recommendations that relate to commercial technology is the inclusion of several of Section 809 Panel's proposed changes to clarify statutory definitions of commercial items in the FY 2019 NDAA.<sup>120</sup> The full recommendations of the Section 809 Panel will be ripe for consideration in the FY 2020 legislative cycle.

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118. A significant issue with the preference for the acquisition of commercial items, which is contained in FAR Part 12 and codified in 10 U.S.C. 2377, is that there has not been a recourse mechanism for companies that feel the government has not effectively considered whether it can meet its needs with their commercial technology. A notable exception, and an important precedent, is a 2016 ruling in the U.S. Court of Federal Claims in the case *Palantir USG v United States*, 129 Fed. Cl. 218 (2016), that preemptively terminated a source selection process for the Army's Distributed Common Ground System program because the court found that the Army had not meaningfully considered whether Palantir's commercial product could meet its requirements. For a discussion of the ruling, see Jen Judson, "Judge Rules in Favor of Palantir in Lawsuit Against US Army," *Defense News*, October 31, 2016, <https://www.defensenews.com/land/2016/10/31/judge-rules-in-favor-of-palantir-in-lawsuit-against-us-army/>.

119. The Section 809 Panel credits a report from the Center for a New American Security for its categorization of commercial technology applicable to military needs. The report is Ben Fitzgerald, Alexandra Sander, and Jacqueline Parziale, *Future Foundry: A New Strategic Approach to Military-Technical Advantage* (Washington DC: Center for New American Security, 2016), <https://www.cnas.org/publications/reports/future-foundry%2520>.

120. House Armed Services Committee Democrats, *Fiscal Year 2019 National Defense Authorization Act Chairman's Mark Summary* (Washington DC: U.S. House of Representatives, n.d.), [https://democrats-armedservices.house.gov/\\_cache/files/d/5/d5c1ec75-886e-4801-af26-ea5334bb78e0/4C5CD-7B0CF530D216E3B693C01709AD1.fy-19-ndaa-chairmans-mark-summary-dem-final.pdf](https://democrats-armedservices.house.gov/_cache/files/d/5/d5c1ec75-886e-4801-af26-ea5334bb78e0/4C5CD-7B0CF530D216E3B693C01709AD1.fy-19-ndaa-chairmans-mark-summary-dem-final.pdf).



## PROSPECTS FOR THE CURRENT AND FUTURE ACQUISITION CYCLES

While commercial technology continues as a driver of acquisition speed, especially for IT, the decentralization of acquisition decision-making and the delegation of milestone decision authority to the military departments will likely encourage different priority balances to emerge in different sectors of the acquisition system.

“The decentralization of acquisition decision-making and the delegation of milestone decision authority to the military departments will likely encourage different priority balances to emerge in different sectors of the acquisition system.

The delegation of acquisition authority to the United States Army has resulted in a significant internal reorganization of its acquisition functions.<sup>121</sup> The Army is for the first time establishing a command focused on bringing together the wide variety of acquisition stakeholders in one structure: the Army Futures Command. Army Futures Command will bring the system for deciding requirements for new capabilities together with the system responsible for the acquisition process. In effect, the new command

consolidates acquisition responsibilities within the service more closely under the control of the Army Chief of Staff, to whom the commander of Army Futures Command will report.<sup>122</sup> The Army Futures Command will pursue the Army's new modernization strategy, which is built around six major priorities and hopes to significantly accelerate the delivery of new capabilities.<sup>123</sup> By centralizing responsibility for requirements setting and acquisition execution in one command, the Army hopes to reduce the friction (and timespan) of coordinating across the Army's multiple major communities.

By contrast, the United States Air Force plans to extend its delegation of

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121. The Army's decision to reorganize its acquisition functions would not have been prohibited even if milestone decision authority had not been delegated, but the Army's interest in pursuing this path was likely spurred by the increased responsibility for acquisition placed on the Army Chief of Staff.

122. Most of the elements of Army Futures Command previously resided in the Training and Doctrine Command, Army Material Command, Army Test and Evaluation Command, or the Office of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology. For a description, see David Vergun, "US Army Futures Command to Reform Modernization, Says Secretary of the Army," *Army News Service*, December 8, 2017, <https://www.army.mil/article/197886/>.

123. For a description of the Army's modernization priorities see Patrick Tucker, "US Army Chief Announces Major Reorganization for How Army Develops, Buys Weapons," *Defense One*, October 6, 2017, <https://www.defenseone.com/technology/2017/10/feeling-rivals-heat-us-army-streamlining-and-centralizing-way-it-buys-weapons/141603/>.



acquisition authority from OSD by redelegating this authority down to program executive officers and empowering program managers.<sup>124</sup> This redelegation may reflect the relative maturity of the Air Force's major programs, such as the KC-46 Tanker and the B-21 Bomber, where the high-level strategic issues have already been decided (notably, in both cases with cost control as the major priority), and the focus is on program execution. Matters of program execution are often best handled at the program level or as close to it as possible.<sup>125</sup> However, less mature parts of the Air Force acquisition portfolio, such as recent efforts to design both new systems for command and control as well as systems to approach space as a warfighting domain, may use the same decentralized authority to achieve different objectives. Notably, Air Force SAE Dr. Will Roper is using the prototyping authority granted by Congress to rapidly demonstrate critical high-performance technologies, such as hypersonic strike systems that was called for in the 2018 NDS.<sup>126</sup>

Decentralizing and distributing acquisition authority within the military departments may lead to a variety of microcosms within the acquisition system, where the balance of acquisition priorities is different. Other trends, however, will impact the acquisition system across its entire scope. Another major trend is the increasing functionality of weapon systems that are defined by software rather than hardware. The capability seen on the Air Force's flight lines, in the Army's motor pools, or the Navy's homeports is increasingly determined by lines of code rather than steel and aluminum.

This trend has major implications for the acquisition system because it presents challenges to its basic structure, which was originally designed around an industrial production model. Software-defined systems break down the boundaries around which many organizations and processes are organized. Software-based systems do not graduate from develop to production to sustainment like hardware-based systems, which presents challenges to government budgeting mechanisms that are leading to calls for new funding categories to deal with the iterative nature of software development and production.<sup>127</sup>

124. As described in testimony from Air Force Secretary Heather Wilson and cited in Aaron Mehta, "Policy Shift: DoD is Pushing Major Program Management Back to the Military," *Defense News*, December 11, 2017, <https://www.defensenews.com/pentagon/2017/12/11/policy-shift-dod-is-pushing-major-program-management-back-to-the-military/>.

125. For a clear expression of this principle, see the guidance on Urgent Capability Acquisition in Enclosure 13 of DoD Instruction 5000.02, "Approval authorities for each acquisition program covered by this enclosure will be delegated to a level that promotes rapid action." See: "DODI 5000.02 Enclosure 13: Urgent Capability Acquisition," MITRE -, n.d., <https://aida.mitre.org/dodi-5000/rapid-fielding-of-capabilities/>.

126. For a description of the Air Force's effort to field a hypersonic strike weapons see Aaron Mehta, "Air Force Awards Nearly \$1 Billion Contract for a Hypersonic Cruise Missile," *Defense News*, April 18, 2018, <https://www.defensenews.com/air/2018/04/18/air-force-taps-lockheed-for-new-hypersonic-cruise-missile/>.

127. Wilson Brissett, "Pawlikowski Says Air Force Needs Faster Software Development," *Air Force*

Consider the idea that a system that can send and receive electrons may serve many purposes, such as a communications device, a sensor, a weapon, and an electronic defense system. Software-based capabilities are steadily spreading, and they are a powerful reason why USD Ellen Lord appointed a special assistant, Jeff Boleng, for software acquisition. Boleng will “help oversee the development of software development policies and standards across DoD and offer advice on commercial software development best practices to Pentagon leadership ...”<sup>128</sup> Perhaps the perfect embodiment of this trend towards software-based capabilities is in artificial intelligence. How this trend will affect the balance of acquisition priorities in the future is difficult to predict, but one thing seems likely: the balance will remain dynamic rather than static, leading to a continuation of cycles in acquisition reform for years to come.

### RECENT POLICY CHANGES

In addition to the aforementioned changes to the defense acquisition system, the current administration has two notable policy priorities, increasing the usage of OTA agreements and speeding up foreign military sales (FMS), that effect “how DoD buys it.” The following sections examine how DoD has used newly granted authorities to create new priorities for how DoD procures goods and services.

### OTHER TRANSACTION AUTHORITY

The “hot” thing in defense acquisition at the moment are OTA agreements.<sup>129</sup> Neither a contract, grant, or cooperative agreement, an OTAs is a mechanism intended for DoD to access innovation outside of the traditional acquisition system. Unlike contracts, grants, or cooperative agreements, OTAs are not subject to the Federal Acquisition Regulation (FAR), Defense Federal Acquisition Regulation Supplement (DFAR), or other regulations. They allow DoD greater flexibility and customization than traditional contract mechanisms. However, compared to more traditional contract mechanisms, DoD is only authorized to use OTAs for a more limited set of activities, such as primarily research projects and prototyping with some authority to transition these projects to production.<sup>130</sup>

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*Magazine*, July 17, 2017.

128. Jane Edwards, “Report: Jeff Boleng Named DoD’s Special Assistant for Software Acquisition,” *ExecutiveGov.com*, April 16, 2018, <http://www.executivegov.com/2018/04/report-jeff-boleng-named-dods-special-assistant-for-software-acquisition/>.

129. Scott Maucione, “OTA Contracts Are the New Cool Thing in DoD Acquisition,” *Federal News Radio*, October 19, 2017, <https://federalnewsradio.com/acquisition/2017/10/ota-contracts-are-the-new-cool-thing-in-dod-acquisition/>.

130. Legal Information Institute, “10 U.S. Code § 2371 – Research Projects: Transactions Other

DoD has had OTA authorities in some form since 1989, but the failure of the Army's Future Combat System (FCS) in the mid-2000s, managed under an OTA, led to a substantial narrowing of their use on larger, more complex programs until recently.<sup>131</sup> OTAs received renewed interest after the FY 2015 NDAA expanded the definition beyond "weapons or weapon systems proposed to be acquired or developed by the Department of Defense" to prototypes "directly related to enhancing the mission effectiveness of military personnel and the supporting platforms, systems, components, or materials proposed to be acquired or developed by the Department of Defense, or to improvement of platforms, systems, components, or materials in use by the Armed Forces."<sup>132</sup> Section 815 of the FY 2016 NDAA then even further expanded DoD's OTA authority by making DoD's OTA authority permanent, modifying the definition of non-traditional defense contractor, and allowing DoD to issue follow-on production contracts for OTA prototypes.<sup>133</sup>

#### *OTA Usage Across DoD*

Data from FPDS show that DoD obligations awarded using OTAs increased from \$0.7 billion in FY 2015 to \$2.11 billion in FY 2017, a 195 percent increase. In total dollars, Army OTA obligations have grown more than any other agency. This is not surprising given that the prior to the recent OTA push, the Army accounted for 90 percent of DoD OTA obligations between FY 2013 and FY 2015. Between FY 2015 and FY 2017, Army OTA obligations increased from \$0.6 billion to \$1.5 billion. DARPA, the original source of DoD OTA authorities, had used OTAs with regularity prior to the recent statutory changes, but has seen a sharp up-tick in recent years. Between FY 2015 and FY 2017, DARPA OTA obligations increased from \$0.06 billion in FY 2015 to \$0.38 billion in FY 2017, a 485 percent increase. Finally, the Air Force OTA usage prior to the recent changes was limited, but the service

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Than Contracts and Grants" (Cornell Law School, November 25, 2015), <https://www.law.cornell.edu/uscode/text/10/2371>; Legal Information Institute, "10 U.S. Code § 2371b – Authority of the Department of Defense to carry out certain prototype projects" (Cornell Law School, November 25, 2015), <https://www.law.cornell.edu/uscode/text/10/2371b>.

131. Catherine L. Stevens, "An Analysis of the Department of Defense's Use of Other Transaction Authority" (master's thesis, Naval Postgraduate School, June, 2016), 29-31, [https://calhoun.nps.edu/bitstream/handle/10945/49391/16Jun\\_Stevens\\_Catherine.pdf?sequence=1](https://calhoun.nps.edu/bitstream/handle/10945/49391/16Jun_Stevens_Catherine.pdf?sequence=1); Lauren C. Williams, "Why the Army is Wary of Other Transaction Authority," *FCW*, March 28, 2018, <https://fcw.com/articles/2018/03/28/ota-army-fears-williams.aspx>; "An Analysis of the Department of Defense's Use of Other Transaction Authority."

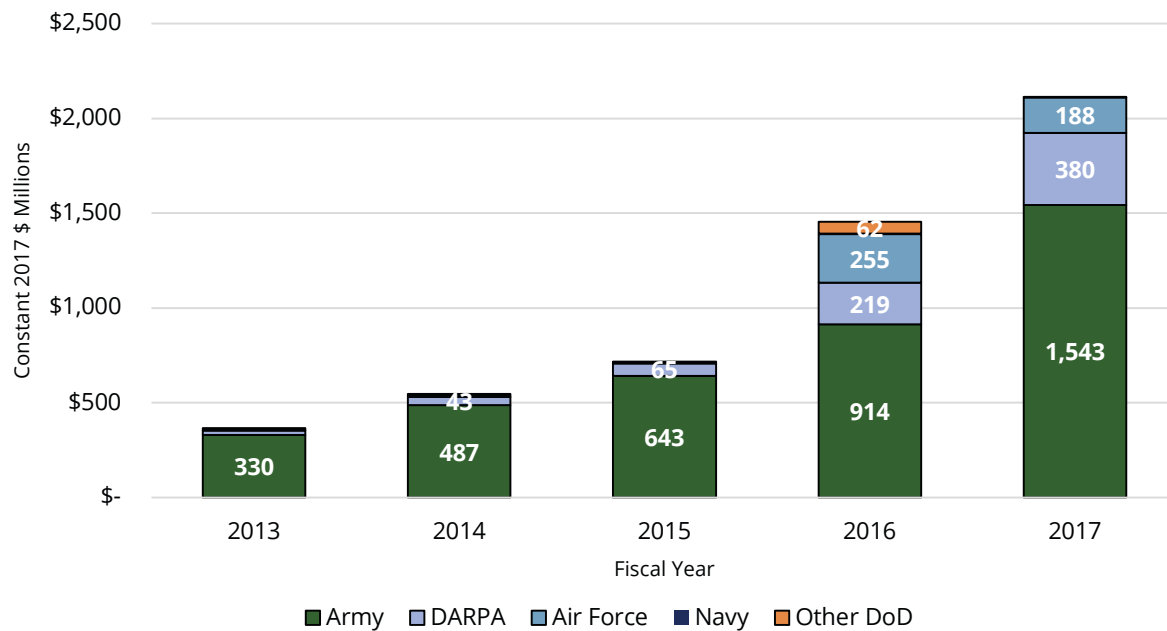
132. U.S. Air Force, "Other Transaction Authority (OTA) Overview," n.d., [https://www.transform.af.mil/Portals/18/documents/OSA/OTA\\_Brief.pdf?ver=2015-09-15-073050-867](https://www.transform.af.mil/Portals/18/documents/OSA/OTA_Brief.pdf?ver=2015-09-15-073050-867).

133. Consortium for Command, Control, Communications and Computer Technologies, "Section 815 of Fiscal Year 2016 National Defense Authorization Act (Amendments affecting Other Transaction Authority)" (Washington, DC: Consortium for Command, Control, Communications and Computer Technologies, 2016), [https://cmgcorp.org/wp-content/uploads/2016/07/Section\\_815\\_MEMO.pdf](https://cmgcorp.org/wp-content/uploads/2016/07/Section_815_MEMO.pdf).

has quickly adopted them since. In FY 2015, Air Force OTA obligations totaled just \$4.99 million, but had increased to \$187.7 million in FY 2017, a 3659 percent increase. Note, while some of this increase is the result of the recent policy changes, rocket engine development is the largest source of increased Air Force OTA obligations as the Air Force seeks to develop a replacement to the Russian-made RD-180 rocket engine.<sup>134</sup>

Figure 4-1 shows defense OTA obligations by Agency from FY 2013 to FY 2017.

Figure 4-1 | Defense OTA Obligations by Customer, 2013–2017



Source: FPDS; CSIS analysis

“DoD obligations awarded using OTAs increased from \$0.7 billion in FY 2015 to \$2.11 billion in FY 2017, a 195 percent increase.

#### Army OTA Usage

Within the Army, the largest OTA user, OTAs are nearly exclusively executed through Army Contracting Command New Jersey (ACC-NJ) at Picatinny, the Army’s Center of Excellence for OTAs.<sup>135</sup> In fact, prior to the recent OTA push, ACC-NJ accounted for 95 percent of all DoD OTA obligations and 99 percent

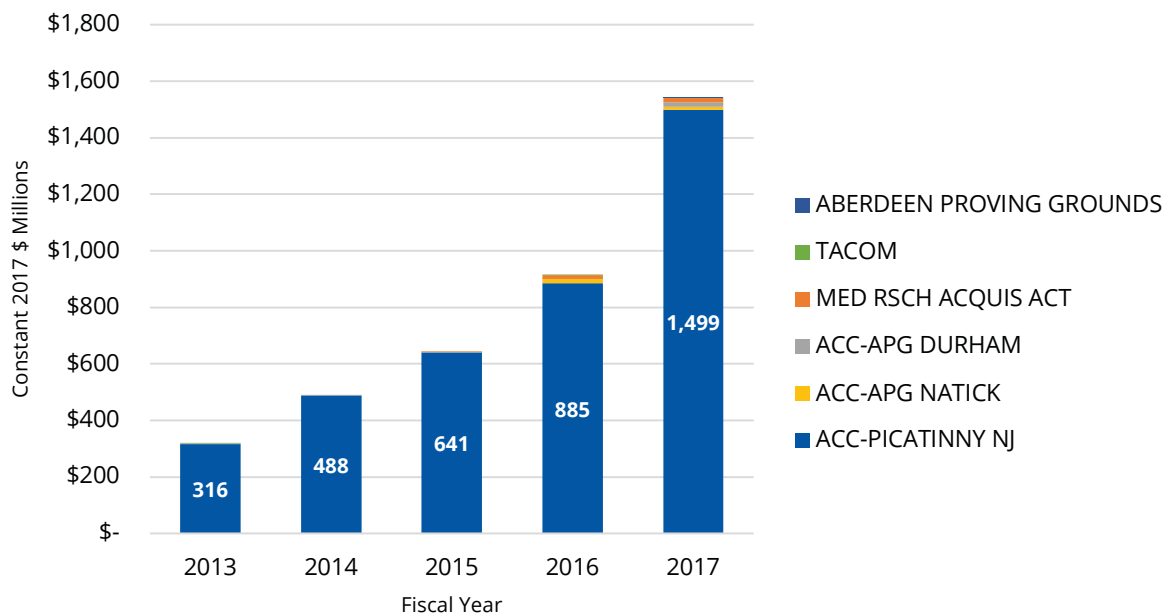
134. Todd Harrison, Andrew P. Hunter, Kaitlyn Johnson, Evan Linck, and Thomas Roberts, *Beyond the RD-180* (Washington, DC: Center for Strategic and International Studies, March 2017), [https://csis-prod.s3.amazonaws.com/s3fs-public/publication/170321\\_Harrison\\_BeyondRD180\\_Web.pdf?x-CcqM08DBsqdKdJOdUs3d7IBJnoTL8LP](https://csis-prod.s3.amazonaws.com/s3fs-public/publication/170321_Harrison_BeyondRD180_Web.pdf?x-CcqM08DBsqdKdJOdUs3d7IBJnoTL8LP).

135. U.S. Army, “Army Contracting Command: New Jersey,” July 18, 2016, <https://www.slideshare.net/GiselleBodinLyons/acc-nj-fact-sheet-2016>.

of Army OTA obligations between FY 2013 and FY 2015. As OTAs have become more popular across DoD, ACC-NJ has fallen as a share of total DoD OTA obligations, but is still the leading DoD OTA contracting office by a considerable amount. Between FY 2015 and FY 2017, ACC-NJ OTA obligations increased from \$640.8 million to \$1.54 billion, a 134 percent increase. Of note, total Aberdeen Proving Grounds (APG) OTA obligations have increased 2160 percent since FY 2017. APG OTA obligations increased from \$1.2 million in FY 2015 to \$16.8 million in FY 2016 and \$26.0 million in FY 2017.

Figure 4-2 shows Army OTA obligations by contracting office from FY 2013 to FY 2017.

Figure 4-2 | Army OTA Obligations by Contracting Office, 2013-2017



Source: FPDS; CSIS analysis

### OTA Concerns

Although there is widespread support for OTAs, they are not a panacea. There are significant concerns about the lack of publicly-available information on OTA awards and the potential for them be used inappropriately. Because OTAs are neither contracts, grants, or cooperative agreements, they are not subject to the same FAR and DFARS-based transparency requirements of those other acquisition mechanisms. Instead, it can be difficult to find even the most basic answers to questions of how much DoD spends under

OTAs, what DoD is using OTAs for, or to whom the OTA spending is going.<sup>136</sup> Furthermore, there are valid concerns that the recent expansion of DoD's OTA authorities could lead to them being used for purposes other than their intended purpose, such as accessing innovation from nontraditional defense suppliers through prototyping.<sup>137</sup> However, by one account, only 35 percent of new OTA dollars awarded from FY 2015 to FY 2017 went to non-traditional suppliers.<sup>138</sup> Over the last year, Congress and GAO have already started to somewhat push-back on DoD's OTA usage, but the greatest concern is that over usage of OTAs could lead to a return of the mid-2000s anti-OTA sentiments, which could cause DoD to lose much of its authority to use this critical acquisition mechanism.

As previously mentioned in "Reforming the Defense Acquisition System," GAO upheld Oracle's protest of the Army's decision to award a follow-on production OTA to REAN Cloud LLC. GAO found that because the Army failed to include the potential for follow-on production in the initial development OTA solicitation, the follow-on OTA did not meet the 10 U.S.C. § 2371b(f) competitive procedures solicitation. Furthermore, GAO found that the REAN Cloud prototype did not meet the 10 U.S.C. § 2371b(f) (2)(B) completeness requirements.<sup>139</sup> This ruling was important because it asserted a basis for both the GAO's jurisdiction and its criteria for ruling on OTA bid protests, which was previously unknown.<sup>140</sup> In MorphoTrust USA, LLC's 2016 protest of a Transportation Security Agency (TSA) OTA award, GAO ruled that "We have also found that agreements issued by an agency under its "other transaction" authority "are not procurement contracts, and therefore we generally do not review protests of the award, or solicitations for the award, of these agreements under our bid protest jurisdiction," but would instead rule on "whether the action undertaken was a knowing and authorized one."<sup>141</sup> "According to the law firm of Arnold & Porter, the 2016 MorphoTrust case established GAO's jurisdiction to review agency's decision to use OTAs, but did not establish the clear parameters

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136. Scott Maucione, "Peering Into the Black Box of OTA Awards," Federal News Radio, July 24, 2018, <https://federalnewsradio.com/contracting/2018/07/peering-into-the-black-box-of-ota-awards/>.

137. Legal Information Institute, "10 U.S. Code § 2371b."

138. Scott Maucione, "As OTAs Grow, Traditional Contractors Are Reaping the Benefits," Federal News Radio, July 17, 2018, <https://federalnewsradio.com/contracting/2018/07/as-otas-grow-prime-contractors-are-reaping-the-benefits/>.

139. U.S. Government Accountability Office, *Decision of the Matter of Oracle America, Inc.* (Washington DC, May 31, 2018), <https://www.gao.gov/assets/700/692327.pdf>.

140. Locke Bell and Anna Sturgis, "DoD's Prototype OTA Guide Offers Insight Into DoD's Experiment In Regulation-Free Acquisition," The Government Contractor, May 24, 2017, 5, <https://www.dau.mil/cop/rqmt/DAU%20Sponsored%20Documents/Article%20-%20Govt%20Contractor,%20DoD%20Prototype%20OTA%20Guide,%2024%20May%202017.pdf>.

141. U.S. Government Accountability Office, *Decision on the Matter of MorphoTrust USA, LLC, File B-412711*, (Washington DC, May 16, 2016), <https://www.gao.gov/assets/680/677357.pdf>



for determining whether an action was “known and authorized.” This decision clarified that GAO will “delve into allegations of noncompliance with the underlying OTA enabling statute.”<sup>142</sup>

Given the REAN Cloud case and broader transparency concerns, Congress has started to increase oversight and accountability for DoD’s OTA authorities but is still supportive of OTAs broadly. The House’s version of the FY 2019 NDAA included a provision requiring DoD to notify Congress within 30 days if it intended to enter into a follow-on award worth more than \$5 million. This provision was stripped in the final FY 2019 NDAA conference bill but was seen as a “warning shot” in DoD.<sup>143</sup> Although the Congressional notification requirement was stripped from the FY 2019 NDAA, Section 873 of the FY 2019 requires DoD to gather data on OTA usage, use that data to update policy and guidance, and prepare an annual report on DoD’s OTA usage.<sup>144</sup> Finally, the FY 2019 House defense appropriations bill contained a Congressional follow-on production notification provision similar to the House’s FY 2019 NDAA language, but like the final FY 2019 NDAA, this notification provision was stripped during conference in favor of expanded reporting requirements.<sup>145</sup>

### **SPEEDING UP FOREIGN MILITARY SALES**

In accordance with the NDS’ priority to strengthen partners and allies as well as the administration’s broader push to increase U.S. arms exports and strengthen the U.S. defense industrial base, DoD has, internally, made speeding up FMS a priority.<sup>146</sup> USD(A&S) Ellen Lord is taking the lead on this issue, working with Deputy Secretary Shanahan and the Defense Security Cooperation Agency (DSCA). Meanwhile, DoD is working to reduce delivery times by streamlining implementation of the FMS process. DoD views speeding up the process as critical for achieving not only the NDS and administration’s priorities but competing with Russia and China for global defense exports. Lord recently noted that other countries have said, “We’re going to go with the Russian alternative, we’re going to go with the

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142. Ronald D. Lee, et al., “GAO Will Police ‘Other Transaction Authority’ Awards”, Arnold and Porter, June 12, 2018, <https://www.arnoldporter.com/en/perspectives/publications/2018/06/gao-will-police-other-transaction-authority-awards>

143. Justin Doubleday, “Authorizers Leave OTA Untouched; DoD Heeds ‘Warning Shot’.”

144. U.S. Congress, House, Committee on Appropriations, Department of Defense Appropriations Bill 2019: Report, 115th Cong., 2d sess., Section 873 (2018), [https://docs.house.gov/meetings/AP/AP00/20180613/108421/HRPT-115-HR\\_Defense.PDF](https://docs.house.gov/meetings/AP/AP00/20180613/108421/HRPT-115-HR_Defense.PDF).

145. Justin Doubleday, “Spending Bill Increases Reporting Requirements for OTAs,” Inside Defense, September 17, 2018, <https://insidedefense.com/daily-news/spending-bill-increases-reporting-requirements-otas>.

146. Samantha Cohen, Melissa Dalton, and Andrew P. Hunter, “Essential Imperatives for U.S. Arms Transfer Policy” (Washington, DC: Center for Strategic and International Studies, July 24, 2018), <https://www.csis.org/analysis/essential-imperatives-us-arms-transfer-policy>.



Chinese alternative because we know we can get it quickly. We know that it might fail 80 to 90 percent of the time, but we will have something.”<sup>147</sup>

DoD’s initial efforts to speed up FMS are focusing on the new authorities granted in the FY 2017 NDAA that allow for the creation of a pilot program that will accelerate the FMS process for up to 10 contracts.<sup>148</sup> Ellen Lord has used that new authority to stand up six Procurement Action Lead Time (PALT) pilot programs with the goal of having signed contracts no more than 210 days post-RFP.<sup>149</sup> Ultimately, this effort’s goal is to be able to leverage the data from one FMS sale to sell the same, or mostly similar variant, system to another country.<sup>150</sup>

Long-term, Secretary Lord is pushing the importance of exportability at the design stage and trying to work with Congress to get more flexibility in FMS contract pricing mechanisms. On designing for exportability, Lord highlighted subsystems as an area where International Traffic in Arms Regulations (ITAR) and other export controls can prohibit direct commercial sales (DCS) and slow down the process.<sup>151</sup> There was already a focus on designing for exportability preference in the last administration, but Lord has emphasized the continuation of that focus.<sup>152</sup> On FMS contracting pricing mechanisms, the FY 2017 NDAA required all FMS transactions be executed using firm-fixed price (FFP) contracts.<sup>153</sup> DoD hopes to get some relief from this provision in order to have more contract pricing flexibility, noting that FFP requirements can slow the FMS process.<sup>154</sup>

## 4.2 | Performance of the Defense Acquisition System

As covered above, the Defense Acquisition system is presently undergoing a significant transition and reorganization. The newly formed organizations,

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147. Yasmin Tadjeh, “Pentagon Moving to Expedite Weapons Exports to Allied Nations,” *National Defense Magazine*, May 23, 2018, <http://www.nationaldefensemagazine.org/articles/2018/5/23/lord-pentagon-expediting-weapon-exports-to-ally-nations>.

148. *National Defense Authorization Act for Fiscal Year 2017*, Public Law 114-328, 114th Cong. (2016), Sec. 830.

149. Aaron Mehta, “2018 Pentagon Priority: Speeding Up Foreign Weapon Sales,” *Defense News*, December 29, 2017, <https://www.defensenews.com/pentagon/2017/12/29/2018-pentagon-priority-speeding-up-foreign-weapon-sales/>

150. Patrick Tucker, “Pentagon Is Speeding Up Arms Exports to Saudi Arabia, Other Allies,” *Defense One*, May 23, 2018, <https://www.defenseone.com/business/2018/05/pentagon-speeding-arms-exports-saudi-arabia-other-allies/148448/>

151. Justin Doubleday, “DoD Acquisition Chief Says Companies Should Design Systems with ‘Exportability’ in Mind,” *Inside Defense*, April 25, 2018, <https://insidedefense.com/daily-news/dod-acquisition-chief-says-companies-should-design-systems-exportability-mind>

152. Stephanie Sanok Kostro and Rhys McCormick, *Institutional Foundations of Federated Defense* (Washington, DC: Center for Strategic and International Studies, January 2015), 10, [https://csis-prod.s3.amazonaws.com/s3fs-public/legacy\\_files/files/publication/150105\\_Kostro\\_Institutional-Foundations\\_Web.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/150105_Kostro_Institutional-Foundations_Web.pdf).

153. *National Defense Authorization Act for Fiscal Year 2017*, Sec. 830.

154. Tucker, “Pentagon Is Speeding Up Arms Exports to Saudi Arabia, Other Allies.”

R&E and A&S, both have new leadership who will put their own stamp on their programs and the range of policy questions within their purview. However, past CSIS research has found that “trends are largely cyclical in the first two years of an acquisition regime, it’s in the years beyond those first two or so that you begin to see the largest impacts of changes in acquisition policy and guidance.”<sup>155</sup> As a result, it is probably still too early to see the effects of the Lord (USD(A&S)) and Griffin (USD(R&E)) regime on contracting inputs, like the extent of competition, let alone on contracting outputs, such as whether multi-year contracts experience cost growth.

### DID BBP STICK THE LANDING?

The results discussed in this section pertain primarily to the Better Buying Power (BBP) reforms of Sec. Ash Carter and USD(AT&L) Frank Kendall. This backwards look is important for two reasons. First, defense acquisition decisions can have ramifications that lasts decades into the future. For example, in December 2017, USD(A&S) Lord announced a new cost-review on the F-35, a program started in the 1990s.<sup>156</sup> Second, each new acquisition regime builds on the policies, successes, and failures of the last, so better understanding the baseline established by BBP is important to what comes next.

GAO’s annual Weapon Factbook Series is a data-rich report card on the performance of MDAPs. The 2018 report stated that “[s]ince DOD began to implement acquisition reforms 8 years ago, new defense weapon systems programs have done a better job staying within budget estimates than their predecessors. However, most programs continue to proceed without the key knowledge essential to good acquisition outcomes.”<sup>157</sup> Even including the caveat, the preliminary outcome of this evaluation is that BBP has been successful in addressing its core priority of increasing the government’s buying power. Critically, this result cannot be solely attributed to more conservative cost estimates that assume greater costs up front. The GAO reports that “DOD has initiated 25 programs since 2010, when the government implemented significant acquisition reforms. These 25 programs represent 29 percent of the 86 programs in the current portfolio, but only account for about 15 percent of the portfolio’s total acquisition cost.”<sup>158</sup>

155. McCormick, et al., *Measuring the Outcomes of Acquisition Reform by Major DoD Components*, 53.

156. Colin Clark, “Lord Announces ‘Deep Dive’ F-35 Cost Review; FMS Changes” *Breaking Defense*, December 08, 2017, <https://breakingdefense.com/2017/12/lord-announces-deep-dive-f-35-cost-review-fms-changes/>.

157. U.S. Government Accountability Office, *Weapon System Annual Assessment: Knowledge Gaps Pose Risks to Sustaining Recent Positive Trends* (Washington, DC: GAO, 2018), 2, <https://www.gao.gov/products/GAO-18-360SP>.

158. *Ibid.*, 21.

Accurate cost estimation and cost containment is always on the short list of acquisition priorities, but it is not the only—or even necessarily the most important—job of acquisition management. As mentioned in section 4.1: Reforming the Defense Acquisition System, Congress is presently putting the most priority on increasing innovation and speed in the acquisition system. Likewise, the GAO has a range of longstanding metrics for evaluating the acquisition system that they report on each year, such as the aforementioned discussion of key knowledge points. This paper will cover the GAO’s findings in a few key areas of performance and then proceed to investigate performance through evaluation of contract terminations and cost overruns to provide additional insights on these areas.

## SCHEDULE

Improved schedule estimates don’t necessarily deliver what Congress is asking for when it comes to speedier delivery of new capabilities. However, the ability to prioritize speed in acquisition is contingent on understanding how fast systems can realistically be developed and delivered. This has been a growing problem for DoD in recent years, though GAO’s analysis did find some reason for hope, noting that “the 2017 portfolio’s average time to deliver capability increased by just over a month in the past year—an improvement over the delays incurred in the previous two portfolios we reviewed.”<sup>159</sup> While schedule slips often accumulate over time and rarely decline, these delays are not just attributable to older programs. The GAO found that “the average time to deliver capability increased by just under 1 month for the sub-portfolio of programs initiated before 2010 but increased by 2.6 months for the sub-portfolio of programs initiated since 2010. This difference could be attributed to older programs being much further along in production and having schedules less prone to change.”<sup>160</sup>

Past research has come to differing conclusions about how hard it would be to improve time estimating. Thomas Light, Robert S. Leonard, Julia Pollak, Meagan L. Smith, and Akilah Wallace at RAND modeled both cost and schedule delays in 2017 and found that there is “a considerable amount of cost and schedule growth risk facing all MDAPs at [Milestone B (MS B)]”<sup>161</sup> and that there was no simple formula for improving estimates at the margins:

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159. Ibid., 12.

160. U.S. Government Accountability Office, *Weapon System Annual Assessment: Knowledge Gaps Pose Risks to Sustaining Recent Positive Trends*, 23.

161. Thomas Light et al., *Quantifying Cost and Schedule Uncertainty for MDAPs* (Santa Monica, CA: RAND Corporation, 2017), 44.

We also find that looking across the Air Force’s current MDAP portfolio, it is not possible to precisely estimate an MDAP’s level of future cost growth or schedule slip, because there is simply too much unexplained variation in program cost and schedule outcomes. But our approach can provide decisionmakers with useful information on the range of uncertainty in MDAP outcomes that they can expect.<sup>162</sup>

However, David Tate of the Institute for Defense Analysis (IDA) is more optimistic, arguing that the biggest obstacle to effective schedule estimating is that doing it right is simply not a priority: “Not infrequently, the initial schedule estimate for an MDAP is not an estimate at all, but a constraint set externally with little regard to program content or historical precedent.”<sup>163</sup> He also found that, in most cases, cycle times for various types of platforms were fairly consistent over time and trouble often arises from trying to beat past performance. “We see that a clear relationship exists between schedule optimism and schedule growth for both new start programs and modifications of existing systems. Interestingly, the average percent schedule growth for a given level of optimism is greater than the amount of optimism. This suggests either that excessive optimism is a symptom of a deeper problem, or that there are cascading effects from being too optimistic.”<sup>164</sup> If Tate is correct, then improving schedule estimates may be low hanging fruit in the pursuit of more timely acquisition.

## COMPETITION

The GAO findings on competition reveal the differences between an MDAP-centric view of competition and the contract competition findings discussed in section 4.3: Contract Obligations by Effective Competition. While contractual competition has declined in aggregate from 2016 to 2017, its incorporation in MDAPs has shown progress over the past year. In 2017, GAO found that “DOD’s implementation of another key reform initiative—the fostering of competitive environments in acquisition—is stagnant.”<sup>165</sup> The news was improved by the 2018 report:

Of the 57 current and future programs we assessed, 55 reported they intend to promote competition during the acquisition process, while 2 future programs reported they currently have no plans for competition either before or after development start... The total of 55

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162. Ibid., 4.

163. David M. Tate, *Acquisition Cycle Time: Defining the Problem* (Alexandria, VA: Institute for Defense Analyses, 2016), 6.

164. Ibid., 4.

165. U.S. Government Accountability Office, *Defense Acquisition: Assessment of Selected Weapons Programs* (Washington, DC: GAO 2017), Highlights. <https://www.gao.gov/assets/690/683838.pdf>

programs that plan to promote competition [represent] an increase from last year's assessment, when only 41 programs signaled such plans... Sixty-one percent of programs that awarded contracts for development, test, or production reported implementing acquisition strategies that promote competition that included awarding contracts competitively. Overall, the current programs that awarded contracts competitively incurred less estimated total acquisition cost growth than others after accounting for quantity changes, both since last year and as compared to their initial cost estimates.<sup>166</sup>

Much of the discrepancy between contract competition trends and GAO trends can be examined using the F-35 as an example. That program was competitively awarded in development, but sole source follow-on development and production contracts led to an Aircraft platform portfolio with a declining rate of competition. However, the comparative improvements found in other platform portfolios—as described in section 4.3: Contract Obligations by Effective Competition—might be related to the propagating number of competitive plans praised by the GAO. These plans are unlikely to suddenly manifest a competitor for an entire system where one doesn't already exist, but may allow for subsystem and component level competition, a BBP priority that current acquisition officials have also mentioned in conversations with the study team.

#### KNOWLEDGE-BASED ACQUISITION AND TRADE OFFS

While the GAO results are largely favorable for the BBP period, they do have a significant caveat:

On the one hand, we observed positive cost performance in the programs that DOD has initiated since 2010, when acquisition reforms began to take root—a trend we first highlighted in our 2016 assessment. Yet, like so many programs before them, most of these newer programs have continued to proceed without the requisite knowledge that our prior work has shown underpins good program outcomes.<sup>167</sup>

This assessment was backed by a study of 15 programs that found three practices associated with less cost growth and fewer delays: “(1) demonstration

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166. U.S. Government Accountability Office, *Weapon System Annual Assessment: Knowledge Gaps Pose Risks to Sustaining Recent Positive Trends*. An important caveat on this analysis is the negative performance of the F-35 was excluded from the analysis because the “[F-35] program's approximately \$118.8 billion in cost growth since its original cost estimate has an outsized effect when calculating average cost changes for groups of acquisition programs,” 29-30; *Ibid.*, 32.

167. *Ibid.*, 1.

that all critical technologies were very close to final form, fit, and function within a relevant environment before starting development; (2) completion of a preliminary design review prior to starting development; and (3) release of at least 90 percent of design drawings by critical design review.”<sup>168</sup> These results are consistent with Light et al.’s finding that “MDAPs that spend a larger portion of their development budget prior to MS B tend to face reduced risk of cost growth after MS B.”<sup>169</sup> Interestingly, on two of these factors, the eight programs most recently assessed by the GAO were more highly ranked than the prior 35, but the GAO’s emphasis is on complete compliance rather than the trendline.

This is an area where the competing objectives of the defense acquisition system come into play. Speed in delivering cutting-edge technologies, a recent priority for Congress as well as many DoD leaders, is in tension with the GAO’s best practice of only proceeding after achieving certain technological readiness levels. Similarly, when competing for development contracts, the ability to incorporate new technologies is often the only way to allow multiple vendors to effectively compete. These goals do not negate the reality of technology risk, but they do suggest that mitigating, rather than removing, the risk may be the most likely path to managing competing objectives. The next two performance categories, contract terminations and cost growth, can illustrate the downsides of taking on too much risk.

### CONTRACT TERMINATIONS

CSIS has developed two means of using FPDS data to evaluate the performance of the defense acquisition system: (1) partial and complete terminations and (2) ceiling breaches. This approach was first developed in our study of fixed-price contracts and has been further refined in our looks at contracts that are responding to crises as well as when looking at the effects of competition and consolidation on performance.<sup>170</sup> For the purposes of these sections, both contract awards and task orders are referred to as contracts. A contract that experiences a complete or partial termination, whether for cause or convenience, represents a failure to deliver or a mismatch between the present needs and what the contract anticipated. It is an inexact measure, but it still captures important occurrences in the acquisition system.<sup>171</sup> Likewise, the standard to judge by is a relative

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168. Ibid., 3.

169. Light, et al, “Quantifying Cost and Schedule Uncertainty for major Defense Acquisition Programs (MDAPs).”

170. These studies were sponsored by the Naval Postgraduate School and the datasets that underlie them, and that underlie this section, are freely available upon request.

171. While all terminations have some significance, the meaning can vary greatly. FPDS treats



one, a system with no partial or complete terminations would probably represent a system that was too risk-averse or not doing a good enough job addressing poor performance or changed circumstances.

In Figure 4-3, the total number of contracts are shown in blue while the count that experience a partial or complete termination are shown in red. Because terminations are quite rare, the y-axis scale is logarithmic. This allows comparison of the slope of the red and blue line, as a steeper slope means a greater relative rate of change. The graph is divided into 9 sections, with the columns categorizing the starting cost ceiling for the contract and the rows categorizing the initial duration. Each graph is also labeled with both the total number of contracts and the total obligations over the period from 2007 to 2015. For longer contracts, categorizing more recent years provides an added challenge, as many of these contracts are still ongoing and, therefore, could still experience a termination in the future.

The gap between the dotted and solid line represent those contracts whose natural life extends beyond the end of the study period. Note that options, often a year in duration, can extend the natural life of a contract well beyond its initial duration. This approach might be chosen by contracting officers to give the government flexibility in implementation at the expense of contractor certainty. Alternately, it may be an approach imposed by policy or statute, as with the case of contracts funded by accounts limited to one-year budget authority, such as O&M and MILPERS appropriations accounts.”<sup>172</sup>

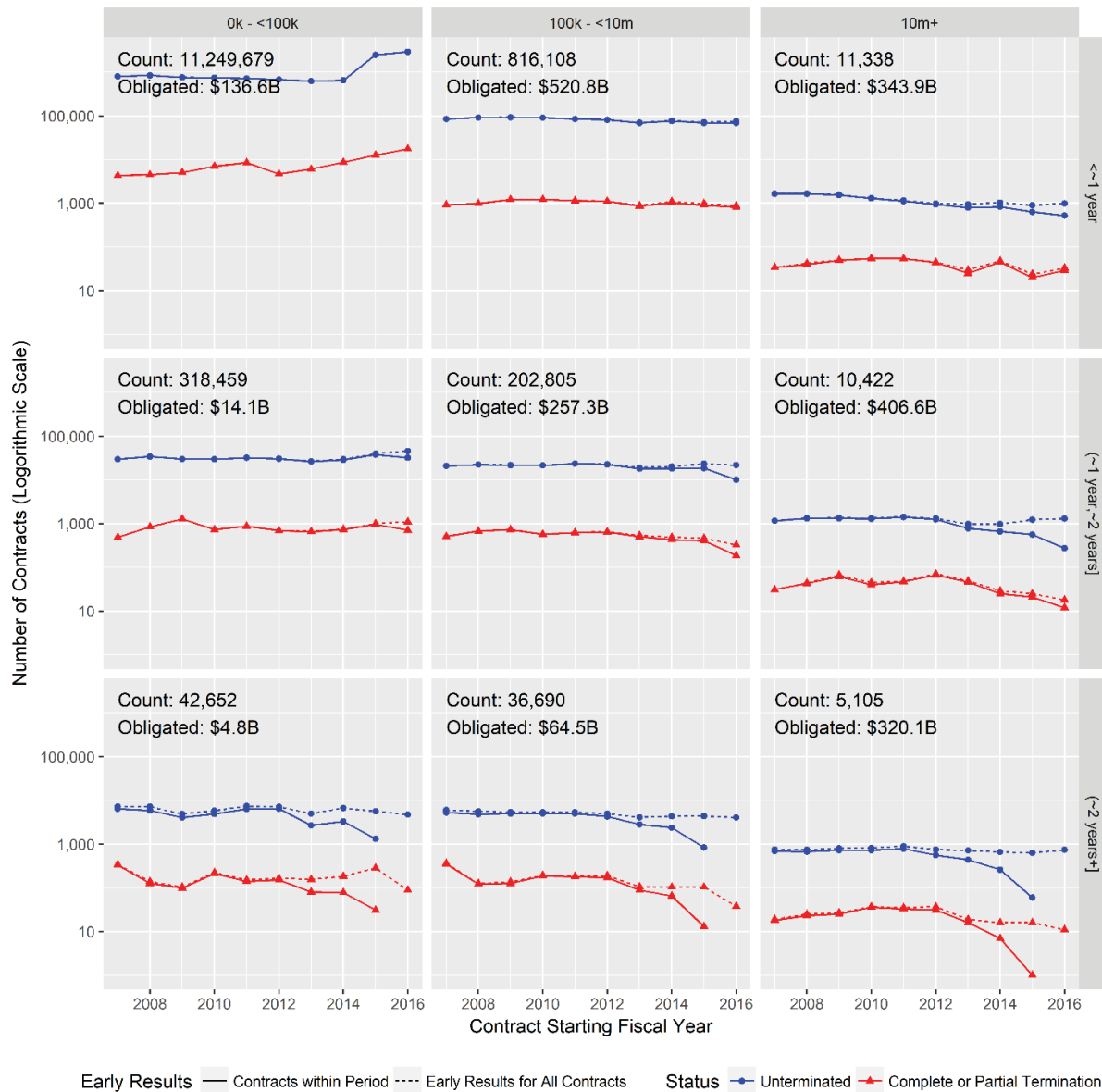
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partial terminations the same as complete terminations. As a result, a terminated contract may be completed such as in the case of a bid protest where a termination is recorded early in the life of a contract but the task then goes on to be completed by another vendor. The risk of false negatives is greater. Most contracts and task orders are not formally ended for extended periods, and thus we cannot be sure that all terminated contracts are properly closed out and recorded. In addition, this measure does not capture when the government may simply allow an unsatisfactory contract to lapse without renewal.

172. *Task and Delivery Order Contracts: General Authority*, accessed September 21, 2017, <http://uscode.house.gov/view.xhtml?hl=false&edition=prelim&req=granuleid%3AUSC-prelim-title10-section2304a>.



Figure 4-3 | Partial and Complete Contract Terminations by Start Year



Source: FPDS; CSIS analysis

This year's results continue the patterns CSIS observed last year. First, peak terminations typically occurred between fiscal year 2009 and fiscal year 2012. This is the period during which contract spending peaked and reversed, "more than 30 programs were cancelled, capped, or ended" by Sec. Gates,<sup>173</sup> and by 2013, the Budget Caps were in place. The second observation

173. Robert Gates, "Speech to the American Enterprise Institute," (delivered 24 May 2011), <http://www.americanrhetoric.com/speeches/robertgatesamericanenterpriseinstitute.htm>

is that for contracts with initial ceilings of at least \$100,000, there appears to be a lower rate of cancellations starting in 2013, with further declines in many categories in 2014, and the lower number sustaining through 2015. This period includes the BBP 2.0 and 3.0 and suggests that at very least those cost saving measures did not drive new terminations. This finding is particularly important for contracts with longer base years. As Scot Arnold and Bruce R. Hamon at IDA observe multiyear procurement “obligates the government to multiple future year purchases, imposing an opportunity cost in the form of larger contract termination liability.”<sup>174</sup> Arnold and Hamon consider termination costs, along with fewer opportunities to renegotiate price, to be “significant costs that erode the [Multi-Year Procurement] discount.”<sup>175</sup> Therefore, less frequent terminations reduce the risk of multiyear contracting. Conversely, spikes in the number of terminations—such as what occurred with contracts with at least two base years but a ceiling of below a hundred thousand—may simply be an artifact of smaller sample sizes, but, nonetheless, such spikes suggest greater caution may be necessary.

The most notable new trend is visible in the top left corner, which means they also have an initial duration of less than a year and an initial ceiling of under \$100,000, a category that covers the vast majority of contracts by count. The low ceilinged and short contracts experienced the largest growth from FY 2014 to FY 2015, jumping by 279 percent after declining with a -2.5 percent compound annual growth rate from FY 2007 to FY 2014. For these smaller and shorter contracts, the number of terminations has also been rising since a drop in FY 2012, but the entire rise during this period is 288 percent, comparable to the one-year jump in number of contracts in this category.

### COST GROWTH

The GAO’s finding on reductions in cost growth was heartening but came with a key caveat:

DOD’s 2017 portfolio of major weapon programs has grown in cost and size. GAO’s analysis shows that programs initiated since 2010 had better cost performance between 2016 and 2017 than the rest of the portfolio— an estimated \$5.6 billion decrease versus a \$60.3 billion increase. It is too early to say whether this performance will continue and curb future cost growth. Future cost outcomes hinge

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174. Scot A. Arnold and Bruce R. Harmon, *The Relative Costs and Benefits of Multi-year Procurement Strategies* (Alexandria, VA: Institute for Defense Analyses, 2013), 7, [https://www.ida.org/idamedia/Corporate/Files/Publications/IDA\\_Documents/CARD/ida-document-ns-d-4893.pdf](https://www.ida.org/idamedia/Corporate/Files/Publications/IDA_Documents/CARD/ida-document-ns-d-4893.pdf).

175. *Ibid.*, 35.

on how these programs perform once they enter production, when cost growth is most prevalent.<sup>176</sup>

While the same caveat on yet unknown production cost applies, this finding builds on good news regarding the 2009 Weapon System Acquisition Reform Act (WSARA), which the GAO found was a “driving factor” in reducing the rate of development cost growth.<sup>177</sup> While the news was good, diminishing returns from the reforms may be kicking in, as the 2017 gain in buying power was “significantly less than the \$10.7 billion increase in buying power achieved by the 2016 portfolio.”<sup>178</sup> The GAO also reported increased use of affordability constraints and “should cost” analyses, with promising statements from all but one of the 34 programs in the sample that have adopted these constraints. That said, GAO concluded that, at this stage, “the effectiveness of the constraints remains untested.”<sup>179</sup>

CSIS began last year with an analysis of cost growth that includes all contracts and task orders, not just those of MDAPs. This orders all contracts and task orders by their total cost ceiling increase and then checks how large that increase was for a contract at the 50th, 80th, 90th, and 95th percentile and is shown in Figure 4-4.

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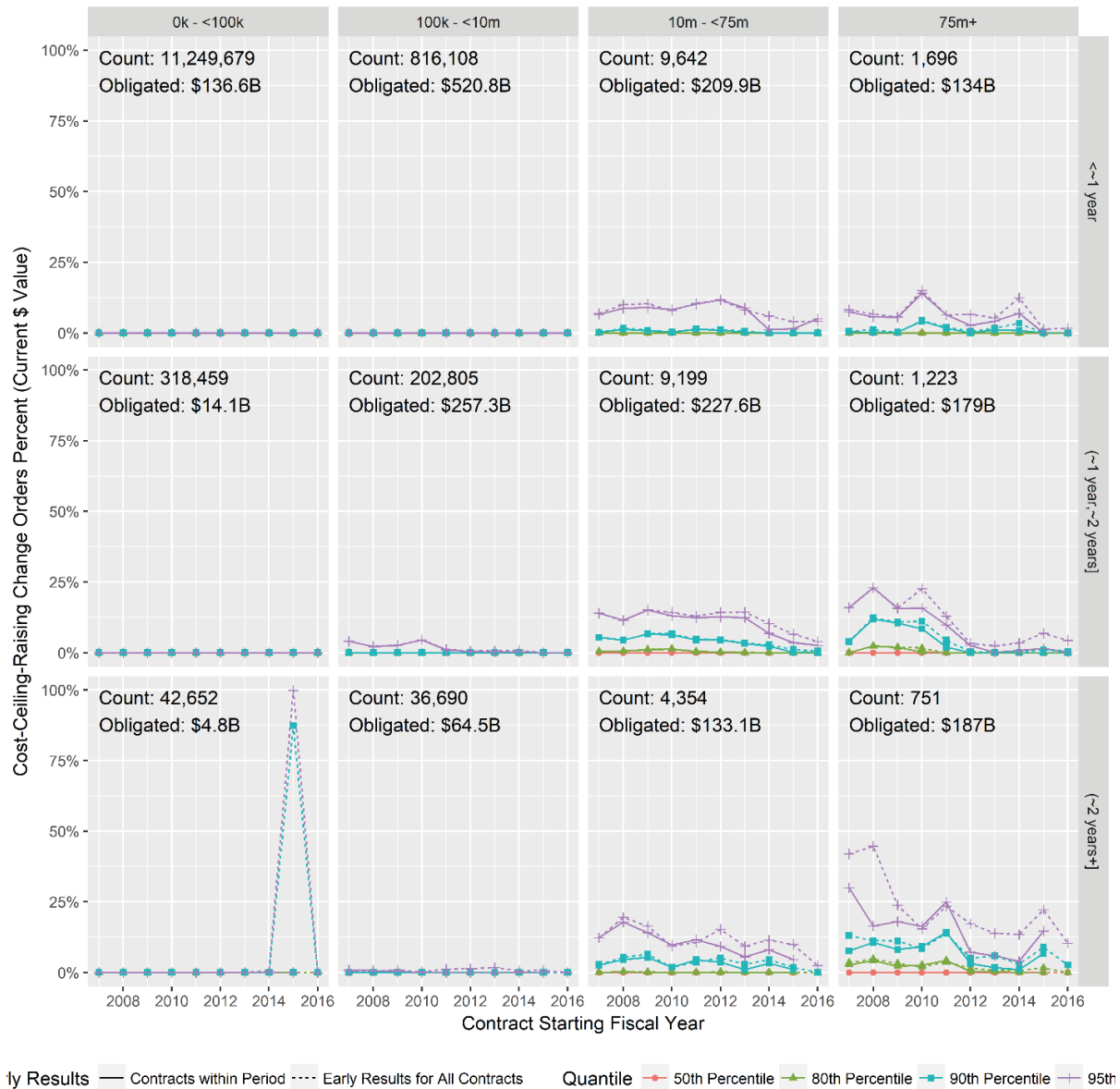
176. GAO, “Weapon System Annual Assessment: Knowledge Gaps Pose Risks to Sustaining Recent Positive Trends”, 2.

177. *Ibid.*, 24.

178. *Ibid.*, 15.

179. *Ibid.*, 32.

Figure 4-4 | Ceiling Breaches by Start Year and Quantile



Source: FPDS; CSIS analysis

The graph is divided into initial size and duration categories because of the stark variation between different scopes of contract. For example, in the small and short contracts in the upper left corner, not even 1 in 20 contracts (the 95th percentile) experience cost growth. By comparison, when it comes to longer duration contracts with a base size of at least \$75 million that are in the early years of the period, 1 in 5 contracts (the 80th percentile) experience cost growth.

The FY 2015 and FY 2016 data continued the largely positive trends noted in last year's report, with one notable exception. Namely in the lower left window, where in 2015, a comparatively small group of contracts (about eight hundred out of a population of six thousand) with initial ceilings below \$100,000 and a base length of two-plus years have experienced a ceiling breach of at least 50 percent. One contract out of twenty doubled its ceiling. This phenomenon is an outlier that has vanished by FY 2016, and accounts for very little in cost-obligation terms. However, combined with the growing number of terminations for long base contracts with ceilings of under one hundred thousand dollars, this information suggests that this category of contracts may merit more attention.

Otherwise, with some year on year blips, the cost-growth findings for all contracts and task orders seem to reflect the trend that the GAO observed for MDAPs. The blips, such as the FY 2015 spike for contracts and tasks orders with the initially highest ceilings and longest durations, do suggest that problems can quickly return, absent continued learning and sound management. Nonetheless, between these results and those of the GAO, the evidence suggests that improvements in cost control under BBP were real and cost control efforts should be maintained even as attention moves on to other acquisition priorities.

### 4.3 | Contract Obligations by Effective Competition

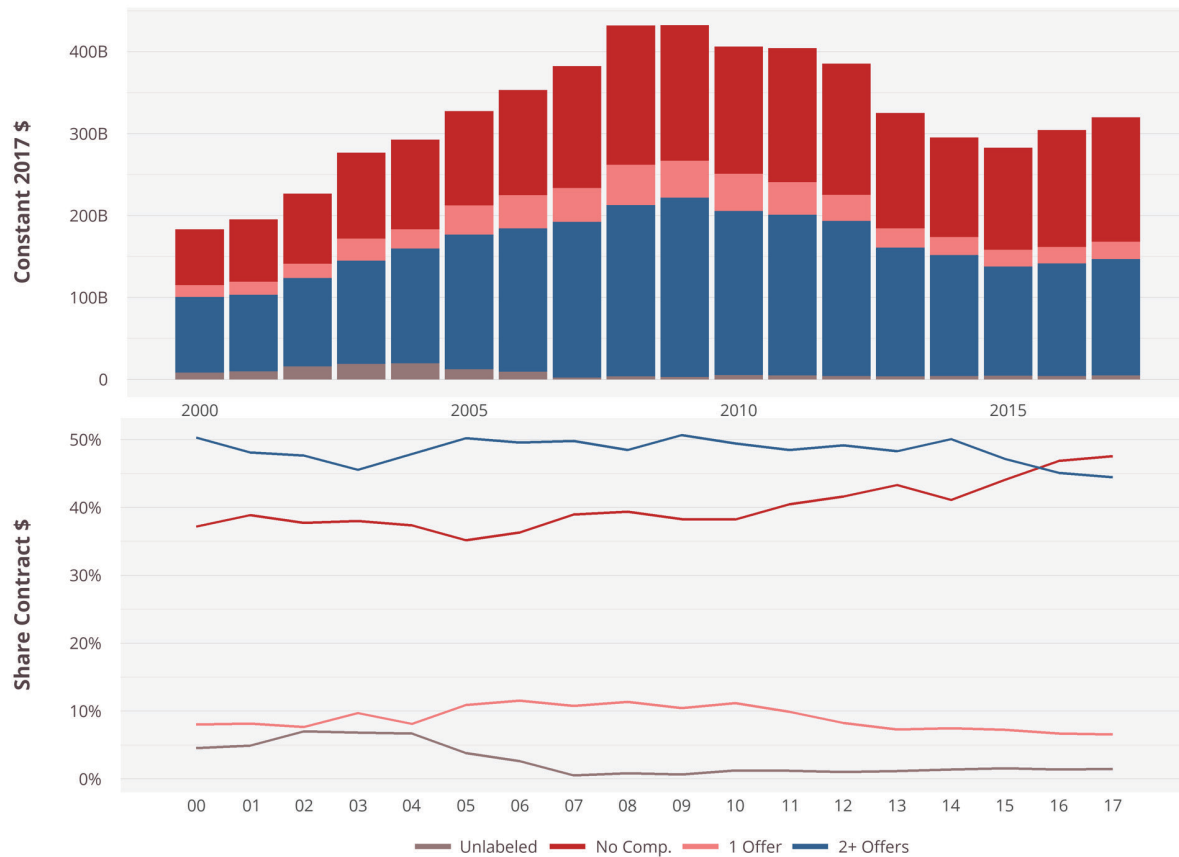
Previous CSIS research has shown that the rate of effective competition has remained relatively steady since 2000 despite policy guidance favoring increased competition.<sup>180</sup> However, the data show that the rate of effective competition has fallen slightly over the past two years during the defense contracting rebound. In FY 2015, 47 percent of contract obligations were awarded after effective competition and 51 percent awarded without effective competition. In FY 2016, the share of contract obligations awarded after effective competition fell to 45 percent. The effective competition rate continued its decline in FY 2017, falling to 44 percent. This drop was heavily driven by the declining rate of competition in the Aircraft platform portfolio.

Figure 4-5 shows the rate of effective competition for defense contract obligations from FY 2000 to FY 2017.

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180. Ellman et al., *Defense Acquisition Trends, 2016*; McCormick et al., *Measuring the Outcomes of Acquisition Reform by Major DoD Component*; CSIS defines "effective competition" as competitively sourced contracts receiving at least two offers. This intentionally excludes competitively sourced contracts that receive only one offer; CSIS believes that many of these contracts would have been more appropriately classified as sole-source, and that in any case, DoD is less likely to receive the benefits of competition when there is only one offeror.

Figure 4-5 | Defense Contract Obligations by Level of Competition, 2000–2017



Source: FPDS; CSIS analysis

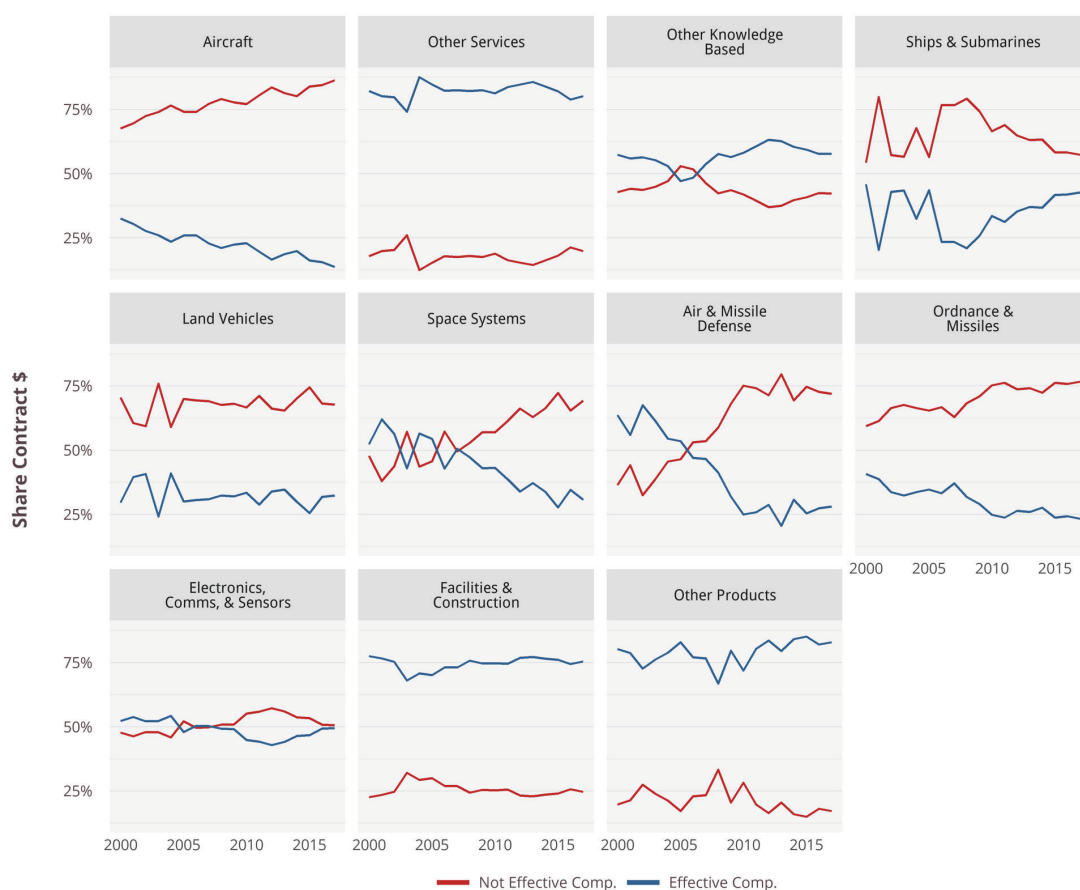
The declining rate of effective competition for defense contract obligations has been driven by significant increases in the total sum of contract obligations awarded without effective competition. Since FY 2015, contract obligations awarded with no competition has grown from \$124.4 billion to \$152 billion, a 22 percent increase. Comparatively, contract obligations awarded after effective competition have grown from \$133.2 billion to \$142.2 billion, a 7 percent increase. Of note, policy guidance issued to reduce the number of contracts awarded after receiving only one offer seems to be working. Over the past four years, contract obligations awarded after receiving only one offer have held relatively steady in terms of both raw dollars and share of defense dollars.

To examine the trends in declining effective competition for defense contract obligations, this paper continues by examining the competition trends by platform portfolio. The competition trends within the different DoD components are discussed in Chapter 6: What are the Defense Components Buying?

## EFFECTIVE COMPETITION BY PLATFORM PORTFOLIO

Previous CSIS research demonstrated that sequestration and the defense drawdown had varying effects on the different sectors of the defense industrial base. Some sectors, like Ships & Submarines and Facilities and Construction, saw increased competition while others, such as Aircraft and Land Vehicles, saw declining rates of effective competition.<sup>181</sup> A number of platform portfolios that experienced a downturn in effective competition during the defense drawdown reversed course and saw increased competition over the past two years (the defense contracting rebound) while other portfolios experience continued declines in competition. Figure 4-6 summarizes the rates of effective competition across platforms portfolios from FY 2000 to FY 2017.

Figure 4-6 | Defense Contract Obligations by Platform Portfolio by Level of Competition, 2000-2017



Source: FPDS; CSIS analysis

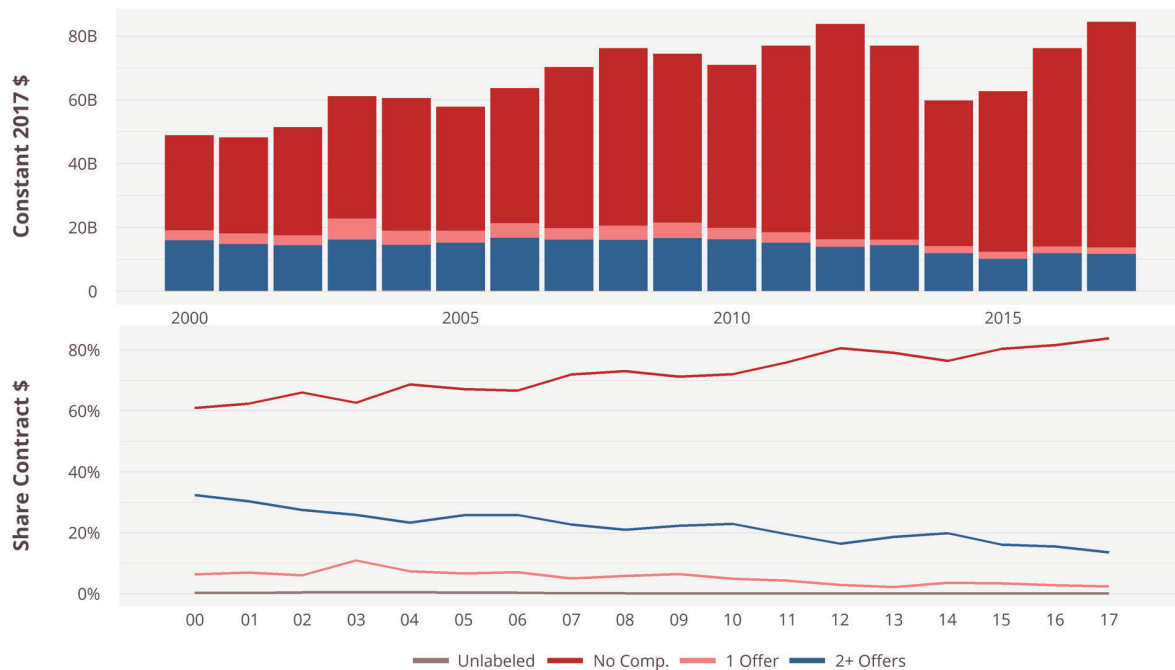
181. McCormick et al., Measuring the Impact of Sequestration and the Drawdown on the Defense Industrial Base.



## AIRCRAFT: THE NON-COMPETITIVE BECOMES MORE NON-COMPETITIVE

Aircraft, one of the least competitive platform portfolios, has become increasingly non-competitive under the defense contracting rebound of the past two years—an ongoing trend over the past two decades. Figure 4-7 shows Aircraft contract obligations by level of competition from FY 2000 to FY 2017.

Figure 4-7 | Level of Competition for Defense Aircraft Contract Obligations, 2000-2017



Source: FPDS; CSIS analysis

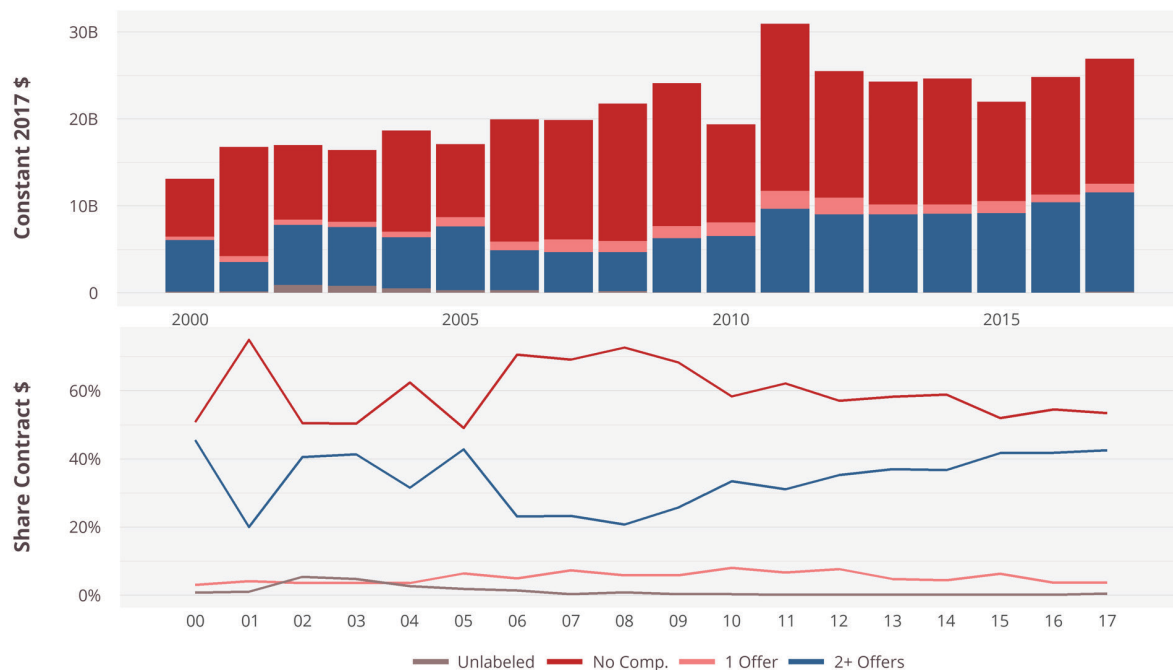
Aircraft, one of the least competitive platform portfolios, has become increasingly non-competitive under the defense contracting rebound of the past two years.

Over the past two years, the share of Aircraft contract obligations awarded without effective competition rose from 83.3 percent in FY 2015 to 86.1 percent in FY 2017. Although the share of contract obligations awarded after receiving only one offer has fallen, this decrease was offset by increases in the share of contract obligations awarded without competition. As the Aircraft platform portfolio rebounded over the past two years, contract obligations awarded without competition grew faster than the overall Aircraft rate of growth. Between FY 2015 and FY 2017, Aircraft contract obligations awarded without competition rose from \$50.7 billion to \$71.2 billion, a 40 percent increase, a rate faster than overall Aircraft's 34 percent growth.

## SHIPS & SUBMARINES: INCREASING COMPETITION CONTRARY TO COMMON RHETORIC

Contrary to public rhetoric about the non-competitiveness of the defense shipbuilding sector, the rate of effective competition within the Ships & Submarines platform portfolio increased over the last two years, continuing the somewhat surprising trend that began during the defense drawdown.<sup>182</sup> Figure 4-8 shows defense Ships & Submarines contract obligations by level of competition from FY 2000 to FY 2017.

Figure 4-8 | Level of Competition for Defense Ship & Submarines Contract Obligations, 2000-2017



Source: FPDS; CSIS analysis

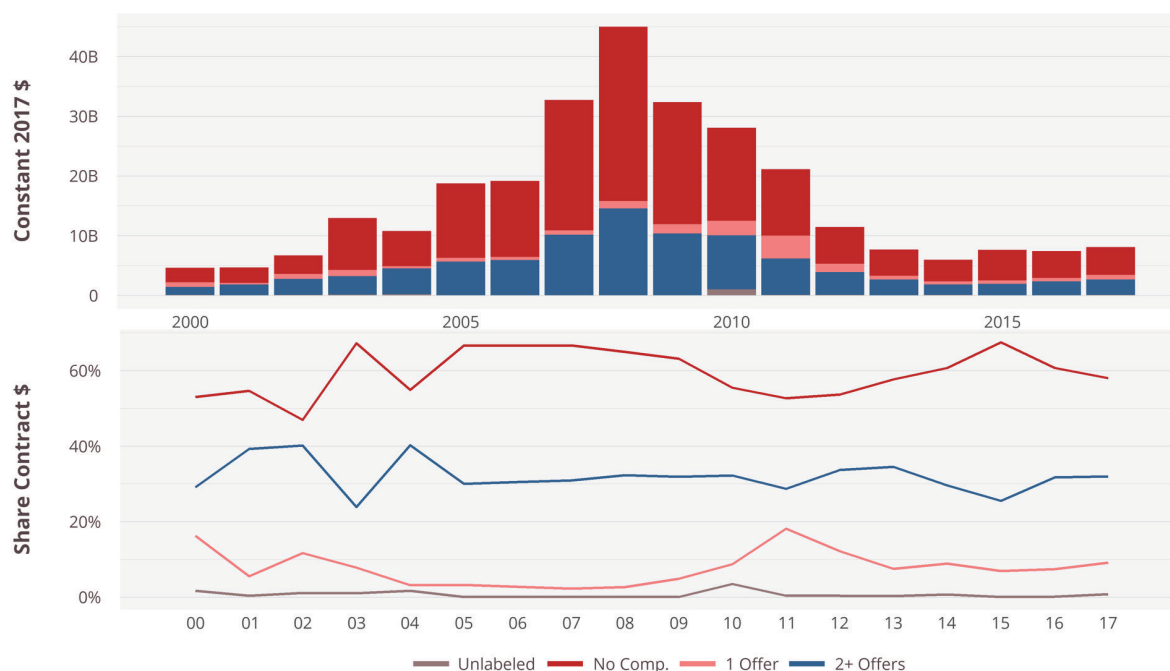
Between FY 2015 and FY 2017, the rate of effective competition in the Ships & Submarines platform portfolio increased slightly from 41.9 percent to 42.9 percent. The decline in the rate of non-effective competition in the Ships & Submarines sector was the result of the share of contract obligations awarded after one offer falling from 6.4 percent in FY 2015 to 3.8 percent in FY 2016 and FY 2017. Meanwhile, the share of contract obligations awarded without competition rose from 51.7 percent in FY 2015 to 53.3 percent in FY 2017. Of note, in-terms of total contract obligations, two-plus offers (25 percent) and no-competition (26 percent) rose at near equivalent rates.

182. Ibid.

## LAND VEHICLES: EFFECTIVE COMPETITION RECOVERING; SINGLE-OFFER REMAINS VOLATILE

Land Vehicles, which saw a downturn in effective competition during the defense drawdown, experienced increased effective competition over the past two years.<sup>183</sup> Figure 4–9 shows defense Land Vehicles contract obligations by level of competition from FY 2000 to FY 2017.

Figure 4–9 | Level of Competition for Defense Land Vehicles Contract Obligations, 2000-2017



Source: FPDS; CSIS analysis

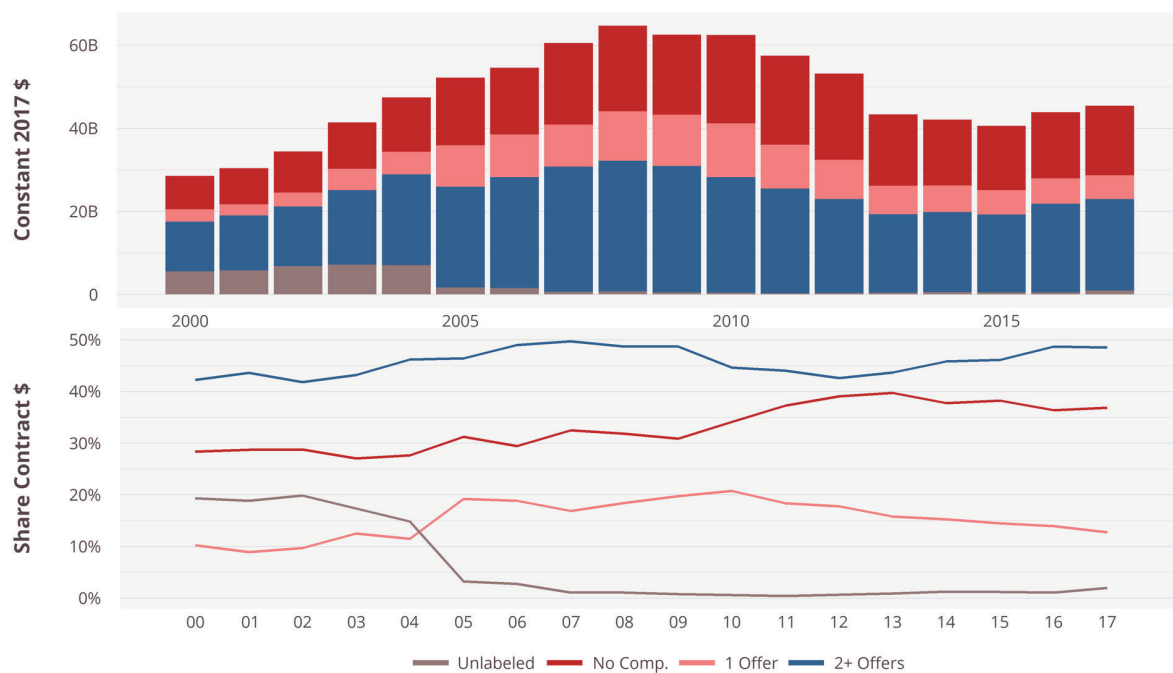
The rate of effective competition in the Land Vehicles sector increased from 25.7 percent to 32.9 percent between FY 2015 and FY 2017. Although the share of contract obligations awarded without competition fell from 66.9 percent to 57.9 percent, there was an uptick in the share of contract obligations awarded after one offer. The share of Land Vehicles contract obligations awarded with only one offer increased from 7.4 percent to 9.2 percent. Given the volatility in the percentage of contract obligations awarded with one offer since FY 2009, it remains to be seen if this is a one-year outlier or an emerging trend.

183. Ibid., 34-35.

## ELECTRONICS, COMMS, & SENSORS: POSITIVE COMPETITION TRENDS ACROSS THE BOARD

Similar to Land Vehicles, the Electronics, Comms, & Sensors (EC&S) experienced an uptick in the rate of effective competition during the defense contracting rebound, after declining during the defense drawdown.<sup>184</sup> Figure 4-10 shows defense Electronics, Comms, & Sensors contract obligations by level of competition from FY 2000 to FY 2017.

Figure 4-10 | Level of Competition for Defense EC&S Contract Obligations, 2000-2017



Source: FPDS; CSIS analysis

Between FY 2015 and FY 2017, the rate of effective competition in the Electronics, Comms, & Sensors increased from 46.7 percent to 49.5 percent, largely as a result of effectively competed contract obligations outpacing the overall sector trends. Electronics, Comms, & Sensors contract obligations awarded after effective competition grew from \$18.7 billion in FY 2015 to \$22.0 billion in FY 2017, an 18 percent increase. Comparatively, overall Electronics, Comms, & Sensors contract obligations only grew 11 percent over the same timeframe. Subsequently, the share of Electronics, Comms, & Sensors contract obligations awarded after no-competition and only one offer both fell. The share of contract obligations awarded with no-

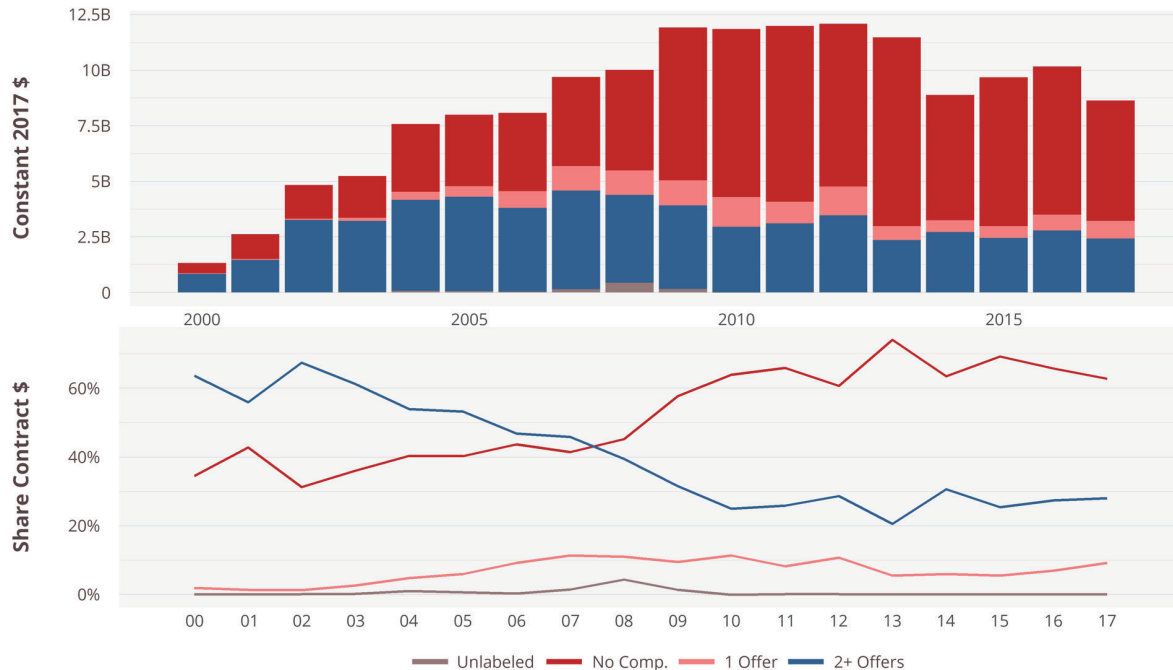
184. Ibid., 60.

competition fell from a 38.7 percent market share to 37.5 percent, while one offer fell from 14.6 percent to 13.0 percent.

#### AIR AND MISSILE DEFENSE: EFFECTIVE COMPETITION INCREASES, BUT SO DOES SINGLE-OFFER

Over the last two years, as Air and Missile Defense contract obligations declined 11 percent, there were positive trends in increasing rates of effective competition and declining rates of no-competition. However, the Air and Missile Defense platform did see an up-tick in single-offer competition. Figure 4-11 shows defense Air and Missile contract obligations by level of competition from FY 2000 to FY 2017.

Figure 4-11 | Level of Competition for Defense Air and Missile Defense Contract Obligations, 2000-2017



Source: FPDS; CSIS analysis

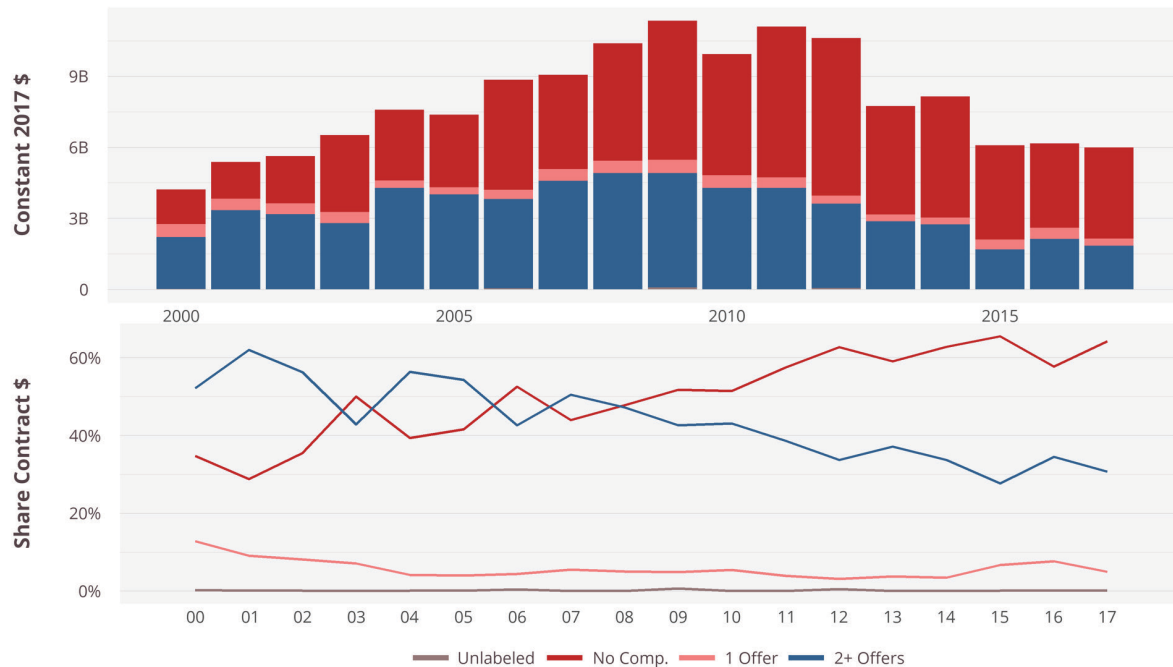
The share of Air and Missile Defense contract obligations awarded after effective competition rose from 25.3 percent in FY 2015 to 28 percent in FY 2017 as a result of total Aircraft and Missile Defense effective competition (-1 percent) contract obligations declining slower than the overall platform (-11 percent). The share of Air and Missile defense contract obligations awarded without competition fell from 69.2 percent to 62.8, while total non-competitive contract obligations declined 19 percent. Finally, the share of Air and Missile defense contract obligations awarded after one offer

increased from 5.5 percent to 9.2 percent given the 49 percent growth in total single offer Air and Missile defense contract obligations. Between 2015 and 2017, Air and Missile Defense contract obligations increased from \$0.5 billion to \$0.8 billion, a 49 percent increase.

#### SPACE SYSTEMS: POSITIVE COMPETITION TRENDS, BUT POTENTIAL TROUBLE AHEAD

The rate of effective competition trends for Space Systems were largely positive over the past two years. Figure 4-12 shows defense Space Systems contract obligations by level of competition from FY 2000 to FY 2017.

Figure 4-12 | Level of Competition for Defense Space Systems Contract Obligations, 2000-2017



Source: FPDS; CSIS analysis

From FY 2015 to FY 2017, the rate of effective competition in Space Systems increased while both single offer and no-competition declined. 30.6 percent of Space Systems contract obligations were awarded after effective competition in FY 2017, whereas 27.6 percent were awarded in FY 2015. Space Systems contract obligations awarded after effective competition totalled \$1.8 billion in FY 2017, as compared to \$1.7 billion in FY 2015, a 9 percent increase. Meanwhile, the share of Space Systems contract obligations awarded without competition fell to 64 percent from 65.3 percent, while single-offer fell from 7.1 percent to 5.4 percent.

While the effective competition trends in the Space Systems sector were largely positive, there are a few data points that could point to potentially problematic future trends. In FY 2016, Space Systems contract obligations awarded after effective competition increased by 26 percent but then declined 13 percent in FY 2017. Meanwhile, Space Systems contract obligations awarded without competition rose 8 percent in FY 2017 after declining 11 percent in FY 2016. Although effective competition and no competition are higher and lower in FY 2017 than FY 2015 respectively, the FY 2017 trends could be either an anomaly or an early indicator of a return to a less competitive Space Systems platform portfolio.

#### 4.4 | Performance-Based Logistics

The defense market is a highly specialized sector of the economy. In some areas, this specialization means that the universe of potential vendors can be limited to only a single or a few firms due to the need to generate a unique military capability. At all times, the monopsonistic nature of much of the defense market limits the extent that standard competitive economic models operate. These factors put a special premium on developing mechanisms to align the incentives of DoD and its specialized vendors. One mechanism that aims to achieve this alignment of incentives is performance-based logistics contracts. This section reports the trends for PBL contracts throughout the past 16 years and discusses the various uses of incentives in PBL contracts.<sup>185</sup>

The potential for misalignment of incentives between the government and its vendors is multifaceted. For instance, vendors are incentivized to seek increased workload and scope while program offices representing the government aim for efficiency and reduced costs, which often means less work for the vendor. Since much of the defense market is a monopsony, where DoD is the only buyer, there are low incentives for commercial vendors to more efficiently price items whose prices the government has previously been willing to accept. Similarly, defense vendors are cautious to invest heavily in R&D if there is uncertainty in future purchases of the final product. For many defense systems, uncertainty about future purchases can be high. Alternatively, incumbent vendors may perceive that there are no other companies to compete against after the initial contracts are awarded and when future purchase are well known, given their sizable advantages

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185. The trends reported here are adapted from a previous CSIS study, *Use of Incentives in Performance-Based Logistics Contracting*, supported by the Naval Postgraduate School Acquisition Research Program under Contract No. N00244-16-1-0009. The views expressed in written materials or publications, and/or made by speakers, moderators, and presenters, do not necessarily reflect the official policies of the Naval Postgraduate School nor does mention of trade names, commercial practices, or organizations imply endorsement by the U.S. government.



over potential competitors. These dynamics place strong demands on government contracts to compensate for the missing market mechanisms that can control price and promote efficiency in the commercial sector as well as align incentives between the government customer and vendors. PBL, when properly constructed, is designed to achieve this outcome.

DoD's PBL Guidebook defines PBL as a contracting method where the customer pays according to how performance aligns with contractual obligations. The guidebook specifically defines that PBL contracts should: "Describe requirements in terms of results to be obtained rather than the methods of performance. In other words, the task should describe the desired result or outcome rather than how work is to be performed."<sup>186</sup> The reasoning behind this is that "When commercial providers are paid for performance outcomes, not per transaction, their profits are directly impacted in a negative way by any additional costs they may incur in delivering contractual requirements."<sup>187</sup> The intent behind PBL contracts is to incentivize commercial vendors such that increased profit equates to reduced costs. By formulating a PBL contract to create a situation where the government is buying a performance outcome, the risks are shared between the government customer and commercial vendor supplier.<sup>188</sup> This inherently shifts more responsibility to the commercial vendor.

### USES OF INCENTIVES IN PBL CONTRACTS

PBL contracts implement different incentive schemes to foster processes and outcomes that benefit both DoD as a customer and commercial vendors as the suppliers. There are four types of incentives often used in PBL contracts: time-based incentives, financial incentives, scope incentives, and other types of incentives.

#### *Time-Based Incentives*

Time-based incentives focus on either the maximum length of a contract, the means for extending the life of existing contracts, or a combination of the two. PBL contracts that last for multiple years are desirable because commercial vendors are incentivized to make initial investments in R&D,

186. Assistant Secretary of Defense for Logistics and Materiel Readiness, *PBL Guidebook: A Guide to Developing Performance-Based Arrangements* (Washington, DC: Department of Defense, 2016), 10, <https://www.dau.mil/guidebooks/Shared%20Documents%20HTML/PBL%20Guidebook.aspx>.

187. Ibid.

188. Gupta et al., "Contractor Incentives for Success in Implementing Performance-Based Logistics: A Progress Report," in *Proceedings of the Seventh Annual Acquisition Research Symposium* (Monterey, CA: Naval Postgraduate School, April 30, 2010). <https://calhoun.nps.edu/bitstream/handle/10945/33467/NPS-AM-10-034.pdf?sequence=1&isAllowed=y>; Gardner et al., "Balancing Incentives and Risks in Performance-Based Contracts," *Defense Acquisition Research Journal* 22, no. 4 (Oct. 2015).

physical capital, and process improvements, therefore increasing the likelihood that performance targets are consistently met, and overall costs are reduced. From the perspective of the vendor, longer time frames are crucial so that a return on investment has time to accrue. Vendors find this particularly crucial given the usual single-year nature of federal budgeting. One drawback of time-based incentives is that they are most effective in competitive environments. Competitive environments, however, are uncommon in the PBL arrangements in the U.S.

### *Financial Incentives*

Financial incentives relate to both the type of contract and the type of fee structures outlined in the contract. Specifically, the different types of fee structures include fixed fees, incentive fees, and award fees. PBL contracts can utilize two different approaches with respect to financial incentives. One approach uses profit sharing as its core, and the other approach uses financial incentives linked to performance metrics.

Cost sharing by using approaches such as incentive fees is a financial incentive approach that aims to alleviate the variety of issues that arise due to asymmetrical information between the buyer and the vendor. The scenario wherein the buyer maximizes benefits for the government customer would involve DoD choosing to lower costs and pay a lower price. In the scenario wherein the supplier maximizes benefits for the PBL vendor, the product would be sold at the same price despite lowered costs, and the excess finances resulting from these reduced costs would go towards maximizing profits for the vendor. Cost-sharing financial incentives aim to find a middle ground where when costs are reduced, both the DoD buyer and the PBL vendor can reap the benefits of a lower price and a higher profit margin. In practice, if a contract ends up below estimated cost, the original contract can have rates in place that allows both the government buyer and the commercial vendor to receive a portion of the money saved.

The use of performance metrics is another financial incentive approach where contract specifications can utilize financial incentives in either a positive or a negative manner. The positive manner rewards contractors when they exceed performance metrics by an amount above the contractual metrics. The negative manner penalizes a contractor for failing to meet contractual benchmarks and metrics. After interviewing various government and industry officials, the CSIS team found larger support for negative incentives because negative incentives are more often tied to the contractual obligations for pricing and fee mechanisms, which have a greater influence and connection to contractors' baseline goals.

### *Scope-Based Incentives*

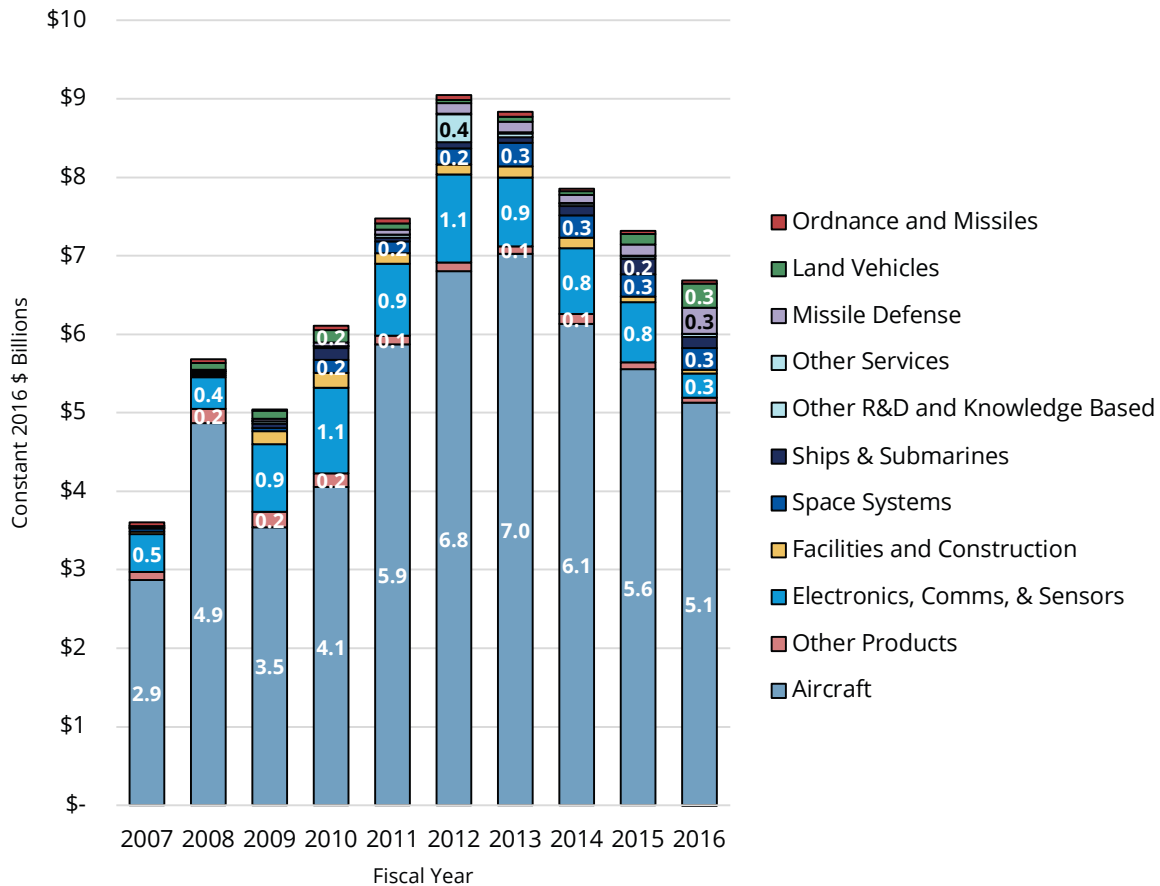
Scope-based incentives capitalize on the contract's scope of work, in that the government can create an incentive mechanism based on reducing or increasing the contract's scope of work. Given a large scope of work, PBL vendors have more control over the entire logistics process of the given weapon system, and consequently, they have more opportunity to increase efficiency and earn a return on investment. A contract with a greater scope has the potential to reduce costs while simultaneously increasing profits for the contractor and increasing efficiency for DoD. One challenge associated with scope-based incentives revolves around competition. Expanding the scope of a contract to increase scope-based incentives decreases the opportunities for other commercial vendors who might be more efficient at procuring a sub-system of the main platform of interest. Another challenge confronting scope-based incentives is that of statutory maintenance regulations that require, for instance, the Air Force to have 50 percent of all maintenance work performed by government depots. This could be problematic if the Air Force decides to increase the scope for an agreement that had positive performance, because it could clash heads with meeting their statutory maintenance regulations. As a result, the process of moving work out of a government depot might be cumbersome in practice and could generate opposition in Congress.

### **DOD PBL TRENDS: 2000-2017**

#### *What Does DoD Use PBL Contracts For?*

Figure 4-13 shows DoD PBL contracts by platform portfolio. The Aircraft platform portfolio has been the dominant user of PBL contracting over the 2000–2016 period. Aircraft accounted for over 89 percent of DoD PBL contract obligations from 2000–2007 and have accounted for 76 percent of DoD contracts since 2007. Within the Aircraft platform portfolio, PBL usage began to increase in FY 2011 and spiked in FY 2012 and FY 2013. This increase was heavily driven by the growth of the C-17A PBL program. The decline since 2013 is distributed across platform portfolios and co-exists with various PBL programs experiencing reduced contract obligations.

Figure 4-13 | Defense PBL Contract Obligations by Platform Portfolio, 2007-2016



Source: FPDS; CSIS analysis.

The second largest platform portfolio source of DoD PBL contract obligations is Electronics, Comms & Sensors, accounting for 12 percent of overall DoD PBL contract obligations since 2007. However, EC&S contract obligations declined by 40 percent between FY 2015 and FY 2016, leading to EC&S accounting for less than 10 percent of overall DoD PBL contract obligations in a FY for the first time since 2008.

Meanwhile, the Land Vehicles platform portfolio only accounted for just over 2 percent of DoD PBL contract obligations in a single FY (3 percent in 2010) during the 2000-2015 period but increased to 5 percent in 2016. Space Systems never accounted for more than 1 percent until 2010 but has accounted for 3 percent of total DoD PBL contract obligations since.

Interestingly, there have been very few contract obligations for Ships & Submarines, with total PBL contract obligations of just above \$50 million

over the entire FY 2000 – FY 2016 period. While the maintenance and repair requirements for ships and submarines, particularly the nuclear fleet, differ greatly from those of most other platforms in DoD’s inventory, it is nonetheless surprising to see that virtually no PBL work has been tried, even for smaller surface ships or shipboard systems. Interviews conducted by the CSIS team with an international government official did find a ship performance-based contracting success story using similar approaches to what is applied in other sectors. In that example, the program was a “dreadful support environment, 500 days over, maintenance dockings, etc.” After the introduction of a performance-based contract, culture, and relationship, the performance “started to hum.” This particular case is an example of when PBL contracting improved the system by ameliorating the support network and improving program performance.

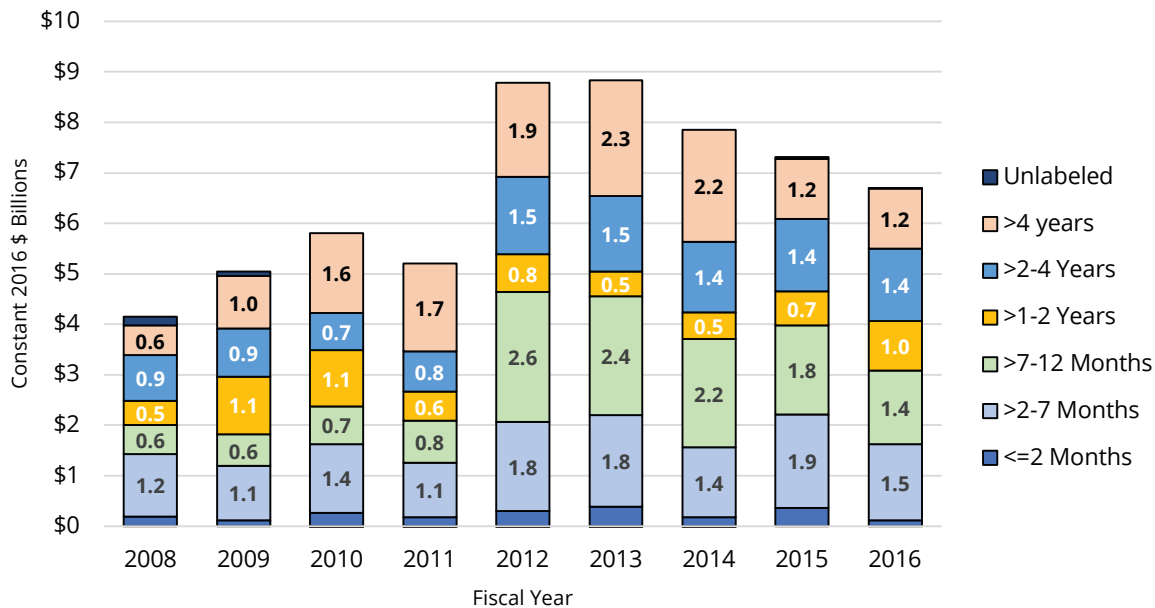
#### *Time-Based Incentives in DoD PBLs*

This section examines trends associated with the time-based incentive mechanism that is commonly associated with PBL contracts, as measured by contract duration. The main advantage of time-based incentives for PBL vendors is reduction of uncertainty in future work, which fosters substantial and adequate investment in R&D, equipment, and process improvements. If PBL vendors are contracted for a period of five or more years, initial investments are more likely to yield higher profits at the end of the contract.<sup>189</sup> If there is no guarantee that the PBL vendor will have enough time to achieve a decent return on invested capital, then the PBL vendor faces uncertainty in justifying heavy investments. Figure 4-14 displays DoD PBL contract obligations by initial maximum duration for the timeline from FY 2000 to FY 2016.

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189. Andrew Hunter et al., *Performance-Based Logistics: A Process Analysis for the Defense Logistics Agency* (Washington, DC: Center for Strategic and International Studies, July 2015), [https://csis-prod.s3.amazonaws.com/s3fs-public/legacy\\_files/files/publication/151014\\_Performance-Based\\_Logistics.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/151014_Performance-Based_Logistics.pdf).

Figure 4-14 | Defense PBL Contract Obligations by Initial Maximum Duration, 2000-2016



Source: FPDS; CSIS analysis

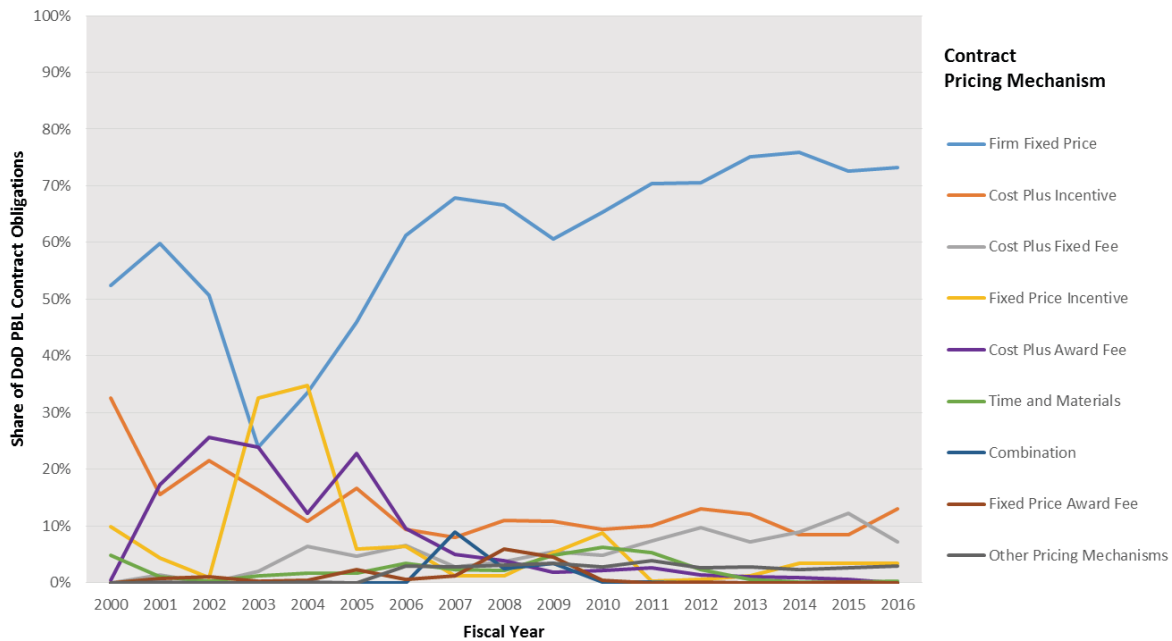
Figure 4-14 shows that PBLs greater than two years have declined since FY 2014. Since 2012, PBL contracts for a duration of greater than 7-12 months but less than one year have taken a large share of all PBL contract obligations. Additionally, PBL contracts for a duration of 2-7 months have taken a large share of all PBL contract obligations since FY 2012. These trends are surprising given findings from a recent CSIS study that interviewed an array of government and industry officials experienced in PBL contracting. Generally, their views support contract length as a critical incentive in PBL contracting.<sup>190</sup> However, they also argued that longer contracts were the most underused incentive for DoD PBLs, which is consistent with the trends in Figure 4-14.

#### Financial-Based Incentives

Trends associated with financial-based incentives are displayed in Figure 4-15. A majority of DoD PBL contracts are structured as fixed-price during every single year from FY 2000 to FY 2016. The vast majority of DoD PBL contracts are specifically structured as firm-fixed-price contracts, which follows generally accepted best practices for PBL contracting.

190. Ibid.

Figure 4-15 | Defense PBL Contract Obligations by Contract Pricing Mechanism, 2000-2016



Source: FPDS; CSIS analysis

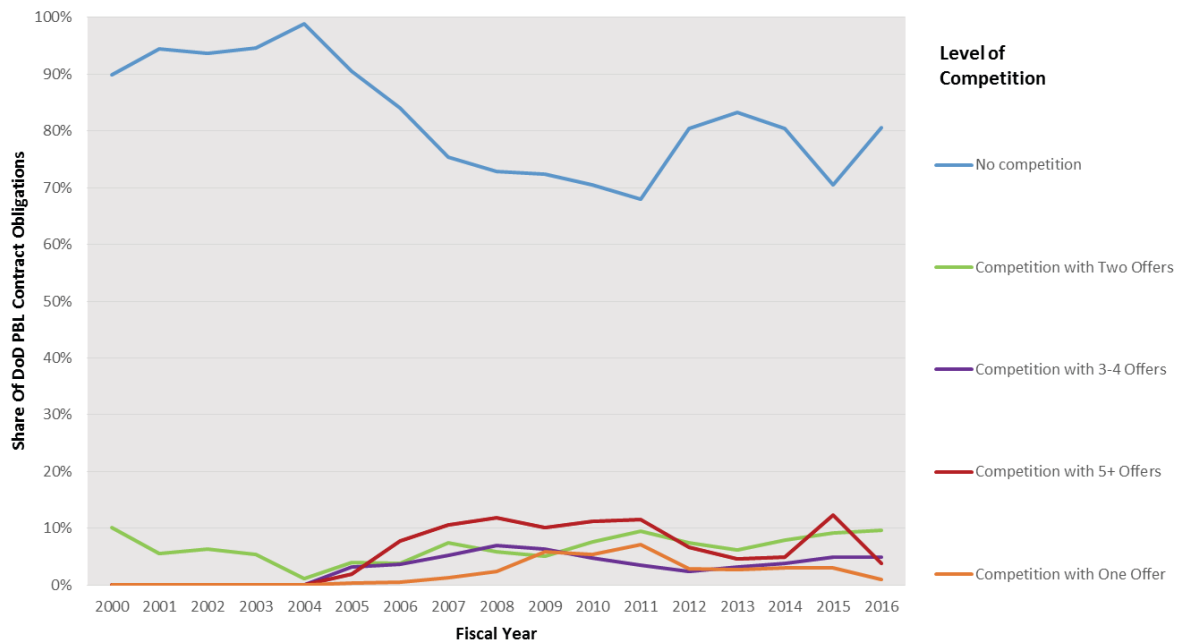
Since FY 2000, 68 percent of DoD PBL contract obligations have been awarded under firm-fixed-price contracts. Fixed-price incentive contracts briefly dominated PBL contracting obligations from FY 2003 to FY 2004; however, that trend quickly disappeared, and the use of fixed-price incentive contracts remained relatively low during this time period (similar to the other contract pricing mechanisms). Cost-plus incentive contracts generally remain a bit higher than the other pricing mechanisms, and then both firm-fixed price and cost-plus fixed fee contracts rise a bit higher towards the end of the period as well.

#### *Level of Competition in PBL Contracting*

One of the inherent challenges of the defense PBL market segment is that competition is often not available. While about half of overall DoD contract dollars in recent years have been awarded after effective completion, DoD PBL contracts are far less competitive, as can be seen in Figure 4-16:



Figure 4-16 | Level of Competition for Defense PBL Contract Obligations, 2000-2016



Source: FPDS; CSIS analysis

For the 2000–2016 period, 78 percent of DoD PBL contract obligations have been awarded without competition. This is not surprising, since most PBLs for platforms and systems go to the original manufacturer for several reasons, including:

- Most Original Equipment Manufacturers (OEM) retain the technical data rights to their platforms and systems, without which it is impossible for another vendor to perform the functions under a PBL contract.<sup>191</sup>
- OEMs have supply chains already developed, whereas anyone competing to take over a PBL contract would have to build a new supply chain from scratch.
- OEMs frequently provide initial contractor support and then enjoy advantages as an incumbent that are common to many types of contracts.

Nonetheless, there has been a significant increase in the share of PBL contract obligations awarded after effective competition since the early 2000s. While only 1 percent of PBL contract obligations were awarded after effective competition in 2004, that share rose to between 23 percent

191. This can be true even in cases where the original manufacturer might be willing to sell those data rights, the cost is likely to be more than DoD is willing to pay.

and 25 percent between 2007 and 2011, with the largest portion made up of competitions receiving five or more offers. That share has declined in recent years, remaining in the mid-to-high teens, but nonetheless remains notably higher than in the early 2000s.

FY 2017 continued the now five-year trend in decreasing use of PBL contracting mechanisms. Aircraft maintains its significant share of PBL contracts by platform portfolio. The various lengths for initial maximum duration have remained at about the same distribution as previous years, despite the decrease in DoD's use of PBL contracts overall. Furthermore, the PBL contracting environment continues to favor non-competed contracts, although PBL contracts can work effectively under competition.<sup>192</sup> DoD should evaluate the PBL contracting environment to identify why the use of PBL contracting has decreased and how it can improve effective competition for such contracts.

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192. Hunter et al., *Use of Incentives in Performance-Based Logistics Contracting* (Washington DC: Center for Strategic and International Studies, 2018).

## From Whom Is DoD Buying?

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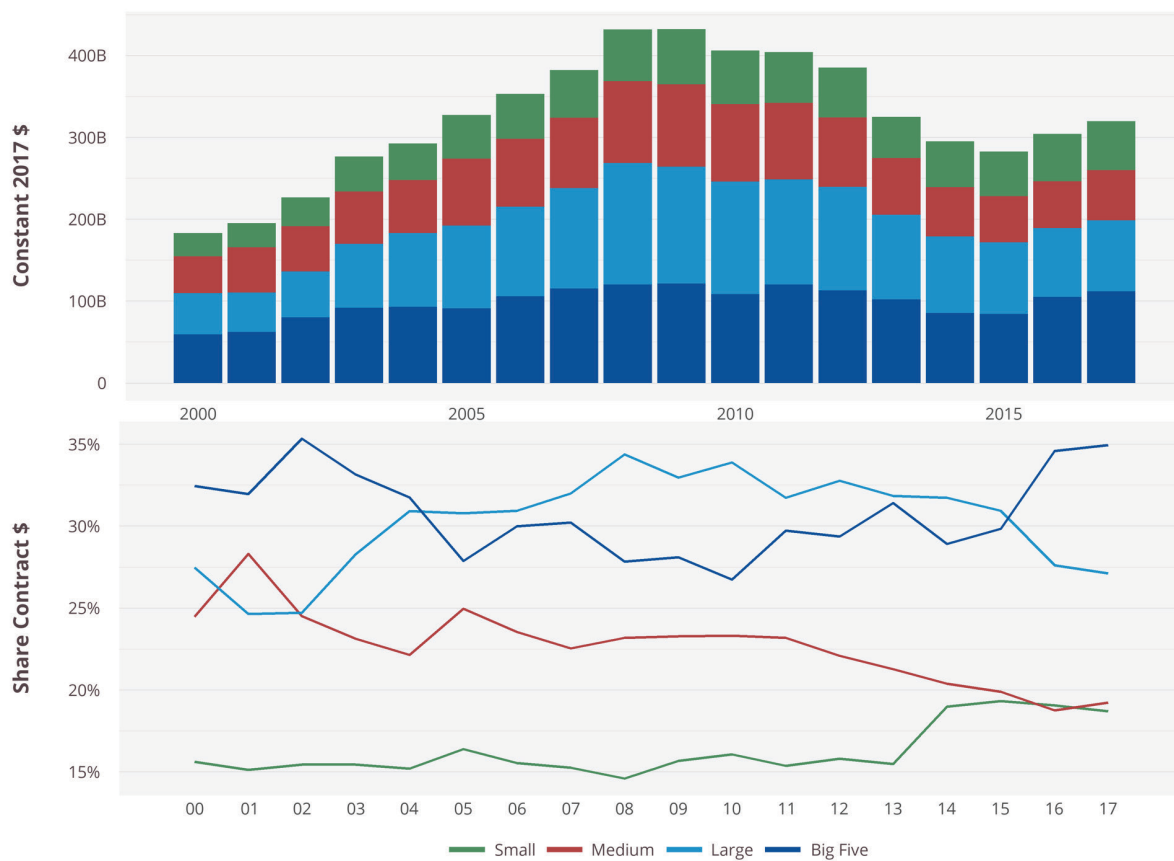
**Given DoD's dependence on industry** to develop and manufacture weapon systems and deliver services and supplies, it is of great importance to understand the composition of the defense industrial base. Moreover, industry has taken on increasing importance in both providing the logistical capabilities the military relies upon and performing the research and development that delivers new military capabilities, giving DoD even stronger grounds to understand trends in the defense industrial base. Defense contract obligations declined starting in FY 2009 as a result of sequestration and the broader defense drawdown, but DoD contract obligations reversed course and increased in FY 2016. Accordingly, it is an opportune time for DoD to evaluate how competition within the industrial base responds to this change in the direction of contract expenditures.

This chapter analyzes the impact that the recent defending contracting rebound has on the vendors that comprise the defense industrial base. The first section measures the changes in the composition of the defense industrial base by looking at the share of contract obligations going to different size categories of vendors. The second section examines which vendors comprise the top overall defense vendors and the top vendors in the products, services, and R&D sectors as ranked by contract obligations and also examines what this information can tell us about industrial base consolidation. The third section looks at the trends in the number of vendors in the different platform portfolios. The final section looks at specific industrial base issues and concerns that are related to domestic sourcing policies and foreign sourcing through defense trade.

## 5.1 | Changes in the Composition of the Defense Industrial Base

With respect to the private-sector vendors from whom DoD buys, the following figures and charts show contract obligations, by dollars and by share, allocated among Small, Medium, Large and the Big Five vendors that are operating in the defense industrial base. For the methodology of how CSIS categorizes companies as Small, Medium, Large, and the Big Five, see section A 1.5: Vendor Categorization.

Figure 5-1 | Defense Contract Obligations by Size of Vendor, 2000-2017



Source: FPDS; CSIS analysis

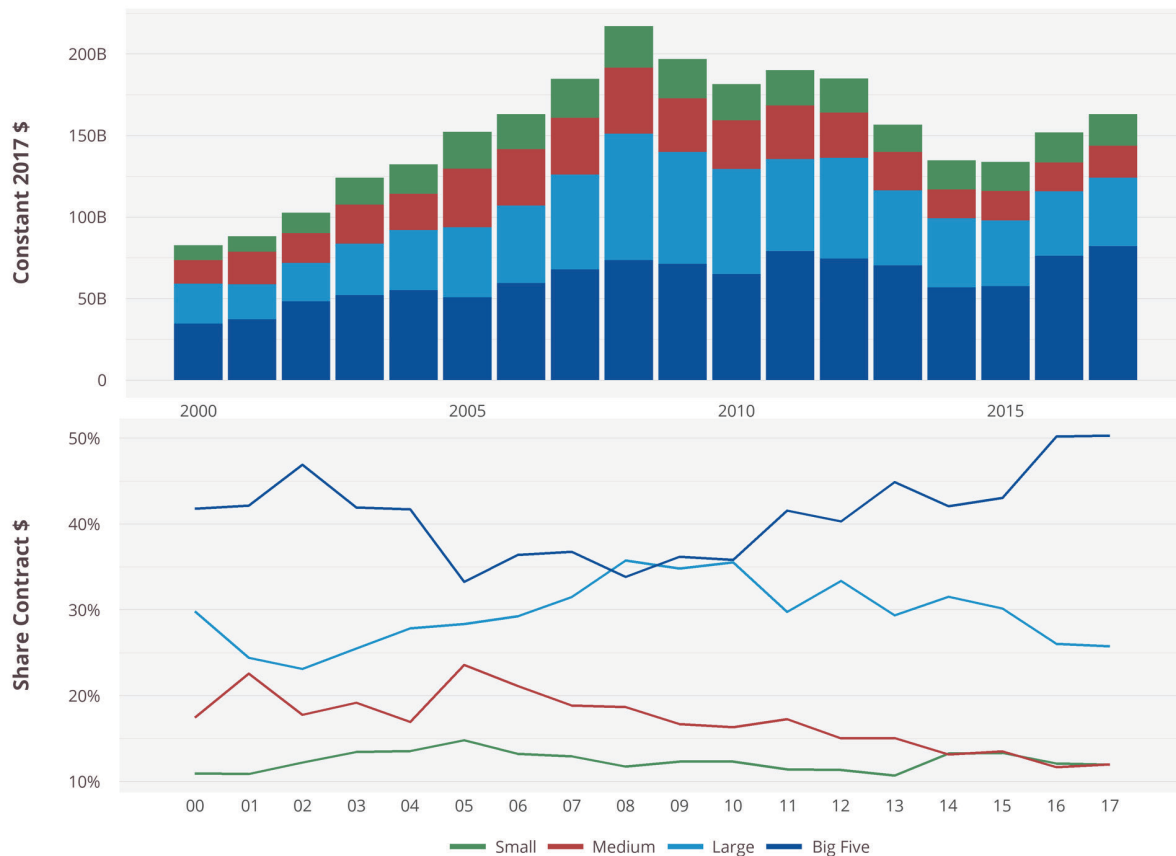
Figure 5-1 shows total DoD obligations for Small, Medium, Large, and Big Five vendors since FY 2000. All four categories have seen an increase in total contract obligations between FY 2015 and FY 2017 except for Large vendors. Big Five vendors saw the largest increase (33 percent) in total contract obligations, while Medium (9 percent) and Small vendors' (10 percent) contract obligations increased slightly less. Big Five vendors are the only category that increased their share of total DoD contract obligations,

going from 30 percent in FY 2015 to 35 percent in both FY 2016 and FY 2017. Conversely, both Small and Medium vendors remained steady as a share of total DoD contract obligations, while Large vendors declined. These trends suggest that the bounce back from the floor of budget decline has largely benefitted the Big Five vendors.

The defense contracting rebound has largely benefited the Big Five, but Small and Medium vendors have also benefited, while Large vendors fared the worst.

#### PRODUCTS: BIG FIVE DOMINATE DESPITE GROWTH AMONGST ALL

Figure 5-2 | Defense Products Contract Obligations by Size of Vendor, 2000-2017



Source: FPDS; CSIS analysis

The share of overall DoD contract obligations for products by vendor size is displayed in Figure 5-2 above. Contract obligations for each of the four defense vendor size categories increased between FY 2015 and FY 2017, but Large, Medium, and Small vendors all grew at rates below the rate of topline growth in defense products. The Big Five experienced the largest growth in

defense products contract obligations, increasing from \$56.7 billion in FY 2015 to \$82.1 billion in FY 2017, a 43 percent increase. Medium and Small vendor contract obligations grew at nearly equivalent rates, increasing 8 percent and 9 percent respectively. Finally, Large vendor contract obligations increased the least of all four categories, only increasing 4 percent over the past two years.

“The defense contracting rebound has largely benefited the Big Five, but Small and Medium vendors have also benefited, while Large vendors fared the worst.

Even though Large, Medium, and Small vendors' contract obligations increased between FY 2015 and FY 2017, each still lost defense products market share to the Big Five. The Big Five already had the largest share of defense products contract obligations prior to their recent gains, but they further solidified their command of this market between FY 2015 and FY 2017, going from a 43 percent

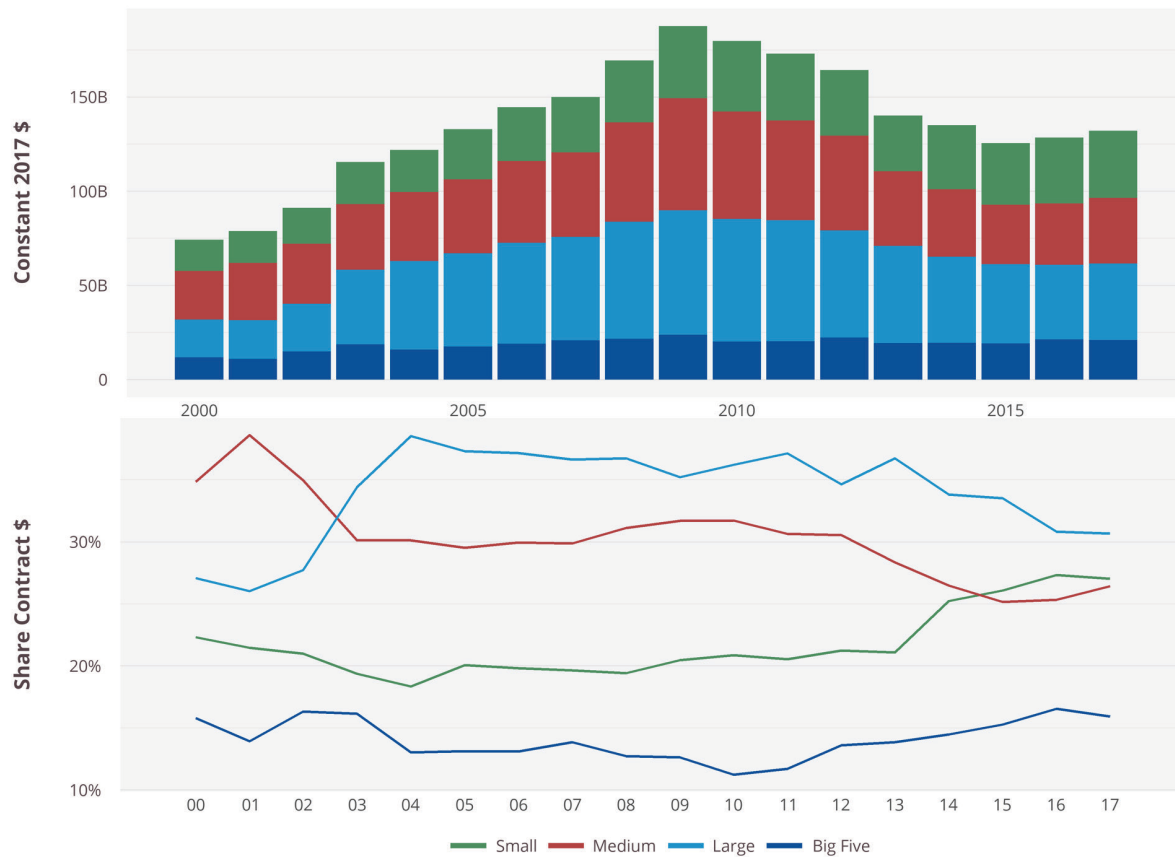
share in FY 2015 to 50 percent in each of the past two years. Large vendors experienced the greatest decline in market share, falling from 30 percent in FY 2015 to 26 percent in FY 2017. Medium vendors' share of defense products contract obligations went from 14 percent in FY 2015 to 12 percent in FY 2017. Finally, Small vendors' market share loss was minimal, only going from 13 percent in FY 2015 to 12 percent in FY 2017.

#### **SERVICES: LARGE VENDORS CONTINUE DECLINE EVEN AS SERVICES MARKET REBOUNDS**

As discussed in Chapter 3: What is DoD Buying, the trends in the composition of the defense services industrial base were a continuation of previous trends. Both the Big Five (10 percent) and Medium vendors (11 percent) grew at rates that were over twice the rate of the overall growth in services contract obligations (5 percent). Small vendors did not lag too far behind the Big Five and Medium vendors, increasing 9 percent between FY 2015 and FY 2017. Finally, Large vendors declined 4 percent between FY 2015 and FY 2017 but did see a more positive trend in FY 2017 compared to FY 2016. In FY 2016, Large vendors' contract obligations declined 6 percent, but in FY 2017 they increased 2 percent. It remains to be seen whether this is the start of a positive trend for Large vendors in the services sector.

Figure 5-3 shows defense services contract obligations by size of vendor from FY 2000 to FY 2017.

Figure 5-3 | Defense Services Contract Obligations by Size of Vendor, 2000-2017



Source: FPDS; CSIS analysis

### RESEARCH AND DEVELOPMENT: BIG FIVE AND SMALL VENDORS GROW AT TWICE THE OVERALL RATE

There have been several notable shifts in the composition of the R&D industrial base in recent years, particularly in FY 2017.

During sequestration and the defense drawdown, the Big Five took the brunt of the cuts in R&D contract obligations, falling from a 56 percent market share in FY 2009 to 33 percent in FY 2015. Over the past two years—and in particular in FY 2017—the Big Five have seen a modest revival in their R&D contracting fortunes, but nowhere near their prior dominance. Big Five defense R&D contract obligations have increased from \$7.6 billion in FY 2015 to \$8.7 billion in FY 2017, a 15 percent increase. In FY 2017, Big Five defense contract obligations increased 12 percent, significantly higher than the 2 percent increase the previous year. As a share of defense R&D contract obligations, the Big Five have risen from 33 percent in FY 2015 to 35 percent in FY 2017.



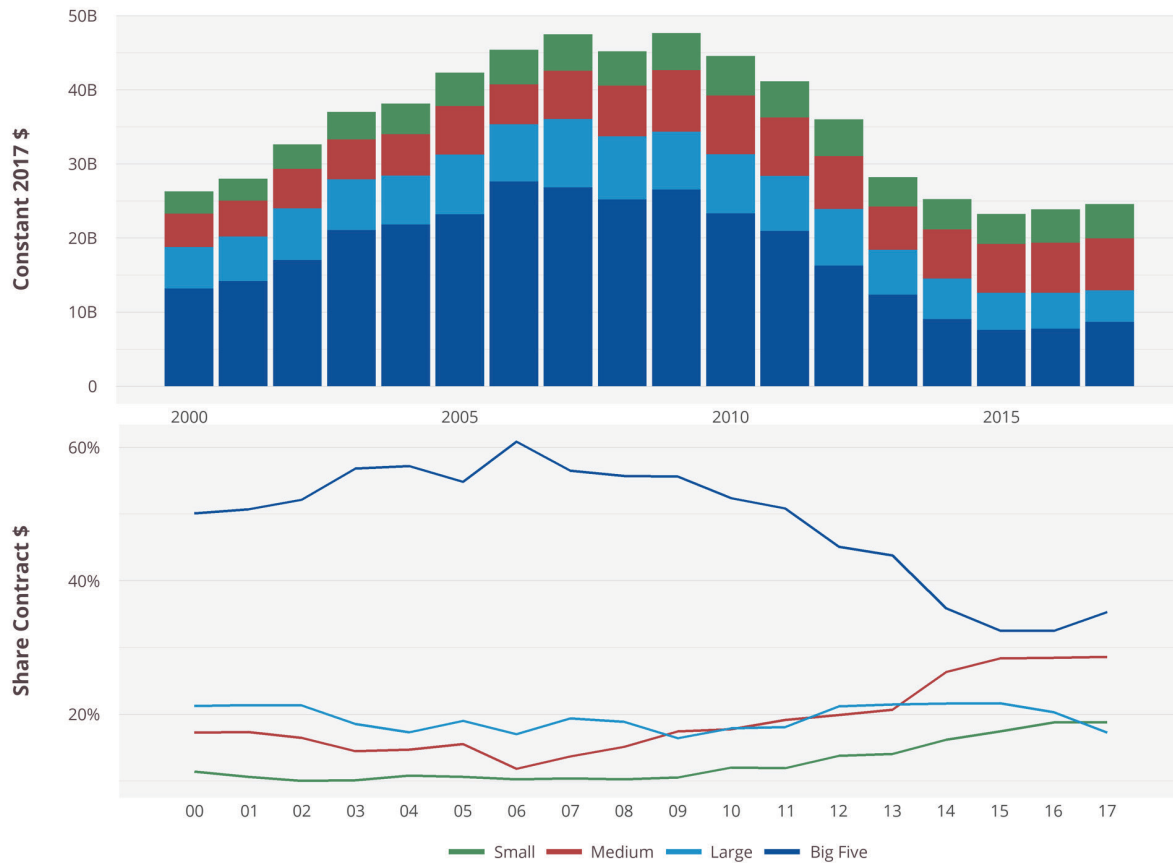
Small vendors have fared nearly as well as the Big Five in recent years, seeing a 14 percent increase in defense R&D contract obligations between FY 2015 and FY 2017, over twice the rate of the total growth in R&D contracting. Small vendors accounted for 19 percent of defense R&D contract obligations in FY 2017, an increase from their 17 percent market share in FY 2015.

Although Medium vendors in the defense R&D industrial base came out relatively unscathed from sequestration and the drawdown, experiencing just an 11 percent decline in defense R&D contract obligations from FY 2010 to FY 2015 (compared to the 45 percent decline in total defense R&D contract obligations), it was unknown what would happen to them once defense R&D contracting rebounded. Since defense contracting starting to rebound in FY 2015, Medium vendors have not seen as much relative success as they did during sequestration and the drawdown but have seen an increase in R&D contract obligations (7 percent) in-line with the overall growth in defense R&D contracting (6 percent) between FY 2015 and FY 2017. As a share of defense R&D contract obligations, Medium vendors rose from 28 percent in FY 2015 to 29 percent in FY 2017.

Between FY 2010 and FY 2015, Large vendors (-47 percent) declined at rate relatively equivalent to the total decline defense R&D contract obligations (-45 percent) but have not seen the same reversal in fortunes in recent years as defense R&D contracting has rebounded. Between FY 2015 and FY 2017 Large vendors' defense R&D contract obligations have declined 16 percent as overall defense R&D contracting grew. As Large vendors' R&D contract obligations have declined, their market share has fallen from 22 percent in FY 2015 to 17 percent in FY 2017.

Figure 5-4 shows defense R&D contract obligations by size of vendor from FY 2000 to FY 2017.

Figure 5-4 | Defense R&D Contract Obligations by Size of Vendor, 2000-2017



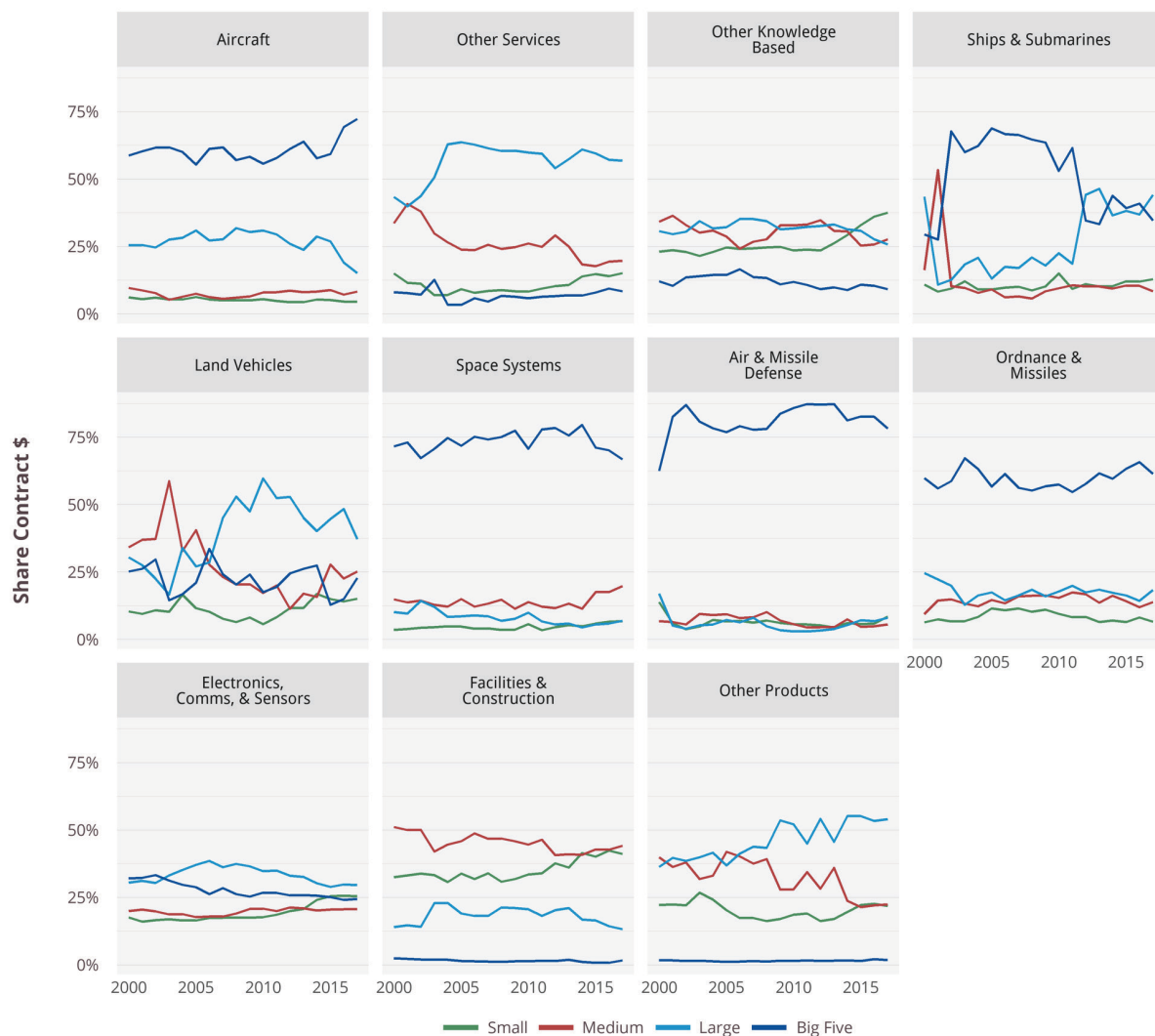
Source: FPDS; CSIS analysis

## 5.2 | Platform Portfolio by Vendor Size

Looking at the composition of the defense industrial base by platform portfolio shows that the trends differ in the various sectors of the industrial base. Some platform portfolios, like Electronics, Comms, & Sensors, saw minimal changes in recent years. Whereas some platform portfolios, such as Ordnance and Missiles and Air and Missile Defense, saw modest changes. Finally, there were more significant changes in the Aircraft, Land Vehicles, Ship & Submarines, and Space Systems platform portfolios. The following sections analyze the trends in the four sectors experiencing the greatest changes between FY 2015 and FY 2017.

Figure 5-5 shows defense contract obligations by platform portfolio by size of vendor from FY 2000 to FY 2017.

Figure 5-5 | Defense Contract Obligations by Platform Portfolio by Size of Vendor, 2000-2017



Source: FPDS; CSIS analysis

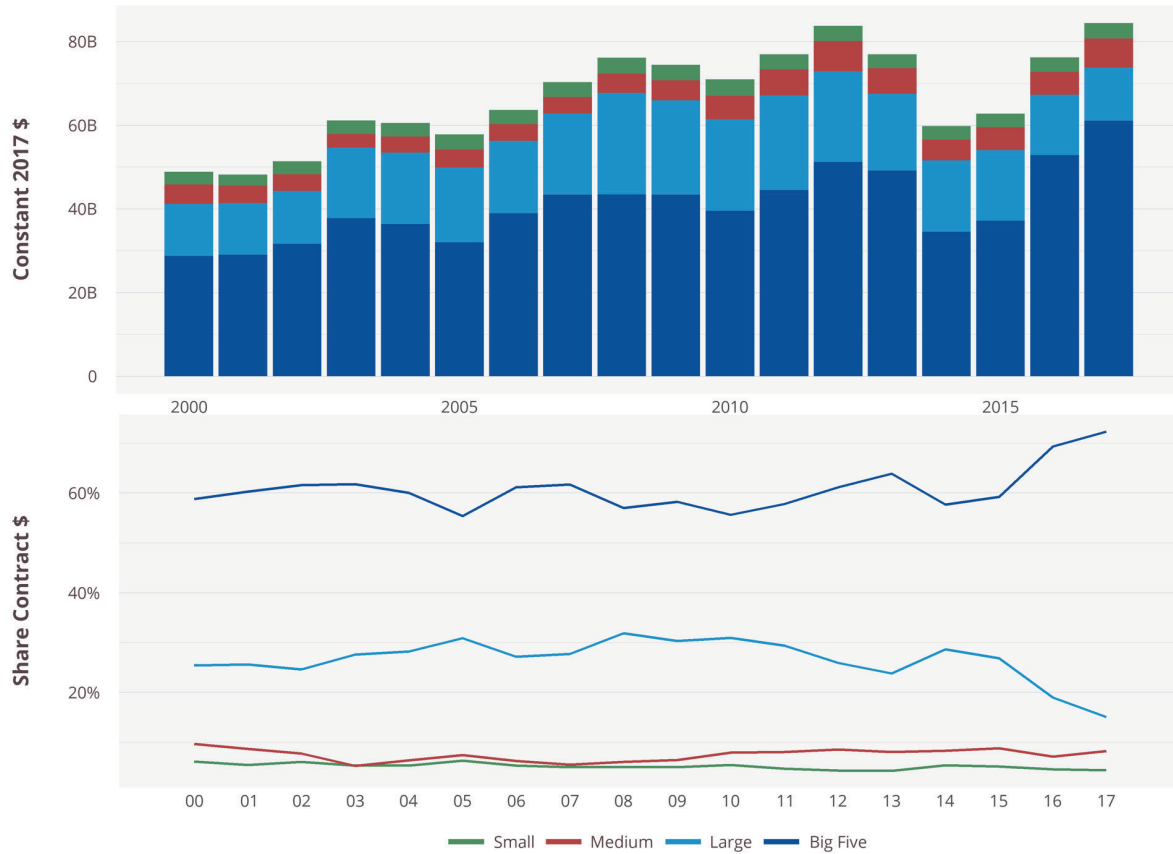
### AIRCRAFT: BIG FIVE PREDOMINANCE

During the defense drawdown, the Big Five grew significantly as a share of Aircraft contract obligations.<sup>193</sup> Between FY 2015 and FY 2017, this trend not only continued, but accelerated. As a share of Aircraft contract obligations, the Big Five rose from 59 percent in FY 2015 to 72 percent in FY 2017. Large vendors were disproportionately affected by the Big Five's rise, falling from 27 percent market share to 15 percent. Comparatively, Small and Medium vendors were largely unaffected, falling just one percent each.

193. McCormick et al., *Measuring the Impact of Sequestration and the Drawdown on the Defense Industrial Base*, 24-25.

Figure 5-6 shows Aircraft contract obligations by platform portfolio by size of vendor from FY 2000 to FY 2017.

Figure 5-6 | Aircraft Contract Obligations by Size of Vendor, 2000-2017



Source: FPDS; CSIS analysis

#### LAND VEHICLES: MEDIUM AND LARGE VENDORS EXPERIENCE GROWTH

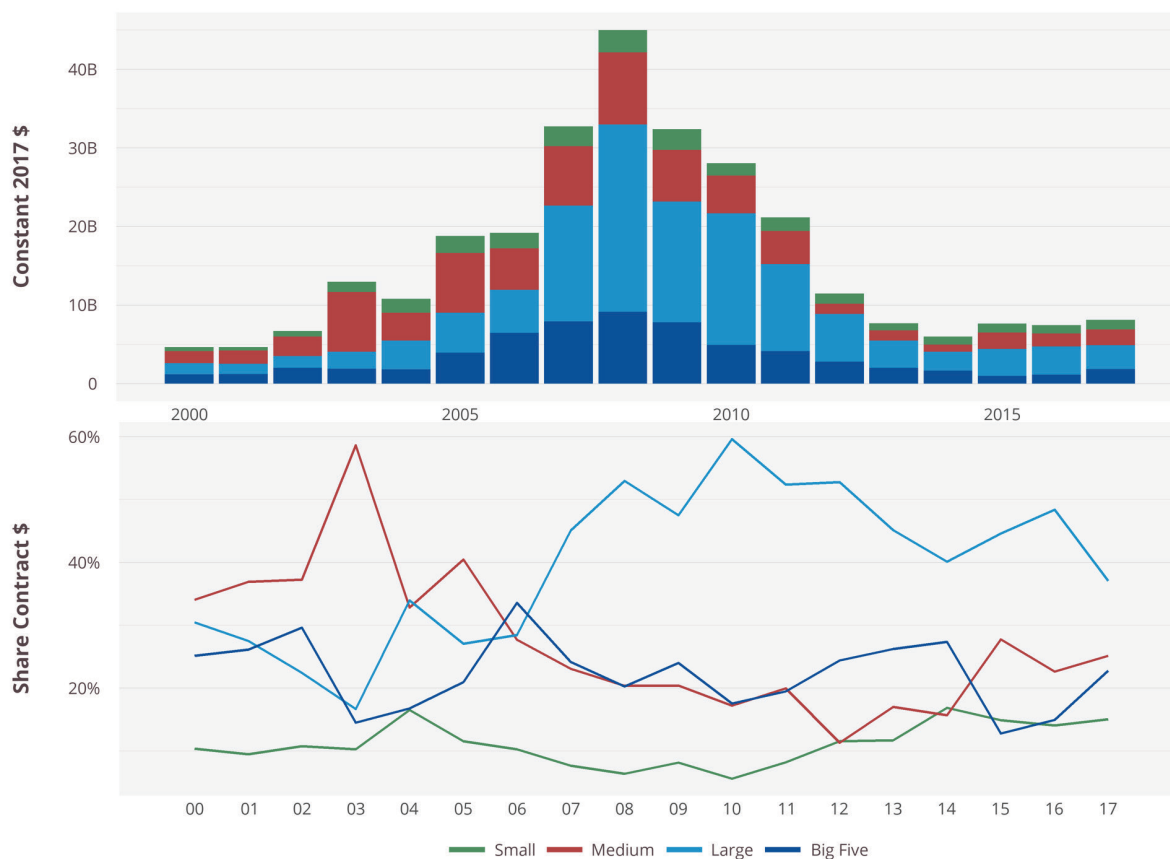
Unlike the Aircraft sector, the Land Vehicles' vendor size trends did not follow the defense drawdown trends. During the defense drawdown, Medium and Large vendors rose as a share of Land Vehicles contract obligations at the expense of the Big Five, who hit historic lows.<sup>194</sup> Between FY 2015 and FY 2017, however, the Big Five's share of the Land Vehicles platform portfolio increased at Large vendors expense. The share of Land Vehicles contract obligations awarded to the Big Five rose from 12.6 percent to 22.4 percent, while Large vendors fell from 44.5 percent to 36.7 percent.

194. Ibid., 31-32.

The Big Five’s sharp rise and Large vendor’s fall is the result of the 89 percent increase in Big Five Land Vehicles contract obligations and the 12 percent decrease in Large vendors contract obligations.

Figure 5-7 shows Land Vehicles contract obligations by platform portfolio by size of vendor from FY 2000 to FY 2017.

Figure 5-7 | Land Vehicles Contract Obligations by Size of Vendor, 2000-2017



Source: FPDS; CSIS analysis

#### SPACE SYSTEMS: BIG FIVE DIP TO LARGE AND MEDIUM’S BENEFIT

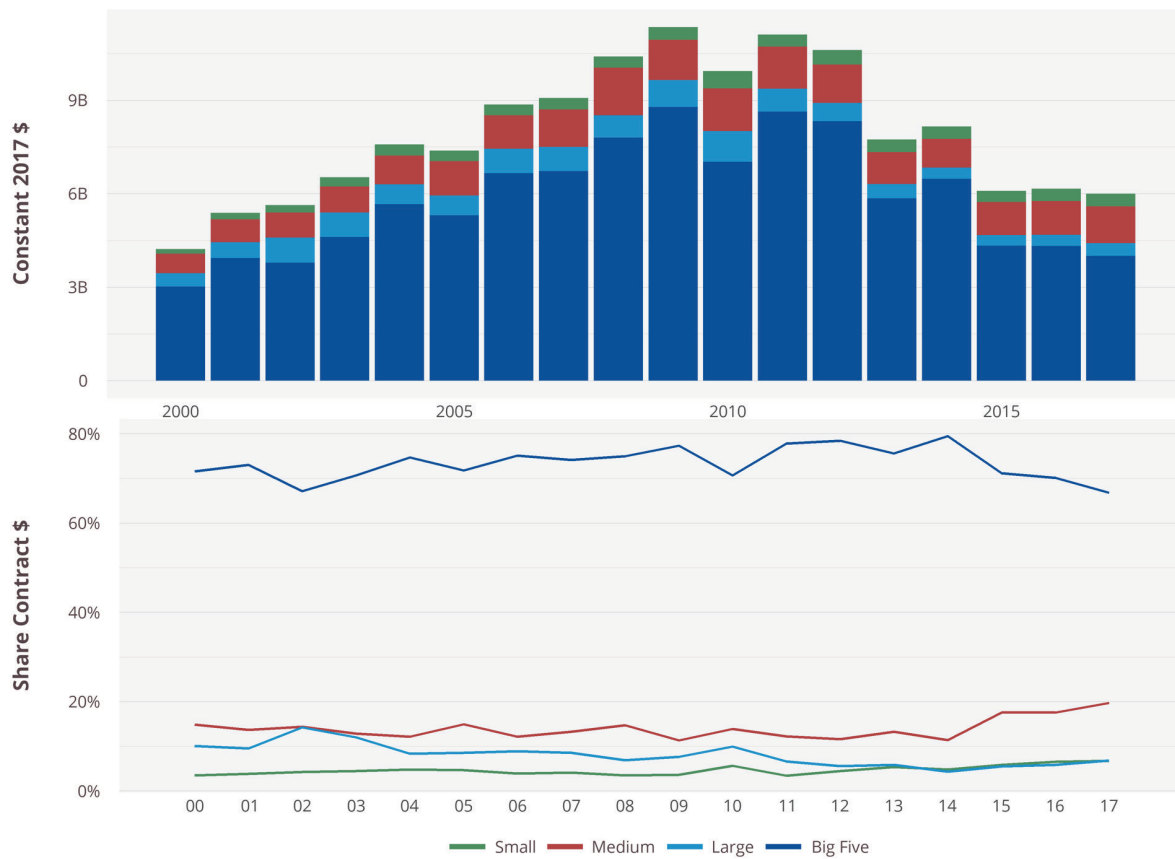
The Big Five declined as a share of defense Space Systems contract obligations between FY 2015 and FY 2017, a continuation of an ongoing trend since the tail end of the defense drawdown—a trend in sharp contrast to most other sectors.<sup>195</sup> In FY 2015, the Big Five accounted for 70.8 percent of overall defense Space Systems contract obligations but fell to 66.5 percent in FY

195. Ibid., 50-52.

2017. The Big Five’s declines were offset by modest increases for Large and Medium sized vendors. Large vendors rose from a 5.9 percent market share in FY 2015 to 7.2 percent in FY 2017, while Medium vendors rose from 17.5 percent to 19.6 percent. Small vendors also increased slightly between FY 2015 and FY 2017, rising from 5.8 percent to 6.7 percent.

Figure 5–8 shows Space Systems contract obligations by platform portfolio by size of vendor from FY 2000 to FY 2017.

Figure 5–8 | Space Systems Contract Obligations by Size of Vendor, 2000–2017



Source: FPDS; CSIS analysis

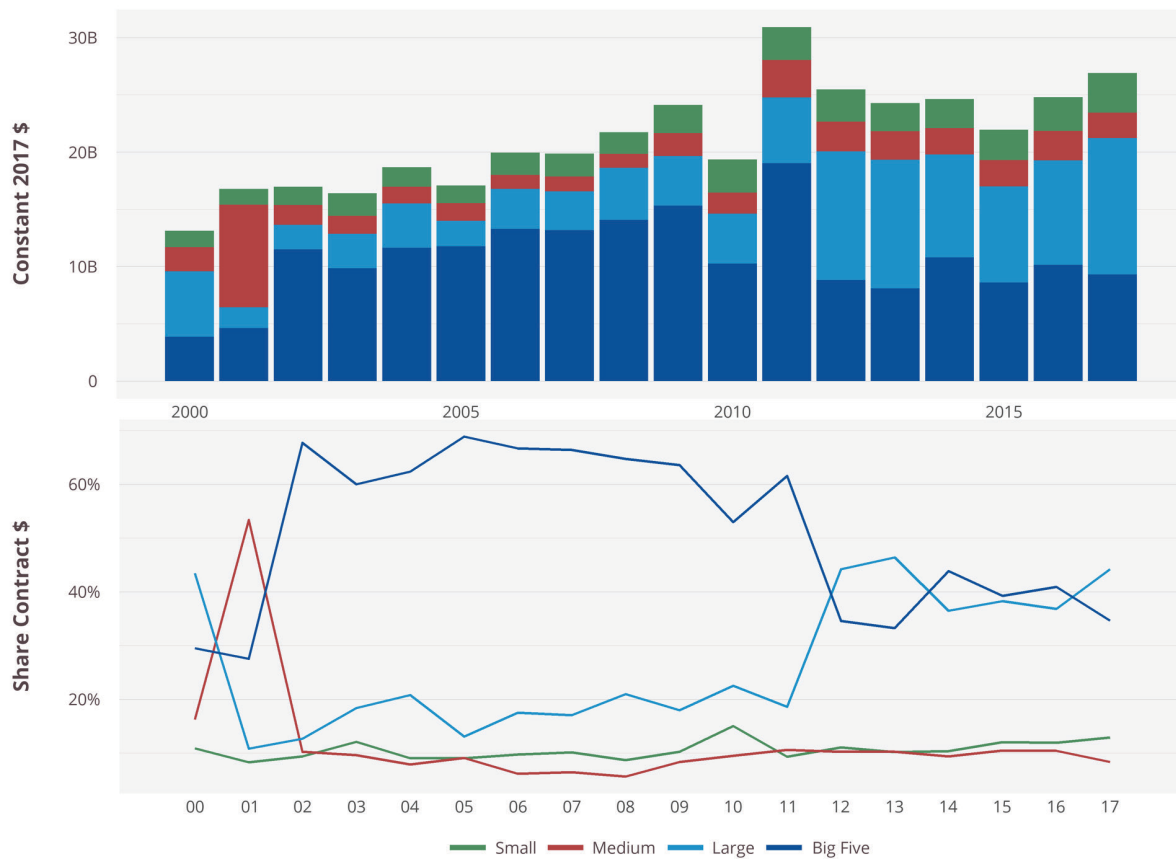
### SHIPS & SUBMARINES: LARGE CONTINUES GROWTH THANKS TO HII

Large vendors have grown as a share of Ships & Submarines contract obligations in recent years at the expense of the Big Five. Large vendors have gone from a 38 percent market share in FY 2015 to 43.9 percent in FY 2017, while the Big Five have fallen from a 38.9 percent market share to 34.4 percent. The decline in the share of Ships & Submarines contract

obligations that are awarded to the Big Five isn't too surprising as we get further away from Northrop's decision to spin-off its shipbuilding assets to create Huntington Ingalls Industries. Of note, Small vendors retained the minor increase in market share they gained at the start of the defense contracting rebound.<sup>196</sup>

Figure 5-9 shows Ships & Submarines contract obligations by platform portfolio by size of vendor from FY 2000 to FY 2017.

Figure 5-9 | Ships & Submarines Contract Obligations by Size of Vendor, 2000-2017



Source: FPDS; CSIS analysis

### 5.3 | The Present and Future Consolidation of the Defense Industry

To further investigate trends in the defense-industrial base, CSIS examines contract obligations for the top 20 vendors. Additionally, this report breaks

196. Ibid., 38-39.



these ranks over obligations specifically for products, services and R&D spending. Table 5-1 reports total DoD obligations contracted through the top 20 vendors for FY 2015, the last year of sequestration and the defense drawdown, and FY 2017.

Table 5-1 | Top 20 Defense Vendors, 2015 and 2017

	Top 20 Vendors in FY 2015	Obligations in 2017 Millions	Top 20 Vendors in FY 2017	Obligations in 2017 Millions
1	Lockheed Martin	\$ 30,191	Lockheed Martin	\$ 48,236
2	Boeing	\$ 14,890	Boeing	\$ 21,021
3	Raytheon	\$ 12,320	General Dynamics	\$ 13,794
4	General Dynamics	\$ 11,919	Raytheon	\$ 13,585
5	Northrop Grumman	\$ 9,939	Northrop Grumman	\$ 10,106
	<b>Top 5 Total</b>	<b>\$ 79,261</b>	<b>Top 5 Total</b>	<b>\$ 106,742</b>
6	UTC	\$ 7,051	Huntington Ingalls	\$ 6,456
7	L3 Communications	\$ 5,293	BAE Systems	\$ 5,896
8	BAE Systems	\$ 4,876	L3 Communications	\$ 4,851
9	Humana	\$ 3,663	Humana	\$ 3,645
10	Bechtel	\$ 3,070	Bechtel	\$ 3,576
11	Huntington Ingalls	\$ 2,982	Health Net	\$ 2,900
12	Health Net	\$ 2,851	UnitedHealth Group	\$ 2,897
13	SAIC	\$ 2,591	McKesson	\$ 2,840
14	UnitedHealth Group	\$ 2,583	SAIC	\$ 2,613
15	General Atomics	\$ 2,375	General Atomics	\$ 2,563
16	McKesson	\$ 2,219	Bell Boeing Joint Project Office*	\$ 2,510
17	Bell Boeing Joint Project Office*	\$ 2,128	UTC	\$ 2,409
18	Amerisourcebergen	\$ 1,908	General Electric	\$ 2,226
19	Booz Allen Hamilton	\$ 1,851	Amerisourcebergen	\$ 2,218
20	United Launch Alliance*	\$ 1,777	Booz Allen Hamilton	\$ 2,066
	<b>Top 20 Total</b>	<b>\$ 126,477</b>	<b>Top 20 Total</b>	<b>\$ 156,408</b>
	<b>Overall DoD Total</b>	<b>\$ 282,493</b>	<b>Overall DoD Total</b>	<b>\$ 319,789</b>

Source: FPDS; CSIS analysis (\*-Joint Venture)

The top 5 defense vendors remained the same between FY 2015 and FY 2017, but in FY 2017 General Dynamics swapped places with Raytheon for the third and fourth spot respectively.

Outside of the top 5, the composition of the top 20 defense vendors remained consistent between FY 2015 and FY 2017 except for General Electric replacing United Launch Alliance (ULA). In FY 2015, General Electric ranked 22nd, but they rose to 19th in FY 2017. ULA fell from 20th in FY 2015 to just outside the top 20 in FY 2017, ranking 21st. Huntington Ingalls Incorporated (HII)

rose from 11th in FY 2015 to sixth in FY 2017. After selling Sikorsky to Lockheed Martin, United Technologies Corporation (UTC) fell from sixth in FY 2015 to 17th in FY 2017. Finally, the top 20 defense vendors increased their share of total defense contract obligations from 45 percent in FY 2015 to 49 percent in FY 2017.

#### TOP PRODUCTS VENDORS: MARKET BECOMING INCREASINGLY CONCENTRATED

Defense products contract obligations increased 43 percent between FY 2015 and FY 2017, resulting in only a little change in the rankings of top 20 defense vendors by contract obligations, but causing a substantial increase in market concentration. Table 5-2 shows the top 20 defense products vendors ranked by contract obligations in FY 2015 and FY 2017.

Table 5-2 | Top 20 Defense Products Vendors, 2015 and 2017

	Top 20 Vendors in FY 2015	Obligations in 2017 Millions	Top 20 Vendors in FY 2017	Obligations in 2017 Millions
1	Lockheed Martin	\$ 22,042	Lockheed Martin	\$ 40,035
2	Boeing	\$ 10,721	Boeing	\$ 15,626
3	General Dynamics	\$ 9,289	General Dynamics	\$ 10,362
4	Raytheon	\$ 8,432	Raytheon	\$ 8,326
5	UTC	\$ 5,415	Huntington Ingalls	\$ 6,173
<b>Top 5 Total</b>		<b>\$ 55,899</b>	<b>Top 5 Total</b>	<b>\$ 80,522</b>
6	Northrop Grumman	\$ 3,996	Northrop Grumman	\$ 4,793
7	Huntington Ingalls	\$ 2,801	BAE Systems	\$ 3,245
8	Bechtel	\$ 2,561	Bechtel	\$ 3,133
9	McKesson	\$ 2,216	McKesson	\$ 2,818
10	BAE Systems	\$ 2,203	Bell Boeing Joint Project Office*	\$ 2,511
11	Bell Boeing Joint Project Office*	\$ 2,127	Amerisourcebergen	\$ 2,218
12	Amerisourcebergen	\$ 1,908	General Electric	\$ 2,007
13	General Atomics	\$ 1,780	Atlantic Diving Supply	\$ 1,557
14	L3 Communications	\$ 1,738	General Atomics	\$ 1,540
15	Textron	\$ 1,469	Oshkosh	\$ 1,507
16	General Electric	\$ 1,267	L3 Communications	\$ 1,505
17	Orbital ATK	\$ 1,215	UTC	\$ 1,472
18	Atlantic Diving Supply	\$ 1,113	Textron	\$ 1,266
19	Oshkosh	\$ 1,050	Orbital ATK	\$ 1,208
20	AM General	\$ 958	Harris	\$ 1,132
<b>Top 20 Total</b>		<b>\$ 84,302</b>	<b>Top 20 Total</b>	<b>\$ 112,434</b>
<b>Products Total</b>		<b>\$ 133,769</b>	<b>Products Total</b>	<b>\$ 163,105</b>

Source: FPDS; CSIS analysis (\*-Joint Venture)

Huntington Ingalls Incorporated replaced UTC as the fifth ranked vendor for DoD products between FY 2015 and FY 2017. Huntington Ingalls had ranked seventh in FY 2015, and UTC ended up falling from fifth to 17th in FY 2017. Otherwise, the composition of the top 5 defense products vendors remained the same between FY 2015 and FY 2017. The data show that as defense products contract obligations increased 22 percent between FY

2015 and FY 2017, and the share going to the top 5 vendors increased from 42 percent to 49 percent.

**The composition of the top 20 defense vendors remained consistent between FY 2015 and FY 2017 except for General Electric replacing United Launch Alliance.**

There was only one change in the composition of the top 20 defense products vendors between FY 2015 and FY 2017. Harris, ranked 25th in FY 2015, replaced AM General as the 20th largest defense products vendor between FY 2015 and FY 2017. Over the past two years, AM

General fell from that 20th position to 25th in FY 2017. Finally, the share of defense products contract obligations awarded to the top 20 vendors rose from 63 percent in FY 2015 to 69 percent in FY 2017, suggesting that that the market for defense products might have become more concentrated, though other circumstances within the industry could be contributing to these figures.

#### **TOP SERVICES VENDORS: BOEING TAKES THE TOP SPOT**

Defense services contract obligations increased 5 percent between FY 2015 and FY 2017, resulting in only minimal changes in the rankings. Table 5-3 shows the top 20 defense services vendors ranked by contract obligations in FY 2015 and FY 2017.

Table 5-3 | Top 20 Defense Services Vendors, 2015 and 2017

	Top 20 Vendors in FY 2015	Obligations in 2017 Millions	Top 20 Vendors in FY 2017	Obligations in 2017 Millions
1	Northrop Grumman	\$ 4,278	Boeing	\$ 4,852
2	Lockheed Martin	\$ 4,258	Lockheed Martin	\$ 4,283
3	Boeing	\$ 3,674	Northrop Grumman	\$ 3,672
4	Humana	\$ 3,663	Humana	\$ 3,644
5	L3 Communications	\$ 3,224	Raytheon	\$ 3,357
<b>Top 5 Total</b>		<b>\$ 19,097</b>	<b>Top 5 Total</b>	<b>\$ 19,808</b>
6	Health Net	\$ 2,851	L3 Communications	\$ 3,099
7	Raytheon	\$ 2,785	Health Net	\$ 2,900
8	UnitedHealth Group	\$ 2,583	UnitedHealth Group	\$ 2,897
9	General Dynamics	\$ 2,306	General Dynamics	\$ 2,830
10	BAE Systems	\$ 2,264	BAE Systems	\$ 2,204
11	SAIC	\$ 1,903	United Launch Alliance*	\$ 1,952
12	United Launch Alliance*	\$ 1,768	SAIC	\$ 1,872
13	Booz Allen Hamilton	\$ 1,326	Booz Allen Hamilton	\$ 1,484
14	DynCorp International	\$ 1,207	DynCorp International	\$ 1,307
15	URS	\$ 1,112	CACI	\$ 1,207
16	CACI	\$ 1,031	URS	\$ 1,205
17	Hewlett Packard	\$ 1,029	Hewlett Packard	\$ 1,043
18	Vectrus	\$ 943	Vectrus	\$ 1,010
19	Fluor	\$ 726	Leidos	\$ 880
20	UTC	\$ 682	General Atomics	\$ 867
<b>Top 20 Total</b>		<b>\$ 43,612</b>	<b>Top 20 Total</b>	<b>\$ 46,565</b>
<b>Services Total</b>		<b>\$ 125,486</b>	<b>Services Total</b>	<b>\$ 132,118</b>

Source: FPDS; CSIS analysis (\*-Joint Venture)

The data show that Northrop Grumman, Boeing, Lockheed Martin, and Humana remained the top four DoD services vendors in between FY 2015 and FY 2017, albeit with Boeing replacing Northrop Grumman as the top DoD services vendors in FY 2017. Rounding out the top 5, in FY 2017, Raytheon replaced L3 Communications as the fifth-largest DoD services vendor. The top 5 vendors accounted for 15 percent of total DoD services in both FY 2015 and FY 2017.

Outside of the top 5, there were only minimal changes in the composition of the top 20 vendors between FY 2015 and FY 2017. Fluor and UTC were the only FY 2015 top 20 vendors to fall out of the top 20 services vendors in FY 2017. UTC falling out of the top 20 is not surprising given its November 2015 sale of its subsidiary, Sikorsky Aircraft to Lockheed Martin. Meanwhile, Fluor fell from 19th in FY 2015 to 24th in FY 2017. UTC and Fluor were

replaced by Leidos and General Atomics at 19th and 20th place respectively. Finally, the top 20 vendors accounted for 35 percent of total DoD services in both FY 2015 and FY 2017.

#### TOP R&D VENDORS: MINIMAL CHANGES IN COMPOSITION OF THE TOP 20

Defense R&D contract obligations increased 6 percent between FY 2015 and FY 2017, resulting in only slight changes in the rankings of top 20 defense vendors by contract obligations. Table 5-4 shows the top 20 defense R&D vendors ranked by contract obligations in FY 2015 and FY 2017.

Table 5-4 | Top 20 Defense R&D Vendors, 2015 and 2017

	Top 20 Vendors in FY 2015	Obligations in 2017 Millions	Top 20 Vendors in FY 2017	Obligations in 2017 Millions
1	Lockheed Martin	\$ 3,891	Lockheed Martin	\$ 3,918
2	Northrop Grumman	\$ 1,665	Raytheon	\$ 1,901
3	Raytheon	\$ 1,103	Northrop Grumman	\$ 1,635
4	MIT	\$ 996	MIT	\$ 1,032
5	UTC	\$ 953	The Aerospace Corporation	\$ 886
	<b>Top 5 Total</b>	<b>\$ 8,608</b>	<b>Top 5 Total</b>	<b>\$ 9,372</b>
6	The Aerospace Corporation	\$ 866	MITRE	\$ 807
7	MITRE	\$ 775	Johns Hopkins University	\$ 739
8	Johns Hopkins University	\$ 756	General Dynamics	\$ 602
9	Booz Allen Hamilton	\$ 521	Booz Allen Hamilton	\$ 581
10	Boeing	\$ 496	Boeing	\$ 542
11	Alion Science & Technology	\$ 411	Alion Science & Technology	\$ 455
12	BAE Systems	\$ 410	BAE Systems	\$ 447
13	Leidos	\$ 390	Leidos	\$ 362
14	Wyle Laboratories	\$ 342	Georgia Tech	\$ 321
15	L3 Communications	\$ 331	Wyle Laboratories	\$ 271
16	General Dynamics	\$ 325	L3 Communications	\$ 247
17	Georgia Tech	\$ 226	CACI	\$ 233
18	CACI	\$ 201	Pennsylvania State University	\$ 202
19	Battelle	\$ 197	UTC	\$ 178
20	Jacobs Engineering Group	\$ 185	Carnegie Mellon University	\$ 162
	<b>Top 20 Total</b>	<b>\$ 15,039</b>	<b>Top 20 Total</b>	<b>\$ 15,519</b>
	<b>R&amp;D Total</b>	<b>\$ 46,476</b>	<b>R&amp;D Total</b>	<b>\$ 49,129</b>

Source: FPDS; CSIS analysis (\*-Joint Venture)

The Aerospace Corporation replaced Sikorsky in FY 2017's top 5 Defense R&D vendors after UTC's sale of Sikorsky dropped UTC from the fifth ranked R&D vendor in FY 2015 to the 19th ranked vendor in FY 2017. Between FY

2015 and FY 2017, Raytheon swapped places with Northrop Grumman for the second and third ranked defense R&D vendor respectively. Lockheed Martin and the Massachusetts Institute of Technology (MIT) held steady between FY 2015 and FY 2017 as the first and fourth ranked defense R&D vendors respectively. The share of defense R&D contract obligations awarded to the top 5 vendors remained a consistent 19 percent in both FY 2015 and FY 2017.

### VENDOR COUNT

CSIS research last year found that, over the course of the defense drawdown, the number of unique prime vendors doing business with DoD declined by approximately 20 percent.<sup>197</sup> Although there was a 20 percent decrease for all of DoD, the declines were uneven across sectors. Some sectors—like Ships & Submarines and Space Systems—fared better than others. In the case of Ships & Submarines, the number of prime vendors actually grew over the defense drawdown, while other sectors—like Land Vehicles (–27 percent)—experienced more catastrophic declines.<sup>198</sup>

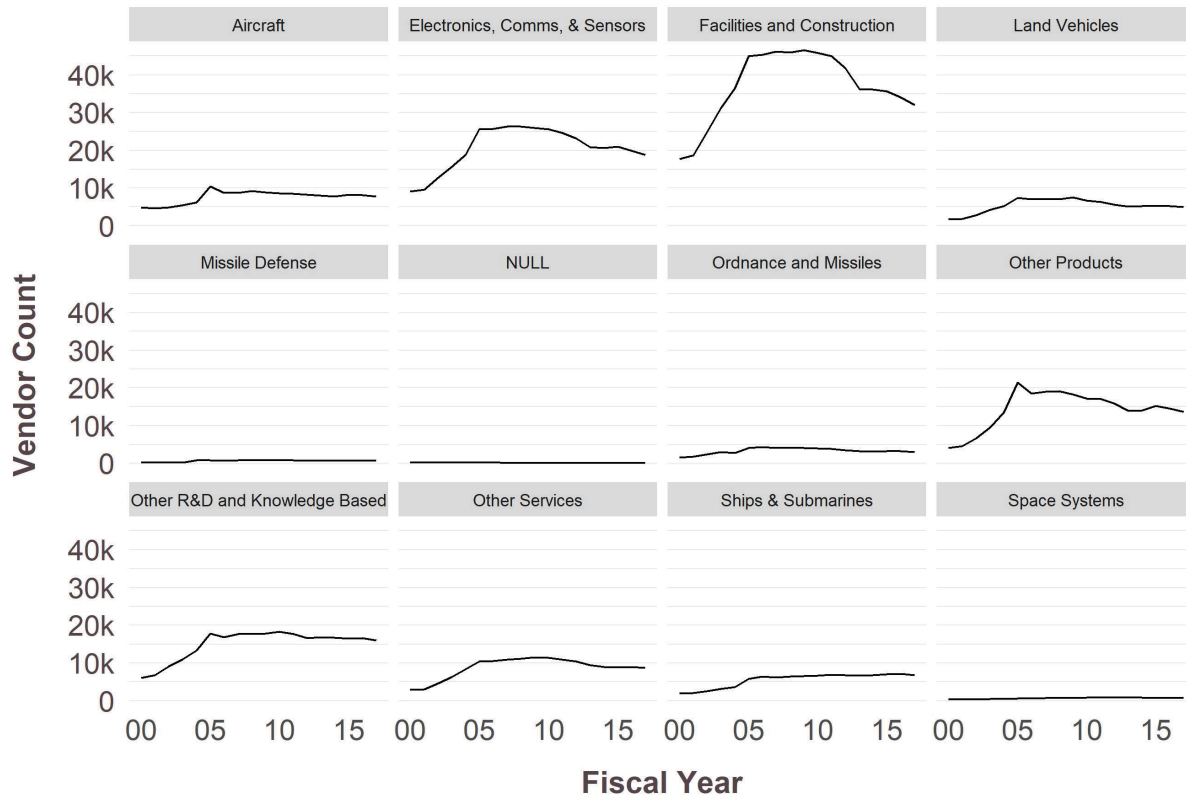
Figure 5-10 shows the number of prime vendors doing business with DoD by platform portfolio from FY 2000 to FY 2017.

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197. Ibid., XIV, 16-18.

198. Ibid.

Figure 5-10 | Defense Vendor Count by Platform Portfolio, 2000-2017



Source: FPDS; CSIS analysis

The data show that despite defense contract obligations increasing 13 percent between FY 2015 and FY 2017, the number of unique prime vendors doing business with DoD continued to decline by 9 percent. As defense contract obligations increased 8 percent in FY 2016, the number of defense prime vendors fell 3 percent. When the growth in defense contract obligations slowed to 5 percent in FY 2017, the percentage decline of defense prime vendors doubled to 6 percent.

Just as during the contracting drawdown, the changes in the number of vendors varied across different portfolios during the contracting recovery. Prime vendors in the Air and Missile Defense platform portfolio (the only platform portfolio that increased) increased 1 percent between FY 2015 and FY 2017, despite contract obligations decreasing 11 percent. However, the Air and Missile Defense vendor count trends follow the platform portfolio's topline whipsaw effect. In FY 2016, the number of Air and Missile Defense prime vendors increased 8 percent as contract obligations increased 5 percent. When contract obligations declined 15 percent in FY 2017, the number of prime vendors declined 6 percent.



The number of prime vendors in the Ships & Submarines (-5 percent), Aircraft (-6 percent), Land Vehicles (-6 percent), and Space Systems (-6 percent) platform portfolios all declined less than the total decline (-9 percent). The data show that there does not seem to be a correlation between increasing contract obligations and an increase in prime vendors. The number of prime vendors declined in the Ships & Submarines, Aircraft, and Land Vehicles contract obligations despite a respective 22 percent, 24 percent and 7 percent increase in total contract obligations in those platform portfolios. Unlike the other three platform portfolios, Space Systems contract obligations declined 1 percent as prime vendors fell 6 percent.

“Despite defense contract obligations increasing 13 percent between FY 2015 and FY 2017, the number of unique prime vendors doing business with DoD continued to decline by 9 percent.

Finally, the number of prime vendors in the Facilities and Construction (-10 percent) and Electronics, Comms, & Sensors (-10 percent) platform portfolios declined at rates slightly greater than the overall rate (-9 percent). The Facilities and Construction data is not surprising given both the 2 percent decline in contract obligations between FY 2015 and FY 2017 and the fact that the Facilities and Construction platform experienced the “largest decline in average number

of vendors during the BCA decline period (-17 percent).”<sup>199</sup> The 10 percent decline in prime vendors in Electronics, Comms, & Sensors platform portfolio is more surprising given the 12 percent increase in EC&S contract obligations; this serves as further evidence against a correlation between increases in contract obligations and increases in prime vendors.

The data limitations that existed in *Measuring the Impact of Sequestration and the Defense Drawdown on the Defense Industrial Base* still exist, limiting CSIS’ ability to definitely say what happened to the disappearing prime vendors.<sup>200</sup> Although the continuing decline in total prime vendors is of potential concern, it is also important to note that the dynamics in industry are different today than they were during the defense drawdown. The largest contract obligations increases have gone to procuring legacy weapon systems in the Aircraft, Ships & Submarines, and Ordnance and Missiles platform portfolios, significantly limiting the pool of potential prime vendors. Given these platform portfolio’s more limited prime vendor base, the trends in the lower tiers of the supply chain are of more

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199. Ibid.

200. Ibid.

interest with regards to the health of the industrial base. Unfortunately, the subcontracting data available from the Federal Funding Accountability and Transparency Act Subaward Reporting System (FSRS) is unreliable, limiting its analytical use. Additionally, there has been a large uptick in mergers and acquisition (M&A) activity across the broader economy, but especially in the aerospace and defense sector.<sup>201</sup> By its very function, an increase in M&A activity slims the pool of prime DoD vendors.

The decline in the number of prime vendors working with DoD, even as contract spending has recently been experiencing relatively healthy growth, merits close attention. The National Defense Strategy identifies the need to accomplish exactly the opposite outcome, to expand DoD's outreach to industry to include a broader swath of industry, which the strategy calls the National Security Innovation Base.<sup>202</sup> The data from the last three years suggest that this effort will have to counter a significant adverse trend occurring in the industrial base. Recent research at CSIS has identified part of the problem: a substantial decline in the number of new vendors entering the defense industrial base over the last decade.<sup>203</sup> This decline in new entrants, combined with declines in existing vendors across the majority of platform portfolios over the last decade, suggests that increases in procurement and R&D funding alone will not result in increases in participation in the industrial base. DoD will need to adopt specific policies to expand the industrial base to both include a substantial share of new vendors and counter the existing trend towards declining numbers of prime vendors.

## 5.4 | Industrial Base Issues and Concerns

The U.S. manufacturing sector—to include defense industrial base issues and concerns—has been a high-profile priority of the current administration. Since taking office in January 2017, the administration has used the full-extent of its executive powers to reinforce existing industrial policy regulations and policies, create new industrial policies, and conduct

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201. Greg Roumeliotis, Pamela Barbaglia, "Global mergers and acquisitions reach record high in first quarter," *Reuters*, March 30, 2018, <https://www.reuters.com/article/us-deals-review/global-mergers-and-acquisitions-reach-record-high-in-first-quarter-idUSKBN1H60EC>; PricewaterhouseCoopers, PWC Deals: Global Aerospace and Defense Deals Insights Year-End 2017, (McClean, VA: PWC: 2018), <https://www.pwc.com/us/en/industrial-products/publications/assets/pwc-aerospace-defense-industry-mergers-acquisitions-q4-2017.pdf>; Ian Cookson, et al. Aerospace and Defense Outlook: Mergers and Acquisitions Update 2018 (Boston, MA: Capstone Headwaters, April 2018).

202. U.S. DoD, *Summary of the 2018 National Defense Strategy*.

203. Samantha Cohen, Gregory Sanders, Samuel Mooney, and Marielle Roth, *New Entrants and Small Business Graduation in the Market for Federal Contracts* (Washington, DC: Center for Strategic & International Studies, November 2018), [https://csis-prod.s3.amazonaws.com/s3fs-public/publication/181120\\_NewEntrantsandSmallBusiness\\_WEB.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/publication/181120_NewEntrantsandSmallBusiness_WEB.pdf).

reviews of the various manufacturing sectors. For the defense industrial base, three of the most prominent executive-branch activities have been the executive order mandating a review of the defense industrial base, increased emphasis on Buy American and domestic source requirements, and the expansion of the National Technology and Industrial Base (NTIB) to include the United Kingdom and Australia. The following sections examines those three activities and their implications for the defense industrial base.

### **INDUSTRIAL BASE REVIEW EXECUTIVE ORDER**

On July 21, 2017, the president signed Executive Order (EO) 13806—Presidential Executive Order on Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States—mandating a sweeping review of the U.S. defense industrial base.<sup>204</sup> EO 13806 requires an interagency assessment of the capacity and resilience of the Defense Industrial Base and its supply chains. Furthermore, the EO required an assessment of future needs, current gaps in the Defense Industrial Base (defined as either non-existing, threatened, or single-point of failures), and a comprehensive list of potential contingencies that could disrupt the Defense Industrial Base. Finally, EO 13806 mandated that the final report should include potential legislative, regulatory, or policy changes needed to strengthen the capacity and resilience of the Defense Industrial Base.<sup>205</sup>

Within DoD, the EO efforts were led by the DoD Office of Manufacturing and Industrial Base Policy (MIBP), but the final report and recommendations will come from Peter Navarro, White House Director of Trade and Industrial Policy, who is taking the data and recommendations from each of the federal agencies and synthesizing them into a singular narrative.<sup>206</sup> The administration had originally planned to survey company's proprietary data as part of efforts to identify weak spots, but they later backed off that plan amongst criticism from industry.<sup>207</sup> Instead, the interagency teams

204. Exec. Order. No. 13806, "Presidential Executive Order on Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States," 82 Fed. Reg. 34597 (July 26, 2017), <https://www.govinfo.gov/app/details/FR-2017-07-26/2017-15860>.

205. Susan B. Cassidy, Justin Ganderson, John Sorrenti, "Six Takeaways from President Trump's Executive Order on Assessing Manufacturing and the Defense Industrial Base," *Insidegovernmentcontracts.com*, August 1, 2017, <https://www.insidegovernmentcontracts.com/2017/08/six-takeaways-president-trumps-executive-order-assessing-manufacturing-defense-industrial-base/>.

206. Sydney J. Freedberg, Jr., "Industrial Base Analysis Picks Up Steam; Recommendations To White House By April," *Breaking Defense*, December 11, 2017, <https://breakingdefense.com/2017/12/industrial-base-analysis-picks-up-steam-recommendations-to-white-house-by-april/>.

207. Joe Gould, "Trump administration shelves plans to survey US defense firms," *Defense News*, December 21, 2017, <https://www.defensenews.com/global/the-americas/2017/12/21/trump-administration-shelves-plans-to-survey-us-defense-firms/>.

used existing government data and worked with the Aerospace Industries Association (AIA) and National Defense Industrial Association (NDIA) to consult their members about the some of the issues that the survey had hoped to address.<sup>208</sup> Although the EO mandated that the final report was to be delivered within 270 days, the final report was not publicly released until October 2018.<sup>209</sup>

The final report, *Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States*, found that that U.S. defense industrial based faced an “unprecedented set of challenges” that “threaten the Department of Defense's (DoD) ability to be ready for the 'fight tonight', and to retool for great power competition,” particularly in the lower tiers of the supply chain. Broadly speaking, the report found that the U.S. defense industrial base is “surprisingly” dependent on “competitor nations,” the current domestic workforce is insufficient, and “many sectors continue to move “critical capabilities offshore in pursuit of competitive pricing and access to foreign markets.”<sup>210</sup> Furthermore, the report went on to identify five macro trends affecting the defense industrial base:

1. Uncertain U.S. government spending creating instability that drives away small firms
2. Declining U.S. manufacturing capability and capacity
3. Antiquated U.S. government business practices
4. Competitor nations’ industrial policies, both specific targeting policies and the “collateral damage of globalization”
5. Workforce gaps resulting from diminished U.S. Science, Technology, Engineering and Mathematics, and trade skills

The report concluded by providing blue print strengthening the defense industrial base centered around four levers: “investment, policy, regulation and legislation.” The unclassified report included a preview of some of the overarching recommendations, while the classified report contained

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208. Sydney J. Freedberg, Jr., “White House Industrial Base Study Focuses on Near-Term Fixes,” *Breaking Defense*, August 1, 2018, <https://breakingdefense.com/2018/08/white-house-industrial-base-study-focuses-on-near-term-fixes/>.

209. Gordon Lubold and Doug Cameron, “Report Cites Weaknesses in Industries Vital to U.S. National Defense,” *Wall Street Journal*, October 4, 2018, <https://www.wsj.com/articles/report-cites-weaknesses-in-industries-vital-to-u-s-national-defense-1538694184>.

210. Interagency Task Force in Fulfillment of Executive Order 13806, *Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States* (Washington, DC: Government Printing Office, September 2018), <https://media.defense.gov/2018/Oct/05/2002048904/-1/-1/1/ASSESSING-AND-STRENGTHENING-THE-MANUFACTURING-AND-DEFENSE-INDUSTRIAL-BASE-AND-SUPPLY-CHAIN-RESILIENCY.PDF>.

more-specific recommendations for addressing the roughly 300 specific supply chain vulnerabilities identified.<sup>211</sup>

The Dwight D. Eisenhower School for National Security and Resource Strategy at the National Defense University (NDU), under Major General John Jansen, United States Marine Corps, has been running its own adjacent industrial base review since earlier this year that will eventually report to Deputy Secretary Shanahan and General Dunford, Chairman of the Joint Chiefs of Staff.<sup>212</sup> NDU has consulted with MIBP and Navarro but will issue its own separate report and recommendations. Although there is overlap with the broader interagency industrial base review, the NDU effort is heavily focused on questions on structuring both the defense industrial base and the national security innovation base for mobilization.<sup>213</sup>

### BUY AMERICAN AND DOMESTIC SOURCE REQUIREMENTS

Federal procurement in the United States historically includes domestic source restrictions that are reflected in both the Buy American Act and other domestic laws. The Buy American Act (41 U.S. Code §§ 8301–8305) requires federal contracting agencies to favor domestic materials and services for public use or public works in the United States and has undergone various amendments over time.<sup>214</sup> Other domestic source laws include statutes such as the Berry Amendment and the Kissel Amendment. The Berry Amendment requires that DoD purchases certain items such as textiles, food, shoes, and hand measuring tools from domestic suppliers, and the Kissel Amendment extends this requirement to the Department of Homeland Security (DHS), which affects procurement for the United States Coast Guard.<sup>215</sup> A requirement originally in the Berry Amendment that applied to specialty metals like certain steel alloys and titanium remains in force, but it is now a separate provision of law.<sup>216</sup> While domestic content policies have long regulated DoD procurement, recent developments initiated by the current administration and Congress could affect treatment of acquisitions from foreign sources in the coming years.

211. Rhys McCormick, "Review Warns Defense Industrial Base Faces 'Unprecedented Set of Challenges'" Center for Strategic and International Studies, October 5, 2018, <https://www.csis.org/analysis/review-warns-defense-industrial-base-faces-unprecedented-set-challenges>.

212. Freedberg, "White House Industrial Base Study Focuses on Near-Term Fixes."

213. Marjorie Censer, "Jansen Set to Soon Debrief Shanahan, Dunford on Industrial Base Assessment," *Inside Defense*, July 18, 2018, <https://insidedefense.com/inside-pentagon/jansen-set-soon-debrief-shanahan-dunford-industrial-base-assessment>.

214. Legal Information Institute, "41 U.S. Code Chapter 82 - BUY AMERICAN" (Cornell Law School, n.d.), <https://www.law.cornell.edu/uscode/text/41/subtitle-IV/chapter-82>.

215. Michaela D. Platzer, "Defense Primer: The Berry and Kissell Amendments" (Washington, DC: Congressional Research Service, March 1, 2017), <https://fas.org/sgp/crs/natsec/IF10609.pdf>.

216. Legal Information Institute, "10 U.S. Code § 2533b - Requirement to Buy Strategic Materials Critical to National Security from American Sources; Exceptions" (Cornell Law School, n.d.), <https://www.law.cornell.edu/uscode/text/10/2533b>.

President Trump has advocated for policies that promote domestic manufacturing throughout both his campaign and his term in office. Furthermore, these policies have long found support across party lines with some Senate Democrats most recently advocating for Buy American policies in the FY 2018 NDAA.<sup>217</sup> While globalization has resulted in both greater efficiency for corporations' supply chains and lower prices for consumers, it has also resulted in an increasing share of manufacturing activity occurring overseas.

The migration of manufacturing overseas is contentious in all contexts. However, in the context of defense acquisition, there are added concerns about supply chain vulnerability and potential strategic capability shortfalls that have led to policies seeking to counter the tide of globalization. While domestic source requirements have meant that a significantly larger proportion of major weapon systems is produced in the United States than is typical in the broader economy, global supply chains are a reality for the defense industry as well. Policy makers have leveraged this connection by focusing on linkages between defense industry and products such as aluminum and steel, where significant global over capacity has led to declining U.S. production of these materials. President Trump has argued that the ensuing reduction in research and development—as well as jobs in sectors such as aluminum and steel—puts American national security at risk because defense requirements might not be met domestically in a time of need.<sup>218</sup>

When considering current defense trade policy, it is important to understand that engaging in bilateral trade agreements binds nations together both politically and economically at various levels. Consequently, the ramifications of deviating from such agreements are multifaceted and could jeopardize valuable relationships with U.S. trade partners. This section examines recent policy changes regarding domestic source requirements, trade actions related to national security, and present trends of DoD foreign purchases in FY 2016.

#### **CURRENT POLICIES REGARDING BUY AMERICA LAWS**

Since the Trump administration entered office, there have been various efforts intended to strengthen the Buy American Act and related policies. On

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217. Justin Ganderson, Sandy Hoe and Jeff Bozman, "Inside Government Contracts: Procurement Law and Policy Insights," Covington & Burling LLP, September 22, 2017, <https://www.insidegovernmentcontracts.com/2017/09/senate-democrats-look-strengthen-buy-american-policies-requirements/>.

218. Exec. Order. No. 13806, "Presidential Executive Order on Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States."



April 18, 2017, President Trump signed EO 13788 to examine enforcement of both Buy American and Hire American policies. The purpose of this executive order was to maximize federal procurement of goods, products, and materials manufactured in the United States and to diligently enforce laws that govern foreign workers in the United States.<sup>219</sup> Executive Order 13788 references the Buy American Act, which requires government contracts for products and materials to contain at least a minimum level of content manufactured in the United States. Exceptions include products and materials that are procured for use outside of the United States; are not already “mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and are not of satisfactory quality”; are purchased from a country that has entered into a Reciprocal Defense Procurement Memorandum of Understanding with the United States; and are below certain dollar thresholds.<sup>220</sup>

Executive Order 13788 mandated various requirements for agency leaders across the government. First, agency heads were mandated to assess and evaluate compliance with Buy American Laws, propose policy for future actions to maximize the use of products and materials manufactured in the United States, and submit their findings to the Secretary of Commerce and the Director of OMB by September 15, 2017. Second, the Secretary of Commerce, cooperating with the heads of various other government agencies, was instructed to provide direction to agencies on proposing policy for future actions to maximize the use of products and materials manufactured in the United States by June 17, 2017. Third, the Secretary of Commerce and the United States Trade Representative (USTR) were required to evaluate the impacts of U.S. free trade agreements and the World Trade Organization (WTO) Agreement on Government Procurement “on the operation of Buy American Laws.”<sup>221</sup> Finally, the Secretary of Commerce was directed to consult with the Secretary of State, the OMB Director, and the USTR to submit a report to the President that includes information and results that were gleaned from the Executive Order’s previous four requirements by November 24, 2017.<sup>222</sup>

On June 20, 2017 in compliance with the second mandate from Executive order 13788, then Director, Defense Procurement and Acquisition Policy (DPAP), Claire M. Grady, issued a memorandum for various leaders within DoD,

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219. Exec. Order. No. 13788, “Buy American and Hire American,” 82 Fed. Reg. 18837 (April 21, 2017), <https://www.govinfo.gov/app/details/FR-2017-04-21/2017-08311>.

220. Legal Information Institute, “41 U.S. Code § 8303 - Contracts for public works” (Cornell Law School, n.d.), <https://www.law.cornell.edu/uscode/text/41/8303>.

221. Exec. Order. No. 13788, “Buy American and Hire American.”

222. Ibid.



which previewed the forthcoming guidance. Preliminary measures stated in the memorandum include updated learning modules for DAU to administer for professional development.<sup>223</sup> Additionally, Secretary of Commerce Wilbur Ross and OMB Director of Mick Mulvaney issued a memorandum for heads of all executive departments and agencies providing guidance for adhering to executive order 13788, on June 30, 2017. The memorandum provides more detailed guidance on what and how agencies should investigate their current compliance with the Buy American Act and included suggestions on how to write policy recommendations for strengthening Buy American laws in the future.<sup>224</sup>

This increased interest in domestic sourcing crossed party lines when a coalition of Senate Democrats advocated for strengthening Buy American laws in a series of amendments that they proposed to the FY 2018 NDAA in September 2017. First, the senators proposed to strip out provisions in the Senate version of the NDAA, which was contained in section 863 of the bill. Section 863 of the Senate bill aimed to shorten the list of products in existing law that were required to be purchased from manufacturers in the NTIB (National Technology and Industrial Base).<sup>225</sup> The amendment was focused on maintaining domestic source requirements for buses, chemical weapons antidotes, components of naval vessels, valves and machine tools, and solar panels. Secondly, the senators aimed to lessen the scope of the “overseas exemption” that is currently part of the Buy American Act. Finally, to promote transparency, the senators advocated for increased reporting on waivers that are associated with Buy American laws. One major concern expressed by the senators was the potential for defense contractors to source jobs and elements of their supply chain offshore. None of these amendments were actually voted on, however, as the Senate invoked cloture to limit debate on the NDAA prior to their consideration. In a letter to the chairmen of the SASC and HASC, the Democratic senators subsequently argued against including section 863 of the Senate-passed NDAA in the final

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223. Clair M. Grady, "Improving Compliance with the Berry Amendment and Buy American Act" (Washington, DC: Office of the Under Secretary of Defense, June 20, 2017), <https://www.acq.osd.mil/dpap/policy/policyvault/OSD005724-17-DPAP.pdf>.

224. Wilbur Ross and Mick Mulvaney, *Assessment and Enforcement of Domestic Preferences In Accordance with Buy American Laws* (Washington, DC: White House, June 30, 2017), [https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2017/M-17-27\\_assessment\\_enforcement\\_domestic\\_preference\\_buy\\_american\\_laws.pdf](https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2017/M-17-27_assessment_enforcement_domestic_preference_buy_american_laws.pdf).

225. The NTIB defines the defense industrial cooperation between the United States, Canada, and Australia. Please see recent CSIS work for recent developments and issue areas associated with the NTIB: Rhys McCormick et al, *National Technology and Industrial Base Integration: How to Overcome Barriers and Capitalize on Cooperation* (Washington, DC: Center for Strategic and International Studies, March, 2018), [https://csis-prod.s3.amazonaws.com/s3fs-public/publication/180307\\_McCormick\\_NationalTechnologyAndIndustrialBaseIntegration\\_Web.pdf?Yd28kTbbpfedujBec.QYCbUtwM-DC4qaj](https://csis-prod.s3.amazonaws.com/s3fs-public/publication/180307_McCormick_NationalTechnologyAndIndustrialBaseIntegration_Web.pdf?Yd28kTbbpfedujBec.QYCbUtwM-DC4qaj).

bill.<sup>226</sup> The final version of the NDAA substantially narrowed the original scope of the Senate-passed language, effectively terminating the domestic source requirement for just two products: chemical weapons antidotes and solar panels.<sup>227</sup>

### *Trade and National Security*

The Trump administration has made an explicit linkage between national security and trade and has taken aggressive action on multiple fronts by using the president's trade authorities to combat threats to the industrial base. A prominent example comes in the use of the president's authority under Section 232 of the Trade Expansion Act of 1962.<sup>228</sup> On February 16, 2018, Secretary Ross released two reports, resulting from investigations initiated under Section 232. Those reports recommended that the president should take action to protect U.S. manufacturers of steel and aluminum. The reports found that high levels of steel and aluminum imports undermined U.S. production of these materials, that critical industries relied on these materials, and that their need for them was increasing. The reports recommended that the president select from several options on both steel and aluminum, which consisted of either globally-applied tariffs on these products or a combination of tariffs and quotas imposed on specific countries whose exports to the United States of steel and aluminum were deemed to be causing injury to U.S. industry<sup>229</sup>

These actions were designed to increase the domestic production of steel and aluminum to a higher share of the United States' manufacturing capacity. The report argued that the current level of U.S. dependence on foreign suppliers for steel and aluminum threatens U.S. national security as defined by Section 232.<sup>230</sup> Following the release of the reports by Secretary Ross, President Trump issued two Presidential Proclamations on March 8, 2018 that imposed a 10 percent tariff on aluminum articles and a 25 percent tariff on steel articles imported from all countries, with the initial exception of Canada and Mexico due to North American Free Trade Agreement (NAFTA) renegotiation.<sup>231</sup>

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226. John McCain et al, *NDAA Buy American* (Washington, DC: U.S. Senate, October 20, 2017), <https://www.baldwin.senate.gov/imo/media/doc/NDAABuyAmerica.pdf>.

227. National Defense Authorization Act for Fiscal Year 2018 Conference Report, H.R. Rep. No. 115-404 (2017), <https://www.congress.gov/115/crpt/hrpt404/CRPT-115hrpt404.pdf>.

228. Department of Commerce, "Fact Sheet: Section 232 Investigations: The Effect of Imports on the National Security," April 20, 2017, <https://www.commerce.gov/news/fact-sheets/2017/04/fact-sheet-section-232-investigations-effect-imports-national-security>; Department of Commerce, "Section 232 Investigation on the Effect of Imports of Aluminum on U.S. National Security," April 27, 2017, <https://www.commerce.gov/page/section-232-investigation-effect-imports-aluminum-us-national-security>.

229. Department of Commerce, "Secretary Ross Releases Steel and Aluminum 232 Reports in Coordination with White House," February 16, 2018, <https://www.commerce.gov/news/press-releases/2018/02/secretary-ross-releases-steel-and-aluminum-232-reports-coordination>.

230. Ibid

231. U.S. President, Proclamation No. 9704, "Adjusting Imports of Aluminum Into the United

Additionally, President Trump emphasized that the United States “has important security relationships” with some countries and that tariffs may be bypassed or modified if partners could reach an agreement such that “imports from that country no longer threaten to impair the national security.”<sup>232</sup> On May 31, 2018, President Trump approved Section 232 tariff modifications, announcing measures agreed with Argentina, Brazil, and Australia and their subsequent exclusion from the tariffs.<sup>233</sup> Notably, the proclamation revealed that going forward, similar exemptions were not in place for the European Union, Mexico, and Canada. Mexico, Canada, and the European Union soon responded with retaliatory tariffs against the United States.<sup>234</sup>

The Trump administration has taken on another issue related to both trade and national security, namely the substantial technology transfer from U.S. industry that is occurring due to a range of Chinese industrial and investment policies. These policies include restrictions on U.S. investment in China, joint venture requirements, use of licensing restrictions, and other measures that pressure U.S. firms into transferring technology to Chinese partners. They also include aggressive acquisition of technology firms in the United States and the outright theft of intellectual property from U.S. firms through electronic and other means. The Trump administration has leveraged a separate aspect of the president’s trade authority in this arena, Section 301 of the Trade Act of 1974. Section 301 empowers the USTR to take action to address acts, policies and practices of foreign trade partners that are “unreasonable or discriminatory and that burden or restrict U.S. commerce.”<sup>235</sup> On March 22, 2018, President Trump announced his actions in response to the USTR’s Section 301 investigation into these practices, instructing the USTR to publish a proposed list of tariffs, pursue dispute settlement in the World Trade Organization, and address concerns about investment in the United States by China “in industries . . . deemed important to the United

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States”, 83 Fed. Reg. 11619 (March 15, 2018), <https://www.govinfo.gov/app/details/FR-2018-03-15/2018-05477>; Proclamation No. 9705, “Adjusting Imports of Steel Into the United States”, 83 Fed. Reg. 11625 (March 15, 2018), <https://www.govinfo.gov/app/details/FR-2018-03-15/2018-05478>.  
232. Ibid.

233. U.S. President, Proclamation No. 9758, “Adjusting Imports of Aluminum Into the United States”, 83 Fed. Reg. 25849 (June 5, 2018), <https://www.govinfo.gov/app/details/FR-2018-06-05/2018-12137>; Proclamation No. 9759, “Adjusting Imports of Steel Into the United States”, 83 Fed. Reg. 25857 (June 5, 2018), <https://www.govinfo.gov/app/details/FR-2018-06-05/2018-12140>.

234. Chris Isadore, “Mexico Imposes Tariffs on \$3 Billion Worth of US Exports,” CNN Money, June 6, 2018, <http://money.cnn.com/2018/06/06/news/economy/mexico-us-tariffs-retaliation/index.html>; Allison Martell, “Canada to Impose Tariffs on U.S., Challenge at WTO,” *Reuters*, May 31, 2018, <https://www.reuters.com/article/us-usa-trade-canada/canada-to-impose-tariffs-on-u-s-challenge-at-wto-idUSKCN1IW2SH>; Jackie Wattles and Alanna Petroff, “Trade Clash: EU to Hit US with \$3.3 Billion in Tariffs Next Month,” June 6, 2018, <http://money.cnn.com/2018/06/06/news/economy/european-union-tariffs-united-states/index.html>.

235. White House, “Presidential Memorandum on the Actions by the United States Related to the Section 301 Investigation” (March 22, 2018), <https://www.whitehouse.gov/presidential-actions/presidential-memorandum-actions-united-states-related-section-301-investigation/>.

States.”<sup>236</sup> The following day, China reacted by announcing \$3 billion in tariffs on American aluminum and steel exports.<sup>237</sup> On April 3, 2018, the USTR released a proposed tariff list on Chinese products,<sup>238</sup> imposing \$50 billion worth of imports and covering 1,300 separate tariff lines.<sup>239</sup> China responded to this round of U.S. tariffs by announcing another 106 U.S. products to be targeted for a 25 percent tariff on April 4 and filed a WTO complaint. China's response resulted in President Trump instructing the USTR to consider \$100 billion of additional tariffs “in light of China’s unfair retaliation.”<sup>240</sup>

On June 15, 2018, President Trump formally announced the implementation of 25 percent tariffs on a total of \$50 billion worth of Chinese goods from industrially significant technologies (as identified and recommended following the earlier Section 301 investigation on China).<sup>241</sup> The first wave of tariffs went into effect on July 6, covering \$34 billion, while the second wave on \$16 billion “goes through a public comment and review process with a date to be decided later.”<sup>242</sup> The tariffs, including “goods related to China’s Made in China 2025 strategic plan to dominate...emerging high-technology industries,” brought an immediate rebuke from China, who then announced retaliatory tariffs of 25 percent worth \$50 billion.<sup>243</sup> Three days later, President Trump responded by directing the USTR to “identify \$200 billion worth of Chinese goods for additional tariffs at a rate of 10

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236. Office of the U.S. Trade Representative, “Section 301 Fact Sheet,” March, 2018, <https://ustr.gov/about-us/policy-offices/press-office/fact-sheets/2018/march/section-301-fact-sheet#>; Office of the U.S. Trade Representative, “President Trump Announces Strong Actions to Address China’s Unfair Trade,” March, 2018, <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/march/president-trump-announces-strong>.

237. Lauren Kyger and Andrea Durkin, “U.S. China ‘Trade War’ Timeline,” *tradevistas*, May 24, 2018, <https://tradevistas.csis.org/u-s-china-trade-war-timeline/>.

238. Office of the U.S. Trade Representative, “Under Section 301 Action, USTR Releases Proposed Tariff List on Chinese Products,” April, 2018, <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/april/under-section-301-action-ustr>.

239. Office of the U.S. Trade Representative, *Notice of Determination and Request for Public Comment Concerning Proposed Determination of Action Pursuant to Section 301: China’s Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation*, Docket No. USTR-2018-0005, (Washington, DC: USTR, 2018), <https://ustr.gov/sites/default/files/files/Press/Releases/301FRN.pdf>.

240. White House, “Statement from President Donald J. Trump on Additional Proposed Section 301 Remedies,” April 5, 2018, <https://www.whitehouse.gov/briefings-statements/statement-president-donald-j-trump-additional-proposed-section-301-remedies/>.

241. White House, “Statement by the President Regarding Trade with China,” June 15, 2018, <https://www.whitehouse.gov/briefings-statements/statement-president-regarding-trade-china/>.

242. William A. Reinsch, et al., “China Tariffs,” Center for Strategic and International Studies, June 16, 2018, <https://www.csis.org/analysis/china-tariffs>; Office of the U.S. Trade Representative, “USTR Issues Tariffs on Chinese Products in Response to Unfair Trade Practices,” June 2018, <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/june/ustr-issues-tariffs-chinese-products>.

243. Ryan Woo, Stella Qiu, “China to Impose 25 Percent Tariffs on 659 U.S. Goods Worth \$50 billion,” *Reuters*, June 15, 2018, <https://www.reuters.com/article/us-usa-trade-china-tariffs/china-to-impose-25-percent-tariff-on-659-u-s-goods-worth-50-billion-xinhua-idUSKBN1JB2MS>; Presidential Statement, “Statement from the President Regarding Trade with China,” June 18, 2018, <https://www.whitehouse.gov/briefings-statements/statement-president-regarding-trade-china-2/>.

percent.”<sup>244</sup> Stressing China’s intention to “keep the United States at a permanent and unfair disadvantage,” President Trump stated that further Chinese retaliations would be met by the United States pursuing additional tariffs on another \$200 billion of goods.<sup>245</sup>

### U.S. ARMS TRANSFER POLICY

Not all of the administration’s defense trade policy action has involved imposing tariffs and quotas on imports, however. The Trump administration has also focused on promoting U.S. defense exports. On April 19, 2018, President Trump released the National Security Presidential Memorandum regarding U.S. Conventional Arms Transfer (CAT) Policy.<sup>246</sup> The memorandum emphasized the importance of a “dynamic defense industrial base” for American security, declaring that when proposed transfers fall within national security, economic security, and foreign policy interests, “the executive branch will advocate strongly on behalf of United States companies. The executive branch will also streamline procedures, clarify regulations, increase contracting predictability and flexibility, and maximize the ability of the United States industry to grow and support allies and partners.”<sup>247</sup> The memorandum further lays out the Trump administration’s intention to bolster the security of the United States and maintain its technological edge through “appropriate protections on the transfer of United States military technologies,” including increasing “trade opportunities for United States companies . . . supporting United States industry with appropriate advocacy and trade promotion,” strengthening the defense industrial base by improving financing options and increasing contract flexibility, and accounting for the financial or economic effects of transfers on the defense industrial base.<sup>248</sup>

### DEFENSE TRADE POLICY

Trade policy is inherently complex because it involves both economic and political factors, and defense trade policy adds additional complexities of national security. This complexity is exacerbated with respect to federal procurement, as policy makers must navigate various regulatory hurdles and trade agreements while simultaneously acting on behalf of their taxpaying constituents. The policy initiatives undertaken by the Trump

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244. White House, “Statement from the President Regarding Trade with China”, June 18, 2018, <https://www.whitehouse.gov/briefings-statements/statement-president-regarding-trade-china-2/>.

245. Ibid.

246. White House, “National Security Presidential Memorandum Regarding U.S. Conventional Arms Transfer Policy,” April 19, 2018, <https://www.whitehouse.gov/presidential-actions/national-security-presidential-memorandum-regarding-u-s-conventional-arms-transfer-policy/>.

247. Ibid.

248. Ibid.



administration that are described in this section can be used to forecast and discuss likely trends to come. Since the focus of these trends has revolved around implications for national security, the defense sector will be a natural test case for the Trump administration's trade policy.

There is a myriad of benefits and costs associated with international trade. On the one hand, benefits include lower costs for manufacturers, lower prices for consumers, and a more efficient allocation of resources both domestically and internationally. Additionally, international trade can be used as a tool to exert soft power, promoting democratic practices or other American values through economic incentives or assistance. Alternatively, trade can be used to exert hard power, influencing the behavior of other states through punitive economic sanctions or embargos. Furthermore, international trade can serve as a strategic tool to mitigate the likelihood of military conflict by fostering economic interdependence between states, binding nations together through complex economic relationships and interconnectedness.

On the other hand, the costs associated with international trade equate to reduction in domestic manufacturing plants, job losses, and reliance on other countries for certain goods. The United States has national security interests in maintaining the manufacturing capabilities necessary to procure materials that are critical to the production of weapon systems. However, it is unclear whether it is worth the expense of increased costs for both the government and consumer in order to implement policy that ensures that those materials are domestically produced. Withdrawing from trade agreements could cause retaliatory action from U.S. trade partners. The ramifications of such events could burden consumers and policy makers with various economic and strategic costs. Consequently, policy makers should not approach trade as a zero-sum game and must carefully consider all facets of the economic and political costs associated with such agreements. The direct implications that the Trump administration's Buy American and America First approach to defense trade has on industry and the national security objectives it serves remains uncertain.

#### **PURCHASES FROM FOREIGN ENTITIES TRENDS<sup>249</sup>**

DoD's total foreign purchases in FY 2017 amounted to 3 percent of total DoD contract obligations that year. Table 5-5 shows that while DoD purchased around \$320 billion of goods and service that year, around \$10.7 billion of

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249. This section uses CSIS-hosted FPDS data to replicate the figures reported in the Fiscal Year 2017 Purchases From Foreign Entities Report to Congress from the DoD: [https://www.acq.osd.mil/dpap/cpic/cp/docs/2017\\_DoD\\_Foreign\\_Entities\\_RTC-July\\_2018.pdf](https://www.acq.osd.mil/dpap/cpic/cp/docs/2017_DoD_Foreign_Entities_RTC-July_2018.pdf)

those purchases were from a foreign entity.<sup>250</sup> Furthermore, as shown in Table 5-6, 12 countries out of the 137 countries that DoD purchased goods and services from accounted for 76 percent of total foreign purchases made by DoD. The average contract size for each of the top 12 countries with the highest foreign purchases was less than one million dollars. For instance, Greece had the highest average contract size with an average contract of \$980,000. The average contract size for the country with the highest total number of purchases from DoD, Japan, was around \$62,791. Relative to the U.S. GDP in 2017 that totaled around \$19 trillion, the magnitude of foreign purchases made by DoD is minimal at 0.06 percent of total GDP.

**Table 5-5: Total Defense Purchases 2017**

<b>Total DoD Purchases 2017</b>	
Actions	Obligated Amount Millions of \$
14,424,924	\$319,788
<b>Total Purchases from Foreign Entities 2017</b>	
Actions	Obligated Amount Millions of \$
161,897	\$10,715

Source: FPDS; CSIS analysis

**Table 5-6: Top Twelve Countries with the Highest Contract Obligations Under Contract with DoD During FY 2017**

<b>Country</b>	<b>Actions</b>	<b>Obligated Amount</b>	<b>Average Obligation per Action</b>	<b>Percent of Total Foreign Obligations</b>
Japan	22,391	\$ 1,405,954,873	\$ 62,791	13%
United Arab Emirates	38,575	\$ 1,365,808,806	\$ 35,407	13%
Germany	24,457	\$ 954,632,626	\$ 39,033	9%
South Korea	22,391	\$ 942,401,392	\$ 42,088	9%
United Kingdom	7,761	\$ 905,708,643	\$ 116,700	8%
Kuwait	1,849	\$ 569,792,285	\$ 308,162	5%
Canada	7,385	\$ 545,319,954	\$ 73,842	5%
Afghanistan	1,168	\$ 347,991,800	\$ 297,938	3%
Saudi Arabia	525	\$ 306,921,587	\$ 584,613	3%
Greece	281	\$ 275,471,790	\$ 980,327	3%
Spain	1,638	\$ 268,995,860	\$ 164,222	3%
Italy	4,724	\$ 249,083,647	\$ 52,727	2%

Source: FPDS; CSIS analysis

250. The DoD defines foreign purchases as those being purchased from a foreign entity, which in the FPDS is defined as either a “foreign-owned business not incorporated in the U.S.” or an, “other foreign entity (e.g., foreign government).”



To further investigate foreign purchases made by DoD in 2017, the study team breaks out foreign contract obligations by Product or Service Code (PSC) category and the value of international purchases in Table 5-7 and Table 5-8 respectively. Table 5-7 presents values for obligations purchased by DoD in each PSC category, and Table 5-8 reports the same values for purchases made from foreign entities. While the greatest proportion of total DoD purchases went to Aircraft, Table 5-8 shows that the greatest proportion of total foreign DoD purchases went to FRS&C. Foreign purchases for fuels was the product service category with the highest percentage of total DoD purchases, and 36 percent of DoD's spending for fuel were purchases from foreign entities. Products such as iron and steel are categorized by FPDS in the PSC of Other, among other products or services. Purchases from foreign entities in the Other PSC category amounted to 3 percent of total DoD Other purchases in 2017, which, compared to the magnitude of all DoD purchases, is a relatively small sum.

**Table 5-7: Defense Total Actions and Obligations in 2016  
by Product Service Area**

<b>Product Service Area</b>	<b>Actions</b>	<b>Obligated Amount</b>
Aircraft	95,823	\$ 57,545,472,258
Clothing & Subsistence	1,251,662	\$ 11,390,240,144
Electronics & Communications	224,188	\$ 20,068,603,414
Engines & Power Plants	130,948	\$ 8,752,104,552
ERS	10,799,568	\$ 26,359,030,202
FRS&C	122,377	\$ 29,770,701,317
Fuels	280,045	\$ 7,561,336,177
Ground Vehicles	139,522	\$ 6,275,360,011
ICT	88,285	\$ 15,359,139,945
Launchers & Munitions	16,397	\$ 8,097,964,827
MED	16,628	\$ 13,670,225,734
Missiles & Space	7,015	\$ 12,535,601,741
Other	1,031,144	\$ 12,869,521,486
PAMS	151,416	\$ 46,958,498,321
R&D	46,145	\$ 24,565,013,812
Ships	23,749	\$ 18,008,958,696

Source: FPDS; CSIS analysis

Table 5–8: Total Actions and Obligations of Foreign Purchases in 2016 by Product Service Area from 165 Countries

<b>Product Service Area</b>	<b>Actions</b>	<b>Obligated Amount</b>	<b>Average Obligation per Action</b>	<b>% of Total Obligations per Product Service Area</b>
Aircraft	1,569	\$ 269,281,780	\$ 171,626	0.47%
Clothing & Subsistence	48,178	\$ 762,805,018	\$ 15,833	6.70%
Electronics & Communications	3,389	\$ 301,638,628	\$ 89,005	1.50%
Engines & Power Plants	1,279	\$ 63,650,981	\$ 49,766	0.73%
ERS	21,175	\$ 1,204,859,054	\$ 56,900	4.57%
FRS&C	19,750	\$ 2,793,894,460	\$ 141,463	9.38%
Fuels	21,104	\$ 2,753,805,733	\$ 130,487	36.42%
Ground Vehicles	3,321	\$ 183,891,230	\$ 55,372	2.93%
ICT	3,327	\$ 209,567,199	\$ 62,990	1.36%
Launchers & Munitions	1,168	\$ 720,364,234	\$ 616,750	8.90%
MED	833	\$ 17,059,231	\$ 20,479	0.12%
Missiles & Space	101	\$ 26,540,787	\$ 262,780	0.21%
Other	17,442	\$ 463,511,546	\$ 26,574	3.60%
PAMS	18,726	\$ 837,562,421	\$ 44,727	1.78%
R&D	308	\$ 73,079,668	\$ 237,727	0.30%
Ships	227	\$ 34,056,143	\$ 150,027	0.19%

Source: FPDS; CSIS analysis

Table 5–9 reports the foreign purchases by DoD that were either not applicable, waived, or exempt from the Buy American Act. 60 percent of foreign purchases were not applicable, waived, or exempt from the Buy American Act in FY 2017. The largest number of total obligations exempt from the Buy American Act were not applicable because they were manufactured outside of the U.S. for use outside of the U.S. The average size of a contract in this category was around \$150,000. The other categories with foreign purchases exempt from the Buy American Act have a relatively small share of total DoD purchases in FY 2017.

Table 5–9: Contract Obligations Not Applicable, Exempt, or Waived from Buy American Law

Category	Actions	Obligated Amount	Average Obligation per Action	% of Total Obligations	% of Foreign Obligations
<i>Buy American Act is not Applicable</i>					
Use Outside of the United States	22,211	\$ 3,278,665,744	\$ 147,615	1.03%	30.60%
<i>Buy American Act is Waived</i>					
Qualifying Country	36,349	\$ 2,880,602,494	\$ 79,248	0.90%	26.88%
U.S. Trade Agreement	1,937	\$ 41,178,317	\$ 21,259	0.01%	0.38%
<i>Exemptions from the Buy American Act</i>					
Commercial IT	718	\$ 135,065,197	\$ 188,113	0.04%	1.26%
Domestic Non-availability	2,081	\$ 75,502,816	\$ 36,282	0.02%	0.70%
Public Interest Determination	22	\$ 399,533	\$ 18,161	0.00012%	0.00%
Resale	77	\$ 2,026,930	\$ 26,324	0.00063%	0.02%
Unreasonable Cost	3,208	\$ 12,637,767	\$ 3,939	0.00395%	0.12%

Source: FPDS; CSIS analysis

Agency officials acting in response to EO 13788 should consider these trends both when drawing conclusions from the current state of foreign federal purchases and when proposing recommendations for future actions. Given the FY 2017 trends, the magnitude of foreign purchases made by DoD is relatively small compared to total DoD purchases. Furthermore, the top three PSC categories that had the largest amount of obligations from DoD foreign purchases were FRS&C, Fuels, and ERS, which are three categories that are likely driven mostly by overseas contingency operations and unlikely to be efficiently sourced domestically.

#### EXPANSION OF THE NATIONAL TECHNOLOGY AND INDUSTRIAL BASE

DoD's close defense industrial cooperation with allies like Canada, the United Kingdom, and Australia has always been a source of U.S. military strength, but even more so following the end of the Cold War and the proliferation of technological development globally. These close defense industrial relationships allowed the United States to rely on these key allies to help strengthen the U.S. defense industrial base and support

U.S. military operations. Canada has been formally included in the United States' definition of the NTIB since 1992, but the FY 2017 NDAA expanded the NTIB definition to also include the United Kingdom and Australia, reflecting the close defense relationships between those countries and the United States<sup>251</sup> Furthermore, section 881 of the FY 2017 NDAA required the Secretary of Defense to “develop a plan to reduce the barriers to the seamless integration between the persons and organizations that comprise the national technology and industrial base.”<sup>252</sup>

NTIB expansion is directly relevant not only to the second priority in the National Defense Strategy, “strengthening alliances as we attract new partners,” but also the other two priorities where the NTIB partners can play an important role: “rebuilding military readiness as we build a more lethal Joint Force,” and “reforming the Department’s business practices for greater performance and affordability.”<sup>253</sup> As DoD focuses on rebuilding lethality and readiness, NTIB partners can help provide key technologies and capabilities where U.S. efforts alone are insufficient. For example, even prior to NTIB integration, the U.S. had critical ongoing cooperative development efforts with the United Kingdom on quantum computing, and they shared similar efforts on unmanned system and hypersonics with the Australians.<sup>254</sup> Furthermore, many of the mechanisms used to reform DoD’s business practices are directly relevant to promoting greater NTIB integration. A CSIS report released earlier this year, *National Technology and Industrial Base Integration: How to Overcome Barriers and Capitalize on Cooperation*, highlighted the potential of cooperation in two business practice reforms—PBLs and open systems architectures (OSA)—that could spur greater NTIB partner integration, but the range of potential mutually beneficial mechanisms is not limited to just those two.

The FY 2019 NDAA contained two NTIB specific provisions: Section 842 – Removal of national interest determination requirements for certain entities and Section 844 – Limitation on certain procurements application process. Section 842 made it so that national interest determinations are no longer required for “covered NTIB entities” working under National Industry Security Program special security agreements to access proscribed

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251. US Code 10 § 2500 (2016).

252. *National Defense Authorization Act for Fiscal Year 2017*.

253. U.S. DoD, *Summary of the 2018 National Defense Strategy*.

254. Rhys McCormick, Samantha Cohen, Andrew P. Hunter, Gregory Sanders, Samuel Mooney, Daniel Herschlag, *National Technology and Industrial Base Integration: How to Overcome Barriers and Capitalize on Cooperation* (Washington, DC: Center for Strategic and International Studies, March 2018), [https://csis-prod.s3.amazonaws.com/s3fs-public/publication/180307\\_McCormick\\_National-TechnologyAndIndustrialBaseIntegration\\_Web.pdf?Yd28kTbbpfedujBec.QYCbUtwMDC4qaJ](https://csis-prod.s3.amazonaws.com/s3fs-public/publication/180307_McCormick_National-TechnologyAndIndustrialBaseIntegration_Web.pdf?Yd28kTbbpfedujBec.QYCbUtwMDC4qaJ).

information.<sup>255</sup> Section 844 expanded section 2543 of title 10 United States Code, “Miscellaneous limitation on the procurement of goods other than United States goods,” to require the Secretary of Defense to create a process for determining whether potential items should be limited to only NTIB manufacturers.

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255. FY 2019 NDAA Sec. 842 defines “covered NTIB entities” as persons working for U.S. subsidiaries of parent companies headquartered in one of the three NTIB partners and who are “subject to the foreign ownership, control, or influence requirements of the National Industrial Security Program.”

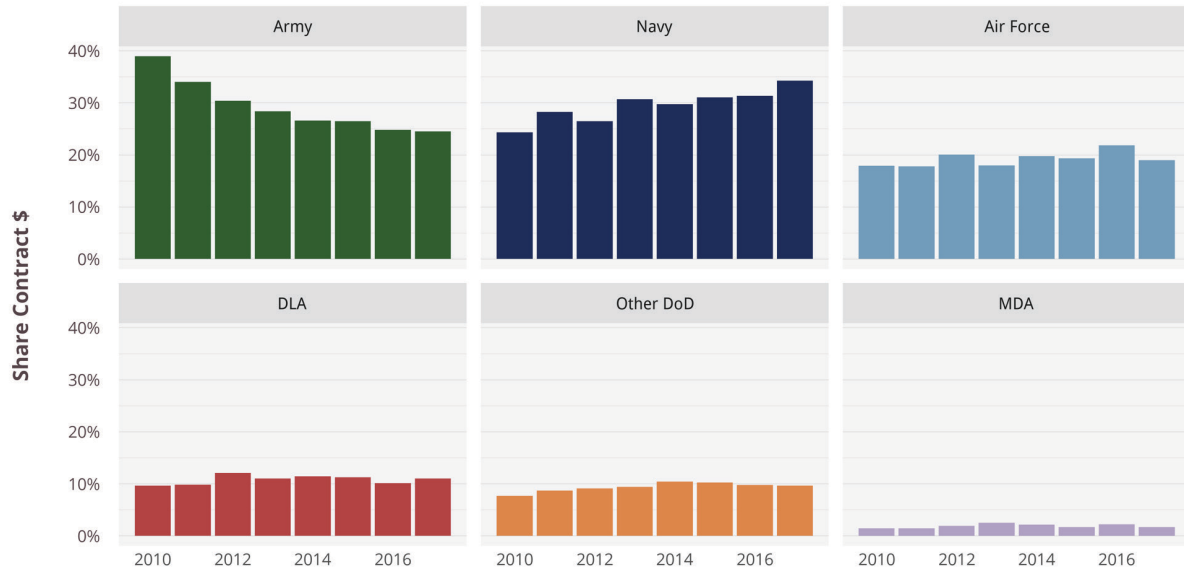
## What Are the Defense Components Buying?

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**The following sections analyze** the contracting portfolios of the major DoD components (Army, Navy, Air Force, DLA, MDA, and Other DoD, which includes all contracting entities not captured by the first five categories), focusing on trends between FY 2015 and FY 2017. These sections provide a critical look at trends within DoD components, because despite DoD being frequently talked about as a singular entity, contracting decisions are predominantly made within the components. This analysis provides critical insights into what the defense components are buying, with a more in-depth look at professional services, how the components buy, and from whom they buy.

Figure 6-1 shows DoD contract obligations broken down by major DoD component, from FY 2010 to FY 2017.

Figure 6-1 | Defense Contract Obligations by Component, 2010-2017



Source: FPDS; CSIS analysis

## 6.1 Department of the Army

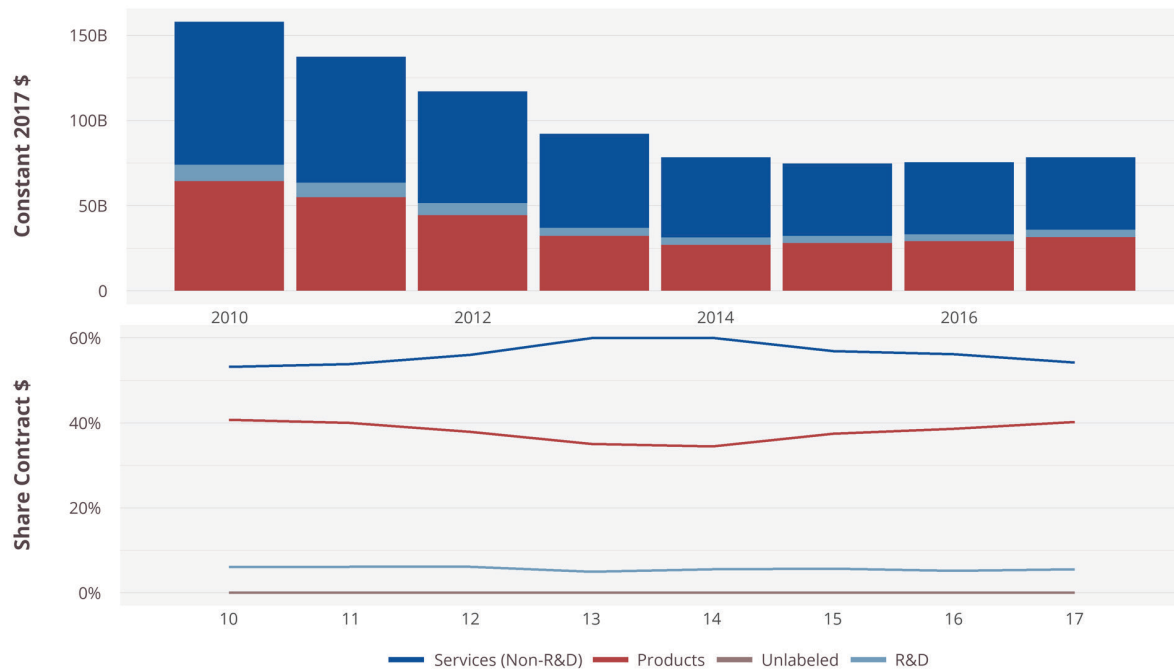
After six-years of significant decline, Army contract obligations increased 5 percent between FY 2015 and FY 2017, albeit a rate below the overall DoD growth rate (13 percent). Army contract obligations grew from \$74.7 billion in FY 2015 to \$75.4 billion in FY 2016 and then \$78.3 billion in FY 2017.

### WHAT IS THE ARMY BUYING?

Figure 6-2 shows Army contract obligations, broken down by area, from FY 2010 to FY 2017.



Figure 6-2: Army Contract Obligations by Area, 2010–2017



Source: FPDS; CSIS analysis

Products accounted for much of the 5 percent growth in Army contract obligations, increasing 13 percent between FY 2015 and FY 2017. The 13 percent growth in Army products contract obligations resulted from steady growth in FY 2016 (4 percent) and FY 2017 (8 percent). Army R&D contract obligations remain near historic lows despite Army R&D contract obligations increasing 2 percent between FY 2015 and FY 2017.<sup>256</sup>

“Army R&D contract obligations remain near historic lows.

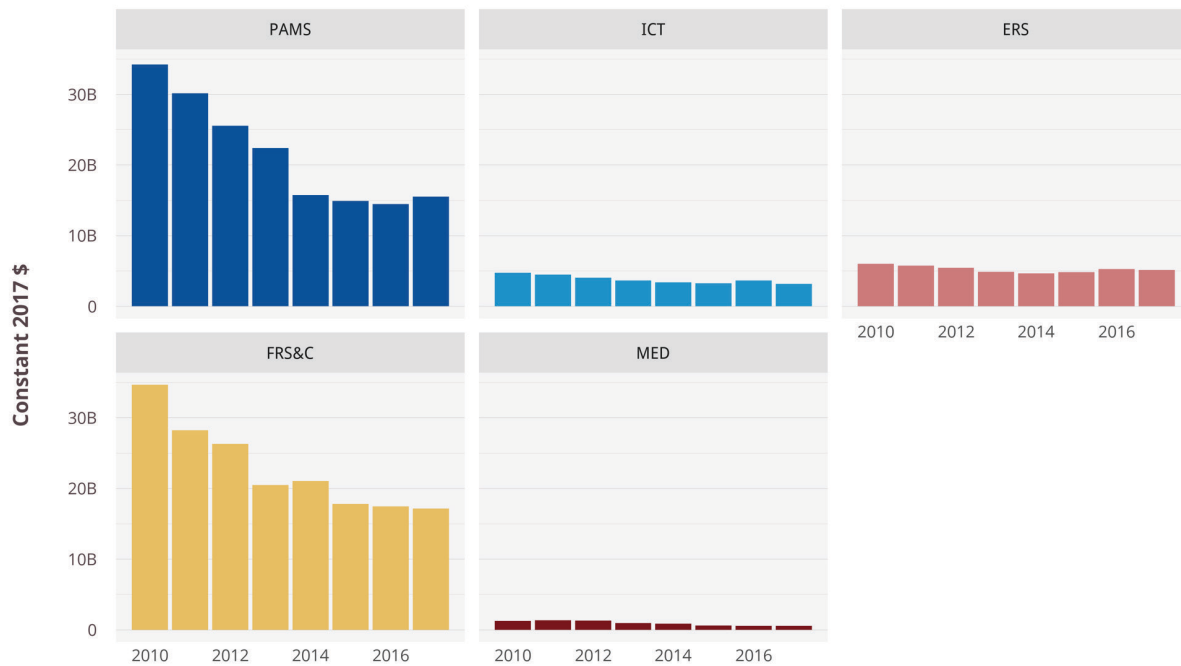
Topline Army services contract obligations remained steady between FY 2015 and FY 2017, but there were several changes within the Army’s services portfolio. Army ERS (7 percent) and PAMS (3 percent)

contract obligations increased between FY 2015 and FY 2017, while FRS&C (–4 percent), ICT (–4 percent), and MED (–7 percent) all declined. As a share of Army services contract obligations, FRS&C continued falling, while PAMS saw a slight uptick as ERS, ICT, and PAMS remained relatively steady.

Figure 6-3 shows Army contract obligations by services category from FY 2010 to FY 2017.

256. Rhys McCormick, "The Army Modernization Challenge: A Historical Perspective" Defense 360 Center for Strategic and International Studies, March 28, 2016, <https://defense360.csis.org/army-modernization-challenge-historical-perspective-2/>.

Figure 6-3 | Army Contract Obligations by Services Category, 2010-2017



Source: FPDS; CSIS analysis

#### ARMY CONTRACTING OBLIGATIONS BY PLATFORM PORTFOLIO

There were several notable shifts in the Army’s contracting portfolio by platform portfolio over the past two years. First, Aircraft and Ordnance and Missiles both grew at rates faster than topline Army growth and increased their share of total Army contract obligations, while Facilities & Construction and Air and Missile Defense both fell. Army Aircraft contract obligations increased 20 percent between FY 2015 and FY 2017, rising from a 12.5 percent share of contract obligations to 14.3 percent. Army Ordnance and Missiles contract obligations increased 79 percent over the past two years, and they nearly doubled their share of total Army contract obligations, going from 5.9 percent in FY 2015 to 10.2 percent in FY 2017. Comparatively, Army Air and Missile Defense contract obligations declined 40 percent, going from a 6.1 percent share to 3.1 percent. Army Facilities & Construction contract obligations steadily declined a total 5 percent between FY 2015 and FY 2017. In two other notable platforms, Army Electronics, Comms, & Sensors (5 percent) contract obligations grew in-line with total Army contract obligations, while Land Vehicles (0 percent) remained steady even as total Army contract obligations grew 5 percent.

Figure 6-4 shows Army contract obligations by platform portfolio from FY 2010 to FY 2017.

Figure 6-4 | Army Contract Obligations by Platform Portfolio, 2010-2017



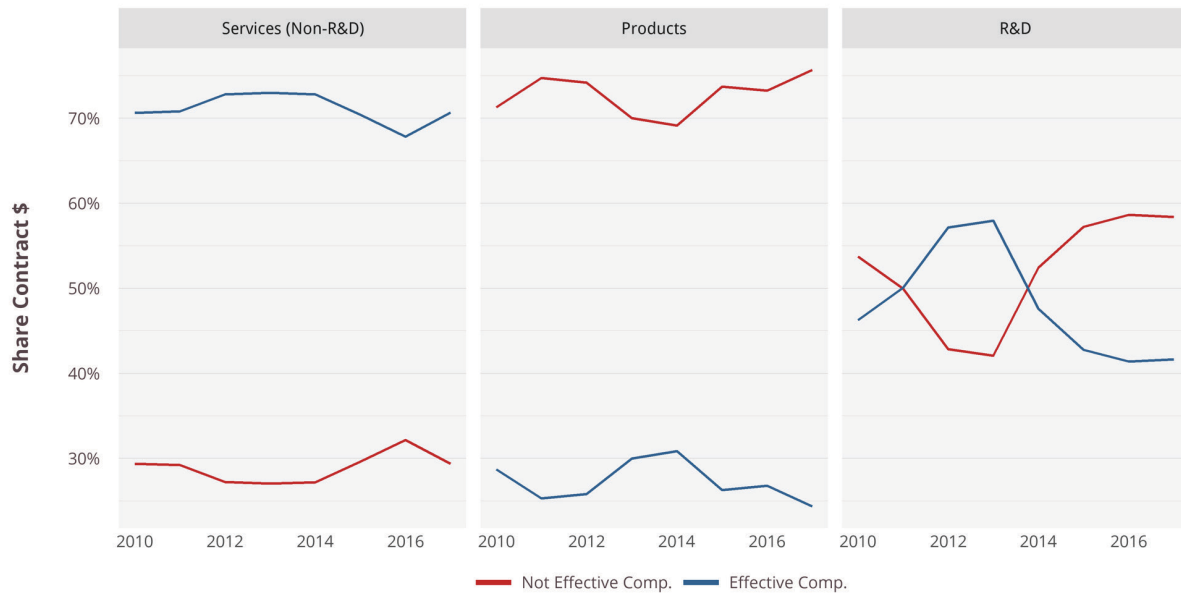
Source: FPDS; CSIS analysis

### HOW IS THE ARMY BUYING IT?

The rate of effective competition for Army contracting fell slightly over the past two years, going from 51.2 percent to 49.5 percent. The slight declines in effective competition in both products and R&D drive the topline trends. The rate of effective competition fell from 26 percent to 24 percent in Army products and from 43 percent to 41 percent in Army R&D.

Figure 6-5 shows the level of competition for Army contract obligations by area from FY 2010 to FY 2017.

Figure 6-5 | Level of Competition for Army Contract Obligations by Area, 2010-2017



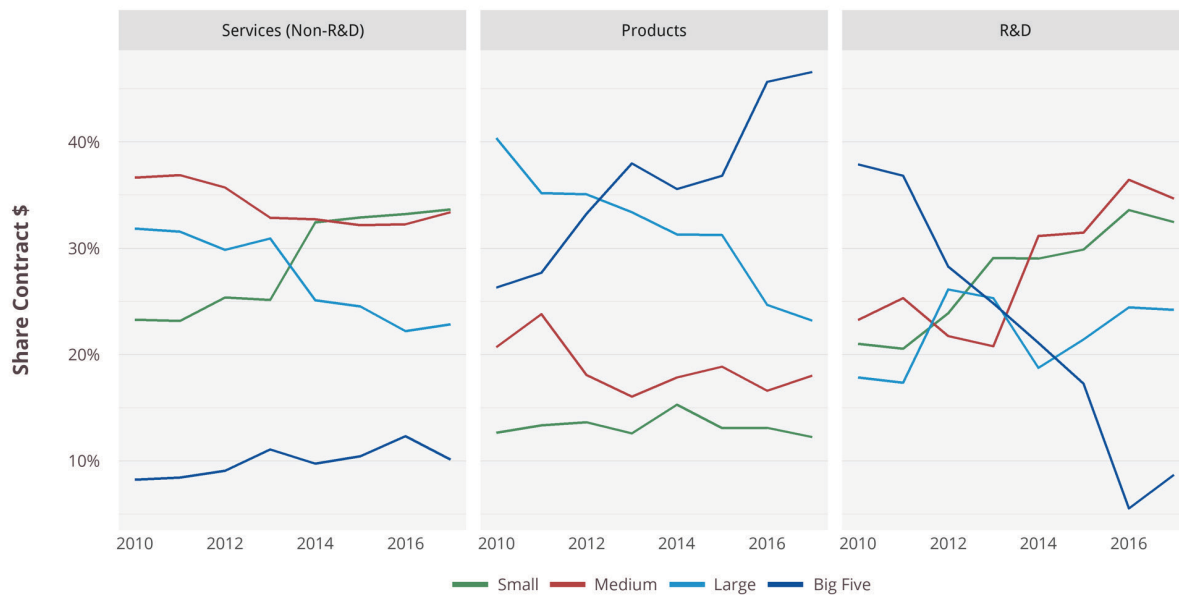
Source: FPDS; CSIS analysis

#### FROM WHOM IS THE ARMY BUYING?

When Army contract data are analyzed by vendor size, they show the Big Five increasing their share of topline Army contract obligations at Large vendor's expense. The Big Five went from accounting for 20.5 percent of Army contract obligations in FY 2015 to 24.5 percent in FY 2017. Meanwhile, Large vendors' share of Army contract obligations fell from 27.6 percent to 23.6 percent. Medium and Small vendors' share of Army contract obligations remained relatively steady.

Figure 6-6 shows Army contract obligations by area by size of vendor from FY 2010 to FY 2017.

Figure 6-6 | Army Contract Obligations by Area by Size of Vendor, 2010-2017



Source: FPDS; CSIS analysis

The Army products data echo the topline vendor size trends, but at a greater magnitude. The Big Five's share of Army products contract obligations rose from 36.7 percent in FY 2015 to 46.4 percent in FY 2017. Large vendors' share of Army products contract obligations declined from 31.3 percent to 23.2 percent. Like the topline Army trends, there are minimal changes for Small and Medium sized vendors.

Although the Big Five increased their market share in Army products, the same cannot be said for their share of Army R&D, where the Big Five declined precipitously. The Big Five's share of Army R&D contract obligations cratered from 17.2 percent in FY 2015 to 5.5 percent in FY 2016 before slightly rebounding to 8.6 percent in FY 2017. This is the continuation of an ongoing trend that has been occurring since FY 2009, when the Big Five accounted for 47.6 percent of Army R&D contract obligations. The Big Five's decline in Army R&D contract obligations benefited Large, Medium, and Small vendors at relatively equal rates.

For Army services, Small and Medium sized vendors saw a slight uptick in their market share compared to the Big Five's marginal decline and Large vendor's greater decline. Small and Medium sized vendors went from accounting for 32.3 percent and 31.8 percent of Army services contract obligations in FY 2015 to 33.2 percent and 33 percent respectively. The decline in the Big Five's market share from 10.1 percent to 9.9 percent

was marginal compared to Large vendor's decline from 25.7 percent to 23.9 percent.

## TOP ARMY VENDORS

Table 6-1 | Top 10 Army Vendors, 2017

	Top 10 Army Vendors in FY 2017	Obligations in 2017 Millions	2015 Rank
1	Lockheed Martin	\$ 6,767	1
2	Raytheon	\$ 3,892	2
3	General Dynamics	\$ 3,483	3
4	Boeing	\$ 3,456	6
5	BAE Systems	\$ 2,119	7
Top 5 Total		\$ 19,717	
6	Oshkosh	\$ 1,334	9
7	Northrop Grumman	\$ 1,199	5
8	L3 Communications	\$ 1,162	8
9	SAIC	\$ 1,032	10
10	General Atomics	\$ 844	15
Top 10 Total		\$ 25,289	
Army FY 2017 Total		\$ 78,296	

Source: FPDS; CSIS analysis

Table 6-1 shows the top 10 Army vendors ranked by contract obligations in FY 2017. There was more turnover in the top Five Army vendors between FY 2015 and FY 2017 than the Air Force and Navy. While Lockheed Martin, Raytheon, and General Dynamics remained ranked first, second, and third respectively, Boeing and BAE Systems entered the top 5 in FY 2017 after having been the sixth and seventh ranked Army vendor in FY 2015. Northrop Grumman, the fifth-ranked vendors in FY 2015, fell to seventh in FY 2017, while the fourth-ranked vendor, UTC, fell outside the top 100 after selling one of its business units, Sikorsky, to Lockheed Martin in 2015.<sup>257</sup>

Outside the top 5, Oshkosh, L3 Communications, and SAIC all remained in the top 10 Army vendors, albeit with Oshkosh and SAIC in new positions. General Atomics, the only new entrant into the Army top 10 between FY 2015 and FY 2017, took the tenth spot in the Army's top vendors ranking in FY 2017.

257. Andrew Clevenger, "Lockheed Completes Sikorsky Acquisition," *Defense News*, November 6, 2015, <https://www.defensenews.com/industry/2015/11/06/lockheed-completes-sikorsky-acquisition/>.

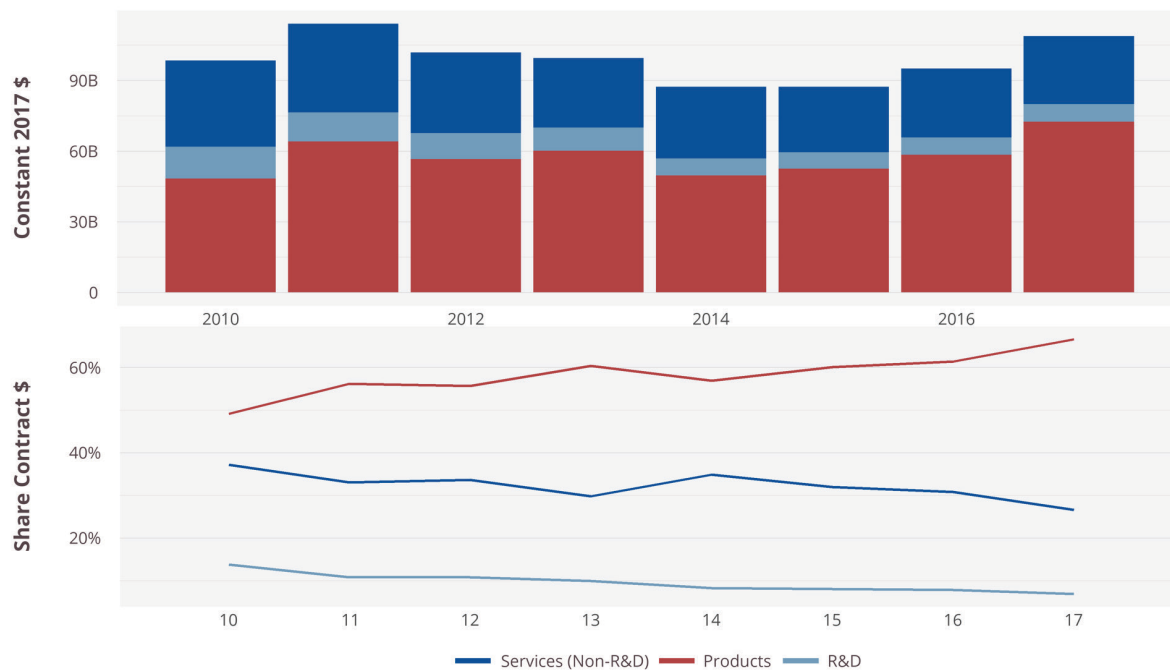
## 6.2 | Department of the Navy

From FY 2015 to FY 2017, Navy contract obligations increased 25 percent, a rate well above the overall DoD growth rate (13 percent), rising from \$87.7 billion to \$109.4 billion. Navy contract obligations grew each of the previous two years, increasing 9 percent in FY 2016 and 15 percent in FY 2017.

### WHAT IS THE NAVY BUYING?

Figure 6–7 shows Navy contract obligations, broken down by area, from FY 2010 to FY 2017.

Figure 6–7 | Navy Contract Obligations by Area, 2010–2017



Source: FPDS; CSIS analysis

The growth in the Navy's contract portfolio was concentrated in products, which increased 38 percent between FY 2015 and FY 2017. Navy products contract obligations initially grew 11 percent in FY 2016, a rate slightly higher than the overall 9 percent growth in Navy contract obligations. In FY 2017, products contract obligations increased (24 percent) much higher than the overall rate of growth (15 percent). Between FY 2015 and FY 2017, Navy products contract obligations grew from \$52.5 billion to \$72.5 billion.

Navy R&D and Services contract obligations increased 6 percent and 5 percent respectively between FY 2015 and FY 2017. However, after growing the previous year, both R&D and services contract obligations remained steady between FY 2016 and FY 2017.



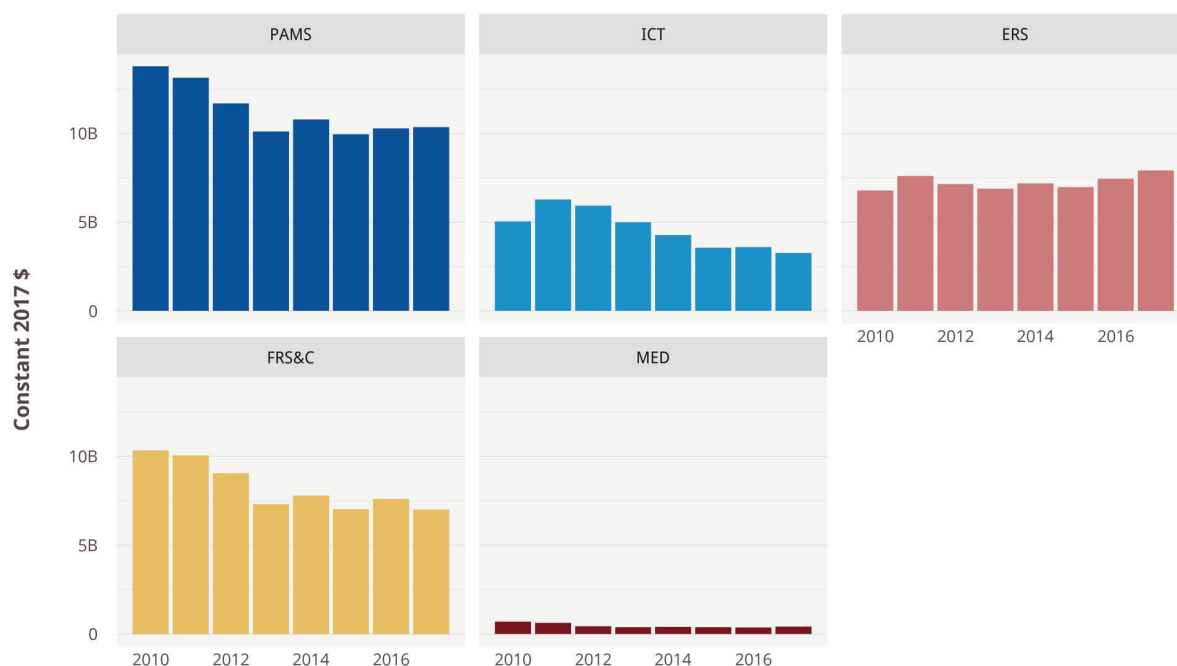
“The growth in the Navy’s contract portfolio was concentrated in products.

Between FY 2015 and FY 2017, ERS surpassed FRS&C as the largest share of the Navy’s services contract portfolio. Navy ERS contract obligations increased 14 percent between FY 2015 and FY 2017, the largest increase amongst all Navy services categories, while its share

of obligations rose from 24.8 percent to 27.0 percent, likely reflecting the Navy’s focus on restoring readiness. Navy MED contract obligations grew at the second-fastest rate, increasing 7 percent between FY 2015 and FY 2017. PAMS contract obligations grew 4 percent, a rate in-line with the overall rate of growth. Finally, FRS&C contract obligations remained steady between FY 2015 and FY 2017, while ICT contract obligations declined 2 percent, the only decline among Navy services categories.

Figure 6-8 shows Navy contract obligations by services category from FY 2010 to FY 2017.

Figure 6-8: Navy Contract Obligations by Services Category, 2010-2017



Source: FPDS; CSIS analysis

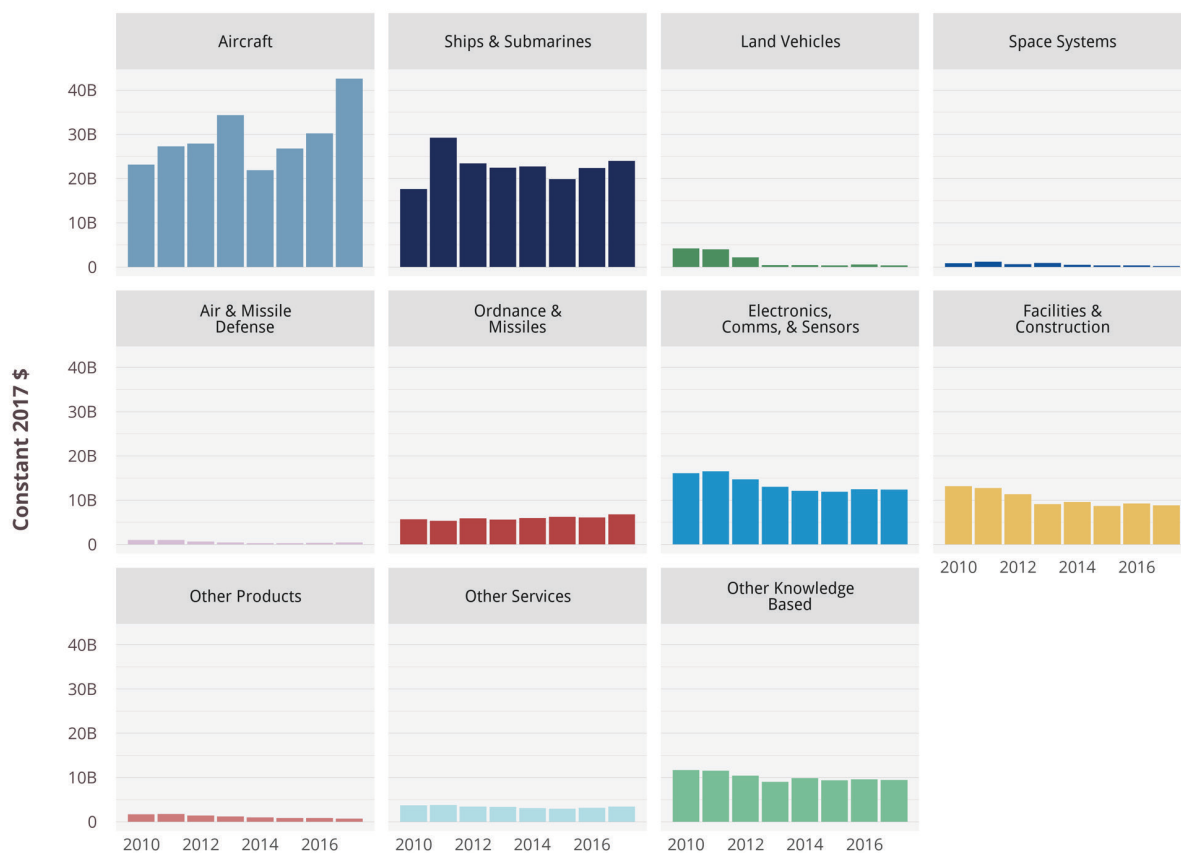
#### NAVY CONTRACTING OBLIGATIONS BY PLATFORM PORTFOLIO

The Navy’s platform portfolio contract data show a significant increase in Aircraft contract obligations between FY 2015 and FY 2017. Navy Aircraft

contract obligations increased from \$27 billion in FY 2015 to \$42.8 billion in FY 2017, a 58 percent increase.<sup>258</sup> As a share of Navy contract obligations, Aircraft rose from 31 percent to 39 percent. Meanwhile, Ships & Submarines contract obligations, the second-largest Navy platform portfolio, grew at a rate (21 percent) slightly below the overall Navy growth rate (25 percent). Finally, EC&S fell from 14 percent of Navy contract obligations in FY 2015 to 12 percent in FY 2017.

Figure 6-9 shows Navy contract obligations by platform portfolio from FY 2010 to FY 2017.

Figure 6-9 | Navy Contract Obligations by Platform Portfolio, 2010-2017



Source: FPDS; CSIS analysis

### HOW IS THE NAVY BUYING IT?

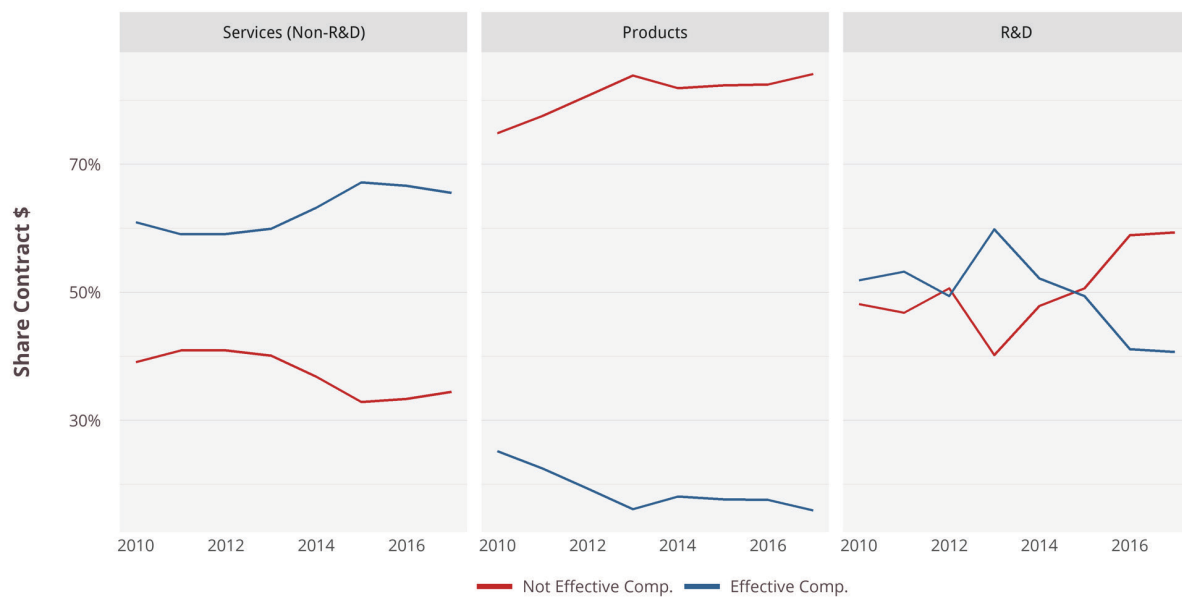
The rate of effective competition for Navy contracting decreased from 34 percent in FY 2015 to 31 percent in FY 2017, and that decline was reflected

258. Note: FPDS categories all F-35 contract obligations as Navy.

in all three contracting areas. The rate of effective competition for Navy products declined from 17.7 percent to 15.9 percent. Effective competition for Navy R&D contract obligations declined sharply, falling from 49.1 percent to 40.5 percent. Finally, the rate of effective competition for Navy services contract obligations declined from 66.6 percent to 64.4 percent.

Figure 6-10 shows the level of competition for Navy contract obligations by area from FY 2010 to FY 2017.

Figure 6-10: Level of Competition for Navy Contract Obligations by Area, 2010-2017

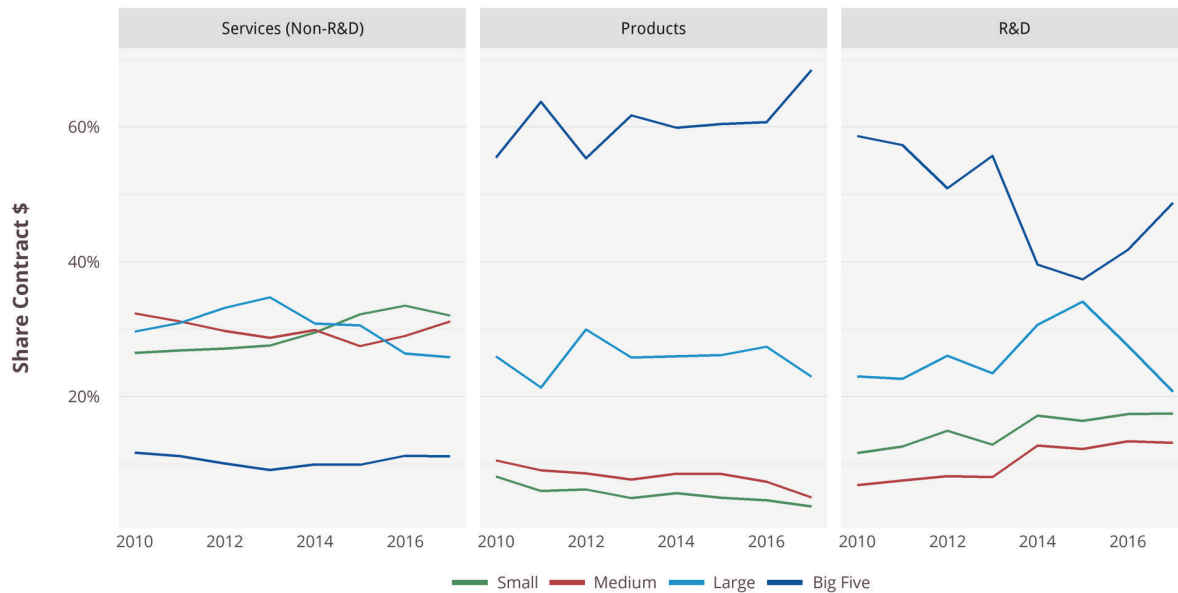


Source: FPDS; CSIS analysis

### From Whom Is the Navy Buying?

In recent years, the Big Five increased their share of total Navy contract obligations at the expense of all other vendor sizes. Figure 6-11 shows Navy contract obligations by area by size of vendor from FY 2010 to FY 2017.

Figure 6-11 | Navy Contract Obligations by Area by Size of Vendor, 2010-2017



Source: FPDS; CSIS analysis

The Big Five accounted for 68 percent of Navy products contract obligations in FY 2017, an up-tick from the Big Five's 60 percent market share in FY 2015. The Big Five's increased dominance of Navy products resulted in decreased market share for all other vendor size categories. Large vendors' market share went from 26 percent to 23 percent, Medium vendors fell from 9 percent to 5 percent, while Small vendors' market share declined 1 percent.

In Navy R&D, the Big Five increased their market share at the direct expense of Large vendors. Large vendors accounted for 34 percent of Navy R&D contract obligations in FY 2015, but they fell precipitously between FY 2015 and FY 2017, accounting for just 21 percent of Navy R&D contract obligations in FY 2017. The Big Five's market share increased from 37 percent to 49 percent. Medium (13 percent) and Small vendors (18 percent) each increased their market share by 1 percent in FY 2017 from FY 2015.

Compared to products and services, the Big Five's share of Navy services only grew marginally (1 percent) between FY 2015 and FY 2017. Instead, the data show that Medium vendors increased their market share at Large vendors' expense. In FY 2015, Medium and Large vendors accounted for 28 percent and 30 percent of Navy services contract obligations respectively. Whereas, in FY 2017, Medium vendors accounted for 31 percent of Navy services contract obligations while Large vendors accounted for just 26 percent.

## TOP NAVY VENDORS

Table 6–2 | Top 10 Navy Vendors, 2017

	Top 10 Navy Vendors in FY 2017	Obligations in 2017 Millions	2015 Rank
1	Lockheed Martin	\$ 30,102	1
2	General Dynamics	\$ 9,348	2
3	Huntington Ingalls Incorporated	\$ 6,452	7
4	Boeing	\$ 6,073	4
5	Raytheon	\$ 4,674	3
Top 5 Total		\$ 56,650	
6	Northrop Grumman	\$ 3,676	6
7	Bechtel	\$ 3,134	9
8	BAE Systems	\$ 2,733	8
9	Bell Boeing Joint Project Office*	\$ 2,410	10
10	UTC	\$ 982	5
Top 10 Total		\$ 69,586	
Navy FY 2017 Total		\$ 109,424	

Source: FPDS; CSIS analysis (\*-Joint Venture)

Table 6–2 shows the top 10 Navy vendors ranked by contract obligations in FY 2017. Huntington Ingalls Incorporated re-entered the top 5 in FY 2017 after ranking seventh in FY 2015. Meanwhile, UTC fell from the fifth in FY 2015 to tenth in FY 2017. The share of Navy contract obligations awarded to the top 5 rose from 40 percent in FY 2015 to 52 percent in FY 2017.

Outside of the top 5, the composition of the top 10 Navy vendors remained steady, although there was some movement within the top 10. For example, Bechtel rose from ninth to seventh. The share of Navy contract obligations awarded to the top 10 rose from 55 percent in FY 2015 to 64 percent in FY 2017.

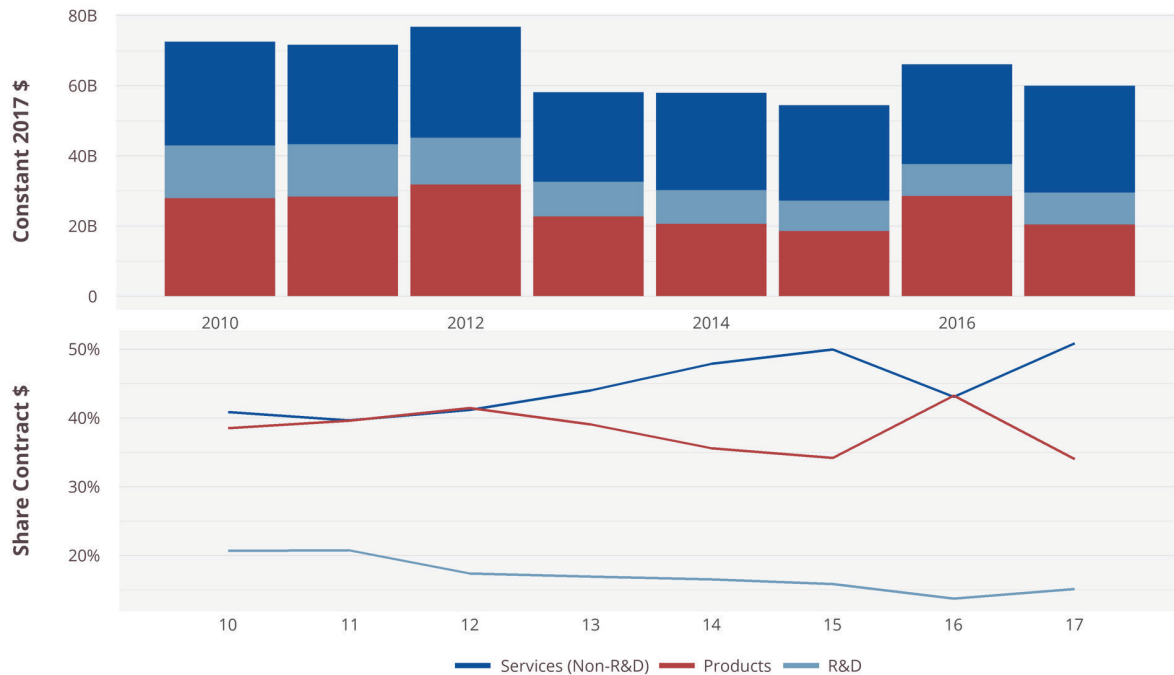
### 6.3 | Department of the Air Force

From FY 2015 to FY 2017, Air Force contract obligations increased 11 percent, a rate in-line with the overall DoD growth rate (13 percent), rising from \$54.6 billion to \$60.6 billion. However, Air Force contract obligations experienced a significant whipsaw between FY 2016 and FY 2017. In FY 2016, Air Force contract obligations increased 21 percent, far surpassing the 8 percent growth in overall DoD contract obligations. However, in FY 2017 Air Force contract obligations declined 9 percent.

## WHAT IS THE AIR FORCE BUYING?

Figure 6-12 shows Air Force contract obligations, broken down by area, from FY 2010 to FY 2017.

Figure 6-12 | Air Force Contract Obligations by Area, 2010-2017



Source: FPDS; CSIS analysis

“From FY 2015 to FY 2017, Air Force contract obligations increased 11 percent, a rate in-line with the overall DoD growth rate.

The whipsaw in topline Air Force contracting only affected products, and it was the result a sharp uptick in products contract obligations in FY 2016, which was followed by a return to recent norms in FY 2017.<sup>259</sup> Air Force products contract obligations totaled \$28.6 billion in FY 2016, 54 percent higher than the previous year. In FY 2017, Air Force

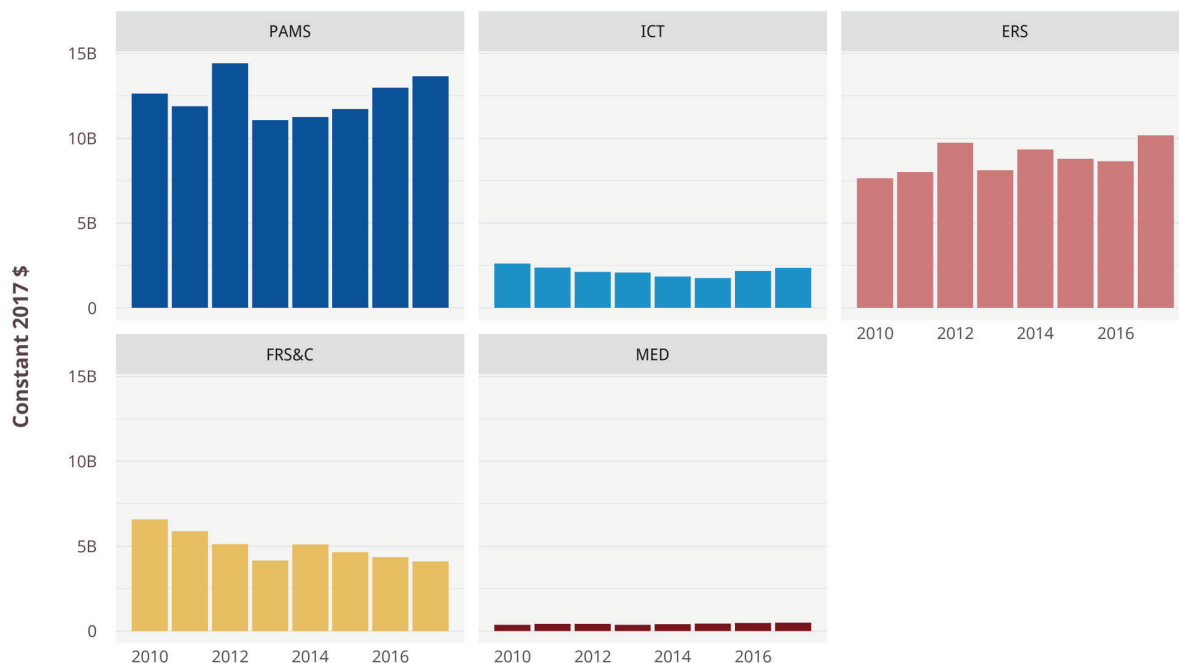
products contract obligations declined 28 percent to \$20.7 billion, a figure more in line with the trends of the last five years.

Air Force R&D contract obligations grew 6 percent between FY 2015 and FY 2017.

259. Air Force products contract obligations increased 11 percent between FY 2015 and FY 2017.

Air Force services contract obligations grew 13 percent between FY 2015 and FY 2017. Within the Air Force services contracting portfolio, FRS&C continued its slide as Air Force FRS&C contract obligations declined 34 percent. While FRS&C continued to freefall, Air Force ICT contract obligations (34 percent) grew at over twice the topline Air Force services rate. Comparatively, ERS (16 percent), MED (10 percent), and PAMS (16 percent) all grew over the past two years at rates closer to the overall growth in Air Force services. Figure 6-13 shows Air Force contract obligations by services category from FY 2010 to FY 2017.

Figure 6-13 | Air Force Contract Obligations by Services Category, 2010-2017



Source: FPDS; CSIS analysis

#### AIR FORCE CONTRACTING OBLIGATIONS BY PLATFORM PORTFOLIO

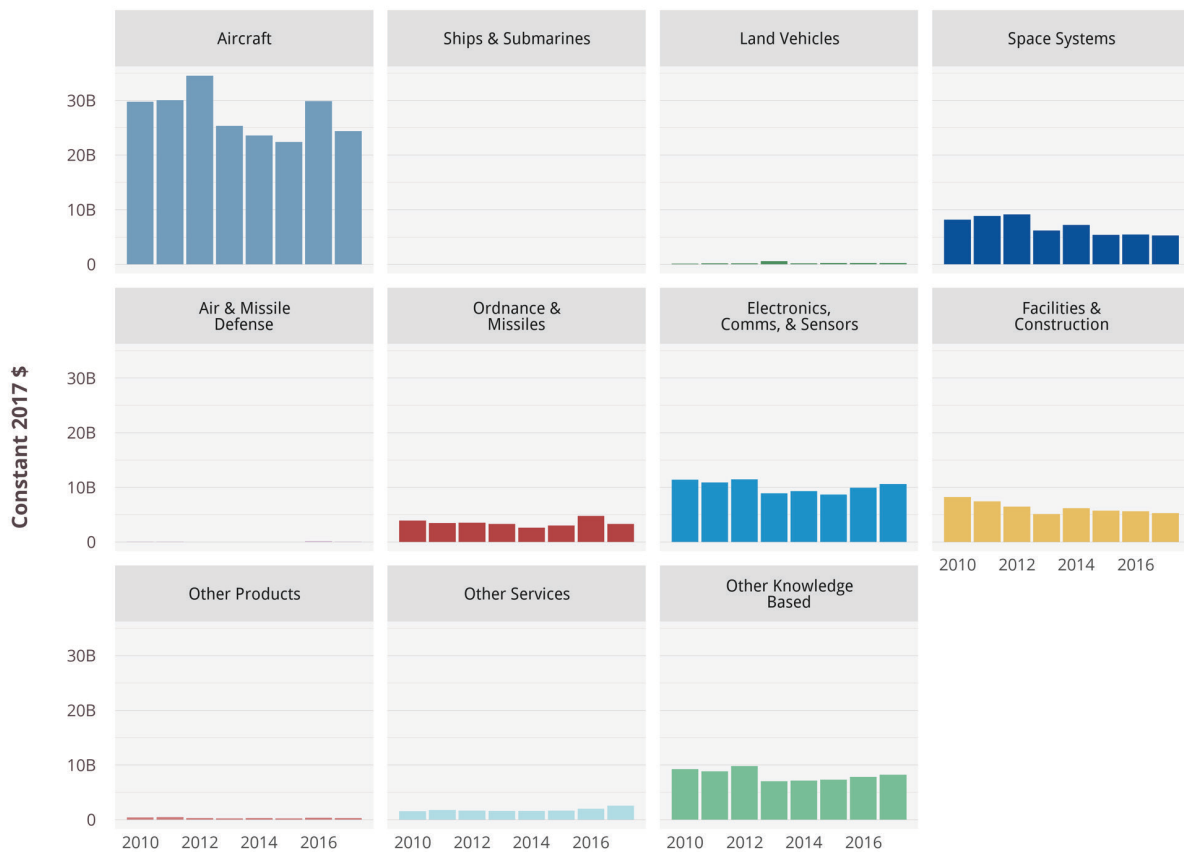
The platform portfolio contracting data show that although the composition of the Air Force contracting portfolio has remained steady over the past two years, there were a few interesting trends worth noting. First, in the Aircraft portfolio there was a significant whipsaw between FY 2016 and FY 2017. Air Force Aircraft contract obligations increased 33 percent in FY 2016 only to decline 18 percent in FY 2017. Despite the 18 percent decline, Air Force Aircraft contract obligations were still 10 percent higher than they were in FY 2015. Second, there was a large surge in Air Force Ordnance and Missiles contracting in FY 2016. That year, Air Force Ordnance and Missiles contract



obligations went from \$3 billion to \$4.7 billion, a 58 percent increase. Finally, Air Force Electronics, Comms, & Sensors (24 percent) contract obligations have grown faster than total Air Force contracts (11 percent).

Figure 6-14 shows Air Force contract obligations by platform portfolio from FY 2010 to FY 2017.

Figure 6-14 | Air Force Contract Obligations by Platform Portfolio, 2010-2017



Source: FPDS; CSIS analysis

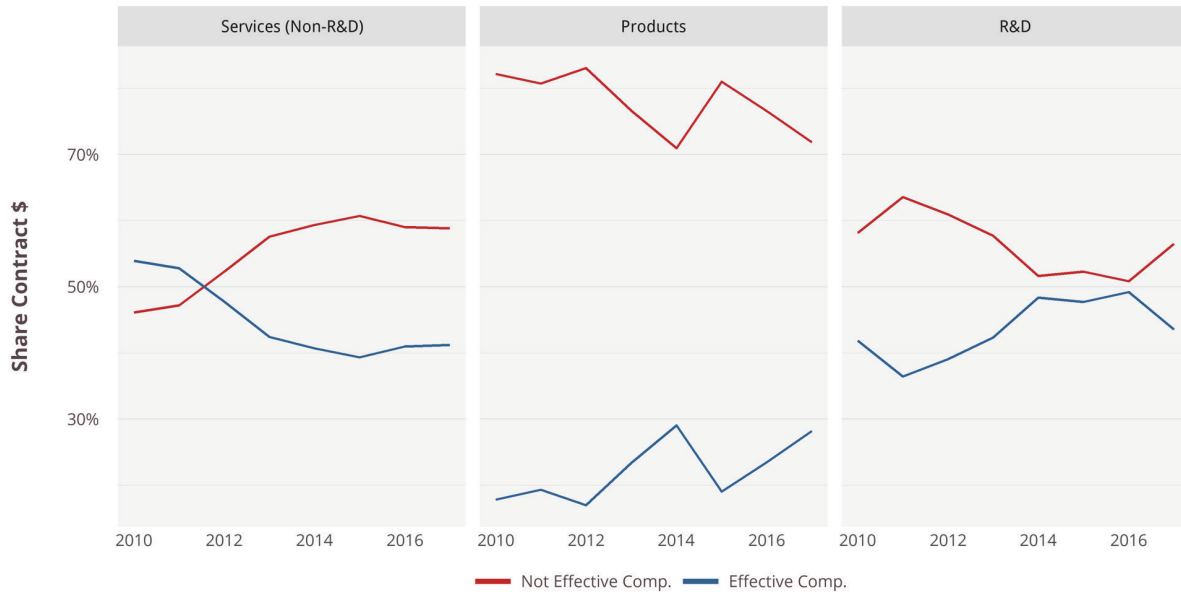
### HOW IS THE AIR FORCE BUYING?

The rate of effective competition for Air Force contracting increased from 34 percent in FY 2015 to 37 percent in FY 2017. Notably, the rate of effective competition for Air Force products increased from 19 percent to 28 percent. Additionally, there was a slight reversal in the previous trends of declining competition for Air Force services that was highlighted in previous CSIS reports.<sup>260</sup>

260. Jesse Ellman, *Air Force Faces Puzzling Decline in Competition for Services* (Washington, DC:

Figure 6-15 shows the level of competition for Air Force contract obligations by area from FY 2010 to FY 2017.

Figure 6-15 | Level of Competition for Air Force Contract Obligations by Area, 2010-2017



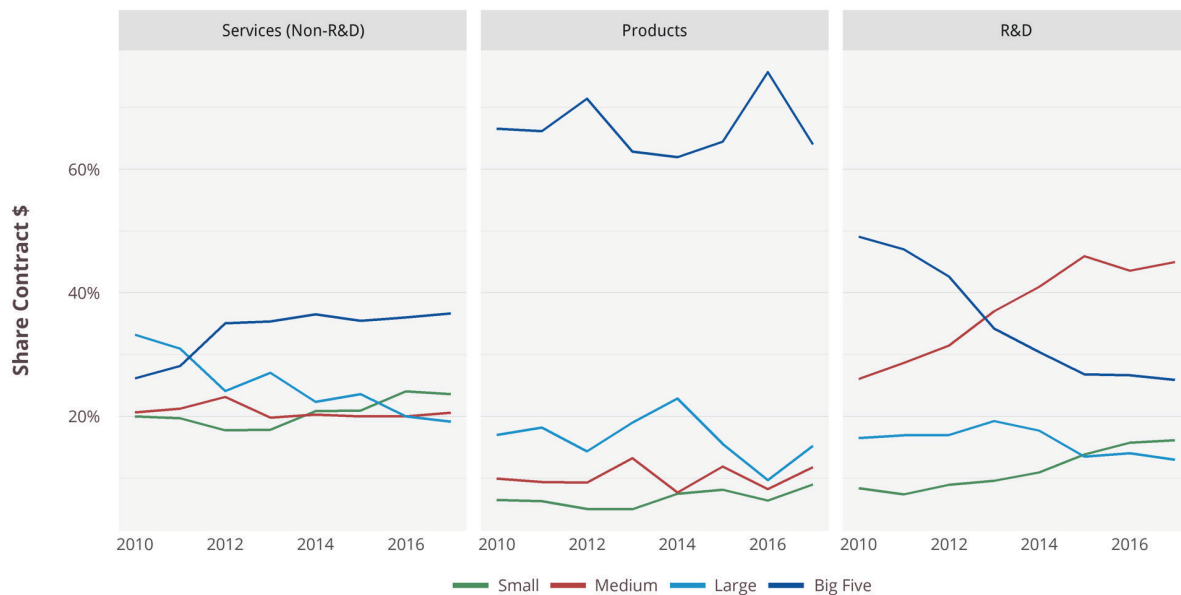
Source: FPDS; CSIS analysis

#### FROM WHOM IS THE AIR FORCE BUYING?

There were significant differences in the Air Force vendor size contracting trends in the two years between FY 2015 and FY 2017. In FY 2016, the share of Air Force contract obligations awarded to the Big Five increased significantly, rising from 43.9 percent to 51.7 percent. Meanwhile, the share of FY 2016 Air Force contract obligations awarded to Large vendors fell from 19.2 percent to 14.7 percent. In FY 2017, the Big Five returned to FY 2015 levels, accounting for 44 percent of FY 2017 Air Force contract obligations. Although Large vendors saw a slight uptick in market share between FY 2016 and FY 2017 (16.8 percent), they did not wholly rebound. Small vendors saw a slight uptick in FY 2017, accounting for 17.8 percent of FY 2017 Air Force contract obligations, a number slightly higher than the 15.6 percent and 15.4 percent market share in FY 2015 and FY 2016, respectively.

Figure 6-16 shows Air Force contract obligations by area by size of vendor from FY 2010 to FY 2017.

Figure 6-16 | Air Force Contract Obligation by Size of Vendor by Area, 2010-2017



Source: FPDS; CSIS analysis

The Big Five's substantial increase in market share in FY 2016 was heavily driven by the Air Force products contracting trends. In FY 2016, the Big Five accounted for 75.7 percent of Air Force products contract obligations, significantly higher than FY 2015's 64.4 percent. However, in FY 2017 the Big Five reverted to FY 2015 levels, accounting for 64 percent of FY 2017 Air Force products contract obligations. The Big Five's increase in Air Force products contract obligations impacted the other three vendor size categories but affected Large vendors the most. Large vendors fell from 15.5 percent of Air Force products contract obligations in FY 2015 to 9.7 percent in FY 2016 but did rebound to 15.2 percent in FY 2017. Finally, Small vendors saw a slight uptick in Air Force products market share between FY 2015 and FY 2017, rising from 8.1 percent to 9 percent.

Small vendors gradually grew in market share for Air Force R&D contract obligations between FY 2015 and FY 2017, rising from 13.8 percent to 16.1 percent. This growth was offset by slight declines in market share for Large, Medium-sized vendors, and the Big Five. The Big Five went from a 26.8 percent market share to 25.9 percent, Large vendors went from 13.5 percent to 13 percent, and Medium vendors went from 45.9 percent to 45 percent.

In Air Force services, Large vendors declined in market share between FY 2015 and FY 2017 while Big Five, and Small and Medium vendors all increased, albeit at varying rates. As a share of Air Force services contract

obligations, Large vendors went from 23.6 percent to 19.1 percent. Small vendors were the biggest beneficiary, rising from 20.9 percent of Air Force services contract obligations in FY 2015 to 23.6 percent in FY 2017. The Big Five went from 35.5 percent to 36.7 percent, while Medium vendors grew more gradually, going from 20 percent to 20.6 percent.

### TOP AIR FORCE VENDORS

Table 6–3 | Top 10 Air Force Vendors, 2017

	Top 10 Air Force Vendors in FY 2017	Obligations in 2017 Millions	2015 Rank
1	Boeing	\$ 9,203	2
2	Lockheed Martin	\$ 8,464	1
3	Northrop Grumman	\$ 3,995	3
4	Raytheon	\$ 2,636	4
5	L3 Communications	\$ 2,552	5
Top 5 Total		\$ 26,850	
6	United Launch Alliance*	\$ 1,952	6
7	General Atomics	\$ 1,428	7
8	UTC	\$ 1,034	8
9	Massachusetts Institute of Technology	\$ 1,016	9
10	BAE Systems	\$ 917	12
Top 10 Total		\$ 33,197	
Air Force FY 2017 Total		\$ 60,562	

Source: FPDS; CSIS analysis (\*-Joint Venture)

Table 6–3 shows the top 10 Air Force vendors ranked by contract obligations in FY 2017. The data show that beyond Boeing and Lockheed Martin swapping the top position, the top 5 Air Force vendors remained the same in FY 2017 as FY 2015. The top 5 vendors accounted for 45 percent of Air Force contracts obligations in FY 2015 and 44 percent in FY 2017.

Beyond the top 5, BAE Systems, was the only new vendor in the top 10 from FY 2015, replacing the Aerospace Corporation. BAE Systems rose from 12th in FY 2015 to tenth in FY 2017. The top 10 vendors accounted for 56 percent of Air Force contracts obligations in FY 2015 and 55 percent in FY 2017.

## 6.4 | Missile Defense Agency

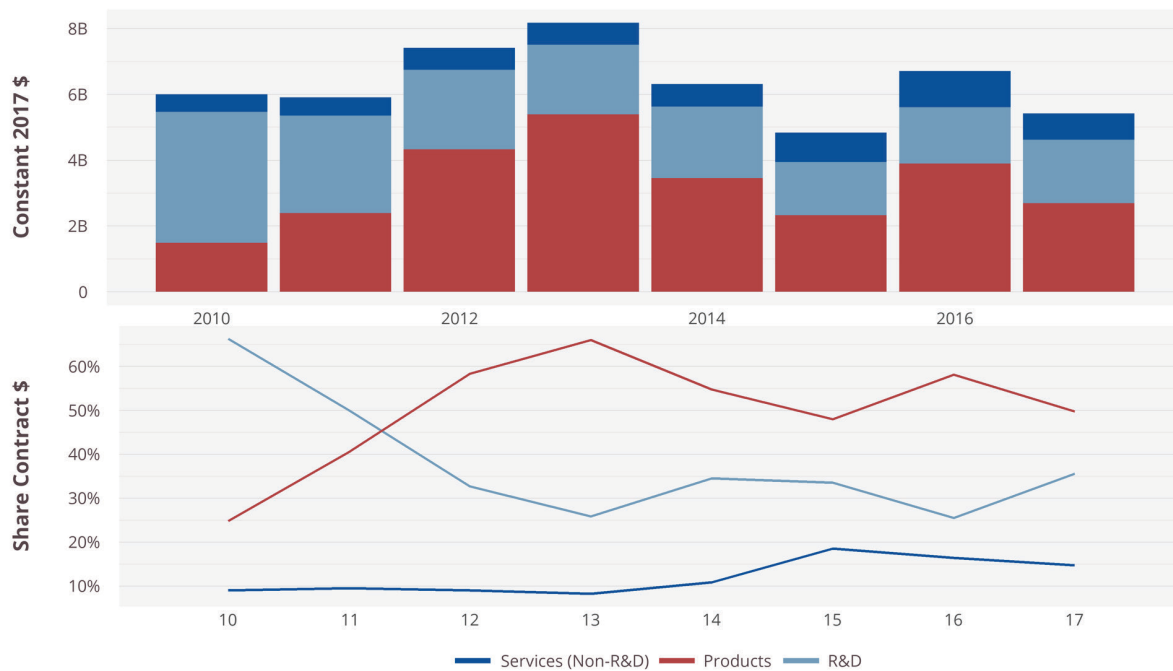
MDA contract obligations increased 12 percent between FY 2015 and FY 2017, a rate in line with the overall DoD rate of growth (13 percent). However, there was a significant whipsaw between FY 2016 and FY 2017 as MDA

contract obligations declined 19 percent in FY 2017 after increasing 39 percent in FY 2016.

### WHAT IS MDA BUYING?

Figure 6-17 shows MDA contract obligations, broken down by area, from FY 2010 to FY 2017.

Figure 6-17 | MDA Contract Obligations by Area, 2010-2017



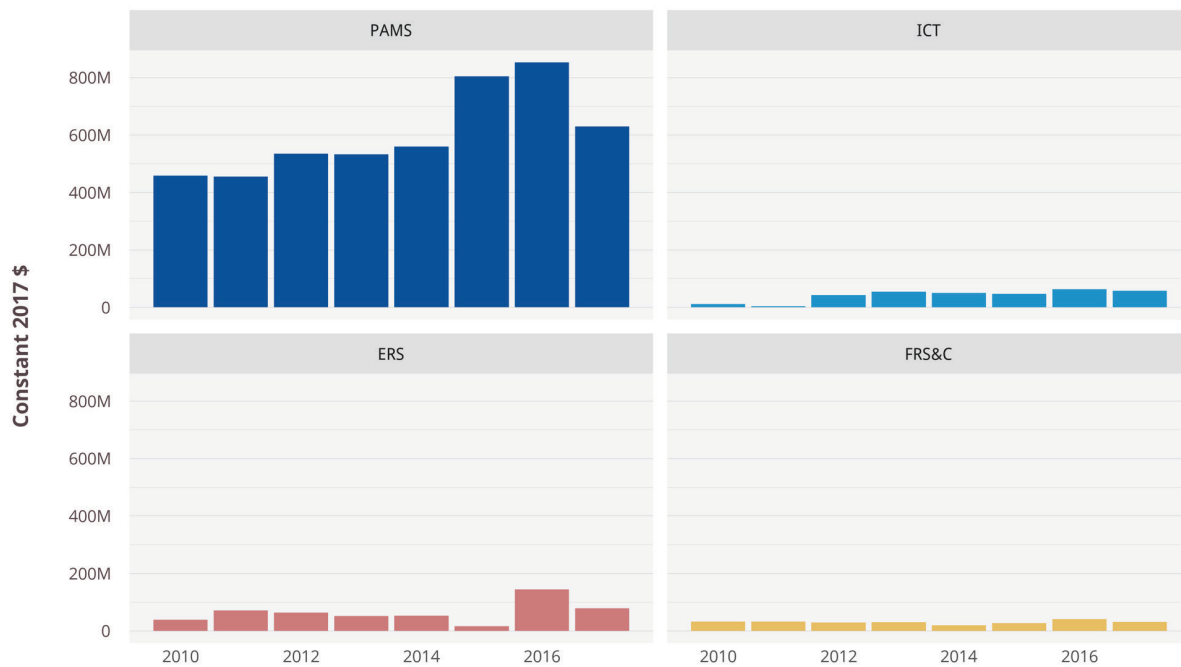
Source: FPDS; CSIS analysis

Although MDA products contract obligations increased 16 percent between FY 2015 and FY 2017, the greatest whipsaw occurred here. Contract obligations for MDA products increased from \$2.3 billion in FY 2015 to \$3.9 billion in FY 2016—a 68 percent jump—before declining 31 percent in FY 2017.

Comparatively, MDA R&D contract obligations grew each of the past two years. MDA R&D contract obligations grew 6 percent in FY 2016 and a further 13 percent in FY 2017.

MDA services contract obligations also experienced a whipsaw effect, but not quite the same magnitude as seen in MDA products. MDA services contract obligations increased 39 percent in FY 2016 before declining 19 percent in FY 2017. There was upheaval within the MDA services portfolio, with each services category experiencing its own whipsaw effect. Figure 6-18 shows MDA contract obligations by services category from FY 2010 to FY 2017.

Figure 6–18 | MDA Contract Obligations by Services Category, 2010–2017



Source: FPDS; CSIS analysis

PAMS contract obligations, by-far the largest MDA services category, increased 6 percent in FY 2016, a rate well below overall MDA services (23 percent), before declining 26 percent in FY 2017. As a share of MDA services contract obligations, PAMS went from 90 percent to 79 percent.

Despite experiencing a sizable whipsaw effect, MDA ERS went from the smallest services category in FY 2015, accounting for just 1.8 percent of MDA services contract obligations, to the second-largest services category after PAMS in FY 2017 (9.9 percent). ERS contract obligations increased from \$0.02 billion in FY 2015 to \$0.14 billion in FY 2016, a 797 percent increase. In FY 2017, ERS contract obligations declined 45 percent, the largest percentage decline.

MDA FRS&C contract obligations increased 54 percent in FY 2016 but declined 23 percent in FY 2017.

Finally, MDA ICT contract obligations experienced the smallest whipsaw, declining just 8 percent in FY 2017 after increasing 34 percent in FY 2016. As a share of MDA services contract obligations, ICT rose to 7.3 percent in FY 2017 from 5.7 percent in FY 2015.

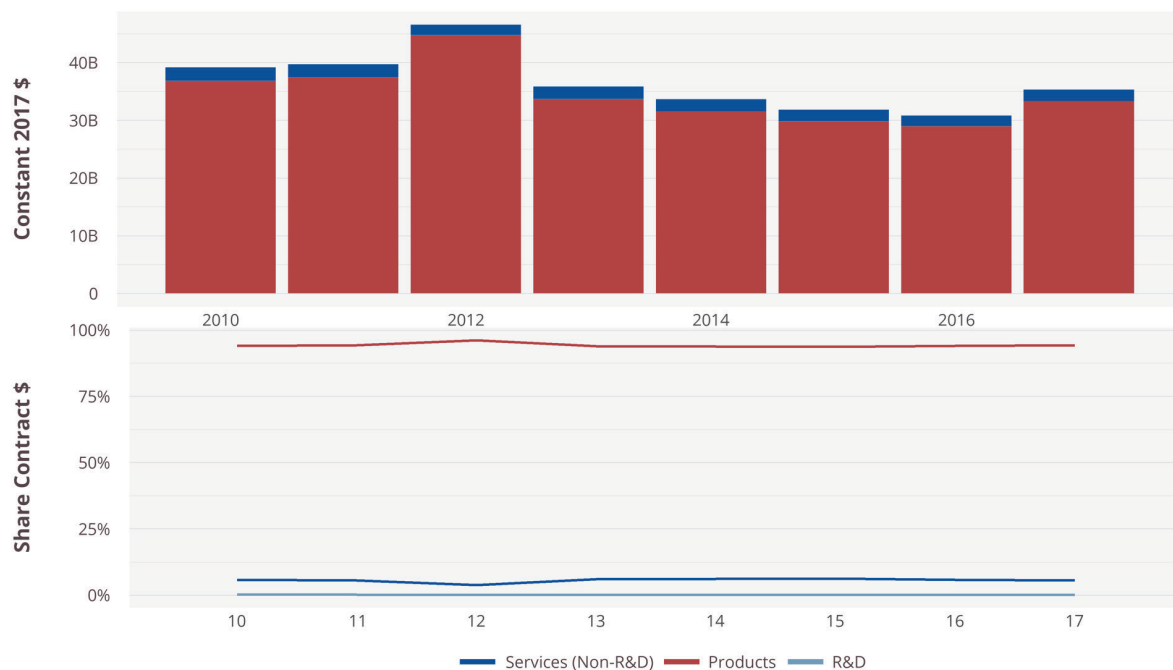
## 6.5 | Defense Logistics Agency

DLA contract obligations increased 11 percent between FY 2015 and FY 2017, a rate slightly below the overall rate of growth. DLA contract obligations initially declined from \$31.8 billion in FY 2015 to \$30.8 billion in FY 2016, a 3 percent decline, but they then rebounded to \$35.3 billion in FY 2017, a 15 percent increase.

### WHAT IS DLA BUYING?

Figure 6-19 shows DLA contract obligations, broken down by area, from FY 2010 to FY 2017.

Figure 6-19 | DLA Contract Obligations by Area, 2010-2017



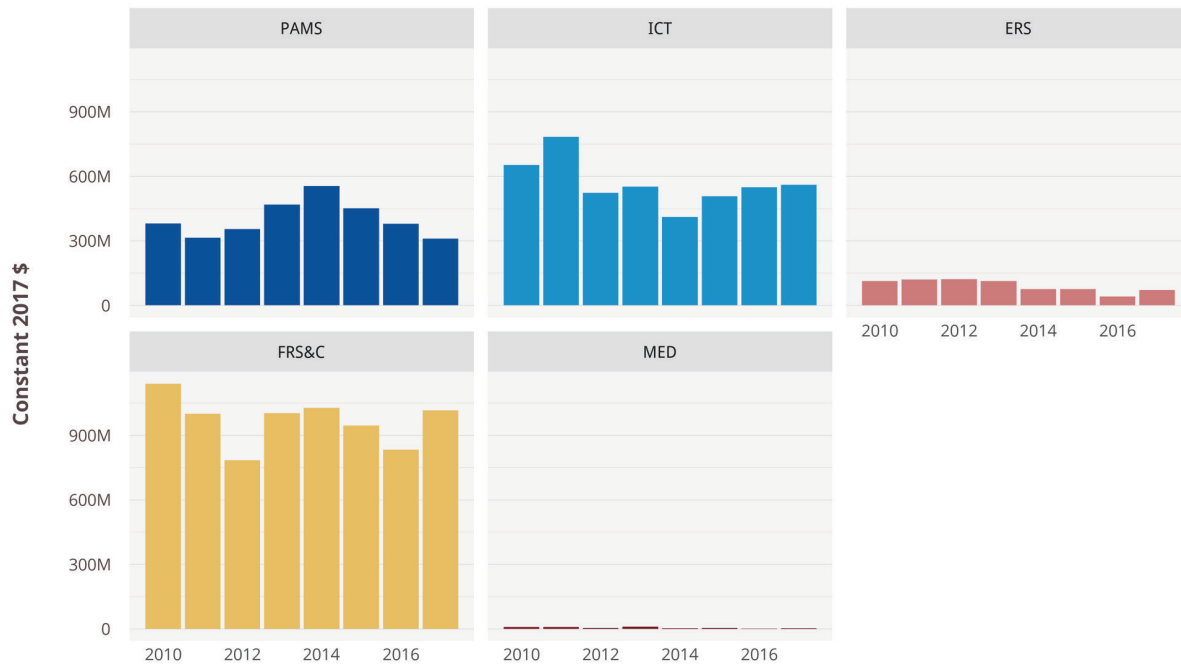
Source: FPDS; CSIS analysis

DLA products contract obligations increased from \$29.8 billion in FY 2015 to \$33.3 billion in FY 2017, a 12-percent jump. As a share of DLA contract obligations, products only further increased in predominance, rising to 94.3 percent in FY 2017 from their previous level of 93.7 percent in FY 2015.

DLA services contract obligations declined 1 percent between FY 2015 and FY 2017. As a share of DLA contract obligations, services fell from 6.2 percent to 5.5 percent. There was some volatility within DLA's services contracting portfolio. Figure 6-20 shows DLA contract obligations by services category from FY 2010 to FY 2017.



Figure 6-20 | DLA Contract Obligations by Services Category, 2010-2017



Source: FPDS; CSIS analysis

DLA was one of the few sources of growth in FRS&C contract obligations between FY 2015 and FY 2017. DLA FR&S contract obligations grew from \$0.9 billion in FY 2015 to \$1.0 billion in FY 2017, an 8 percent increase. As a share of DLA services contract obligations, FRS&C increased from 47.7 percent to 51.9 percent.

DLA ICT contract obligations increased 10 percent between FY 2015 and FY 2017. Of note, DLA ICT contract obligations grew consistently over the past two years, increasing 8 percent in FY 2016 and 2 percent in FY 2016. As a share of DLA services contract obligations, ICT rose from 25.6 percent to 28.6 percent.

DLA PAMS contract obligations declined sharply each of the past two years, falling a total of 31 percent. As a share of DLA services contract obligations, PAMS went from 22.8 percent in FY 2015 to 15.8 percent in FY 2017.

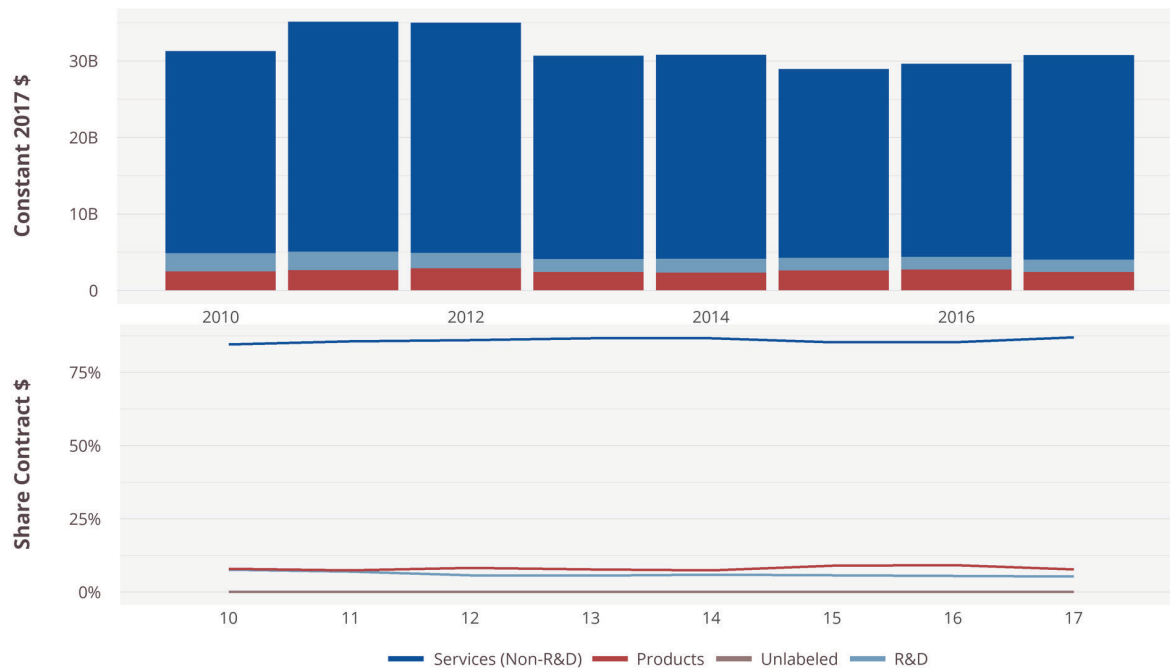
## 6.6 | Other DoD

Other DoD contract obligations increased 6 percent between FY 2015 and FY 2017, a rate that is half the rate of the overall rate of growth.

## WHAT IS OTHER DOD BUYING?

Figure 6–21 shows Other DoD contract obligations, broken down by area, from FY 2010 to FY 2017.

Figure 6–21: Other DoD Contract Obligations by Area, 2010–2017



Source: FPDS; CSIS analysis

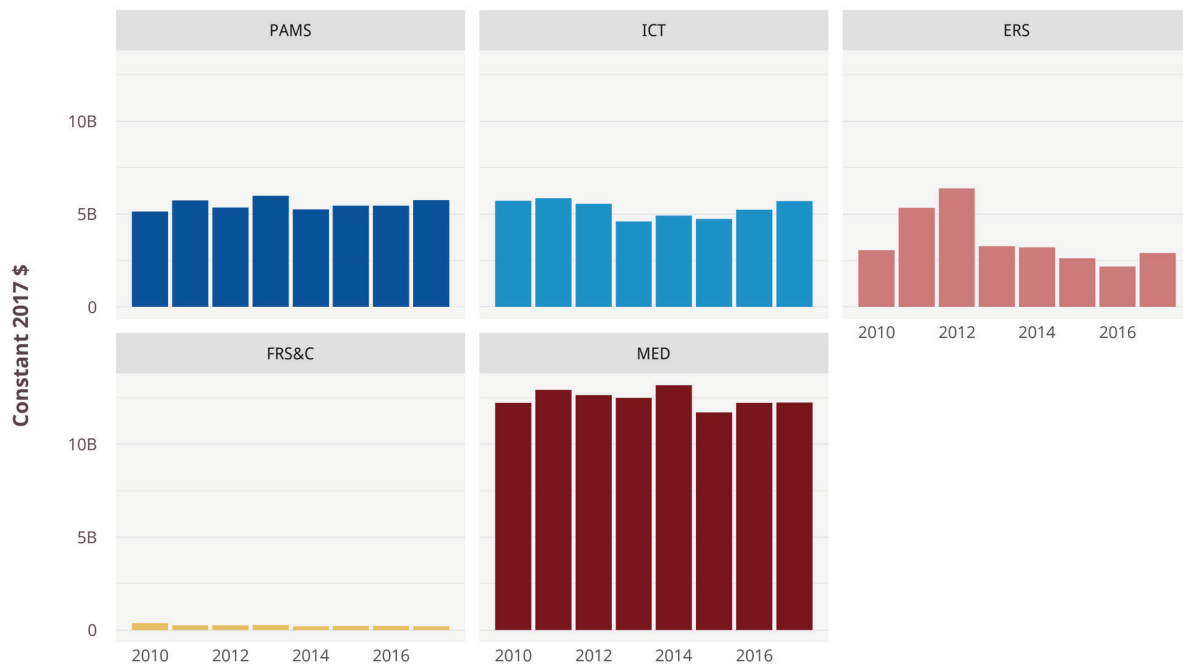
Other DoD contract obligations increased 6 percent between FY 2015 and FY 2017. During that period, Other DoD products contract obligations declined 8 percent. Meanwhile, Other DoD services contract obligations increased 5 percent in FY 2016, but they then fell 12 percent in FY 2017. As a share of Other DoD contract obligations, products fell from 9 percent in FY 2015 to 7.8 percent in FY 2017.

Other DoD R&D contract obligations declined 2 percent between FY 2015 and FY 2017.

Other DoD services contract obligations grew steadily over the past two years, rising from \$24.7 billion in FY 2015 to \$26.8 billion in FY 2017, a 6 percent increase. Other DoD services grew at a rate (2 percent) equal to the topline Other DoD growth in FY 2016 and slightly above the Other DoD topline (4 percent) rate of growth in FY 2017 (6 percent). As a share of Other DoD contract obligations, services rose from 85.3 percent to 86.9 percent.

Figure 6–22 shows Other DoD contract obligations by services category from FY 2010 to FY 2017.

Figure 6-22 | Other DoD Contract Obligations by Services Category, 2010–2017



Source: FPDS; CSIS analysis

Within the Other DoD services portfolio, every services category except FRS&C grew over the past two years, but at varying rates. Both ERS (11 percent) and ICT (20 percent) grew at rates above the topline Other DoD rate of growth (8 percent). As a share of Other DoD services contract obligations, ERS remained relatively steady (10.6 percent v. 10.8 percent), but ICT increased its share. ICT contract obligations went from accounting for 19.1 percent of Other DoD services in FY 2015 to 21.3 percent in FY 2017.

MED (5 percent) and PAMS (6 percent) both grew at rates below the topline Other DoD services growth rate. As a result, both saw a slightly downward turn in their share of Other DoD services contract obligations. MED went from 47.4 percent in FY 2015 to 45.7 percent in FY 2017, while PAMS fell from 22 percent to 21.5 percent.

FRS&C (–9 percent) was the only Other DoD services category to decline between FY 2015 and FY 2017, but it accounts for less than one percent of Other DoD spending on services.

## Conclusion

The rebound in defense contracting over the past two years has been, on the whole, positive news for DoD and the supporting defense industrial base, especially following sequestration and the defense drawdown. This chapter summarizes the findings from this report's analysis of the current state of defense acquisition. Combining detailed policy and data analysis, this report examined the following ideas and questions:

- DoD Contract Spending in a Budgetary Context
- What s DoD Buying?
- How is DoD Buying It?
- Whom is DoD Buying From?
- What Are the Defense Components Buying?

This chapter concludes by looking at what's next for the defense acquisition system as it sits at a critical inflection point.

## DoD Contract Spending in a Budgetary Context

### HOW HAS THE DEFENSE CONTRACTING TOPLINE RESPONDED TO THE RECENT INCREASES IN THE DEFENSE BUDGET?

Over the past two years, defense contract obligations have grown at a quicker rate than DoD Total Obligation Authority (TOA). Between FY 2015 and FY 2017, defense contract obligations have increased 13 percent compared to the 5 percent growth in DoD TOA. In FY 2016, DoD TOA increased 3 percent while defense contract obligations increased 8 percent. In FY 2017, DoD contract obligations increased 5 percent as TOA increased 2 percent.

After falling to 48 percent in FY 2015, a level not seen since the start of the century, defense contracts have subsequently risen as a share of DoD TOA. In FY 2016, defense contract obligations totaled 51 percent of DoD TOA. In FY 2017, defense obligations further rose, totaling for 52 percent of DoD TOA, a figure in-line with the recent historical average of defense contracts as a share of DoD TOA (52 percent).

### HOW DOES THE GROWTH IN DEFENSE CONTRACT OBLIGATIONS COMPARE TO BROADER FEDERAL CONTRACTING LANDSCAPE?

Defense contract obligations (13.2 percent) increased faster than non-defense contract obligations (10.3 percent) between FY 2015 and FY 2017. However, while the defense contracting rebound did not begin until FY 2016, non-defense contract obligations began rebounding in FY 2015. Measuring non-defense contract obligations by comparing their numbers in the first year of the rebound, FY 2015, to FY 2017, non-defense contract obligations have increased by 12.2 percent, a figure-closer to the total defense contracting rebound.

## What Is DoD Buying?

### HOW HAS THE DEFENSE CONTRACTING REBOUND CHANGED WHAT DOD IS PURCHASING?

By area, the largest defense contracting rebound occurred in products. Between FY 2015 and FY 2017, defense products contract obligations increased from \$133.8 billion to \$163.1 billion, a 22 percent increase. Comparatively, defense services and R&D contract obligations have only increased 5 percent and 6 percent respectively. The unequal rate in defense products growth has increased its share of DoD contract obligations—going from 47 percent in FY 2015 to 51 percent in FY 2017—at the expense of defense services, which fell from 44 percent to 41 percent over the same period.

Defense contract obligations have grown at different rates across the 11 platform portfolios over the past two years. Aircraft (34 percent), Ordnance and Missiles (32 percent), and Ships & Submarines (22 percent) all increased at rates quicker than overall defense contract obligations (13 percent). Meanwhile, Air and Missile Defense (-11 percent) and Space Systems (-1 percent) contract obligations declined between FY 2015 and FY 2017, even as the overall topline grew.

“Over the past two years, defense contract obligations have grown at a quicker rate than DoD Total Obligation Authority.

Although Land Vehicles contract obligations grew at a rate (7 percent) nearly less than half the overall rate of growth between FY 2015 and FY 2017, the FY 2016 and FY 2017 trends differed sharply. In FY 2016, Land Vehicles contract obligations declined 3 percent, while overall defense contract obligations increased 8 percent. However, when

defense contract obligations growth slowed to 5 percent in FY 2017, Land Vehicles contract obligations increased at twice the rate of the overall growth (10 percent). For a sector that was hammered during sequestration and the defense drawdown, this FY 2017 increase is positive news for Land Vehicles, but the \$8.2 billion in FY 2017 contract obligations is still roughly half this century’s historical average of \$16.0 billion.

#### **WHAT IS THE STATUS OF THE INNOVATION INITIATIVES IN THE NEW ADMINISTRATION?**

DIUx has fared well in the new administration, even being made a permanent office in recent months by dropping the experimental designation in its title to become the Defense Innovation Unit. Becoming the Defense Innovation Unit comes on the heels of several DIUx successes over the past two years. In that time, DIUx has gained several new hiring and contracting authorities. The first new authorities came in July 2017 from Deputy Secretary Work prior to his departure, and additional hiring authorities were later added in the FY 2019 NDAA. Furthermore, its successes since its 2016 relaunch have included Mattis choosing to “enthusiastically embrace” DIUx, the Air Force canceling one of its prominent air planning contracts in favor of a DIUx solution, and DIUx transitioning a DIUx cybersecurity monitoring pilot program to the Army.<sup>261</sup> DIUx will have the opportunity to build on these successes with a \$41 million budget increase in FY 2019.

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261. Goldstein, “The Future of the Pentagon’s DIUx Unit Seems Bright.”

SCO's fortunes have been more mixed in the new administration, especially since its director Dr. Will Roper, left SCO earlier this year to become the assistant secretary of the Air Force for Acquisition. SCO faced an uncertain future after the House Subcommittee on Emerging Threats and Capabilities included language in the House's version of the NDAA that would eliminate or transfer SCO's responsibilities to another office by October 1st, 2020. This provision was later walked back in conference with the Senate, but the Secretary of Defense is now required to submit a report to Congress on the office's future by March 1, 2019. However, the August 2018 appointment of Chris Shank as Dr. Roper's replacement as Director of SCO may indicate that the Secretary of Defense intends to report favorably on keeping the office in that report.

The term Third Offset Strategy has fallen out of favor within DoD, but many of the ideas still linger and are reflected when senior defense officials talk about reorientation to great power competition or the importance of the National Security Innovation Base. The new administration has, however, widened the number of priority capabilities beyond Third Offset's emphasis on human-machine collaboration and combat teaming. They now also emphasize hypersonics, missile defense, a modern strategic deterrent, space-based systems, trusted microelectronics, future computing capabilities, and dual-use technologies. Yet, just like in the last administration, there is still some distance to go before these technologies will be translated into new fieldable capabilities that are integrated into the service's force structure, CONOPS, and doctrine.

The Defense Innovation Board has continued its work into the new administration. In FY 2017, the Defense Innovation Board issued 16 recommendations on how DoD can better access and implement innovation across the department. In FY 2018, the Defense Innovation Board pivoted to software, beginning by releasing a set of 10 recommendations, Ten Commandments of Software, that were to serve as guiding principles for DoD's software acquisition efforts. The Ten Commandments of Software was followed by a proposed series of metrics across four categories that DoD should consider for software development instead of the SLOC, which is the metric DoD has traditionally used for software.<sup>262</sup>

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262. The four categories of metrics were: deployment rate, response rate, code quality, and program management, assessment, and estimation.



## HAS THE TROUGH IN THE DEVELOPMENT PIPELINE FOR MAJOR WEAPON SYSTEMS CONTINUED IN FY 2017?

The eight-year trough in the development pipeline for major weapon systems appears to have bottomed out, but the trough continues to exist, and it will still be some time before DoD fully recovers.

After taking the brunt of the R&D cuts during the eight-year trough in major weapon systems development, declining 76 percent between FY 2009 and FY 2016, System Development & Demonstration (6.5) contract obligations started to rebound in FY 2017. System Development & Demonstration (6.5) contract obligations increased from \$3.8 billion in FY 2016 to \$4.2 billion in FY 2017, an 11 percent increase. However, current System Development & Demonstration (6.5) are still less than half the historical average this century (\$10.2 billion).

The eight-year trough in the development pipeline for major weapon systems appears to have bottomed out, but the trough continues to exist, and it will still be some time before DoD fully recovers.

Advanced Technology Development (6.3) and Operational Systems Development (6.7) contract obligations suffered the second (–60 percent) and third-largest (–54 percent) cuts during the eight-year trough respectively. These areas have been slower to recover than System Development & Demonstration (6.5). Advanced Technology Development (6.3) contract obligations increased from \$4.0 billion to \$4.2 billion, a 3 percent increase, which is approximately \$3.4

billion less than recent historical averages. Meanwhile, Operational Systems Development (6.7) contract obligations only increased 1 percent in FY 2017 as overall R&D contract obligations increased 6 percent.

DoD contract obligations for Advanced Component Development & Prototypes (6.4) in FY 2016 and FY 2017 outpaced historical averages. In FY 2016 and FY 2017, DoD Advanced Component Development & Prototypes (6.4) contract obligations totaled \$4.9 and \$5.1 billion respectively, higher than the \$4.7 billion historical average since FY 2000. This is not too surprising given the recent policies and initiatives aimed at increasing DoD's usage of prototypes and experimentation.

Finally, defense Applied Research (6.2) contract obligations increased 1 percent in FY 2017, while defense Basic Research (6.1) contract obligations declined 1 percent.

## WHAT IS DOD SPENDING ON SERVICES?

Overall DoD spending on services has increased 5 percent between FY 2015 and FY 2017, rising from \$125.5 billion in FY 2015 to \$132.1 billion in FY 2017. Within DoD's services portfolio, the six different services categories have increased, or in one instance decreased, at varying rates.

Overall DoD PAMS contract obligations increased 6 percent between FY 2015 and FY 2017, a rate just above the 5-percent growth in total DoD services. PAMS is the largest source of DoD spending on services, accounting for 35 percent of overall DoD services contract obligations.

ERS and ICT defense contract obligations grew at rates more than twice the overall rate of growth, increasing 13 percent and 10 percent respectively.

MED defense contract obligations increased 4 percent between FY 2015 and FY 2017, one-third less than the total growth in defense services spending.

FRS&C defense contract obligations continued to tumble, declining 4 percent between FY 2015 and FY 2017. From FY 2009 to FY 2017, FR&SC defense contract obligations declined 33 percent, a number well above the 23 percent decline in total defense services contract obligations over that same period.

In recent years, there have been significant shifts in the defense services trends. Small vendors have increased as a share of PAMS and ICT contract obligations, while the Big Five have focused their growth on ERS. Services contract obligations have proven resilient even in the face of policy guidance dictating that spending on services is to be truncated. However, given the Department's emphasis on restoring readiness in recent years, it is not a surprise that managing an aging inventory requires higher ERS spending. Additionally, the rise in DoD's medical costs, as measured by spending on MED services, is not a problem unique to DoD but true across the broader U.S. economy.

## How Is DoD Buying It?

### WHAT MAJOR ACQUISITION REFORM EFFORTS ARE CURRENTLY UNDERWAY?

The major acquisition reform efforts currently underway are the reorganization of the defense acquisition system, the FY 2018 NDAA's general acquisition reform focus on IT, the JEDI Cloud effort, the recommendations of the Section 809 panel, and new policy priorities aimed at increasing OTA usage and speeding up FMS.

### *Reorganization of the Defense Acquisition System*

The primary focus of DoD's internal acquisition reform efforts over the past two years has gone into implementing the major changes that Congress made to the structure of the defense acquisition system in recent NDAA's, notably dissolving AT&L and the delegation of authorities to the services.

On February 1, 2018, in accordance with the FY 2017 NDAA, USD(AT&L) was formally divided into the two new acquisition offices: USD(R&E) and USD(A&S). Although USD(AT&L) was disestablished on February 1, the reorganization is expected to continue for upwards of two years, and the detailed implementation guidance that outlines how AT&L offices would be split amongst the two offices was only issued in July 2018, although DoD had released an initial restructuring plan in August 2017. On July 13, 2018, Deputy Secretary Shanahan officially signed off on the detailed AT&L reorganization implementation guidance that, while an improvement on the August 2017 plan, left many questions unanswered.

The Army and the Air Force have used the MDAP acquisition authorities delegated to them in the FY 2016 NDAA to make significant changes to their acquisition structures and processes. The Army has created a new command, Army Futures Command, that houses many of its acquisition activities under a single four-star command located at Austin, Texas. The creation of Army Futures Command aligns the Army's acquisition efforts more closely than before under the Chief of Staff of the Army by pursuing the six priorities that form the foundation of the Army's new modernization strategy. The Air Force has taken its new authorities and delegated them down even further to the program executive officer and program manager level. Additionally, the Air Force under Dr. Will Roper is actively using many of the FY 2016 NDAA's middle tier and prototyping authorities.

### *FY 2018 NDAA*

The FY 2018 NDAA targeted commercial IT acquisition reforms more closely than the FY 2016 and FY 2017 NDAA's sweeping structural changes. The creation of online marketplaces proposed by HASC Chairman Mac Thornberry was the most controversial acquisition change in the FY 2018. This online marketplace would work like Amazon and other online stores, and let DoD buy commercial goods—such as commercial artificial intelligence applications to be used with sensitive military data or commercially-available tools for the repair of military aircraft—from a single online marketplace while still meeting requirements for competition, commercial item, fair and reasonable pricing, domestic sourcing, and small business utilization. Language requiring the creation of an online marketplace was included in the FY 2018 NDAA that passed Congress, but the final NDAA

language required the creation of more than one marketplace, delayed implementation for two-years, and expanded its usage from DoD to all government agencies. Meanwhile, the SASC included several new software development requirements relating to delivery of source code and use of open source software in its version of the NDAA. However, these software development provisions were walked back from their initial formulation as strict requirements to, instead, establish preferences, guidelines, and criteria for consideration in contract negotiations.

### *JEDI Cloud Contract*

DoD's efforts to acquire a new commercial-based cloud computing platform, JEDI, has come under intense scrutiny because of DoD's decision to award the market-leading JEDI award to only one vendor. Some in industry have argued that awarding the JEDI award to only one vendor will lead to a DoD cloud computing monopoly, while DoD argues that consolidating JEDI efforts under a single vendor is more efficient and more in-line with commercial practices. The final JEDI RFP signaled DoD to continue with its plans to only award JEDI to a single vendor, but the FY 2019 NDAA restricted DoD's JEDI funding by 15 percent until DoD delivers a report to Congress that provides a detailed JEDI acquisition strategy and justification.<sup>263</sup>

### *Section 809 Panel*

The Section 809 Panel, created in the FY 2016 NDAA to "find ways to streamline and improve the defense acquisition process," has delivered two of three planned volumes of recommendations for streamlining acquisition.<sup>264</sup> The first sets of recommendations have included, but are not limited to, a focus on changing the requirements process from focusing on technical requirements to "compet[ing] solutions to problems," redefining various acquisition rules to encourage greater commercial items usage, and reorganizing title 10 of the U.S. code.<sup>265</sup> Congress implemented a number of the Section 809 panel's initial recommendations in the FY 2019 NDAA, and they will likely take the full recommendations into consideration when drafting the FY 2020 NDAA.<sup>266</sup>

263. U.S. House of Representatives, John S. McCain National Defense Authorization Act for the Fiscal Year 2019.

264. "What is the Purpose of the Section 809 Panel?," Section 809 Panel, <https://section809panel.org/about/> (accessed September 4, 2018).

265. *Report of the Advisory Panel on Streamlining and Codifying Acquisition Regulations, Volume 1 of 3*, 8. [https://section809panel.org/wp-content/uploads/2018/04/Sec809Panel\\_Vol1-Report\\_Jan18\\_RE-VISED\\_2018-03-14.pdf](https://section809panel.org/wp-content/uploads/2018/04/Sec809Panel_Vol1-Report_Jan18_RE-VISED_2018-03-14.pdf); [https://section809panel.org/wp-content/uploads/2018/06/Sec809Panel\\_Vol2-Report\\_June18.pdf](https://section809panel.org/wp-content/uploads/2018/06/Sec809Panel_Vol2-Report_June18.pdf).

266. Joseph R. Berger, Tom Mason, Ray McCann, Francis E. Purcell, Jr., "FY 2019 NDAA Signed Into Law with Annual Procurement Reforms, Including Far-Reaching Changes for Commercial Item Contracting," Thompson Hine LLP, August 14, 2018, <http://www.thomsonhine.com/publications/fy-2019-ndaa-signed-into-law-with-annual-procurement-reforms-including-far-reaching-changes->

### *Other Policy Changes – OTAs and FMS*

Two other notable policy priorities in the new administration are the increased usage of OTAs by DoD and Secretary Lord's efforts to speed up FMS. DoD OTA obligations increased from \$0.7 billion in FY 2015 to \$2.1 billion in FY 2017 (a 195 percent increase) after Congress made several statutory changes to liberalize their usage in FY 2015 and FY 2016. However, despite just recently expanding OTA authorities, Congress has started to push-back against the large OTA push in DoD. The House version of the FY 2019 NDAA requires DoD to notify Congress within 30 days if it intended to award a follow-on contract in excess of \$5 million; however, this provision was stripped during conference.<sup>267</sup> Although the Congressional notification requirement was stripped from the FY 2019 NDAA, Section 873 of the FY 2019 requires DoD to gather data on OTA usage, use that data to update policy and guidance, and prepare an annual report on DoD's OTA usage.<sup>268</sup> Finally, the FY 2019 House defense appropriations bill contained a Congressional follow-on production notification provision that is similar to the House's FY 2019 NDAA language, but like the final FY 2019 NDAA, this notification provision was stripped during conference in favor of other new reporting requirements.<sup>269</sup>

Secretary Lord has made speeding up FMS a priority both to remain in line with the NDS and the administration's priorities and also to better enable the U.S. to compete with Russian and Chinese arms sales. Her initial efforts at speeding up FMS are focusing on the six FMS pilot programs that were created using the new authority granted in the FY 2017 NDAA and whose ultimate goal is to have a signed FMS contract less than 210 day after issuing an RFP. Long-term, Secretary Lord is focusing on both designing new systems for exportability and loosening FMS firm-fixed price contract pricing mechanism requirements.

### **DID BETTER BUYING POWER AND THE WEAPON SYSTEM ACQUISITION REFORM ACT STICK THE LANDING?**

Acquisition reform historically has been a continuous process of attempting to align the defense acquisition system with the present priorities of elected leaders and the evolving global environment. The full outcomes of individual reform efforts will often take decades to fully manifest, as the MDAPs initiated under each regime reach fruition. Nonetheless, it is possible to

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for-commercial-item-contracting.

267. John S. McCain National Defense Authorization Act for Fiscal Year 2019, Sec. 211.

268. Ibid.

269. Doubleday, "Spending bill Increases reporting requirements for OTAs."

evaluate performance of the Better Buying Power initiative using available data, and separate analyses by the GAO of MDAPs performance and CSIS analysis of contract terminations and ceiling breaches separately found similar results: significant progress was maintained in containing cost growth. While there are a range of important details in these analyses, two caveats deserve special emphasis. First, while gains have been made since the last Defense Acquisition report, the pace of improvement has tapered off and the GAO is concerned about the limited adoption of its recommended knowledge-based methods. Second, schedule delays continue to worsen, which highlights challenges in schedule estimation that will make it difficult to credibly evaluate attempts to speed up the acquisition system.

## Whom Is DoD Buying From?

### HOW HAS THE COMPOSITION OF PRIME VENDORS CHANGED DURING THE CONTRACTING REBOUND AND WHAT CAUSES CAN BE IDENTIFIED?

The defense contracting rebound has most benefited the Big Five, but Small and Medium vendors have also benefited, while Large vendors fared the worst.

Contract obligations awarded to the Big Five increased 33 percent between FY 2015 and FY 2017 compared to the 13 percent growth in total defense contract obligations. Subsequently, as a share of defense contract obligations, the Big Five have risen from 30 percent in FY 2015 to 35 percent in FY 2017, their highest level since FY 2002. The Big Five's contract obligations outpaced the topline growth in all three areas between FY 2015 and FY 2017, but the biggest increases growth occurred in products. Big Five defense products contract obligations increased 43 percent (\$24.5 billion), a rate well above the 22 percent growth in total defense products contracts. Big Five defense services and R&D contract obligations increased 10 percent and 12 percent respectively, rates above the 5 percent and 6 percent growth in respective topline, but the sum of services and R&D increases only totaled \$3 billion.

Large vendors' contract obligations declined 1 percent between FY 2015 and FY 2017 and fell as a share of defense contract obligations from 31 percent to 27 percent. Large vendors defense products contract obligations increased 6 percent, but those gains were offset by the 16 percent decline in Large vendors R&D contract obligations and 4- percent decline in services.

Small (10 percent) and Medium (9 percent) vendors grew at nearly equivalent rates between FY 2015 and FY 2017. Small vendors grew in each of the three areas, but the 14 percent increase in defense R&D contract obligations awarded to Small vendors outpaced the 9 percent increases in both services and products. Medium vendors similarly grew in each of the three areas, but



unlike Small vendors, Medium vendors' greatest increase came in defense services. Defense services contract obligations awarded to Medium vendors increased 11 percent between FY 2015 and FY 2017, a number well above the 7 percent growth in R&D and 8 percent growth in products.

#### **WHO ARE THE TOP VENDORS AND WHAT DO THEY TELL US ABOUT INDUSTRIAL BASE CONSOLIDATION?**

The only change in the companies composing the top 20 defense vendors as ranked by contract obligations between FY 2015 and FY 2017 was General Electric replacing ULA. Within the top 20, Huntington Ingalls Industries and UTC were the biggest movers in ranking over the past two years, as time passes since 2011, when Northrop decided to spin-off its shipbuilding assets—which created Huntington Ingalls Industries—and 2015, when UTC decided to sell Sikorsky to Lockheed Martin. Huntington Ingalls Industries rose from 11th in FY 2015 to sixth in FY 2017, while UTC fell from sixth in FY 2015 to 17th in FY 2017.

There was little change in the composition of top 20 vendors, but there was an increase in the concentration of the defense contract obligations that were awarded to the top defense vendors. The share of defense contract obligations awarded to the top 20 increased from 37 percent in FY 2015 to 41 percent in FY 2017.

##### *Products*

Huntington Ingalls Industries ranked fifth in total defense products contract obligations in FY 2017 after ranking seventh in FY 2015, while UTC, the previous fifth place holder, fell to 17th in FY 2017. Harris replacing AM General was the only other change in top 20 defense products vendors.

There was a sharp increase in the share of defense products contract obligations going to the top vendors between FY 2015 and FY 2017. As defense products contracts increased 22 percent between FY 2015 and FY 2017, the share of total defense products contract awarded to the top 5 increased from 42 percent to 49 percent, and the share awarded to the top 20 increased from 63 percent to 69 percent.

##### *Services*

After ranking third in FY 2015, Boeing surpassed Lockheed Martin and Northrop Grumman to become the top DoD services provider in FY 2017. Additionally, Raytheon replaced L3 communications as the fifth-ranked services vendor in FY 2017 after ranking seventh in FY 2017. L3 communications subsequently fell to sixth in FY 2017 after it divested some of its services



business. Otherwise, the only other changes in the composition of the top 20 defense services was Leidos and General Atomics replacing Fluor and UTC as the 19th and 20th ranked vendors, respectively.

There was no change in the concentration of defense services contract obligations going to the top 20 vendors between FY 2015 and FY 2017. In both years, 35 percent of defense services contract obligations were awarded to the top 20 vendors.

#### *R&D*

The Aerospace Corporation replaced UTC as the fifth-ranked R&D vendor in FY 2017 after UTC fell post-Sikorsky sale. The Pennsylvania State University and Carnegie Mellon University replacing Battelle and the Jacobs Engineering Group were the only other changes in list of vendors that comprised the top 20 defense vendors as ranked by contract obligations.

There was no change in the concentration of defense services contract obligations going to the top 20 vendors between FY 2015 and FY 2017. In both years, 32 percent of defense services contract obligations were awarded to the top 20 vendors.

## What Are the Defense Components Buying?

### HOW HAVE THE BUDGET DRAWDOWN, SEQUESTRATION, AND ITS AFTERMATH AFFECTED CONTRACT SPENDING WITHIN THE MAJOR DOD COMPONENTS?

Defense contract obligations increased across each of the major DoD components between FY 2015 and FY 2017, but there were notable differences in the trends between components.

Navy contract obligations increased the most amongst DoD components, increasing from \$87.6 billion in FY 2015 to \$109.4 billion in FY 2017, a 25 percent increase. In FY 2016, Navy contract obligations (9 percent) grew in-line with total defense contract obligations (8 percent), but in FY 2017, Navy contract obligations (15 percent) increased at three times the overall rate (5 percent). During the defense contracting rebounded, the Navy further increased its command of the largest share of DoD contract obligations by components, a position it has held since FY 2013. Navy contract obligations accounted for 34 percent of total DoD contract obligations In FY 2017, their highest level since FY 2000 and 10 percent higher than the Army, the second-highest component as a share of total DoD contract obligations.

Navy contract obligations increased the most amongst DoD components...Air Force contract obligations grew at a rate equal to the overall DoD growth,

while Army contract obligations are up 5 percent since FY 2015, but lag behind the Air Force and Navy.

“Navy contract obligations increased the most amongst DoD components...Air Force contract obligations grew at a rate equal to the overall DoD growth, while Army contract obligations are up 5 percent since FY 2015, but lag behind the Air Force and Navy.

Air Force contract obligations increased 11 percent between FY 2015 and FY 2017, but there was a significant whipsaw last year. In FY 2016, the first year of the defense contracting rebound, Air Force contract obligations increased 21 percent, but they then declined 9 percent in FY 2017. Although Air Force contract obligations are up since the end of sequestration and the defense drawdown, it remains to be seen whether future years more closely resemble FY 2016's sharp rise or FY 2017's decline.

Army contract obligations are up 5 percent since FY 2015, lagging the Air Force and Navy, but a welcome recovery from the 50 percent decline in Army contract obligations between FY 2009 and FY 2015. The Army's contracting recovery started slowly in FY 2016 (1 percent) compared to the overall rebound (8 percent), but in FY 2017, Army contract obligations grew at rates (4 percent) more in-line with the topline growth (5 percent).

DLA (11 percent) and MDA (12 percent) contract obligations grew at nearly the same rate as overall DoD contract obligations (13 percent) between FY 2015 and FY 2017 while Other DoD (6 percent) grew at roughly half that rate.

#### WHAT ARE THE SPECIFIC SOURCES OF ANY INCREASES OR DECLINES IN CONTRACT OBLIGATIONS WITHIN THE MAJOR DOD COMPONENTS?

##### *Army*

Army products contract obligations increased 13 percent between FY 2015 and FY 2017, far outpacing the minimal growth in Army R&D (2 percent) and steadiness in Army services (0 percent) contract obligations. Army Aircraft (20 percent) and Ordnance and Missiles (74 percent) were the two largest sources of increases in Army contract obligations between FY 2015 and FY 2017, while Facilities & Construction (-5 percent) and Air and Missile Defense (-40 percent) were the two largest decreases.

Over the past two years, the rate of effective competition for Army contract obligations decreased from 51.2 percent to 49.5 percent.

The Big Five were the biggest beneficiaries of the Army's 5 percent growth in contract obligations, rising from a 20.5 percent market share in FY 2015 to 24.5 percent in FY 2017. Large vendors subsequently fell from a 27.6 percent market share to 23.6 percent. Finally, UTC fell from the fourth largest Army vendor in FY 2015 to outside the top 100 after selling Sikorsky to Lockheed Martin, and they were replaced in the top 10 Army vendors by General Atomics, who went from 15th in FY 2015 to tenth in FY 2017.

### *Navy*

Navy products contract obligations increased 38 percent between FY 2015 and FY 2017, dwarfing the 5 and 6 percent increases in Navy services and R&D contract obligations respectively. The Navy's 25 percent growth in total contract obligations was heavily driven by the 58 percent increase in Navy Aircraft contract obligations between FY 2015 and FY 2017. Navy Ships & Submarines increased 21 percent between FY 2015 and FY 2017, slightly below the Navy's overall growth rate.

The Navy's rate of effective competition declined from 34 percent to 31 percent over the past two years. Even more worrisome was the sharp decline in effective competition for Navy R&D contract obligations. The Navy's rate of effective competition for R&D contract obligations went from 49.1 percent in FY 2015 to 40.5 percent in FY 2017.

The Big Five increased their share of Navy contract obligations between FY 2015 and FY 2017 at the expense of all other vendor size categories, going from 42.3 percent to 51.6 percent. Finally, there was no change in the composition of the top 10 Navy vendors between FY 2015 and FY 2017, but Huntington Ingalls Incorporated continues to solidify its position the further we get from the spin-off, rising from seventh in FY 2015 to third in FY 2017.

### *Air Force*

Air Force products contract obligations increased 11 percent between FY 2015 and FY 2017, but there was a colossal whipsaw between FY 2016 and FY 2017. In FY 2016, Air Force products contract obligations increased 54 percent, but then declined 28 percent the next year. This whipsaw was most seen in the Aircraft and Ordnance and Missile platform portfolios, which each increased 10 percent between FY 2015 and FY 2017 but with upheavals between FY 2016 and FY 2017. In FY 2016, Aircraft and Ordnance and Missile contract obligations increased 33 percent and 58 percent, respectively, but they then declined 18 percent and 31 percent in FY 2017, respectively. Air Force Electronics, Comms, & Sensors (22 percent) grew at over twice the rate of Air Force contract obligations and experienced no whipsaw. Of

note given the recent Space Force news, Air Force Space Systems contract obligations declined 1 percent between FY 2015 and FY 2017.

The Air Force has historically been known for poor rates of effective competition, but its rate of effective competition increased in these last two years as overall DoD competition rates have fallen. Notably, the Air Force increased its rate of effective competition from products from 19 percent to 28 percent and slightly reversed the previous trend of declining competition for services.

As a result of the significant whipsaw in Air Force contract obligations, the Big Five sizably increased their share of Air Force contract obligations in FY 2016 but returned to more normal levels in FY 2017. Small vendors increased their share of Air Force contract obligations in FY 2017, rising from 15.6 percent to 17.8 percent of all Air Force contract obligations. Finally, the composition of the Air Force top 10 Vendors remained mostly steady between FY 2015 and FY 2017, with only BAE Systems replacing the Aerospace Corporation as the tenth-ranked vendor in FY 2017.

## Final Thoughts

The defense acquisition system currently sits at an inflection point that will likely transform the defense acquisition system and the supporting defense industrial base for the next 10 to 20 years. Defense contracting may have rebounded these past two years, but there are unanswered questions about continued defense budget growth and the long-term effects of the last few years' acquisition reform efforts. Furthermore, the current administration's decisions on balancing competing priorities of readiness and modernization will inform U.S. force construct planning for the next 30 years. Cumulatively, these decisions will inform the likely transformation of the U.S. defense acquisition system.

Defense acquisition reform efforts may have slowed down last year compared to the past few years, but the efforts in Congress to fundamentally restructure the defense acquisition system are the biggest changes to the defense acquisition system since the changes centralizing defense acquisition post-Packard Commission and Goldwater Nichols. Compared to the 1990s streamlining emphasis and the 2008–2014 cost control era, the recent Congressional reforms seek to fundamentally change DoD's program management and decision-making structures for developing and procuring MDAPs.<sup>270</sup> The dissolution of USD(AT&L) and the delegation of

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270. Andrew Hunter, "The Cycles of Defense Acquisition Reform and What Comes Next."

greater acquisition decision-making authority to the military services could fundamentally alter which capabilities DoD develops and procures, while the recent program management changes could spur the end of MDAPs as we have known them.<sup>271</sup> Whether these changes ultimately accomplish Congress' goals to speed up defense acquisition and spur technological advancement will not be known for many years to come, but whether or not these reforms accomplish those goals, they will transform the defense acquisition system.

“The defense acquisition system currently sits at an inflection point that will likely transform the defense acquisition system and the supporting defense industrial base for the next 10 to 20 years.

DoD's current challenge to balance competing readiness and modernization priorities, including finding the proper balance within DoD's modernization investment portfolio, will reverberate in U.S. force construct planning for the next 30 years, which will only further compound the likely forthcoming transformation of the defense acquisition system. Given DoD's recent large increases in products contract obligations and the composition of its R&D portfolio, which

is balanced towards Basic (6.1) and Applied (6.2) research, the contract data show that during the defense contracting rebound, DoD has prioritized more immediate and longer-term (10–15 years) challenges over more intermediate-term challenges in the next five to ten years. This balancing act only becomes more challenging in the coming years as DoD seeks to increase investments in emerging technologies (like hypersonics) and create access to innovations from non-traditional suppliers while preventing parts of the current force that are sitting at inflection points, like the F-18 inventory, from tipping over and entering a death spiral.

Any of these issues by themselves would likely transform the defense acquisition system, but combined, they could bring some of the most radical changes to the modern defense acquisition system since its inception at the end of World War II. Whether such a radical change accomplishes what the reformers set out to achieve will not be answered in the immediate future, but today's decisions will inform the trajectory of this transformation for the years to come. When making the difficult decisions about how

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271. Andrew Hunter, *Moving Away from Traditional Major Defense Acquisition Program Structure* (Washington, DC: Center for Strategic and International Studies, July 9, 2016), [https://csis-prod.s3.amazonaws.com/s3fs-public/publication/160902\\_Moving\\_Away\\_Traditional\\_Major\\_Defense\\_Acquisition.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/publication/160902_Moving_Away_Traditional_Major_Defense_Acquisition.pdf).

to implement the recent reforms or when choosing between competing investment priorities, decisionmakers need to pay heed to emerging data about the performance of the acquisition system and ensure that the coming transformation of the defense acquisition systems is one for the better.

# Appendix A | Methodology

For over a decade, the Defense-Industrial Initiatives Group (DIIG) has issued a series of analytical reports on federal contract spending for national security across the government.<sup>272</sup> These reports are built on FPDS data, presently downloaded in bulk from USAspending.gov. DIIG now maintains its own database of federal spending, including years FY 1990 to FY 2017, which is a combination of data download from FPDS and legacy DD350 data. For this report, however, the study team primarily relied on FY 2000 to FY 2017. Data before FY 2000 require mixing sources and incurs limitations discussed in section A.1.

## Inherent Restrictions of FPDS

Since the analysis presented in this report relies almost exclusively on FPDS data, it incurs four notable restrictions.

First, contracts awarded as part of overseas contingency operations are not separately classified in FPDS. As a result, we do not distinguish between contracts funded by base budgets and those funded by supplemental appropriations.

Second, FPDS includes only prime contracts, and the separate subcontract database (Federal Subaward Reporting System, FSRS) has historically been radically incomplete; only in the last few years have the subcontract data started to approach required levels of quality and comprehensiveness.<sup>273</sup> Therefore, only prime contract data are included in this report.

Third, reporting regulations require that only unclassified contracts be included in FPDS. We interpret this to mean that few, if any, classified contracts are in the database. For DoD, this omits a substantial amount of total contract spending, perhaps as much as 10 percent. Such omissions are probably most noticeable in R&D contracts.

Finally, classifications of contracts differ between FPDS and individual vendors. For example, some contracts that a vendor may consider as

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272. This appendix draws from numerous past Acquisition Trends, Defense Contracting and Federal Services Contracting Reports. The latest version of this methodology can be found online at: <https://github.com/CSISdefense/Lookup-Tables> along with DIIG's other publicly-available FPDS lookup tables. When the methods are drawn from new research within this past year, the specific source is noted in the footnotes.

273. For more on the current quality and comprehensiveness of FSRS, see Nancy Y. Moore, Clifford Grammich, and Judith Mele, "Findings from Existing Data on the Department of Defense Industrial Base," RAND Corporation, 2014.



services are labeled as products in FPDS and vice versa. This may cause some discrepancies between vendors' reports and those of the federal government.

## Constant Dollars and Fiscal Years

All dollar amounts in this data analysis section are reported as constant FY 2017 dollars unless specifically noted otherwise. Dollar amounts for all years are deflated by the implicit GDP deflator calculated by the U.S. Bureau of Economic Analysis with FY 2017 as the base year, allowing the CSIS team to more accurately compare and analyze changes in spending across time. Similarly, all compound annual growth values and percentage growth comparisons are based on constant dollars and thus adjusted for inflation.

Due to the native format of FPDS and the ease of comparison with government databases, all references to years conform to the federal fiscal year. FY 2017, the most recent complete year in the database, spans from October 1, 2016, to September 30, 2017.

## Included Agencies

This report tracks all contracting activity managed by DoD components with exceptions noted here. The civilian portion of U.S. Army Corps of Engineers contracting is also incorporated. However, contracts funded by DoD but managed by other agencies, such as the General Services Administration, are not included, except in budget-related charts where DoD funded contracts are explicitly referenced. Finally, in FY 2013, the Defense Commissary Agency (DeCA) stopped reporting most of its contract obligations (approximately \$5 billion) into FPDS. Because this creates a significant data discrepancy that distorts trend analysis, CSIS has excluded DeCA from the dataset throughout the study period.

## Data Reliability Notes and Download Dates

Any analysis based on FPDS information is naturally limited by the quality of the underlying data. Several Government Accountability Office (GAO) studies have highlighted the problems of FPDS (for example, William T. Woods' 2003 report "Reliability of Federal Procurement Data," and Katherine V. Schinasi's 2005 report "Improvements Needed for the Federal Procurement Data System—Next Generation").

In addition, FPDS data from past years are continuously updated over time. While FY 2007 was long closed, over \$100 billion worth of entries for that year were modified in 2010. This explains discrepancies between the data presented in this report and those in previous editions. The study team changes over prior-year data when a significant change in topline

spending is observed in the updates. Tracking these changes does reduce ease of comparison to past years, but the revisions also enable the report to use the best available data and monitor for abuse of updates.

Despite its flaws, the FPDS is the only comprehensive data source of government contracting activity, and it is more than adequate for any analysis focused on trends and order-of-magnitude comparisons. To be transparent about weaknesses in the data, this report consistently describes data that could not be classified due to missing entries or contradictory information as “unlabeled” rather than including it in an “other” category.

The FY 2017 data used in this report were downloaded in February 2017.

## Detailed Methods

The prior sections apply to all DoD contracting data or the data for years FY 1990 to FY 1999. The sections below are specific to only selected graphs or tables that posed additional technical challenges.

### COMPETITION<sup>274</sup>

The study team followed DoD methodology and calculated competition by using two fields: extent of competition, which is preferred for contract awards; and fair opportunity, which is preferred for task and delivery orders under most indefinite delivery vehicles (IDVs). In the vast majority of cases, competitive status is classified for the entire contract duration. Thus, if a contract had a duration of three years and was competed in the first year, it qualifies as competed for the entire duration. This also extends to single-award indefinite delivery contracts, which are classified based on whether the original vehicle was competed rather than consistently treated as only receiving an offer from the single awardee. However, for some other vehicles, such as multiple-award IDVs, the number of offers is instead tracked separately for each task order.

To better evaluate the rate of “effective competition,” the study team categorizes competitively awarded contracts by the number of offers received.<sup>275</sup> CSIS focused on the number of offers for competed contracts because it reveals information about the request for proposals. A solicitation that only has a single respondent indicates some combination of three factors: thinness in the underlying market, a failure to notify or give

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274. This section is adapted from Sanders, *Avoiding Terminations, Single-Offer Competition, and Costly Changes with Fixed-Price Contracts*.

275. CSIS defines effective competition as a competitively sourced contract awarded after receiving two or more offers.

adequate response time to potential competitors, or a contract that is unappealing to vendors.

The focus on the number of offers also has a basis in the regulation known as the Single Offer rule (DFARS 215.371), which addresses competitive acquisitions in which only one offer is received. This rule was rewritten in 2012 in order to add a policy section that "shift[s] the emphasis away from whether the circumstances described at FAR 15.403-1(c)(1)(ii) constitute adequate price competition, to an emphasis on the objectives of the rule, i.e., to increase competition and, if only one offer is received nevertheless, to make sure that the price is fair and reasonable and that the statutory requirements for obtaining certified cost or pricing data are met."<sup>276</sup> The revised rule also emphasizes the need to extend the period of solicitation when only one offer is received, which allows for seeing whether a longer response period can elicit additional bids. Essentially, the new standard suggests that if you cannot get two bidders, you must evaluate whether proceeding with one bid can be done while still protecting the interests of the government.

#### CONTRACT INITIAL DURATION AND SIZE<sup>277</sup>

When contract initial duration and size become factors, the dataset used is limited to contracts reported in FPDS that were initially signed no earlier than FY 2007 and completed by FY 2013. Determining when contracts are completed is the most challenging portion of compiling the dataset. Contracts closed out or terminated by the end of FY 2013 are included even if their current completion dates run into the next fiscal year. However, many contracts in FPDS and in the sample are never marked as closed out or terminated in the Reason for Modification field. In these cases, completion status is based on the current completion date of the most recent transaction in FPDS. This method could accidentally include contracts that have not yet reached their ultimate conclusion dates and are merely dormant. However, the FY 2013 sample end date means that any such contracts would have to be inactive for an entire fiscal year, which is unlikely.

FPDS raw data are available in bulk from [USAspending.gov](https://www.USAspending.gov) starting in FY 2000. However, data quality steadily improves over that decade and a half, particularly in the commonly referenced fields of interest to this study.

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276. "Defense Acquisition Regulations System; Defense Federal Acquisition Regulation Supplement; Only One Offer (DFARS Case 2011-D013)," 77 Fed. Reg. 39125 (June 29, 2012), <https://www.federalregister.gov/documents/2012/06/29/2012-15569/defense-acquisition-regulations-system-defense-federal-acquisition-regulation-supplement-only-one>.

277. This section is adapted from Sanders, *Avoiding Terminations, Single-Offer Competition, and Costly Changes with Fixed-Price Contracts*.

In most cases, unlabeled rates topped out at 5 to 10 percent. The critical exceptions are the Base and All Options and the Base and Exercised Options fields, which report contract ceilings. Prior to FY 2007, these fields are blank for the majority of contracts. Calculating the extent of ceiling breaches is impossible when that field is not available. In addition, this study classifies contract size by original ceiling and not total obligations, because the latter figure is dependent on contract performance.

Because a key dependent and independent variable are not available prior to FY 2007, the study team chose to set FY 2007 as the start date rather than risk sample bias by including only those earlier contracts that were properly labeled. This restriction poses a significant limitation in that no contracts of more than seven years in duration can be included, and five-year contracts are only in the study period if they were either closed out early or started by October 1, 2007.

#### TERMINATIONS<sup>278</sup>

Contract termination is determined through the Reason for Modification field in FPDS. A contract is considered terminated if it has at least one modification with the following values:

- “Terminate for Default (complete or partial)”
- “Terminate for Cause”
- “Terminate for Convenience (complete or partial)”
- “Legal Contract Cancellation”

These four categories and the “Close Out” category are used to mark a contract as closed. As discussed above, many contracts well past their current completion date never have a transaction marking them as closed; however, a termination is an active measure that mandates reporting, unlike the natural end of a contract, which can go unremarked.

The four different values of contract termination provide useful granularity, but even a termination for convenience indicates that something has likely gone awry. Thus, given the already low number of terminations, the study team treats a contract as either terminated or not, rather than subdividing by type.

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<sup>278</sup>. Ibid.

## CHANGE ORDERS AND CEILING BREACHES<sup>279</sup>

Similar to contract terminations, change orders are reported in the Reason for Modification field. There are two values that this study counts as change orders: “Change Order” and “Definitize Change Order.” For the remainder of this report, contracts with at least one change order are called Changed Contracts.

There are also multiple modifications captured in FPDS that this current study will not investigate as change orders. These include:

- Additional work (new agreement, FAR part 6 applies)
- Supplemental agreement for work within scope
- Exercise an option
- Definitize letter contract

The Number of Change Orders refers to the number of FPDS transactions for a given contract that lists one of the two change order categories as their Reason for Modification. The vast majority of contracts do not receive change orders, but changed contracts are still far more common than terminations.

A “ceiling breach” is the term the study team uses to refer to when the total potential cost of a contract increases due to a change order. In federal acquisition, the government usually sets a “cost ceiling” of contracts that limits the total amount of funds it may obligate on a single contract. This maximum cost ceiling can serve as a target for vendors looking to maximize their revenue under a contract. However, cost ceilings can be raised, meaning that they do not represent true maximums. When work under a contract is set to exceed the contract ceiling for any reason, the government is forced to breach these cost ceilings. “Ceiling Breaches” represent output indicators because they indicate that either the real cost of a contract or its true scope of work was not fully understood at the time that the contract was awarded.

This study uses changes in the Base and All Options Value Amount as a way of tracking the potential cost of change orders. The Base and All Options Value Amount refers to the ceiling of contract costs if all available options were exercised. The alternative ceiling measure, Base and Exercised Value Amount, is not used, because contracts are often specified such that the bulk of the eventually executed contract—in dollar terms—is treated as

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279. Ibid.

options. In these cases, the all-inclusive value provides a better baseline for tracking growth.

The Obligated Amount refers to the actual amount paid to vendors. This study team does not use this value for the analysis, because spending for change orders is not necessarily front-loaded. For example, a change to a contract in May 2010 could easily result in payments from May 2010 through August 2013.

The Extent of Ceiling Breach is calculated as follows:

$$\text{Extent of Ceiling Breach} = \frac{\text{Base \& All Options Value Increases from Change Order Modifications}}{\text{Base \& All Options Value Amount for Original, Unmodified Transaction}}$$

## VENDOR CATEGORIZATION

### *Small, Medium, and Large Vendors*

To analyze the breakdown of competitors in the market into Small, Medium, and Large vendors, the CSIS team assigned each vendor in the database to one of these size categories. Any organization designated as Small by the FPDS database—according to the criteria established by the federal government—was categorized as such unless the vendor was a known subsidiary of a larger entity. Due to varying standards across sectors, an organization may meet the criteria for being a Small business in certain contract actions and not in others. The study team did not override these inconsistent entries when calculating the distribution of value by vendor size.

Vendors with total annual revenue of more than \$3 billion, including from nonfederal sources, are classified as Large. This classification is based on the vendor's most recent revenue figure at time of classification. For vendors that have gone out of business or been acquired, this date may be well before 2017. A joint venture between two or more organizations is treated as a single separate entity, and organizations with a Large parent are also defined as Large. Due to their system integrator role and consistent market share, the study team placed the five largest defense contractors (Lockheed Martin, Boeing, Raytheon, Northrop Grumman, and General Dynamics) into a separate category called "Big Five defense vendors." Any vendor assigned a unique identifier by FPDS but is neither Small nor Large is classified as "Medium."

To identify Large vendors, the study team investigated any vendor with total federal contract obligations of \$500 million in a single year or \$2 billion over the study period. Determining revenues is the most labor-intensive

part of the process and involves the use of vendor websites, news articles, various databases, and public financial documents. When taken together, all of this work explains the increase in the market share of large vendors versus some older editions of this report. While Large vendors are, on rare occasions, reassigned into the middle tier, the vast majority of investigations either maintain the status quo or identify Small or Medium vendors that should be classified as large.

#### *Handling of Subsidiaries and Mergers and Acquisitions*

To better analyze the defense industrial base, the study team made significant efforts to consolidate the data that are related to subsidiaries and newly acquired vendors with their parent vendors. This results in, among other things, a parent vendor appearing once on CSIS's top 20 lists rather than being divided between multiple entries. The assignment of subsidiaries and mergers to parent vendor is done on an annual basis, and a merger must be completed by the end of March in order to be consolidated for the fiscal year in question. This enabled the study team to more accurately analyze the defense industrial base, the number of players in it, and the players' level of activity.

Over the past seven years, the study team has applied a systematic approach to vendor rollups. FPDS uses hundreds of thousands of nine-digit DUNS (Data Universal Numbering System) codes from Dun and Bradstreet to identify service providers. A salutary benefit of this standardization is that FPDS now provides parent vendor codes. These parent codes track the current ownership of vendors but are not backward looking. Thus, a merger that happened in 2010 would not affect parent assignments in 2000. This prevents the study team from adopting these assignments in their entirety. The study team investigates vendors that receive either \$250 million of total contract revenue or more than \$1 billion in obligations between 2000 and 2014 no matter how much they receive in any individual year. We have reinforced these manual DUNS number assignments with automated assignments based on vendor names. Qualifying for an automated assignment by name requires three criteria: 1) the vendor has a standardized name that matches with the name of a parent vendor, 2) the name has been matched to the parent vendor by the CSIS or the Parent DUNS number field, and 3) there are no alternative CSIS assignments with that vendor name. This process is not immune to error, but it reduces the risk that a DUNS code is considered large in one year but overlooked in another. As an error-checking mechanism, the study team investigated contradictions by comparing our assignments to those made by Parent DUNS numbers for every DUNS number with \$500 million in annual obligations or \$2 billion in total obligations.



## PLATFORM PORTFOLIO

To assess trends across the different sectors of the defense industrial base, CSIS classifies contracts into 11 unique platform portfolios. These platform portfolios, generally aligning to the different major DoD platforms, contain the records of all contracts within that specific platform portfolio. In other words, platform portfolios aggregate all product, service, and R&D contracts by the type of platform the contracts are associated with.

To create the 11 platform portfolios, the study team categorized contracts using the following process. First, contracts are categorized using their Project ID, a CSIS field based upon the SystemEquipmentCode in FPDS. Second, Missile Defense Agency (MDA) contracts not already categorized using Project ID are categorized as Air and Missile Defense. Third, contracts are categorized using their listed DoD Claimant Program Code. Finally, for all remaining contracts not categorized during any of the previous steps, they are categorized by their Product Service code.

The eleven unique CSIS platform portfolios are as follows:

- Aircraft
- Ships & Submarines
- Land Vehicles
- Air and Missile Defense
- Space Systems
- Ordnance and Missiles
- Other Products
- Electronics, Comms & Sensors
- Facilities and Construction
- Other Services
- Other R&D and Knowledge Based

## Appendix B | List of Acronyms

ACC-NJ	Army Contracting Command New Jersey
ACD&P	Advanced Component Development & Prototypes
AIA	Aerospace Industries Association
APG	Aberdeen Proving Grounds
ARRA	American Recovery and Reinvestment Act of 2009
ASD	Assistant Secretary of Defense
ATD	Advanced Technology Development
BAC	Budget Activity Codes
BBP	Better Buying Power
C3	Command, Control, and Communications
CAT	Conventional Arms Transfer
CEO	Chief Executive Officer
CIA	Central Intelligence Agency
CONOPS	Concept of Operations
CRADA	Cooperative Research and Development Agreements
DARPA	Defense Advanced Research Projects Agency
DASD	Deputy Assistance Secretaries of Defense (DASD)
DAU	Defense Acquisition University
DCMA	Defense Contract Management Agency
DCS	Direct commercial sales
DDR&E	Director of Defense Research and Engineering
DE	Directed energy
DFAR	Defense Federal Acquisition Regulation Supplement
DHS	Department of Homeland Security
DIU(x)	Defense Innovation Unit Experimental
DLA	Defense Logistics Agency
DoD	Department of Defense
DPAP	Defense Procurement and Acquisition Policy
DSCA	Defense Security Cooperation Agency

DT&E	Developmental Test & Evaluation (DT&E)
DTRA	Defense Threat Reduction Agency
EC&S	Electronics, Comms, & Sensors (EC&S)
EI&E	Energy, Installations, and Environment
ENG	Engineering]
EO	Executive Order
FAR	Federal Acquisition Regulation
FASA	Federal Acquisition Streamlining Act of 1994
FCS	Future Combat System
FFP	Firm-fixed price
FMS	Foreign Military Sales
FPDS	Federal Procurement Data System
FSRS	Federal Funding Accountability and Transparency Act Subaward Reporting System
FY	Fiscal Year
GAO	Government Accountability Office
GOCO	Operation of Government R&D Facilities
GSA	General Services Administration
HASC	House Armed Services Committee
HII	Huntington Ingalls Incorporated
IDA	Institute for Defense Analysis
IT	Information Technology
ITAR	International Traffic in Arms Regulations
JEDI	Joint Enterprise Defense Infrastructure
M&A	Mergers and acquisition
MDA	Missile Defense Agency
MDAP	Major Defense Acquisition Program
ME	Microelectronics
MIBP	Office of Manufacturing and Industrial Base Policy
MILPERS	Military Personnel
MIT	Massachusetts Institute of Technology
ML/AI	Machine learning/artificial intelligence
MS B	Milestone B

NAFTA	North American Free Trade Agreement
NASA	National Aeronautics and Space Administration
NDAA	National Defense Authorization Act
NDIA	National Defense Industrial Association
NDS	National Defense Strategy
NDU	National Defense University
NTIB	National Technology and Industrial Base
O&M	Operations & Maintenance
OE&M	Original Equipment Manufacturers
OMB	Office of Management and Budget
OSA	Open systems architectures
OSD	Office of the Secretary of Defense (OSD)
OTA	Other Transaction Authority
OUSD	Office of the Under Secretary of Defense
PALT	Procurement Action Lead Time
PARCA	Office of Performance Assessments and Root Cause Analyses
PBL	Performance Based Logistics
PQM	Production, Quality, and Manufacturing
PSC	Product or Service Code
QS	Quantum science
R&D	Research and Development
R&E	Research and Engineering
RDT&E	Research, Development, Test, and Evaluation
RFP	Request for Proposals
RIMPAC	Rim of the Pacific Exercise
S&T	Science & Technology
SAE	Service Acquisition Executive
SASCD	Senate Armed Services Committee
SCO	Strategic Capabilities Office
SD&D	System Development & Demonstration
SLOC	Source lines of code
STM	Science & Technology Management

T&E	Test and Evaluation
TOA	Total Obligation Authority
TRANSCOM	United States Transportation Command
TSA	Transportation Security Agency
ULA	United Launch Alliance
USD(A&S)	Under Secretary of Defense for Acquisition and Sustainment
USD(A&TL)	Under Secretary of Defense for Acquisition, Technology, and Logistics
USD(R&E)	Under Secretary of Defense for Research and Engineering
USTR	United States Trade Representative
UTC	United Technologies Corporation
WSARA	Weapon System Acquisition Reform Act
WTO	World Trade Organization

# About the Project Directors and Authors

**Rhys McCormick** is a fellow with the Defense-Industrial Initiatives Group (DIIG) at CSIS. His work focuses on unmanned systems, global defense industrial base issues, and U.S. federal and defense contracting trends. Prior to working at DIIG, he interned at the Abshire-Inamori Leadership Academy at CSIS and the Peacekeeping and Stability Operations Institute at the U.S. Army War College. He holds a B.S. in security and risk analysis from the Pennsylvania State University and an MA in security studies from Georgetown University.

**Andrew P. Hunter** is a senior fellow in the International Security Program and director of the Defense-Industrial Initiatives Group at CSIS. From 2011 to 2014, he served as a senior executive in the Department of Defense, serving first as chief of staff to undersecretaries of defense (AT&L) Ashton B. Carter and Frank Kendall, before directing the Joint Rapid Acquisition Cell. From 2005 to 2011, Mr. Hunter served as a professional staff member of the House Armed Services Committee. Mr. Hunter holds an MA degree in applied economics from the Johns Hopkins University and a BA in social studies from Harvard University.

**Samantha Cohen** is a former research associate with the Defense-Industrial Initiatives Group at CSIS. Her work focuses on managing and analyzing data to identify relationships among policies, defense spending, and the related impacts on the United States and national security. Her recent research focuses on designing and managing international joint development programs, new entrants survival rates and business graduation in the market for government contracts, and defense acquisition trends. Ms. Cohen holds a BS in economics from American University in Washington, D.C., and an MS in economics from Katholieke Universiteit (KU) Leuven Belgium.

**Gregory Sanders** is a fellow in the International Security Program and deputy director of the Defense-Industrial Initiatives Group at CSIS, where he manages a research team that analyzes data on U.S. government contract spending and other budget and acquisition issues. In support of these goals, he employs SQL Server, as well as the statistical programming language R. Sanders holds an MA in international studies from the University of Denver and a BA in government and politics, as well as a BS in computer science, from the University of Maryland.





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