KENTUCKY DEFENSE-INDUSTRY HIGHLIGHTS & TRENDS

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KENTUCKY CABINET FOR ECONOMIC DEVELOPMENT & KENTUCKY COMMISSION ON MILITARY AFFAIRS

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INTRODUCTION

On behalf of the Kentucky Commission on Military Affairs (KCMA) and the Kentucky Cabinet for Economic Development (CED), in 2017 TPMA completed thorough analyses of the Aerospace and Aviation (A&A) industries, and Department of Defense (DoD) related economy in Kentucky.[1] Recognizing that 2018 brought substantial changes to United States Defense strategy, and also recognizing the growing significance of the Bluegrass State in these industries, the CED, following recommendation of KCMA, commissioned this follow-up study focused on the DoD economy.

In this report, TPMA reviews numerous pieces of literature that explain trends in defense spending at the national level, reviews recent spending trends in Kentucky, and forecasts spending over the next ten years in the state. The 2017 studies remain the flagship reports on A&A and Defense in Kentucky. This report pushes forward those trends based on recent state and federal advancements and provides a 10-year DoD spending forecast within Kentucky.

[1] Reports posted online here: http://kyaerodefensemap.com/.

EXECUTIVE SUMMARY

Following a thorough analysis of Department of Defense (DoD) spending trends both nationally and state-wide, below is provided a short-list of the trends and factors that are likely to affect businesses and industry engaged with DoD in the state over the next 10-years.

- DoD's 2018 National Defense Strategy prioritizes agile and modern systems within key capabilities and systems, with a goal to continually update existing systems while developing new modern systems that can meet potential threats with speed and accuracy. The NDS asserts that deferred maintenance has impacted existing systems' ability to maintain a competitive advantage internationally.
- Competitiveness for DoD contracts is decreasing with time, thereby favoring companies such as "the Big Five" DoD consulting organizations. Notably, in FY17 the share of contract obligations awarded after effective competition fell to 44%, lower than the fifteen-year historical average of 49%. In certain industries, such as aerospace and arms manufacturing, the degree of competitiveness is even lower.
- Recent acquisition reform has pushed to focus on speed as opposed to bureaucratic controls. Specifically, while DoD contract obligations grew by 13%, contracting of defense products increased by 22%. During that same time, services and research and development grew by a more modest 5% and 6% respectively.
- The U.S. Army is the one military branch with the most connection to the state of Kentucky, both in terms of contracts and personnel payments. Over the past few fiscal years, contract obligations to the Army have increased, particularly in connection with army aircraft and ordinance & missiles obligations. In addition, the FY19 budget proposal puts forth a request for a 2.6% pay raise for military personnel.

In addition to the general points listed above, TPMA's analysis provides the following statistics to inform economic development and other state-based planning and investment:

- As of FY17, Kentucky ranks 17th in terms of spending, but 10th in terms of spending as a share of GDP (4.0%), equating to $8.2 billion on contracts and payroll in FY17.
- FY18 stands out as an outstanding year for DoD contracting in the Bluegrass state, representing a 43% year-over-year increase from FY17, landing Kentucky at 2.5% of all national DoD contract activity. Growth is headlined by noteworthy increases in the Finance & Insurance industry (Tricare), as well as remediation services, and technical consulting.
- In addition to Tricare west region administrator, Humana Military Services, Kentucky hosts an array of large multi-national defense companies including Lockheed Martin; Bechtel Parsons; Raytheon; Boeing Sikorsky; BAE and SAIC, among others. Though Kentucky is highly dependent on Humana for DoD revenue, currently, the array of both large and small product and service providers provides hope for future industry diversification.

- In FY18, Kentucky's DoD contracting landed at an all-time high of $8.3 billion. By FY23, spending is forecasted to reach $9.0 billion, with a potential high of $9.6 billion and a potential low of $8.5 billion. Finally, by FY28, spending is projected to settle at $10.0 billion, with a potential high of $10.9 billion and a potential low of $8.7 billion.
- Considering both defense spending and the operations of military installations, the direct impact of DoD in Kentucky reached $10.16 billion in FY18. That economic activity directly supports 59,921 jobs including both Active Duty military and defense contractors.[2]
- The total economic impact of DoD activities, considering direct spending and associated multiplier effects, reached $17.39 billion in FY18. Jobs created or supported by this activity totaled 109,385, which represents a 6.9% increase since the last DoD EIA report completed by TPMA in 2017.

[2] Please note, due to the fact that Fort Campbell is very near the border with Tennessee TPMA adjusted downward the direct impact and employment for this installation based on the degree of Active Duty personnel who live outside of the state.

2018 NATIONAL DEFENSE STRATEGY

In Fiscal Year 2017 (FY17), National Defense spending accounted for 4.0% of Kentucky's GDP, up from 3.7% in FY16[3]. The Bluegrass State has seen positive trends in DoD acquisitions in recent years but DoD has demonstrated a clear agenda to change its strategy starting in FY18.[4] Hence, it is worth a careful analysis of those trends to infer any possible risks and opportunities that could exist over the coming fiscal years. For the first time in a decade, the DoD released a National Defense Strategy that defines the DoD's strategic defense goals. The Summary of the 2018 National Defense Strategy (NDS) provides context on what DoD spending might look like in years to come. This document lists the DoD's priorities and goals to protect America's competitiveness against international threats.

At the highest strategic level, the 2018 NDS calls for a more lethal, resilient, and rapidly innovating Joint Force in combination with strategic allies and partners to sustain American influence and safeguard international order. In particular, the report cites four foreign States posing a threat to U.S. national security: China, Russia, North Korea and Iran. The NDS stresses the need to sustain predictable investment that will promote readiness to meet international threats with force and speed. The 2018 National Defense Strategy will shape the budgets for FY's 19-23[5].

Particular attention is given to modernizing systems that will:

- Be innovative;
- Strengthen Alliances and Attract New Partners; and
- Reform the Department for Greater Performance and Affordability.

The DoD's primary goal is to provide adequate and combat-ready military forces to protect the national security of the United States. In order to do this, the DoD must build a more lethal military force. the 2018 NDS details the key components and objectives the DoD will prioritize to achieve this goal. Specifically, the strategy emphasizes:

- Preparedness for war;
- Modernization of key capabilities;

Key Capabilities

1. Nuclear Forces
2. Space and cyberspace as warfighting domains
3. Command, control, communications, computers and intelligence, surveillance, and reconnaissance (C4ISR)
4. Missile defense
5. Joint lethality in contested environments
6. Forward force maneuver and posture resilience
7. Advanced autonomous systems
8. Resilient and agile logistics

[3] U.S. Department of Defense, Office of Economic Adjustment. (2019). Defense Spending by State: Fiscal Year 2017. http://www.oea.gov/sites/default/files/fy2017-r2/FY2017_Defense_Spending_by_State_Report_Web_Version_20190315_KY.pdf

[4] Federal budgets operate according to Fiscal Years (FY), which end on the last day of September and start on the first day of October. Hence, the United States' FY 18 extended from October 1, 2018 to September 30, 2019.

[5] Department of Defense of the United States of America. (2018). Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge.

- Innovative operation concepts;
- A lethal, agile and resilient force posture and employment; and
- Workforce talent.

Modernization of key capabilities includes the investment and upgrading of existing and emerging systems listed in the highlight box. Modernization of key capabilities ensures that the U.S. military is operating with up-to-date equipment that can match the ambitious expansions of U.S. adversaries and competitors.

While technological and cyber threats have reshaped the international defense arena, traditional tactics play a central role in defining the 2018 NDS. Technological innovation, however, greatly impacts whether and how the United States is able to maintain a competitive advantage in National Defense as new commercial technologies become available to non-state actors and state competitors. Additionally, in-line with recent focus by the Trump Administration, the NDS includes the National Security Innovation Base (NSIB) to protect and promote U.S. National Security[6].

[6] See: https://www.brookings.edu/research/brookings-experts-on-trumps-national-security-strategy/ National Security Innovation Base (NSIB) has been defined by the Brookings Institution as the network of American knowledge, capabilities, and people that turns ideas into innovations, products, and companies that protect and enhance the American Way of life.

Three Major Themes Included in the 2018 NDS and Application to Kentucky:

1) ***A focus on speed in procuring and integrating technological advances into operational use.*** A competitive advantage at beta scale development is insufficient unless quickly integrated into the field. This replaces a burdensome bureaucratic decision making and risk management mechanisms with results and performance-based management systems. This will likely result in a faster procurement process that could benefit the prime contractors doing work in Kentucky.
2) ***A desire to ease entry barriers for small innovative suppliers that have traditionally not participated in the Department of Defense (DoD) sphere.*** Small suppliers offer the potential for innovative and new technologies that may present strategic advantages to the DoD. Additionally, they may offer opportunities to enhance the DoD's ability to procure and operationalize increasingly innovative technologies and services. As indicated in TPMA's 2017 analysis, Kentucky is full of small and mid-sized DoD contractors, 1,036 to be exact.[7] Hence, this emphasis will likely assist smaller product and service providers in obtaining contracts, given the proper knowledge of how to apply for such opportunities.
3) ***Routine modular upgrades to systems to enhance the rate at which innovation and modifications can be operationalized.*** In essence, prioritizing operationalization of frequent upgrades and integration of business innovation insights in lieu of cumbersome approval process to update systems will improve the DoD's ability to rapidly integrate innovative technologies into existing processes. Faster integration of technology will benefit larger contractors, as it will allow for a more rapid adoption of new technologies into production systems. Larger companies doing business in Kentucky, such as Lockheed Martin, Raytheon SAIC, and others, will likely see the greatest benefits.

Key factors for success in achieving these goals include the modernization of equipment and the development of consistently innovative technologies in order to meet future defense and national security threats with an upper hand. These strategic goals will ensure that the U.S. maintains its global military influence, an ability to access to markets, and strong alliances and partnerships that contribute to overall U.S. prosperity and standard of living.

Through sustained predictable budgets the 2018 NDS asserts that the Department of Defense (DoD) can achieve and sustain military superiority on a global scale. Due to the increased modernization of competitors and adversaries, the pressure on the U.S. to modernize has grown in the past decade. Among key opponents to U.S. National Security China and Russia have made strides recently in military modernization that exemplifies the pressing need for the U.S. military to invest in modernizing operations and equipment in addition to maintaining up-to date technologies.

[7] Ninety-two (92) represents the count of employers with 500 or fewer employees, in accordance the U.S. Small Business Administration's definition of small companies: https://www.sba.gov/advocacy/firm-size-data.

BUDGETARY TRENDS FY15-FY17

Acquisition Trends

Two major trends impacting the future acquisition of products and services by the DoD have emerged. The first includes proposed policy changes intended to facilitate a focus on delivering results at the "speed of relevance" over bureaucratic controls intended to mitigate risk. Additionally, there has been an increased share of contract obligations devoted to acquisition of products. This latter trend is exemplified in the uneven increase of contract acquisitions between FY15 and FY17. Specifically, while DoD contract obligations grew by 13%, contracting of defense products increased by 22%. During that same time, services and research and development grew by a more modest 5% and 6% respectively[8].

In FY16, increased focus on restructuring defense acquisition led to initiatives in both the House and Senate intended to enable DoD to innovate and procure products and services more rapidly[9]. Either motion would result in fewer bureaucratic controls intended to mitigate risk in defense acquisition while allowing for alternative pathways for acquisition and increased decision-making authority at the Secretary level. The Senate's initiative would allow for rapid prototyping and fielding. The House proposes oversight boards to monitor spending, while separating prototyping from product development after approval of preliminary and design, allowing for rapid integration of mature technology.

Federal acquisition regulations typically require contracts to be awarded on the basis of full and open competition between potential vendors. Under specific circumstances, however, noncompetitive contracts may be awarded where vendor capacity is limited or where special programs allow for sole-source awards[10]. According to the 2018 report by McCormick, Cohen, Sanders, and Hunter of the Center for Strategic & International Studies (CSIS), in FY17 the share of contract obligations awarded after effective competition fell to 44%, lower than the historical average of 49% between FY00 and FY15[11]. This downward trend is especially the

> *Aircraft, already one of the least competitive sectors, became even more non-competitive during the defense contracting rebound. As Aircraft obligations increased 34 percent between FY 2015 and FY 2017, the rate of effective competition fell from 16.7 percent to 13.9 percent.*
>
> *(Source: Acquisition Trends 2018: Defense Contract Spending Bounces Back Executive Summary)*

[8] McCormick, R., Cohen, S., Sanders, G., & Hunter, A. P. (2018). Acquisition Trends 2018: Defense Contract Spending Bounces Back Executive Summary. *Center for Strategic & International Studies (CSIS).*

[9] Hunter, A. P. (2016). Moving Away from Traditional Major Defense Acquisition Program Structure. *Center for Strategic & International Studies.*

[10] United States Government Accountability Office. (2015). Defense Contracting: DOD's Use of Competitive Procedures, GAO-15-484R Defense Contracting.

[11] McCormick, R., Cohen, S., Sanders, G., & Hunter, A. P. (2018). Acquisition Trends 2018: Defense Contract Spending Bounces Back Executive Summary. *Center for Strategic & International Studies.,* pp., 8.

case for the Aircraft platform portfolio, for which the rate of effective competition decreased by 2.8% between FY15 and FY17.

This increase in contract obligations has benefitted the "Big Five" defense contractors disproportionally, who together represent 33% of the increase in contracts while other vendors experienced more modest increases. These five include Boeing, Lockheed Martin, Northrop Grumman, Raytheon and General Dynamics. Kentucky stands to benefit partially from this consolidation, due the presence of some of the Big Five contractors in the state. However, states with stronger presence of prime contracting such as Washington, Texas and South Carolina, will likely benefit more.

Meanwhile entry into the defense industry by new vendors has lagged despite some attempts to increase the industrial base by encouraging small innovative vendors to deliver the best products and technology to the DoD. This is illustrated by the fact that despite contract obligations increasing by 13% between FY15 and FY17 the number of unique prime vendors has decreased by 9%. This generates some concern given focus on ensuring the DoD's ability to access a broader base of vendors for services and products as part of a strong and expansive industrial base for obtaining state of the art defense products. Given the data availability around subcontracts which is unreliable, the CSIS Acquisition Trends does not include analysis on how this trend looks at the subcontractor level[12].

Previous Budgetary Spending

Overall spending has increased, and there are signs of a recovery from the initial impact of sequestration on defense spending resulting from budget control measures taking effect in FY13. In more recent years the continuing resolutions[13] have impacted the overall spending and ability of the DoD to anticipate budgetary limits as they relate to contracting potential.

The DoD acquisition process includes three major phases to develop and operationalize defense systems and programs. The three phases include technology development, system development, and production. Between phases, milestones are used to gauge readiness to move to the next phase. Milestone B, also known as development state, is the point at which a technology moves into product development to ensure that the design is stable and performs as expected[14]. This is followed by Milestone C, production start.

[12] Ibid., pp. 9-11.

[13] Temporary extensions to previous fiscal year budgetary allocations into a subsequent fiscal year in light of congressional failure to approve new budgetary allocation for the subsequent year.

[14] For more detail on the phases of DoD acquisition see: United States Government Accountability Office. (2018). Weapons Systems Annual Assessment: Knowledge Gaps Pose Risk to Sustaining Recent Positive Trends. *GAO Highlights: Highlights of GAO-18-360SP*; or Light, T., Leonard, R. S., Pollak, J., Smith, M. (2017). Quantifying Cost and Schedule Uncertainty for Major Defense Acquisition Programs (MDAPs). *RAND Corporation.*

Figure 1: DoD Stages of Acquisition. Source: Quantifying Cost and Schedule Uncertainty for Major Defense Acquisition Programs (MDAPs).

Due to the nature of technology and product development, contract obligations and systems may exceed approved amounts when operationalized due to cost growth and unanticipated costs, also known as "schedule slip". A 2017 RAND report attempted to better anticipate how Major Defense Acquisition Programs (MDAPs) will experience cost growth that deviates from the approved budget authority and how likely they are to experience schedule slip by using inputs determined at Milestone B.

This is especially important as the uncertainty of cost growth and schedule slip poses a challenge for MDAPs and previous attempts to gauge these risks have proven unreliable. Overall, the report determines that planning fallacy has led to historical tendency to underestimate project costs and timelines. This is crucial in estimating potential actual spending of programs based on current contract obligations for modeling impact of DoD spending[15].

BUDGET PROJECTIONS

Spending Trends by DoD Branch

Defense contract obligation increased in all major DoD components between FY15 and FY17[16]. As with other categories of DoD contract obligations and spending, each component's portfolio has increased unevenly, with some divisions growing more rapidly than others.

Army contract obligations increased by 5% during this time period. The majority of this growth was due to a 13% increase in contract obligations for products, followed by very little growth in R&D (2%) and services (0% growth). This growth is largely due to increased army aircraft and ordinance & missiles obligations which increased by 20% and 74% respectively. Facilities and Construction and Air & Missile defense decreased by 5% and 40% respectively representing the largest decline in army contract obligations. Although Kentucky contains a significant Army presence, due to two military installations and depot, many contracts run through these entities are for services, construction and environmental remediation. Increases in product spending could have an effect on the state, if contractors such as Boeing Sikorsky and Raytheon, receive increased orders for their products.

[15] Light, T., Leonard, R. S., Pollak, J., Smith, M. (2017). Quantifying Cost and Schedule Uncertainty for Major Defense Acquisition Programs (MDAPs). RAND Corporation.
[16] Ibid., pp. 11.

Navy contract obligations increased a much more significant 25% between FY15 and FY17. Similar to the Army and, the largest increase in navy contract obligations was products, which increased by 38%. R&D and services contract obligations experienced more modest growth at 5% and 6% respectively. Much of this growth in contract obligations is attributable to the 21% growth in Navy Ships & Submarines contract obligations.

Air Force contract obligations increased by 11% during this time, showing high volatility during this time with a 22% increase in FY16 and a 9% decrease in FY17. This volatility notably impacted Air Force product contract obligations which shifted from a 54% increase in FY16 to a 28% decrease in FY17. The primary impact of this volatility was focused on the Aircraft platform portfolio in particular, which increased 33% and subsequently decreased 18% during the same time. McCormick, Cohen, Sanders, and Hunter (2018) note in particular that effective competition for Air Force contract obligations rose, contrary to the trends for the Army and Navy and the overall DoD during the same time period. One point to note is that the share of small vendors receiving Air Force contract obligations rose 2.2% in FY16. A bump in contract spending could be in order for Kentucky, in association with Air Force spending specifically related to the Minuteman III program.

Major Components

The U.S. Government Accountability Office (U.S. GAO) Weapons System Annual Assessment provides a brief overview of cost, schedule and performance of the DoD's weapon systems acquisitions programs on an annual basis. The 2018 Weapon Systems Annual Assessment provides detail on $1.66 trillion representing a portfolio of 86 major weapon systems acquisitions programs[17].

Additionally, the 2018 assessment differentiates programs that were initiated prior to 2010 and those initiated after to determine whether programs initiated since 2010 demonstrated better cost performance. Weapons Systems acquisition includes three phases which include technology development, system development, and production and operationalization which accounted for the largest share of cost growth in FY17. As shown in Figure 2, the total cost growth occurs after production start, making it difficult to gauge how programs initiated in recent years will perform once they reach this stage of development. While the GAO's assessment determined that programs initiated since acquisition reforms were initiated, the GAO clarifies that given the disproportionate cost growth after production start makes it difficult to gauge if this trend will last.

[17] United States Government Accountability Office. (2018). Weapons Systems Annual Assessment: Knowledge Gaps Pose Risk to Sustaining Recent Positive Trends. *GAO Highlights: Highlights of GAO-18-360SP.*

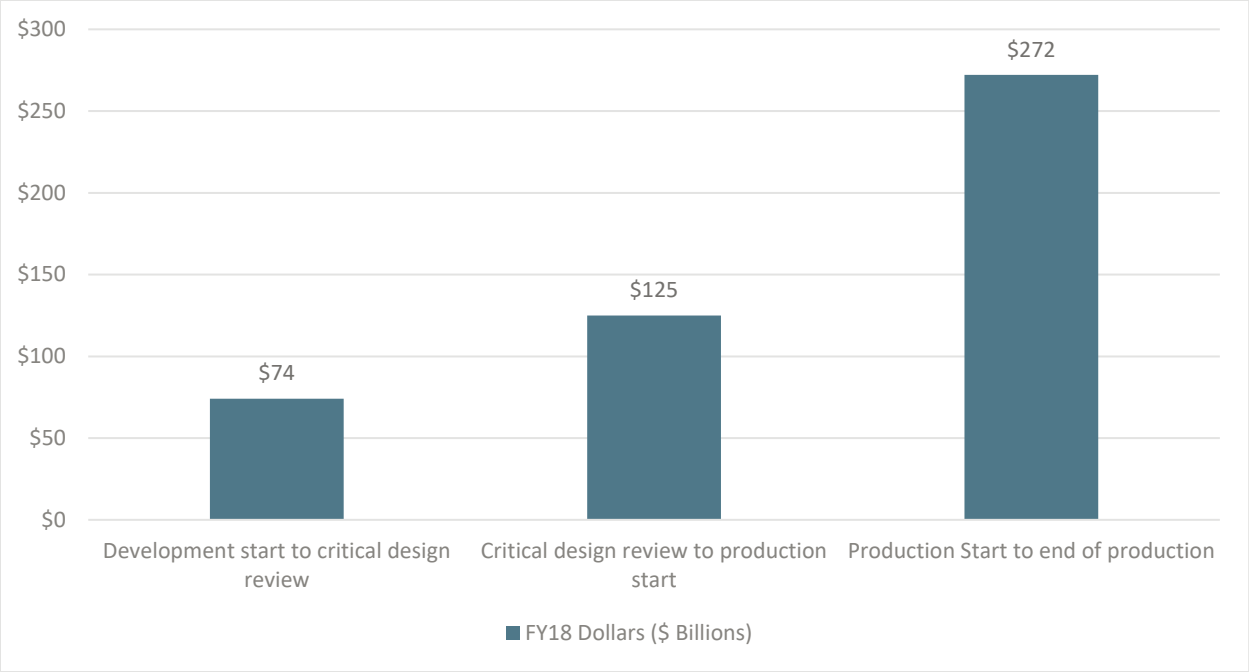


Figure 2 Programs in DoD's 2017 Portfolio Cost Growth. Source: (2018) Weapons Systems Annual Assessment: Knowledge Gaps Pose Risk to Sustaining Recent Positive Trends.

Purchasing Category Trends

Defense contracting has rebounded from sequestration in FY13, but this rebound has not occurred evenly across all portfolios. As demonstrated in Figure 3, the largest increases in contract obligations have been in product contracts across all three major DoD components. The largest increases in platform portfolios were in contract obligations for Aircraft (34%), Ordnance & Missiles (32%), and Ships & Submarines (22%) which increased at larger rates than the increase of overall defense contract obligations (13%) between FY15 and FY17. During the same time period, other platform portfolios decreased despite overall DoD contract obligation growth such as Space Systems and Air & Missile Defense which fell by 1% and 11% respectively. The diversification of Kentucky's DoD contracting base in fields such as aerospace and ordnance & missiles, means there are several growth trends for the state to pick up on in forthcoming fiscal years.

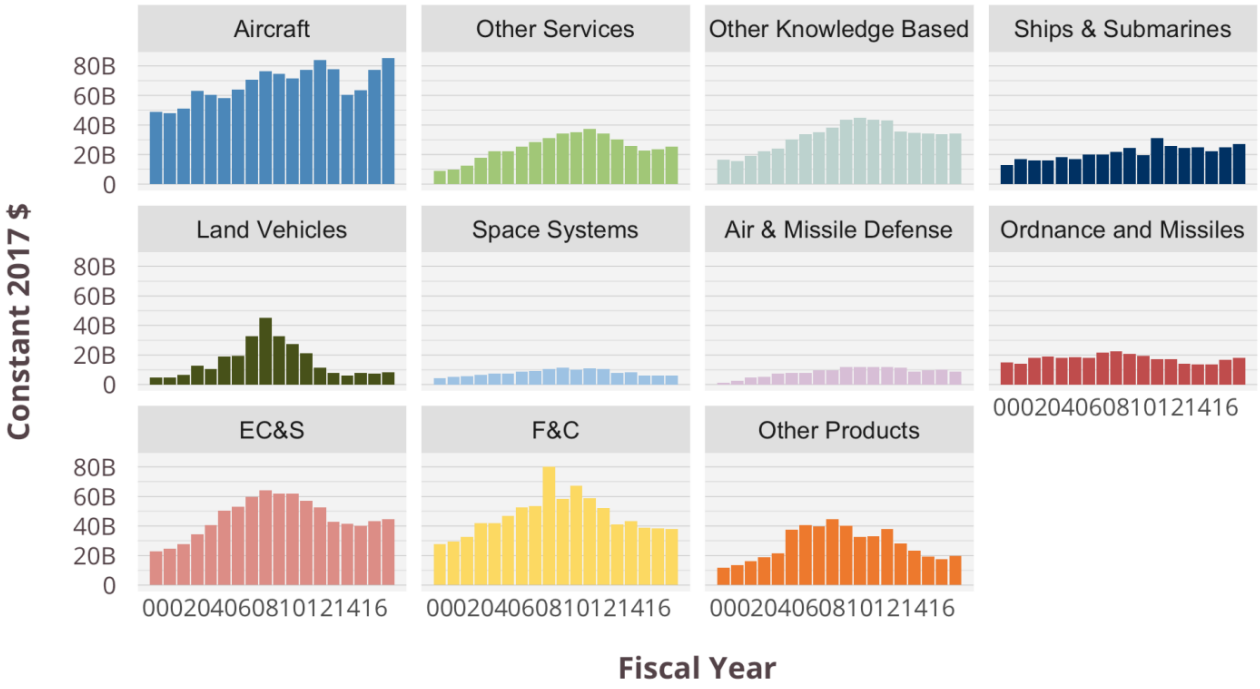


Figure 3: Defense Contract Obligations by Platform Portfolio, 2000-2017. Source: McCormick, R., Cohen, S., Sanders, G., & Hunter, A. P. (2018). Acquisition Trends 2018: Defense Contract Spending Bounces Back Executive Summary. Center for Strategic & International Studies., pp. 4.

FY19 Budget

The key components identified in the NDS include speed of delivery, continuous adaptation and frequent modular upgrades to systems in addition to streamlining and reduced barriers to new entrants and small-scale vendors.

Overlapping budgetary policies and acts across years impact the current budgetary spending and requests, including continuing resolutions (CR). In addition to the requested base budget, the defense budgetary request includes Overseas Contingency Operations (OCO) funds. OCO funds, also referred to as war funds, are additional funds available to the Pentagon and State Department that are not subject to sequestration and are intended to use for wartime efforts. Emergency Supplemental Funds may be appropriated to cover emergencies that are urgent and cannot wait until subsequent appropriations. Budgetary authority may differ from outlays (payments) by the DoD due to cost uncertainty, failure to obligate funds, or in extreme cases where funds are spent over the course of multiple years for large construction projects.

The overall budget request for FY19 is $686.1B, which includes a $93.4B increase from FY17 and the FY18 CR base budgets. OCO and Emergency Supplemental funds are decreased in the FY19 request, resulting in a total increase of only $74.3B compared to the FY18 CR. This represents a

10% increase from the FY18 CR. While the FY19 budget represents an increase in the base budget, it follows historical trends of DoD outlays remaining around 3.0-3.1% GDP between 2015-2019[18].

Discretionary Budget Authority ($ Billions)	FY18[19]	FY19 Request	Change FY18 - FY19	Percent Change FY18-FY19
Military Personnel	139.8	152.9	13.1	9.4%
Operation and Maintenance	261.6	283.5	21.9	8.4%
Procurement	125.6	144.3	18.8	15.0%
RDT&E	74.6	92.4	17.8	23.8%
Revolving and Management Funds	1.9	1.6	-0.4	-19.2%
Defense Bill	603.5	674.7	71.2	11.8%
Military Construction	7.1	9.8	2.7	38.4%
Family Housing	1.2	1.6	0.3	27.3%
Military Construction Bill	8.3	11.4	3.1	36.8%
Total Base + OCO + Emergency	**611.8**	**686.1**	**74.2**	**12.1%**

Table 1 DoD Total (Base + OCO + Emergency) Budget by Appropriation Title. Source: Office of the Under Secretary of Defense (Comptroller) Chief Financial Officer. (2018). Defense Budget Overview: United States Department of Defense Fiscal Year 2019 Budget Request.

Type of Procurement

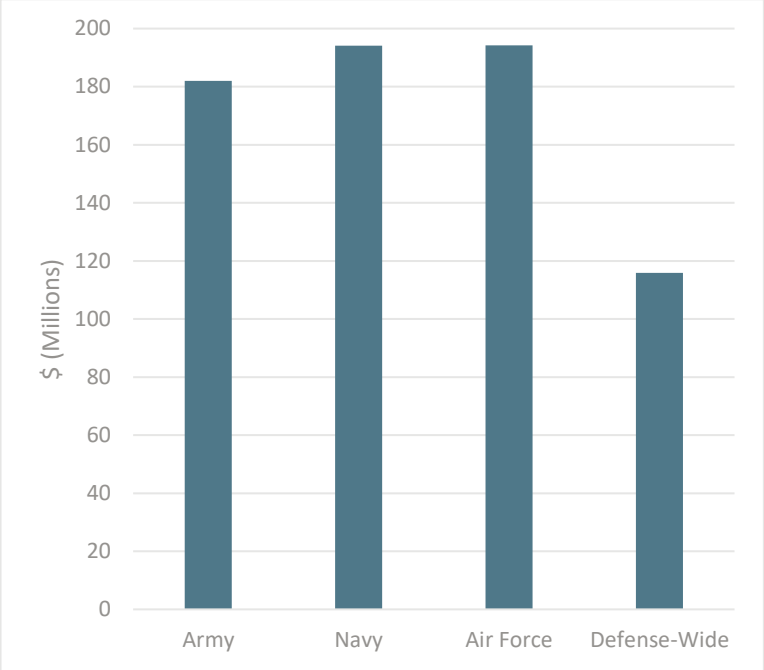
Personnel One of the largest expenses for the DoD is military pay and benefits, which comprise roughly one-third of the DoD budget. The requested amount for FY19 military personnel was $152.9 Billion, which is a 13.1% increase from FY18. Additionally, the budget considers a 2.6% pay raise for military personnel, and a 0% increase for civilian personnel in FY19. Among the three major military branches, the base budget devoted to military personnel for Army, Navy and Air Force is as follows: $63.7, $50.2, and $38.9 Billion respectively. The large number of Army personnel stationed in Kentucky will benefit from the compensation increase, which will filter out through increased in-region spending on local goods and services.

Products Spending on munitions was higher than projected in both FY17 and FY18 and may merit a higher band of uncertainty when modeling in future budget projections. Given the unpredictability of conflict and the need for the DoD to be ready to meet and beat external security threats there is a constant need to maintain and replenish munitions stores. More than one branch of the military may require the same type of munitions, potentially increasing demand for specific products. Decrease in munitions previously forced consolidation in response to decreased demand, as some suppliers do not have the capacity or commercial base to operate without military demand for munitions. The FY19 budget request proposes to procure munitions at maximum production capacity. Supply side limitations might affect this number, though

[18] Office of the Under Secretary of Defense (Comptroller) Chief Financial Officer. (2018). Defense Budget Overview: United States Department of Defense Fiscal Year 2019 Budget Request.
[19] Note included in original source: Reflects the Continuing Resolution funding level and Division B of Public Law 115-96 (Department of Defense Missile Defeat and Defense Enhancements Appropriations Act, 2018).

previous investment into production lines to ensure need is met has allowed rapid increases in output rates.

Services In addition to personnel and products the DoD procures services on a regular basis. Since FY00 42% of DoD contract obligations have gone to Services, however the share of service contracts has fallen from 44% to 41% between FY15 and FY17[20]. Services procured may include infrastructure and equipment maintenance, administrative series and medical work. Service contract obligations have increased in recent years, which included a shift toward small vendors. Policy recommendations have encouraged decreases in spending on services, though overall this has not had a significant impact. McCormick, Cohen, Sanders, and Hunter (2018) attribute this resilience to growing medical costs in the U.S. and the maintenance needs of an increasingly aging fleet. The shift in focus away from services may eventually have an impact on the Tricare system, which is Kentucky's single biggest DoD spending pillar. However, increasing costs in the healthcare industry inevitably lead to increased costs in insurance as well. Hence, it is difficult to predict how Tricare spending will change over time.



Source: Office of the Under Secretary of Defense (Comptroller) Chief Financial Officer. (2018). Defense Budget Overview: United States Department of Defense Fiscal Year 2019 Budget Request.

Military Department The requested FY 19 discretionary budget is spread across the major military branches almost equally. The defense-wide budget amount represents a smaller amount than each of the three major military departments.

[20] McCormick, R., Cohen, S., Sanders, G., & Hunter, A. P. (2018). Acquisition Trends 2018: Defense Contract Spending Bounces Back Executive Summary. Center for Strategic & International Studies., pp. 5.

DEFENSE SPENDING IN KENTUCKY

For the purposes of measuring the impact on state economies the differentiation between portfolios should dictate the expected outcomes and underlying assumptions. Trends vary between states based on local markets, location of bases and supplier locations that lend a certain predictability to the magnitude of defense spending within the local economy.

Defense in the Blue Grass State

The DoD spent $407.0 billion on contracts and payroll in FY17 in total. $8.2 billion of this was spent in the state of Kentucky, making it 17th in terms of overall spending. However, The Blue Grass State ranked 10th among U.S. States and the District of Columbia in terms of defense spending as a share of State GDP. In the FY17 defense spending accounted for 4.0% of the State's GDP[21]. This is higher than the United States average of 2.3% of state GDP during the same year. In FY17 $5.4 billion of this went to contract spending, with the remaining $2.8 billion going to personnel spending.

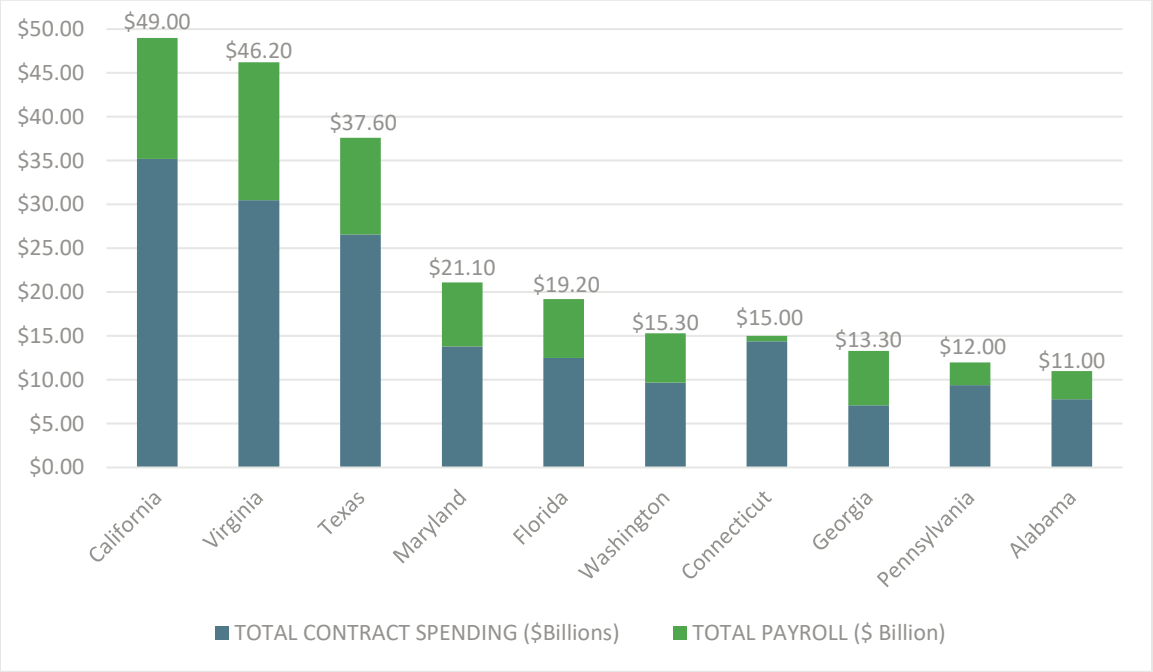


Figure 5: Top 10 States by Total Defense Spending FY17. Source: U.S. Department of Defense, Office of Economic Adjustment. (2019). Defense Spending by State: Fiscal Year 2017.

Contract spending makes up a larger share of spending in most states. The state with the largest defense spending is California, where DoD spent $49.0 Billion in FY17. This is followed by the rest of the U.S. and the District of Columbia. While Kentucky is only 17th in terms of total spending by dollar amount, the Blue Grass State ranks tenth in terms of spending as a share of State GDP

[21] U.S. Department of Defense, Office of Economic Adjustment. (2019). Defense Spending by State: Fiscal Year 2017.

where Defense spending accounted for 4.0% of State GDP in FY17. The total share of state GDP ranges from a high of 8.9% in Virginia and a low of 0.5% in Oregon.

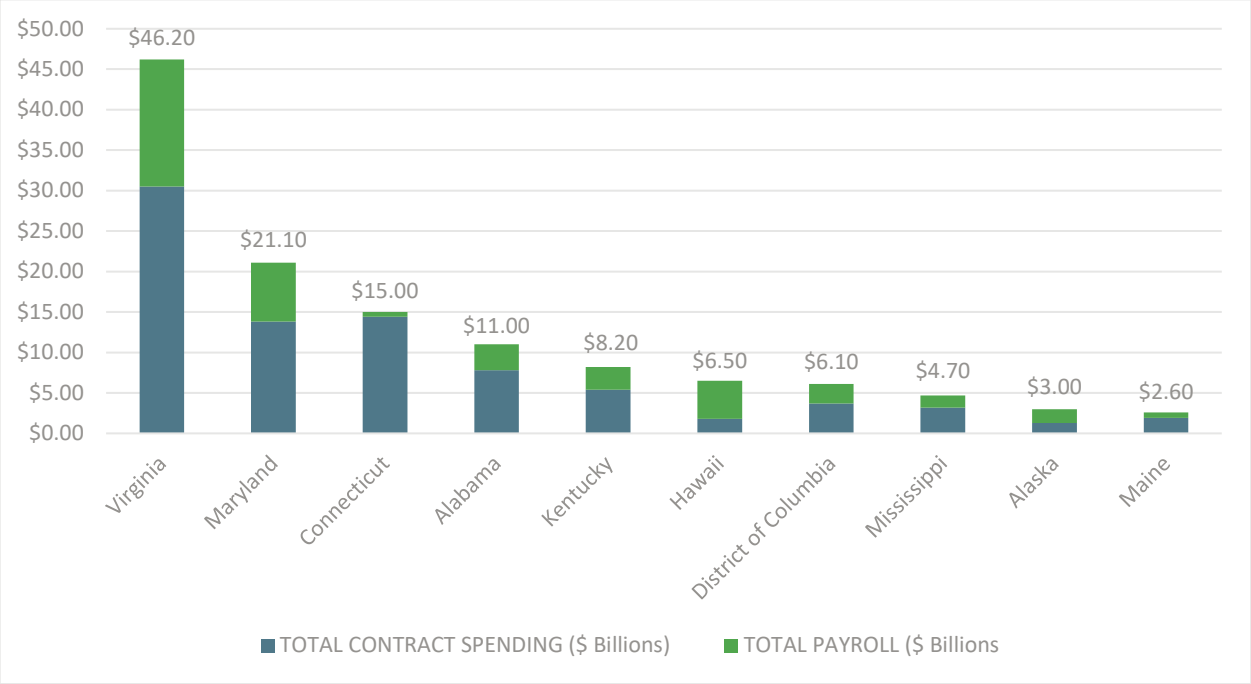


Figure 6: Top 10 States by Defense Spending as Percent of State GDP FY17. Source: U.S. Department of Defense, Office of Economic Adjustment. (2019). Defense Spending by State: Fiscal Year 2017.

State	Defense Spending as a Share of State GDP (%)	Total Spending on Contract and Payroll ($ Billions)
Virginia	8.9%	$46.2
Hawaii	7.3%	$6.5
Connecticut	5.6 %	$15.0
Alaska	5.5%	$3.0
Maryland	5.3%	$21.1
Alabama	5.1%	$10.9
District of Columbia	4.5%	$6.1
Mississippi	4.2%	$4.8
Maine	4.1%	$2.6
Kentucky	4.0%	$8.2

Table 2: Top 10 States by Defense Spending as Percent of State GDP FY17. Source: U.S. Department of Defense, Office of Economic Adjustment. (2019). Defense Spending by State: Fiscal Year 2017.

Types of Spending

The two primary types of defense spending are contracts, which procure services and products for defense needs, and payroll to personnel (including active duty, reserve and civilian employees). Of the $8.2 billion spent in Kentucky in FY17, approximately $5.4 billion went to contracts. The largest portion of defense contracts in Kentucky went to services (83%). This was followed by supplies and equipment (15%), construction (2%) and research and development (0%). Contracts, considered by service type, went primarily to other defense contracts (74%) followed by army (20%), navy/marines (5%), and air force (1%). In FY17 there were a total of 17 contract awards, which is one more than the previous fiscal year. Spending is attributed to top contractors, with Humana representing the largest at $3.2 billion alone. Notably, without the contributions of Humana, Kentucky would rank 25th in terms of overall defense spending across all state in the U.S. and the District of Columbia.

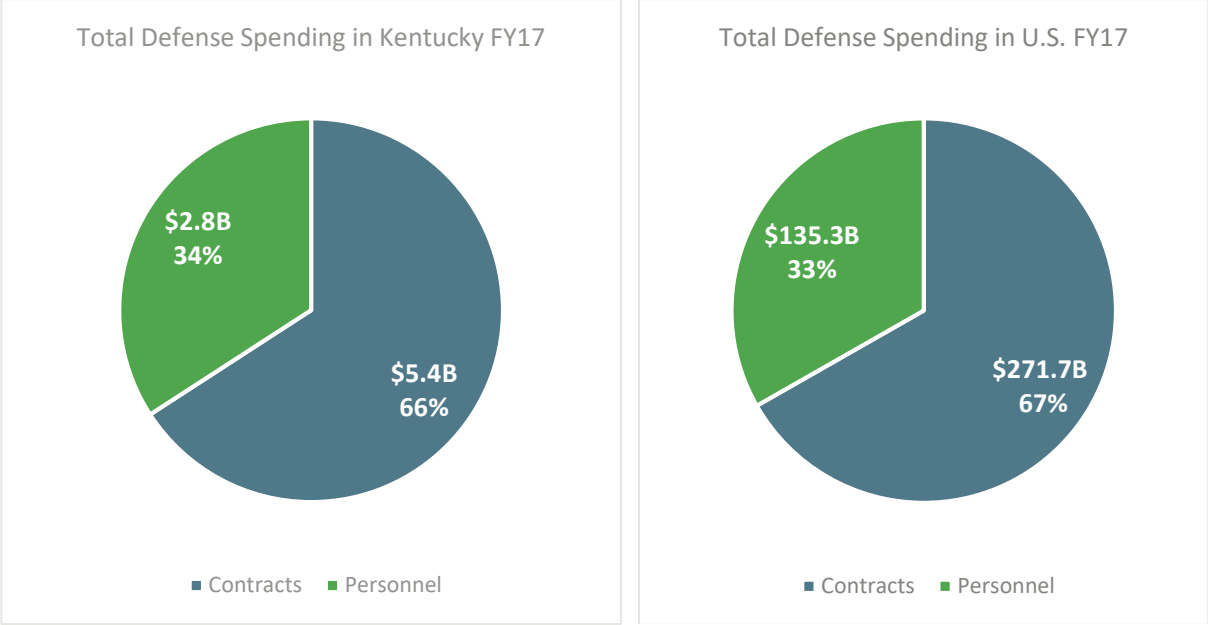


Figure 7: FY17 defense spending in Kentucky does not differ from the total U.S. in terms of distribution of funds going to personnel spending and contract spending.

A total of 55,866 personnel account for $2.8 billion in payroll spending in Kentucky. Among these expenses, 59% goes to active duty military, followed by 23% to national guard/reserve personnel and 18% to civilians. The primary branch accounting for personnel spending in Kentucky is the Army with 95% of all personnel spending. The three counties representing the largest payroll expenditures are Christian, Hardin and Jefferson Counties with a total of 46,518 personnel of the total 55,866 in the State of Kentucky.

Spending Impacts

Geographically, the two counties with the highest amount of spending are Jefferson County and Fayette County where defense spending reached $3.1 billion and $613.7 million FY17 respectively. Kentucky has several major military sites and operations geographically spread throughout the State that include:

1. Blue Grass - Army Depot Army Active - Madison
2. Fort Campbell - Army Active - Christian[22]
3. Fort Knox - Army Active - Hardin
4. Louisville IAP-Standiford - AF Guard - Jefferson
5. US Army Corps of Engineers - Army - Jefferson
6. US Coast Guard - Homeland Security - Jefferson
7. NG Frankfort Boone NG Center - Army Guard - Franklin
8. W.H. Ford Regional Training Ctr - Army Guard - Muhlenberg
9. Bluegrass Station-Kentucky – National Guard - Fayette

DETAILED DOD SPENDING INFORMATION

Beyond high level statistics, it is also helpful to explore DoD contract spending cuts according to a number of meaningful characteristics, including time, sub-agency, acquisition program, industry and company. DoD spending data can vary based on how the data are categorized and whey they were pulled from federal databases. For clarity, these data refer to contracts *performed* in the state of Kentucky, categorized by fiscal year and in nominal U.S. dollars, not adjusted for inflation. The data are inclusive of ten full fiscal years of spending, the data were downloaded from USASpending.gov on February 8th, 2019.

[22] A portion of Fort Campbell is located in Tennessee.

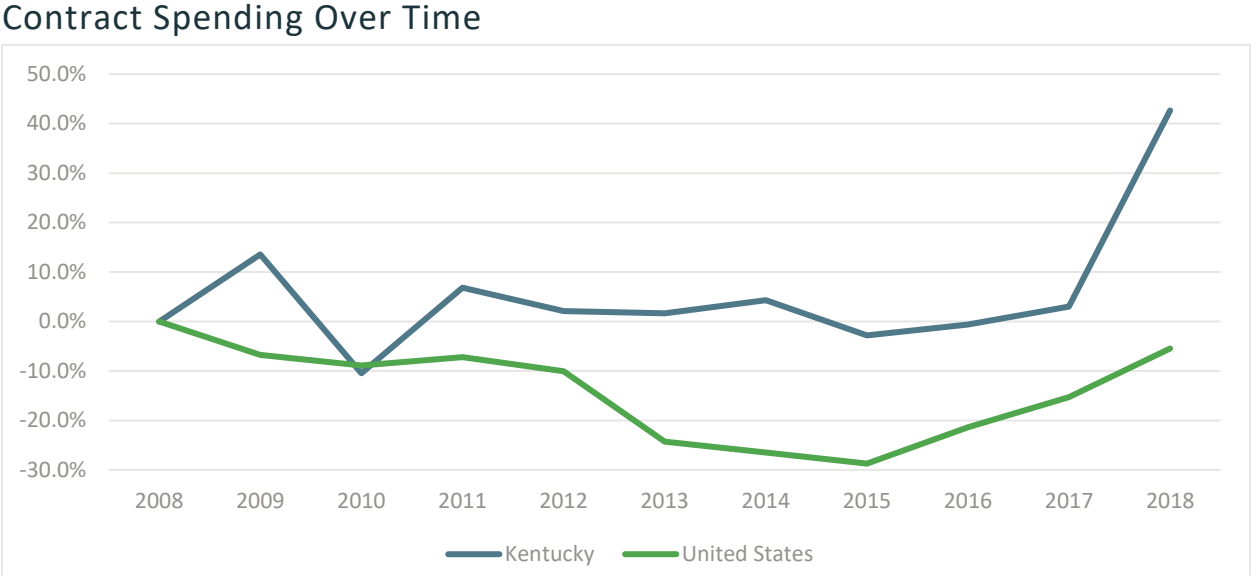


Figure 8: Cumulative change in DoD Prime Contracts performed in Kentucky and the United States, fiscal years 2008 through 2018

In demonstrating percentage growth, Figure 8 allows for easy comparison between Kentucky and United States, both year over year and cumulatively over the past decade. DoD contracting in Kentucky has been on the rise over the past ten fiscal years, excluding some unusual year over year changes early in the period. The fiscal years 2009, 2011 and 2017 each represent strong year-over-year growth, whereas fiscal years 2010, 2012 and 2015 were periods of year-over-year decline.

The most noteworthy trend, however, is the exceptional increase in contracts in FY18 bring contracts performed in the state of Kentucky to $8.26B, a 42.7% year-over-year increase from FY17. Kentucky-based DoD contracts composed 2.5% of the national total in FY18, the highest rate over the past decade. All told, between FY08 and FY18, DoD contracting expanded 42.7% in Kentucky a vastly superior growth rate than the United States, which decreased by -5.4%.

Spending by DoD Sub-Agency

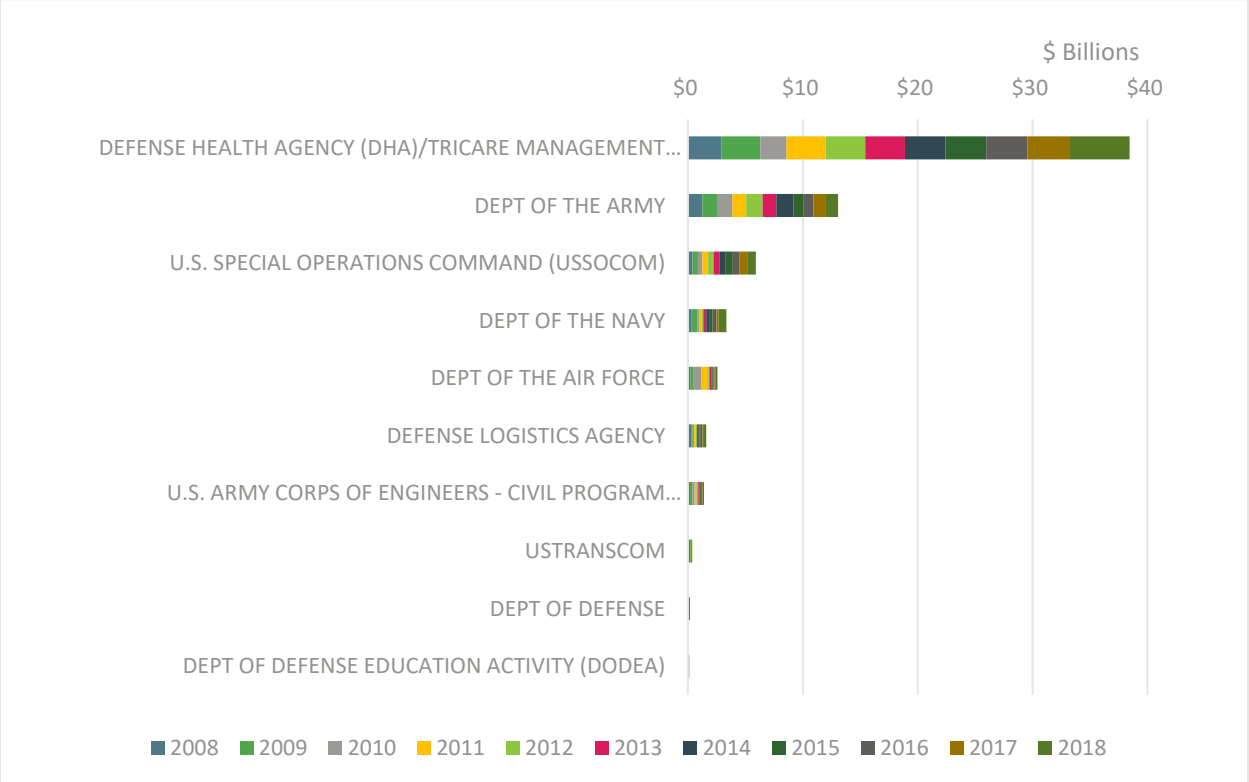


Figure 9: DoD Prime Contracts performed in Kentucky, 2008 through 2018 by DoD Sub-agency and fiscal year

The DoD is engaged in a diverse array of peace-keeping missions, civic missions and development projects. As such, it is helpful to breakout spending according to sub-agency, which is the most highly aggregated sub-field reported via USASpending.gov. Figure 9 displays all sub-agencies that funded greater than $100 million between FY08 and FY18. The chart indicates that Kentucky's defense spending stream is very dependent on a handful of sub-agencies, namely: Defense Health Agency (DHA),

Department of the Army, and U.S. Special Operations Command (USSOCOM). These three sub-agencies account for 85.5% of all defense spending in Kentucky over the past decade.

Contracts awarded by DHA[23] were by far the largest in the state, averaging $3.49 billion per year, and at an average annual rate of 6.1% between FY08 and FY18, far outpacing average growth in inflation. In addition, DHA spending increased 44.1% year-over-year ending in fiscal year 2018, accounting for much of the spending boost experienced within the state during that year.

Spending by the Department of the Army decreased over the given time frame but has been trending up over two out of the past three fiscal years. Lastly, spending by several sub-agencies was strong in early years but dropped by zero by FY 2018, including Defense Logistics Agency (DLA) and USTRANSCOM.

Spending by Acquisition Program Code

Base Realignment & Closure (BRAC) periods have the opportunity to either significantly grow or shrink a state's defense footprint. For the time-being, the U.S. Office of Economic Adjustment has stated that BRAC is not on the table within the short-term future.[24] Other means for growing a defense-based economy include developing or attracting companies that manufacture and service specific equipment and vehicles.

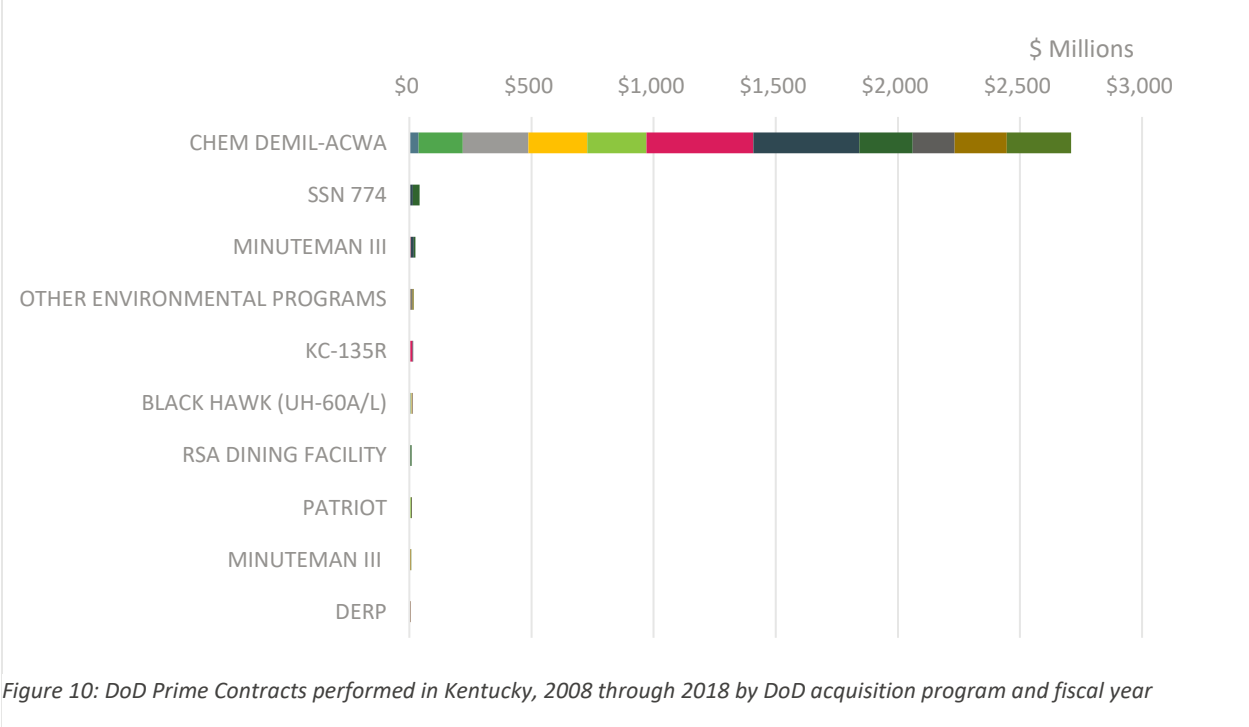


Figure 10: DoD Prime Contracts performed in Kentucky, 2008 through 2018 by DoD acquisition program and fiscal year

[23] Prior to 2014 DHA was called "Tricare Management Activity TMA"

[24] Correspondence with Office of Economic Adjustment staff, Association of Defense Communities Conference, Washington D. C. July 2018.

Based on this concept, Figure 10 displays all spending for acquisition programs greater than $5 million over the past ten fiscal years. It should be noted in association with these data, however, that the vast majority of spending is not associated with any acquisition code.

The clear leader in the state is CHEM DEMIL-ACWA, accounting for 94.1% of spending labeled with an acquisition program number. This activity is operated by a joint venture called Bechtel Parsons Blue Grass and associated with the Blue Grass Chemical Agent Destruction Pilot Plant, which has been a component of the DoD Program Executive Office, Assembled Chemical Weapons Alternatives agreement along with several other facilities across the country. Smaller but still noteworthy programs include SSN 774; MINUTEMAN III; OTHER ENVIRONMENTAL PROGRAMS; KC-135R; and BLACK HAWK (UH-60A/L). Of the programs listed, just three have received any degree of Defense funding in the past three fiscal years, including CHEM DEMIL-ACWA ; MINUTEMAN III; and OTHER ENVIRONMENTAL PROGRAMS; hence reactivation of lost contracts may be a possibility for certain of the acquisition programs listed above.

The MINUTEMAN III is an intercontinental ballistic missile (ICBM) under production for the Air Force Global Strike Command. Activity in this category includes contributions by several companies including production of packing and gasket materials by the Parker-Hannifin Corporation, and guided missile handling and servicing equipment executed by DRS Environmental Systems, Inc.

Lastly, OTHER ENVIRONMENTAL PROGRAMS includes a diverse array of industry codes spanning building companies, environmental remediation and engineering services, lead most notably by Environmental Consulting Services. The largest companies involved in such acquisitions include GEO CONSULTANTS, L.L.C.; PLEXUS SCIENTIFIC CORPORATION; and H M S ENTERPRISES INCORPORATED (7967), which each received greater than $2 million in contracts over the past ten fiscal years.

Spending by Industry Code

Moving from more generic to more specific forms of categorization, Figure 11 demonstrates Kentucky defense contracting by North American Industrial Classification (NAICS) code, one of the most specific and helpful ways to view such information.

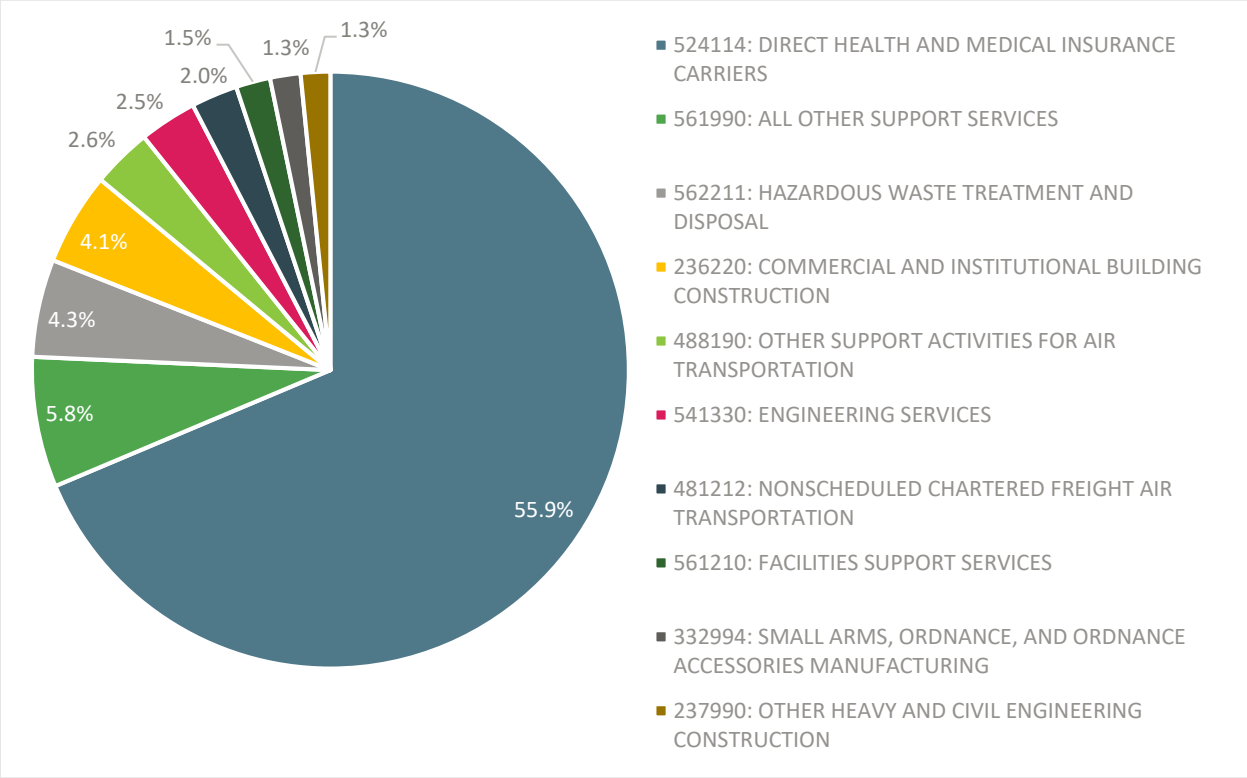


Figure 11: DoD Prime Contracts performed in Kentucky, 2008 through 2018 by NAICS Code

Figure 11, once again, demonstrates the importance of Tricare to the state economy, as contracts to NAICS 524114: Direct Health & Medical Insurance Carriers, dwarf all other contributors, accounting for 55.9% of all contracts over the past decade. There are other noteworthy contributors as well including All Other Support Services; Hazardous Waste Treatment & Disposal; and Commercial & Institutional Building Construction, which each account for over $2 billion in spending and greater than 4% of the overall total.

The All Other Support Services category generally includes businesses involved in miscellaneous consulting services. In this case 50 individual companies received such contracts, headlined by the Lockheed Martin corporation.

Within the Hazardous Waste Treatment & Disposal industry Bechtel Parsons Blue Grass owns the lion's share of activity, followed by twenty-one other smaller players.

As is normally the case with construction work for DoD, the field is composed by a long list of small to mid-sized firms, some local and some national.

Highlighting industries with potential to diversify Kentucky's defense industrial base, Table 3 demonstrates industries with the greatest average annual growth rates between FY08 and FY18 inclusive of all industries with greater than $100 million in contracts over the past decade. The highest growth industries include Couriers & Express Delivery Services (113.2% growth); Process, Physical Distribution & Logistics Consulting Services (97.6% growth); and All Other Support Services (62.4% growth). In terms of year-over-year growth the following industries each experienced multi-million-dollar revenue increases between FY17 and FY18: Engineering Services: Small Arms, Ordnance & Ordnance Accessories Mfg; Other Electronic Component Mfg.; Couriers & Express Delivery Services; Wired Telecommunications Carriers; and Other Aircraft Parts & Auxiliary Equipment Mfg.

Significant industries that have declined in total contract value include Commercial & Institutional Building Construction (-15.3% decline); and Other Support Activities for Air Transportation (-9.0% decrease).

NAICS & Title	FY08 - FY18 Total ($ M)	% of Grand Total	FY18 Total ($ M)	Avg. Annual Growth Rate
492110: COURIERS AND EXPRESS DELIVERY SERVICES	$142	0.2%	$84	113.2%
541614: PROCESS, PHYSICAL DISTRIBUTION, AND LOGISTICS CONSULTING SERVICES	$165	0.2%	$34	97.6%
561990: ALL OTHER SUPPORT SERVICES	$3,961	5.8%	$651	62.4%
334419: OTHER ELECTRONIC COMPONENT MANUFACTURING	$112	0.2%	$52	55.5%
541512: COMPUTER SYSTEMS DESIGN SERVICES	$308	0.4%	$60	38.2%
517110: WIRED TELECOMMUNICATIONS CARRIERS	$279	0.4%	$94	31.1%
541690: OTHER SCIENTIFIC AND TECHNICAL CONSULTING SERVICES	$128	0.2%	$1	26.3%
611512: FLIGHT TRAINING	$155	0.2%	$22	24.2%
541330: ENGINEERING SERVICES	$1,745	2.5%	$602	17.8%
334220: RADIO AND TELEVISION BROADCASTING AND WIRELESS COMMUNICATIONS EQUIPMENT MANUFACTURING	$167	0.2%	$3	13.8%
334511: SEARCH, DETECTION, NAVIGATION, GUIDANCE, AERONAUTICAL, AND NAUTICAL SYSTEM AND INSTRUMENT MANUFACTURING	$736	1.1%	$8	6.8%
562211: HAZARDOUS WASTE TREATMENT AND DISPOSAL	$2,966	4.3%	$264	6.4%
221122: ELECTRIC POWER DISTRIBUTION	$125	0.2%	$21	6.2%
524114: DIRECT HEALTH AND MEDICAL INSURANCE CARRIERS	$38,499	55.9%	$5,243	6.0%
334111: ELECTRONIC COMPUTER MANUFACTURING	$110	0.2%	$22	3.7%
561210: FACILITIES SUPPORT SERVICES	$1,043	1.5%	$87	0.2%

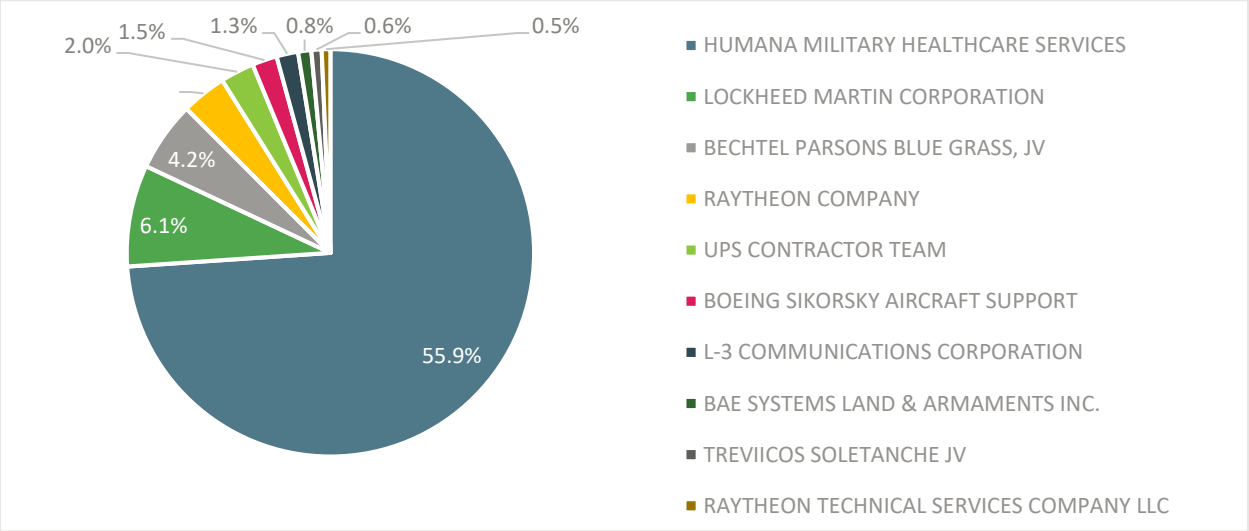
NAICS & Title	FY08 - FY18 Total ($ M)	% of Grand Total	FY18 Total ($ M)	Avg. Annual Growth Rate
481212: NONSCHEDULED CHARTERED FREIGHT AIR TRANSPORTATION	$1,411	2.0%	$0	N/A
315210: CUT AND SEW APPAREL CONTRACTORS	$121	0.2%	$46	N/A
561720: JANITORIAL SERVICES	$145	0.2%	$12	-0.1%
315211: MEN'S AND BOYS' CUT AND SEW APPAREL CONTRACTORS	$328	0.5%	$24	-2.5%
237990: OTHER HEAVY AND CIVIL ENGINEERING CONSTRUCTION	$896	1.3%	$54	-4.7%
332994: SMALL ARMS, ORDNANCE, AND ORDNANCE ACCESSORIES MANUFACTURING	$926	1.3%	$95	-5.8%
488190: OTHER SUPPORT ACTIVITIES FOR AIR TRANSPORTATION	$1,824	2.6%	$140	-9.0%
336413: OTHER AIRCRAFT PARTS AND AUXILIARY EQUIPMENT MANUFACTURING	$728	1.1%	$65	-9.1%
722310: FOOD SERVICE CONTRACTORS	$198	0.3%	$11	-9.9%
236220: COMMERCIAL AND INSTITUTIONAL BUILDING CONSTRUCTION	$2,810	4.1%	$92	-15.3%
237310: HIGHWAY, STREET, AND BRIDGE CONSTRUCTION	$265	0.4%	$12	-17.2%
541990: ALL OTHER PROFESSIONAL, SCIENTIFIC, AND TECHNICAL SERVICES	$124	0.2%	$2	-24.5%
561110: OFFICE ADMINISTRATIVE SERVICES	$169	0.2%	$2	-25.1%
333415: AIR-CONDITIONING AND WARM AIR HEATING EQUIPMENT AND COMMERCIAL AND INDUSTRIAL REFRIGERATION EQUIPMENT MANUFACTURING	$310	0.5%	$1	-28.6%
315999: OTHER APPAREL ACCESSORIES AND OTHER APPAREL MANUFACTURING	$167	0.2%	$1	-36.3%
339999: ALL OTHER MISCELLANEOUS MANUFACTURING	$309	0.4%	$1	-36.4%
481211: NONSCHEDULED CHARTERED PASSENGER AIR TRANSPORTATION	$223	0.3%	$1	-44.0%
336411: AIRCRAFT MANUFACTURING	$449	0.7%	$0	-49.2%
541612: HUMAN RESOURCES CONSULTING SERVICES	$451	0.7%	$0	-100.0%

Table 3: Kentucky DoD Contracts by NAICS Code, Average Annual Growth Rate between FY08 and FY18

Spending by Company

Figure 12 displays spending in Kentucky by company, using aggregate spending over the past ten years. Similar to the industry chart (Figure 11) the contributions of Humana are once again clear. Other large contributors include Lockheed Martin, which lists four places of performance (Lexington, Fort Campbell, Richmond & Louisville); Bechtel Parsons; and the Raytheon Corporation, which executed work in Louisville, Fairdale, Fort Campbell, and Frankfort. In addition to Humana, most of the other major contractors listed had significant up-ticks in contract dollars obligated, including the Lockheed Martin Corporation; Raytheon Corporation; Bechtel Parsons Blue Grass; Boeing Sikorsky Aircraft Support and BAE Systems Land & Armaments.

The list of companies that saw decreases in revenue in FY18 is smaller. It includes a number of construction companies, as well as the following services companies: DRS Environmental Systems, Inc.; Science Applications International Corporation (SAIC); Raytheon Technical Services Company LLC; and Strategic Communications LLC. Decreases for SAIC and Strategic Communications LLC, are particularly worth monitoring, as both companies saw significant increases in average annual revenue up until FY18.



Spending by Location

TPMA's 2017 DoD Industry analysis report covers regional spending and economic impact, in detail, so a full treatment of the topic is not necessary in this analysis. Counties receiving the greatest amount of DoD activity are either major metro areas of host to military installations, these include Jefferson, Fayette, Christian and Hardin. Recent trends reveal some potentially interesting shifts, however, year over year growth in contracts is shows strong growth in a few counties that are historically not centers of DoD activity. In FY18, Livingston County was up $47.5 million; Laurel up $44.5 million and Menifee up $32.4 million, placing each in the top ten in contracts received in FY18.

Figure 13 displays change in annual contracts executed by county, between FY17 and FY18. Counties increasing in contract values are various shades of blue and those with decreases are various shades of red.

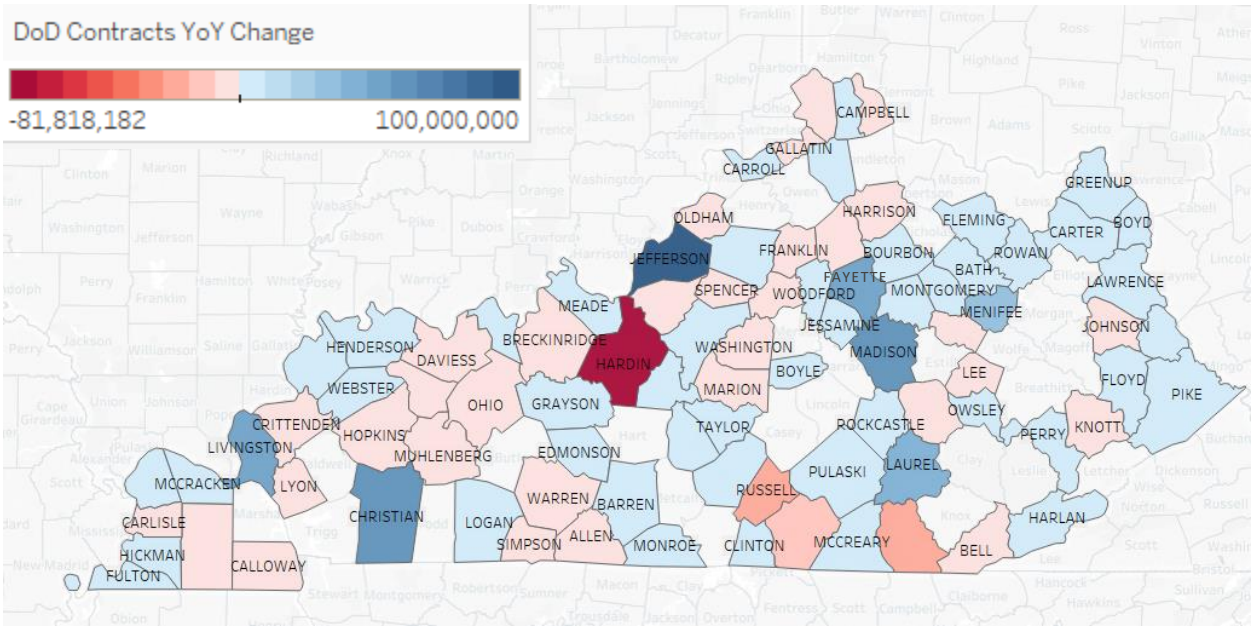


Figure 13: DoD Prime Contracts Performed in Kentucky by County, FY17 to FY18 Year over Year Change

DOD SPENDING FORECAST FOR KENTUCKY

Using the information researched throughout this analysis, TPMA created a customized forecast for DoD spending in Kentucky between FY18 and FY28. Figure 14 displays this forecast along with DoD spending in Kentucky between FY 2008 and FY 2018, for context. As with any monetary forecast, a higher level of confidence is assigned to time periods nearer to the present date. Across the 10-year time horizon there are more unknown variables effecting DoD spending (e.g.: major contracts switching vendors, international conflict, etc.) and hence the high and low estimates spread out in a funnel pattern.

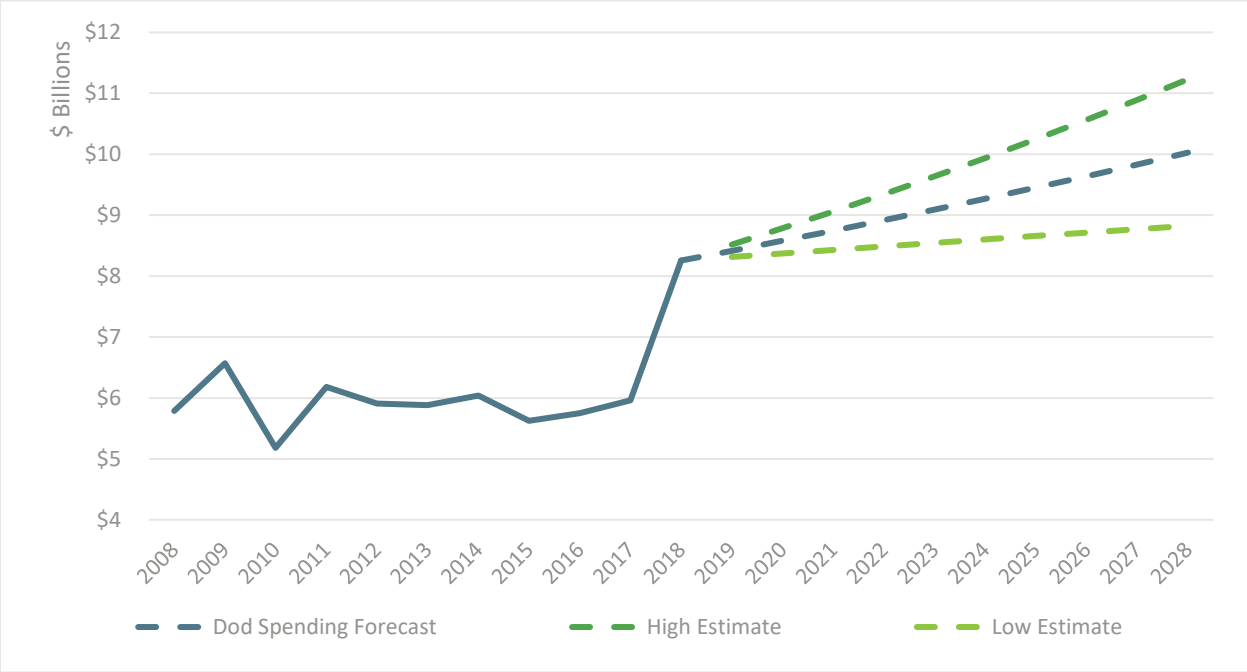


Figure 14: 10-Year DoD Spending Forecast in Kentucky

Starting in FY19, TPMA projects DoD spending in Kentucky to continue its recent up-tick and reach $8.4 billion. Over the next five years, spending is forecasted to reach $9.0 billion, with a potential high of $9.6 billion and a potential low of $8.5 billion. Finally, by 2028, spending is projected to land at $10.0 billion, with a potential high of $10.9 billion and a potential low of $8.7 billion.

Fiscal Year	Low Estimate	DoD Spending Forecast	High Estimate
2018	--	$8,256	--
2019	$8,517	$8,416	$8,315
2020	$8,785	$8,579	$8,373
2021	$9,060	$8,746	$8,431
2022	$9,344	$8,916	$8,488
2023	$9,636	$9,091	$8,546
2024	$9,937	$9,270	$8,602
2025	$10,246	$9,452	$8,658
2026	$10,565	$9,639	$8,714
2027	$10,892	$9,831	$8,769
2028	$11,230	$10,026	$8,823

Table 4: Forecasted DoD Spending FY19 through FY28, with High and Low Estimates, $ Billions

Factors driving forward DoD spending in Kentucky over the next decade include increase emphasis on products purchased by the Army, Navy and Air Force; consistent revenue through Humana's Tricare program, and the presence of Big Five contractors such as Lockheed Martin and Raytheon.

Despite some positive trends, not all industries are projected to contribute positively. For one, recent decreases in environmental management contracts through the Blue Grass Chemical Agent-Destruction Pilot Plant will likely lead to weakened spending on Administrative and Support and Waste Management and Remediation Services. Also, as a state with a higher proportion of spending on services, such as insurance, healthcare and logistics, Kentucky will likely not experience the same windfall of growth as states with a higher proportion of spending on defense products (such as Texas, and Washington).