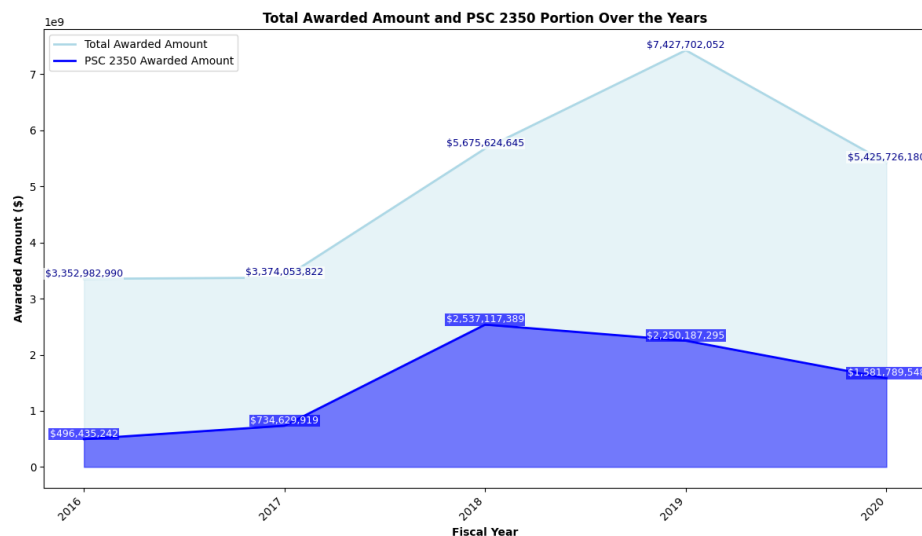


Ground Combat Systems (GCS) have long been essential to the US Department of Defense's security objectives, historically providing immense advantages in land-based military conflicts. The time period between 2016 and 2020 saw high volatility in GCS program contract awards, prompting analysis into prior results and possible future strategies.

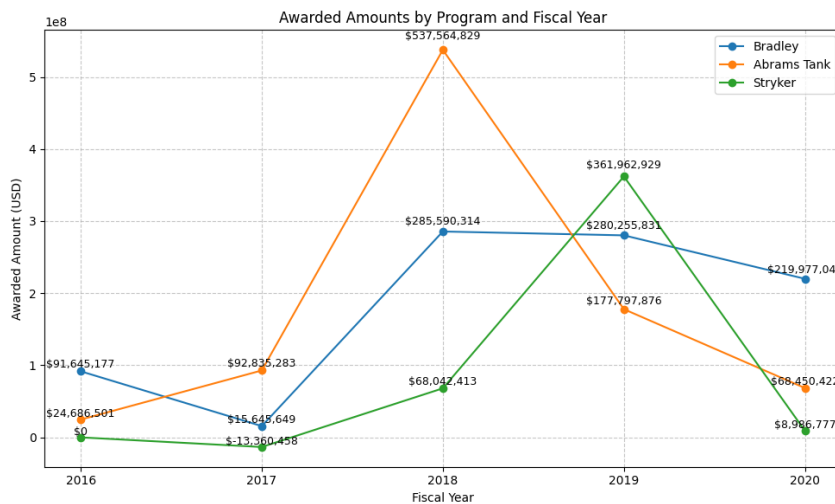
The plot below visualizes the total awarded amount for GCSs from 2016 to 2020. Additionally, the spending attributed to Product and Service Code (PSC) 2350, representing spending related to combat, assault, and tactical vehicles, is displayed. The data clearly exhibits a significant increase in awards in 2018, further carried on in 2019, before a subsequent decrease in 2020. While PSC 2350 spending correspondingly saw a substantial award increase in 2018, the general 2019 peak exhibited in the general GCS program did not replicate itself, seeing consecutive decreases in the two years post 2018.



On January 19th, 2018, the Department of Defense released a summary of the quadrennial National Defense Strategy report (U.S. Department of Defense, 2018). This edition marked a substantial shift in US defense priorities, largely subduing the DoD's counterterrorism focus and instead defining the "reemergence of long-term, strategic competition" from China and Russia as the central challenge to American prosperity. This general strategic shift bolstered domestic defense efforts, and subsequently GCSs, potentially substantiating the seismic increase that awards exhibited in 2018.

The more specific focus of this work corresponds to three individual programs: The Abrams tank, Bradley fighting vehicles, and Stryker armored personnel carriers. The primary Abrams and Bradley vehicles entered service around the 1980's whereas the Stryker carrier debuted in the early 2000's, presenting a differing timeline in terms of development and progression regarding the vehicles (U.S. Army, 2021). The plot below displays the awarded amounts regarding each of these programs from 2016

to 2020. The Abrams tank award increased substantially in 2018, driven by a 450 million USD award corresponding to the refurbishment of the tank fleet as well as newly integrated software and hardware. This was quickly followed by decreases in 2019 and 2020. The Bradley fighting vehicle exhibited a similarly significant spike in 2018, yet avoided sharp decreases in the subsequent 2 years. The Stryker vehicles experienced a decline in 2017, followed by increases in 2018 and 2019, and concluding with a relatively large fall.



Examining the proportion of spending corresponding to differing PSCs and vendors over the years can provide an understanding of possible trends. Generally, understanding the type of contract that may be prevalent in the subsequent years can allow for strategic positioning with respect to future acquisitions. Generally, physical vehicle contracts have codes that begin with 23, 25 codes relate to vehicular components, J codes represent maintenance, R codes represent engineering, and Z codes represent tank maintenance. These contracts were grouped and their percentage contribution to total award figures per year per program are presented in code. For Stryker vehicles, practically all awards come from physical vehicle related contracts, and this remains consistent over the years. Abrams tanks see incredibly high volatility in terms of the proportion of awards coming from vehicle based contracts, with values of 1%, 0%, 83%, 0% and 8% over the years. Other than 2018, a large proportion of Abrams value is derived from components, engineering, and maintenance, with a strong 70% of contract value in 2017 being sourced from maintenance contracts. In 2019 and 2020, 11% and 14% of Abrams contract value was tied to vehicle components, a sharp increase from two consecutive years of 0%. The data suggests that future contracts will likely focus on components and electronics. The Bradley vehicles exhibit a slow, yet constant increase in awards related to maintenance, and a sharp, consistent decrease in contract value coming from vehicle component contracts. Vehicle related contracts correlate strongly with the general Bradley awards in 2018 and 2019, yet see a sharp decrease in 2020 when compared to

Bradley's overall contract awards. Such trends generally pose a possibility that future value in the area of Bradley vehicles is tied more to maintenance and engineering as opposed to physical vehicles and components.

Vendor data may paint a similar picture. Again, Stryker vehicles do not provide a large amount of insight, with essentially all awards being collected by General Dynamics Land Systems, the original producer. It is unlikely that other firms can even compete in the area. The Abrams tanks on the other hand see 64 distinct vendors, with General Dynamics Land still playing a prevalent role. The firm secured the large 2018 contract, causing them to represent 97% of all Abrams tank awards in 2018. They have captured the largest portion of Abrams tank value every year. The Canadian Commercial Corporation has recently surged to capture 22% of all contract value in 2020, doubling their 2019 value of 11%. Their contracts are all in the field of vehicle electronics, falling in line with the previously mentioned increase in component prevalence for Abrams. BAE Systems dominates the Bradley vehicle award distribution, with L3 Technologies' awards share consistently falling from a high point of 42% in 2016 to 0% in 2020. L3 were responsible for a large share of component contracts, which have steadily decreased since 2016. Every maintenance related Bradley contract but one belong to just two firms, Lockheed Martin and Raytheon Technologies. The steady increase in maintenance contract value cited earlier in tandem with the strong share of such contracts captured by Lockheed Martin and Raytheon Technologies positions these firms to possibly reap consistent awards over the coming years.

The analysis of GCS awards from 2016 to 2020 reveals shifting priorities within the Department of Defense. The spike in 2018 corresponds closely with a reorientation of national defense policy that is most likely not to be repeated, whereas individual program trends, particularly for Abrams and Bradley vehicles, highlight growing emphasis on maintenance and engineering rather than vehicle production. In the current stage of weaponry, it seems as if the DoD is not quite ready to give up on the core vehicles despite their age. Upkeep and steady progression define this five year period and may continue to define the subsequent years in this field.

U.S. Army. (2021). U.S. Army weapons systems handbook. Headquarters, Department of the Army. <https://asc.army.mil/web/portfolio-item/ground-combat-systems/>

U.S. Department of Defense. (2018). Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American military's competitive edge. <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>