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CRITICAL TECHNOLOGIES ADVISORY

INDUSTRY WHITE PAPER | AUGUST 2023

THE STATE OF THE NATIONAL SECURITY ENVIRONMENT

Amid escalating strategic threats from the People's Republic of China (PRC) and growing territorial aggression from Russia, the United States Department of Defense (DoD) confronts the urgent task of modernizing and integrating critical technologies to address multi-domain national security concerns.

US adversaries are increasingly deploying non-kinetic means, leveraging advancements and accessibility of critical & emerging technologies such as artificial intelligence, autonomy, and space systems – which have the potential to directly impact not only our defense industrial base and mobilization systems, but also critical civilian infrastructure.

“Now and over the next two decades, we face strategic challenges stemming from complex interaction between a rapidly changing global balance of military capabilities; emerging technologies; competitor doctrines that pose new threats to the U.S. homeland and to strategic stability” – 2022 National Defense Strategy

The US National Defense Strategy calls for a “broad and deep change in how we produce and manage military capability” ([2022 National Defense Strategy](#)). Key components of driving this change and building enduring advantages include transforming the foundation of the future force, making the right technology investments, and adapting and fortifying our defense ecosystem – with an emphasis on private sector collaborations with contractors, investors, and the early-stage technology start-up sphere. If the US is to successfully contest geopolitical competition in the next decade, it is imperative that both public and private sector work together to modernize and integrate key technologies while properly resourcing the founders that build them.



Seed Areas

Biotechnology
Quantum Science
FutureG
Advanced Materials



Effective Adoption

AI & Autonomy
Advanced Computing
Microelectronics
Space Technology



Defense-Focus

Directed Energy
Hypersonics
Integrated Sensing
Cybersecurity

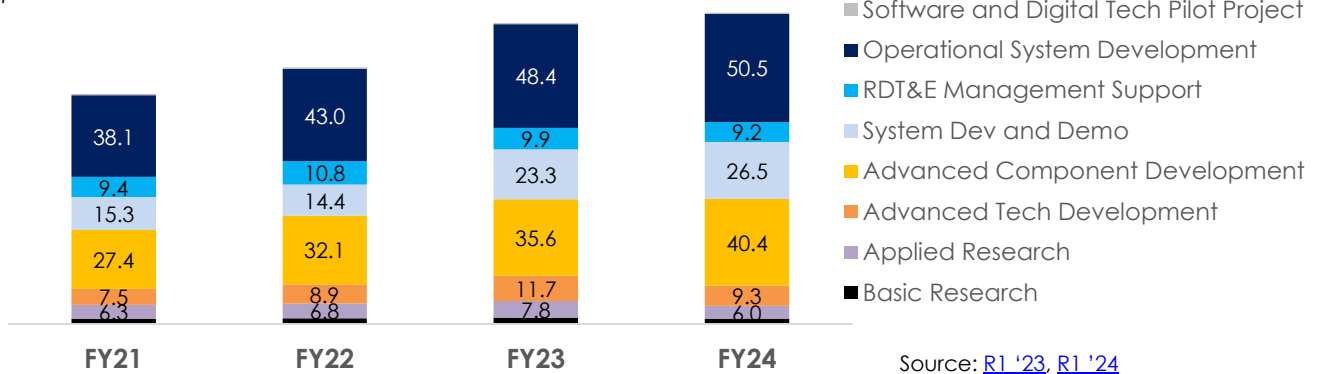
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DEFENSE INNOVATION – ECOSYSTEM OBSERVATIONS

DoD appropriations for Research, Development, Test, and Evaluation (RDT&E) have doubled over the past six years (reaching \$144B in 2023). This includes a ~20% increase to earlier-stage initiatives like Basic Research, Applied Research, and Advanced Technology Development – which counters the 13% cut previously requested by the Biden Administration.

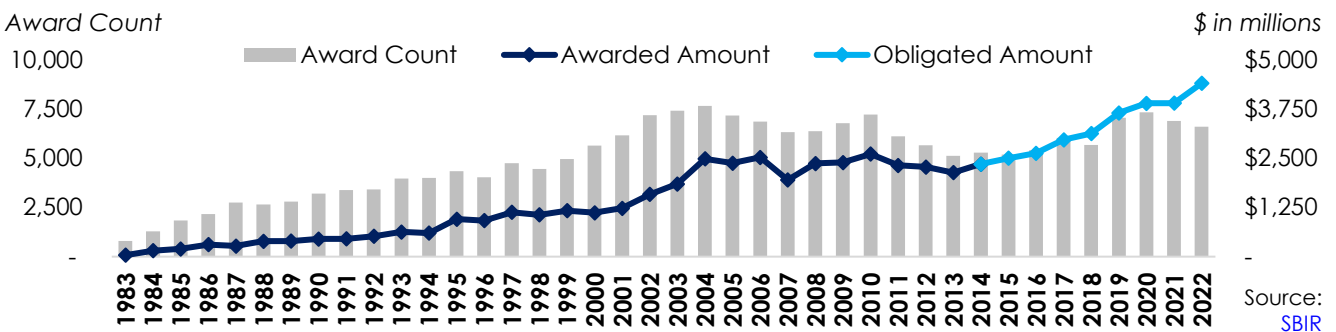
RDT&E APPROPRIATIONS

\$ in billions



An increasing amount of RDT&E funding has flowed to Small Business Innovation Research (SBIR) / Small Business Technology Transfer (STTR) - phased awards to engage the small business community in research and prototyping within critical technology areas. While growing appropriations are a positive step towards technology modernization, the SBIR program has been consistently criticized for producing lackluster results. Awardees often stagnate in Phase I/II efforts without ever transitioning technology to Phase III contracts with a program of record – only 16% over the last decade (DIB, [“Terraforming the Valley of Death”](#)). The challenge of transitioning technology beyond experimentation and prototyping has been a longstanding problem for the DoD and ultimately led to today’s push for new prototyping programs beyond traditional SBIR - discussed in the next section.

SBIR AWARD SUMMARY BY YEAR



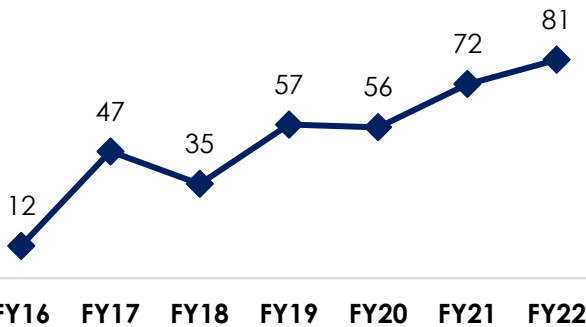
DEFENSE INNOVATION – ECOSYSTEM OBSERVATIONS

DoD Defense Innovation Initiatives

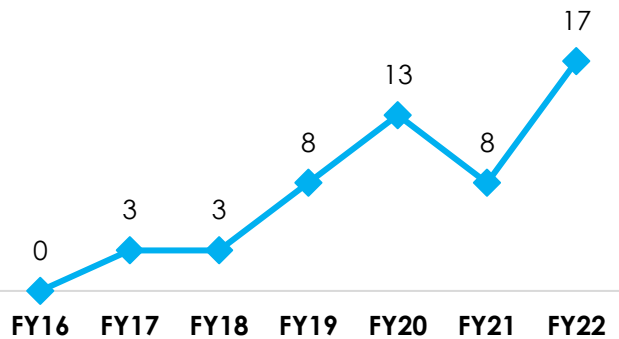


The last decade has brought about several non-traditional innovation groups including Defense Innovation Unit (DIU), AFWERX/SPACEWERX, NavalX, and Army Futures Command with overlapping objectives of engaging the start-up ecosystem and sourcing dual-use technologies from commercial markets. Advantages to these programs include rapid contracting capability with Other Transaction Authority (OTA) agreements and public-private investment matching mechanisms. The DIU has been the face of these efforts, measuring success with prototype and transition awards. In 2022, the program received over 1,600 proposals but only 17 transitions. While House appropriators propose growing the DIU from \$100M to \$1B+ as soon as possible, SBIR and innovation programs alone are currently incapable of transitioning start-up technologies at meaningful scale with the urgency national security requires.

DIU Prototype Awards



DIU Transition Awards



Source: [DIU Report, '22](#)

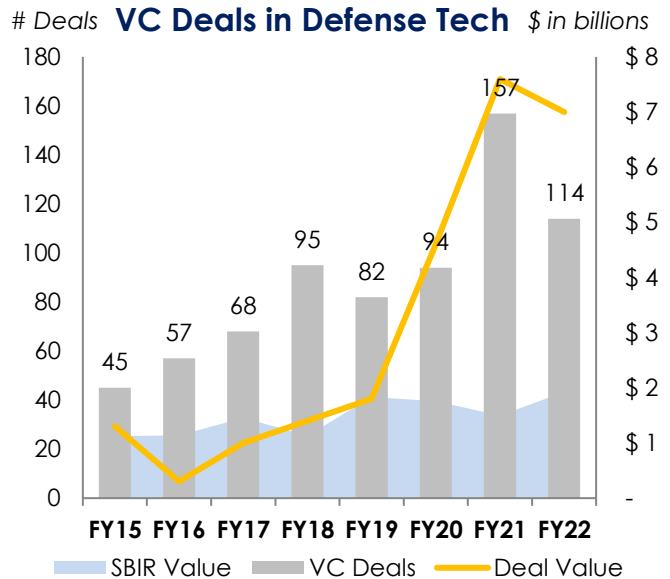
Unrefined investment strategies, lengthy program-specific budget cycles, and outdated procurement methods have collectively made it both difficult and unlikely for defense tech start-ups to succeed in transitioning technology and building businesses with scalable, recurring revenue. While broader DoD procurement reform is underway, substantial increases in venture capital and strategic investor interests (defense primes) are quickly reshaping the landscape. Most notably by resourcing founders with economic capital to mitigate near-term “valleys of death”, intellectual capital to navigate the complexities of growth within the DoD procurement taxonomy, and ultimately redefining the new norm for successful exits as younger companies become targets for strategic M&A.

DEFENSE INNOVATION – ECOSYSTEM OBSERVATIONS

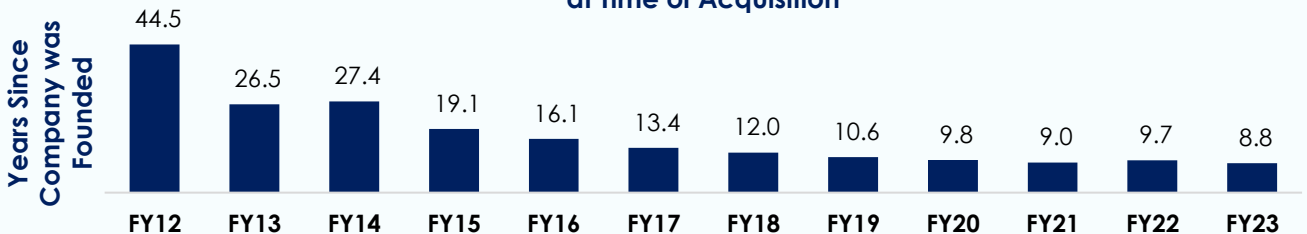
PRIVATE SECTOR MOTIONS

Venture capital investments into aerospace and defense technologies exceeded \$7 billion in 2021 and 2022, a substantial increase from \$4 billion in 2020. Silicon Valley VCs and strategic corporate funds have been driving this deal flow, investing in segments that align close to the DoD's defined critical technology areas (e.g., artificial intelligence, autonomy, cybersecurity, high-performance computing, advanced manufacturing, and space tech).

From 2016 to 2022, over 70% of the venture-backed exits came from M&A - typically from strategic investors seeking to integrate next-gen capabilities and secure niche IP.



Average Age of National Security Tech Companies at Time of Acquisition



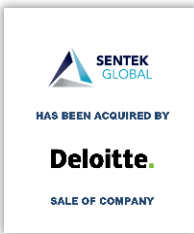
INCREASED ENGAGEMENT FROM DEFENSE PRIMES

Overall, defense primes and large contractors have become more involved with early-stage businesses in the defense innovation ecosystem. We've witnessed increased engagement with Mentor-Protégé Programs (MPP) – contractor partnerships with small businesses to expand their capabilities and footprint across DoD supply chains, an uptick in capital deployment via corporate venture functions, and increased M&A appetite for younger technology businesses. From 2012 to 2023, the average age of acquired defense technology companies dropped from 44.5 to 8.8 years. This trend is projected to continue as blue-chip contractors look to the start-up community for niche software and hardware engineering capability and intellectual property across critical technology stacks.

KEY TAKEAWAYS

- ✓ **Innovation programs will continue to advance broader private-public collaboration, providing the most near-term value through ecosystem networking and discovery**
- ✓ **VCs will better align investment theses with priority critical technology areas with a preference for validated product-market fit and a clear DoD customer**
- ✓ **Defense primes and strategic investors will prioritize earlier-stage M&A within build-buy-partner paradigms as they position to win critical technology contracts**
- ✓ **Founders and their VCs can leverage growing base of strategic interests for earlier exits at competitive valuations**

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