

# Prototyping for Disruption

An explanation from the Defense Innovation Unit

by Maj Andrew Mawdsley, USMCR

We can do better. Marines have long touted the Corps' reputation as an innovative and "do more with less" force. However, limited budgets, obligated through legacy processes, limit our nimbleness of culture and adoption of technology. We are not doing enough to capture gains in modern technology.

To keep pace with our peer competitors we must take better advantage of the ecosystem of innovative U.S. technology companies that are investing much more than the U.S. Government in areas that are critical to an enduring military-technical advantage. Today, the commercial market is outspending Government research and development (R&D) in many key technology sectors by a factor of more than 10:1,<sup>1</sup> investing over a trillion dollars in the last five years in strategically important areas such as artificial intelligence (AI), autonomy, and space. Seeing an opportunity to leverage commercial R&D efforts, in 2015 Secretary Ash Carter created the Defense Innovation Unit (DIU) to capitalize on emerging technologies in the commercial space. However, the Marine Corps has lagged behind the other Services in investing personnel in DIU and using it as a service to support Marine Corps requirements (see Figure 1).

In our efforts to modernize, the Marine Corps should further invest in DIU and leverage its unique access, processes,

*"Success no longer goes to the country that develops a new technology first, but rather to the one that better integrates it and adapts its way of fighting."*

—2018 National Defense Strategy

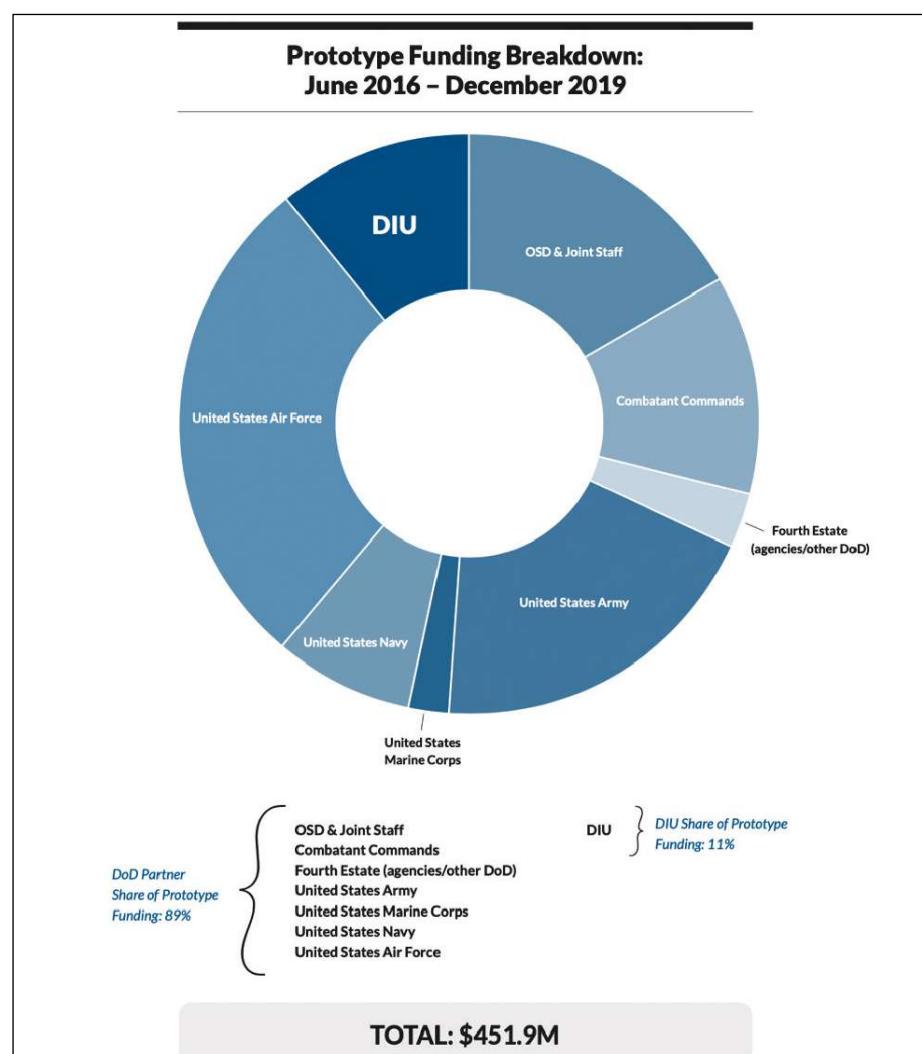


Figure 1.

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and capabilities as a supporting function to capture more of the rapidly evolving, game-changing technology that will make Marines more lethal and survivable on the battlefields of the future.

### Strategic Context

While providing a thorough structure to manage and guide massive Federal contracts, the current Federal Acquisition Regulations (FAR) are in some cases a strategic liability. The purpose of the FAR is “for the codification and publication of uniform policies and procedures for acquisition by all executive agencies.” It is a broad mandate and one that must balance several competing policy interests, to include socioeconomic ones. However, it is not the most lean and capable vehicle for acquiring the best technology through partnerships with cutting edge commercial companies. Too often, innovative and fast-moving companies view contracting with the government as an impediment to scaling their business quickly. This leaves us grappled strategically as we are increasingly seeing that technological dominance is the new global battleground. Our adversaries are investing heavily and building strategically in this space, having optimized their modernization strategies to adopt critical technologies as quickly as possible.

As part of its “Made in China 2025” strategic plan, the Chinese government is investing \$300 billion in higher-value chain industries like AI, machine learning, robotics, and Internet of Things to modernize its industry and create differentiated capabilities for its military.<sup>2</sup> As an example, China accounted for 48 percent of the \$15.2 billion invested in AI startups in 2017. Similarly, Russia is making aggressive investments in emergent technology areas. To quote Vladimir Putin in 2017:

Artificial intelligence is the future, not only for Russia, but for all humankind. It comes with colossal opportunities, but also threats that are difficult to predict. Whoever becomes the leader in this sphere will become the ruler of the world.<sup>3</sup>

China and Russia are nation-state adversaries that are focused on trans-

forming their military capabilities, but we also see threats at the other end of the spectrum where insurgents and terrorists take advantage of commercial off-the-shelf technology as a means of disrupting and attacking our troops. We can think back to several recent examples of insurgents in low-intensity conflict using commercially available drones, sophisticated communications gear, and night vision equipment

ing, quantum computing, and nanotechnology will continue to change the world—we must be positioned to capture the returns on investment ... Our future force development must include appropriate prioritization in these technologies; however, doing so will not be easy. It will require divesting of legacy capabilities that cannot be economically adapted to meet the demands of the future, while also taking calculated risks in some areas.

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### ***The FAR system was established with the founding premise that the Government either owned or had direct access to the latest R&D and cutting-edge technology.***

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to attack and tie up large contingents of regular forces. In order to compete across the spectrum of armed conflict, we must ensure that our acquisition processes and requirements are not limiting our access to emerging technological advantages and thus putting Marines at an unnecessary disadvantage on future battlefields.

### Marine Corps Planning Guidance

Thankfully, the above-mentioned strategic imperatives are at the forefront of our leadership’s thinking. In the 2019 *Commandant’s Planning Guidance*, the Commandant makes clear his mandate to prioritize force design and modernization:

Force design is my number one priority ... We will divest of legacy defense programs and force structure that support legacy capabilities. If provided the opportunity to secure additional modernization dollars in exchange for force structure, I am prepared to do so.

There is clear recognition that if we are to maintain our relevance and value as a Corps to the country, we will have to redesign our force and the processes by which we support it. Further, and more specific to necessary areas of technology investment, he states:

Technologies such as artificial intelligence, robotics, additive manufac-

It follows then that the Marine Corps should seek out DOD entities and capabilities that advance the fielding of these emerging and advanced technologies. Currently, DIU is the only DOD organization focused exclusively on transitioning commercial technology to the Services in areas where U.S. businesses are operating at the leading edge.

### DIU Foundations and Intent

DIU was founded with the intent to “rebuild the bridge between the Pentagon and Silicon Valley,” as the two ecosystems had grown apart over the past decades because of base closings and the retrenching of the defense industrial base. In its first year, Secretary Carter opened DIU (then DIUx) offices in Silicon Valley, Austin, Boston, and the Pentagon. DIU focused on technology areas where commercial companies were pushing the frontier and developing capabilities that could transform warfighting capabilities and provide game changing results in future conflicts. As DIU has evolved, the core portfolio technology areas have continued to focus on critical innovation sectors with disruptive opportunities. The current DIU portfolios, AI, autonomy, cyber, space, and human systems, also track commercial sector R&D and venture capital investment. DIU focuses on dual-use technology

where commercial R&D is a significant multiple of defense-related R&D and where the technology cycles/iterations occur much faster than in traditional defense industries.

## Two-Sided Platform

In many ways DIU today is a marketplace where buyers and sellers can come together to develop DOD solutions that are commercially available (see Figure 2). This is slowly evolving the view of Silicon Valley in working with DOD. There has been common perception in the tech industry that due to FAR processes working with the Government is difficult, slow, and uncertain. DIU recognized that to gain small to medium tech companies' interest in partnering with the Government, the acquisition process would have to closely mirror commercial terms and commercial speeds. The process would have to be faster, the bar of entry to compete would need to be lower, and the U.S. Govern-

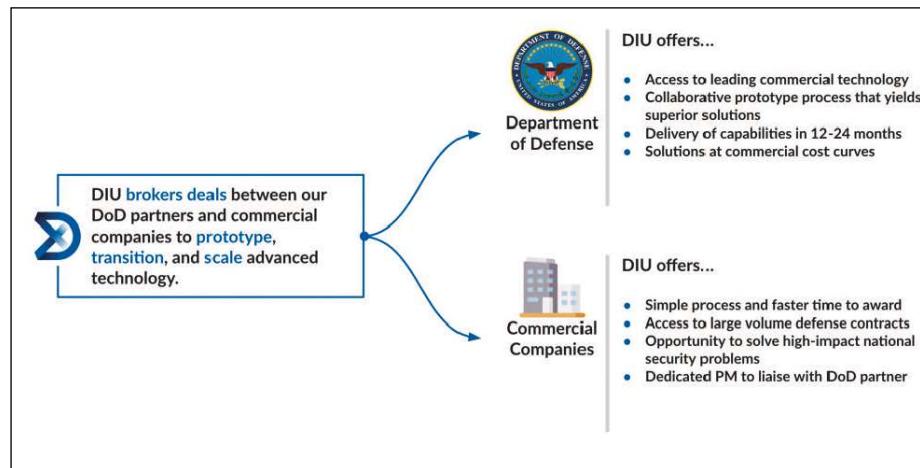


Figure 2.

ment would have to demonstrate a clear path to scaling the technology as a reliable partner. Similarly, if DOD entities with annual requirements and budgets were going to partner with DIU as a platform and tool for finding solutions, DIU would have to have a differenti-

ated process that accessed technology and produced results that the existing FAR process could not. The result of the competing dynamics has in essence created a two-sided platform where DIU serves as a conduit for defense entities with requirements and budgets con-

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necting to startups and other high-tech companies that are at the cutting edge of development on emergent technologies critical to national security.

### DIU as a Facilitating Function

Until the 1980s the Government far outspent the commercial sector on research in emerging technologies. The FAR system was established with the founding premise that the Government either owned or had direct access to the latest R&D and cutting-edge technology. As the Government controlled the pace of release of emerging technologies, it could afford to have a thorough and drawn out acquisition process and establish cumbersome, sometimes inefficient, programs of record. Today, the opposite is true. Because of the delta in commercial sector R&D spending versus the Government, the commercial sector owns the preponderance of cutting-edge intellectual property. DIU facilitates the DOD's access to commercially available cutting-edge technologies in order to produce better outcomes and solutions in a time frame that the existing FAR acquisition processes cannot match. DIU is not the decision maker on what technology might meet a Service or Agency needs but provides existing DOD acquisition entities a means to get to a solution in a time frame that keeps pace with technology.

### Disruptive Acquisition Value Proposition

DIU produces value for DOD partners in four key areas. First, given its *integrated presence and networks* in Silicon Valley, Austin, and Boston, DIU can help DOD access a wider technology base. Connections with venture capitalists, investors, and an ecosystem of startups through large tech companies enable DOD clients to choose between a much wider range of potential solutions. As an example, 64 unique companies submitted proposals in response to the most recent DIU solicitation for commercial AI solutions. If we compare the aforementioned response to a typical FAR based response by industry to the government, we see an order of magnitude difference. With a faster,

more streamlined bid and selection process, more emergent companies are open to do business with DIU than traditional government acquisition entities.

A second value creation area for DIU is *flexibility*. Unlike the FAR process, DIU designed the commercial solutions opening, which is a competitive, merit-based process to award other transaction agreements at commercial speeds to simulate typical commercial interactions and contracting. Where the FAR process places a wall between the Government and commercial companies, the commercial solutions opening process is collaborative undertaking. The process includes flexibility in accounting systems and negotiating intellectual property rights with partner companies, the latter of which is critically important to innovative technology companies.

Third, the DIU *speed to solution* is unmatched in DOD. DIU has reduced the time it takes to coordinate with a partner, identify a problem, prototype a solution and field the solution, from nearly a decade to less than two years. The ongoing target is to move from problem identification to sourcing and prototype contract award in 60-90 days, compared to the current DOD contracting process of 18+ months. Realistically a FAR-based program of record operates in the six to twenty-year time frame. In order to keep pace with technology and how quickly it iterates DIU is focused on the two to five-year time frame.

Finally, DIU produces value for DOD through significant *cost savings* of leveraging a technology that has already been funded by R&D in the commercial market. Instead of putting out a new requirement for a defense contractor to build a solution from the ground up and iterate only when contractually required to, DOD can reap the benefits of commercial companies that are constantly iterating and innovating to be competitive in the open market. As an Office of Secretary of Defense entity, DIU typically seeks economies of scale by bringing in additional partners to most projects.

### Opportunity for the Marine Corps

Coming back to the *Commandant's Planning Guidance*, the opportunity and calling to utilize DIU as a tool seems clear:

We will make strategic investments in data science, machine learning, and artificial intelligence ... These investments will be focused on the application of existing systems and tools (COTS and GOTS). We will leverage the investments other Services have made as a fast follower ... All of our investments in data science, machine learning, and artificial intelligence are designed to unleash the incredible talent of the individual Marine.

As a Service that prides itself on its ability to do more with less, we have yet to capitalize on the value proposition of further integrating with DIU to find current commercially available cutting edge technologies that will make our Marines more lethal, survivable, and efficient. Going forward, the Marine Corps should recognize DIU as a key tool in its arsenal to unleash the world's greatest technology ecosystem into the hands of the Marine.

### Notes

1. Staff, *National Patterns of R&D Resources: 2016–17 Data Update*, NSF 19-309, (Alexandria, VA: National Science Foundation, 2019), available at <https://ncses.nsf.gov>.

2. James McBride and Andrew Chatzky, "Is 'Made in China 2025' a Threat to Global Trade?", *Council on Foreign Relations*, (May 2019), available at <https://www.cfr.org>.

3. Alina Polyakova, "Weapons of the Weak: Russia and AI-Driven Asymmetric Warfare," *Brookings Institution*, (November 2018), available at <https://www.brookings.edu>.

