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Closing the Innovation Gap at SOCOM

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Abstract

Doing business with the U.S. Special Operations Command (SOCOM) can be difficult. There are a number of physical and regulatory hoops to jump through: getting on MacDill Air Force Base, getting into the SOCOM compound, and the prohibition of electronic devices on the compound, just to name a few. Not to mention the intricacies of the federal acquisition process, which could take more than a year from Broad Area Announcement (BAA) to contract award. To address these hurdles in a rapidly changing technological environment, SOCOM, in conjunction with the Doolittle Institute (now DEFENSEWERX), created SOFWERX: An unclassified facility where Special Operations operators can bring their requirements and be tested out and rapidly prototyped (https://www.sofwerx.org/). Once down selected, they can then move into a SOCOM Program of Record and be fast-tracked into the acquisition process. This compression of the Concept Development to Prototype phases vastly increases the time to product deployment.

Case Study: SOFWERX

Introduction

Doing business with the government is hard: It is bureaucratic and byzantine at best. A typical acquisition project can take a minimum of three years to get from concept development to prototype and requires detailed product specifications that may have changed by the time the product is ready for market. Given the nature of rapidly evolving technology, that process inhibits innovation and puts our service members at a disadvantage on the battlefield as their adversaries are not encumbered with such onerous bureaucratic and regulatory requirements. A perfect example is the Islamic State (or IS) using Commercial Off the Shelf (COTS) drones and re-purposing them for combat operations. Although Congress and the Department of Defense (DoD) have both recognized these shortcomings and are attempting to reform the system to make it more agile, the efforts to date have been spotty at best.

During the last 16 years of uninterrupted warfare, several agencies sprang up to address urgent battlefield requirements that were not being met. Two examples were the Joint Improvised Explosive Device Defeat Organization (JIEDO; now the Joint Improvised Defeat Agency or JIDA; https://www.jieddo.mil/) and the Rapid Equipping Force (REF; http://www.ref.army.mil/). These organizations and others set the pace for rapid prototyping and fielding of equipment and services to the warfighter, including significant innovations in protective equipment like body armor and mine-resistant vehicles. However, many of our present and future threats lie outside of the realm of conventional risks. With the advent of cloud computing, clustered Graphical Processing Units (GPUs), the proliferation of data, and the risks of cyberattacks by criminals, state, and non-state actors, the need to decrease the time from concept to market for information-related capabilities has become an imperative.

At the Joint Staff in the Pentagon, in the Under Secretary of Acquisition, Technology & Logistics (AT&L), former Secretary of Defense, Ash Carter formed three entities to try and accelerate the technology acquisition process. One entity is called the Strategic Capabilities

Office (SCO), founded in 2012. Another is the Defense Innovation Unit Experimental (DIUx and now DIU), founded in August 2015 (www.diux.mil). The third is MD5 (https://md5.net), whose mission is to build a collaborative community through "Education, Collaboration and Acceleration programs" (https://community.md5.net/md5/about). The SCO takes existing military capabilities and "makes them do something different." The DIU mission is to connect commercial and traditional defense contractors to broad defense requirements using a funding mechanism called Other Transaction Authorities (OTA), which allows for more rapid contracting, usually in 90 days or less.

Recognizing they lacked the agility to get the warfighters technology more rapidly, SOCOM created SOFWERX in October 2015. SOCOM and the Doolittle Institute created SOFWERX through a mechanism called a Partnership Intermediary Agreement (PIA), which "increases the likelihood of success in the conduct of cooperative or joint activities … with small business firms [and] institutions of higher education" (https://www.gpo.gov/fdsys/granule/USCODE-2011-title15/USCODE-2011-title15-chap63-sec3715). Located in Ybor City in Tampa, FL, this completely unclassified venue offers unfettered access for innovative companies to bring their ideas to the Special Operations Community. Cameron Hunt, former SOFWERX Chief Innovation Officer, describes the organization as being "left of requirements"[1] and "more McGyver than Q" (Hunt, 2017).

The Case

The U.S. Special Operations Command (USSOCOM) was formally created in 1987, but it ultimately resulted from lessons learned as a result of the failed attempt to free the hostages in Iran in 1980. Embarrassing failures often create opportunities for future success. USSOCOM is a Functional Combatant Command responsible for training and equipping Special Operations Forces (SOF) as compared to a Geographic Combatant Command, like U.S. Central Command (CENTCOM), who is responsible for the Middle East, South West Asia, and the Central Asian States. In 1991, SOCOM was granted service-like acquisition authority for SOF specific equipment. This gives SOCOM the ability to conduct research and development, acquire equipment, and maintain that equipment— the same capability that the Air Force, Army, and Navy have. The only caveat is that those activities must be peculiar to SOF. In addition to those authorities, Title 10, Section 167 grants SOCOM Head of Agency (HOA) status, the only COCOM with this status. This combined with the acquisition authority allows SOCOM to perform the functions of a service with a drastically reduced bureaucracy.

Since its inception in 1991, the SOCOM Acquisition, Technology, and Logistics (SOF AT&L; https://www.socom.mil/SOF-ATL/) has endeavored to be innovative and responsive to the warfighter's needs. Even though 16 years of warfare has pressured the acquisition system to field very innovative solutions, the increasingly short cycle of technology innovation has pressured the formal acquisition process to keep up with technology and to harness the efforts coming out of business incubator sites such as Silicon Valley, Boston, government research labs, and academic research institutions. As a consequence, SOCOM, under the aegis of Mr. James "Hondo" Geurts, the SOCOM

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[1] A variation of the military saying, "being left of bang," i.e., being proactive and preventative.

Acquisition Executive (now Assistant Secretary of Defense for Navy Acquisition) has explored a number of ways to speed up the acquisition process. This effort is now being improved under the direction of James Smith, the current acquisition executive.

Up until this time, the barriers to entry in doing business with SOCOM were both physical and procedural. Simply gaining physical access to SOCOM requires a sponsor to allow you access to MacDill AFB, the home of SOCOM and CENTCOM. The SOCOM sponsor would need to generate a visitor request to allow access to the SOCOM campus. To compound matters, due to security requirements, no commercial computers, cell phones, etc. are allowed inside the facility. In addition, to get an audience with a program manager at SOCOM, a potential vendor must submit an idea through the SOF AT&L website, which serves as a "gatekeeper" to the AT&L offices. Traditional defense contractors understand the system and have an easier time negotiating the process.

This is the genesis of SOFWERX. SOFWERX is interested in attracting novel solutions to warfighter problem sets using both traditional solution providers, but more importantly innovative firms, who would not normally do business with the government for a wide variety of reasons. "Hondo" Geurts asked the penultimate question: "How do we keep pace with the exponential growth in our operations as well as technology, and where do you find a place where you can marry that all together?" (Gibbons-Neff, 2016). In October 2015, in response to disappointing results for the concept development of the TALOS project (Tactical Assault Light Operator Suit, also known colloquially as the "Iron Man Suit"), the SOFWERX idea came to fruition. SOCOM negotiated and signed a partnership intermediary agreement with the Doolittle Institute, and SOFWERX was born (Hunt, 2017).

A partnership intermediary agreement (PIA) gains its authority from 15 U.S.C. 3715, and is a "contract or memorandum of understanding with an intermediary that provides for the performance of services for a federal laboratory to increase cooperative or joint activities with small businesses, institutions of higher education or educational institutions" (Use of Partnership Intermediaries, 2015). The Doolittle Institute is a non-profit organization that receives base funding from SOCOM to execute a "one-to-end list" of requirements both from SOF AT&L and nominations from warfighters (Andrews, 2017). The execution of funds through a non-profit entity allows SOCOM to experiment unencumbered by the bureaucratic limitations of the Federal Acquisition Regulations (FAR), but ensures oversight through the SOF AT&L office. This allows for rapid prototyping through "challenges," hackathons, disrupters, and capability collaboration events (CCE).

SOFWERX provides a completely unclassified environment where new ideas can be tested and validated (or not) ostensibly drastically reducing the time from concept development to operational prototype. SOFWERX does this in a number of ways. Through their website (www.sofwerx.org), they announce events that open to warfighters, interagency partners, academia, and industry to provide an open environment, or ecosystem, for the free flow of information and discussion. The 10,000-square foot facility provides a laboratory where prototypes can be manufactured and tested (within a certain scale).

From an initial staffing of a handful of employees in October 2015 (all full-time SOFWERX employees are employed by the Doolittle Institute and not SOCOM), by November 2017 there were 21 Defensewerx employees, four industry fellows (including a University of South Florida fellow from the School of Engineering), an international researcher from Norway, eight core interns, six interns dedicated to the Thunderdrone effort, and two additional interns provided for by matching funds for a total of 16 interns, all paid. In

addition, USF has seven paid interns (one PhD and six graduate interns) dedicated to a small satellite contract.

On November 15, 2017, SOFWERX introduced TEAMWERX, their web portal to manage the challenge process. "TEAMWERX is a prize challenge platform designed to find innovative solutions to warfighter problems" (https://www.teamwerx.org/). One example of a challenge is called City System-of-Systems Intelligence Model, with a prize of $22,500, which has a goal of "Populate a City Systems-of-Systems Intelligence (CSSI) model template from publicly available data about major cities" (https://www.teamwerx.org/city-system-of-systems-intelligence/). The beauty of these challenges (if they succeed) is that the challenge performs the function of a "fair and open competition" as defined by the FAR, and therefore the winner can be ultimately be awarded a sole source contract for production. This can be a huge time and cost saving for the government and, therefore, the taxpayer.

These types of competitions also allay concerns from non-traditional defense contractors (e.g., commercial technology companies), who are typically nervous about sharing intellectual property (IP) with the government. In this respect, SOFWERX serves as a neutral facilitator and not like a typical government research lab who wants to control IP from government-funded research. SOFWERX can exercise Research & Development Agreements that allow for the protection of IP with no expectation of results. This allows the innovators the "freedom to fail" without repercussions. This arrangement encourages innovation, unlike in the traditional government acquisition programs, which typically rely on incremental progress.

Many of the prize challenges and CCEs are technical in nature, and there is an increasing interest in data science, big data, artificial intelligence, and machine learning (see Appendix A). But many of the successes are very practical in nature. One of the recent success stories was a prize challenge to develop a "bow bumper" that attaches to the bow (front) of a light attack boat to serve as a cushion of sorts when an assault team of SEALs forcibly boards another boat or structure in the water. An existing product (inflatable) that had problems was being used. Feedback from the warfighter to SOFWERX initiated a prize challenge. Originally, eight vendors, including the incumbent, provided designs (two inflatable), and out of those, three were selected for prototype testing. Interestingly enough, the initial third place vendor became the winner of the challenge and their design is now in production (see Appendix B).

Another win for SOFWERX came when a group of SOF medics came to them with a problem they had fitting litters (military terminology for *stretchers*) into the back of their all-terrain vehicles: the Polaris MRZR (Polaris, n.d.). SOFWERX was able to take a MRZR down to their local machine shop (called DIRTYWERX), work with the medics, and fabricate the parts needed on the spot. After several iterations, the medics approved the modification, the specifications were documented, and the parts kit was put out for bid for production. This all happened in the course of a few weeks (see Appendix C).

As important as the winners are, one of the important operating principles of SOFWERX is the ability to fail. In this sense, the SOFWERX definition of failure is not finding a "workable material solution." One example of this was a prize challenge called Fogbreaker designed to assist high speed offshore boat drivers track multiple data points through Augmented Reality while having to pay attention to existing potential navigational hazards. SOFWERX did award three winners, but the warfighter determined that none of them provided good enough solutions to proceed with further development.

One of the challenges for SOCOM AT&L has been how to integrate and leverage SOFWERX into their own Programs of Record. In January 2017, Guerts asked Kelly

Stratton-Feix to be Director of Acquisition Agility, whose purview is to manage SOFWERX. At the time, Stratton-Feix was working on a master's program that required a project that had a million dollar return on investment, so the SOFWERX position essentially killed two birds with one stone. When she stepped into the job, she had not worked with non-traditional acquisition authorities like the PIA and Other Transaction Authorities, so part of her initial work was educating herself on the strengths and limitations of these authorities. What she also found was that the program managers (PM) at SOCOM did not understand these authorities either, including how they would fit into the acquisition cycle and how they could support their acquisition efforts. These PMs are very busy people who manage very complex programs and like most busy people, they did not see the incentives of learning new methods. Although not strictly part of her job title, she felt very strongly that she needed to educate her peers. She went back through the authorities, specifically the National Defense Authorization Act of 2015 which gave birth to SOFWERX and DIUx, and also the specific authorities concerning Partnership Intermediate Agreements (PIA) and Other Transactions. She stood up a team of people to do the research and once she felt comfortable with the statutes and how it fit into the acquisition process, she launched a comprehensive education program for the acquisition workforce at SOCOM to increase awareness and to help PMs to leverage these "new" authorities to their benefit (Stratton-Feix, 2019).

One of the other issues she recognized almost immediately was the need to tie warfighter nominations to continuing funding streams in Programs of Record (POR). Serving the requirements of the warfighter is at the core of SOFWERX's mission, but if a product is developed for the warfighter is not tied to a POR that can support ongoing Operations & Maintenance (O&M) support. She had a meeting with Tambrein Bates, the SOFWERX Director, to come to an agreement on what percentage of unfunded requirements they would support from the SOFWERX budget (20%) and how they would increase the PM participation and leveraging of the SOFWERX ecosystem. Stratton-Feix and her team conducted two training sessions for all the PMs, she and Bates conducted roundtable discussions with all the PMs to get them comfortable with how these authorities can help them be successful.

As a consequence, the pace and involvement of PMs in the SOFWERX ecosystem has increased dramatically. For example, a recent Collider event held from April 9–11, 2019, had multiple PMs and SOCOM Agreements Officers participating in nine different Technical Focus Areas. The number of successful transitions has also improved, as the chart in Figure 1 illustrates (SOFWERX, 2019).
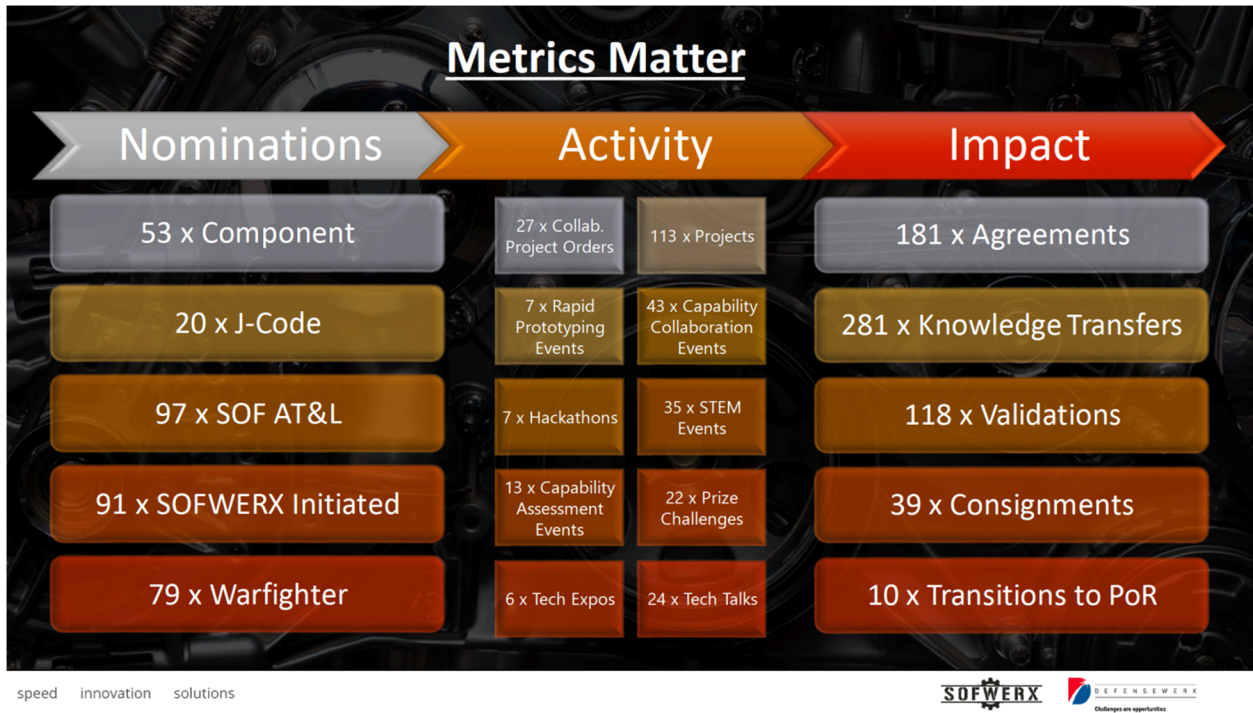
Figure 1.   Metrics Matter

For those who are not familiar with the intricacies of the government acquisition processes and the significant hurdles and barriers to entry that exist, this case study may beg the question, "So what?" Many of these efforts to incorporate innovation into the acquisition process are considered bypass mechanisms or work-arounds that may or may not prove to be long-term solutions. In addition, as one would imagine, there exists in the community of federal acquisition professionals a considerable amount of pushback to what some consider to be an attempt to circumvent an existing system that may in fact threaten their livelihoods. While these may be legitimate concerns, the needs of the warfighter to take advantage of the rapidly changing technology development cycle as well as the potential for substantial taxpayer savings should outweigh those concerns.

Another important human factor is the rotation cycle for service members and senior executive service government employees. Sometimes an initiative started under an incumbent may not survive the incoming leadership due to the vagaries of human irrationality or the perceived lack of political capital of the program. The new SOCOM acquisition executive, James Smith, has embraced the SOFWERX concept and expanded the role of SOFWERX in the SOF AT&L process. In January 2019, SOCOM introduced a Commercial Solutions Offering (CSO) that is open for a year that covers a number of areas to support what they refer to as the "Hyper Enabled Operator" (https://www.socom.mil/SOF-ATL/Pages/JATF-CSO-CY19.aspx). This CSO is similar to the DIU model where proposers submit short white papers and quad charts. The PMs then down select and request abbreviated proposals, which then can result in an award using OTA funding. This CSO offering lowers the barrier to entry for non-traditional defense contractors who typically do not have the resources for formal proposal writing nor the accounting and finance systems required by the Defense Contract Accounting Agency (DCAA) for FAR-based contracts.

There have also been budgetary discussions in Congress as to the utility of organizations like SOFWERX and DIU, as well as the vagaries of whether or not a new administration will support the initiatives that began under the previous administration. Fortunately, both the former Defense Secretary Mattis, the Chairman of the Joint Chiefs, Gen Dunford, the CTO in AT&L, have all been very visible and vocal in supporting these innovation efforts recently in the press and in congressional testimony (Williams, 2017).

Conclusions

SOFWERX is an interesting study of the application of commercial start-up innovation practices coupled with the unusual requirements of the warfighter for more rapid access to emerging technologies. The SOFWERX model is rapidly growing and evolving and continuing to prove its value to both the warfighter community, as well as to the industrial base of companies with interesting technologies who may have never considered working with the DoD.

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Appendix A: Example CCE

SOCOM Far Ridgeline Review
- Artificial Intelligence/Machine Learning
13 April 2017

SOCOM personnel shared relevant operational vignettes and SOF use cases with the invited guests to create a shared understanding of the SOF environment. The invited guests shared their expertise in the area of ML and AI, with a goal toward understanding how the various domain knowledge of the guests could impact SOF capability. At the conclusion of the review, all participants had an increased understanding of common areas of interest, and there were a number of follow-on interactions expected to occur.

Event Outcomes

- ML/AI relies on data. SOF will need to resolve the current "stovepipe" mindset to enable effective use of ML/AI. This includes classification issues, ownership issues, proprietary issues, and the "purpose" issue (where data is used only for one purpose, then thrown away). One person noted that by not addressing this problem, we are creating our own self-imposed "denial of service" attack.

- It's important to use ML/AI for the things it's good at. Pattern recognition is one of those things, and is directly relevant to patterns of life.

- ML/AI can move us from reactive to proactive/ predictive.

- We need to collect data all the time. There was a correlation to the SOF truth that states "Competent Special Operations Forces cannot be created after emergencies occur", because data cannot be created AFTER we need it.

- AI/ML not only makes machines intelligent, it feeds human decisions.

- Culture/bureaucracy will be a LARGE impediment to leveraging ML/AI. If our incentives remain focused on reducing risk rather than implementing capability, we won't leverage the innovation.

- Three major portions of ML/AI need to be integrated to create a game-changing capability for SOF: vision, language, and contextual relevance.

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Appendix B: Bow Bumper
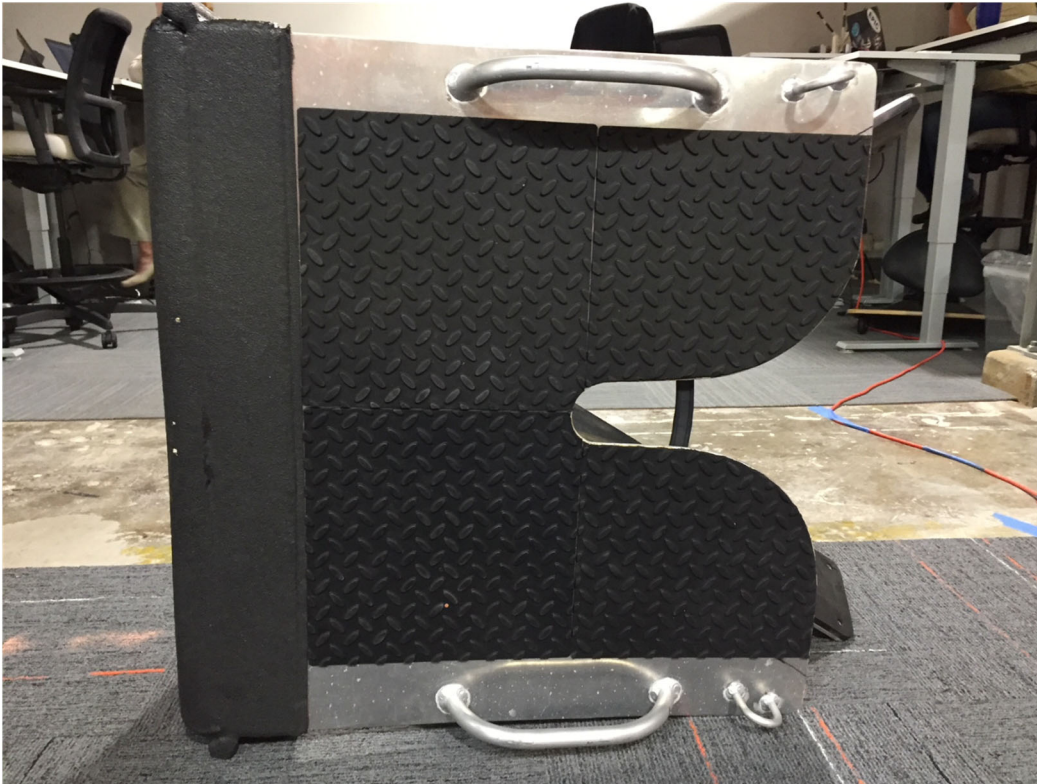
Appendix C: MRZR

Appendix D: Technology Focus Areas

SOFWERX

Collider Event

Table of Contents	
TFA #	**TFA Category**
1	Artificial Intelligence / Machine Learning for MISO
2	Media Production Manipulation & Forensic Analysis
4	Edge Computing
5	Maritime Operations Enabling Technologies
8	Medium Range Gas Gun (MRGG)
9	Data Visualization
10	Human Performance Optimization
11	Business Information and Execution System

For more information and to submit, visit: www.sofwerx.org/collider