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MAKING THE DEFENSE ACQUISITION SYSTEM MORE WARFIGHTER-CENTRIC

INCREASING STAKEHOLDER ENGAGEMENT AND INNOVATION AT THE TACTICAL EDGE

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CONTENTS

SUMMARY

The historically limited role of warfighters in the acquisition process has contributed to a variety of operational problems. The Defense Acquisition System (DAS) needs to become more warfighter-centric to deliver capabilities that keep up with the rapidly changing demands of the modern-day battlefield. This shift requires more and beter warfighter input into the design and development process. Moreover, uniformed scientists and engineers need to operate with sufficient acquisition authorities to rapidly innovate solutions to emerging battlefield problems at the tactical edge.

INTRODUCTION

The Defense Acquisition System (DAS) is critical to equipping warfighters with the capabilities to succeed in complex and rapidly evolving operational environments. However, the DAS has generally failed to adequately incorporate operational concerns. It often treats warfighters as consumers instead of stakeholders. It also fails to capitalize on the potential for innovation at the "tactical edge." The April 9, 2025, Executive Order (EO), "Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base," is an opportunity to change this paradigm by (amongst other things) making the DAS more warfighter-centric. Upcoming DAS redesigns should include specific directions to make warfighters active participants in the acquisition process beginning with requirements development and to give uniformed scientists and engineers the acquisition tools they need to make battlefield adaptations at the tactical edge.

DANGERS OF LIMITED WARFIGHTER INVOLVEMENT

Warfighters traditionally often have minimal input during the early phases of system design. This lack of user input can do more than lead to suboptimal performance outcomes. In the context of military operations, it can create real danger. For example, a relatively recent study examined how the acquisition process affects military accidents. In particular, it looked at the role played by the provision of feedback in different software development models.[1] The study found use of the waterfall model could elevate the risk of accidents. In that model, input from warfighters only came in the later stages of testing and development. Thus, safety hazards were only revealed after it was too late to rework system designs.[2]

The study examined several incidents. For example, during the invasion of Iraq in 2003, multiple U.S. Army Patriot air defense batteries had friendly fire incidents in which they shot down a British Royal Air Force Tornado fighter-bomber, radar locked onto a U.S. F-16, and shot down a U.S. Navy F/A-18.[3] A subsequent investigation determined that problems with how the Patriot interpreted friend or foe signals were central to those incidents. Those problems, in turn, stemmed from known problems with the identification process that were never addressed because they were discovered in late stage testing.[4] Similarly, investigations into the U.S.S. Vincennes shootdown of Iran Air Flight 655 in 1988 yielded significant evidence that user interface designs contributed to the crew mistakenly believing the aircraft was descending in the manner of an attacking aircraft (the aircraft was actually ascending). Again, this system was built using a waterfall model, problems with the interfaces were tested only at the very end of the development process, and even then were never subject to realistic testing.[5] Finally, the study examined evidence that flaws in human factor engineering of the navigation system were a major contributor to the 2017 collision between the U.S. Navy destroyer U.S.S. John S. McCain and an oil tanker in the Strait of Malacca.[6] The study acknowledged that investigations into each incident pointed to multiple potential causes. Nonetheless, it demonstrated how the driving causes of each incident included poor software design and late stage user involvement in testing, driven in large part by the use of waterfall models.

BENEFITS OF MAKING WARFIGHTERS INTO ACTIVE STAKEHOLDERS

The study contrasted these examples of accidents driven by poor software design with the mission planning software used during the U.S. withdrawal from Afghanistan in 2021. Kessel Run developed software using rapid development cycles, user feedback, and "dry run" testing. This process allowed performance issues caused by massive increases in the system's use to be successfully resolved in hours. As a result, the Air Force was able to support an enormous and sudden surge in flights.[7]

The Department of Defense (DoD) has seen similar results when warfighters are treated as active stakeholders rather than passive consumers and realistic testing is accomplished before it is too late to make changes.[8] Similar approaches are practiced by U.S. Special Operations Command (SOCOM). SOCOM applies an agile philosophy that it calls “Extreme Product Ownership.” Like Kessel Run in Afghanistan, and in stark contrast to the waterfall model, this approach is designed to lower risks to development and combat operations by focusing on users and value.

One example of this approach in action came with another mission planning product. Helicopter pilots from the 160 Special Operations Aviation Regiment (SOAR) needed new software because their existing platform lacked much of the required functionality. They needed a program that could accurately calculate their route on a map and be tracked by the onboard computer. Once a vendor was selected, a 160 SOAR pilot was quickly trained, acted as program manager, and actively adjudicated feedback from other pilots and coordinated with the vendor on those inputs as the vendor used a DevSecOps and iterative model of development.[9] This process led to new software that provided the unit with improved user interfaces, increased capabilities, and addressed cybersecurity vulnerabilities. It enhanced mission effectiveness and flexibility. Moreover, instead of waiting years for a product that did not reflect operational realities or proper testing, they received quarterly minimum viable product (MVP) releases, which led to fast improvements to real world planning and, in turn, special operations capabilities.[10]

MOVING AGILE ACQUISITION TO THE TACTICAL EDGE

Making warfighters active stakeholders in agile acquisitions is a necessary first step. But that alone will not make the DAS sufficiently warfighter-centric. Another necessary step will be to push agile acquisition authorities out to the tactical edge to give warfighters the tools they need to adapt capabilities to rapidly changing battlefield conditions. This need isn’t theoretical—it is a necessity being demonstrated every day in conflicts around the world, to include the war in Ukraine.

In the Russian-Ukrainian War, drones now kill more soldiers and destroy more armored vehicles than all other “traditional weapons of war.”[11] But those drones are rapidly changing. Both sides are constantly adapting drones for new uses and rapidly fielding new capabilities in response to actions taken by the enemy. For the Ukrainians, this “arms race” has meant operating drone workshops. Workshops are comprised of ten to twelve specialized Ukrainian soldiers who are often skilled engineers or technicians. They are constantly innovating and testing new technologies in response to rapidly changing battlefield conditions. These workshops do not belong to a siloed organization that is kept isolated from the units they serve. Instead, they are integrated within Unmanned Aerial Vehicle battalions which, in turn, operate underneath a brigade.[12]

This battlefield presence of integrated science and technology personnel is likely a harbinger of bigger things to come. Future battlefields will likely involve a wide array of exponentially accelerating technologies. These technologies will likely involve increased use of drones (to include swarms), degraded communications, the need to mask from enemy sensors or risk being quickly targeted by long range precision fires, and increased human-machine teaming. These capabilities will need to be adapted in real time in response to rapidly changing battlefield conditions.[13] There simply will not be time to wait for regular acquisition processes—even those built to be rapid. Instead, uniformed scientists and engineers working at the tactical edge will need sufficient acquisition training and authority to execute these battlefield adaptions in real time.

Luckily, we don’t need to reinvent (or re-procure, as it were) the wheel. We already have two models for how to push this type of innovation to the tactical edge: the "MacGyver" model and the previous Air Force tactical battle labs.

In their paper "The Air Force Needs MacGyver: Reimagining the role of Air Force scientists and engineers,"[14] the authors argue the Air Force should repurpose some of its scientists and engineers from being acquisitions officers to working in detachments embedded within operational units. These detachments would help the operational units to which they are assigned "to generate ad-hoc capabilities as part of dynamic kill chains. This rapid innovation requires units to adapt mature technology through iterative experiments and practice field innovation."[15] This approach would require delegating some additional acquisition authorities down to wing or group commanders so that these detachments can acquire the commercial technologies required to build MVPs to meet unit needs and potentially form the basis of an Urgent Capability Acquisition.[16] An example of this approach in action comes from U.S. Air Force Central Task Force 99 in which Air Force personnel and members of industry utilized software created by a commercial vendor to 3D print, assemble, and fly a test an Unmanned Aerial System in under 24 hours.[17]

Another approach to rapid tactical innovation comes from the Air Force tactical battle labs, which were shuttered in 2007. They were, in effect, "teams of Lego masters." The labs "existed to pair adapted mature technology with novel operating concepts to generate new warfighting solutions…and quickly close known capability gaps."[18] For example, the battle lab was tapped at the beginning of Operation Enduring Freedom to find a solution to conducting operations in mountainous terrain that blocked the line-of-sight communications used for aircraft performing close air support. In response to this challenge, the battle lab repurposed a training pod, commonly carried by fighter aircraft, to carry an iridium satellite radio modem and VHF/UHF radio[19]…all before the advent of the Urgent Operational Need process or advent or Starlink. These labs could be delegated acquisition authorities that would cover the relatively small ceiling of their program costs and be aligned with an agile contracting activity.

CONCLUSION

"Extreme Product Ownership" and moving technical innovation to the tactical edge are effective, proven practices that can be rapidly scaled across DoD. They have already demonstrated success at executing the types of agile,[20] commercial warfighter capabilities required by the EO and other recent policy directives. More important, these practices help ensure that U.S. warfighting capabilities can keep pace with rapidly changing battlefield conditions. Failure to meet this rapid demand for change will not just represent a failure to follow an EO—it could mean defeat on the battlefield.

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3 Id. at 22.

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5 Id. at 18-20.

6 Id. at 24.

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20 The term "agile" often refers to a form of software development that utilizes continuous delivery of code and rapid iterations. See e.g. https://software.af.mil/resources/agile/ (accessed on June 17, 2025). The term is also being applied to project management in a similar fashion to software development, i.e., the utilization of an iterative approach to planning and delivering value. See e.g. https://www.dau.edu/acquipedia-article/agile-project-management (accessed on June 17, 2025).

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