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SPECIAL OPERATIONS AS AN INNOVATION LABORATORY

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COMMENTARY

At a recent conference, a young military officer challenged the crowd: "I will buy the first round of beers if anyone can find a strategic guidance document in the last five years that doesn't contain the word 'innovation.'" No one took up the bet. Innovation is both a buzzword and a boogeyman for the Department of Defense. Everybody wants some, and lots of people claim they are doing it, but is it working?

The secretary of defense's advisory Defense Innovation Board recommends the following changes to current innovation efforts:

> seek out empirical evidence [… be] rapid, iterative, and risk-tolerant. Instead of giving processes pride of place … focus on outcomes, and how to get there most efficiently. These practices should be generalized, and not only to products and services, but potentially to strategies and operations as well.

The Defense Innovation Board is not alone. There are a number of voices calling for such fast, iterative feedback loops between operational experiences on the one hand and the acceleration of technological solutions on the other, an approach often referred to as "rapid prototyping." What remain lacking, however, are concrete plans to make this approach a reality within the U.S. military. Some refer to rapid prototyping as a "mindset" or "culture" that needs to be inculcated throughout the force. Others seek to rely on nascent technologies to make the process work: "Immediate feedback will pour into a data lake where the latest methods in machine learning and artificial intelligence can improve operational effectiveness." There is also a rich historical record of "bottom up" innovation, from the industrial age wars of the 20th century, to Vietnam, to the frontline troops who have been innovating in Iraq and Afghanistan, but this kind of innovation is often *ad hoc* and driven by individual entrepreneurship. Our goal here is to propose a simple and cost-effective way to improve existing innovation efforts in the field: aligning military graduate researchers with deployed special operations units in order to rapidly prototype concepts and technologies. To do so, we discuss the attractive qualities of special operations for this role, the natural fit of military graduate students as research partners, and some basic methodological strategies.

Special operations forces are an attractive option for field innovation for the same reasons that they are entrusted with high-risk missions — their maturity, flexibility, rigorous selection processes, and potential for risk-tolerance. They are also consistently deployed globally, with units operating across all six geographic combatant commands, and conduct a wide array of missions — from near-peer competition, to direct action counterterrorism, to working closely with partner forces. As such, they are well-positioned to explore an equally wide range of innovation challenges. Partnering these units with the special skills of military graduate researchers enables concepts to be tested in the field, bringing the feedback necessary for successful prototyping of innovative technologies.

First, it is not new to argue that special operations forces may (and often do) serve as an innovation incubator for the broader force. As far back as 1978, Eliot Cohen argued that elite units can serve as laboratories that could "try out new doctrines, test their validity, and then spread them to the rest of the force." Further, since the Goldwater-Nichols Act of 1986 established Special Operations Command, special operations forces enjoy a relatively high degree of "jointness" (inter-service and inter-agency cooperation), which fosters cross-community collaboration. This effect is compounded by the small size of special operations forces; the members of this "user community" cross paths routinely and can therefore regularly share and refine innovative ideas. Finally, the special operations community has already developed or supported a number of new entities such as SOFWERX and the Defense Innovation Unit (as well as service and component innovation directorates) to tackle such challenges. These organizations provide ready-made partners in this effort.

In recent decades, special operators have already demonstrated themselves to be an innovation laboratory through their role in the development, testing, and implementation of emerging technology and concepts. Take, for example, global positioning systems (GPS) — one of the most influential technological advances in last 30 years. As early as the 1960s, the U. S. military had used a rudimentary

version of this technology to guide both ships and aircraft, and by 1978 it increased its GPS capabilities by launching the first Navstar satellite constellation. The system was largely untested in combat, however, until Operation Desert Storm, during which special operations forces were vital to testing the system in the laboratory of combat. Special operators deployed behind enemy lines used GPS technology to navigate across the barren desert, conducting special reconnaissance deep in enemy territory. Their experiences and mistakes were used to improve techniques and equipment for the entire joint force. For example, after the Gulf War, the Army dictated that all armored vehicles would now carry GPS receivers and the demand for handheld devices, though primitive by today's standards, surged across the force. With the lessons learned from this field testing, the implementation of GPS technology and its satellite constellation grew over the years, and the improved GPS infrastructure greatly enabled military operations during the recent conflicts in Afghanistan and Iraq.

What the GPS example lacks, however, are the collaborative partners necessary to conduct more rigorous prototyping studies in the field. While forward deployed special operations units offer an ideal environment to conduct rapid prototyping, military students at graduate education institutions could offer much-needed additional labor and expertise. As military professionals, they would understand the relevant organizational, operational, and strategic contexts; as graduate students, they could employ the research techniques they use in the classroom. Finally, they would have the freedom to connect the research to the relevant actors (academic, industry, and inter-agency) across the wider innovation ecosystem. Through such a partnership on operationally relevant research projects, the professional development of these students would directly contribute to the transformation of the joint force.

This kind of partnership was shown to be useful in the utilization of Android team awareness kits. Originally developed by the Air Force Research Laboratory, this technology is an Android-based operating system installed on tablets, cell phones,

and other handheld devices that provides real-time battlefield awareness and satellite communication using GPS technology. Much of its testing and implementation has been conducted by special operations personnel while attending graduate programs. The technology has been tested during the remote advising and assisting of partner nation special operations forces, sensitive site exploitation, and collaborative mission planning, as well as to enable remote technical expertise for WMD-related operations. These technologies will also have implications for the conventional forces, as advising roles and inter-operability with partner nations become increasingly important, but they will have been developed and refined by teams of special operations personnel both on the battlefield and in the classroom.

We should recognize the technical limitations of using military graduate students in this role. Most military professionals attending mid-career education focus on some form of strategic studies or social sciences, rather than technical subjects such as engineering or applied science. However, students of the social sciences will be useful: Dr. Eric Schmidt of the Defense Innovation Board testified to the House Armed Services Committee that the Defense Department "does not have an innovation problem, it has an innovation *adoption* problem." In other words, the technical aspects of innovation are less of a challenge than its human and organizational implementation and strategic utilization. Furthermore, some military education entities, such as the Naval Postgraduate School (providing the Department of Defense's only special operations-focused master's degree program with applied research capabilities) and the Air Force Institute of Technology have social science, strategic studies, and technical programs co-located on their campuses. Such institutions are fully capable of connecting individual student projects into broader research agendas.

We now turn to some simple analytic tools that could — in conjunction with other contextually relevant methodologies — structure such prototyping efforts as students move into the field. There are established Department of Defense

guidelines for the rapid prototyping of material solutions, but these largely presuppose identified requirements to be developed. What is lacking is a method to mesh the prototyping effort with the threats, opportunities, and experiences that emerge directly from the operational environment. Here we offer three underutilized analytic tools that can readily be implemented: field experimentation, natural experimentation, and inductive reasoning.

Experiments are designed to establish control; they allow the researcher to isolate the independent effect of various factors upon some outcome. Field experimentation refers to conducting such research in "a naturalistic setting and manner … as a hedge against unforeseen threats to inference that arise when drawing generalizations from results obtained in laboratory settings." True field experimentation — as opposed to simple technology demonstrations — would allow the researcher to contend with all of the potential confounding factors that are created by actual field conditions and encounters with opposing forces. This would require as many aspects of a "down range" setting as possible, which can be readily provided by the wide array of operations carried out by special operations units. Natural experiments can be considered a subset of field experiments, where control over potential confounding factors that occur naturally in the environment can be leveraged in testing. Given obvious restrictions on imposing "random assignment" within military operations, it is important to take advantage of naturally occurring experimental opportunities. Finally, inductive reasoning refers to the process of inferring general principles from the observation of particular instances; in other words, learning through discerning trends or patterns within observed data. Though this seems the most obvious of the three methods discussed here — and might appear to be subsumed under existing "lessons learned" endeavors — the U. S. military has often struggled to learn or to implement the lessons it has garnered from experience. Researchers who are actually trained in the proper use of induction and deduction as modes of reasoning would greatly assist in structuring the military's efforts to learn from observations garnered in the field.

Our proposed initiative satisfies the key points of the Defense Innovation Board's recommendations cited above.

Using special operations forces as the laboratory could leverage the military community most comfortable with the rapidity, cognitive flexibility, and risk tolerance necessary for prototyping. Further, partnering this "laboratory" with graduate student research teams will be fiscally attractive, as the researchers are already funded, while still achieving the required analytic rigor. Finally, these operators and military graduate students would be fully capable of applying these techniques to broader strategic and operational concepts, not just the technological "shiny objects" that often take precedent in discussions around innovation. In implementation, this laboratory for innovation establishes a risk buffer in acquisition and organizational change processes, by making more information available while using the smallest force necessary.

Most importantly, the special operations community seems to be waking up to its potential as a prototyping laboratory. In a recently released U.S. Army special operations forces strategic document, Special Forces leadership seems primed for our proposal: "Our formations excel in ground-up innovation. We will take this to the next level, using the live battle labs of combat zones … to experiment and industrialize what works." This may, in fact, be seen as a new core mission for special operations forces: "what the nation will most require from [special operations forces] in the future is not raids and strikes, but the ability to provide early understanding … [therefore] leaders must prioritize their innovation efforts."

While experience and flexibility make special operations units natural candidates for field experimentation, we do not suggest that all such units begin experimenting in all places while forward deployed. Innovation and experimentation introduce their own kind of risk in practical application, and the addition of that risk does not necessarily fit within all deployments. Rather, through partnership with military graduate education programs, special operations units are best postured to find opportunities for field experimentation

that balance all of these risks in a sensible fashion. Second, if the Department of Defense is to address Eric Schmidt's identified "innovation adoption" problem, it must do so by addressing not just systems and processes, but also attitude and culture. Military graduate students, regardless of their chosen course of study, are ideally positioned to consider new approaches to problems. What better a time is there than during their graduate study to "learn by doing" in applying their research to problems faced by their parent forces? Doing so will provide the professional development sorely needed to develop the future leaders of an agile and innovative military.

In sum, our proposal simply leverages existing investments for a new purpose. Three seemingly disparate activities can be intertwined to great effect: special operations deployments, military graduate education, and the quest for innovation. Recognizing the complementarities of these three activities and harnessing the power of collaboration amongst these actors may provide a first step towards a new model of diffused innovation throughout the U. S. military.

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The views expressed in this article are those of the authors and do not reflect the official policy or position of the Department of Defense or the U.S. government.

Image: U.S. Navy (Photo by Senior Chief Mass Communication Specialist Jayme Pastoric)

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