DIU Is Vehicle for Boosting Navy Technology

A team of Department of Defense drone operators and experts test the technical capabilities of various uncrewed aerial systems during a Defense Innovation Unit led prize challenge to identify platforms, components, and capabilities for Blue UAS, which clears and validates flying platforms are safe to fly, cyber-secure, and meet DOD requirements, at Marine Corps Air Ground Combat Center, Twentynine Palms, California, on Nov. 2-6, 2024. *Photo credit: DIU | Devon Bistarkey*

As the U.S. Navy and Department of Defense race to develop more innovative offensive and defensive capabilities to deter China and other adversaries, most agree that greater engagement with the private technology sector is needed.

That’s in part the impetus behind the Replicator initiative, a DoD effort started in 2023 to speed adoption of commercial military and national security technology, particularly lower-

cost uncrewed capabilities. This is also key to realizing the goals of the new 2024 Navigation Plan, released in September by Admiral Lisa M. Franchetti, then the 33rd chief of naval operations. The plan focuses on faster integration of robotics and autonomous resources.

Enter the Defense Innovation Unit, a once “experimental” DoD office that in 10 years has become a central player in the Pentagon’s push to adopt and scale commercial technology for military applications.

Since its start in 2015, the office has pioneered deep relationships with Silicon Valley and the tech sector nationwide and a process for quickly prototyping military applications of commercial technologies. This has led to 450 prototype contracts and $68 billion in private investment, according to DIU’s fiscal 2023 annual report. These investments translated into 62 contracts for commercial solution transitions to the warfighter, the DIU report says.

Although DIU is a small office, with a fiscal 2024 budget of $983 million (compared to the nearly $875 billion in annual authorized defense spending), its influence is growing and getting attention. In 2023, the Pentagon elevated DIU in the organization chart to report directly to the office of the defense secretary. Now, DIU Director Douglas A. Beck serves on or provides leadership and staff support to various entities driving Pentagon innovation, including the Deputy’s Innovation Steering Group and Defense Innovation Working Group, both of which have oversight roles in implementing Replicator.

This puts “DIU at the forefront to deliver future capabilities at speed and scale,” Beck said in Feb. 15, 2024, testimony before the House Armed Services Committee.

DIU-Navy Collaboration

To learn more about how DIU works with the Navy to bring about innovation, Seapower spoke late last year with Alex Campbell,

a highly decorated Navy captain who is director of the Maritime portfolio at DIU. Campbell, who has a master's degree in business administration from Georgetown University, is a designated officer in explosive ordnance disposal, diving and salvage, and surface warfare and a naval parachutist. He supported the conflicts in Iraq, Afghanistan and others around the globe and, throughout his career, earned multiple service and campaign awards.

Campbell is also experienced in defense procurement. He ran the counter weapons of mass destruction portfolio for Special Operations Command and programs to build uncrewed, underwater systems and software. At DIU, Campbell connects Navy and combatant commanders with commercial firms to address complex military maritime needs.

The condensed and edited discussion follows.

How does DIU leverage relationships with the tech sector to develop solutions for the military?

DIU has this really unique, within the DoD, understanding of the commercial technology space. A really important part of DIU is our commercial operations team, and they essentially live, eat and breath where investment is happening in the commercial tech space and the defense tech space and also live, eat and breathe where these early and midstage startup companies are and [where] even more mature companies [are]. They have what I would call a real-time market survey, so that when we work through these problems of a service or combatant command, we're able to then pair them with certain parts of the commercial tech sector or the defense tech sector [to develop needed capabilities].

What's one example of a Navy-DIU partnership?

Project Overmatch is an important partner with DIU and has been for the last two or three years. And they have a remit to build basically a modernized tactical communications grid

across ships and aircraft and in the joint world … to bring forth the best in [artificial intelligence] and autonomy capabilities for these tactical use cases, which makes them a great partner for DIU. [This is essentially to] do digital transformation for ships, submarines and aircraft, [which is] really, really, really difficult.

Why is this transformation so challenging?

Because you have all of these weapons systems [on a destroyer] – whether it's radars or missile systems or torpedoes or electronic warfare systems – and they all generate just terabytes and terabytes of data in any given day. And there's a lot of room to improve essentially saving that data and finding a way to get that data into a cloud repository so that both government engineers and commercial companies can access that data so that they can build software capabilities that improve a warfighter's ability to do their job. You really can't create AI capability if you can't find a meaningful way to bring in all of the data that these Navy platforms generate on the day to day.

What is the fundamental importance of data in building naval autonomy, whether on a drone boat or on a destroyer?

If I have a drone boat and it's driving through the ocean and it encounters some big tanker on the ocean, it needs to be able to ingest data from a camera or from a radar system. It needs to know where that tanker is out in front of it, and it needs to know, "Hey, I have to turn left or I'm going to crash into the tanker."

It may sound like a very simple example, but you have to collect data over hundreds and hundreds of hours of running these drone boats out in the ocean in order to essentially have examples to train algorithms so that they know … whatever it is they need to do. This must all be in accordance with Coast Guard regulations for how a boat would behave if a human

were driving it. And so, on the autonomous-system side, you have to collect all of that data to help inform how that drone boat will behave on the ocean. In that regard, data is fundamental.

And how is data functioning to render a destroyer more autonomous?

On a destroyer, you have these radar systems that do a whole range of things. But if you want to, for example, train a machine-learning capability to automatically sense specific targets, you need to collect a whole lot of data from those radar systems. And then you have to have a human being basically watch the playback from those radar systems and say, "OK, this particular signal in my radar data, that's a commercial airliner. This particular signal on my radar data is a seagull. This particular piece of data is a military aircraft."

And then you train an algorithm to automatically detect those things based on all the different data signatures …. and so, in that regard, data is just as fundamental to the drone boat as it is to the destroyer.

But humans still make the critical decision in the field?

You're not removing the human being from a lethal decision-making process; you're creating tools so that they can make better decisions faster.

What are the even steeper challenges in operationalizing autonomous capabilities for maritime military missions?

On the [more] difficult end of that spectrum [from navigation of a single drone boat], you have to figure out how to get hundreds or thousands of those craft to not only turn left, turn right, speed up and slow down – to avoid a tanker or an island or whatever – now you have to have all of those platforms doing it in concert with one another. And

communicating in concert with one another, and creating effectively what I'll call a model of the world around them.

So, if I have hundreds of these platforms on the surface of the ocean, or in the air, or under the sea, I need all of those platforms to understand where all of their partners are in the world. And then I need them to sense the world around them such that they can accomplish very specific missions. And that mission autonomy is very complex.

I think those are the areas we're looking to push into. That's sort of the next frontier of employing autonomous systems at scale. And that's something the commercial world hasn't even really figured out.

Then-Deputy Secretary of Defense Kathleen H. Hicks and staff members participate in interactive demonstrations during a DIU capabilities brief at the DIU, Mountain View, California, Dec. 12, 2023. *Photo credit: Department of Defense | U.S. Navy Petty Officer 1st Class Alexander Kubitza*

How does DIU work with the Navy and the larger military community to address these complicated issues?

DIU spends time understanding a problem set from both the military's and the commercial technology sector's perspective. By understanding both sides of the coin, we are able to say, "OK, we've identified this problem, we've spent time with you to understand the left and right limit of these problems." Regardless of where the problem starts from – whether it's a program office or from a fleet – we like to get that entire team of stakeholders together. Because what we've found is that if we don't do that, we can probably go run a really fun prototype, but the likelihood that that prototype is going to turn into a production contract and actually get fielded to a Sailor in a way that is integrated with other capabilities around it is very low.

How does the "commercial solutions opening" process work to develop those capabilities?

The central value proposition of DIU is this thing called a commercial solutions opening, which is a business and an acquisition process. We take a really thorough understanding of the problem, and we take a really thorough understanding of the tech and commercial space, and we forge that into a plan to go execute a project [in collaboration with government technology, warfighting and program management offices in the Navy or other services]. And in this commercial solutions opening, we put a solicitation or a request for proposal on our website. And then companies can bid on that proposal or bid on that request and provide a proposal for how they would go about solving for this problem.

How is DIU's process different from the traditional acquisition process?

In the traditional defense acquisition process, when you put a request for proposal or a solicitation out, it's usually this 10-, 20-, 30-page, very detailed document that really specifies solutions in many cases. When we put a solution or an RFP out it's usually one-and-a-half to three pages [that's]

just a problem statement. It very rarely specifies a specific solution. And what we find is we really open the door to compelling solutions that you might not otherwise get when you specify a solution in your RFP.

And this process is faster. We do this pretty quickly. We post these solicitations for 10 days at a time, sometimes up to 15 days at a time, and then we move really quickly. Let's say we get 100 proposals, we move really quickly to … pick the best paper proposals, and then bring those teams in to do a live pitch and live Q and A, and sometimes we actually do live demonstrations depending on what the problem is and what the intended capability is.

How does the other transaction authority funding mechanism speed things up?

The other transaction authority is a contracting authority and nothing more. There's no financial authority tied to it. It is a mechanism to do contracting that is outside of the federal acquisition regulation, which is what most contracts in the DoD are done through.

But in the context of the Navy, almost every contracting shop in the Navy could choose to write and conduct more OTA-based contracts. So, it's not an authority issue, it's an adoption issue. We usually award one to five OTAs within 120 days of that solicitation going out. Which is three to five times faster than a traditional prototype contract … using the FAR as their guidebook and as their authority. And so that speed really makes a big difference in terms of getting companies to start solving warfighter problems faster and also keeping pace with technology … and then getting those prototypes out there as quickly as possible.

What happens in the prototype process?

Our protypes usually last 12 to 24 months. At the end of that 12- to 24-month period, we're going to try and field some

viable product of that capability and ideally transition it to that traditional program office. [And Congress has in recent years given DoD more authority to quickly produce successful prototypes developed via competitively awarded OTAs.] So, I can take a successful prototype capability awarded through a competitively sourced OTA, and I can use that to do a sole-source production award immediately thereafter.

Is DIU willing to work with the prime defense contractors (e.g., Boeing, Lockheed Martin and Raytheon)?

We're not anti-prime in any way, shape or form. But, at the same time, DIU exists with a specific remit to expand the industrial base for commercial dual-use tech companies, for new defense performers and for nontraditional defense performers. Part of the reason that DIU was stood up originally, around 10 years ago, was to essentially rebuild a bridge that had atrophied with commercial tech and Silicon Valley to create opportunities [and] to create space for that tech to be applied and leveraged by the DoD in ways that [weren't] happening.

Why wasn't that happening?

Part of the reason [is that a] 50-person startup can't afford to hire five people just to do military business development and to navigate the somewhat complex maze and pathway of a FAR-based contract. Or [know] how to leverage Congress to put an earmark in for the defense budget. All of these things that the defense primes have hundreds and hundreds of people doing every day.

DIU exists to really simplify the process so that a 50-person startup … can essentially provide the same
sort of proposal for any customer. OTA contracts are much simpler and much more like a commercial contract than what you're going to see through the FAR.

Do you expect the Navy to conduct more projects with DIU in

the future?

We have been seeing an absolute increase in demand signal from the Navy, both for software and for hardware applications. So, I feel like that's a growth area. And I think the Navy is increasingly aware of DIU's ability to move quickly and to bring in commercial companies and commercial performers that may not have otherwise bid in the traditional FAR-based contracting process on SAM.gov.

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