


THE DEFENSE INNOVATION UNIT
FY 2023 **ANNUAL REPORT**


Focus
Speed
Scale

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Test event for the Huntington Ingalls Industries (HII) REMUS 300 near Juneau, Alaska. (Source: PMS-408 Expeditionary Missions)

DIU ANNUAL REPORT // FY 2023 IN REVIEW

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LETTER FROM THE DIRECTOR

In 2015, former Secretary of Defense Ash Carter founded the Defense Innovation Unit (DIU) — then DIUx — as part of a broader strategic initiative to maintain U.S. technological superiority in the face of a shifting threat landscape. While traditional development and acquisition pathways will most likely get us where we need to be technologically by somewhere in the 2030s, the urgency and imperative of today dictate that we must leverage commercially derived technologies that exist right now. Those technologies will continue to evolve at an ever-accelerating rate to meet the relentless demands of billions of consumers around the world and the enterprises that serve them. We find ourselves at a tipping point: The Department of Defense (DoD), Congress, the interagency, and the commercial sector all recognize that the time to accelerate the application of commercial technology for strategic impact is upon us. In response to this critical mass, Secretary of Defense Lloyd Austin realigned DIU as a direct report this past April and charged our team with developing a plan to scale DIU's impact.

In its earliest stage of development, or "DIU 1.0," the primary focus was to build a much-needed bridge between the Department and the commercial technology sector. Success during this first phase was measured simply by the volume of interest and engagement from both sides. The second phase of DIU, "DIU 2.0," proved that the model of leveraging "dual fluency" talent and flexible acquisition tools; building relationships within the commercial sector; and delivering critical capabilities to the warfighter within months, rather than many years, *works*. DIU has since cultivated a reputation as an acquisition pioneer by exercising the Other Transaction (OT) authority to rapidly acquire and tailor relevant commercial technology. This has yielded more than 450 prototype OT contracts, 62 of which culminated in commercial solution transitions to the warfighter. Importantly, these prototypes have attracted more than $68B of private investment, deepening a broad set of enduring relationships with the investment community.

DIU 3.0 is all about applying the capability developed during DIU 2.0 with the focus, speed, and scale necessary for strategic effect. The DIU 3.0 approach relies on the expertise we have cultivated up to this point and stems from more than 300 discussions with key national and international stakeholders from government, industry, and academia. Under DIU 3.0 — which Secretary Austin approved in August, and parts of which Congress codified in the 2024 Fiscal Year National Defense Authorization Act (NDAA) — we are working closely with our partners in the combatant commands (CCMDs), the Services, and across the DoD to amplify operational needs, break down systemic barriers for scaling commercial technology, and above all, deliver strategic impact that helps ensure the United States can deter major conflict or, if forced to fight, win. These efforts are already well underway and are reflected in this year's annual report — a true testament to the DIU team's commitment and skill and to that of our teammates across the Department, interagency, Congress, allies, partners, and teammates in the public and private sectors.

Thank you to the DIU team for all of your hard work and achievements in FY 2023. It is a privilege to serve alongside you in support of this critical mission. Finally, thank you to our stakeholders and partners across the Department, the commercial sector, the investment community, Congress, academia, our international allies and partners, and the broader defense innovation network for your continued support and dedication to our national security.

As we build upon this momentum in FY 2024 and beyond, everything we do at DIU — and across the public and private defense innovation community — will be measured against our ability to generate strategic impact. Together, it is our job to break new ground and to take the prudent risks necessary to reduce the strategic and operational risks facing our nation and the warfighters whose job it is to defend it. The time to deliver is now. I have never felt more confident in our ability to address this imperative, and I look forward to working together on the critical mission before us.

Douglas A. Beck
Director, Defense Innovation Unit
Senior Advisor to the Secretary of Defense

DIU ANNUAL REPORT // FY 2023 IN REVIEW

Secretary of Defense Lloyd J. Austin III visits the Defense Innovation Unit, Moffett Field, Calif., Dec. 1, 2023. (Source: DVIDS)

FY 2023 IN REVIEW

BUILDING ON THE MOMENTUM

Change was a constant for DIU throughout FY 2023. DIU gained a new director, Doug Beck, and crafted a new blueprint for commercial technology integration across the DoD. Perhaps the most significant shift was the Secretary of Defense's decision to realign DIU as a direct report.[1] This move is a recognition that the DoD must scale its use of readily available commercial technology to stay ahead of our competitors. Building on this momentum, Congress designated DIU as a Principal Staff Assistant through the the FY 2024 NDAA, further codifying DIU's role as a direct advisor to the Secretary of Defense and as the principal liaison for the Department to the commercial technology sector, and to investors around the world.[2]

Ninety days after the realignment and appointment of Director Beck, DIU submitted to the Secretary of Defense its "DIU 3.0" plan, which outlines the critical shift in focus, action, and resourcing that DIU will undertake to deliver with the focus, speed, and scale required for strategic effect. DIU 3.0's eight mutually reinforcing lines of effort (LOEs) are designed to support the National Defense Strategy (NDS) and to reflect the Secretary's three priorities to defend the nation, take care of our people, and succeed through teamwork. Each LOE builds on the momentum generated since DIU's inception in 2015 and directly addresses the systemic challenges that have hampered commercial technology adoption within DoD. The Secretary of Defense approved this plan Aug. 31, 2023 (see page 8 for the 3.0 plan overview).

SYNCHRONIZING WARFIGHTER NEEDS WITH COMMERCIAL CAPABILITIES

DIU's 3.0 plan prioritizes a robust connection to warfighters and their evolving needs. To that end, in FY 2023, DIU refocused its defense engagement strategy and established a network of DIU liaisons and embeds across five of the seven geographic CCMDs to understand and close their most important strategic gaps using commercial technology. For example, DIU established a deep embed presence with U.S. Indo-Pacific Command (USINDOPACOM). Adm. John Aquilino, Commander of USINDOPACOM, established the Joint Mission Accelerator Directorate (JMAD) to better meet USINDOPACOM's critical mission needs. The directorate spearheaded and integrated critical initiatives like the Joint Fires Network (JFN). Adm. Aquilino called upon DIU to appoint a JMAD Deputy Director and Chief Technology Officer to serve at USINDOPACOM headquarters in Hawaii and lead a team of DIU embeds across USINDOPACOM. DIU's team of embeds in USINDOPACOM will help the whole DIU team and our partners across the Department's Defense Innovation Community of Entities (DICE) to address warfighter needs with the focus, speed, and scale required to meet the challenges represented by the People's Republic of China and other threats across the region.

DIU also embedded personnel within the U.S. European Command (USEUCOM) and Security Assistance Group-Ukraine (SAG-U) in Germany to identify needs and barriers to obtaining technology. DIU's USEUCOM and SAG-U embeds have been collaborating with the government of Ukraine, international partners, USEUCOM staff, the North Atlantic Treaty Organization (NATO), and others to frame high priority operational problems and to identify cutting-edge solutions that can be rapidly fielded to Ukrainian forces.

By simultaneously leading a consortium of representatives from across the DICE, allies, and academia, DIU is able to cull the innovation landscape for readily available technology solutions. For example, the National Security Innovation Network (NSIN) launched Project STAPEL (Small Tactical Aerial Platforms for Extended Loitering) in September 2023. It is one of the first initiatives from DIU's new defense engagement strategy.

In addition to embedding personnel within the CCMDs, DIU is also at the heart of a major change in the Department's approach to breaking systemic barriers to scaling emerging technologies at speed, namely the Deputy's Innovation Steering Group (DISG) and the Defense Innovation Working Group (DIWG).[3] As a standing member and agenda-setter for the DISG and Chair of the DIWG, DIU will work across the Department to catalyze the defense innovation ecosystem for more cohesive effort and impact.

The inaugural meeting of the DISG in September 2023 marked the formal launch of the Replicator Initiative. The Replicator Initiative is a Department-wide effort to provide a template for future endeavors

[1] Secretary of Defense Memorandum, "Realignment and Management of the Defense Innovation Unit," April 4, 2023, https://media.defense.gov/2023/Apr/04/2003192904/-1/-1/1/REALIGNMENT-AND-MANAGEMENT-OF-THE-DEFENSE-INNOVATION-UNIT.PDF
[2] Defense Acquisition University, "Glossary Term: Principal Staff Assistants," https://www.dau.edu/glossary/principal-staff-assistants
[3] The DISG is one of the three major Deputy Secretary of Defense-led governance forums, alongside the Deputy's Management Action Group (DMAG) and the Deputy's Workforce Council (DWC). The DISG is co-chaired by the Deputy Secretary of Defense and the Vice Chairman of the Joint Chiefs. Other members include Under Secretaries from across the Office of the Secretary of Defense, the DoD Chief Information Officer (CIO), the Chief Digital and Artificial Intelligence Officer, as well as Service and CCMD leadership. DIWG membership includes all of the aforementioned senior DoD leaders, minus the Deputy Secretary of Defense and the Chairman of the Joint Chiefs of Staff.

"We are doubling down on our efforts to leverage leading-edge commercial technology for our concepts of operation. DIU's uniquely talented personnel embedded in the Joint Mission Accelerator Directorate are foundational to our efforts."

— Adm.John C. Aquilino, Commander of the United States Indo-Pacific Command

Adm. John C. Aquilino, Commander, USINDOPACOM with DIU Director, Doug Beck at Dragon's Lair IX in Honolulu, Hawaii, Nov. 2, 2023. (Source: U.S. Army)

1 **Focus on the most critical capability gaps and embed with the warfighter to do so.**
DIU 3.0 includes embeds at the most critical nodes of warfighter demand, within the most innovative operating organizations of the Joint Force, the special operations community, and each of the services. Those embeds will both help shape demand for technology and ensure that innovation efforts are unwaveringly focused on meeting it.

2 **Partner at every level with DoD's "engines of scale."**
DIU 3.0 aims to strengthen partnerships with key Department stakeholders, including Service branches and Office of the Secretary of Defense (OSD) entities, ensuring alignment on operational priorities and scaling successful prototypes where there is mutual agreement between service leadership and acquisition executives.

3 **Catalyze the DoD's innovation entities into a community of impact.**
DIU will work with partners across the Department's community of defense innovation entities — as well as with the Chief Data and Artificial Intelligence Office (CDAO) — to take advantage of opportunities to generate impact through shared best practices, talent management, shared systems and processes, and enhanced teamwork. DIU has been charged by the Secretary and Deputy Secretary of Defense with ensuring maximum synergy — and eliminating dyssynergy — across this team.

4 **Take the partnership with the commercial tech sector to a new level.**
DIU's alignment as a direct report to the Secretary of Defense, backed by recent legislation, solidifies its role as a pivotal partner for the commercial tech sector, providing accessible pathways for collaboration and innovation. DIU will leverage this positioning — as well as the dual-fluent talent that is central to its success — to continue tapping into the relentlessly evolving commercial technology sector for viable solutions to military problems. It will also put in place new structures — physical, digital, and procedural — to provide easier onramps to the Department for acquiring these solutions, building on the work already being done through NSIN.

5 **Realize the enormous potential of tech partnership with allies and partners.**
DIU is forging stronger ties with defense innovation entities in allied nations such as the United Kingdom, Australia, and India. And it is helping other key partners establish similar organizations, recognizing the collaborative nature of technological advancement and the shared interest in upholding the international system.

6 **Build the trust and momentum required for speed and scale.**
DIU 3.0 must operate, communicate, and above all deliver in a way that reinforces and capitalizes on existing momentum; that builds a shared enthusiasm and growing alignment between internal and external partners; and that both inspires and merits the special trust required for stakeholders on all sides to take necessary risks.

7 **Retool DIU to support all of the above.**
DIU faces a crucial moment in its growth, needing to expand its expertise in integrating commercial tech and to foster relationships across the Department while also urgently addressing staffing challenges. To achieve its mission and support the Department effectively, DIU must swiftly enhance its talent acquisition and retention strategies. The task is already underway with plans approved for increased staffing and the addition of senior executives.

8 **Provide the Secretary and Deputy Secretary with world class dual-fluency advice.**
The Department's decision to elevate the DIU Director enhances its capacity to leverage both traditional and commercial tech sectors, fostering deeper collaboration with industry and academia. With its unique position at the intersection of these worlds, DIU aims to facilitate a renewed level of collaboration reminiscent of historical successes in wartime innovation.

Vivek Virmani, Director of iDEX, Joseph Felter, and Doug Beck, DIU Director, speak at launch of INDUS-X Gurukul Education Series on November 8, 2023. (Source: Defense Innovation Unit)

"This is a consequential partnership, and together with DIU we have been able to truly energize the defense ecosystem — including startups and investors — to solve problems of mutual concern with commercial technology."

— Vivek Virmani, Director, iDEX

to rapidly field and scale technology, focusing on removing systemic barriers. Replicator-1 will field thousands of existing attributable autonomous systems within 18 to 24 months. The DIU team is at the heart of this initiative.

CATALYZING THE INNOVATION ECOSYSTEM

When the Secretary of Defense approved the DIU 3.0 strategy in September 2023, he further empowered DIU to catalyze and synergize the DICE. This collaboration will generate impact through shared best practices, talent management, shared systems and processes, and enhanced teamwork.

In addition to fostering partnerships across the DoD, DIU took steps to deepen collaboration and integration with our most tech-capable allies and partners. DIU's global partnerships team spent much of FY 2023 developing and strengthening a defense innovation network of allies and partners by understanding common challenges; reducing barriers to cooperation; sharing best practices; creating ties across the United States and partner technology industry; and building processes for and executing cooperative projects to strengthen ties.

India: During the INDUS-X launch in June 2023, DIU and iDEX (India's DIU equivalent) agreed to strengthen cooperation between their organizations through a series of engagements and collaborative projects. Immediately following this, DIU, NSIN, the Office of the Secretary of Defense for Policy, and our Indian counterparts agreed to execute a series of Joint Prize Challenges during FY 2024. DIU and iDEX selected two problem sets for the first challenge: undersea communications and intelligence, surveillance, and reconnaissance (ISR) sensing for oil spill detection. The challenges will be run jointly. The United States — via DIU and NSIN — will lead the execution of the undersea communications challenge, while India — via iDEX — will lead the execution of the ISR sensing challenge. DIU and iDEX will together select a winner from each country for each challenge (four winners total). The objective of these challenges is to strengthen cooperation and interoperability, identify novel technology solutions to problems of mutual concern, and to transition new capabilities to U.S. and Indian forces.

AUKUS: DIU will launch a prize challenge in FY 2024 with the United Kingdom and Australia under the umbrella of the Australia-UK-U.S. (AUKUS) Pillar II trilateral security partnership, which began in FY 2023. The first AUKUS Pillar II Prize Challenge will be focused on Electronic Warfare.

Singapore: The United States and Singapore launched the Critical and Emerging Technology (CET) Dialogue in 2023, which affirmed a commitment to strengthen our bilateral partnership and build enduring technology collaboration. DIU led in-person discussions with Singaporean defense innovation counterparts throughout FY 2023, and both parties agreed to execute a memorandum of understanding that will institutionalize our defense innovation partnership, facilitate collaborative projects, and allow us to execute with speed. DIU and Ministry of National Development (MND) officials agreed to

launch an autonomous systems-focused prize challenge in FY 2024.

Japan: In June 2023, the DIU director met the former Director General of Japan's Technology Strategy for the Acquisition, Technology, and Logistics Agency (ATLA). During this meeting, the two leaders committed to pursuing close cooperation between DIU and ATLA, including establishing a routine cadence for working and senior level engagements, by exchanging personnel, through engagements with leading Japanese firms working in critical technology areas, and by the execution of joint projects.

Ukraine: DIU, in collaboration with NATO partners and Brave1 (the Ukrainian government's defense technology cluster), planned (and subsequently co-hosted in October 2023) the "Ukraine and the Future of Unmanned Aerial Systems" forum in Warsaw, Poland. Senior leaders, including the Minister for Strategic Industries and the Deputy Minister for Digital Transformation, led discussions on critical drone-related issues in Ukraine. The two-day event brought together more than 200 European, Ukrainian, and U.S. participants from various sectors, fostering discussions on battlefield challenges, technology delivery pathways, and strategic industry development.

North Atlantic Treaty Organization (NATO): In December 2023, NATO's Defense Innovation Accelerator for the North Atlantic (DIANA) selected 44 companies from more than 1,300 applicants to participate in its new Accelerator Programme, an initiative that launched in FY 2023 to foster innovation and collaboration between NATO and the private sector by providing support, mentorship, and resources to startups developing technologies relevant to NATO's mission and objectives. The selection of the inaugural cohort for the Accelerator Programme marks a significant step forward in realizing the objectives outlined in DIANA's charter. In partnership with NSIN, the accelerator is scheduled to commence in early FY 2024 across five NATO locations, including planned launches in Boston and Seattle. The NATO DIANA cohort forms an integral part of DIU's broader activities.

LENDING EXPERTISE OUTSIDE DOD

DIU takes pride in the caliber of individuals within its ranks. Among them is Ritwik Gupta (Contractor), who currently advisesDIU's Autonomy Portfolio and supports the technical evaluation of proposed defense solutions to ensure integrity, functionality, and compliance with established standards. He also serves as a lead advisor to the Federal Bureau of Investigation's (FBI) Science & Technology Branch on AI and AI Policy. Much like DoD, the FBI and other federal agencies are rapidly attempting to understand the implications of AI and how to best harness its power. There are three core objectives to Gupta's efforts: facilitate enterprise AI strategy, develop frameworks to leverage AI for investigative work, and map adversarial utilization of AI. This joint initiative between DIU and the FBI underscores the reach of DIU's dual-fluent talent, as well as DIU's commitment to promoting inter-agency collaboration and strengthening the nation's security infrastructure. By sharing best practices, experience, and expertise, we can help the whole government navigate the challenges and opportunities that naturally arise alongside novel dual-use technology.

"The event became a real breakthrough in the defense and innovation cooperation of partner countries. It led to a range of activities, from a joint search for UAS solutions, review of organizational and regulatory problems, to an outline for public-private and international partnership. It gave all participants an understanding of the current situation and needs, and provided a road map of cooperation for the near future."

— Yegor Dubinsky, Deputy Minister, Ministry of Digital Transformation, Government of Ukraine

MOBILIZING TECH FLUENT TALENT

As an OSD organization, DIU attracts dual-fluent talent from all of the Services in a mix of active-duty personnel, veterans, reservists, and commercial tech executives.
In addition to DIU's core staff, the Acquisition Directorate recruited and trained four acquisition professionals through the Immersive Commercial Acquisition Program (ICAP). ICAP is a competitive training initiative for DoD acquisition professionals who are seeking hands-on experience with the OT authority and want to help their organizations become better business partners for commercial companies. After the success of the inaugural ICAP effort, DIU renewed the program for a second year, recruiting six fellows for the FY 2024 cohort.

DIU's Acquisition Directorate continues

DIU Acquisition Director, Cherissa Tamayori, accepts Innovation in Contracting Award at the NCMA World Congress Conference on July 24, 2023 in Nashville, Tennessee. (Source: Defense Innovation Unit)

to receive accolades for its Commercial Solutions Opening (CSO) process. DIU knows that some private sector companies elect not to pursue federal government contracts because federal acquisition regulations are cumbersome. Other Transaction (OT) agreements offer wide latitude to amend or exclude contract clauses and requirements that are mandatory in traditional procurements. Recognizing this,the National Contract Management Association (NCMA) awarded DIU's Acquisition Directorate the prestigious Innovation in Contracting award, which recognizes successful and novel contract management practices.

PARTNERING WITH THE VENTURE CAPITAL COMMUNITY

Throughout FY 2023, DIU has prioritized expanding broad and targeted engagements with private capital partners. Increased interest rates and other macroeconomic factors have placed significant downward pressure on venture finance and have created favorable market conditions for private credit. This environment has facilitated the creation of new structures and arrangements among capital partners, and DIU is expanding engagements to include private equity, private credit, investment banks, and institutions. DIU is utilizing these relationships to improve the deployment of capital into national security areas requiring production and scaling.

MAKING BIG BETS ON CRITICAL HARDWARE

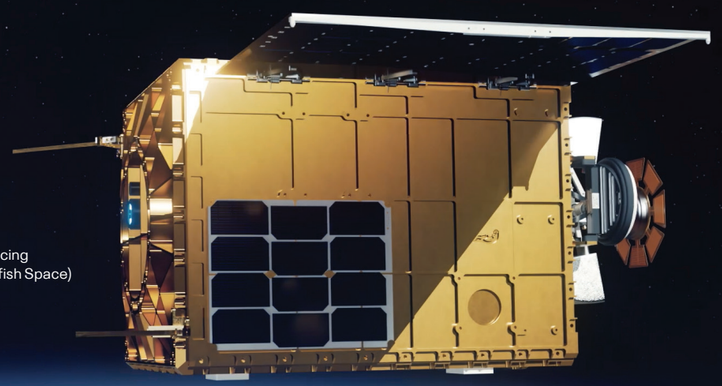
Since its inception in 2021, the National Security Innovation Capital (NSIC) has received a total of $35M in Congressional appropriations to award prototype OT contracts to startups ranging in value from $600K to $3M. Six companies successfully completed prototypes, and all firms currently under contract are meeting their scheduled milestones. Nine companies have raised new funding from vetted private sources at valuations two to five times higher than before partnering with NSIC, thanks to the technical progress the companies achieved using those funds. The new private financing was up to 20 times the amount provided by NSIC.

NSIC PROJECT SPOTLIGHT

The increased access to space with frequent launches for comms and other commercial efforts is leading to debris in space. This debris field is due in part to satellites that are appropriately deorbited, but others are prematurely retired due to lack of fuel or stranding in degraded orbits due to launch anomalies. Recent advances in robotics, guidance, navigation and control have converged to realize a new vision for in-space servicing, similar to how cars are easily serviced on roads today. Such a vision, if appropriately realized, promises to bring space into the sustainability age that is already the focus of much global concern on Earth.

In March 2023, NSIC awarded $3M to Starfish Space to further mature its Nautilus capture arm for the next version of its Otter servicing vehicle. NSIC saw value in Nautilus' vision for both commercial and defense applications, and they worked closely with Starfish Space, and DoD partners to jointly develop a statement of work with clearly-defined milestones and deliverables. The funds will specifically be used to develop an advanced version of the arm that offers enhanced docking dynamics and longer-term adhesion performance through an improved end effector design.

Many prototype development projects funded by NSIC offer unique real-time benefits for multiple parties. For example, because of NSIC's commitment, Starfish Space was able to accelerate the closing of its seed round with trusted domestic and allied investors. It was also able to use the resources that would have otherwise been devoted to fundraising and marketing to move into a new headquarters and expand recruiting efforts. An Air Force testing facility in New Mexico is also being utilized for environmental testing, and coordination on potential matching funds from AFWERX may allow for a future mission demonstration concept.



Envisioned Otter servicing vehicle. (Source: Starfish Space)

ENGAGING THE NATIONAL SECURITY INNOVATION BASE

DIU's sister organization, NSIN, builds networks of innovators to generate new solutions to national security problems. Between 2016 and 2023, NSIN engaged 10,230 new people; helped 1,453 new companies enter the national security innovation base, yielding 125 DoD-funded technologies; and directly supported the launch of 39 dual-use ventures from extant DoD lab technology. NSIN has also supported partner company expansion that raised about $10.8B in private capital since 2016 and $9.9B in DoD funding.

Shabodi was one company to use its NSIN experience to fuel its growth. Shabodi participated in NSIN's 2022 Propel accelerator program, in which ventures developed national security applications from technologies including advanced computing, 5G, space, artificial intelligence, and machine learning. During the program, Shabodi demonstrated how its Application Enablement Platform (AEP) could streamline 5G and advanced network integration for the Air Force Research Laboratory (AFRL) and other DoD organizations. Building off the support for its AEP technology, the company recently raised $10.3 million in a Series A round.

"Working with NSIN and going through the Propel program provided an additional layer of credibility, as it provides a path for early stage scaleups to build a direct commercial relationship with the U.S. Government."

— Vivek Chopra, CEO, Shabodi

For more information on DIU's projects, programs, and partnerships, please turn to the Featured Portfolio Projects section on page 23.

METRICS & PERFORMANCE

DIU's latest performance metrics show a narrative of resilience, growth, and strategic excellence. In FY 2023, DIU posted 33 new solicitations to our website and received a total of 1,768 commercial proposals, an 8% increase from the prior year, even as DIU acted to focus more aggressively on fulfilling the most strategic requirements for maximum value. The average number of proposals received jumped from 45 in FY 2022 to 54 in FY 2023. This led to 90 prototype contracts — up from 81 in FY 2022 — with a total value of $298M. DIU transitioned 10 commercial solutions, bringing the cumulative transition rate to 51%.

Since FY 2016, DIU has awarded 450 prototype OT contracts to commercial companies and has directly facilitated the successful transition of 62 prototype contracts for 57 unique vendors into transitions contracts across the federal government. These amount to $5.5B in contract ceiling awards backed by $19.1B of private capital.

In FY 2024 and beyond, our organization will refine its metrics framework to align closely with new strategic objectives, ensuring a comprehensive evaluation of our impact on mission partners within the DoD. These updated metrics will emphasize not just outputs, but the strategic value and long-term outcomes of our initiatives, providing a more accurate assessment of our strategic effect.

DIU by the Numbers

FY 2023 Snapshot

33 solicitations for commercial solutions posted to diu.mil (-8%)[4]

1,768 commercial proposals received (+8%)

197 average business days to award prototype OT contracts (+39%)[5]

90 prototype OT contracts awarded to commercial companies (+11%)

$502.2M total value of prototype OT contracts awarded to commercial companies ($298M) plus modifications from prior contracts (+145%)

10 commercial solutions transitioned to DoD users (-41%)[6]

June 2016 – Sept.2023

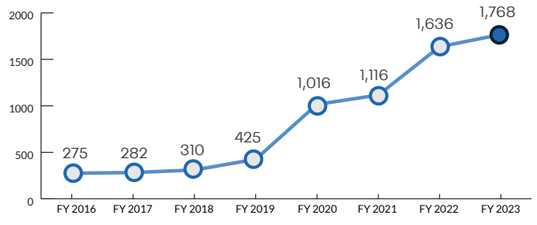
Commercial Solutions Opening			Prototyping		Transition	
188 prototype projects initiated to solve DoD challenges	**6,828** commercial proposals received	**$68B+** in private investment leveraged (as of Sept. 30, 2022)	**450** prototype OT contracts awarded to commercial companies	**69** projects have been completed (all prototyping efforts concluded)	**62** total number of commercial solutions transitioned to DoD users	**$5.5B** total value of production OT (or other) contracts awarded to commercial companies

[4] DIU 3.0 will focus directly on initiatives that are truly strategic and that the Secretary's national mission force for innovation is uniquely positioned to help deliver. At the same time, DIU 3.0 will bake into its strategy and its processes the discipline about where not to focus, where to help others succeed instead, and where to simply get out of the way. Accordingly, we anticipate a decrease in the number of solicitations posted on DIU's website.

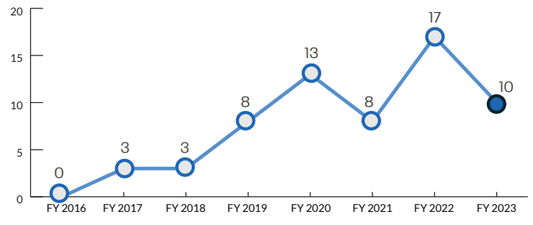
[5] Excluding the DIU Portal awards, the days to award is 171 out of 66 new contracts in FY 2023. DIU's target average number of business days to award a prototype OT contract is 60-90 days. The actual number has grown from 142 in FY 2022 to 197 in FY 2023. Some drivers for this increase include limited bandwidth for DIU agreements officers and program managers, financial and accounting protocols, expiring funding, and growing throughput.

Volume of Activity (Throughput) FY 2016 – FY 2023

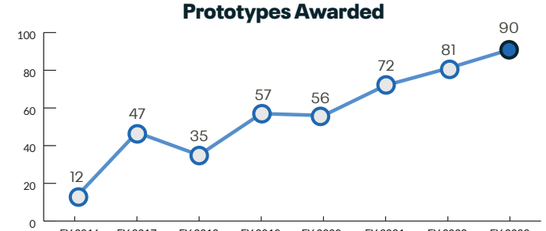
Number of Proposals Received



Transitioned Awards



Prototypes Awarded

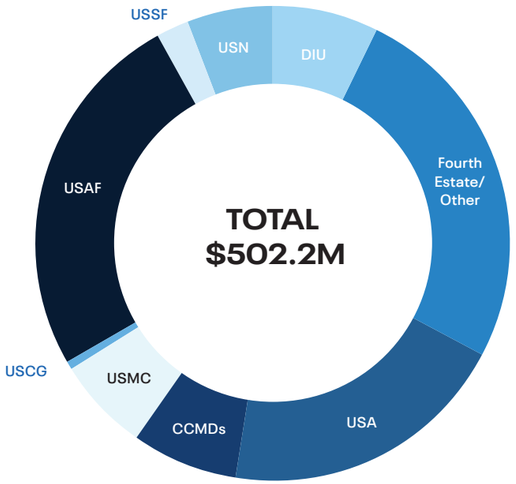


[6] The number of transitions per fiscal year depends on multiple factors, including how long it takes to prototype a solution and what the result of the prototyping activities are and whether a DoD/U.S. government partner is ready and/or has funds to purchase a solution. Although our number in FY 2023 was 10, one of those 10 transitions (Small-Class Unmanned Underwater Vehicle, or SCUUV) was the largest to-date (nearly $350M). Upward trends in the number of transitions are not a given.

WHAT IS A TRANSITION?

A commercial solution transitions when the prototype successfully completes and results in a production or service contract with a DoD or U.S. government entity. A transition enables the DoD to field a product or solution in an operational environment for service member use.

Obligated Prototype Funding Breakdown (FY 2023)



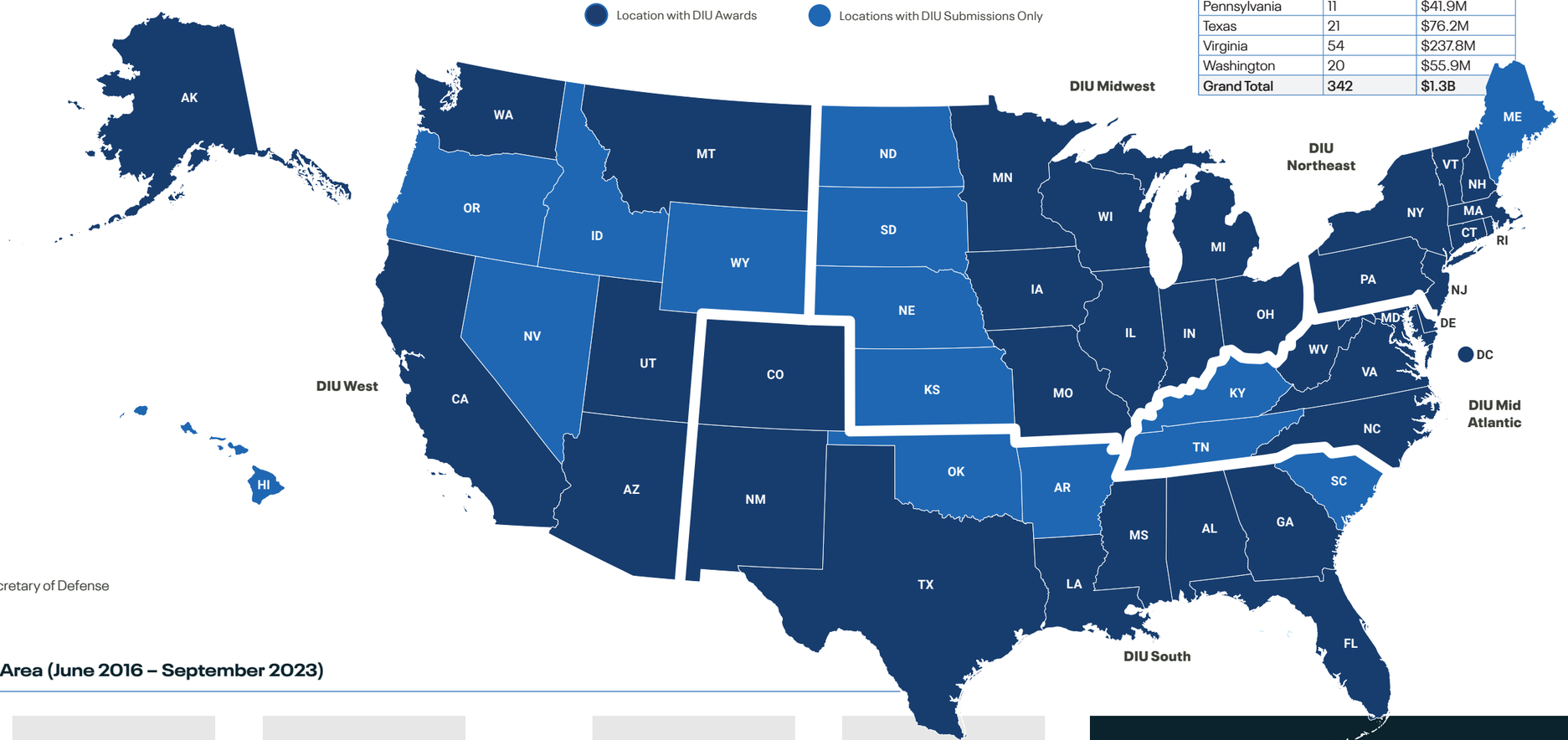
DIU = Defense Innovation Unit
CCMDs = Combatant Commands
USA = United States Army
USMC = United States Marine Corps
USN = United States Navy
USAF = United States Air Force
USSF = United States Space Force
USCG = United States Coast Guard
Fourth Estate/Other = Office of the Secretary of Defense

In FY 2023, DIU received vendor submissions from all 50 states. Between June 2016 and September 2023, DIU awarded 450 OT Prototype contracts (+18%) across 389 unique vendors (+19%) with a total value of $1.7B. Additionally, since 2016, DIU has made contract awards to 27 foreign-based companies (+42%), with a total award value of $75.9M (+130%).

DIU Contracts by State (Top 10)

State	Number of Contracts	Amount Obligated
California	159	$635.1M
Colorado	11	$109.6M
Florida	20	$55.9M
Massachusetts	22	$60.9M
Maryland	11	$10.7M
New York	12	$36.8M
Pennsylvania	11	$41.9M
Texas	21	$76.2M
Virginia	54	$237.8M
Washington	20	$55.9M
Grand Total	342	$1.3B

Domestic Prototype Awards (FY 2016 – 2023)



Obligated Prototype Funding by Portfolio/Technology Area (June 2016 – September 2023)

Artificial Intelligence & Machine Learning
49 Awards
$144.6M

Autonomy
142 Awards
$452.0M

Cyber & Telecommunications
67 Awards
$112.9M

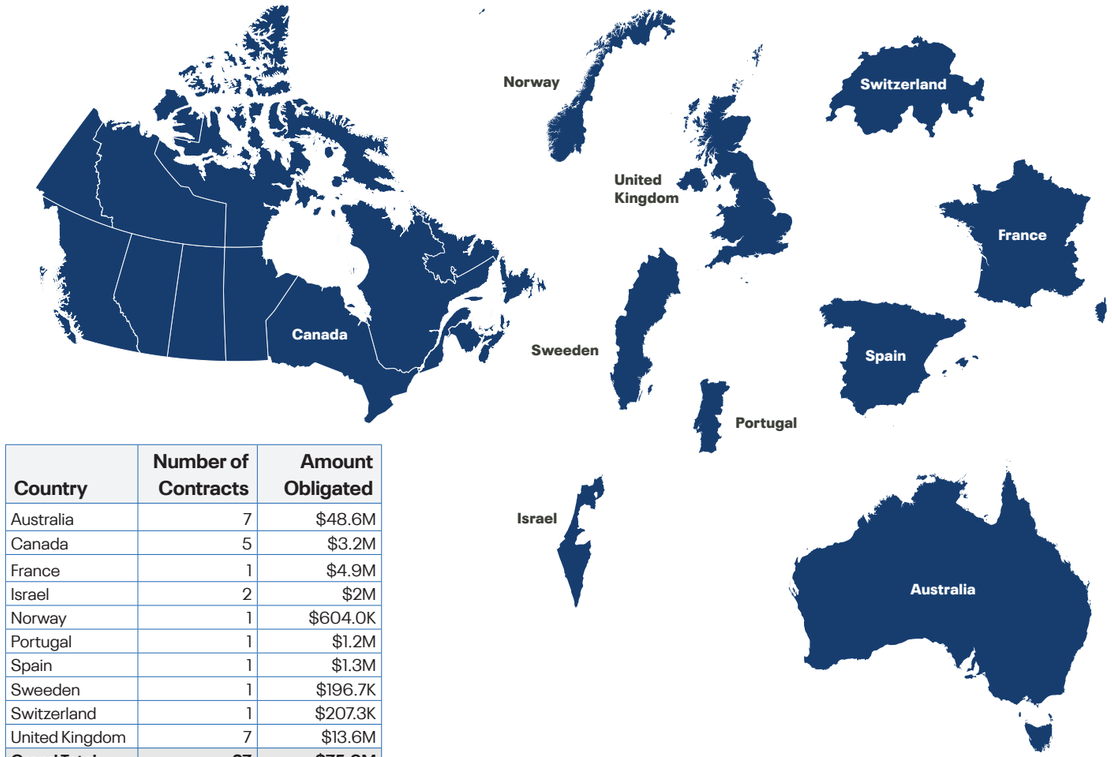
Energy
51 Awards
$200.0M

Human Systems
69 Awards
$320.3M

Space
72 Awards
$440.1M

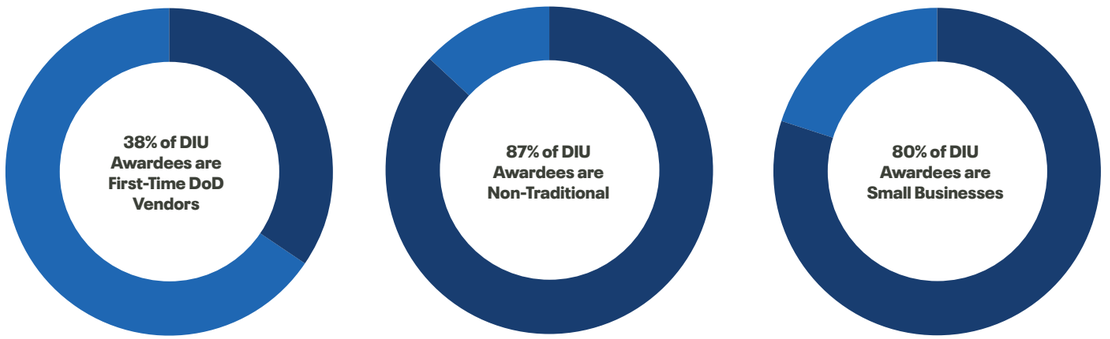
GRAND TOTAL OF
450 AWARDS AT $1.7B

International Prototype Awards (FY 2016 – FY 2022)



Country	Number of Contracts	Amount Obligated
Australia	7	$48.6M
Canada	5	$3.2M
France	1	$4.9M
Israel	2	$2M
Norway	1	$604.0K
Portugal	1	$1.2M
Spain	1	$1.3M
Sweeden	1	$196.7K
Switzerland	1	$207.3K
United Kingdom	7	$13.6M
Grand Total	**27**	**$75.9M**

Contract Award Recipients by Business Type



DIU's engagement with first-time DoD contractors as well as small and nontraditional businesses shows steady growth year over year. This trend aligns with DIU's ongoing efforts to establish itself as a primary entry point into the DoD. Notably, DIU is actively conveying demand signals from CCMDs, underscoring its role in facilitating connections between innovative businesses and the DoD's operational needs.

FY 2023 SELECT TRANSITIONED PROJECTS

DIU recognizes that companies and investors view production contracts as a critical indicator of whether DoD is serious about modernizing with commercial technology and whether there will be recurring revenue from the Department. This is why DIU closely tracks transitions from prototypes to fielded capabilities through follow-on, multi-year contracts, such as Production OTs, Indefinite Delivery/Indefinite Quantity (IDIQs), Blanket Purchase Agreements, and listings on the General Services Administration (GSA) schedule. In FY 2023, a total of 10 technology solutions transitioned to a DoD end-user, raising our cumulative transition rate from 47% at the end of FY 2022 to 51%. At the request of one of our mission partners, we are only able to include nine out of the ten narratives in this report.

Artificial Intelligence & Machine Learning

AIR LOGISTICS OPTIMIZATION (ALO): DoD currently uses a manual process to plan and schedule logistical movements across the globe in all domains. Factors such as vehicle capabilities, personnel, cargo priorities, maintenance constraints, and weather are weighed manually to meet mission taskings, creating scheduling challenges. To optimize energy use across aircraft, the C3 AI ALO application uses information such as sensor and mission data to create prediction models that help DoD leaders establish more efficient flight protocols, lowering fuel consumption without compromising combat capability. The application has increased the accuracy and reliability of fuel consumption predictions, which can reduce the impact of fuel emissions on the climate by enabling more efficient fuel use.

Vendor: C3 AI
Transition Date: May 23, 2023
Prototype Award Value[7]**:** $1.34M
Transition Agreement: Production OT (via Missile Defense Agency) with ceiling of $2.5M
Transition Partner: U.S. Air Force

BLUE UNMANNED AERIAL SYSTEMS 2.0: Access to secure, trusted, and reliable small unmanned aerial systems (sUASs) is essential to national defense. The majority of affordable and capable commercial drones are manufactured overseas while Section 848 of the FY 2020 National Defense Authorization Act (NDAA) prohibits the use of parts produced in covered countries. The Spirit by Ascent Aerosystems is a compact, all-weather, coaxial sUAS. It is modular, allowing for various battery and sensory configurations, with an open-source software stack and includes custom payload integrations. The Spirit can be used for ISR, precision delivery, communications relay, and target identification.

Vendor: Ascent Aero Systems
Transition Date: March 27, 2023
Prototype Award Value: $84K
Transition Agreement: GSA Schedule
Transition Partner: Multiple Services

Autonomy

[7] This refers to the current amount of money obligated from the time of the initial prototype award through Sept 30, 2023.

Autonomy

BLUE UNMANNED AERIAL SYSTEMS 2.0: Access to secure, trusted, and reliable sUAS is essential to national defense. The majority of affordable and capable commercial drones are manufactured overseas while Section 848 of the FY 2020 NDAA prohibits the use of parts produced in covered countries. The Freefly Systems Alta X was originally created for professional filming and can be used for ISR. It is a versatile multi-rotor aircraft designed around open architecture, endurance, and payload capacity. It can be folded to half its deployed size for easy transportation by a single operator.

Vendor: Freefly Alta X
Transition Date: March 21, 2023
Prototype Award Value: $89K
Transition Agreement: GSA Schedule
Transition Partner: Multiple Services

COLLABORATIVE TACTICAL AUTONOMY FOR NETWORKED AIRCRAFT: Existing standoff weapons fly pre-planned routes but encounter highly dynamic environments, leaving them vulnerable to sophisticated air defense systems. To improve the efficacy and survivability of our long-range weapons, a minimum level of autonomy must be incorporated into their design. This solution provides collaborative mission autonomy algorithms, or agents, that command large numbers of long range air vehicles (weapons, sensors, etc.) in order to penetrate contested airspace in a survivable and effective manner, reacting in real-time to changes in the environment or losses in forces.

Autonomy

Vendor: EpiSys Science, Inc
Transition Date: June 15, 2023
Prototype Award Value: $1.166M
Transition Agreement: Production OT with ceiling of $1.9M
Transition Partner: U.S. Air Force Life Cycle Management Center (AFLCMC) Disruptive Futures Division (EBZ)

"For SpyCloud, DIU made the complex task of connecting with federal entities like USCYBERCOM remarkably easy. Through our partnership, we had the opportunity to prove that our unique collection of darknet intelligence data gives U.S. cyber forces an irrefutable cyber advantage."

— Ted Ross, CEO, SpyCloud

CYBER THREAT TELEMETRY: The DoD lacks insight into the commercial threat intelligence databases that enable real-time analysis and decision-making by cyber operators. As part of an ongoing series of projects that started with Cyber Threat Intelligence in 2017, this project expands on existing USCYBERCOM efforts to maintain situational awareness of threat activity with a solution that would augment threat intelligence feeds with non-traditional and non-IT-based cyber data sets. SpyCloud is one of four vendors that successfully demonstrated integration of their platform into military cyber operations and into the U.S. government communities of interest. The capability is easily scalable to other government teams within the cyber operations communities due to the lightweight nature of the software delivery mechanisms and the training and engineering loads required to operate the toolset. The other two prototype participants are on track to transition within the next fiscal year.

Cyber & Telecommunications

Vendor: SpyCloud
Transition Date: March 31, 2023
Prototype Award Value: $775K
Transition Agreement: Five- year Production OT with ceiling of $9M
Transition Partner: U.S. Cyber Command (USCYBERCOM) / J9

Cyber & Telecommunications

CYBER THREAT TELEMETRY: The DoD lacks insight into the commercial threat intelligence databases that enable real-time analysis and decision-making by cyber operators. As part of an ongoing series of projects that started with Cyber Threat Intelligence in 2017, this project expands on existing USCYBERCOM efforts to monitor threat activity with a solution that would augment threat intelligence feeds with non-traditional and non-IT-based cyber data sets. CA Services is one of four vendors that successfully demonstrated integration of their platform into military cyber operations and into the U.S. government's communities of interest. The capability is easily scalable to other government teams within the cyber operations communities due to the lightweight nature of the software delivery mechanisms and the training and engineering loads required to operate the toolset. The other two prototype participants are on track to transition within the next fiscal year.

Vendor: CA Services
Transition Date: April 12, 2023
Prototype Award Value: $780K
Transition Agreement: Five-year Production OT with ceiling of $20M
Transition Partner: USCYBERCOM / J9

NATIONAL CAPITAL REGION — INTEGRATED AIR DEFENSE SYSTEM (NCR-IADS): The NCR's security is, in part, protected by an air defense system that monitors aircraft through a network of visual and infrared cameras. These cameras are at the end of their service life and are becoming increasingly difficult to sustain. In just 18 months, Teleidoscope provided an AI-based visual recognition and identification system to replace the current systems. These new systems provide a greater than 10x increase in capability compared to the existing systems. The timeline for fielding the improved camera system was accelerated by several years by a $16.77M funding award via the Accelerate the Procurement and Fielding of Innovative Technologies (APFIT) Fund in May 2023.

Vendor: Teleidoscope
Transition Date: May 29, 2023
Prototype Award Value: $1.6M
Transition Agreement: Production OT with ceiling of $100M
Transition Partners: Air Force Materiel Command, AFLCMC, NCR-IADS Program

Artificial Intelligence & Machine Learning

Autonomy

SMALL-CLASS UNMANNED UNDERWATER VEHICLE (SCUUV): The U.S. Navy's mine countermeasure (MCM) fleet is rapidly approaching the end of its service life, and the Navy is seeking to leverage autonomy with new sensors and modularity that allow for continuous improvements. Huntington Ingall Industries prototyped and delivered small form-factor unmanned undersea vehicles with open architecture and modularity principles for subsystems. The HII REMUS 300 will replace the MK 18 Mod 1.

Vendor: Huntington Ingalls Industries
Transition Date: Sept. 28, 2023
Prototype Award Value: $10.7M
Transition Agreement: FAR-Based with ceiling of $347.8M
Transition Partners: U.S. Navy, U.S. Marine Corps, Naval Special Warfare Command

ADVANCED TACTICAL COMMUNICATIONS (ATC): The DoD lacks access to small, lightweight, multi-band Software Defined Radio (SDR) solutions for the warfighter at the edge. This solution provides digital cloud connectivity through multi-band communications that is end-user device (EUD)-agnostic, easy to use, affordable, and fully integrated into DoD and other government cloud network ecosystems.

Vendor: Somewear Labs
Transition Date: Oct. 29, 2022
Prototype Award Value: $3.1M
Transition Agreement: Production OT with a ceiling of $1M
Transition Partners: SOCOM

Space

FEATURED PORTFOLIO PROJECTS

As a joint organization, DIU works with defense partners across the Services and Combatant Commands — and sometimes with civilian and intelligence agencies — to identify and scope projects that could have the largest potential impact on national security. The following section contains a selection of projects across our six technology portfolios that we believe will have an outsized impact and scale across the Department of Defense and the whole-of-government.

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Applying artificial intelligence (AI) and machine learning (ML) to accelerate critical decision-making and operational impact.

AUTOMATED ML FOR MINE COUNTERMEASURE (MCM) OPERATIONS (AMMO)

Deploying machine learning to monitor and improve critical ML algorithms.

The Navy relies on ML models to support mine detection by unmanned underwater vehicles (UUVs), but it lacks a way to monitor post-deployment performance and maintain the models' operational utility.

To resolve this issue, DIU is supporting the Navy in its efforts to develop a machine learning operations (MLOps) pipeline that will track post-deployment performance of existing mine countermeasure (MCM) ML algorithms. In May 2022, DIU began the commercial solutions opening (CSO) process to identify vendors that could deliver MLOps tools to support the continuous retraining, deployment, and updating of the Navy's existing ML models, as well as monitor the models' responses to changes in their operational environments. Ideal MLOps prototypes would be able to, among other capabilities, manage data provenance and quality, automate dataset preparation activities (i.e., data cleaning), track experiments and model versions, and provide a searchable model catalog.

DIU and the Navy, in conjunction with mission partners, selected five companies. The five vendors are currently on track to complete their prototypes in FY 2024. Once stress-tested and deployed, the prototypes will play a critical role in ensuring the continued viability of the Navy's existing ML algorithms.

NATIONAL CAPITAL REGION — INTEGRATED AIR DEFENSE SYSTEM (NCR-IADS)

Improving the security of the National Capital Region with the power of AI.

The security of the National Capital Region (NCR) is critical for DoD and the U.S. government broadly. The NCR's security is, in part, protected by an integrated air defense system that monitors aircraft through a network of visual and infrared cameras. Prior to FY 2023, the cameras were growing increasingly out-of-date and becoming increasingly difficult to sustain.

To combat this problem, DIU aided the U.S. Air Force in identifying possible vendors that could provide a long-range, multi-spectrum, AI-powered camera system for surveillance, identification, and warning. Successful prototypes would be capable of tracking and identifying objects in real time at distances of 30 nautical miles or more and would possess additional functionalities, such as object recognition, image enhancement, and a visual warning system for errant aircraft.

After an 18-month prototype period that concluded in April 2023, Teleidoscope, a first-time, non-traditional DoD vendor, received a $100M ceiling production contract from the Air Force to deliver their improved, AI-enabled camera system. A month later, Teleidoscope was also awarded $16.77M in funding via the Accelerate the Procurement and Fielding of Innovative Technologies (APFIT) Program. Teleidoscope's new systems will greatly improve air defense operators' ability to detect, identify, and track aircraft in the NCR.

The speed of DIU's prototype process, as well as Teleidoscope's receipt of APFIT funding, will allow the Program Executive Office for Digital (PEO Digital) to procure and field the majority of the updated cameras and associated AI/ML systems in FY 2023 and FY 2024.

"Our analysts have to spend time sorting through images to find the ones that cover the areas most affected by natural disasters. They then have to correlate those images to surrounding infrastructure, label all the relevant features, and only then can [they] highlight the significant damage and send it forward to first responder teams. Using AI/ML to do the routine tasks of georectification, identification, and labeling will greatly speed up how quickly we can get important information to the folks that need it most."

— COL Brian McGarry, Chief, Operations, Plans, and Training Division of the National Guard Bureau

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Aerial image of the Great Vermont Flood in July 2023. (Source: National Guard Bureau)

"The partnership between our NCR Integrated Air Defense System (NCR-IADS) and DIU has not only been exciting but essential to our success. The leadership and support from DIU's top-notch acquisition professionals has been instrumental in the prototyping effort for the camera and visual warning system. And ... we're looking forward to the next stage advancing past prototyping to production of the new systems with Teleidoscope."

— Lt. Col. Kurtis Engelson, US Air Force and the materiel lead for Battle Control Systems

AI FOR AERIAL IMAGERY

Improving the speed and effectiveness of disaster relief.

The National Guard Bureau (NGB) relies on a Shared Situational Awareness (SSA) platform to respond to humanitarian crises. However, the current platform lacks the ability to process, assess, and utilize large volumes of complex electro-optical aerial images. This presents a particular challenge for disaster response efforts, which generally require detailed, up-to-date composite images of critical infrastructure to effectively deploy response teams.

To improve the NGB's access to near-real-time imagery for use in disaster response, DIU in partnership with NGB issued a solicitation calling for software prototypes that could process, assess, and disseminate unclassified electro-optical aerial images of varying nadirs. The preferred solution would use AI and ML algorithms to process image batches of up to 3,000 images faster and with less processing power than the previous system. The solution would also be able to detect and label key infrastructure, such as cell towers, retaining walls, nuclear reactors, and wastewater sites.

DIU and NGB issued prototype awards to two companies in FY 2022. Work for these efforts began in FY 2023. Both prototypes are expected to significantly expedite and improve the NGB's humanitarian assistance and disaster response efforts upon completion in FY 2024.

AUTONOMY

Accelerating the adoption and scaling of trusted commercial autonomy and improving our ability to counter adversarial systems.

COLLABORATIVE TACTICAL AUTONOMY FOR NETWORKED AIRCRAFT

Transforming chaos into choreography using collaborative AI.

Advancing innovative weapons systems and concepts through experimentation is the driving force behind the Air Force's Golden Horde program, an initiative that concentrates on the development of tactical networked armaments. DIU has supported the Air Force Research Laboratory's (AFRL) Golden Horde initiative since 2020 and continues to play a crucial role in advancing the Air Force's strategic objectives in collaborative autonomy.

In 2021, DIU selected six vendors to prototype AI algorithms that could be used within a live, virtual setting known as the Golden Horde Colosseum. These six vendors were tasked with demonstrating survivability and target destruction rates in combat scenarios with evolving complexity. During this 12-month prototype, four Colosseum events were held, with EpiSci emerging as the best-in-class commercial solution for collaborative AI in networked weapons. EpiSci's performance in the Colosseum led to a post-prototype contract with the AFRL to continue to refine the AI and ML algorithms for eventual fielding.

DIU's participation in Golden Horde demonstrates harnessing recent technological developments for strategic advantage. With EpiSci's Tactical AI and broader networked weapon systems development, DIU is not only strengthening the Air Force's resilience in contested environments, but also enhancing its combat capabilities.

AUTONOMOUS SYSTEMS FOR MARITIME OPERATIONS

Navigating waters together for autonomously delivered national security and warfighter safety.

Within the dynamic realm of maritime operations, DIU has emerged as a catalyst for innovation, working with key partners to advance widespread implementation of state-of-the-art autonomous maritime systems. In particular, the DoD has identified two distinct platforms: Saildrone, which enables persistent maritime ISR, and Huntington Ingalls Industries' (HII) REMUS 300, which the U.S Navy selected to support the U.S. Marine Corps (USMC), Naval Special Warfare (NSW), and the Navy Explosive Ordnance Disposal (EOD) community in mine countermeasure operations (MCM).

Saildrone continues to field its technology for multiple defense partners. Last year, GSA listed all three of Saildrone's models to facilitate broad government agency access. In 2023, the company booked more than $20M in orders through a DIU Production OT agreement and conducted missions for Customs and Border Protection (CBP), the U.S. Coast Guard (USCG), and the U.S. Navy's 4th Fleet in their Caribbean-based operation WINDWARD STACK.

The small class UUV (SCUUV) program is a valuable complement to the achievements of Saildrone. In FY 2023, after a successful DIU prototype, the U.S. Navy selected HII for a FAR-based production award with an overall ceiling of approximately $350M, marking one of the largest facilitated contracts since the organization's inception. HII's REMUS 300 carries enormous potential to protect explosive ordnance disposal operators and safeguard crucial shipping lanes through advanced UUV capabilities that can detect danger beneath the waves. The ability for long-duration UUVs to scout and detect mines has become increasingly critical, as the war in Ukraine has demonstrated. The first delivery of REMUS 300 to the Navy's PMS-408 Expeditionary Missions is expected to occur in September 2024, with additional deliveries anticipated through 2028.

GROUND VEHICLE AUTONOMOUS PATHWAYS

Driving progress: Autonomous solutions for the Army.

Over the past few years, the commercial sector has benefited from substantial technological breakthroughs in the robotics and self-driving vehicle sectors. If modified and integrated into military operations, these same autonomous technologies could significantly reduce risk for service members in combat. The U.S. Army partnered with DIU to launch the Ground Vehicle Autonomous Pathways (GVAP) project. This efforts is focused on prototyping software to enable the autonomous and teleoperated navigation of uncrewed ground vehicles (UGVs). The project will also provide a technical pipeline to continue the rapid development and deployment of autonomous features as they become commercially available.

A panel of DoD subject matter experts facilitated a rigorous and competitive down-select process, resulting in the selection of five vendors for this effort: Applied Intuition Inc., Kodiak Robotics, Neya Systems, Robotic Research Autonomous Industries, and Scale AI.

"The DIU CSO process brought new vendors, with significant development and testing experience, to raise the floor on autonomy in the DoD ... The commercial sector has invested heavily in this technology, and we are excited to see this in action by leveraging the self-driving technology that is working on American highways today."

— Product Manager, Robotic Combat Vehicle

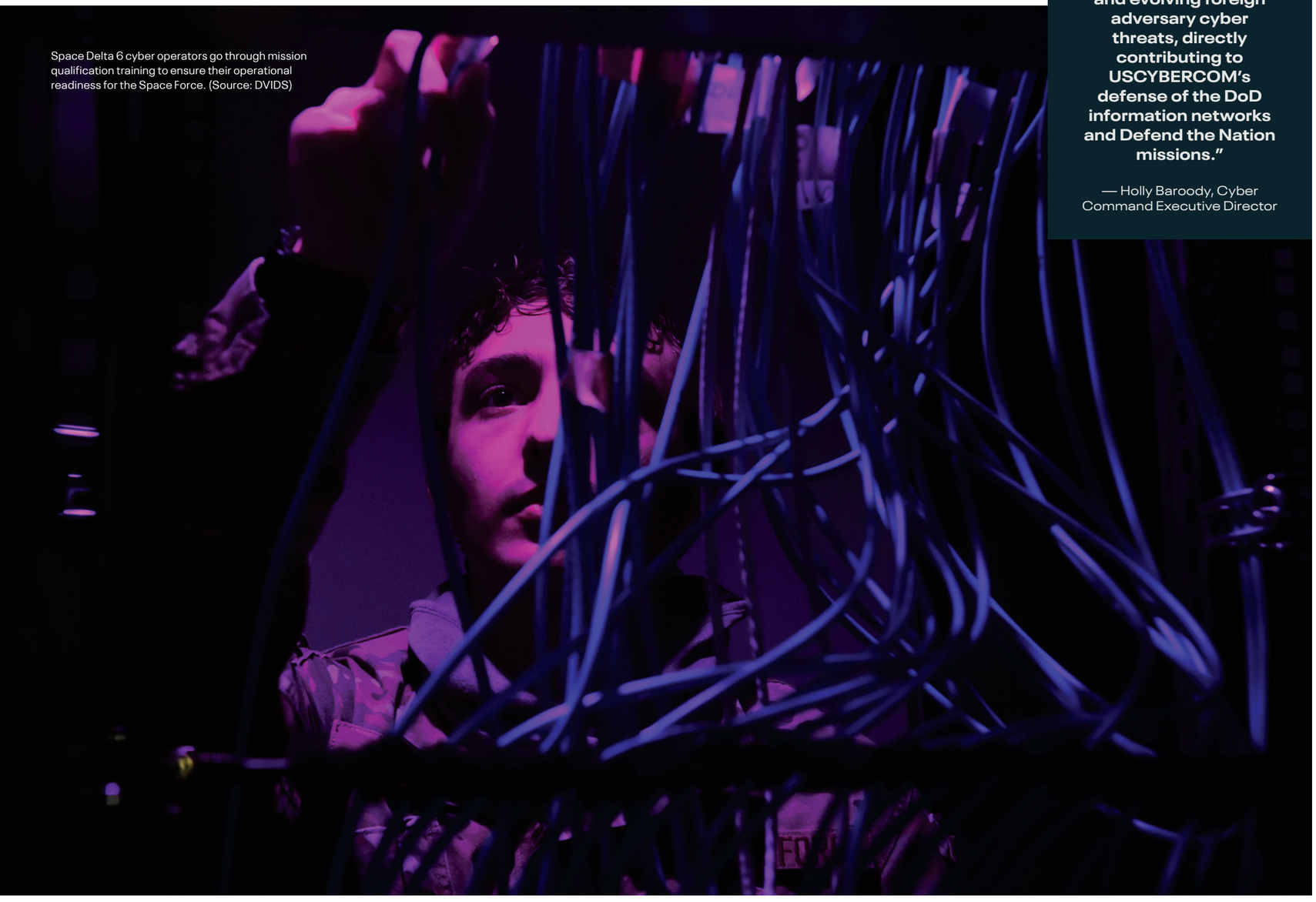
"The DIU small UUV program is a great example of how government and industry working together can accelerate the adoption of commercial technology and put relevant capabilities into the hands of the warfighters at speed and scale. The entire process was innovative, with a competitive evaluation that was unique."

— Duane Fortheringham, President of Unmanned Systems Missions Technologies, HII

Test event for the Huntington Ingalls Industries (HII) REMUS 300 near Buzzards Bay, Massachusetts. (Source: PMS-408 Expeditionary Missions)

CYBER & TELECOM

Securing and protecting the DoD's computer networks, warfighting systems, critical infrastructure, and information from attacks to enable communications and enhance situational awareness.



Space Delta 6 cyber operators go through mission qualification training to ensure their operational readiness for the Space Force. (Source: DVIDS)

"The innovative industry solutions that DIU brings to the table are a game changer. DIU has substantively advanced USCYBERCOM's ability to generate insights and respond to sophisticated and evolving foreign adversary cyber threats, directly contributing to USCYBERCOM's defense of the DoD information networks and Defend the Nation missions."

— Holly Baroody, Cyber Command Executive Director

AN EVOLVING RELATIONSHIP WITH USCYBERCOM AND NSA

Delivering concrete solutions to cyber forces since 2017.

Since its inception, DIU's Cyber and Telecommunications Portfolio has been well-positioned to support USCYBERCOM's three-fold mission of defending the DoD information networks, providing support to combatant commanders for execution of their missions around the world, and strengthening our nation's ability to withstand and respond to cyber attacks. Since 2017, DIU has partnered with USCYBERCOM on a range of projects and has provided solutions that have focused on commercial threat intelligence, data, and telemetry; hunt forward operations; deception technologies; mobile endpoint security; vulnerability analysis and remediation; and asset inventories/post-patch testing. In total, DIU and USCYBERCOM have transitioned eight projects with 13 solutions making up a total contract value of $448M.

AEROSPACE GROUND EQUIPMENT (AGE) 5G ASSET TRACKING

Easily tracking aerospace ground equipment around the world.

Tracking AGE on U.S. military flight lines is a significant challenge for technicians. On any given military base, there are hundreds of AGE assets that vary in size, shape, and function, ranging from hydraulic test stands and diesel generators to jacks, maintenance stands, and nitrogen carts. Current methods for tracking these AGE assets involve manually recording their locations on paper. This process, which occurs an estimated 12-15 times per day, per item, is inefficient and time consuming, especially since assets are often moved without notice.

In September 2022, DIU partnered with the Naval Information Warfare Center (NIWC) Pacific, and the U.S. Air Force Materiel Command (AFMC) on a project seeking compact, low-maintenance asset tracker devices that combined

"As a direct result of the AGE experiment at JBPHH, the time to find a particular AGE asset has gone from hours to minutes. The off-the-shelf GPS trackers provided a rapid, low cost, long battery-life solution that significantly increased situational awareness, the AGE team can now see all AGE assets with a glance at the tracking dashboard. The DIU team provided invaluable support through the source selection and contracting process. The thoroughness with which each vendor was screened paired with DIU's CSO process ensured the success of the AGE experiment, which resulted in transition of the AGE tracking capability."

— Monica Umeda, NIWC Pacific

Web3 for data security is a specialized and rapidly evolving field. In less than 90 days, DIU put forward a clear problem statement, rigorously and swiftly vetted the capabilities and practical experience of 50+ highly qualified applicants, and helped VIA and the Navy finalize a contract together. Now, VIA and the Navy have a strong partnership bringing next generation zero-trust multi-level security and data federation to SIPR 2.0 and other programs essential to maintaining advantage over peer adversaries. Thank you, DIU!

— Joe Babiec, Chief Commercial Officer, VIA

low-power multiprotocol sensors and computer vision. By leveraging asset tracking devices, operators receive AGE location data in real-time with a user-friendly graphical interface.

DIU selected three companies to deliver a more automated solution: LX Group (an Australia -based company), Kudelski, and VOS Systems.

The companies are now prototyping devices at Hickam Air Force Base in Hawaii and Whidbey Island's Naval Air Station. It is one of four current 5G projects and one of two funded by the DoD Chief Information Office's 5G team.

MULTI-LEVEL SECURITY AND DATA FEDERATION THROUGH BLOCKCHAIN

Integrating a fully distributed, trustless data model.

Military service members need timely, trusted, and resilient access to both classified and unclassified information to perform their mission in contested, denied, or degraded environments. Current operational military networks are fragmented, which reduces data sharing efficiency and increases the potential for inadvertent (or malicious) misuse.
In an effort to shift away from this network-centric paradigm to a more data-centric one, DIU and NIWC issued a commercial solicitation in Fall 2022 for a fully distributed, trustless data execution model leveraging blockchain.

DIU selected VIA, a Boston-based company, for its customizable and fast-responding platform.
By leveraging common components within the VIA Science solution, the DoD has successfully prototyped:

- *Secure, auditable, and multiparty computation for the secure sharing of data sets;*
- *Resilient and auditable chain of custody for digital assets through fingerprinting and advanced hashing techniques;*
- *Enhanced workflows with artificial intelligence and blockchain technologies to more securely and efficiently share sensitive information; and*
- *Data analysis and visualization, which allows the use of local large language models without directly sharing data or additional non-local transformation or processing.*

The technology solution leverages AI, blockchain, cryptography, and decentralized storage to enable real-time data verification, automated ingestion, and privacy controls, laying the groundwork for the next generation of DoD's SIPRNet.

In collaboration with mission partners, the Navy and Marine Corps are working on phased integration with long-term zero trust initiatives throughout the DoD ecosystem. Early deployments for other DoD clients have already demonstrated the feasibility of utilizing this modern agile approach while maintaining essential security controls as part of a continuous integration into DevSecOps pipelines.

"Our partnership with DIU has shown us how disruptive dual use tech, plus rapid execution, can change the way PEOs compete, evaluate, deliver, transition, and operate. The speed and outcomes provided a new standard for how we move the needle for our warfighters, not to mention that they saved us 25% off top line cost."

— Justin Fanelli, Acting Chief Technology Officer, U.S. Department of the Navy

Dr. Stafford Sheehan, Air Company CTO, operating a fuel distillation system at the company's demonstration plant. (Source: Air Company)

ENERGY

Strengthening military installation resilience and enhancing operational energy capabilities to ensure national security.

SYNTHETIC FUELS FOR CONTESTED ENVIRONMENTS (SynCE)

Revolutionizing military energy resilience.

DoD expends significant time and resources managing worldwide aircraft, ground, and combat services fuel logistics. This involves a combination of ships, tanker planes, and convoys. Not only are these supply networks

time and cost-intensive, they are also vulnerable in both non-contested and contested environments. During Operation Enduring Freedom/Operation Iraqi Freedom one civilian or military member was killed for every twenty-four ground fuel convoys. Recent activity in the Red Sea also exemplifies the vulnerability of global supply lines. In a near-peer conflict, these supply lines would be even more at risk. In addition to the human and material cost of doing business as usual, the DoD recognizes the geopolitical threat of climate change, and is dedicated to reducing emissions and taking bold steps to accelerate adaptation to reduce the adverse impacts of climate change.

Leveraging new and expanding commercial synthetic 100% chemically-similar, drop-in fuels technology (to include jet, JP5/8, and diesel) has the potential to shift DoD's fuel resupply paradigm in favor of synthetic fuel production at or near the point of need. Small-scale, highly-mobile, and rapidly-deployable synthetic fuel production systems would decouple fuel from a constrained logistics environment and deter adversary targeting while also providing decarbonization pathways for the future joint forces. This same technology can be scaled up for installation-use both CONUS and OCONUS.

To reduce these logistical challenges, save lives, provide energy independence in future conflicts, and meet the Military Services' climate action goals, DIU has partnered with the US Air Force, US Army Office Chief of Engineers, the Operational Energy Capability Improvement Fund (OECIF), and Department of Energy, — awarding a contract with a $65M ceiling to Air Company. NORTHCOM, SOUTHCOM, TRANSCOM, AFRL, and CENTCOM have all come aboard as partners as well with several demonstrations in the works. SynCE is part of the US Army's FIERCE Energy Hub.

The technology creates fuel from the atmosphere's most abundant pollutant, carbon dioxide (CO_2). Air Company's system mimics photosynthesis to convert CO_2 from sustainable feedstocks (CO_2 and water) into synthetic fuels that are carbon-neutral or negative depending on its production. The system is electricity-source agnostic and can be paired with the existing grid, batteries, or small modular reactors (SMR). Synthetic fuel production has been around for nearly 100 years, however Air Company (vendor for SynCE) found a way to reduce the number of steps, resulting in a 90% efficiency gain, making synthetic fuel feasible for the first time from both the economic and energy-efficiency standpoints.

SynCE's fuel is currently in the beginning stages of fuel certification and is 12 months ahead of schedule. It has been demonstrated in air, land, and sea vehicles and initial reports indicate that it may burn cleaner than traditional fuels, thus reducing maintenance costs.

Project SynCE represents a bold step towards a more secure and sustainable energy future for the DoD. This initiative promises to reduce logistical challenges, enhance mission flexibility, save lives, and significantly reduce greenhouse gas emissions by leveraging synthetic fuels across the spectrum of military operations in any clime and place.

STABLE TACTICAL EXPEDITIONARY ELECTRIC POWER (STEEP) PROGRAM

Revolutionizing energy management for the military.

The DoD requires reliable and efficient power solutions, especially in remote environments where logistical challenges abound. Recognizing this, DIU partnered with the Marine Corps Systems Command to launch the STEEP program. The primary objective of the STEEP program is to develop systems that can be transported by vehicles. The system will have embedded control functionality that improves grid stability and reliability while providing the ability to conduct silent watch operations and peak load shaving.

To carry out this prototype effort, DIU and the Marine Corps awarded contracts to Cummins Power Generation Inc. and GM Defense, LLC. Full-scale operational testing for STEEP solutions will begin in FY 2024. This program can potentially revolutionize energy practices in austere and remote military operations, ensuring that the DoD can continue to operate effectively in the most challenging environments.

EXTENDED DURATION STORAGE FOR INSTALLATIONS (EDSI)

Delivering long duration storage solutions for U.S. military installations.

Decentralized energy resiliency empowers the DoD to sustain a wide range of operations — from humanitarian or natural disaster assistance to countering threats — at installations and in contested logistics environments. To enhance operational efficiency on both the grid and customer side, critical facilities are now being equipped with prototype advanced energy storage systems to fulfill energy-dense operations and installation energy with resilient power system backups.

The EDSI project will make resilient backup power systems a reality for DoD installations and operational energy platforms by increasing the minimum power threshold and uptime that batteries, bases and battlefield energy, and sourcing use can all stay online. Since battery systems can draw power during non-peak times for lower cost, the EDSI effort will help installations lower their power inputs and draws to isolate high power loads when general demand for

"This groundbreaking microgrid project at Stewart Air National Guard Base exemplifies the deployment of innovative technologies to deliver resilient, sustainable solutions at U.S. military installations. Together with Redflow, we're energized to witness how this 1.2 MWh microgrid will bolster base resilience and set new standards for clean energy advancement, inspiring a green and resilient future for DoD installations worldwide."

— Nicole Bulgarino, Executive Vice President, Ameresco

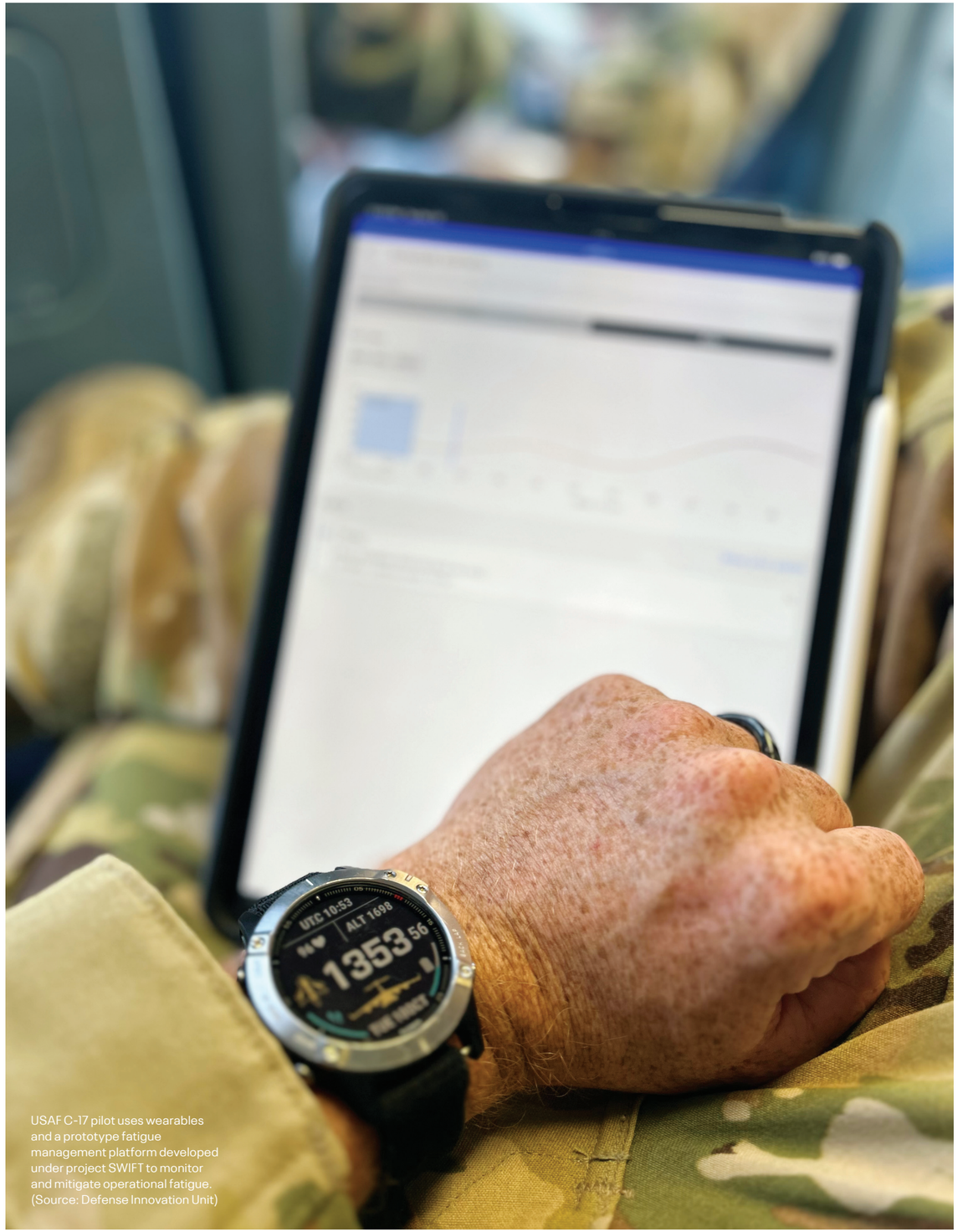
electricity is high in containers that can be stationary and mobile.

DIU, in partnership with the Air Force and the Navy, awarded three prototype contracts to CellCube, Inc., DD Dannar, LLC, and Redflow Limited.

The DoD's EDSI initiative aims to prototype energy storage systems capable of delivering between 50kW and 1MW for more than eight hours, with the potential for future scalability to 10MW or more. This endeavor is a critical step toward enhancing energy resilience and independence at over 450 military installations and associated necessary facilities, which rely heavily on grid connections.

By embracing cutting-edge technology and collaborating with commercial partners, the DoD is poised to enhance the resilience and reliability of energy sources at its critical installations, safeguarding national security interests in an increasingly complex and uncertain world.

Unveiling the future: The DD Dannar Mobile Power Station 375kW prototype, in collaboration with DIU Energy, NIWC PAC, Next Step, and OSD/Operational Energy Capability Improvement Fund, arrives on the Honolulu tarmac via commercial air cargo, en route for pioneering expeditionary trials with the 3rd Marine Littoral Unit at Kaneohe Bay. (Source: Pacific Air Cargo)



USAF C-17 pilot uses wearables and a prototype fatigue management platform developed under project SWIFT to monitor and mitigate operational fatigue. (Source: Defense Innovation Unit)

HUMAN SYSTEMS

Optimizing the human system and enabling platforms through enhanced equipment, innovative training, and novel health applications.

SMART WEARABLES FOR FATIGUE TRACKING (SWIFT)

Fatigue risk management for aircrew.

Cognitive fatigue is a major contributing factor to aircraft mishaps, costing the DoD an estimated $140M annually and putting aircrew and passenger lives at risk.[8] Current aviation operational risk management practices lack the quantitative precision to detect fatigue risk, relying on self-reported inputs from aircrew or generalized biomathematical models that ignore critical individual traits that determine fatigue risk. To address this, DIU and the AFRL launched the Smart Wearables in Fatigue Tracking (SWiFT) project in 2022 to prototype a cognitive fatigue decision aid with the company Pulsar Informatics.

Pulsar's fatigue risk management software builds from existing solutions deployed in the commercial aviation and trucking industries. Using data on sleep patterns, circadian phase, and cognitive alertness collected from wearable devices, the technology generates personalized scores and countermeasure recommendations. SWiFT is validating the findings across multiple USAF use-cases, starting with maximum endurance operations conducted by Air Mobility Command (AMC). To date, more than 200 aircrew have been onboarded with data collected during AMC's exercise Mobility Guardian 2023 in the IndoPacific, as well as worldwide tanker airlift control center missions.

As project prototyping advances, the AFRL and DIU teams will look to validate the fatigue risk management software in additional use-cases to include shift-work-heavy missions of remotely piloted aircraft aircrew and intensive "burst work" missions of fighter and attack pilots. The team also has plans to onboard new wearable devices with a bring-your-own-device platform applicable across diverse aviation missions.

VIRTUAL TRAINING FOR AIR DOMINANCE (VTRAD)

Next generation extended reality training solutions for the fighter pilot of the future.

Flight training can run as much as $50k per flight hour and often provides limited access to quality training tools. Legacy simulator solutions, while cheaper and less risky to operate, are still costly to build and maintain, resulting in limited contact time for students. Students still spend the majority of their training time in classrooms, or "chair flying" with insufficient access to quality training media. Current training pipelines also lack the ability to integrate with other weapon systems in a joint or distributed manner.

"Through DIU, Det 24 is rapidly developing extended reality training solutions for the future of fighter bomber pilot training. Leveraging the synthetic environment for part-task training and mission recreation will translate into training efficiencies. This effort broadens the spectrum of training devices available for fast-jet flying."

— Lt Col Steve Briones, Commander, Det 24, USAF

[8] Gaines AR, Morris MB, Gunzelmann G. Fatigue-Related Aviation Mishaps. Aerosp Med Hum Perform. 2020 May 1;91(5):440-447. doi: 10.3357/AMHP.5515.2020. PMID: 32327018. (https://pubmed.ncbi.nlm.nih.gov/32327018/, Table 2)

"Tactical units have little influence over procurement activities, even though they own the problems and work to find the solutions. Proving Grounds is a process to eliminate the barrier of access to commercial technology and innovation to the warfighter. The goal of Proving Grounds is to bridge this paradox of meeting government standards and shortening the chain from requirement validation to resource integration via business-to-business relationships."

— MSgt William Thompson, AFSOC

Modern advancements in extended reality (XR) and distributed computing capabilities allow for low-cost, high fidelity, immersive pilot training. After the success of the Pilot Training Transformation (PTT) program, DIU has again partnered with Air Education and Training Command (AETC), Vertex Solutions LLC, and Swedish vendor, Metrea Simulations, to deliver next generation XR training solutions for the fighter pilot of the future. The VTRAD project introduces a new category of training technology, the enhanced immersive training device (eITD), which builds on recent advancements in mixed reality and commercial gaming solutions. VTRAD is also prototyping a next-generation flight simulation engine that is capable of supporting the high-fidelity requirements of fast-jet training.

In addition to soon being used as the virtual training system for graduate-level fighter pilots at AETC, this solution is producing strategic-level impacts. With the help of DIU, 19AF/DET 24, and the Texas Air Guard (149th FS), Ukrainian fighter pilots who are training in the U.S. will have access to portable, lightweight, immersive F-16 training devices to enhance the U.S.-led training pipeline. This solution will not only support Ukrainians, but will also be used to increase the throughput of allied fighter training pipeline including the Republic of Singapore Air Force (RSAF) F-16 pilots, a key ally in USINDOPACOM.

PROVING GROUNDS

Rapid technology assessment and evaluation.

DoD remains encumbered by acquisition processes that are optimized for procuring major weapons systems through multi-year programs of record. In contrast, the private sector is able to evaluate and procure emerging technologies in a matter of days, weeks, or months in order to maintain highly competitive product development cycles. To leverage best practices found in the commercial sector, DIU is partnering with the Air Force Special Operations Command (AFSOC) on a project titled Proving Grounds to provide a rapid process of vetting and evaluating new technical solutions.

Proving Grounds provides key advantages that include an ability to perform competitive assessments of software products using real (non-synthetic) government data in accredited network environments as well as the ability to rapidly execute commercial leases and procure physical products. More generally, Proving Grounds provides a predictable process that allows for quick appraisal of commercial solutions under different operating conditions (physical, virtual, etc.); expedited scoping of contractual details like price and duration; and an ability to "try before you buy" on government networks under strict government security standards.

A panel of DoD subject matter experts competitively selected two vendors to support this initiative: Second Front Systems (2F) and Dark Wolf Solutions. Working with these companies, Proving Grounds has already been used to accredit a software system more than 75% faster than the traditional authority to operate process. Similarly, Proving Grounds was used to assess the technical and operational feasibility of a commercial communications architecture that could securely supplement traditional military communications systems.

SPACE

Accelerating transformative commercial technologies to broaden DoD's access to cutting-edge space capabilities, such as responsive launch; persistent sensing; dynamic space operations; in-space servicing & logistics; and low latency, resilient communications.

Tactically Responsive Space (TacRS)

Responding to on-orbit threats on relevant timelines

To address on-orbit threats to U.S. space systems with responsive end-to-end solutions, the U.S. Space Force is working with commercial providers to rapidly deliver both launch and on-orbit operations infrastructure. The Space Safari Program Office of the U.S. Space Force's Space Systems Command (SSC) partnered

As of publication of this report, DIU awarded a $32M contract to Rocket Lab for the design and manufacture a spacecraft to conduct rendezvous proximity operations. (Source: Rocket Lab)

"It is critical that we tap into and leverage commercially developed capabilities — ones that we can rapidly field to execute the VICTUS HAZE mission and then be able to count on for future TacRS operational needs. Our partnership with DIU provides the right ecosystem, expertise, and mission focus to execute the VICTUS HAZE mission and establish a robust partnership with commercial providers."

— Lt Col Jason Altenhofen, Director of Operations for the Space Safari Program Office

with DIU on the next TacRS mission, called VICTUS HAZE, to identify and build-out commercial capabilities to further enable the TacRS program. TacRS focuses on all aspects of the national security imperative to deliver on-orbit capabilities to the joint force with speed and agility.

As of publication of this report, DIU awarded a $32M contract to Rocket Lab for the design, manufacture, and operations of a spacecraft to conduct rendezvous proximity operations. (Source: Rocket Lab)

VICTUS HAZE follows on VICTUS NOX, a completed Space Safari TacRS mission that launched September 2023. VICTUS NOX demonstrated the DoD's ability to launch and establish on-orbit operations in days, rather than months or years. The VICTUS NOX mission informed the VICTUS HAZE goals, which focus on end-to-end execution using commercial capabilities. Space Safari is leveraging commercial solutions that are quickly modifiable and will further reduce timelines, normalize the TacRS Concept of Operations, and increase the range of orbits that can be reached on short notice.

The program includes the logistics, ground segment, launch service, on-orbit operations, and spacecraft bus; which is the main body and structural component of a satellite or spacecraft that holds the payload and all scientific instruments. DIU posted its CSO for TacRS in August of 2023.

Established in January 2021, Space Safari is an acquisition program office responsible for responding to high-priority, urgent space needs by rapidly acquiring, integrating, and executing missions supporting USSPACECOM requirements and other combatant commander needs. By working with DIU, Space Safari has expanded its reach by accessing the joint force's end users as well as DIU's network of commercial and industry partners.

HYBRID SPACE ARCHITECTURE (HSA)

A software-defined, multi-domain network providing secure, assured, low latency, multipath connectivity for the joint force, allies, and global partners.

Information superiority is a strategic enabler in deterring, defending, and dominating future conflict with peer competitors on a global scale. The ability to maintain an advantage in both situational awareness and timely decision-making is central to achieving a decisive victory and dissuading would-be aggressors from initiating engagements regardless of domain. Collecting, processing, and distributing information at the speed of strategic relevance is key to building and sustaining information superiority.

Legacy government space systems are extremely capable but are reliant on proprietary data architectures that are neither scalable nor easily integrated. However, commercial "new space" systems that leverage modern information architectures are based on open standards which improve speed, latency, security, and interoperability. Given the rapid scalability and agility of these commercial space systems, there is a growing demand on the part of warfighters to leverage them to improve access and resiliency across the tactical, operational, and strategic levels supporting joint and combined forces.

DIU's HSA combines commercial solutions from four key technology areas: source, data transport, cybersecurity and cloud. It integrates new technologies to assure data provenance, manages information across multiple security layers, and empowers end users with the ability to tailor their information needs based on trust as a quality of service metric. HSA

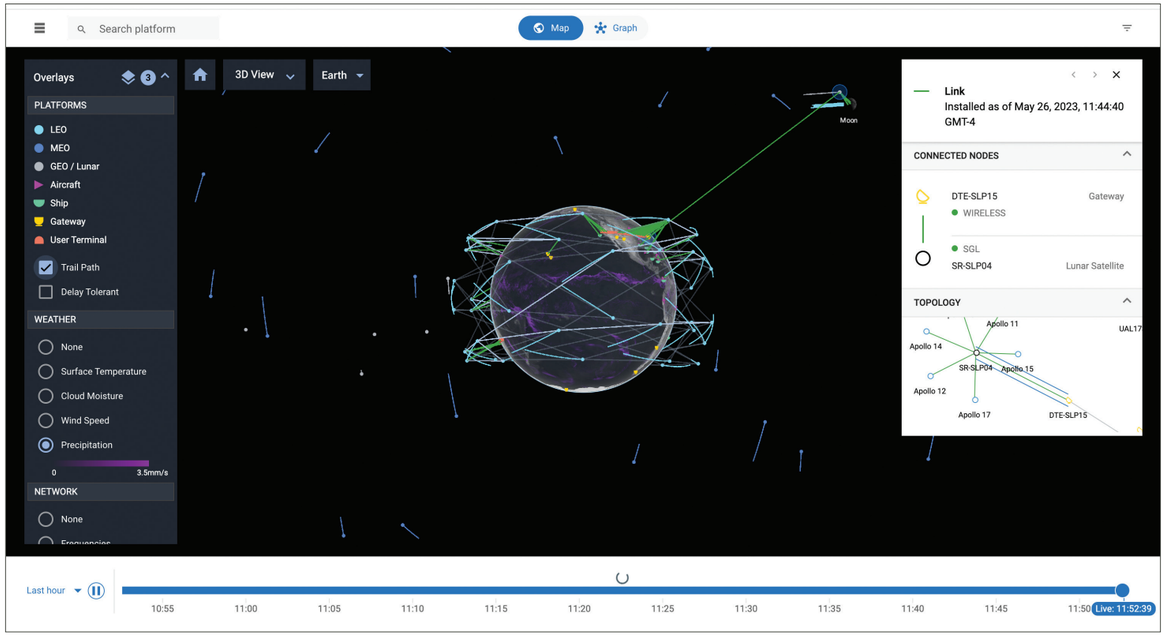


Illustration - Screen-capture form the Aalyria Technology Data Orchestration Interface Known As "Space Time"

"The Space Force is moving to this hybrid architecture. That is, you'll reside in multiple orbits. You get resiliency not only from hundreds and hundreds of satellites, but hundreds of satellites that are working in conjunction with dozens that are in different orbits. So now it's really difficult to actually take out the space layer."

— Derek Tournear, Director, Space Development Agency

uniquely enables a continuum of trust that can empower end users to make timely decisions based upon a variety of sources and acceptable risk.

Unlike terrestrial internet, the HSA is an open, scalable, multi-spectrum Internet of Things (IoT) environment that employs zero trust, blockchain, and emerging technologies such as homomorphic encryption to assure the security, trust, and data provenance across commercial, civil, military, and allied network architectures. HSA uses the Disruption/Delay Tolerant Networking (DTN) protocol that provides a "store & forward" capability not currently supported with Transmission Control Protocol/Internet Protocol (TCP/IP).

HSA is not limited to terrestrial military applications. It is extensible to the Moon, Mars, and beyond. For that reason, DIU is collaborating with NASA to support its LunaNet effort by providing communications for the Artemis Program that is returning American astronauts to the Moon, no earlier than 2025.

DIU performed its first demonstration of HSA to the Commander of Space Systems Command (USSF) in November of this year and is preparing to exercise HSA in support of USINDOPACOM during VALIANT SHIELD 2024.

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