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ON

OUTPACING CHINA:

EXPEDITING INNOVATION TO THE WARFIGHTER

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Introduction

Chairman Rogers, Ranking Member Smith, and distinguished members of the committee, thank you for the opportunity to testify before you regarding the Department of Defense's (DoD's) efforts to outpace the People's Republic of China (PRC) and expedite innovation to the warfighter. Together, Under Secretary for Acquisition and Sustainment (USD A&S) LaPlante, Under Secretary for Research and Engineering (USD R&E) Shyu, and I are committed to ensuring that the United States maintains our technological edge, thereby remaining the most advanced and formidable fighting force, and to working as a cohesive team to do so. I testify today having served as the Director of the Defense Innovation Unit (DIU) since May 2023. I look forward to discussing how we can move quickly to integrate and deploy unique and complementary disruptive technologies from commercial sources with the scale and speed necessary to deter competitors and ensure victory in potential conflicts in line with the priorities of the 2022 National Defense Strategy (NDS).

Innovation is a Strategic Imperative

Technological innovation, spurred by trillions of dollars of private investment and innovation in many technology domains critical to U.S. military power, is advancing at a much faster rate in the private sector than in the traditional defense sector.[1] Progress in 11 of the 14 critical technology areas, as identified by the USD R&E, is led by commercial sector advancement, that is identifying, testing, and refining these areas through relentless market-driven efforts driven by the insatiable demands of billions of consumers around the world and the enterprises that serve them.[2] Recent history demonstrates that new relevant technology areas such as phones and digital consumer

[1] United States Joint Chiefs of Staff. "Joint Doctrine Note 1-18, Strategy". GPO, 2018

[2] Under Secretary of Defense for Research and Engineering. *USD(R&E)* "Technology Vision for an Era of Competition". GPO, 2022

products are at least as likely to emerge from the commercial crucible as they are from academia, government laboratories, or traditional defense contractors environments.

Advanced dual-use technologies, propelled primarily by private sector innovation, are shaping the character of war, as software, open-source data sets, enhanced processing capabilities, and robotics become increasingly accessible across various domains. This proliferation of critical technologies, including those easily accessible by potential adversaries, poses both opportunities and challenges as it also extends capabilities once exclusive to nation-states to a broader spectrum of users. We are seeing these phenomena play out in Ukraine, in the persistent terrorist attacks by the Houthis on merchant vessels transiting the Red Sea and the Gulf of Aden, and in the recent terrorist attacks on U.S. forces in the Middle East.

As outlined in the NDS, the Department needs to leverage technological innovation alongside other national power resources in a cohesive, integrated approach to address the escalating multi-domain threat posed by the PRC. Building on the NDS, the Joint Concept for Competing underscores the need for the DoD to fully deploy economic, financial, regulatory, and other tools to ensure U.S. and allied advantage.

For the DoD to effectively implement the NDS and counter the pacing challenge of the PRC — while simultaneously addressing other threats facing the nation — it must leverage commercial technology with the focus, speed, and scale necessary to deter major conflict and win if forced to fight. Recognizing this imperative, Secretary Austin took decisive action by realigning DIU as a direct report in April 2023 and charging DIU with developing a comprehensive plan aimed at accessing and rapidly integrating the United States' and our allies' vibrant commercial technology sectors with our most critical capability needs. Section 913 of the Fiscal Year 2024 National Defense Authorization Act (FY24 NDAA) codified this realignment and establish the DIU Director as a Principal Staff Assistant (PSA) to the Secretary and "serve as the principal liaison between the Department of Defense and individuals and entities in the national security innovation base,

including, entrepreneurs, startups, commercial technology companies, and venture capital sources."

Expediting Innovation to the Warfighter: Navigating Multiple Valleys of Death

Former Secretary Ash Carter established DIU in 2015 to get after this challenge. In its initial phase, or "DIU 1.0," the primary focus was to build a bridge between the Department and the commercial technology sector. DIU 1.0's success was marked by the early recognition of the value of talent with "dual fluency" at the intersection of technology and national security. DIU 1.0 laid the foundation for new government-private sector collaboration, paving the way for subsequent progress across the Department. Today, we are far beyond the gulf of understanding that predated DIU's creation, although much more work is needed to reach the levels of partnership and shared impact that helped build Silicon Valley during World War II and the Cold War.

The second phase of DIU, "DIU 2.0," focused on demonstrating concretely that real military problems can be solved with commercially-derived capabilities, and that existing – but largely unused – authorities could be employed to deliver prototypes to the warfighter in weeks or months rather than years. During this phase, DIU pioneered the Commercial Solutions Opening (CSO) process to rapidly acquire, prototype and make available for production relevant commercial technologies. Those efforts resulted in the successful transition of 62 prototypes through FY23 into follow-on awards across the Department and Federal government, a cumulative transition rate of 51%.[3] These cumulative transitions amount to $5.5 billion in contract ceiling awards backed by more than $68 billion of private capital. DIU 2.0 also helped inspire a growing number of organizations within the Department geared toward amplifying and advancing techniques for harnessing commercial technology. The resulting ecosystem of innovation organizations has made substantial progress toward lowering barriers to entry and rapidly bringing commercial technology to the warfighter. This is enormous progress, but it is not sufficient to meet the imperative. **Today's**

[3] The cumulative period of performance covers June 2016-September 2023.

challenge is to employ the techniques and processes developed during DIU 2.0 to achieve the level of strategic impact the nation requires – and do so fast. This is the focus for DIU 3.0.

DIU's recent repositioning as a direct report to the Secretary, along with the DIU Director's designation as a PSA in the FY24 NDAA, enables two pivotal developments. First, it emphasizes the need to leverage commercial technologies to meet the PRC pacing challenge and other global threats. It aligns DIU's activities fundamentally about implementation of the NDS. Second, it elevates DIU's role as a central hub for integrating commercial tech, new partnerships and talent into the Defense ecosystem. Armed with its unique positioning and fluency in the high-technology ecosystem, DIU can work with partners across the Department to effectively push the boundaries of viable solutions from the rapidly-evolving commercial technology sector into the hands of the warfighter.

To effectuate these new responsibilities, DIU is working closely with the Combatant Commands, enabling DIU to gain invaluable insights into commanders' most critical strategic gaps, and facilitating the development of tailored solutions that leverage commercial technology to address their needs. For example, DIU supports the INDOPACOM Commander by embedding personnel in the new Joint Mission Accelerator Directorate (JMAD). Already, a DIU embed serves as the Deputy Director and Chief Technology Officer focusing on programs like the Joint Fires Network and Mission Partner Environment to rapidly integrate dual-use technology, including through DIU's CSO process. Separately, DIU has established a DIU "embed" as the Science and Technology Advisor and Innovative Technologies Lead for EUCOM's Security Assistance Group – Ukraine. We are moving as fast as resources allow to establish similar embeds at all critical nodes of warfighter demand.

DIU 3.0 serves as a catalyst for innovation across the Department, aiming to unify and mobilize its diverse innovation entities into a powerful and cohesive community of impact in support of the NDS. **Together, with other DoD innovation entities such as Army Applications**

Laboratory, AFWERX, NavalX, and the Marine Innovation Unit, collectively referred to as the Defense Innovation Community of Entities (DICE), DIU is helping catalyze this community's work in support of the Department's innovation efforts, identifying areas for enhancement, accelerating the best ideas, and providing a seamless way for non-traditional vendors to contribute to the mission at speed and scale. As an example, DIU is collaborating with the DICE to develop a common customer relationship management platform to enable greater collaboration and management of the Department's relationship with the commercial sector, and avoid the confusion some commercial tech companies have found is an impediment to effectively working with the Department.

More broadly, DIU 3.0 will dramatically deepen the partnership with the Department's true "engines of scale"—the services—as well as with the critical scaling partners in the Joint Staff and the Office of the Secretary of Defense. Partnerships with both Secretariat and uniformed service leadership, from the service acquisition executives across the Department to leaders in Army Futures Command, the Navy's Disruptive Capabilities Office, and the leaders shaping warfare capabilities for the Air and Space Force, will help DIU ensure that the demand is there to scale successful prototypes aligned with the services' operational imperatives—and that DIU does not work on anything where that agreement is not in place.

DIU also partners closely with R&E to address immediate threats with greater agility and expedite the delivery of new capabilities at scale through the Accelerate Procurement and Fielding of Innovative Technologies (APFIT) program as well as close collaboration on a broad range of critical projects. For example, DIU awarded a contract to a first-time DoD vendor in 2021 to upgrade the cameras and eye-safe lasers used for tracking and visually warning aircraft flying in and around the National Capital Region's controlled airspace. This solution successfully transitioned with a $12.5 million Other Transaction (OT) Production Contract (with a $100 million ceiling) for the Air Force's Program Executive Office Digital in early 2023. The timeline for deploying the

improved artificial intelligence-enabled camera systems was accelerated by several years due to a $16.8 million funding award via the APFIT program in May 2023. This funding was used for the initial procurement and installation of the first tranche of these improved systems. DIU is also working closely with R&E on INDOPACOM's Joint Fires Network, both through the JMAD and also through the application of DIU technologies and contracts to the space, cyber, and artificial intelligence solutions R&E is driving.

A&S is also a critical partner for DIU. For example, DIU and A&S Industrial Base Policy are closely partnering on the Defense Advanced Battery Supply Chain initiative to leverage the rapidly evolving commercial battery market for DoD applications. This effort is working to expedite the standardization, production, and integration of domestic commercial batteries within the DoD and addresses the challenge of encountering low-demand signals and intricate specifications, which hinders the DoD's partnerships with high-volume automotive battery suppliers. Additionally, A&S and DIU are collaborating to improve focus and accountability in scaling capabilities from prototype OT Authorities to production OTs, aligning Department practices with industry standards and balancing rapid scale with appropriate oversight.

In a final example of teamwork, DIU works closely with the Chief Digital and Artificial Intelligence Office (CDAO) on the Department's Artificial Intelligence policies as well as a broad range of critical programs. DIU is providing CDAO with greater access to the commercial industrial base and increased speed to onboard non-traditional vendors for critical CDAO-led efforts. These include the Combined Joint All-Domain Command and Control (CJADC2) campaign of learning as implemented in the Global Information Dominance Experiment (GIDE) series; the deployment of commercial machine learning software infrastructure needed to support large numbers of small, uncrewed systems across the joint force; and commercial delivery and integration to support programs under the JMAD at INDOPACOM. **By collaborating more closely with Department and Service leadership, we are leveraging the full breadth of tools and building pathways**

across the valleys of death to solve the Department's most pressing needs.

DIU as an Innovation Catalyst for the Department

Deputy Secretary of Defense Hicks established the Deputy's Innovation Steering Group (DISG), jointly chaired by the Deputy Secretary of Defense and the Vice Chairman of the Joint Chiefs of Staff, with participation from all Service Secretaries, Combatant Commanders, and senior Office of the Secretary of Defense and Joint Staff leaders. The DIU Director serves as a member of DISG and provides primary staff support, setting agendas for DISG, and chairing the supporting Defense Innovation Working Group (DIWG). Together, these offer the focused, senior-level attention required to break down systemic barriers and rapidly integrate the capabilities that can make the most immediate and strategic impact, making it easier to deliver these capabilities for the warfighter again and again.

One such initiative is Replicator, a Department-wide effort to expedite innovation adoption within the Department while enhancing adaptability and resiliency in warfighting strategy to bolster deterrence and maintain our military superiority. As Deputy Secretary Hicks stated during her remarks on September 6, 2023, the Replicator Initiative is a Department-wide effort, focusing initially on fielding thousands of all-domain attributable autonomous systems within 18 to 24 months to counter the People's Republic of China. Replicator not only seeks to enhance operational capabilities, but also to serve as a catalyst to accelerate the Department's ability to streamline bureaucratic processes for rapid procurement and acquisition, institutionalizing tech capabilities to help drive future innovation. Implementing Replicator is already identifying and knocking down innovation pain points as the Department hones its muscle memory in delivering strategic impact at speed and scale. Replicator is a perfect example of what we *must* do—leverage emerging technology to deliver operational capability now. The execution and implementation of Replicator are under the oversight of the DISG and DIWG, positioning DIU at the forefront to deliver future capabilities at

speed and scale. The Department has recently submitted a reprogramming request to enable us to move out on this important initiative.

Establishing On-Ramps for Talent and Commercial Technology to the Department

DIU is also working with partners across the Department, interagency, and State and Local governments to establish physical and digital on-ramps for commercial and nontraditional talent, vendors, and investors to enter the DoD. Within DIU, the National Security Innovation Network (NSIN), through sponsorship of talent programs with over 100 universities across 93 sponsored programs, has facilitated the participation of more than 1,400 university students to solve 524 DoD problems. Upwards of 40% of our program participants have gone on to pursue careers in national service, through employment with the DoD, other government agencies, or members of the private sector working in the national security sector.

Another great avenue of the on-ramp for talent comes from the DIU/NSIN-sponsored Hacking for Defense program. For instance, in 2016, a Hacking for Defense student founded Capella Space to address the need for increased high-quality imagery from space day or night, and even through inclement weather coverage. This startup later went on to win a DIU contract and became the first American company to own and operate a commercial synthetic aperture radar (SAR) constellation. Following Russia's invasion of Ukraine in February 2022, Capella's imagery service, along with other commercial remote sensing providers under contract with the U.S. Government, proved exceptionally valuable for rapidly delivering unclassified and shareable imagery to EUCOM and supporting Ukrainian assistance efforts.

DIU is also providing crucial support and resources to help non-traditional and small businesses navigate the complex defense landscape. Between 2019 and 2023, NSIN programs and nation-wide regional network teams engaged 10,230 new entrants; helped 1,996 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 programs contribute to the expansion of the national security innovation base through in some cases creation of, but in most cases maturation of, early stage ventures. Ventures who go on, post involvement with NSIN to secure over $10 billion in private capital since 2016 and receive over $9.9 billion in DoD contracts**.** Additionally, within DIU, the National Security Innovation Capital (NSIC), enables dual-use hardware startups to advance key milestones in their product development by addressing the shortfall of private investment from trusted sources. Since FY21, NSIC has provided nearly $36 million to 18 companies focused on autonomy, communications, power, sensors, and space. This funding has enabled companies to expand their manufacturing facilities in the United States and mature the technology, so that NSIC-funded companies have gone on to raise $286.8 million in follow-on private capital.

DIU has expanded its commercial outreach and lowered the barriers to entry with American vendor submissions from across all 50 states. Nearly one-third of DIU vendors on contract from June 2016 to September 2023 are first-time DoD contractor award recipients, representing 140 new solutions that the DoD can now access. Contract awards have gone to 321 nontraditional defense contractors (71% of all recipients) and 273 small businesses (61% of all recipients), demonstrating DIU's commitment to leveraging the breadth of expertise and ingenuity across the nation. In total, between June 2016 and September 2023, after the highly-competitive CSO process, DIU awarded 450 OT Prototype contracts across 390 unique vendors with a total value of $1.7 billion.

We are expanding the Department's presence in key communities for defense tech companies and individuals as well, putting new Defense Innovation On-Ramp Hubs in place in five states with the support of Congress. These hubs provide an accessible entryway for talent and start-ups outside the major tech centers of the country to opportunities with entities across the Defense innovation community, as well as for the entire Department to their solutions. These Hubs will not only help the Department leverage their capabilities, it will also catalyze further technological and

economic development across the country. We already have Hubs established in Wichita, Kansas; Dayton, Ohio; Seattle, Washington; and Phoenix, Arizona. A new Hub in Honolulu, Hawaii will open in March.

Internationally, DIU is moving aggressively to further the NDS in both supporting and harnessing the power of our allies and partners. The results of our efforts have already been demonstrated through contract awards to 27 foreign-based companies and collaboration with the United Kingdom's jHub, the North Atlantic Treaty Organization (NATO) Defense Innovation Accelerator for the North Atlantic (DIANA), and the Australia-United Kingdom-United States (AUKUS) Pillar 2 objectives. Furthermore, DIU's partnership with the NATO Alliance through programs like DIANA demonstrates a commitment to identifying, nurturing, and deploying emerging technologies to address allied security challenges.

During INDUS-X 2023, DIU and iDEX—India's DIU equivalent—agreed to strengthen cooperation through a series of engagements and collaborative projects focused on leveraging both countries' vibrant tech sectors in areas of shared strategic and operational need. And in December 2023, Secretary Austin held the AUKUS Defense Ministerial at DIU's headquarters in Mountain View, CA, announcing a series of critical efforts in support of AUKUS Pillar II. These efforts include a trilateral joint challenge led by DIU and its counterparts in the United Kingdom and Australia. In addition to deepening our partnerships, these engagements strengthen interoperability and provide technology solutions for mutual concerns among the Allied Force. For example, DIU, in collaboration with NATO partners and the Ukrainian government's defense technology cluster (Brave1), brought together more than 200 European, Ukrainian, and U.S. participants from across the military, industry, and research communities, to foster discussions on battlefield challenges, technology delivery pathways, and strategic industry developments needed in Ukraine this past October. This work has helped accelerate new capabilities for the battlefield in Ukraine, as well as valuable lessons learned for U.S. efforts in INDOPACOM, CENTCOM, and elsewhere.

As a result of all of these initiatives, and due to the efforts of patriotic American technologists and entrepreneurs across the nation, the commercial tech sector—including large and small companies—is increasingly ready and eager to work with the Department. Real and perceived cultural barriers notwithstanding, the number and capability of companies developing and proposing technology solutions for defense, and the talent and investment energy that is flowing into those efforts, is inspiring.

However, despite a lot of progress, DoD's "demand signal" for capabilities remains muddled and very difficult for even the most capable of commercial tech entities to decipher, both in terms of strategic prioritization and the likelihood of a path to scale. Even signature examples of DIU projects (e.g., maritime intelligence, surveillance, and reconnaissance technology and the commercial space and communications solutions playing critical roles in Ukraine) are viewed tepidly by some in the private sector due to the lack of scale and commitment in DoD procurement. This mixed demand signaling, combined with one of the well-known valleys of death between initial prototypes and establishing programs of record by the Services that align with the annualized DOD budget process, reinforces the largely justified perception that DoD is a bad counterparty for tech entrepreneurs and investors.

For the "founders and funders" that make up the U.S. commercial technology sector to do what they do best—assess, price, take, and manage risk to rapidly and efficiently deploy (and redeploy) resources at scale—the DoD must have clear priorities and demonstrated success in scaling technologies. Without this clarity, the DoD impedes the flow of billions of dollars of interested private capital to its priorities and creates the mistaken impression in some quarters that capital is a scarce resource. The net result of an ambiguous demand signal decreases DoD's ability to deliver advanced capability to warfighters at speed. DIU 3.0 is directly focused on this challenge with the objective to make it easier for founders and funders alike to take risks that make sense in furthering our national security priorities, and to do so with the speed and scale that we require for

strategic impact.

Overcoming Challenges and Keys to Success

While the Department is making significant strides, DIU continues to face challenges to deliver innovative commercial solutions to warfighters at speed and scale. Part of scaling requires transitioning successful prototypes despite the Planning, Programming, Budgeting, and Execution process that can introduce delays of at least two years before capabilities can be fully integrated. Moreover, there are notable mismatches in funding sources, with prototyping often relying on short-term Research, Development, Test, and Evaluation funds, while program acquisitions typically use longer-term Procurement funding. This discrepancy creates uncertainty for vendors and impedes smooth transitions. Despite the availability of software acquisition pathways, our DoD partners often prefer ownership of software rather than Software-as-a-Service models, leading to further complications. Misaligned incentives further contribute to the challenge, as DoD partners may prioritize incumbent primes to mitigate risk or expend funds rapidly without ensuring successful transitions. These complexities underscore the need for reform within the acquisition process to facilitate smoother transitions and enable more effective utilization of innovative technologies.

Undercutting the above challenges, talent stands as both DIU's greatest asset and its most pressing challenge. DIU’s mission hinges on its ability to attract, develop, deploy, and retain top-tier dual-fluent talent, capable of navigating both the tech sector and the complexities of government. However, attracting and retaining such talent poses a considerable challenge, as these individuals are in high demand and often unable to wait for job offers that entail significant pay cuts compared to the private sector.

Additionally budget uncertainties and continuing resolutions pose significant challenges that severely impact DIU’s mission. We need an FY2024 appropriation. With the necessary resources combined with the authorities and focus already provided by Congress and the Secretary of Defense,

DIU will be well positioned to deliver on the DIU 3.0 strategy with the speed required to meet the imperative faced by the nation.

Conclusion

As a nation, we cannot ask our service members to put their lives on the line without the best capabilities available, and as the NDS makes clear, we cannot afford to mortgage our strategic future to inaction. The imperative for DIU 3.0 is clear. Against a backdrop of international challenges and with the world's most capable technology sector, we can and must do more to identify and adopt impactful commercial technologies at speed and scale. To achieve this, DIU must evolve from "disrupter-*of*-the-team" to "disrupter-*on*-the-team," working with teammates across the Department to deliver, scale, and institutionalize impact.

DIU will also require collaboration from partners across the Department, interagency, commercial tech sector, and allied and partner nations and together—as a team—we will implement our collective strategies, refine them to surmount obstacles, and ultimately deliver the necessary operational capabilities. DIU and its partners on this panel are beginning to address these challenges and equip our warfighters with the latest technological advantages necessary for victory in any potential conflict. Bolstered by recent support and reforms from Congress and DoD leadership, DIU is better positioned to assist our partners in realizing these objectives. We look forward to working with you to maintain technological superiority in defense and enable rapid prototyping, acquisition, and fielding of commercial technology faster than our adversaries. In support of this objective, we are committed to ensuring Congress has the transparency it needs in order to trust in our efforts, and in the bets that you are making on our success. Systemic change is hard. We are working hard to deliver capability on the timeline required by the strategic imperative—rather than a timeline driven by comfortable, linear processes—and that there will be inevitable mistakes on the way to success.

Delivering the full potential of commercially derived technology for the nation will not be easy. It will require us—the Department, the private sector, the interagency, Congress, and our allies and partners—to work together in new ways, and to take bureaucratic, financial, institutional, and reputational risk in doing so. But it is far better for us to take those kinds of risks now—all of which can be mitigated, managed, or overcome—than it is for us to take the risks we incur through inaction. Doing that would merely continue the unforgivable pattern of transferring that risk to the future, converting it to real risk to the warfighter, to the soldiers, sailors, airmen, guardians, and marines who will be on the front lines in any potential conflict. Getting this right will take all of us working together. We cannot afford to get it wrong.