DEFENSE INNOVATION BOARD

SCALING NONTRADITIONAL DEFENSE INNOVATION

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Table of Contents

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Executive Summary

Despite the rapidly accelerating and emergent competition with China and conflicts over Ukraine and the Middle East, the Department of Defense (DoD) still lacks the ability to mass test, procure, and field emerging capability within months or weeks. Without aggressive action, our warfighters risk defeat on the battlefield. We strongly urge immediately amplifying the urgency level, taking a significant portion of Research, Development, Test and Evaluation (RDT&E) investment out of the Planning, Programming, Budgeting and Execution (PPBE) process, and placing it within a system of flexible procurement. In addition, we must act swiftly to ensure the DoD leads in global innovation and competition over AI and autonomous systems – and is a trendsetter for their responsible use in modern warfare.[1] The importance of these tasks cannot be understated; our very democracy and way of life are at stake.

We need to significantly enhance the acquisition system's risk tolerance for failure, enforce existing authorities and contract mechanisms for nontraditional vendors (which we define as any business entity that does not typically work in defense, essentially meaning they are new to the DoD market), and incentivize the DoD contracting workforce to place larger bets on new market participants through a mix of both critical acquisition targets and Open Topic-based pathways.

We must shift from program-of-record requirements-centric transactions to "capability-of-record"[2] portfolio-level oversight and performance-based partnerships. Elevating existing authorities while providing political top cover for fiscal agility across the Services will increase "speed to capital"[3] for nontraditional vendors and enable rapid iteration with the end-user throughout the entire procurement lifecycle.

We recommend the incoming Administration's national security team establish decisive pathfinders for commercial, dual-use, nontraditional capabilities. This requires ruthlessly managing cost, schedule, and performance, and propelling millions of people within the system to move at the pace and scale of our adversaries.[4]

"As a nation, we are in an undeclared state of emergency … The only requirement is winning."

–Shyam Sankar, The Defense Reformation, Oct. 2024

Despite the DoD's meaningful strides in technology acquisition over the past decade, the Defense Innovation Board (DIB) determined in its 2023 *Terraforming the Valley of Death* report (attached in Appendix D) that these "methods were never formalized, shared, and integrated into a repeatable,

[1] See the DIB's concurrent study on scaling manufacturing for unmanned and autonomous weapons systems. Defense Innovation Board. (2025, January 13). A Pathway to Scaling Unmanned Weapon Systems. https://innovation.defense.gov/Portals/63/DIB_A%20Pathway%20to%20Scaling%20Unmanned%20Weapon%20Systems_250113.pdf

[2] Michael Brown and RADM Lorin Selby / War on the Rocks. (2023, September 7). Revisiting the Hedge Strategy with Renewed Urgency. https://warontherocks.com/2023/09/revisiting-the-hedge-strategy-with-renewed-urgency/

[3] Gen. James E. Rainey / Military Review, Army University Press. (2024, August). Continuous Transformation: Transformation in Contact. https://www.armyupress.army.mil/journals/military-review/online-exclusive/2024-ole/Transformation-in-Contact/

[4] The DIB previously assessed that the DoD's current industrial base with its "process-focused, risk-averse culture creates enough obstacles to make it nearly impossible for nontraditional defense companies to contribute to the DoD mission." Defense Innovation Board. (2023, July 17). An Innovation Strategy for the Decisive Decade. https://innovation.defense.gov/Portals/63/DIB_An%20Innovation%20Strategy%20for%20the%20Decisive%20Decade_230717.pdf

transparent process capable of transitioning new DoD R&D entrants to recurring revenue *at scale*."[5] This conclusion is one that we still hold today.

To regain full sight of commercial innovation and ensure overmatch within this decisive decade, the Pentagon will need to continue leveraging its relationships with the established defense primes while rapidly accelerating entry for nontraditional vendors who bring fresh ambition and ideas to compete within a reformed defense industrial base.[6]

To take full advantage of America's dual-use innovation ecosystem, the next Secretary of Defense and Deputy Secretary of Defense will need to open the Service acquisition bureaucracy to competition, disruption, and transparency. Bottom line, we must improve the efficiency of our operations to ensure a significant difference before the next major conflict.

[5] Notably, the DoD made meaningful strides in technology acquisition through methods pursued by the Defense Innovation Unit (DIU), Strategic Capabilities Office (SCO), and various Service- and Combatant Command-level organizations such as AFWERX/SpaceWERX, Army Futures Command, NavalX, Marine Corps Warfighting Laboratory, and SOFWERX, among others. Defense Innovation Board. (2023, July 17). Terraforming the Valley of Death. https://innovation.defense.gov/Portals/63/DIB_Terraforming%20the%20Valley%20of%20Death_230717.pdf

[6] There were 27 major formal investigations conducted on defense acquisition reform between 1960 and 2009. In the last decade, Congress convened two blue-ribbon committees – the Section 809 Advisory Panel on Streamlining and Codifying Acquisition Regulations and the Commission on Planning, Programming, Budgeting, and Execution (PPBE) Reform – to study the issue further. Others across the policy think-tank community, such as the Atlantic Council, Center for a New American Security, and RAND Corporation, have undertaken their own significant reviews. Throughout, the main challenges – schedule slippages, cost growth, and shortfalls in technical performance – rarely shifted. Nearly every study concluded that the barriers to an improved defense acquisition process, leveraging the entirety of America's innovation ecosystem, derive less from a lack of ideas than from the inability of leaders within Congress and the DoD to change counterproductive incentives for government and industry.

Key Findings

Our overarching recommendation within this report is to address the immediate imperatives of **focused organizational structure**, **cultural optimization**, and **dedicated capital** required for dramatically elevating the DoD's ability to leverage nontraditional vendor capabilities *at scale*.

FOCUSED ORGANIZATIONAL STRUCTURE – Nontraditional vendors still do not know where to start in the DoD procurement system. Without a clear front door, vendors struggle to maneuver through the complex defense landscape, hindered by a lack of familiarity with DoD requirements and priorities – a critical "demand signal" that informs their product development, sales, and capital requirement strategies. Moreover, vendors face limited access to key stakeholders, including buyers, funders, and end-users, which restricts their ability to build relationships and secure contracts. This lack of access and understanding is exacerbated by the DoD's internal acquisition processes, which can be opaque and difficult to navigate.

Recommendation 1**:** Congress and the DoD should expand DIU into a cross-Service 'Sherpa', a guide to the DoD market for commercial industry, capable of providing entry-to-exit support to nontraditional vendors *at scale*. DIU (Sherpa) should be:

- A central hub for nontraditional vendors, including startups, small businesses, and investors.
- Resourced with data and AI tools to conduct commercial market research.
- Staffed with cross-Service and independent acquisition and technology experts.
- Empowered to identify and procure commercial solutions for pressing end-user needs.
- Recognizing innovation and investment professionals and rewarding innovation efficiency.
- Evaluating the DoD innovation ecosystem based on tangible key performance indicators.

Details in Appendix A.

CULTURAL OPTIMIZATION – The DoD still lacks the appropriate culture for doing business with nontraditional vendors. Vendors have difficulty adapting to an arcane, multilayered system of acquisition approval and certification processes – from confusing proposal submission and data rights policies to burdensome security clearance requirements which, even in the best-case scenarios, can add months or years to gaining DoD market entry. Vendors struggle to obtain Authority to Operate (ATO) IT security accreditation, worry about oversharing intellectual property, and incur significant costs to ensure compliance with a complex federal regulatory landscape. These barriers limit their direct contact with end-users and mission partners, dramatically extending the development-to-procurement lifecycle and reducing the likelihood of a successful technology transition.

Recommendation 2: Train the DoD acquisition workforce on relational contracting. A multifaceted approach is necessary to foster a culture and mindset shift prioritizing collaboration and empathy:

- Establish metrics for contracting officers on empathy and communication.
- Train Program Executive Offices (PEOs) on balanced proposal pricing, particularly in firm-fixed-price contracts.
- Educate nontraditional vendors on the importance of asserting data rights.
- Offer advanced training opportunities focusing on true commercial pricing practices.

Recommendation 3: Eliminate burdensome, confusing, or lengthy contracting. The DoD needs decisive leadership to create a more industry-friendly acquisition environment:

- Implement DoD-wide standardized proposal formats that mirror commercial practices.
- Streamline solicitation processes per Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) policies and implement a "tiger team" review.
- Eliminate Defense Contract Audit Agency (DCAA) audits and accounting reviews for firm-fixed-price contracts under $2 million.
- Require PEOs to justify contracts with market research in accordance with the Federal Acquisition Streamlining Act (FASA), 10 U.S.C. 3453, and Federal Acquisition Regulations (FAR) Part 10.
- Educate vendors on differences between traditional and Middle Tier of Acquisition pathways.

Recommendation 4: Maintain clarity on tradeoffs across cost, schedule, and performance. Establish a deliberative process for making trades and mitigating risks:

- Establish a Nontraditional Vendor Investment Review Committee overseen by the Office of Cost Assessment and Program Evaluation (CAPE).
- Implement a bifurcated review process for traditional and nontraditional vendor capabilities.
- Develop a transparent process for identifying and documenting "Big R" vs. "little r" requirements.
- Adopt a product management-based approach to cost assessment and program evaluation.

Recommendation 5: Commit to procuring and fielding five to ten game-changing capabilities inside 2027. Embrace a minimum viable product (MVP) mindset to prevent Chinese overmatch:

- Convene a closed meeting (a "First Breakfast") to secure commitments for Congress to fund and the DoD to procure and field a focused set of emerging capabilities inside 2027.
- Grant the Office of Strategic Capital (OSC) "skin in the game" equity financing authority.
- Enhance DIU (Sherpa)'s ability to conduct deep-tech use cases with OSC, DARPA, the Strategic Capabilities Office (SCO), etc.
- Leverage DIU (Sherpa), AFWERX, NavalX, Army xTech, SOFWERX, etc. partnerships with external tech scouts, acquisition advisors, venture capitalists, and other subject matter experts.
- Disrupt the Service labs with Air Force Research Lab (AFRL) Vanguard-like initiatives and Army Futures Command/Rapid Capabilities and Critical Technologies Office (RCCTO)-like constructs.
- Require programs to maintain a basic bill of materials and understanding of their supplier lists.
- Establish a program of record for DoD-wide supply chain risk management.

Recommendation 6: Establish a speedy and efficient security clearance process for nontraditional vendors. The Defense Counterintelligence and Security Agency (DCSA) lacks the authority to oversee DoD-level relationships across personal, physical, and industrial security:

- Establish a central credentialing authority overseen by DCSA, including relevant agencies (e.g., Defense Intelligence Agency (DIA) and National Security Agency (NSA)), to manage personal, physical, and industrial security of SCIFs across the DoD.
- Update and tailor Intelligence Community Directive (ICD) 705 Standard Sensitive Compartmented Information Facility (SCIF) requirements to the needs of nontraditional vendors.

- Scale DIU (Sherpa)'s fractional Facility Security Officer (FSO) initiative, DARPA's Bringing Classified Innovation to Defense and Government Systems (BRIDGES) program, and similar efforts.
- Invest in coworking-style SCIF infrastructure and allow nontraditional vendors greater access to other existing classified facilities such as underutilized government storage hubs.
- Establish enduring clearance reciprocity with the option for clearance holders to pay for continuous vetting following departure from duty.

Recommendation 7: Implement an *ex post* instead of *ex ante* approach to risk in IT, cloud, and network security for nontraditional vendors. The DoD Chief Information Officer (CIO) must foster true reciprocity allowing vendors to "comply once, sell many" in order to drive competition, reduce costs, and improve quality of service:

- Ensure the ATO process remains a top priority for the Secretary of Defense and establish a senior leader "tracking group" to collect data on time to ATO under the new guidance and processes.
- Update the DoD CIO "Cybersecurity Reciprocity Playbook" to ensure it does not perpetuate a culture of non-reciprocity.
- Adopt the Federal Risk and Authorization Management Program (FedRAMP) for DoD unclassified networks rather than maintaining separate, *sui generis* risk management standards.
- Waive Cybersecurity Maturity Model Certification (CMMC) requirements for larger vendors that are already compliant with FedRAMP and DoD-specific Cloud Computing Security Requirements Guide (CC SRG) standards.
- Leverage continuous ATO (cATO) approaches using commercial continuous monitoring (CONMON) tools, focusing on maturity assessments of tactics, techniques, and procedures.

Details in Appendix B.

DEDICATED CAPITAL – Nontraditional vendors have difficulty accessing dedicated capital as they invest resources to transition their prototypes to production. Despite successfully developing innovative solutions, these vendors struggle to scale quickly to meet the needs of the warfighter while satisfying their investors. The complexities of the PPBE resource programming process, a lack of clear guidance and support for SBIR/STTR Phase III contracting, and uncertainty around post-SBIR/STTR funding opportunities exacerbates these production challenges.

Recommendation 8: Reauthorize the DoD SBIR/STTR program with reforms to improve the rate of Phase III transitions for companies with a viable commercial and defense product, eliminating "SBIR mills" that treat the program as a business in itself:

- Re-establish the Rapid Innovation Fund (RIF), now known as the Rapid Integrated Scalable Enterprise (RISE) program, as a unified stopgap measure to address the longstanding concerns with SBIR/STTR Phase III funding. This would provide immediate support to industry while Congress investigates the possibility of creating a permanent DoD SBIR/STTR Phase III program, which could be funded from a variety of sources, including additional appropriations or pooled funds from existing programs.
- Establish a dedicated "Oasis Fund" within each Service, complementing the permanent SBIR/STTR Phase III program with a separate additional vehicle for Service Acquisition Executives to invest in promising nontraditional vendors. Rather than being filled through a separate appropriation or taxing existing Service programs, leverage decolorized End-of-Fiscal-Year (EoFY) contingency readiness funds comprising over $15 billion in (often poorly managed) Service appropriations.

- Require enforcement of Open Topic legitimacy, a minimum funding level, and an independent third-party validation that Open Topics conform to GAO's definition.
- Implement commercialization benchmarks and penalties for "SBIR mill" companies failing to demonstrate sufficient non-SBIR/STTR revenue.
- Adjust size standards for companies eligible for SBIR/STTR awards: 200 employees for Phase I and 1,000 employees for Phase II.
- Institute shot clocks for SBIR/STTR Phase I or II contract notifications and awards.
- Direct the FAR Council to include SBIR/STTR Phase III authority in the FAR.
- Require SBIR/STTR Phase III training for all DoD contracting officers.
- Enforce market research practices and incentives to find commercial items and SBIR/STTR products that meet DoD needs more efficiently.
- Introduce incentives for leveraging open standards and prohibiting proprietary interfaces to encourage prime contractors to adopt commercial technology.

Details in Appendix C.

Appendix A: Focused Organizational Structure

Nontraditional vendors still do not know where to start in the DoD procurement system. Without a clear front door, vendors struggle to maneuver through the complex defense landscape, hindered by a lack of familiarity with DoD requirements and priorities – a critical "demand signal" that informs their product development, sales, and capital requirement strategies. Moreover, vendors face limited access to key stakeholders, including buyers, funders, and end-users, which restricts their ability to build relationships and secure contracts. This lack of access and understanding is exacerbated by the DoD's internal acquisition processes, which can be opaque and difficult to navigate.

At the heart of these challenges lie the DoD's Program Executive Offices (PEOs) and incentive structures surrounding them, which dictate major acquisition decision-making within the Military Departments. A structure adopted on the basis of the 1986 Packard Commission[7], the result of mounting accusations of waste and mismanagement in defense acquisitions during the 1980s, PEOs were originally intended to streamline and focus Service procurement efforts, cut through bureaucratic red tape, and reduce nebulous requirements. However, as major defense firms consolidated after the Cold War, the PEOs inadvertently created a system which disincentivizes risk-taking born from additional layers of regulatory oversight and complexity, deterring new companies from entering the DoD market and, by no fault of their own, fostering a set of conditions for incumbents in the space to eat their competition. Meanwhile, new rules like the 1994 Federal Acquisition Streamlining Act (FASA), which aimed to counter the effects of industrial base consolidation and make it easier for acquisition managers to procure commercial goods and services, have been egregiously violated and proven largely ineffectual at lowering the barriers to entry into the defense sector.

The result – monopsonistic structures that conceal true costs and drive down quality – is quickly reversible. During World War II and the Cold War, the Services engaged in intense competition to produce the best capabilities, regardless of who built them. For a vendor operating within this continuously evolving procurement environment, past performance was no guarantor of future contractual obligation. Investments shifted rapidly toward the most promising technologies, led by long-term acquisition heads who took on large and risky bets, oversaw programs to completion rather than in frequent rotations, and amassed significant personal authority as the successes grew.[8]

Replicating these outcomes is achievable by empowering the Service Acquisition Executives (another product of the Packard Commission) to drive risk-taking within their respective Military Departments, competing PEOs and other acquisition managers against one another based on cost, schedule, and performance incentives that are aligned with the priorities of the dual-use technology ecosystem writ large, and rewarding both wins and failures for their respective contributions to advancing the mission. While the Packard Commission's recommendations to improve acquisition structures were sound when the defense industrial base was large and diverse, after defense industry revenues narrowed during the 1990s, and as commercial R&D continued to outstrip DoD-funded (including defense sector) R&D, their adoption has had gradual unintended consequences for our industrial base competitiveness, which our servicemembers are only now reckoning with.

As the Secretary of Defense's principal staff assistant for innovation since April 2023, the Defense Innovation Unit (DIU) has grown into a significant driver of reforms to procurement incentive structures,

[7] President's Blue Ribbon Commission on Defense Management. (1986, June). A Quest for Excellence (David Packard). https://www.cia.gov/readingroom/docs/CIA-RDP90-00530R000400890003-3.pdf

[8] Shyam Sankar / Palantir. (2024, October 31). The Defense Reformation. https://www.18theses.com/

working with the Services to better engage nontraditional vendors and acquire commercial off-the-shelf items where appropriate. With its re-elevation as a direct report to the Secretary, enhanced local presence, focus on non-Federal Acquisition Regulation (FAR)-based alternatives to cost-plus contracting, and embeds strategically placed at key Combatant Commands, DIU now heads a growing ecosystem of around 300 Service- and Combatant Command-level innovation organizations seeking to disrupt the system from within. DIU is well-positioned to continue catalyzing the DoD's future engagement with nontraditional vendors.

However, DIU still requires additional staffing and infrastructure to provide an end-to-end "concierge service" for nontraditional vendors *at scale*. Congress's Fiscal Year (FY) 2024 $983 million "hedge" investment in DIU was an important milestone for an organization with a history of modest funding and top cover.[9] Today, as the principal staff support to the Deputy's Innovation Steering Group and the chair of the Defense Innovation Working Group, DIU plays an important role in "quarterbacking" the process of accelerating delivery of innovative capabilities for the warfighter. This is demonstrable through its leadership in the Replicator Initiative, the DoD's effort to transform internal processes for procuring unmanned systems by August 2025.[10] DIU must continue building on the governance processes put in place through Replicator, growing its centrifugal role in identifying and bringing aboard commercial technologies while catalyzing others across the Services – especially the PEOs – to do the same.

Scaling DIU with further infusions of 'Series C' investment from Congress, beyond its FY 2024 $983 million appropriation, will be necessary to achieve these goals. The growing success of founder-driven startups has begun to attract commercial companies and investors to the DoD, but sustaining this momentum will require more "wins" (or "points on the board," as DIU Director Doug Beck frequently underscores) to justify continued investment.[11] Despite attracting more than $130 billion in venture backing to the DoD market since 2021, dispersed across roughly 100 defense startups founded during this same period, thus far only a handful of nontraditional vendors are beginning to demonstrate the ability to achieve production at scale.[12]

With DIU enjoying robust bipartisan support on Capitol Hill, the next Secretary of Defense should seize this opportunity to capitalize on Congress's enthusiasm for DIU's mission. Rather than scaling back investments, the DoD should build on the momentum of DIU's FY 2024 budget to further expand its capabilities and connections to the nontraditional vendor ecosystem.

Recommendation 1: **Congress and the DoD should expand DIU into a cross-Service 'Sherpa', a guide to the DoD market for commercial industry.** This entity should serve as a central hub for nontraditional vendors, capable of providing entry-to-exit support to new market participants *at scale*. It should be staffed with cross-Service and independent acquisition experts, resourced with data and AI tools, and empowered to identify and procure commercial solutions for pressing end-user needs. It should also evaluate innovation organizations based on a standard set of incentives and metrics, streamlining the existing DoD innovation ecosystem.

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[9] Defense Innovation Unit (DIU). (2024, June 20). DIU Announces Strategic Allocation of 2024 Budget and Plan to Scale Commercial Tech Adoption. https://www.diu.mil/latest/diu-announces-strategic-allocation-of-2024-budget-and-plan-to-scale

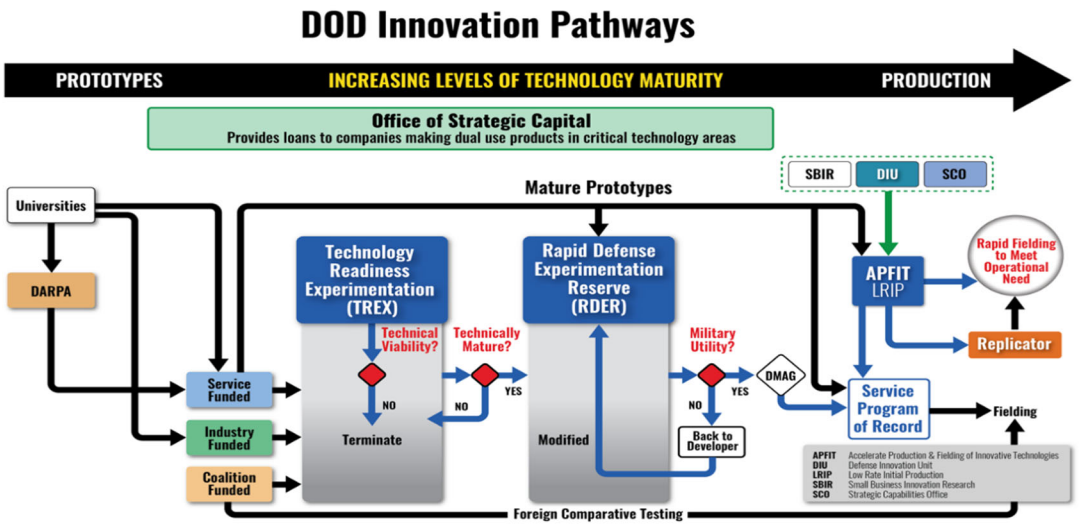
[10] Defense Innovation Unit (DIU). (2023, November 30). Implementing the Department of Defense Replicator Initiative to Accelerate All-Domain Attritable Autonomous Systems to Warfighters at Speed and Scale. https://www.diu.mil/latest/implementing-the-department-of-defense-replicator-initiative-to-accelerate

[11] The Aspen Institute. (2023, July 19) Doug Beck, Aspen Security Forum Panel Discussion. (Addressing Today's Threat and Ensuring Tomorrow's Edge: Accelerating Capabilities for the DoD). https://www.youtube.com/watch?v=WXO3zPucBcg

[12] Heather Somerville / The Wall Street Journal (WSJ). (2024, January 25). Investors are Betting on Defense Startups. The Pentagon Isn't. Tech startups get cool reception from Defense Department despite its rhetoric that it will buy more from Silicon Valley. https://www.wsj.com/tech/defense-startups-risk-becoming-failed-experiment-without-more-pentagon-dollars-dc9e663a?msockid=3b4a9539e9d767b51455805ce8946689

A Front Door for Nontraditional Vendors

DIU along with its **National Security Innovation Network (NSIN)** and **National Security Innovation Capital (NSIC)** sister organizations are pursuing a distributed approach to working with nontraditional vendors, leveraging their local presence and expertise in the DoD Other Transaction Authority (OTA) under 10 U.S.C. 4021 and 4022 to drive innovation across the Services and encourage the use of nontraditional acquisition pathways to get commercial capability on contract rapidly. Through its Commercial Engagement Team, regional network of Defense Innovation OnRamp Hubs, collaboration with the Department of Commerce Economic Development Administration's Tech Hubs, and new Joint Defense Innovation workspace in Austin, Texas, DIU is systematically expanding the defense innovation ecosystem and making it easier for nontraditional vendors to enter the DoD market. DIU additionally has a network of liaisons and embeds across five of the seven geographic Combatant Commands, including deep embeds at European Command (EUCOM), Security Assistance Group-Ukraine (SAG-U), and Indo-Pacific Command (INDOPACOM). Since September 2023, it has helped manage the Deputy's Innovation Steering Group, developed new governance processes for partnering with the Services to scale procurement of commercial capabilities addressing critical warfighter problems, and collaborated with international partners such as Japan, United Kingdom, Australia, Singapore, France, India, Taiwan, and Ukraine to strengthen their engagement with nontraditional vendors. DIU's efforts are having real-world impact. Dozens of products created by DIU portfolio companies are being used on Ukraine's front lines. Since DIU pioneered the Commercial Solutions Opening (CSO) process, more acquisitions are being made through DIU's streamlined pathways, with over $70 billion in purchases since. Under DIU's stewardship, the DoD is accelerating procurement of critical dual-use technologies, such as cutting-edge AI-enabled tools, uncrewed and autonomous systems, and space launch vehicles, to ensure that commercial solutions are deployed to the field rapidly and smartly, in tandem with traditional weapons systems.



Highlights the complexity of existing systems.

Source: Department of Defense

Beyond its primary objective to create a more accessible defense acquisition environment for nontraditional vendors, the Sherpa would hold the following goals, to:

- **Raise Awareness and Education** – reducing the knowledge gap between companies and customers by training and equipping vendors and mission partners with tools to evaluate product-requirement fit, locate appropriate funding, and mechanize new contracts.
- **Scale Rapid Prototyping** – assisting a larger pool of companies prototype faster by establishing a staff of customer-capability managers, fractional Facility Security Officers (FSOs), and solutions to streamline the Authority to Operate (ATO) IT security accreditation process.
- **Quantify Service Demand-Signal** – helping smaller companies scale by systematically tracking the potential return on investment for nontraditional vendors as they transition from prototype to production contracts, leveraging data and AI to inform future investment decisions.

Several steps should be taken to fully activate the Sherpa:

1. **Invest in Commercial Market Research Tools:** Leverage AI and machine learning tools to make sense of the commercial and dual-use markets, with advanced software to manage and continually extract data from the Sherpa's interactions with vendors, end-users, mission partners, private capital, and others. A one-stop, AI-enabled commercial market research and due diligence cell within the Sherpa should be empowered to identify and procure commercial solutions for the most pressing end-user needs in accordance with the market research requirements of the Federal Acquisition Streamlining Act (FASA), 10 U.S.C. 3453, and FAR Part 10.
2. **Staff Cross-Service and Independent Experts:** Establish an agile staff of cross-Service contracting officers, third-party tech scouts, and other independent subject matter experts to improve the Service acquisition workforce's understanding of non-FAR-based funding vehicles, such as the DoD Other Transaction Authority (OTA). In particular, the Sherpa should oversee the adoption of a DIU Commercial Solutions Opening (CSO)-like process within every Service PEO and provide greater oversight of OTA funding as prototype vendors transition to production.
3. **Establish Direct-to-Solution Pathways:** Oversee DoD-wide investment in competitive and post-competition direct-to-solution pathways, such as the Chief Digital and AI Office (CDAO) Tradewinds Ecosystem and Solutions Marketplace, which leverages CSO processes, OTA vehicles, and Broad Agency Announcement (BAA) procedures to match vendors to end-users, identify contracting opportunities, and complete awards within days.
4. **Create Collaborative DevSecOps Environments:** Oversee DoD-wide establishment of new collaborative development, security, and operations (DevSecOps) environments for coding and problem-solving with prospective and existing vendors to provide industry with unambiguous data about requirements and feedback on potential solutions.
5. **Maintain Democratized Knowledge Repositories:** Consolidate and maintain open knowledge repositories, such as the DoD's Innovation Pathways website and SciTechCONNECT hub, to allow companies to better self-serve. The Sherpa should work continuously across the Office of Small Business Programs (OSBP), Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) Program Office, Office of Strategic Capital (OSC), DARPA Commercial Strategy Office, and others to ensure that related efforts are well-aligned and not duplicative.
6. **Recognize Innovation and Investment Professionals:** Establish "Innovation" and "Investment" as recognized Areas of Practice and Military Occupational Specialties. The Services and Combatant Commands should work with key stakeholders, such as the Defense Acquisition University (DAU) and Defense Civilian Personnel Advisory Service (DCPAS), to evaluate their Innovators and Investors based on metrics that may be clearly understood and audited both inside and outside of the DoD.
7. **Establish Incentives for Innovation Efficiency:** Evaluate and empower the Defense Innovation Community of Entities (DICE) using a tangible set of key performance indicators (KPIs), such as response time, customer satisfaction, successful matches made, sales volume resulting from introductions, dollar value of custom development programs eliminated, acceleration of timeline to warfighter delivery, commercial sales, and more. Based on these KPIs, reward competitive performers with additional funding, join strong performers with struggling performers (particularly where clear win-win benefits exist), and encourage limited resources to flow toward effective innovators elsewhere.

An enhanced and fully resourced DIU (Sherpa) would dramatically open Office of the Secretary of Defense (OSD) contract administration to new solutions and approaches for removing the barriers to

entry facing nontraditional vendors. Current DoD programs are still not adequately incentivized to complete projects under budget or ahead of schedule by expanding the industrial base or purchasing commercial “off-the-shelf" items. While OSD does not represent its own customer base in the defense market aside from its fourth-estate agency and field elements, its unique authorities and centralized convening power can reshape and accelerate the investment mission across the Services. An OSD office with parallel mission areas, resources, and personnel should rapidly evolve current investment decision-making, with the goal to sunset upon successfully disrupting the system.

Appendix B: Cultural Optimization

The DoD still lacks the appropriate culture for doing business with nontraditional vendors. Vendors have difficulty adapting to an arcane, multilayered system of acquisition approval and certification processes – from confusing proposal submission and data rights policies to burdensome security clearance requirements. Vendors struggle to obtain Authority to Operate (ATO) IT security accreditation, worry about oversharing intellectual property, and incur significant costs to maintain compliance with a complex and growing federal regulatory landscape. These barriers limit their direct contact with end-users and mission partners, dramatically extending the development-to-procurement lifecycle and reducing the likelihood over time of a successful technology transition.

The DoD faces significant challenges in reversing these barriers, including an entrenched climate of risk aversion and a lack of empathy and understanding for the needs and limitations of nontraditional vendors. First, contracting officers often lack the training and mindset to engage vendors effectively, leading to breakdowns in communication and a mutual lack of trust. Second, procurement decisions remain overly driven by a capability's technical maturity rather than a vendor's holistic contributions to the DoD's fiscal health and warfighting advantage, leading to frequent cost overruns and schedule delays. Meanwhile, the continued focus on technology adoption and transition rates as key metrics for success – i.e., how quickly can capability get on contract and to the field – may overlook two, more fundamental and strategic questions regarding (a) where should the DoD prioritize its dual-use technology investment, and (b) how should the system quantify and demonstrate to commercial industry this demand-signal over time as requirements shift? Despite their growing interest in defense, the commercial markets still struggle to identify what specific technologies and sectors have the most DoD funding opportunities and longer-term financial commitment.

To overcome these challenges, the DoD needs to adopt a procurement mindset centered on "relational contracting,"[13] prioritizing mutually beneficial partnerships and creating streamlined, flexible RDT&E pathfinders and PPBE processes for accommodating the unique needs and capabilities of nontraditional vendors. It needs to become more expeditionary and accommodating to external stakeholders, and overhaul the way capabilities are identified, selected, and funded. Capability opportunities should be commonplace, agility should be hammered into program portfolios and colors of money, and incentives for disruptive practices, such as collaborating with venture-backed startups and automating parts of the certification process, must be promoted broadly. It should not take as many as 25 full-time employees, 12 months, and millions of dollars to prepare a proposal for the average cost-plus DoD contract – whereas a similar commercial contract requires only 3 part-time employees, 2 months, and thousands of dollars.[14]

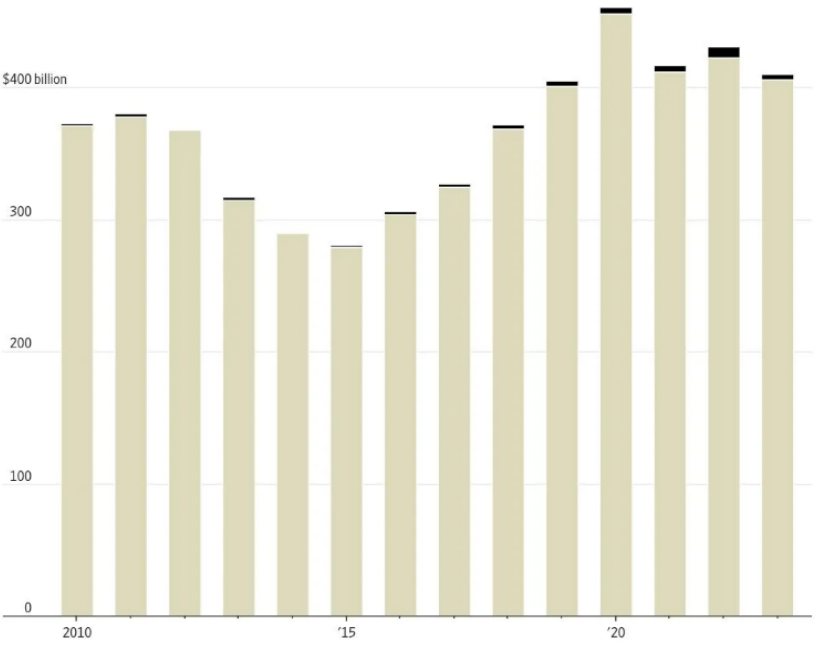
[13] Contracting leaders emphasized during DIB interviews that there needs to be greater education and training for those involved in DoD award selections or contracting in general with small businesses, venture-backed startups, and other nontraditional vendors. One subject recommended that acquisition training should shift from transactional to relational contracting, i.e., a culture and mindset change that emphasizes looking out for a contractor as much as looking out for the taxpayer, rather than an approach that preaches "win-win" negotiations yet takes advantage of ignorance of government contracting rules. Another subject recommended that contracting officers should be required to take a course by an actual venture capitalist or startup operator (rather than a contractor researching and interpreting how startups work) on how startups are funded, how they pay their bills, and how private capital works.

[14] Commission on Planning, Programming, Budgeting and Execution Reform. (2024, March 6). Defense Resourcing for the Future Final Report. https://ppbereform.senate.gov/finalreport/

Re-coupling the Defense and Commercial Innovation Ecosystems

The U.S. defense industry significantly downsized after a sudden meeting at the Pentagon in 1993 known as the "Last Supper," where the heads of the major defense firms were warned that with substantial post-Cold War defense budget cuts on the way, many of their companies would not survive. As this climactic event led to a flurry of mergers and acquisitions by the nation's largest defense contractors, Congress passed the 1994 Federal Acquisition Streamlining Act (FASA) to in turn make it easier for other firms to enter the DoD market. Although FASA introduced mandates for the DoD to use commercial off-the-shelf alternatives to bespoke capabilities and for acquisition managers to place more bets on new technologies and companies, its weak enforcement during the ensuing years resulted in the defense sector's gradual decoupling from the broader commercial private sector.

As the DoD's procurement dollars were diverted to its five biggest primes, the commercial innovation ecosystem's interest in developing dual-use technologies, much less working directly in defense, waned. At the time of the Soviet Union's collapse, approximately 75 percent of the DoD acquisition budget was distributed to commercial, dual-use manufacturers.[15] Today, roughly 10 percent of the defense acquisition budget (an estimated $411 billion in FY 2023 according to data from Govini) is allocated to commercial companies, and less than one percent goes to venture-backed startups, while the rest of the funds go to traditional defense-specialized vendors.[16] Although nearly three-quarters of defense contractors were classified as small businesses when the DoD published its last *Small Business Strategy* in 2023, they collectively receive a minority of DoD contract obligations, and unsurprisingly, the number of small businesses participating in the defense industrial base has continued to decline precipitously.[17]



Source: Govini via Wall Street Journal

The DoD's basic decoupling from commercial industry has had several catastrophic outcomes for its industrial base:

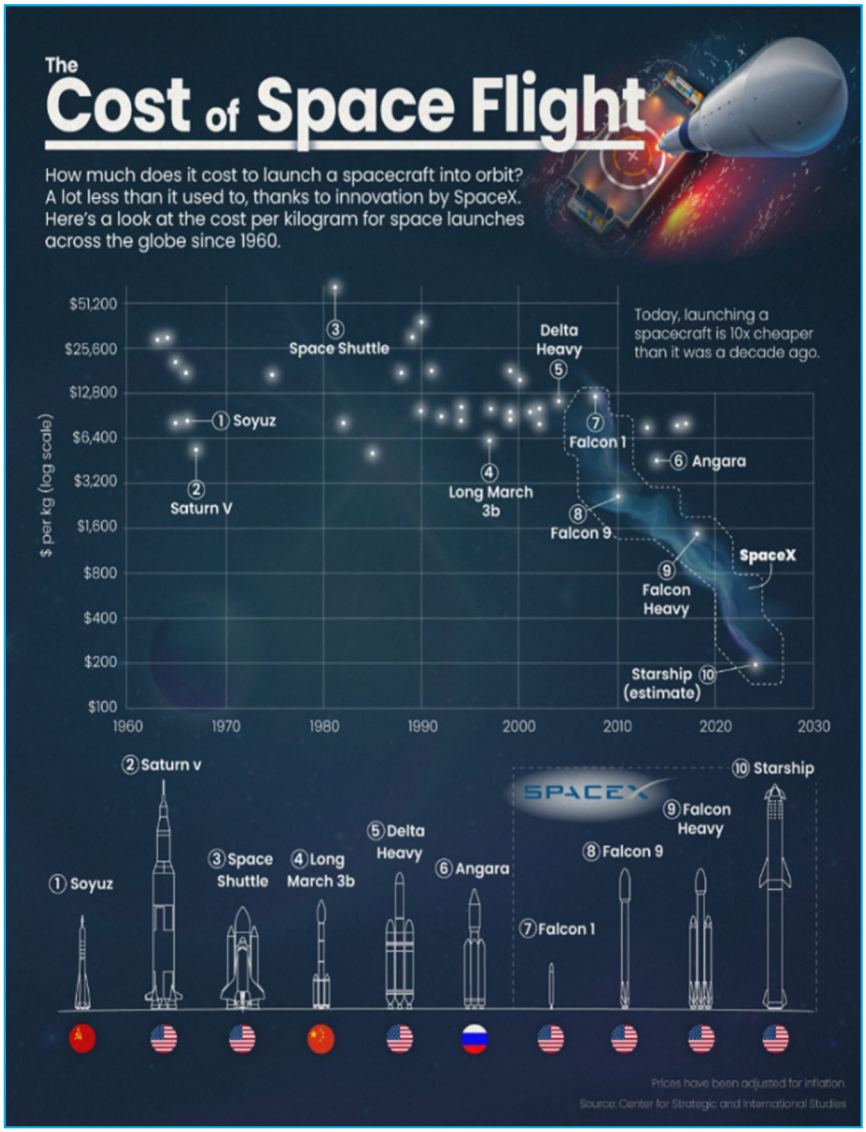
- **Limited Innovation** – overreliance on cost-plus contracts discouraging meaningful investment in game-changing technologies and new manufacturing techniques.
- **Inefficient Use of Resources** – for "exquisite" systems with fixed requirements leading to years of planning and investment with no guarantee of military purchase and wasted funds.
- **Stagnant Price Performance** – stifled competition resulting in defense costs growing faster than inflation, without achieving proportionate price performance decreases.

[15] Shyam Sankar / Palantir. (2024, October 31). The Defense Reformation. https://www.18theses.com/

[16] Ibid; Matt Macgregor and Pete Modigliani / Substack. (2024, January 28). Defense Tech and Acquisition News. https://defenseacquisition.substack.com/p/defense-tech-and-acquisition-news-5ec

[17] U.S. Department of Defense. (2023, January 26). Small Business Strategy. https://www.defense.gov/News/Releases/Release/Article/3279279/dod-releases-small-business-strategy/

Commercial companies, such as SpaceX, have demonstrated the ability to return radical innovation and cost savings to the defense industry, often in the face of stark product development, sales, and capital requirement challenges. Leveraging commercial contracting approaches, SpaceX has achieved remarkable performance improvements and cost declines, with the Falcon 9's launch costs in 2010 falling to $2,500 per kilogram and the Falcon Heavy in 2018 reaching $1,500 per kilogram. Over time, the Starship rocket is anticipated to reduce launch costs 100x over the Falcon 9, and 1,000x over traditional cost-plus launch alternatives in the DoD market.[18] The SpaceX example highlights the importance of embracing firm-fixed-price models, performance-based incentives, agile and modular techniques, and other collaborative approaches to technology development and procurement.



SpaceX's successes have come at a high cost. Stringent government licensing and review processes frequently interfered with its ambitious timelines, while the competitive and litigious nature of government contracting diverted valuable resources from immediate projects. On occasion, SpaceX's rapid pace of innovation outstripped its adherence to regulatory frameworks, clashing with entrenched oversight structures and requiring the resources and clout of its high-profile founder to overcome typical bureaucratic inertia. As SpaceX ventured into important missions with its commercial Starlink system, which has been militarized to provide secure internet access in contested environments and to enhance U.S. strategic nuclear deterrence capabilities, the company has had to balance new equities and priorities, and exercise discretion and good judgment, all while continuing to deliver advanced capability for its consumers and mission partners in a high-demand environment.

Although amplified by its rapid growth in global influence, SpaceX's struggles with the U.S. government are not unique within the DoD's nontraditional vendor ecosystem. While the company's journey to becoming a major disruptive force in the space domain may be difficult to replicate for other nontraditional vendors, its efforts to revolutionize DoD contracting are applicable to less-resourced companies competing with the established defense primes in other areas. SpaceX's over 20-year transformation – from the difficulty it faced acquiring its first major military satellite launch contract in 2015, to becoming a key service provider for connected systems used by the Ukrainians in their defense against Russia – highlights that new defense companies must demonstrate flexibility, ingenuity, and risk-taking beyond what can be expected in other sectors.

Yet, many in the DoD are still failing to leverage total addressable market potential, with requirements, acquisition plans, and budgets that weigh military needs alongside commercial ones. SBIR/STTR and Service research lab contracts continue to fail to indicate future recurring revenue opportunities, which

[18] Pierre Lionnet / Space News. (2024, June 7). SpaceX and the Categorical Imperative to Achieve Low Launch Cost. https://spacenews.com/spacex-and-the-categorical-imperative-to-achieve-low-launch-cost/

are built separately in each Component's Program Objective Memorandum (POM), or five-year budget submit. Rather than systematically tiering its investments to produce completed products, not just mostly prototypes, the DoD continues to overspread its RDT&E spend, placing too many small prototyping bets that fall short of productizing, are ineligible for colors of money, and force productization to shift toward private investors who are not suited to judge DoD product-market fit.

Recommendation 2: **Train the DoD acquisition workforce on relational contracting.** A multifaceted approach is necessary to foster a culture and mindset shift that prioritizes collaboration, empathy, and understanding in all interactions, including sourcing and deal selections, pricing, and data rights. Mobilize organizations, such as DIU (Sherpa), AFWERX, and OSC, that already focus on facilitating end-user/customer introductions, matching products to DoD needs, and mechanizing contracts for nontraditional vendors, to train the Service PEOs on the necessary tools and practices for accelerating the time it takes to get dual-use capabilities on contract and to the field.

1. **Metrics on Empathy and Communication:** Ensure that contracting officers are trained to work effectively with nontraditional vendors, emphasizing empathy, patience, and open communication. This includes being responsive to questions, available for meetings, and willing to guide contractors through complex policies and regulations, even after the completion of market research. Establish metrics for incentivizing and evaluating these behaviors in the workforce.
2. **Balanced Proposal Pricing:** Educate PEOs on the importance of finding a balance in proposal pricing when working with nontraditional vendors, particularly in firm-fixed-price contracts for R&D projects. This balance is crucial to avoid underbidding and potential financial strain due to the uncertainties and escalating costs often associated with R&D.
3. **Protect Core Data Rights:** Educate nontraditional vendors on the importance of asserting their data rights, which is critical for their commercialization and growth. Implement an approach that prioritizes mutual benefits and protects the interests of both the government and contractors, ensuring that vendors are not pressured into giving up their core data rights.
4. **Commercial Pricing Practices:** Offer advanced training opportunities that focus on true commercial pricing practices, moving beyond traditional FAR Part 15 pricing methods. This includes evaluating pricing practices used in the commercial sector and eliminating the reliance on full cost element breakdowns, which can hinder effective collaboration with nontraditional vendors unfamiliar with the DoD's normal practices. Update DoD "guides" that are supposed to help with commercial pricing but that still cling to the idea of full cost breakdowns.

Recommendation 3: **Eliminate burdensome, confusing, or lengthy contracting.** The current state of DoD acquisition reform indicates that efforts such as the Adaptive Acquisition Framework (AAF), the Pentagon's updated 5000 series policies, have yielded mixed results.[19] Established primes report seeing benefits from the AAF while nontraditional vendors, including startups and smaller businesses, express continued concerns over their complexity and inflexibility. The FY 2025 National Defense Authorization Act (NDAA) includes provisions for allowing programs undertaken through the AAF's Middle Tier of Acquisition (MTA) pathway to be executed in perpetuity provided they deliver capability every five years. However, in its latest annual assessment of weapon systems acquisition, the Government Accountability Office (GAO) found that MTA projects, although designed to introduce flexibility and speed to the acquisition process, also continued to report delays in delivering initial capability. GAO concluded that most MTA projects are reverting to traditional lengthy, waterfall

[19] Government Accountability Office (GAO). (2024, December). DoD Acquisition Reform: Military Departments Should Take Steps to Facilitate Speed and Innovation. https://www.gao.gov/assets/gao-25-107003.pdf

approaches with consecutive five-year schedules for prototyping and further development.[20] The DoD's persistence on GAO's High-Risk List[21] underscores the need for further decisive leadership to create a more agile, responsive, and industry-friendly acquisition environment.

1. **Standardize Proposal Formats:** Implement DoD-wide standardized proposal formats that mirror commercial practices, such as pitch decks and commercial proof-of-concept contracts. This simplification will facilitate easier navigation for nontraditional vendors and reduce the barriers to entry for new market participants.
2. **Shorten Solicitations:** Streamline solicitation processes in accordance with SBIR/STTR precedent mandating simplified solicitations to reduce the administrative burden and make it easier for nontraditional vendor applicants to understand their requirements. Implement a "tiger team" to review and redline existing requirements, ensuring that only essential information is requested, as exemplified by the SBIR/STTR policy's outline of required sections, which does not exceed 20 pages.
3. **Eliminate Unnecessary Reviews:** Openly discourage or prohibit the use of unnecessary, burdensome, time-consuming, and costly reviews, such as Defense Contract Audit Agency (DCAA) audits and accounting system reviews, which are not required by policy or law for firm-fixed-price contracts under $2 million. Ensure that contracting officers are aware of and adhere to policies that recommend considering such audits only for contracts over $10 million.
4. **Contract Award Justification:** Require PEOs working with DIU (Sherpa) and cross-functional teams to justify contract awards with thorough market research, in compliance with FASA, 10 U.S.C. 3453, and FAR Part 10. This will ensure that contracting decisions are informed, transparent, and fair, fostering trust and collaboration with nontraditional vendors.
5. **Acquisition Pathway Clarity:** Provide clear guidance and transparency on the acquisition pathways used, ensuring that nontraditional vendors are aware of the processes and timelines involved. This includes educating vendors on the differences between traditional and MTA procurement, as well as the benefits and challenges associated with each. Section 832 of the FY 2025 NDAA requires the Services to undertake new acquisition training focusing on the MTA pathway, technology procured "as-a-Service", and other commercial products and services.

Recommendation 4: **Maintain clarity on tradeoffs across cost, schedule, and performance.** Establish a deliberative process for making trades, ensuring that all relevant stakeholders are engaged and that risks are carefully considered and mitigated. Distinguishing between "Big R" and "little r" acquisition requirements is crucial, as the latter can create unnecessary bottlenecks and delays in the intermediate layers of the DoD's compliance bureaucracy. While "Big R" requirements are typically broad and defined in terms of overall operational or mission needs, "little r" requirements – referring to the detailed technical specifications, interfaces, and performance parameters of systems – can have cascading waterfall implications for a system's larger design requirements, leading to excessive gold-plating. Catching and adjudicating these downstream bottlenecks faster and more frequently will streamline acquisition processes and ensure continued buy-in for investments in nontraditional vendors.

[20] Government Accountability Office (GAO). (2024, June 17). Weapons Systems Annual Assessment: DoD is not yet well-positioned to field systems with speed. https://www.gao.gov/products/gao-24-106831

[21] Government Accountability Office (GAO). (2023, April). High-Risk List: GAO's list, updated at the start of each new Congress, of programs and operations that are vulnerable to waste, fraud, abuse, or mismanagement, or in need of transformation. https://www.gao.gov/high-risk-list

1. **Establish a Nontraditional Vendor Investment Review Committee:** Create a central mechanism to continuously review and evaluate investments in nontraditional vendors and their technologies. Overseen by the OSD Office of Cost Assessment and Program Evaluation (CAPE), this Nontraditional Vendor Investment Review Committee would function as a mission-oriented board or panel to elevate issues as they emerge and facilitate an orderly discussion around risks and tradeoffs across cost, schedule, and performance.
2. **Bifurcate the Review Process:** Implement a bifurcated review process that distinguishes between traditional and nontraditional vendor capabilities, acknowledging the unique characteristics and challenges of each. This would enable more effective assessment and management of risks, as well as tailored support for nontraditional vendors as they navigate the DoD's acquisition processes.
3. **Requirements Identification:** Develop a clear and transparent process for identifying and documenting "Big R" and "little r" requirements, ensuring that contracting officers and nontraditional vendors understand the distinctions and implications of each. This would help prevent unnecessary delays and cost growth resulting from blurry or evolving requirements.
4. **Product Management:** Adopt a product management-based approach to cost assessment and program evaluation, focusing on the specific capabilities and technologies being acquired rather than the program as a whole. This would enable more accurate and efficient decision-making across the lifecycle of an acquisition program, as well as better alignment with the needs and priorities of nontraditional vendors.

Recommendation 5: **Commit to procuring and fielding five to ten game-changing capabilities inside 2027.** The DoD must embrace a minimum viable product (MVP) mindset and dramatically accelerate its efforts to field a focused set of emerging capabilities essential to preventing Chinese overmatch during this decisive decade. This requires a fundamental shift from past initiatives and approaches to prototyping and procuring game-changing technologies – including adopting new partnership models, scaling successful initiatives, and disrupting the Service research labs.

1. **Stakeholder Engagement and Commitment:** The next Secretary of Defense should convene a closed meeting with leaders across the DoD, Congress, industry, and investment community to establish the need for disruption and secure commitments for Congress to fund and the DoD procure and field a focused set of emerging capabilities inside 2027. This meeting – call it a "First Breakfast"[22] – would provide a relationship reset helping build trust and confidence across the industrial base, focusing demand-signal around a handful of capabilities, and paving the way for a new collaborative effort designed to establish technological advantage against our adversaries.
2. **Equity Financing Authority:** Grant the Office of Strategic Capital (OSC) "skin in the game" equity financing authority. While the DoD has not historically provided equity funding to commercial companies, game-changing technologies should merit greater investment by government to ensure rapid development, product-market fit, and scaled productization. Designating OSC as the DoD's traditional investor in transformative capabilities would strengthen industry's commitment to maintaining U.S. technological leadership.
3. **Enhance Deep-Tech Focus:** Enhance DIU (Sherpa)'s ability to conduct deep-tech use cases in collaboration with OSC, DARPA, the Strategic Capabilities Office (SCO), and other organizations. This would enable the DoD to quickly evaluate emerging technologies that are not yet ready for Service deployment but have the potential to drive significant advancements in the near-term.

[22] Shyam Sankar / Palantir. (2024, October 31). The Defense Reformation. https://www.18theses.com/

3. **Leverage Commercial Partnerships:** Leverage commercial partnerships such as DIU (Sherpa), AFWERX, NavalX, Army xTech, Army Applications Lab, and SOFWERX's external tech scouts, acquisition advisors, venture capitalists, and other independent subject matter experts. Alongside key initiatives such as DARPA's Regional Commercial Accelerator network[23] and OSBP's Mentor-Protégé Program[24] and APEX Accelerators[25], these partnerships have shown promise in accelerating the procurement of innovative technologies and expanding them will help unlock the industrial base's full potential inside 2027.
4. **Disrupt the Service Labs:** Disrupt the Service research labs to accelerate the development of commercial technologies while developing military-unique ones. This could involve placing routine large bets using programs resembling Air Force Research Lab (AFRL) Vanguard initiatives[26] and considering an Army Futures Command/Rapid Capabilities and Critical Technologies Office (RCCTO)[27] construct to ensure investment facilitation is targeted and has top cover.
5. **Supplier Bill of Materials:** Require programs to maintain a basic bill of materials and understanding of their supplier lists, enabling better supply chain management and risk mitigation. This would help the DoD identify and address potential vulnerabilities in their industrial supply chains, ensuring the resilience and reliability of critical systems and technologies. Section 849 of the FY 2025 NDAA directs the Secretary of Defense to introduce incentives for establishing transparency and visibility into defense industrial supply chains.
6. **Supply Chain Risk Management:** Establish a program of record for supply chain risk management to strengthen the DoD's commercial, dual-use, and nontraditional supply chain resiliency. This would help improve supply chain understanding from both an economic security perspective and a contract negotiation standpoint, enabling the DoD to make better-informed contract decisions and reduce risks associated with supply chain disruptions.

Recommendation 6: **Establish a speedy and efficient security clearance process for nontraditional vendors.** The current system, managed by the Defense Counterintelligence and Security Agency (DCSA), lacks the authority to oversee DoD-level relationships across personal, physical, and industrial security, imposing undue limits on vendor access to sensitive information and facilities. *Ex ante* security requirements, particularly during the proposal stage of a project, can be a significant barrier to entry, highlighting the need for a more flexible and adaptive clearance system. For context, on average, it can require 95 to 249 days to get secret or top secret-level clearance, and most nontraditional vendors take at least three months, often longer, to gain facility access.[28] Creating a more inclusive and innovative security ecosystem will enable nontraditional vendors to collaborate better with their DoD customers, with one another, and with established primes.

1. **Central Credentialing Authority:** Establish a central credentialing authority, overseen by DCSA with other relevant agencies, to manage personal, physical, and industrial security of Sensitive Compartmented Information Facilities (SCIFs) across the DoD. This would facilitate engagement

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[23] Defense Advanced Research Projects Agency (DARPA). (2024, August 22). DARPA Launches Regional Commercial Accelerator. https://www.darpa.mil/news/2024/regional-commercial-accelerators

[24] DoD Office of Small Business Programs (OSBP). Mentor-Protege Program (MPP). https://mpp.acq.osd.mil/mpp/#/

[25] Office of the Under Secretary of Defense for Acquisition and Sustainment (A&S). APEX Accelerators. https://www.acq.osd.mil/asda/dpc/ce/p2p/docs/training-presentations/2023/APEX%20Accelerators.pdf

[26] Air Force Research Lab (AFRL). Air Force Vanguards. https://afresearchlab.com/technology/vanguards/

[27] Army Rapid Capabilities and Critical Technologies Office (RCCTO). https://www.army.mil/rccto#org-rccto-portfolio

[28] Clearance Jobs. (2024, November 13). How Long Does It Take to Get a Security Clearance? Times Go Up in 2024. https://news.clearancejobs.com/2024/11/13/how-long-does-it-take-to-get-a-security-clearance-times-go-up-in-2024/

with nontraditional vendors, enabling them to work through a single entity to access facilities in accordance with established clearance requirements.

2. **ICD 705 Standard SCIF Requirements:** Update and tailor the Intelligence Community Directive (ICD) 705 Standard SCIF requirements to the needs of the nontraditional vendor workforce, including by improving risk analysis support, conducting risk assessments of existing and planned SCIFs, developing tailored security measures, implementing continuous monitoring and evaluation systems, and ensuring direct collaboration between DCSA, the Defense Intelligence Agency (DIA), and the National Security Agency (NSA) on SCIF technical and physical aspects.
3. **Fractional FSOs and Other Partnerships:** Scale DIU (Sherpa)'s use of fractional Facility Security Officers (FSOs) and other novel partnerships, such as the DARPA Bringing Classified Innovation to Defense and Government Facilities (BRIDGES) program[29], to provide nontraditional vendors with fast-tracked access to classified spaces. This would enable vendors to participate more easily in R&D and contracting processes, while also ensuring the necessary security protocols are in place.
4. **Coworking SCIFs:** Invest in coworking-style SCIFs, including allowing small businesses to access underutilized SCIF space or setting up new SCIFs in facilities managed by the General Services Administration (GSA) that are currently not in full use. Leverage other secure properties across the country, such as government storage hubs, to serve as SCIFs for classified information meetings. This would provide nontraditional vendors with flexible access to classified spaces, enabling them to participate more easily in DoD projects and contracts.
5. **Enduring Clearance Reciprocity:** Establish enduring clearance reciprocity by providing DoD clearance holders, including contractors and Special Government Employees (SGEs), the option to pay for continuous vetting following their departure from duty. This would enable them to maintain their clearance status and facilitate their participation in future DoD projects and contracts.

Recommendation 7: **Pursue an *ex post* instead of *ex ante* approach to risk in IT, cloud, and network security for nontraditional vendors.** The DoD's *ex ante* approach to cybersecurity risk promulgates rules, such as the National Institute of Standards and Technology (NIST) Special Publication (SP) 800-53, -171, and -160 guidelines[30], that require vendors to take a number of compliance steps prior to obtaining Authority to Operate (ATO) IT security accreditation. An *ex ante* approach is commonplace in other jurisdictions, such as the European Union, where the result has been market limiting and competition stifling.[31] The DoD should embrace an *ex post* approach more typical in common law forms of government, allowing vendors to compete on performance, innovation, and price. The DoD can afterwards create a walk-up to compliance within a desired risk profile and nail vendors with liability on the back-end if something bad happens, rather than drowning them in approvals on the front-end. This should increase vendor competition, drive down costs, and incentivize better quality of service, without necessarily compromising on cybersecurity. The DoD Chief Information Officer (CIO), as the key arbiter in this space, must foster true reciprocity allowing nontraditional

[29] Defense Advanced Research Projects Agency (DARPA). BRIDGES: Bringing Classified Innovation to Defense and Government Systems. https://www.darpa.mil/research/programs/bridges

[30] National Institute of Standards and Technology (NIST). (2020, September 23). Special Publication (SP) 800-53 Rev. 5 Security and Privacy Controls for Information Systems and Organizations. https://doi.org/10.6028/NIST.SP.800-53r5; NIST. (2024, May 14). SP 800-171 Rev. 3 Protecting Controlled Unclassified Information in Nonfederal Systems and Organizations. https://doi.org/10.6028/NIST.SP.800-171r3; NIST. (2022, November 16). SP 800-160 Vol. 1 Rev. 1 Engineering Trustworthy Secure Systems. https://doi.org/10.6028/NIST.SP.800-160v1r1; NIST. (2021, December 9). SP 800-160 Vol. 2 Rev. 1 Developing Cyber-Resilient Systems: A Systems Security Engineering Approach. https://doi.org/10.6028/NIST.SP.800-160v2r1

[31] William A. Reinsch and Kati Suominen / Center for Strategic and International Studies (CSIS). (2023, June 21). Are U.S. Digital Platforms Facing a Growing Wave of Ex Ante Competition Regulation?. https://www.csis.org/analysis/are-us-digital-platforms-facing-growing-wave-ex-ante-competition-regulation

vendors to "comply once, sell many" rather than having to recertify and re-attest for each individual contract or system.

1. **Streamlining the ATO Process:** Ensure that streamlining the ATO process is a top priority for the next Secretary of Defense, and continue to collect user- and software-community feedback on changes to the ATO process since the March 2024 DoD CIO "Cybersecurity Reciprocity Playbook" and the May 2024 Deputy Secretary of Defense memo "Resolving Risk Management Framework (RMF) and Cybersecurity Reciprocity Issues".[32] Set shot clocks on ATO applications and establish a Secretary- or Deputy Secretary-led senior leader "tracking group" for the new guidance and processes under Section 1522 of the FY 2025 NDAA to collect data on the efficacy of the changes, including key metrics such as ATO approval rates, average time to ATO, ATO application volume, vendor satisfaction, cost savings, number of ATO-related issues, and cloud service provider participation. Also track RMF compliance, ATO process automation, and estimated overall return on investment of ATO process improvements.
2. **Promoting Reciprocity:** Update the DoD CIO "Cybersecurity Reciprocity Playbook" to provide clearer guidance and support for reciprocity. While the current playbook broadly acknowledges the benefits of reciprocity, its implementation is hindered by overly rigorous and burdensome inter-office coordination requirements that add cost and complexity without demonstrating clear value for the effort. In practice, this makes it more time- and cost-effective for vendors to recertify rather than navigate the reciprocity process, which defeats the purpose of the playbook. The revised playbook should prioritize simplicity, clarity, and efficiency, and focus on delivering tangible value and return on investment for vendors, rather than perpetuating unnecessary bureaucratic complexity.
3. **Adopt FedRAMP for Unclassified Data:** Instead of or in conjunction to (1) and (2), the DoD should transition toward the Federal Risk and Authorization Management Program (FedRAMP) for unclassified data on NIPR (below SIPR) networks and promulgate rules that prioritize FedRAMP requirements, rather than maintaining separate, *sui generis* risk management standards in the RMF and DoD-specific Cloud Computing Security Requirements Guide (CC SRG).[33] If the DoD wants additional unclassified controls, it should work with its interagency partners to bake those into the FedRAMP baseline. That would enable true "comply once, sell many" for vendors and increase marketplace competition.
4. **Waive CMMC for Larger Vendors:** In accordance with (3), waive additional Cybersecurity Maturity Model Certification (CMMC) requirements for larger or established vendors who are already compliant with FedRAMP and/or DoD-specific CC SRG standards. This would further reduce the regulatory burden and spur nontraditional vendor participation in the DoD market.
5. **Leverage cATO Approaches:** Continue promulgating continuous ATO (cATO) approaches leveraging commercial continuous monitoring (CONMON) tools to accredit the DevSecOps pipelines developers use to build software, rather than mandating detailed examinations of the software itself. Conduct maturity assessments on the basic things needed to get a pipeline certified for Continuous Integration/Continuous Deployment (CI/CD), focusing on tactics, techniques, and procedures (TTP) rather than technologies. The emphasis on TTP will help identify areas where customers and vendors may need additional support or guidance.

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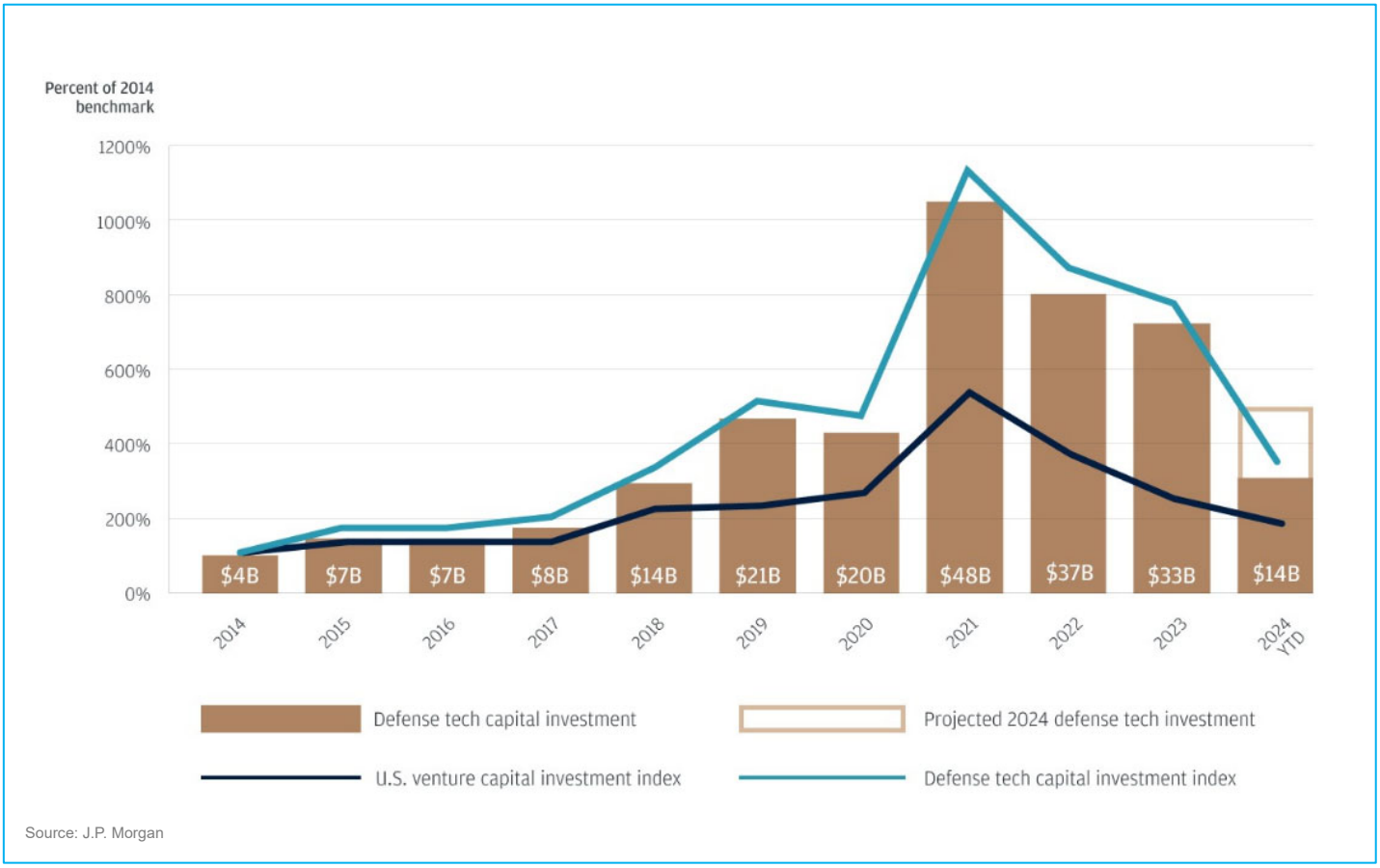
[32] DoD Chief Information Officer (CIO). (2024, May 15). Cybersecurity Reciprocity Playbook. https://dodcio.defense.gov/Portals/0/Documents/Library/(U)%202024-01-02%20DoD%20Cybersecurity%20Reciprocity%20Playbook.pdf; Deputy Secretary of Defense. (2024, May 2). Resolving Risk Management Framework and Cybersecurity Reciprocity Issues. https://dodcio.defense.gov/ Portals/0/Documents/Library/ResolvingRMF.pdf

[33] DoD Cyber Exchange, Defense Information System Agency (DISA). (2024, June 21). Cloud Computing Security Requirements Guide (CC SRG). https://dl.dod.cyber.mil/wp-content/uploads/stigs/zip/U_Cloud_Computing_Y24M07_SRG.zip

Appendix C: Dedicated Capital

Nontraditional vendors have difficulty accessing dedicated capital as they invest resources to transition their prototypes to production. Despite successfully developing innovative solutions, these vendors struggle to scale quickly to meet the needs of the warfighter while satisfying their investors. The complexities of the PPBE resource programming process, a lack of clear guidance and support for SBIR/STTR Phase III contracting, and uncertainty around post-SBIR/STTR funding opportunities exacerbates these production challenges.

The good news here is that America's venture capital industry has heightened its focus and capital commitment to defense-related businesses. Since 2021, venture and other private capital allocators have invested over $130 billion into defense technology startups in areas such as advanced computing and software, sensing connectivity and security (i.e., integrated network systems-of-systems), biomanufacturing, and autonomous systems.[34] According to the Silicon Valley Defense Group, both the amount of capital and number of deals involving defense startups have continued to increase above pre-pandemic levels, despite overall slowdowns in venture distributions and deal activity over the last couple years.[35] Allies and partners have also been coming to the table since Russia's full-scale invasion against Ukraine, most prominently in Europe where investors formed the NATO Innovation Fund (NIF)



[34] Justin Krauss / J.P. Morgan. (2024, September 20). Tapping the United States' greatest weapon: innovation. https://www.jpmorgan.com/insights/investing/investment-trends/defense-tech-innovation-and-the-role-of-startups

[35] Silicon Valley Defense Group (SVDG). NatSec100 – 2024 Edition. https://natsec100.org/

in 2023. Under advisement from their U.S. counterparts, NIF investors from 24 NATO countries have so far committed more than $1 billion to deep tech areas such as AI, autonomy, quantum, space, and advanced materials.[36] Many of these same investors have also been more involved in the Russia-Ukraine conflict, with U.S. and allied investors in Silicon Valley and elsewhere partnering with Ukrainian defense forces to rapidly upgrade their technology infrastructure and access to advanced capability.[37] As geopolitics and conflict continue to shape boardroom decision-making, private capital's determination to play an active role in shaping the future of defense will only deepen.

However, the influx of U.S. private capital in defense, while a critical long-term step toward expanding the defense industrial base, must be accompanied by a corresponding effort from the DoD to adapt its innovation funding model to better support the integration of commercial, dual-use technologies into its existing systems. The DoD's current funding model, including approximately $6 billion in RDT&E funding allocated at the OSD level – essentially to perform individual projects for joint objectives – is incongruous with the massive need to focus integration at the Service level, where the PEOs face a neglected business problem preventing nontraditional vendors from transitioning into programs of record at scale: *technical debt within those programs*.

Today, much of the nontraditional capability that the DoD desires is packaged as a software container or has a data flow requiring a modern digital infrastructure to develop and integrate. This capability has nowhere to go within the DoD's outdated digital infrastructure, thereby keeping the acquisition system tied into traditional vendors, despite a plethora of new strategies and policy directives for adopting open architectures, digital engineering tools, and other innovations from the broader technology ecosystem.

The extended PPBE process only entrenches this legacy paradigm. Under the existing regime, PEOs will largely focus on achieving specific military capabilities (e.g., having a certain number of tanks or aircraft) instead of improving how those capabilities are developed or procured (e.g., using agile software development methods, modular open systems approaches, or new rapid acquisition pathways). Rather, PEOs will remain captive to low-risk activities and resist change and disruption, lacking the capital and schedule to modernize and recapitalize.

Without dedicated capital to guide development and innovation centrally across the Services, the DoD's 40-year-old business model will remain incompatible with the modern, software-defined world. Absent fundamental changes in funding distributions, the PEOs will persist in bolting on new technologies to outdated infrastructure, increasing technical debt year by year, further slowing development, lowering buying power, raising costs, and creating added risk to new technology being integrated. To end this vicious cycle, a significant percentage of RDT&E funding must be taken out of the PPBE process and rapidly reallocated to new centralized organizations at the Service level focused exclusively on development, innovation, modernization, and recapitalization activities.

The FY 2025 NDAA includes a number of important initiatives to address these challenges, such as establishing an implementation team for the PPBE Reform Commission's recommendations, and specific provisions to improve the DoD's software acquisition pathway, require the use of open interface standards for DoD contracts, streamline milestone decision requirements for major defense acquisition programs, expand the scope of projects that can be conducted through the OTA vehicle, introduce new performance incentives related to commercial product and commercial service determinations, and

[36] NATO Innovation Fund. (2024, July 3). EIF and NATO Innovation Fund join forces to unlock private capital for Europe's defence and security future. https://www.nif.fund/news/eif-and-nato-innovation-fund-join-forces-to-unlock-private-capital-for-europes-defence-and-security-future/

[37] Raj M. Shah and Christopher Kirchhoff. *Unit X: How the Pentagon and Silicon Valley are Transforming the Future of War*. (New York: Scribnr, 2024).

allow the use of Defense Modernization Account funds for time-sensitive equipment modernization. While these provisions are sensible and overdue changes, centrally coordinated innovation and funding at the Service level is necessary to dramatically modernize and shift to a hardware-enabled, software-defined environment.

Recommendation 8: **Reauthorize the DoD SBIR/STTR program with reforms to improve the rate of Phase III transitions for companies with a viable commercial and defense product, eliminating "SBIR mills" that treat the program as a business in itself.** The DIB previously cited data indicating that the top 25 all-time recipients of DoD SBIR/STTR awards received 18 percent of total Phase I or II funding, and of those, only four generated more in Phase III contracts than they received in non-dilutive Phase I or II awards.[38] Moreover, 20 of those 25 companies have been receiving SBIR/STTR awards for more than 20 years, suggesting that almost a fifth of all SBIR/STTR funding goes to companies that do not create commercially viable products, but return to the SBIR/STTR pool year after year to consume funding that could be otherwise invested in future commercially viable defense capabilities. Changes in the SBIR/STTR award process would make it more consistent across agencies and less cumbersome for small technology startups.

1. **Formalize a Stopgap SBIR/STTR Phase III Fund:** Congress should re-establish the Rapid Innovation Fund (RIF), now known as the Rapid Integrated Scalable Enterprise (RISE) program currently managed under OSBP, to serve as a unified stopgap measure to address perennial SBIR/STTR Phase III concerns. RIF/RISE was originally established in the FY 2011 NDAA as a solution to years of recommendations for Congress to set aside dedicated SBIR/STTR Phase III funding.[39] RIF's relevance to operational needs, simple proposal process, bridge funding for commercialization, aggressive 18-24 month timelines, and large average award size of $2.5 million made it an effective program. In nine years, RIF distributed over $2.2 billion in funding to more than 30 DoD organizations, of which 57 percent transitioned or were expected to transition to SBIR/STTR Phase III, and at least 31 percent produced capabilities that were fielded and used by warfighters (these numbers likely underestimated).[40] Despite RIF's track record in terms of access to small business innovation and commercialization outcomes, Congress abruptly deleted the program's funding from its FY 2020 appropriations and its successor (RISE) remains unfunded. Current funded efforts, such as DIU's National Security Innovation Capital (NSIC), the Accelerate the Procurement and Fielding of Innovative Technologies (APFIT) pilot, and the Rapid Defense Experimentation Reserve (RDER) initiative, have endeavored to fill the gap left by RIF in meaningful ways. Other important efforts, like the Defense Industrial Base Consortium (DIBC) managed within OSD A&S, are putting funds to work with nontraditional vendors to enable rapid research and prototyping. One proposal we heard from industry – that Congress and the DoD should fund a permanent SBIR/STTR Phase III program from a variety of funding sources[41] – deserves careful investigation by Congress and the key likely implementers across OSD and the Services. In the meantime, elevating RISE as a unified stopgap solution to Phase III concerns would bypass the challenges of creating a new Phase III program – whether with additional appropriations or by pooling funds from existing sources which could take time to decide and enforce. It would also leverage RIF's established

[38] Defense Innovation Board. (2023, July 17). Terraforming the Valley of Death. https://innovation.defense.gov/Portals/63/DIB_Terraforming%20the%20Valley%20of%20Death_230717.pdf

[39] DoD Office of Small Business Programs (OSBP). (2017, December 13). Rapid Innovation Fund (RIF) Program Overview. https://business.defense.gov/Portals/57/Documents/RIF%20Overview%20%28Dec2017%29.pdf?ver=2017-12-13-110403-150

[40] TechLink. Defense Rapid Innovation Fund: An Assessment of RIF Effectiveness FY 2011-2016. https://rt.cto.mil/assessment-of-rif-effectiveness-fy-2011-2016-by-techlink/

[41] Software in Defense Coalition, The Alliance, National Venture Capital Association. (2024, October 3). Joint Innovation Coalition Comments re SBIR. https://the-alliance.squarespace.com/s/Joint-Innovation-Coalition-Comments-re-SBIR-Reauthorization-Oct-3-2024-dsc7.pdf

implementation mechanisms, including fund management and allocation strategies, and create immediate value for industry without precluding future work toward designing a permanent central Phase III program.

2. **Establish Permanent "Oasis Funds":** In tandem with (1), the DoD should work with Congress to create a dedicated transition fund within each Service to support nontraditional vendors in bridging the middle of the acquisition "valley of death" between prototyping and procurement with an “oasis” of decolorized dollars. Each Oasis Fund would complement the permanent SBIR/STTR Phase III initiative, providing a separate additional vehicle for Service Acquisition Executives to invest in promising nontraditional vendors not unlike the AFWERX Strategic Funding Increase (STRATFI) and Tactical Funding Increase (TACFI) programs.[42] Rather than being filled through a separate appropriation or taxing existing Service programs, the Oasis Fund would leverage decolorized End-of-Fiscal-Year (EoFY) contingency readiness funds, which frees up over $15 billion in Service appropriations during the last 48 hours of every fiscal year. Allowing the Services to move a fixed amount of these often poorly managed billions into a transition account that refreshes and decolors expiring funds would provide an additional source of transition dollars for nontraditional vendors at no additional taxpayer expense. To ensure effective use, limitations should be set on the duration and amount of Oasis funding, and investments should be reported yearly to Congress for portfolio-level oversight.
3. **Require Minimum 50 Percent Funding for Open Topics:** Open Topics invite bidders to describe problems they have discovered and solutions they have developed, which often augment and surpass in impact the priorities the DoD advances on its own. GAO recently found that half of DoD Components are issuing legacy narrow topics but falsely calling them open. Currently, more than half of all Air Force SBIR/STTR awards now come via Open Topics, and demonstrate that unrestricted calls for innovation produce more impactful ideas from a broader range of nontraditional respondents. SBIR’s success requires enforcement of Open Topic legitimacy, a minimum funding level, and an independent third-party validation that Open Topics conform to GAO’s definition.
4. **Eliminate “SBIR Mills”:** Implement meaningful commercialization benchmarks that unambiguously convey the message that SBIR/STTR is investment capital, not a business unto itself, and that the DoD expects companies to eventually graduate from the program. Recommend (a) after 25 Phase IIs, a company must demonstrate a greater than 1:1 gross revenue ratio of all non-SBIR/STTR sources directly resulting from SBIR/STTR investments against the total lifetime SBIR/STTR funding the company has been awarded; and (b) failure to meet the benchmark results in company not being permitted to submit any new Phase I proposals until they exceed the benchmark. Expand use of Technical and Business Assistance (TABA) and require agencies to permit awardees to select their own vendors rather than funneling them to agency-selected contractors.
5. **Adjust SBIR Business Size Standards:** Current SBIR/STTR size standards are set to 500 employees for both Phase I and II awards. To ensure funding for early R&D is awarded to truly small and innovative companies – not larger, more established vendors – reduce maximum allowable headcount for Phase I proposals to 200 employees. Meanwhile, to ensure that funding is also directed toward small businesses with the ability to scale R&D and manufacturing capacity, raise maximum allowable headcount for Phase II proposals to 1,000 employees. This would ensure SBIR/STTR also supports companies with the ability to compete directly with larger contractors for scaled production. For reference, the North American Industry Classification System (NAICS), used

[42] AFWERX. Air Force Ventures STRATFI and TACFI Programs. https://v3.afwerx.com/divisions/afventures/stratfi-tacfi/

to define standards for SBIR/STTR funding, sets headcount limits for Research businesses at 1,000 employees and for Manufacturing businesses at 5,000 employees.

6. **Institute Shot Clocks for SBIR Contract Notification and Award:** SBIR/STTR shot clocks could be set at 30 days for Phase I notification of award and 60 days to issue contract, as well as 60 days for Phase II notification of award and 60 days to issue contract. If an agency fails to award in a timely manner, its funding for the following year should be reallocated to other agencies that are meeting the timeline.
7. **Include SBIR Phase III Authority in the FAR:** Currently, the FAR does not explicitly address SBIR/STTR Phase III authority, which creates uncertainty and barriers for small businesses seeking to commercialize their developed technologies. Congress should mandate that the FAR Council include Phase III authority in the FAR to provide clarity and consistency in the implementation of SBIR/STTR and a framework for agencies to follow when awarding Phase IIIs.
8. **Require SBIR Phase III Training for Contracting Officers:** The FY 2025 NDAA introduced new funding for acquisition training for DoD contracting officers. While an essential step, it neglects training for SBIR/STTR Phase III contracting, a significant impediment for FAR-based contracting officers who refuse to negotiate Phase III awards. Congress should mandate and fund Phase III training for all DoD contracting officers.
9. **Enforce Market Research Requirements:** Enforce program strategies that maximize participation of multiple vendors, use of open standards, and commercial content. Audit market research performed by program managers or contracting officers on behalf of the DoD. Implement a new protest process for FAR Part 10 violations. Create career incentives for acquisition professionals to find commercial items and SBIR/STTR products that are “close enough,” pursuant to FAR 10.001(a)(3)(ii), and that deliver the capability faster, at reduced costs, or with improved capabilities compared to the original plan.
10. **Break Down Stovepipes:** Create proposal evaluation criteria and contract incentives for prime integrators that leverage open standards and commercial technology to increase the passthrough fee structure when buying commercial items that displace in-house custom development labor. Open interoperability standards are mandated by law (i.e., National Technology Transfer and Advancement Act and Office of Management and Budget (OMB) Circular A-119), but prime contractors often circumvent them to create stovepipes that keep out third-party commercial plug-in products. Congress should introduce legislation to more strictly enforce the Clinger-Cohen Act, which allows the use of simplified acquisition procedures for commercial items up to $5 million, to prohibit proprietary interfaces for subsystems and software.

Appendix D: DIB Terraforming the Valley of Death Report (July 2023)

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DEFENSE INNOVATION BOARD

TERRAFORMING THE VALLEY OF DEATH

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Table of Contents

Executive Summary

Over the last 25 years, the Department of Defense (DoD) has engaged the growing U.S. technology ecosystem with a series of top-down olive branches. Perry created joint research and development (R&D) projects; Carter, the Defense Innovation Unit (DIU); and now Austin, the Office of Strategic Capital (OSC). This continued outreach is a good sign our military's leaders understand a divided technology ecosystem will ultimately undermine U.S. national security competitiveness, especially against centralized military-civil fusion in China.

However, these olive branches do not mark the end of the valley dividing non- recurring defense R&D funding from recurring defense revenue. At best, they are provisions to aid this valley's crossing. At worst, dangerous Sirens in a "valley of death." With U.S. private investors unprecedentedly pro-defense at a time of global security challenges, **the need for reform is immediate.**

While DoD undertook meaningful strides over the past decade, these largely centered on new organizations experimenting with new reforms. Methods for both investing and transitioning R&D into programs of record

were demonstrated by organizations like AFWERX, Air Force Research Laboratory (AFRL), Army Futures Command, Defense Innovation Unit (DIU), Marine Corps Warfighting Laboratory, Special Operations Command (USSOCOM), and Strategic Capabilities Office (SCO). However, these methods were never formalized, shared, and integrated into a repeatable, transparent process capable of transitioning new DoD R&D entrants to recurring revenue at scale. This task must now be completed and urgently if the Department is to prevail in the "decisive decade" ahead. Delay is increasingly dangerous: keeping the U.S. technology ecosystem divided relative to China's - and future defense unicorns, as mythical as their namesake - is a losing strategy at the starting line. The Pentagon must return to its role of seeding world-changing technology, and to do this, it must fix the valley of death, now.

The Defense Innovation Board Task Force on Strategic Investment Capital assessed how to terraform the startup Valley of Death. Interviewing hundreds of startup companies, venture investors, current and former DoD leaders, and Combatant Commanders, it found that the:

Investment Side of the Valley

Needs reforms that make DoD a better investor and investment partner by (i) becoming more expeditionary and accommodating to external stakeholders, (ii) leveraging total addressable market potential, (iii) clarifying product-market fit, (iv) tiering investments to create complete products (not just prototypes) and (v) making correspondence timely and predictable across the entire investment process. It must also (vi) train, staff, equip, and resource for investment success, not rely on small cadres of passionate government entrepreneurs to shoulder this must-win mission.

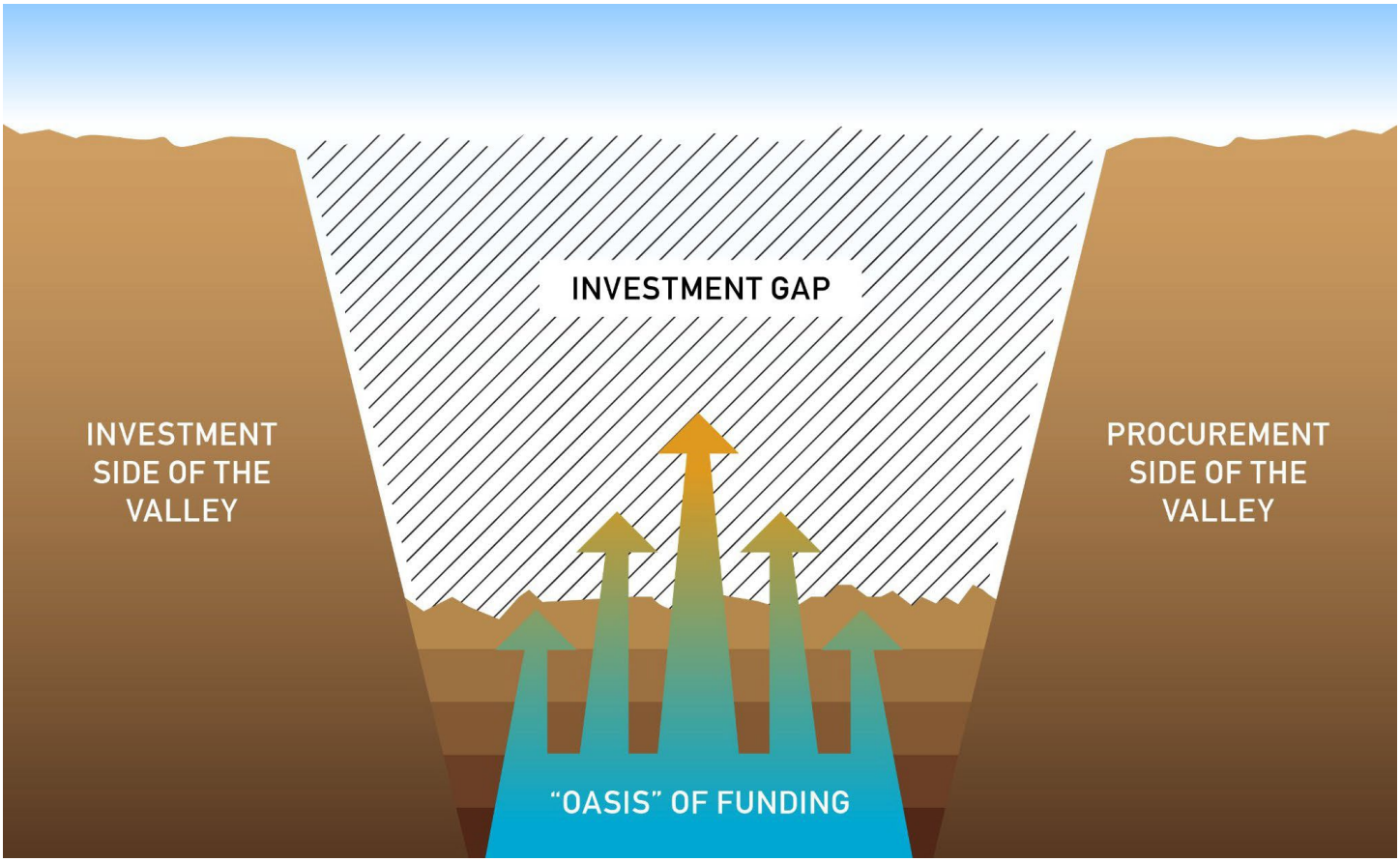

Figure 1. Chart that illustrates the "investment gap" and the opportunity to bridge the "Investment Side" to the "Procurement Side" by creating an "Oasis of Funding" that connects the two sides.

Middle of the Valley

Currently empty, needs an "oasis" of funding to bridge DoD's yearly portfolio of R&D investments into its two- often three-year program-specific budget cycles.

Procurement Side of the Valley

Needs overhauling to create (i) capability opportunities more frequently, (ii) agility in both program portfolios and colors of money, and (iii) incentives that encourage disruptive practices, including working with startups. Though these are required more broadly for long-term competitiveness, they would also make the Procurement Side of the Valley more receptive for startups turning into scale-ups.

These reforms are essential to long-term military competition as part of a broader national one. As a cautionary example, the generative AI helping write this report – and potentially the world's next chapter – was created by a one-time startup not connected to DoD. Can DoD risk tomorrow's world-changers being on a separate innovation battlefield, or worse, an opposing side?

Setting aside the details of this report, the overarching recommendation is to care about our industrial base competitiveness vis-à-vis China as much as our warfighting readiness. The U.S. military flies airplanes anywhere in the world, sails ships into hostile seas, erects military cities in the desert, and oversees it all with satellites in space. If DoD wants to be an investment partner of choice, helping build a winning industrial base for the future – one capable of building a winning military - it can be. But it must **promote it from a priority to a duty: to support and defend U.S. innovation.** The staffing, resourcing, bureaucracy busting, and other must-do reforms would then follow. Amazing people now serving would take this innovation beachhead.

Investment Side of the Valley: SBIR/STTR and Innovation Organizations

The near side of the valley of death is $1.7 billion of annual Small Business Innovative Research (SBIR) and Small Business Technology Transfer Research (STTR) funding. This augments $38.7 billion of laboratory R&D funding. Though capable of acting like DoD's venture fund, its return on investment – particularly transitioning capability into the hands of warfighters - is low.

A recent study by Amanda Bresler and Alex Bresler[1] highlighted the declining ROI of DoD's SBIR investment dollars nearing transition:

- Over the last decade, only 16 percent of DoD SBIR companies won Phase III transition contracts.
- And of these, 61 percent generated more in Phase I/II funding than they did in Phase III transition contract revenue: a negative ROI on those Phase I/II dollars.

Setting aside the disparity between investment and laboratory funding, with a yearly non-dilutive investment fund, and significant control of its own $800-billion-per-year market, why is the Pentagon not succeeding?

The Bresler study points to one of the reasons: over the past decade the DoD has awarded a disproportionate share of its SBIR Phase I/II investment dollars into a small number of the same companies:

- The top 5 percent of companies with the most Phase I/II awards collectively received 49 percent of all Phase I/II funding awarded through the DoD SBIR program.
- The top 25 companies alone (0.53 percent of 4,703) received 18 percent of all Phase I/II funding – over $2.3 billion - an average of over $92 million in Phase I/II awards per company.
- And 24 of these 25 companies have been receiving SBIR awards from the DoD for more than 10 years, 20 of them for more than 20 years.

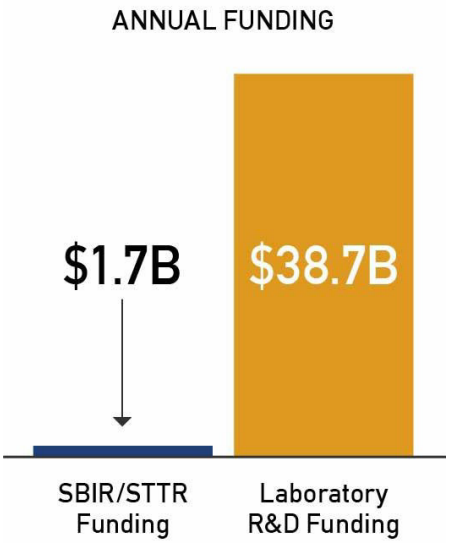

Figure 3. Chart that illustrates disparity between SBIR/STTR funding and Laboratory R&D funding – SBIR/STTR = $1.7B/year; Laboratory R&D = $38.7B/year.

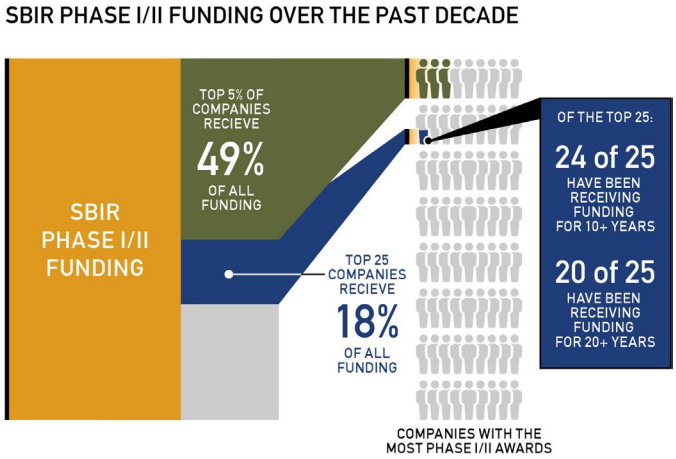

Figure 2. Chart that illustrates money going to a small number of the same companies over and over, but who do not successfully convert the funding they receive into greater success:

- *Top 5% of companies receive 49% of all Phase I/II funding*
- *Top 25 companies (which represent just 0.53% of total) receive 18% of all Phase I/Phase II funding*

[1] Presented at the Naval Postgraduate School's Acquisition Research Symposium in May 2023.

Of these long-time multi-SBIR award winners, the transition rate is low: only 4 of these top 25 SBIR companies generated more in Phase III contract revenue than they received in Phase I/II funding. This hurts new companies, warfighters, and taxpayers alike.

The Bresler study's conclusion echoes one of our own: "The DoD SBIR program awards a disproportionate share of Phase I/II funding to a set of companies that, based on extensive past performance data, are unlikely to deliver capabilities to defense end-users. That the most active DoD SBIR companies are not necessarily those with the greatest potential for transition indicates that they are selected for Phase I/II awards based on other, unrelated criteria."

Addressing the DoD SBIR program's well-documented over-investment in a small number of companies that do not transition scalable capability to warfighters calls for direct action on its own.

But based on our DIB Task Force's findings, we also identify a broader set of challenges that must be addressed immediately to meet the Secretary's intent of establishing "a holistic and scalable approach … to crowd-in private capital and scale capabilities … to ensure our military remains unmatched":

- **Not Leveraging Total Addressable Market Potential.** Though private companies aim to address the biggest possible market, the DoD is unaccustomed to generating requirements, acquisition plans, budgets, and regulations that weigh military needs alongside commercial ones for increased advantage. The Pentagon is simply more practiced in ".mil" procurements than ".com" partnerships. This kills dual-use synergy, defense purchasing power, and commercial trust.
- **Not Generating Product-Market Fit via its Investments.** Across DoD, SBIR/STTR and Laboratory R&D contracts do little to indicate future defense recurring revenue opportunities. Those opportunities, in the Program Objective Memorandum (POM), are built separately and without stakes in these early-stage R&D investments. Whereas early product- market fit is verified in the private sector based on revenue, SBIR/STTR and Laboratory R&D are effectively a defense "resort cash" spent on a customer-less R&D island, with no real value in the broader defense market. This makes the value of dual-use investments difficult for private investors to judge.
- **Not Systematically Tiering its Investments to Create Complete Products, Rather Mostly Prototypes.** Private investment increases as companies move from concept to prototype to product. However, DoD overspreads SBIR/STTR and Laboratory R&D, placing too many small prototyping bets that fall short of productizing. With prototypes ineligible for most of the defense budget's "colors of money", productization either gets shifted to private investors (who cannot judge product-market fit per above) or to larger companies via mergers and acquisitions. The vicious cycle then continues.
- **Not Reforming its Research Laboratories and Tolerating Competition with Industry.** Created in an age where defense invented most of its technology, the research labs have struggled adapting to technology built outside their walls. Mostly "peanut-butter-spreading" projects too thin for strategic impact, lab transitions, where they occur, remain mostly small and incremental, not disruptive and game-changing. Additionally, peanut-butter-spreading often overlaps lab projects with commercial technology areas, inducing competition with startups. Contrastingly, areas where the U.S. military is partnering to accelerate dual-use commercial technology, like electric and vertical-takeoff-and-landing aviation, are creating **military-civil synergy**, vice fusion, where competitive benefits of commercial markets are preserved under government acceleration.

Such synergistic public-private partnerships are disappointingly rare. (One on generative AI would be most welcome.) Though beyond the scope of this study, a major reform of the

research laboratories should be undertaken with the goal of maintaining exclusive DoD R&D while maximally leveraging the private sector's.

- **Not having timely and predictable correspondence across its investment process.** Many facets of DoD's bureaucracy turn what ought to be a fast "yes" or "no" into a slow "maybe." This is due to:
  - *Understaffing and Undertraining* – Organizations are not staffed nor trained for investment as a core acquisition discipline like engineering, contracting, and program management are. As opposed to managing a single program, mentoring a portfolio of companies on defense missions, IT, clearances, and other DoD-isms is not a trained DoD skill. Result: investment remains a side hustle for the passionate few, which inadequately covers the mission.
  - *Uncertain Availability of Funds* – Investment funding often gets held or redirected by changing headquarters priorities, abandoning companies in the pipeline.
  - *Uncertain Decisions and Correspondence* – There is no "shot clock" for DoD investment decisions. In the private sector, companies get told "no" frequently, but more quickly and predictably. Without a shot clock in a predictable DoD investment process, how can companies count on DoD in their growth plans?
- **Not using modern development approaches broadly, especially agile software development, digital engineering, and open modular architectures.** These would allow startups to work on subcomponents of more-complex systems more easily, where security and regulations would otherwise be prohibitive. This is discussed in greater detail in the Procurement section.

As mentioned, DoD did make progress on new reforms with a handful of experimenting organizations. Here are the highlights:

Defense Innovation Unit (DIU)

Though small in scale, DIU became emblematic of DoD's outreach to Silicon Valley and has remained so from 2016 to today. It made quick inroads in technology hotspots where DoD otherwise lacked presence and provided a mechanism for bringing outside companies to work with the government. With the rise of Service investing in 2018, DIU showed agility pivoting into partnerships with Service investors, including co- investing in technologies like sustainable aircraft, small drones, and biometrics, often augmenting staff with extra contracting officers and program managers. Leveraging their off-premise sites, DIU instituted three important reforms:

1) **Outside Presence** – Distributed local presence outside of DoD bases (via DIU and National Security Innovation Network offices) for easier engagements between startups and users.
2) **Dual-Use Focus** – More flexible requirements and development plans to enable military and commercial dual-use synergy, especially with venture-back companies.
3) **Non-Contractual Mechanisms** – Revitalizing Other Transactions Agreements as flexible means of engaging with commercial companies.

The Good and the Bad

DIU made important strides in areas not yet ready for Service customers, especially new supply chains and deep tech. One example, the Blue UAS project restored a U.S. supply chain for small drones, which may now be leveraged by Service users. Another in wearable biometrics matured technology later used by Services to manage COVID. But despite dropping the "x", DIU remained "xperimental" without a cogent DoD process for crossing the valley of death with a role clearly defined in it. Proposed Congressional legislation is now weighing to change that and provide DIU the resources it needs.

AFWERX/SpaceWERX

From 2017-2021, the U.S. Air Force and U.S. Space Force took strides reforming SBIR/STTR; some were later passed into legislation by Congress.

4) **Rapid Contracts and Payments** – Combining open-topic solicitations, contracting sprints, pitch events, and cohort management as a more scalable means of cultivating portfolios of companies.
5) **Public-Private Investment Matching** – Tiered SBIR/STTR investments with private capital matching to entice "pay-to-play" POM dollars into investment contracts. This provided a better measure of product-market fit via larger (up to $60 million) "STRATFIs" for startups to attempt productization.

6) **Investment Acquisition Authority** – Establishing a single investment arm with direct control of SBIR/STTR funding and direct reporting to the Service Acquisition Executive.

The Good and the Bad

This Department saw an uptick in value: five-to-one investment matching in 2021, over 1,500 new companies working in defense, and acceleration of new markets, like electric aviation. Its "Vanguard" process provided a budgetary mechanism for placing bigger R&D bets with AFRL, with one now transitioning to a program of record (i.e., "Skyborg" Collaborative Combat Aircraft). Formalizing AFWERX as the investment acquisition authority provided top cover to push boundaries. But AFWERX lacked sufficient staffing, equipping, and administration from the Air Force to sustainably scale it. This paradigm still exists today.

NavalX

The Navy formed NavalX in 2019, leveraging its worldwide naval presence (i.e., "Tech Bridges") to engage commercial companies. Though the Navy enjoys higher SBIR/STTR transition rates than those in the Bresler study, these mainly feed extant programs with non-dual-use technology. Such non-dual-use SBIR/STRR companies face unspoken competition from the Navy's unique Warfare Centers for the same scopes of work. The creation of NavalX is meant to disrupt this with dual-use entrants. However, NavalX lacked authorities and budget, compelling the Navy to reboot the organization this year. The Navy should make this a high priority.

The Good and the Bad

The Navy leveraged its global presence as an engagement resource but did not put investment processes, budget, nor significant personnel in place.

Army Futures Command

The U.S. Army created Futures Command in 2018 to drive commercial outreach. Growing to 24,000 personnel across 25 states and 15 countries in 2019, the Army alone tackled staffing and equipping for its innovation mission, showing earnestness externally with the scale of its "boots on the ground" and level of top cover under a four-star commander. Though fractured from the Army procurement systems, they created an essential reform missing in the other Services:

7) **Training, Staffing, and Equipping for the Investment Mission** – The innovation mission is important, unique, and broad. This requires Command-level facilitating, not side-hustling inside existing programs.

U.S. Special Operations Command (USSOCOM)

With its unique mission, USSOCOM was given direct acquisition authority for unique Special Operational Forces equipment. Of all DoD entities, USSOCOM embraced an important reform of user input and user experience/interface (UX/UI) considerations by connecting operators directly with developers as a core means for accomplishing missions.

8) **User-Centricity** – Though systems may be more complex than user input and UX/UI considerations, embracing these like the private sector improves the professional experiences of operators while accelerating training learning curves.

Most importantly, USSOCOM understood, encouraged, and rewarded risk- takers. Whether mission risk, cybersecurity risk, or technology risk, USSOCOM made daily decisions that would take the DoD bureaucracy years. An agile organization was the result, one capable of moving at commercial speeds.

9) **Risk-Taking Culture** – Innovators, including investors, must take risks to achieve rewards. Rather than judging them individually, judge their portfolio's return over time.

Strengths and Weaknesses

The Command put users first, embraced advantage wherever it found it, took risks, and created stronger product- market fit. But its process would not scale to more complex systems.

Marine Corps Warfighting Lab and OSD Strategic Capabilities Office (SCO)

Though not SBIR/STTR organizations, these two offices were established to get disruptive capabilities across the valley of death. The former is the designated Marine Corps "sherpa" for guiding non-traditional R&D concepts - as varied as AI to vertical takeoff and landing aircraft - into the POM. The SCO, now in its 10th year, has transitioned over half of its advanced warfighting prototypes - from Multi-Domain Operations to Avatar/Skyborg Collaborative Combat Aircraft to Ghost Fleet Uncrewed Surface Vessels - into Service programs of record, with ten operational today. Transitioning into programs of record at these higher rates produced another key reform.

10) **Prioritize Big Bets and Provide Transition Flexibility** – As private investments get larger, they necessarily get fewer. With so much capital on the line, investors go all-in to ensure companies succeed. While having the equivalent of Seed and Series A investors that build portfolios of small investments is critical and needed in DoD, having Series D like

investors that place big bets for crossing the valley to the POM is needed to finish the process. Such investors must also be POM sherpas.

For both of these organizations, POM transitions took longer than expected on average, with budget uncertainties often forcing them to fund promising capabilities for additional years when valley crossings failed. Even with strong Service support, stakeholders like each OSD Under Secretary, Director of Cost Analysis and Program Evaluation, Deputy Secretary of Defense, Secretary of Defense, White House Office of Management and Budget, and the myriad Members of the four Defense Congressional Committees all get a vote too. No investment process that culminates in valley crossings can easily fix this: it must contend with it.

The Good and the Bad

Both organizations took big disruptive bets and successfully transitioned them into the POM and into the field. But their inability to predict valley crossings forced them to divert resources to keep transitions alive at the cost of other bets.

In most cases, these ten highlighted reforms were carried out by the passionate few working extreme hours with extreme top cover. Training was not formal; staffing, sufficient; nor funding or correspondence, predictable. Though good results were achieved, many companies slipped through the cracks of this "pick-up game." For organizations like DIU and AFWERX, support significantly varied as a function of leadership, burning out those passionate few. As private investors told us, this instability will not make DoD a trusted investment partner long-term.

Combining these best practices with recommendations from our interviews and experience, the DIB recommends the following changes to terraform the Investment Side of the Valley:

Recommendation 1

- Adopt all 10 previous best practices in each Service so the Investment Side of the Valley is more consistent and provisioning for productizing technology. Promote each Service investment lead to be a Program Executive Officer equivalent with commensurate staff, budget, and authority.
- Leverage DIU local presence as a one-stop cross-Service location to engage the DoD and conduct tech scouting.
- Implement investment as formal DoD acquisition discipline: train, staff, and equip for this new functional appropriately. Consider an Army Futures Command like construct to ensure this facilitating remains focused given its uniqueness and importance.
- Reform the research laboratories to accelerate commercial technologies while developing military-unique ones. In both cases, place routine big bets using "Vanguard" like programs.
- Effect policies that prevent redirecting already advertised investment funding and implement a "shot clock" for decisions and correspondence so companies may plan around the DoD.
- Adopt temporal and financial metrics that may be clearly understood and audited both inside and outside of DoD.

Beyond the Services, there are DIU and OSC within the Office of the Secretary of Defense (OSD). Aside from its agencies and field elements, OSD does not represent its own customer base in the defense market. But OSD's unique authorities and centralized convening power can accelerate the investment mission. Therefore, OSD's investment role should be strategic and complementary, focusing on areas where independent Services actions would fall short of DoD's mission needs. These include:

- Regional tech scouting using the DIU/NSIN network and conducting comprehensive market research to support DoD acquisition using commercial technology.
- Investment training, partnering Defense Acquisition University with DIU/OSC.
- Deep tech not yet ready for Service use cases.
- New supply chains.
- Financing and lines of credit.

- International markets and tech hubs.

This last role is not being performed today due to statutory restrictions on SBIR/STTR funding, requiring companies be majority-owned by U.S. citizens. OSD has existing roles and authorities for leveraging international systems, like security cooperation and foreign competitive testing. These should be expanded to include foreign technology and investment under DIU so that DoD may compete on the innovation battlefield globally.

This strategic role will be complementary to the Services, broaden DoD impact, and create a new basis to work with Allies and Partners. As such, strategic investments should have maximal authority to engage companies with debt, equity, grant, agreement, and contract options, leveraging appropriations and the financing program the Office of Strategic Capital is building. The task force commends the Secretary for OSC's creation and its bold vision of creating DoD's first lending program to seed, accelerate, and strengthen the competitive industrial base our nation needs. It is critical that DoD have every available option to fight for the future.

The task force noted the biggest risk to both DIU and OSC, and to a lesser extent SCO due its classified nature, is being headquarters organizations where changing top cover will change impact. When execution mistakes happen, the risk tolerance of the serving Secretaries will determine these organizations' survival. This organizational risk must be addressed.

Stepping back from Recommendation 1, nowhere are best practices being implemented simultaneously, and some have even regressed. The result: DoD talking a good investment game but not considering it a core mission.

Recommendation 2

Facilitate and empower DIU and OSC with diverse authorities (e.g., debt, equity, grants, agreements, and contracts) to make strategic investments in tech scouting, deep tech, industrial base financing, supply chains, and international markets on behalf of DoD.

Finally, as our interviews with companies and investors made clear, we must create better mechanisms for ongoing dialog between public and private officials in the dual-use investment community if we are to achieve the military-civil synergy needed to out-compete China's military-civilian fusion. Better communication will create better companies, capabilities, and markets for the competition.

Recommendation 3

Create a permanent subcommittee of the Defense Innovation Board, or new advisory board, to enable private investors to better understand military needs, and the DoD, the needs of private investment.

Middle of the Valley: The Absent "Oasis"

Even if these Recommendations 1 through 3 were implemented across the DoD, most companies would still be marooned in the middle of the valley. The reason is statutory restrictions on SBIR/STTR limit how large investments may reach. The $60 million Air Force "STRATFIs" each require a unique waiver from the Small Business Administration.[2] Though Congress should remove the need for this waiver, $60 million will not productize many technologies needed by DoD, stranding companies at R&D dead-ends shy of procurement.

The other reason is the Investment Side funds portfolios, whereas the Procurement Side funds itemized programs and services. With defense budgets being built two, even three years ahead of funding availability, successful defense startups will face a major post-SBIR/STTR funding gap, even if they complete productization.

The PPBE process needs a major overhaul to compete against China's centralized budgeting advantages, which the PPBE Commission is assessing. One component must be a funding mechanism that transitions successful startups from defense investment portfolios into specific programs without presupposing winners or undermining Congressional oversight. Such a mechanism would be a much-needed "Oasis" in the Valley of Death, addressing the misalignment of annual R&D vs. two-year procurement budgeting and insufficient productization funding.

To create it, the Services, DIU, et al should report their defense investments to Congress each year, giving overseers insight into the portfolio of startups eligible for next year's Oasis bridge funding, to include their programmatic plans. The remaining unknown would be which subset of companies would succeed during the following year of execution. This provides Congress portfolio-level oversight of transitioning investments, vice giving DoD a blank check.

The Oasis could be funded in several ways:

(i) a separate appropriation,
(ii) taxing Service programs, or
(iii) changing End-of-Fiscal-Year (EoFY) budget rules.

The third is the recommendation. However, it requires new legislation to implement. Because the DoD must carry a funding surplus into the EoFY (for contingency readiness), over $15 billion is allocated - arguably poorly - during the last 48 hours of the fiscal year. Allowing Services to move a fixed amount into a transition account that refreshes and decolors expiring funds would pay for the Oasis with no additional taxpayer resources. Congress could even require notification before transferred funds are obligated. This would also reduce

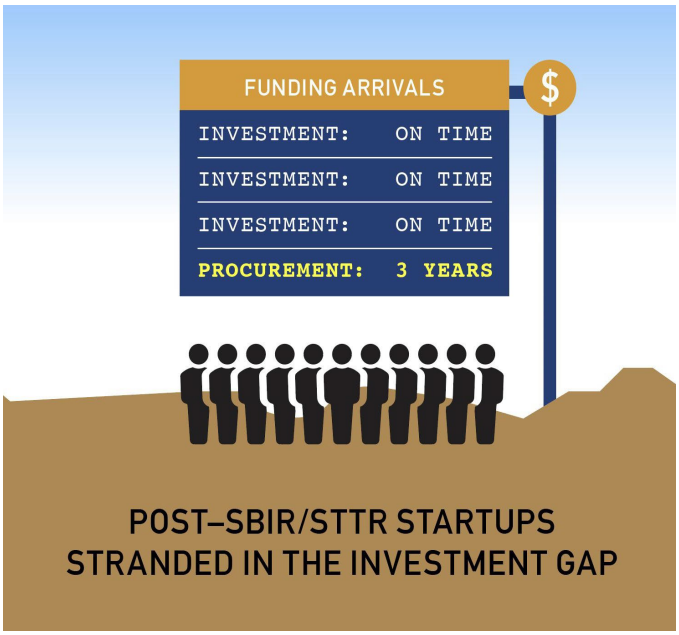

Figure 4. Chart that illustrates the misalignment of timing between the Investment Side, which can fund portfolios expeditiously, and the Procurement Side, which builds their budgets 2-3 years before investment funding is even available.

[2] Waiver is required to pair $15 million of SBIR with matching program funding and two-to-one private capital.

superfluous EoFY spending, a win for warfighters and taxpayers alike.

To avoid misuse, limitations should be set on how long and how much Oasis funding may be used to complete productization and/or bridge

companies to future procurement or service contracts. (Else abuses like those in the Bresler report will occur.) But no matter what funding mechanism is chosen, without budgetary relief, the Middle of Valley will remain a graveyard for dual-use innovation.

Recommendation 4

Create transition “Oasis” funding that addresses the temporal and portfolio-versus-program misalignment of the Investment and Procurement Sides of the Valley while allowing startups to complete productization. Report investments yearly to Congress for portfolio-level oversight, including the Oasis itself.

Overhauling the procurement system is needed for many reasons, not just working with startups. Fed by parochialism, decades of lowest-cost generational programs - where the lion's share is spent on sustainment - and government support have consolidated specialization out of the Defense Industrial Base. Startups, many with access to non-defense recurring revenue, have a chance to help fill the void. But not if the new programmatic opportunities are generational, and recurring revenue, mostly in maintenance. Ultimately, new technology needs greater emphasis to grow a more diverse and dynamic industrial base.

Changing DoD's programmatic landscape is a long game, but it can and must be done, new program by new program. Thankfully, there are macro DoD changes that can make this a bit easier.

Reducing Unnecessary Headquarters Oversight: Having large staffs in the Pentagon, to include those in the Offices of the Under Secretaries of Defense for Acquisition and Sustainment, Research and Engineering, and the Services, whose job is checking the work of others for mistakes is antithetical to risk-taking. It presumes mistakes and learning from them should not exist in defense procurement, which strongly incentivizes the unacceptable status quo. Though there is a necessary role in policy making and compliance with it, current headquarters oversight is a candlesnuffer for innovation. Though beyond the scope of this DIB study, reforming what decisions come to the Pentagon, why, and how often to empower the field is needed for this study's recommendations to be implemented.

Tech Scouting and Market Research to Leverage External Opportunities: The core of a healthy innovation ecosystem is the objective, head-to- head competition of new technologies and products, under expectations that victors are rewarded with sales. Though enshrined in law and policy, market research is woefully under-resourced, making it a shallow compliance check in DoD procurement. Further exacerbated when programs are funded late to need, innovators must force their way into the DoD system, vice entering naturally via normal market behavior.

Treating IT as a Mission-Critical Warfighting System: Across DoD, IT systems and authority-to-operate practices are mostly antiquated beyond relevance. Technical debt, proprietary lock-in, and government-unique requirements stymie dual-use software and data companies alike. Adapting industry best practices - especially open, modular, scalable architectures - could create a militarized internet of things where dual- use software companies could deploy their capabilities. The generative AI helping write this report, recently valued at $29 billion, would not be possible without such approaches. Without action at the Secretary's level, the U.S. military risks falling even further behind.

Adopting Industry 4.0: Joining software, hardware may now be designed, manufactured, and updated more continuously like software. Capable of replacing the full-rate production of generational platforms with lower- rate, continually upgraded systems, this commercial tech trend is ideal for military platforms vis-à-vis China. Having future programs work backwards from turn-key manufacturing technologies (e.g., "gigafactories") - not forward from isolated requirements - unlocks Industry 4.0's potential. The result would be more frequent opportunities for dual-use companies to cross the Valley. No matter how fertile the Investment Side of the Valley becomes, if Procurement opportunities remain generational, the Defense Industrial Base will continue consolidating.

Budgetary Flexibility: Locking programs into small program elements reduces flexibility and purchasing power, including working with startups. Additionally, colors of money are interpreted so conservatively that common sense is not followed, especially for Operations and Maintenance (O&M). Allowing a small

percentage of R&D in an otherwise majority O&M program would open the door to companies whose products need modification to be applied. Many smaller activities could be justified under multiple colors of money, yet the fear of Anti- Deficiency Act (ADA) violations looms large in the field.

Incentives: Across the board, incentives are needed to work with startups, broaden color of money interpretations, adopt Industry 4.0 and modern software approaches, and in general, be disruptive. This includes both defense contracts and promotions.

Recommendation 5

Though needed for broader competitive reasons than working with commercial companies alone,

- Leverage the DIU/NSIN/NavalX network for tech scouting. Create incentives, including awards and promotions, for defense officials who adopt "close enough" commercial solutions in lieu of unique defense development.
- Fund cross-Service IT as a major acquisition program, taking risk on platform force structure, until DoD's IT is on par with industry's and ready for the Age of AI.
- Adopt Industry 4.0 and set capability expiration dates as a "shot clock" for new capability opportunities.
- Consolidate programs into portfolio program elements for greater purchasing power and flexibility, including working with startups.
- Create an DoD checklist for color of money use to shift ADA accountability to an approved checklist (vice the individual) to close the color-of-money gap, leverage overlaps in its definitions, and create greater opportunities for startups outside of R&D.
- Overhaul contract and promotion incentives regarding all of the above.
- Minimize Pentagon headquarters oversight and focus it on creating tools, not rules, to empower the field.

Conclusion

You have now read the top-level recommendations DIB Task Force's study on Strategic Investment Capital. Our detailed recommendations and supporting assessments can be found in Appendix A, an additional recommendation in Appendix B, and a list of study participants and contributors in Appendix C.

Now recall our overarching recommendation: to care about industrial base competitiveness as much as warfighting readiness. Past Congresses, Administrations, and DoDs won a tech-driven Cold War that birthed the Information Age, with all its soft power advantages. With generative AI, Industry 4.0, and other technology unleashing the next industrial revolution, our nation needs DoD – and a calvary of future dual-use unicorns – on the innovation battlefield on which our security and prosperity depend.

The valley of death can and must be terraformed. The time to act is now.

Appendix A: Additional Recommendations

A-1. Investment Side of the Valley: First Contact

Recent studies on the DoD innovation ecosystem (e.g., including RAND's Strengthening the Defense Innovation Ecosystem (RR-A1352-1, 2023), Atlantic Council's *Commission on Defense Innovation Adoption Interim Report* (April 2023)) echo many of the DIB's conclusions. Such studies are about the DoD for the DoD.

The DIB took the side of the prospective entrant, and structured its recommendations based on improving navigating the DoD's budget system. In our surveys, startups and non-traditional vendors made these observations about their first attempt(s) to engage with the DoD innovation ecosystem:

- *"There is no comprehensive entry point that facilitates navigation of the ecosystem."*
- *"Most solicitations appear 'wired' for particular companies with insider knowledge. Solutions appear preordained and not open to outsiders with innovative ways to solve old problems.*
- *"Timelines for proposal submissions are inconsistent and unreliable."*
- *"Timelines for responses to proposals are non-existent and often unacceptably long."*
- *"Communication is poor: it is impossible to reach someone who can provide guidance."*
- *"Proposal formats vary across different parts of DoD, creating unnecessary work in learning multiple formats instead of a small, consistent set."*
- *"Writing large, complex proposals is not worthwhile due to the low probability of winning and lack of constructive feedback. Pitch decks, pitch events, with higher win probability and less preparatory work are preferred."*
- *"Product compliance requirements are prohibitive. Few companies would invest out of their own pocket in advance of a large, committed purchase."*
- *"Being 'Selected but Not Funded' for a contract award does not tell companies whether to keep engaging for funding or move on."*
- *"Total timeline from entry in a Phase I SBIR to a large sale in Phase III is too long and mercurial."*
- *"Government contracts brands companies as a 'SBIR Mill,' slows them down, and drags them away from our commercial market and VC capital."*

We recommend the following actions to fix these problems/perceptions, including KPIs to provide metrics-driven accountability:

1. **Stand up a "SHERPA Office" (Supporting Homeland Entrepreneurs in Revolutionary Product Acquisition) within DIU which offers the following services:**
    - Single entry-point for non-traditional vendors and startups that provides entry-to-exit guidance (i.e., from initial R&D to product delivery) to be staffed by cross-service, rotating SME/Tech Scouts with the following responsibilities:
        - Introduce vendors to potential end-users and customers.
        - Facilitate matching of products to DoD needs, educating end-users on Minimum Viable Product mindset, the value of commercial overlap, and requirements abstraction.
        - Assist vendors in finding appropriate funding (e.g. SBIR, DIU, In-Q-Tel, etc.)

        - Assist operational programs and end-users in understanding and mechanizing contracts for purchase of commercial items.
        - Help non-traditional vendors get into Test and Evaluation events.
        - Be evaluated by Key Performance Indicators (KPIs) such as response time, customer satisfaction, successful matches made, sales volume resulting from introductions, dollar value of custom development programs eliminated, external matching funding from VCs, acceleration of timeline to warfighter delivery, commercial sales, etc.
    - Maintain DoD's central online portal for non-traditional innovators to navigate all innovation business opportunities that is more user friendly than FedBizOps. Improve the existing "Innovation Pathways" website for OSD to make it useful and actively supported.
    - Maintain a DoD-wide alternative set of certification standards, testing activities, and waiver/acceptance criteria for commercial items based on commercial practices. Provide the following service to non-traditional vendors:
        - Guide and assist commercial vendors in obtaining necessary compliance certifications, with costs billable to DoD on future contracts and Independent Research and Development (IRAD). This activity could be outsourced to multiple independent vendors without conflicts of interest to foster competition and streamline compliance processes.
    - Make Innovation a recognized profession or Area of Practice within the department, to include:
        - Recognizing, resourcing, and training to accredit necessary innovation skills.
        - Managing portfolios or cohorts of companies with the KPI of seeking a return on investment for said portfolio,
        - Establishing Innovation as a "seat at the table" while building the POM.

1. **Implement standing Open Topic solicitations instead of periodic, and measure the percentage of R&D allocated to Open Topics.**
2. **Implement a standardized, DoD-wide, "lightweight" proposal format that aligns with commercial practices (e.g., pitch decks, pitch competitions, and short white papers) that includes**
    - Equivalent or less effort than developing a VC pitch deck.
    - Simple submission process (e.g., uploading and registering).
    - Pricing modeled after commercial "proof-of-concept" firm fixed price contracts.
    - Expedient award timelines (e.g., under 4 weeks).
3. **Maintain a standard set of DoD-wide proposal formats so that individual organizations do not impose unique proposal requirements.**
4. **Eliminate "SBIR Mills" (i.e, leveraging SBIR as perpetual contracted labor rather than commercial product investment).**
    - Implement a lifetime limit on SBIR Phase I and II funding per company - including affiliates, spinouts, and subsidiaries – of $100M.
    - Implement a ten year time limit for participation in the SBIR program from the first Phase I contract to submission of final Phase II proposal, with no limits on Phase IIIs.
    - Reduce maximum allowable headcount for submission of a Phase I proposal to under 200 employees, retaining the 500 person limit for Phase II proposal submissions.

A-2. Middle of the Valley: From Prototype to Production

After entering the ecosystem through a SBIR Phase I and/or II or other contract, several additional challenges were reported by the innovators the DIB surveyed.

- *"R&D sponsors are in completely separate organizations from end- users and are often disconnected."*
- *"Technical Points of Contact (TPOCs) do not have the time, capacity, or job mandate to shepherd introductions with end-users and purchasers. Even worse, they are often changed, restarting the relationships with non-traditional vendors."*
- *"Small contracts requiring some R&D to fit a maturing commercial technology to a DoD mission do not have a place in the POM, falling outside the purview of laboratories and field-level services contracts."*
- *"There is no formal 'SBIR Phase III' designed for the sale of finished products, including contract guidelines and instructions for transitioning from Phase II to III contracts."*
- *"Contracting officers and program managers are not aware that Phase III grants permission to award a sole-source contract for products matured under Phase I and II contracts."*
- *"DoD standards often diverge from commercial ones and can be expensive to achieve in advance of, and without guarantees for, purchase orders."*
- *"The requirements process does not account for opportunities."*
- *"There is no planning, nor budgeting, for production contracts immediately following the prototyping phase. 'Innovation' is effectively funded expecting failure."*

The DIB recommends the following actions to fix these challenges.

1. **Require all Phase II, STRATFI, and Phase III SBIR proposals to include an end-user endorsement (e.g., AFWERX current practice) with the SHERPA office responsible for facilitating end-user engagements on a scheduled periodic basis.**

5. **Use the following award criteria for Phase II, STRATFI, and Phase III awards:**
    - Potential to leverage outside capital (e.g., VC funding)
    - Commercialization potential
    - Level of purchaser and/or end-user funding
    - Mandatory presence of some degree of end-user customer funding.
    - First major milestones funded upon contract award as an advance.
    - KPIs: Ratios of outside capital contributing to DoD investment, ratio of DoD end-user customer purchase funds to SBIR funds.

6. **Fund the first major milestone of all Phase II, STRATFI, and Phase III at contract award to aid company planning.**

7. **Automatically award companies that have successfully productized under a Phase II or STRATFI contract, but have not received an OASIS contract, an unfunded Phase III contract, with the SHERPA office maintaining an online purchasing portal that facilitates any DoD purchaser or end-user to purchase the item or retain the service by MIPRing funds.**
    - The purchasing portal should be integrated into the improved "Innovation Pathways" portal or implemented as a new e-commerce site under GSA.
    - Require fast (e.g., less than 30 days) insertion of successful products into this e-catalog.

- KPIs: Track the average number of days to list a commercial item in the purchasing portal, average vendor workload in hours, average number of products added annually, average number of items purchased each year, total dollar amount of purchases each year, and average time from item listing to warfighter delivery.

8. **Establish an "OASIS" fund to bridge successful STRATFI companies (assuming cross-Service adoption of STRATFI awards) from R&D to recurring procurement/service contracts via a formalized Phase III process.**
   - Allocate a budget on par with the current SBIR program, with the top five to ten percent of Phase IIs receiving funding to scale to production.
   - Proposal evaluation criteria should strongly value (i) potential for, and a degree of, matching external funding; (ii) commercialization potential; and (iii) degree of matching DoD purchaser and/or end-user funding.
   - Contract period of performance should be a minimum of three years, with extension clauses to manage POM uncertainty, and then transition to procurement/service contracts thereafter.
   - Requirements developed separately from JCIDS process to harness commercial opportunities instead of dictate specifications.
   - Requires Services, Joint Staff, and Agencies to create a more agile innovative requirements process.
   - Clauses for low-rate procurement or service retention prior to POM transition.
   - KPIs: Track (i) programs of record created, (ii) programs of record fielded, (iii) cost and time saved per fielding over DoD averages, (iv) benefits or any commercialization, (v) success rate of DoD non-traditional vendors compared others in similar markets, and (vi) number of new entrants to DoD's industrial base per year.
9. **Designate an office (likely the Strategic Capabilities Office) to act as DoD's late-stage investor with investments sizes that allow full productization for DoD missions when non-traditional vendors succeed.**
   - This office would manage the OASIS funding, working with STRATFI companies and the SHERPA team.
10. **Companies that receive OASIS contracts or open Phase III purchase orders should be considered for low-interest rate, long-term business loans (via OSC) to support their productization endeavors. These loans should feature favorable terms, such as an initial period with no interest for a specified number of years, followed by a low-interest rate and a long-term repayment period (similar to Atlantic Council recommendation 5).**

A-3. Procurement Side of the Valley: Production Phase

DoD's acquisition system must be changed one new program at a time, with DoD funding as the incentive to change. It must depart from generational purchaser models that specify end states, fund until achieved, upgrade every decade, and maintain for a generation. It must also view IP differently in this paradigm.

In our interviews and surveys, the following opinions were shared with the DIB:

- *"Statutorily required market research for availability of commercial items is lacking at best, disingenuous at worst. DoD program managers lack the necessary resources or motivation to perform it correctly. And DoD's funding model gives the current Defense Industrial Base strong incentives to custom-make and custom-sustain capabilities, vice leverage commercially available*

ones. There is no real verification or auditing process that such market search has been done satisfactorily and no reward system for saving taxpayer money and time-to-market for warfighters by discovering acceptable commercial alternatives."

- *"When working with a prime integrator is the most expedient option for a non-traditional vendor to be part of a DoD program, there is no USG support negotiating terms, IP, interfaces, etc., often putting non-traditional vendors at a disadvantage."*
- *"When working with a prime integrator is the most expedient option, interfaces - to include those for software - are often proprietary because the USG's often generational approach to new programs incentivizes vendor lock-in."*
- *"For prime integrators, the contract 'small business set asides' are not actively managed nor valued by the USG, creating little incentive to be good at leveraging them."*
- *"When working with the USG directly is the most expedient option for a non-traditional vendor to be part of a DoD program, the USG often wants to own IP, curtailing commercialization potential."*
- *"Requirements often describe improvements to legacy capabilities, not options for disruptive new ones."*
- *"Program Element budget lines are too restrictive, limiting funding to the legacy system only, and are often further restricted within that. Broad language in portfolio-level Program Element would give greater purchasing agility and efficiency."*

We recommend the following solutions to these challenges:

1. **Establish an independent "Office of Commercial Market Research" (could be part of DIU, SHERPA, DCAA) empowered to enforce the market research requirements of FASA, 10 USC 3453, and FAR Part 10, staffed with third-party industry experts who are incentivized to find commercial items that meet the lion's share of end-user needs.**
    - Conduct expeditionary tech scouting, maintain a database of commercial technologies and products, and provide outsourced market research services for PMs and contracting officers who lack the capacity to seek out commercial items.
    - Recommend program strategies that maximize participation of multiple vendors, use of open standards, and commercial content.
    - Audit market research performed by PMs or contracting officers on behalf of DoD.
    - Manage a new contract protest process for FAR Part 10 violations.
    - KPIs: Track the number of contract awards from the market research, dollars and time saved, and new entrants to the dual- use industrial base each year.

11. Strictly enforce use of open interoperability standards. While mandated by law (i.e., National Technology Transfer and Advancement Act of 1995, OMB A-119), it is often circumvented. Recommend it as a legislative proposal to prohibit, by systems, proprietary interfaces for subsystems and software - establishing "plug-n-play" for defense, where IP may be owned by "plugging" companies that do not claim ownership of the plug itself.
    - Verify that new programs are not developing new architectures when suitable commercial standards exist.
    - Require open standards for all legacy system modernizations.
    - Routinely audit compliance with open system architecture. Report violations, similar to Nunn-McCurdy violations.

12. Reform the Requirements and Budgeting Processes (i.e., Atlantic Council Recommendations 1, 2 and 10):
    - For new requirements, perform market research based on high-level problem descriptions through the Office of Commercial Market Research.
    - Create high-level objectives, vice requirements, for achieving missions.
    - Reduce the number of Program Element lines while giving them broader descriptions for flexibility.
    - Track overlap between DoD product-market fit and commercial feature sets and report annually to Congress, justifying deviations.
    - Establish a flexible opportunities process, similar to JUON, JEON, or SOCOM's Major Force Program 11.

A-4. Aligning Incentives with Desired Outcomes

Though this is the last set of detailed recommendations, it is without question the most important. All process changes will be foiled if the people executing them are not rewarded for desired outcomes.

Currently, incentives are often opposite to preferred results.

Our study found that DoD programs have few to no incentives to do the following:

- *"Complete under budget and/or ahead of schedule by leveraging commercial technology."*
- *"Buy commercial items that have contributory venture capital or commercial sales that might subsidize future advances."*
- *"Increase the number of industrial base companies in their mission area."*
- *"Transition non-traditional vendors to encourage continued private investment."*
- *"Curtail competition by government laboratories."*
- *"Afford large defense sector returns so that VCs view the defense market more favorably."*
- *"Create dual-use 'defense unicorns' so that defense-friendly companies are often their market's leader, and defense-friendly private investments, often the highest return."*

The following recommendation can help remedy these incentive challenges:

1. **Create career incentives for acquisition professionals so that they are rewarded for finding commercial items that are "close enough", pursuant to FAR 10.001(a)(3)(ii) and delivering the capability faster, at a lower cost, or with improved capabilities compared to the original plan.**
    - Implement individual cash bonuses for cost and time savings and allow programs to keep a percentage of savings.
    - Do not penalize programs that achieve cost saving one year by making it the new cost baseline for all future years.
    - Track the number of programs and total dollars and time saved from commercial items, reduction in delivery schedule, average percentage under budget and ahead of schedule achieved, and number of new industry base vendors.

13. **Create strong proposal evaluation criteria and contract incentives for prime integrators that leverage open standards and commercial technology to include disproportionately higher fee structures.**
    - Provide a bonus for delivering ahead of schedule.
    - Provide a bonus for first-time defense use of commercial technology.
    - Allow the contractor to take small business set-aside credit, not only for the funds spent on purchasing the finished commercial items, but all the R&D funds and investments the vendor was previously awarded to create the product.
    - Track the "commercial substitution rate": percentage of the program budget using commercial items in lieu of custom development.
14. **Reward innovation investors - such as government labs, SBIR, and DIU portfolio managers - for successfully transitioning companies and commercializing technology. Standardize success metrics across the DoD and provide bonuses and promotions based on exemplary performance using the following KPIs:**
    - Average time from the initial DoD contact to warfighter delivery.
    - Average DoD investment to deliver a capability to warfighters.
    - Average time from the initial DoD contact to the first commercial sale of said product supported by DoD investment outside of the DoD.
    - Average DoD investment to enable the first commercial sale of a dual-use product outside DoD.
    - Average ratio of non-DoD investment (e.g., VC, commercial sales) to DoD investment, considering both investment and procurement funding combined.
    - Average ratio of procurement dollars to total investment dollars (i.e., DoD plus private investment).
    - Average ratio of commercial sales outside of the DoD to the DoD investment.
    - Number of competing vendors created through the adoption of open interoperability standards.
    - Number of vendors created and technologies spun out from DoD labs due to successful commercialization.
    - ROI in dual-use and defense sectors for private investors using VC standard performance metrics such as Total Value to Paid-In Capital (TVPI), Distributions to Paid-In Capital (DPI), and Internal Rate of Return (IRR).
    - Total annual private investment in defense and dual use companies.

Thanks for reading!

Appendix B: Strategic Defense Innovation Agency (SDIA)

So, you have read this far and want to do something *big* to fix the Valley of Death and reform acquisition? Then this is the appendix for you.

As this DIB study concluded, we recognized the major disconnect between creating change in the public versus private sector is often- lacking competition. That is why many of this study's recommendations aim to create and align incentives around DoD investment funding so that different parts of the government compete for them, just as different companies do without.

In the POM process, Services and Agencies do compete with each other for DoD funding, but not with themselves inside their ordained mission areas. We strongly desired a means of creating competition on the Procurement Side of the Valley of Death as a means to drive required "long game" changes. The creation of a new competitive agency whose mission overlaps with the Services and existing Agencies was an idea worth capturing but will require further study.

Notionally, DoD, working with Congress, would:

1. Establish a new Presidentially Appointed, Senate Confirmed (PAS) agency director, akin to the National Reconnaissance Office (NRO) Director. Work with Congress to make this position easier to fill (e.g., restrictions) by outside experts. Report this position directly to the Secretary of Defense.

15. Make DIU (for sourcing and investing), OSC (for lending), and SCO (for productizing), and other "alternative pathways" organizations its branches, while growing headcount in each. Repurpose existing headquarters oversight billets as the means of growth to keep government headcount constant.

16. Exempt this agency, and the Services, from non-statutorily required oversight and budget restrictions to create a level playing field. Work with Congress to reduce statutorily required oversight and budget restrictions where prudent.

17. Compete this new agency against the Services for development through production of new capabilities.

Competition is the ultimate source of improvement. If competition with China is not enough to improve the DoD procurement system, then creating competition *within* it might. Congress could use this parallel procurement path as a means to incentivize Services to disrupt themselves under the looming risk of losing budget top-line.

Making the position a PAS would put it on par with the Service Acquisition Executives and NRO Director, while also providing a mechanism to get DIU, OSC, and SCO out of the Pentagon's headquarters, facilitate them administratively, and stabilize them against leadership changes.

The DoD has disrupted its bureaucracy in the past when it created the Defense Advanced Research Projects Agency, NRO, and Missile Defense Agency to adapt to existential threats. It would be wise to consider doing so again to tip the scale in this decisive decade with China.

Appendix C: Study Participants and Contributors

The Taskforce would like to thank the hundreds of individuals who participated in and contributed to this study. Our recommendations were inspired by your candid input and thoughtful suggestions on how best to address the valley of death for startups and crowd-in more private capital to support innovators of dual-use defense technology.

We would like to thank the 310 startups and small businesses, 64 venture capital and private equity investors, and 56 established defense industry and prime contractors who provided invaluable private sector perspectives on their experience with this challenge.

We would also like to thank the dozens of current and former DoD SBIR and innovation organization leaders who shared their insights on what is working and what more needs to be done.

Finally, we would like to thank the many current and former warfighters who provided the most important perspective on what can and must be done to fix this issue so our military can stay ahead of our adversaries in this decisive decade – strengthening US deterrence to prevent conflict, and ensuring overmatch in the event of it.

Particularly, we would like to thank Gen. Brian P. Fenton, Commander USSOCOM, and his staff, for their creative and inspiring feedback; the DIB staff for their support; and James Hickey, MITRE, for his excellent and expert support in preparing and improving this document.