



Atlantic Council

SCOWCROFT CENTER
FOR STRATEGY AND SECURITY

COMMISSION ON DEFENSE INNOVATION ADOPTION

Final Report



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FOR STRATEGY AND SECURITY

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INTRODUCTION

As the United States addresses the rise of competing powers on the global stage, it must confront the acute threat posed by Russia and the longer-term one presented by China. With its military modernization progress, advanced offensive cyber capabilities, hybrid-warfare strategies, and aggressive territorial ambitions in Eastern Europe, Russia poses a considerable threat to democratic institutions and Western norms. Meanwhile, China has built the world's largest military and grown into an economic powerhouse, igniting tension in disputed regional territories and expanding its geopolitical influence far beyond the Indo-Pacific. For the first time in history, the United States is faced with two revisionist powers armed with nuclear capabilities and detrimental territorial ambitions. This new age has amplified the need for enhanced deterrence and defensive measures, particularly in the case of Taiwan. Unfortunately, the United States' defense acquisition process is plagued with lengthy timelines and inefficiencies, underscoring the urgent need for a fundamental shift in how the Department of Defense (DoD) approaches the adoption and integration of new technology.

Historically, US advancements in defense technology have been spurred by international conflict or heavy government research and development (R&D). Outpacing adversaries was not as much an ambition as it was critical for the nation's security. The Cold War served as a catalyst for one of the most innovative periods in US history, a time when US defense capabilities were driven by the military, federally funded research organizations, and traditional defense and aerospace industries. Today, much of that innovation is found in commercial dual-use technology and advancements made by smaller nontraditional companies in the private sector. Often, these advancements include software-driven solutions that are smaller in scale, yet highly attritable. Nontraditional companies have become key players in the defense market due to their ability to adapt quickly to evolving technological and threat landscapes. While US companies continue to demonstrate technological prowess, this rate of innovation serves little use in deterring conflict unless the DoD is able to procure and get new technology into the hands of warfighters at a faster pace.

The current US defense acquisition system was not designed to keep pace with today's rapid rate of innovation. Despite the DoD's recognition of these emergent dual-use technologies, lengthy budget timelines, inflexible procurement options, and outdated internal procedures create unnecessary barriers between the DoD and nontraditional companies seeking

collaboration. Such limitations disincentivize smaller firms from engaging with military projects due to survival concerns in commercial markets; the resulting frustration often compels those that engage to drop out.

In an attempt to reconcile the disconnect between evolving operational needs and limitations posed by dated acquisition processes, the Atlantic Council's *Forward Defense Program* established its Commission on Defense Innovation Adoption. Launched in 2022, the primary objective behind this commission was to take the DoD's acquisition process, and Congress' role in that system, out of the Cold War era. The commission sought actionable recommendations that would advance DoD's adoption of innovative technologies and ability to rapidly field dual-use capabilities.

The commissioners and authors highlighted a number of challenges that the DoD faces. They identified an outdated R&D model that struggles to adopt and apply leading commercial innovations to weapon systems as one of these challenges. They also brought the long timeline and inflexible execution into focus, emphasizing their impact on the DoD's ability to respond to dynamic threats and harness the latest technology. Addressing the critical role of gatekeeping state-of-the-art technology from the warfighter, the commission tackled issues such as a shrinking US defense industrial base, a limited number of prototypes advancing from research to production contracts, and a bureaucracy seemingly designed to stifle speed and innovation. Additionally, the commission assessed the impact of an insufficient understanding of emerging technology by those generating requirements, in addition to program-centric acquisition and cumbersome reporting processes.

The commission interviewed more than seventy key stakeholders across the DoD, industry, and Congress to support extensive research and deliberations. This effort produced ten recommendations to overcome key challenges, which are summarized below.

1 Empower and resource five program executive offices (PEOs) through a new capability portfolio model, authorized by Congress and implemented by the under secretary of defense for acquisition and sustainment USD (A&S). This approach would break down barriers between the DoD and nontraditional companies seeking collaboration, allowing for faster procurement and integration of innovative technologies into military operations.

2 Consolidate program elements and budget line items to simplify budget submissions and allow for greater flexibility in responding to changing warfighter needs, which would encourage smaller firms to engage with DoD without jeopardizing their commercial viability.

3 Congressional appropriations committees should modify reprogramming authorities in their fiscal year (FY) 2024 joint explanatory statements to reflect historical norms, which entails maintaining the existing reprogramming thresholds, but shifting from the requirement of prior approval to congressional notification with a thirty-day timeframe for briefing or rejection.

4 Congress should elevate the Defense Innovation Unit (DIU) to report directly to the deputy secretary of defense and provide it with adequate resources within six months of enactment. This recommendation offers myriad suggested actions and authorities the DIU should be empowered to take, including engaging start-ups, nontraditional vendors, and capital market players to align capability requirements with the twenty-first-century industrial base, and modernize guidance and training for commercial acquisition.

5 Strengthen existing capital market programs and create new pathways for mission-critical technologies by broadening programs for capital market-backed companies, leveraging capital market funding for defense innovation, and enhancing the Small Business Innovation Research (SBIR) grants program to increase competition and widen the aperture of firms competing for SBIR grants.

6 Congress, the Office of the Secretary of Defense (OSD), and service acquisition executives (SAEs) should increase incentives and reduce barriers for leading technology companies to do business with the DoD by September 2024 by rebalancing defense budgets, modernizing access to capital markets, raising cost-accounting standards thresholds, improving online contract opportunities platforms, streamlining security-clearances processes, assigning visible leaders for various programs to champion adoption and simplify processes, mapping and improving acquisition processes for successful research and prototypes, and establishing a working group with primes to incentivize leveraging technology start-up companies.

7 The under secretary of defense (comptroller) and chief financial officer of the DoD (USD (C)/CFO) should propose a streamlined budget-justification format for the president's FY 2026 budget request, focusing on concise program overviews.

8 Allocate \$250 million of the DoD's FY 2024 budget to programs that address challenges in scaling and accelerating successful demonstrations of operationally relevant technologies. Shortening the lag time for successful vendors to receive funding would incentivize new companies to work with the DoD, ultimately increasing the number of technologies transitioned at scale to the warfighter.

9 Existing organizations should adopt the Space Development Agency (SDA) model, which provides a framework for preemptive disruption within the Space Force, focusing on rapidly fielding and scaling modern technologies.

10 The vice chairman of the Joint Chiefs of Staff (VCJCS) and services should establish a team by September 2024 to modernize the DoD's requirements processes, which includes designing a new framework, enabling dynamic requirements systems, streamlining documents, integrating threat and technology assessments, collaborating with industry experts, improving training for requirements managers, and publishing new policies online.

If implemented in their entirety, these recommendations would go a long way toward allowing the United States to swiftly deploy cutting-edge technology at scale and have the potential to resolve near-term deterrence threats. Embracing the private sector's rapid innovation, modernizing acquisition and budgeting processes, and fostering greater collaboration with non-traditional companies would allow the United States to swiftly adopt and deploy cutting-edge technology. As a result, the United States would amplify its leadership in defense innovation, thereby addressing immediate deterrence gaps and ensuring a robust posture against evolving threats in today's era of strategic competition. As of November 2023, six of the commission's ten recommendations have been implemented fully or in part by the DoD or Congress.

FOREWORD

The US DoD needs to accelerate the adoption of cutting-edge technology from the leading edge of the commercial and defense sectors. Doing so will enable the Pentagon to deliver high-impact operational solutions to the warfighter in a much timelier manner. That is why we are co-chairing the Atlantic Council's Commission on Defense Innovation Adoption, which has released this report.

In our time serving in the Defense Department, we have found that the United States does not have an *innovation* problem, but rather an *innovation adoption* problem. That is to say, the United States leads in many emerging technologies relevant to defense and security—from artificial intelligence and directed energy to quantum information technology and beyond. But the DoD struggles to identify, adopt, integrate, and field these technologies in military applications.

The persistence of this challenge is not for lack of trying. The Air Force's Rapid Capabilities Office has cut through bureaucratic constraints to accelerate even the most complicated major acquisitions. The DIU stands out for expanding the range of firms involved in innovation for national security purposes. Army Futures Command has accelerated modernization in ground forces through its cross-functional team model. The new Office of Strategic Capital has a promising new approach to engaging capital markets in support of national security goals.

But the growing national security challenges facing the country and the threat they pose to the rules-based international order require actionable reform across the DoD. We and a group of distinguished commissioners—with decades of service between us in government, the private sector, and

capital markets—believe that time is running out to do so. The United States faces simultaneous competition with two nuclear-armed, autocratic great-power rivals. Russia's ongoing war against Ukraine and China's revanchism not only spur urgent geopolitical considerations, but also cast into sharp relief the US industrial base's ability to produce and field innovative technologies at scale.

To address the DoD's innovation adoption challenge in light of the urgency of the geopolitical environment, this report advances ten policy recommendations for Congress and the Pentagon, focusing on the three key areas of reforming acquisition; overcoming barriers to innovation; and revising specific planning, programming, budgeting, and execution structures.

To that end, the DoD should adapt the way it conducts its acquisition programs to provide additional flexibility in the year of execution, and Congress can authorize that flexibility. We recommend that five DoD program executive offices be empowered to operate in a portfolio model so that they can more easily shift funding among possible products that meet their mission needs. Congress should appropriate money to DoD with *fewer* but *larger* discrete budget line items, and reset reprogramming authorities so that acquisition professionals have greater flexibility.

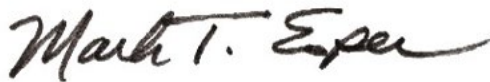
To better leverage innovation in the commercial sector, Congress should restore at least the traditional ratio of procurement funding to other defense spending, and the DoD should more intentionally engage a much broader innovation base. Allocating a higher percentage of the DoD's budget to procurement will clearly signal a larger market to nontraditional defense firms.

Additionally, the deputy secretary of defense, with the DIU as a direct report, should take a leadership role in aligning and harnessing stakeholders within the Pentagon and the existing defense industrial base for the twenty-first century. The DIU should be resourced and empowered to broaden the defense ecosystem by robustly engaging start-ups, nontraditional vendors, and capital market players.

The DoD must develop approaches to more rapidly validate its needs for commercial capabilities, rather than waiting years after identifying a key capability to write a requirement and submit a budget request. The DoD should both reform the Joint Capabilities Integration and Development System (JCIDS) to operate more swiftly

and develop a military need-validation system outside of JCIDS for mature commercial capabilities. Congress and the DoD should expand both eligibility for, and the award size of, SBIR grants. To provide additional mechanisms for rapidly matching key capabilities with funding, they should also provide funds to procure capabilities successfully demonstrated in exercises.

As the 2022 National Security Strategy states, we are living through a “decisive decade,” a sentiment shared by the previous administration as well. Congress and the DoD must seize this opportunity to enact near-term changes that will help get our service members the capabilities they need to defend our country and its interests



The Hon. Mark T. Esper, PhD
27th US Secretary of Defense



The Hon. Deborah Lee James
23rd US Secretary of the Air Force

OVERVIEW

MISSION STATEMENT

Accelerate the DoD's ability to adopt cutting-edge technology from commercial and defense sectors and deliver high-impact operational solutions to the Warfighters.

ENTERPRISE CHALLENGES

The DoD faces the following enterprise challenges in adopting defense innovations:

- 1 Outdated R&D Model** The DoD's requirements and acquisition processes were designed for a time when the DoD was the largest funder of global research and development (R&D). By 2020, however, the federal government's share of national R&D had fallen below 20 percent, and yet its processes have not adapted to this new leader-to-follower reality. Today, while the Defense Advanced Research Projects Agency (DARPA), Federally Funded Research and Development Centers (FFRDCs), national and service laboratories, and universities continue to innovate, many of the most critical technologies are driven by the commercial sector. The DoD struggles to adopt commercial technology at a relevant speed. Innovations from noncommercial R&D organizations are infrequently tied to a commercialization and adoption pipeline. Traditional prime contractors orient their independent R&D (IRAD) toward near-term defense requirements that are prescriptive relative to solutions rather than broadly defining warfighter gaps that allow applications of advanced technologies. As a result, the DoD is unable to effectively apply leading technologies to its weapon systems.
- 2 Long Timelines and Inflexible Execution** Too often, the DoD delivers systems to meet requirements defined more than a decade earlier. It is difficult to insert new technology to effectively respond to dynamic adversary threats, technological opportunities, advances in warfighting concepts, or macroeconomic and supply-chain disruptions, especially within fiscal years. Hardware-centric models ineffectively integrate rapid software updates.
- 3 Fewer Companies Providing Defense Solutions** The DoD's industrial base has shrunk by 40 percent over the past decade, due to both consolidation and exit. This decline stems from multiple causes, including a pivot to fewer more-complex major systems, long timelines, complex regulations, and the high compliance cost of doing business with the DoD. Many start-up, commercial, and international businesses are unable or unwilling to enter the DoD ecosystem. As a result, reduced competitive pressure has increased costs and decreased adoption of innovation.
- 4 Valleys of Death** The DoD spends billions annually on research and prototypes, yet only a small percentage transitions to production contracts with revenue to sustain operations and scale output. Consequently, one must question why the DoD continues to fund so many defense research organizations when most technology innovation comes from the commercial sector. Long timelines for contracts and funding, program constraints, and a disconnected ecosystem are among the transition challenges for companies that have developed viable products or services.
- 5 Hamstrung Workforce** The DoD acquisition workforce is subject to a bureaucratic culture of excessive compliance and oversight, a challenging environment for innovation. Creative problem-solving and measured risk-taking are not often rewarded, and too few individuals with an industry background agree to take senior leadership roles at the DoD.
- 6 Program-centric Acquisition** Defining requirements, securing budgets, and acquiring capabilities are done for hundreds of individual programs. The DoD invests a significant percentage of its funds in complex major systems for which prime contractors offer closed, propriety solutions. This impedes interoperability and responsiveness to changes in operations, threats, and technologies. Open-system architectures with well-defined interface control documents are rarely adopted, which constrains the ability to insert innovative technology.

- 7 Cumbersome Reporting from DoD to Congress** Budget justification documents run dozens of volumes and tens of thousands of pages. Document format, detail, and supporting information is inconsistent among military services and agencies. This impedes Congress's ability to understand program objectives in a timely manner. In turn, Congress does not trust that delegated decisions will consistently result in more rapid technology adoption.
- 8 Limited Understanding of Emerging Technology** The DoD struggles to effectively leverage critical emerging technologies (like biotechnology and quantum information technology) due to a lack of understanding of their state-of-the-art applications among those who generate requirements and draft requests for proposals. As these technologies mature, the DoD is challenged to have meaningful conversations about how to adopt, leverage, and defend against these technologies.

TOP RECOMMENDATIONS

To address these challenges, the Commission recommends that DoD leaders, congressional defense committees, and other executive branch agencies take the following ten high-priority actions to accelerate DoD innovation adoption:

- 1 Introduce a new capability portfolio model**
- 2 Consolidate program elements**
- 3 Reset reprogramming authorities**
- 4 Modernize the DoD to align with the twenty-first century industrial base**
- 5 Strengthen alignment of capital markets to defense outcomes**
- 6 Incentivize tech companies to do business with the DoD**
- 7 Modernize budget documents**
- 8 Establish bridge fund for successfully demonstrated technologies**
- 9 Scale the Space Development Agency model**
- 10 Modernize the DoD's requirements system**

RECOMMENDATION 1:

The DoD and Congress empower and resource five Program Executive Officers (PEOs) to operate via a new capability portfolio model in 2024.

Addresses challenges 2, 4, 5, and 6.

- Congress authorizes in the Fiscal Year (FY) 24 National Defense Authorization Act (NDAA) and/or the Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)) implements via a memo empowering five PEO portfolios to operate via a new capability portfolio model. Component acquisition executives from the US Departments of the Army, Navy, Air Force, US Special Operations Command, and a defense agency will each select a PEO portfolio.
- Service requirements organizations capture portfolio requirements in a concise, high-level document that provides overarching, joint, enduring capability needs and key mission impact measures that focus on warfighter-informed needs and mission outcomes. The Joint Staff validates the portfolio requirements within thirty days. The portfolio requirements document enables leaner program requirements and shapes future research and prototypes.
- Selected PEOs negotiate with congressional defense appropriations staff the consolidation of at least 20 percent of the smallest budget line items within their portfolios. This enables reprogramming flexibility to meet evolving, warfighter-informed requirements. These merged budget accounts must provide Congress with sufficient visibility of major elements within each.
- Selected PEOs develop a set of portfolio strategies, processes, road maps, contracts, infrastructure, and architectures to enable programs to leverage for greater speed and success. Portfolio contracting strategies will look beyond individual contracts or programs to promote a robust industrial base by enabling continuous competition, iterative development, supply chain risk mitigation, greater participation of nontraditional companies, commercial service acquisition, and economies of scale.
- Selected PEOs may lay out plans to decompose large programs into modular acquisitions; leverage common platforms, components, and services; and maximize use of commercial solutions and DoD research. Portfolios will scale and align prototyping, experimentation, and testing infrastructure. They will invest in a common suite of engineering tools, platforms, and strategies to enable interoperability, cybersecurity, and resiliency.
- PEOs require portfolio leaders to actively engage the DoD's R&D community, industry, and academia to communicate joint-warfighter portfolio needs and business opportunities, scout technologies, engage companies, and drive novel solutions to address portfolio needs.
- Congress appropriates at least \$20 million to each portfolio per year for three years to enable PEOs to implement the new model with appropriate staff, analytic tools, and strategies. The five PEOs work out the details for others to adopt. In time, the department will realize savings and return on investment through greater program efficiencies and mission impact.
- PEOs provide the Office of the Secretary of Defense (OSD) and Congress a short annual report to share insight into the new portfolio model progress, including issues, successes, and inputs to scale adoption.

Success Measure: By the end of 2023, five PEO portfolios are identified to operate via the new portfolio model. By the end of 2024, these portfolios begin operating with clear direction, leadership support, and initial implementation plans.

Notional Example: A command-and-control PEO shapes a portfolio strategy that invests in a software factory and enterprise services as a common infrastructure, with smaller programs tapping a diverse vendor base to regularly and iteratively deliver a suite of applications that work together seamlessly.

RECOMMENDATION 2:

Acquisition executives propose consolidated program elements to congressional staff and negotiate what can be included in the Fiscal Year (FY) 2024 Appropriations Act joint explanatory statement.

Addresses challenges 2, 6, and 7.

- The deputy secretary of defense (DepSecDef) directs acquisition executives to propose a list of program elements (PEs) and budget line items (BLIs) to consolidate. This will simplify budget submissions and enable greater flexibility within the year of execution to respond to rapid changes in warfighter needs and technology advancement within capability or mission portfolios.
 - Determine criteria for consolidation, such as BLIs and PEs under \$20 million, software-defined technologies, and supply chain-affected efforts.
 - Determine constructs for consolidation, such as capability areas, mission areas, and organizational alignment.
- Reduce BLI and PE count from more than 1,700 today in the investment accounts by at least 200 BLI and PEs each year, starting with the FY 2024 markup, for three years to enable cost-schedule-performance trade-offs, including the prototyping and fielding of novel systems that meet defined capability or mission areas.
- Allow PEOs, warfighters, and other DoD stakeholders to provide input to acquisition executives. Senior leadership in the resourcing process should propose the items to be consolidated and negotiate with congressional staff in advance of FY 2024 appropriations.
- Identify line items that enable opportunistic efforts to insert technologies into existing weapons programs without requiring a new start. Identify best practices for broadly justifying activities within a capability set.

Success Measure: The number of BLIs in the investment accounts is reduced by at least 200 in time for the passage of regular appropriations in FY 2024.

FY 2023 President’s Budget Request (DoD Total)

	RDT&E	Procurement	O&M	MILPERS
Line Items	956	845	347	270
Median (\$M)	\$35,262	\$42,707	\$243,631	\$87,564
# Under \$20M	390 (41%)	298 (35%)	49 (14%)	88 (33%)

This chart shows the number of line items, its median size, and the percentage under 20 million dollars in the FY23 budget request. Out of more than 1,700 investment budget line items today, nearly 700 are under \$20 million. Micromanaging these small stovepipes reduces flexibility, preventing adjustments in the year of execution. Credit: Eric Lofgren

Example of Program Element Consolidation - SOCOM

RDT&E	FY12	FY13	FY14	FY15	FY16	[...]	FY23
Line Items	29	28	15	15	15		13
Mean (\$M)	\$17.1	\$15.4	\$24.8	\$34.3	\$35.9		\$63.3

Procurement	FY12	FY13	FY14	FY15	FY16	[...]	FY23
Line Items	38	37	27	24	26		25
Mean (\$M)	\$58.3	\$49.9	\$54.3	\$65.8	\$71.6		\$93.7

US Special Operations Command (SOCOM) provides an example for how the number of budget line items can be incrementally reduced in coordination with Congress. This resource flexibility allows SOCOM to take advantage of their close relationship with the warfighter by making integrated decisions that speed up fielding cycle times. Credit: Eric Lofgren

Notional Example: A PEO identifies a novel technology from DARPA or industry to integrate into one of its programs to improve performance and accelerate capability delivery. With investment funds spread across fewer budget accounts, the PEO is able to reprogram funds from a lower-priority development within the year of execution.

RECOMMENDATION 3:

Congressional appropriations committees reset reprogramming authorities to historical norms in their FY 2024 joint explanatory statements.

Addresses challenges 2 and 7.

- Appropriations committees write into FY 2024 joint explanatory statements the following changes:
 - Current reprogramming thresholds will be maintained, but above-threshold actions will revert from congressional prior approval to the historical norm of congressional notification with a thirty-day window for briefing or rejection. This streamlines the process and enables greater reprogramming while still providing Congress “veto authority” to block reprogramming actions they oppose. Prior approval will remain in place for items omitted, deleted, or specifically reduced; general transfer authorities; or above threshold new starts.
 - An alternative approach: Raise reprogramming thresholds from the lesser of \$10 million or 20 percent to at least \$40 million for Research, Development, Testing, and Evaluation (RDT&E) and \$100 million for procurement

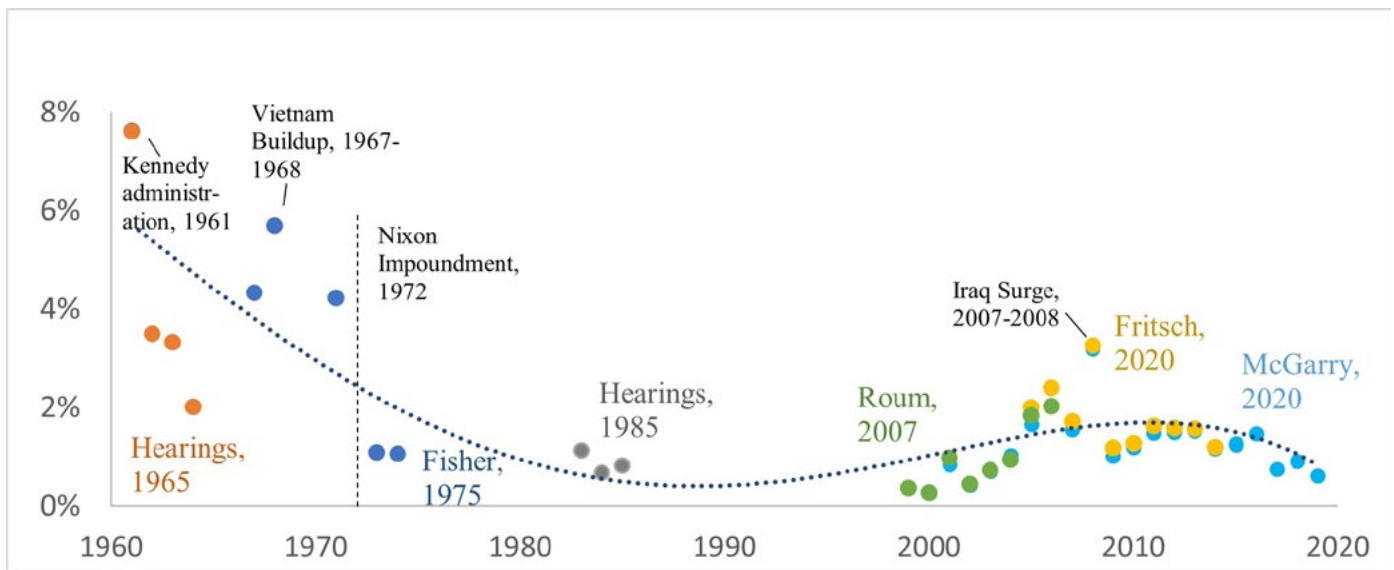
appropriation titles. Historical norms for reprogramming thresholds were \$15 million for RDT&E and \$40 million for procurement yet were progressively lowered to this historically low threshold. This change would revert thresholds to account for decades of inflation.

- Letter notifications for new starts will be “for the fiscal year,” not “for the entire effort.” This enables programs greater flexibility to start small programs while Congress retains the right to veto any new starts it opposes.

Success Measure: Recommended language is included in the FY 2024 Appropriations Act joint explanatory statement by the time regular appropriations are passed.

Notional Example: An acquisition program is “early to need” for procurement funds due to delays in finalizing development. Another program desperately seeks additional funds to accelerate and scale production of its weapon system. Service leadership decides to reprogram \$50M in procurement funds between the programs to optimize investments.

Total Above Threshold Reprogramming as a Percentage of the DoD Budget



This graph charts above threshold reprogramming (ATR) as a percentage of the defense budget according to research by various budget analysts. Modern control of reprogramming was implemented in FY 1963, and management has tightened severely since that time, including the expansion of prior approval requirements. As a result, many resource trades, including the adoption of new innovations, are foregone because of severe administrative burdens. Credit: Eric Lofgren

RECOMMENDATION 4:

Congress directs the DoD to elevate the DIU to a direct report to DepSecDef and resource it effectively to align and harness the nontraditional defense industrial base for the twenty-first century no later than six months of the enactment of this act.

Addresses challenges 1, 2, 3, 4, 5, and 8.

- Re-align DIU as a direct report to DepSecDef with the necessary staffing and resources to engage start-ups, nontraditional vendors, and capital market players in aligning capability requirements to harness solutions from the twenty-first-century industrial base per the 2022 National Defense Strategy.
 - DIU's expanded role should complement existing efforts in USD(R&E) and USD(A&S) in terms of traditional industrial policy and technology scouting, respectively, by better connecting the nontraditional industry and its resources, intelligence, and technologies to the needs of the warfighter.
 - DIU, USD(R&E), USD(A&S), and service partners should regularly integrate their efforts, in communicating to the industrial base the department's needs, planned investments, and business opportunities. In addition, they should share among themselves what is being discovered in industry that aligns with the department's missions.
 - In its expanded role, DIU should be resourced to regularly engage with acquisition organizations (PEOs, program offices), science and technology (S&T) organizations (labs, DARPA), and combatant commands to share the insights it gets from nontraditional industry players throughout the DoD. Additionally, DIU will communicate back to industry where it can align its technologies to the needs of the warfighter as communicated by acquisition organizations and combatant commands.
 - Prioritization for expanded staffing for DIU should be for new billets from the services over funding for contractors. The billets would be priority assignments, selected from relevant PEOs and service acquisition executives (SAEs).
 - DIU should track the intelligence, insights, and inputs it receives from industry trade associations, venture capitalists (VCs), private equity firms, primes, nontraditional defense companies (NDCs), Other Transaction (OT) Consortia, and innovation hubs. This information should be interoperable with USD(R&E)'s existing repository of research and intelligence for the department's needs.
- DIU, USD(A&S), and SAEs charter a team, including joint warfighter perspectives, to streamline processes, reviews, and documents for acquiring commercial solutions. The team will reinforce "buy before build" commercial practices in the early phases of programs by baking it into acquisition strategy templates and program reviews. It will also collaborate with defense industry, capital markets, and Congress to develop a broader set of rapid funding tools and approaches to demand signals consistent with the speed of commercial innovation cycles. It will publish an initial commercial pathway or guide by December 2023, with a comprehensive version in 2024.
- Joint Staff and service requirements organizations develop a rapid "military need validation" process, involving feedback from the warfighter, for commercial solutions in lieu of traditional Joint Capabilities Integration and Development System (JCIDS) requirements documents. This new process will enable hundreds or even thousands of commercial solutions to be validated by empowered, distributed officials, and not subject to the JCIDS process managed by the Joint Staff and the Joint Requirements Oversight Council (JROC).
- The Defense Acquisition University and related organizations should modernize guidance and training for commercial acquisition, to include:
 - Collaborating with industry, traditional and otherwise, in the early phases of an acquisition program to inform concepts, alternatives, and designs. The focus should be on feeding into mission objectives, not market research for system specifications.
 - Contracting strategies focused on commercial solutions (e.g., Commercial Solutions Openings, Other Transactions, Federal Acquisition Regulation Parts 12 and 13).
 - Testing, experimentation, exercises, rapid deliveries, and iteration.
 - Scaling programs like DIU's Immersive Commercial Acquisition Program.

Success Measures: Higher number of DIU projects that transition to a program of record; increased number of vendors entering the federal market and competing for contracts; better alignment of capital market investment and lending to DoD missions; alignment of DoD R&D and prime IRAD funds to help a wider number of entrants across the Valley of Death; increased transparency with the industrial base on DoD's priorities; a commercial pathway, guidance, and training enabling workforce to rapidly and successfully acquire commercial solutions; increased transparency and collaboration within the department on tech-related initiatives and intelligence; resources saved and efficiencies gained from central repository information from traditional and nontraditional industrial base like market intelligence, technology landscape analysis and due diligence on vendors.

Notional Examples: Expanded engagement with nontraditional industrial base helps DIU identify the commercial sector's leader in autonomous software for ground vehicles and, through the streamlined, well-defined process for rapid acquisition, the US Army begins adopting it across its fleet of logistics vehicles on continental United States bases.

In their quarterly engagement, the US Marine Corps Warfighting Laboratory (MCWL) talks to DIU about its desire to procure better mission planning tools at the edge. DIU identifies and provides three viable commercial options for demonstrations. Before presenting them to MCWL, DIU leverages VC firm relationships to get existing due diligence on the potential vendors and discovers one of them draws components of its chips from China. DIU finds an alternative.

In its engagements with capital market players, DIU discovers there are several critical bottlenecks in the quantum computing supply chain due to either a severe lack of redundancy or routing through adversary nations. DIU flags this to R&E, Office of Strategic Capital (OSC), and A&S Industrial Policy to determine how to address this. As part of this, DIU and OSC engage with capital market players to inform them this is now a department priority, helping to direct capital market funding toward these enabling technologies critical to the US broader tech competition vis-à-vis China.

RECOMMENDATION 5:

Strengthen existing capital market programs and create new pathways for mission-critical technologies.

Addresses challenges 1, 3, 4, and 8.

US capital markets represent a critical yet underutilized strategic advantage for the DoD. To better leverage vast capital market resources for defense innovation and mission outcomes, the DoD should broaden programs through which capital market-backed companies can participate and create new pathways for DoD program offices to leverage capital market funding for mission-critical technologies.

Congress directs in legislation the Small Business Agency (SBA), in coordination with the General Services Administration (GSA), to enhance the Small Business Innovation Research (SBIR) grants program no later than six months after enactment.

To better scale SBIRs, the SBA should:

- Generate direct to Phase III SBIR grants in which early successful performers in Phase I can be fast-tracked to more-flexible contract vehicles, for which performers have exemptions from SBA size standards for procurement; no

limits on dollar size of procurement; the right to receive sole-source funding agreements; and the ability to pursue flexible ways to add value to an end user, whether that be research, R&D, services, products, production, or any combination thereof.

- Direct the SBIR offices of the US Army, Navy, and Marine Corps to pilot a Strategic Funding Increase (STRATFI) program to help bridge the Valley of Death between Phase II and Phase III SBIR grants, no later than twelve months after designated. Service pilots would replicate the STRATFI program in that SBIR funding (\$15 million) would receive matched funding from customers (\$15 million) and private funding (up to \$30 million).

To increase competition and widen the aperture of firms competing for SBIR grants, the SBA should:

- Remove the barrier preventing companies with more than 50 percent backing by VCs or other capital market players to compete for SBIR grants. Small businesses often rely on

VC funding to cover the costs of operating as they work to commercialize their products and generate sufficient revenue to sustain their business. This is particularly true in the case of software development, for which highly skilled software engineers are the single most expensive operating cost. Placing strict limitations on the ability of these small businesses to compete for SBIR grants is contrary to the SBIR program goal of supporting scientific excellence and technological innovation.

- Remove the barrier preventing companies that meet the requirements of being a small business, but are publicly traded, to compete for SBIR grants. Small, high-tech R&D firms go public to continue their ability to raise funds for their capital-intensive technologies. By disallowing them from competing for SBIR grants, the DoD is limiting technology competition among some of the most technology proficient corners of the industrial base.

To drive deep tech adoption, the OSC should develop tools for leveraging external capital market funding for pilot projects to service R&D organizations in FY 2024, with a formalization plan in conjunction with the president's FY 2025 budget request.

- OSC to be given expanded authorities to access capital markets to develop revenue, investment, and credit approaches for defense programs contracting with small-, mid-, and large-cap companies. As an initial step, direct \$15 million of external capital market funding to the R&D organization of each military branch to pilot projects that identify two novel use cases in one or more of R&E's deep-tech priority areas of quantum technology, biotechnology, or advanced materials that could be leveraged to achieve service-specific missions. The period of performance would be eighteen months. Service end users would provide matched funding of up to 25 percent of total outside funding to pilot these projects.
- This would assist in directing capital market funding to the DoD's mission, providing additional R&D funding and incentives for deep-tech companies to commercialize their technologies, and creating optimization loops that connect technology to warfighter use cases that can help turn basic research into relevant products and services. Lastly, exposure to deep-tech applications would allow service end users to better understand emerging technologies'

applications to future defense requirements. This will help accelerate the well-aligned adoption of these capabilities to meet services' unique missions at the speed of relevance.

- R&D leads will report to DIU's director and USD(R&E) no more than 180 days past the period of performance on the pilot's utility, lessons learned, and challenges DoD would face if technology were to be adopted at scale.

Success Measures: Meaningful increase in capital market funding for defense-related companies; increased number of companies crossing Valley of Death and program offices integrating commercially developed technology to speed innovation milestones; increased number of production contracts from nontraditional vendors, with more vendors competing for each contract; increased touchpoints between cutting-edge tech and the warfighter/end users; and the identification of specific tech adoption challenges that can be addressed ahead of requirements process for more-seamless tech adoption and integration.

Notional Examples: A majority VC-backed company demonstrates a novel capability that provides an advantage over a near-peer adversary and is fast-tracked to SBIR Phase III, through which the firm begins production at scale and crosses the Valley of Death.

A publicly traded deep-tech company that qualifies as a small business, now allowed to compete for SBIR grants, begins to develop the foundation of a quantum network for the US military.

The US Army discovers through a biotech pilot project that an advanced material it hoped to put into a program of record does not provide meaningful benefit for the cost and pursues another alternative.

The US Navy uses its OSC pilot to buy hours of time on a quantum computer provided over the cloud, through which the Navy discovers the quantum computer's utility in improving logistics and maintenance. However, the Navy does not know how to manage the data being generated and needs an extra data scientist to oversee the process. The Navy begins to generate a data governance process, forms a new billet to manage it, and begins determining the best acquisition pathway in anticipation of purchasing quantum computing as a service.

RECOMMENDATION 6:

Congress, OSD, and SAEs increase incentives and reduce barriers for leading technology companies to do business with the DoD by September 2024.

Addresses challenges 1 and 3.

● Increase Incentives

- **Production Contracts.** The DoD and Congress in future defense budgets rebalance the ratio of RDT&E and Procurement funding to historical norms over the past thirty years. From 1990 to 2019, the ratio was 39 percent to 61 percent, respectively. This would provide more than \$20 billion in additional procurement funds to acquire production quantities faster, leverage commercial R&D, and fuel a broader market for leading technology firms. Increasing production and lowering barriers to entry will attract venture capital firms and bring private research and development funding to the defense market. As most of USD(R&E)'s fourteen critical technologies are commercially driven, this rebalance would enable faster fielding of warfighter priorities.
- **Set Precedent.** USD(A&S) and SAEs report the number of large contracts (i.e., more than \$50 million) awarded to start-ups and NDCs annually to measure and convey the trends of the DoD investing in these companies beyond small SBIR awards.
- **Innovation Funds.** USD(R&E) and services include start-ups and NDCs as part of selection criteria for congressionally directed innovation funds.
- **Show Support.** USD(A&S) and SAEs scale the direction, goals, and guidance for working with small and disadvantaged businesses to include technology start-ups and NDCs. Include NDCs as part of the small-business integration working group being established for FY23 NDAA Section 874.
- **Broaden Access to Capital Markets.** Congress and USD(A&S) modernize the use of Defense Production Act Title III and credit loan authorities available to other agencies and departments to dynamically access capital, embrace commercial terms, and strengthen the domestic industrial base capabilities, based on lessons learned from COVID and the war in Ukraine. This use could include purchase commitments and loan guarantees, similar to how the Export-Import Bank works with US companies overseas, to increase incentives and reduce risk for companies seeking to scale production of critical technologies.

● Decrease Barriers

- Congress should raise the Cost Accounting Standards (CAS) threshold to at least \$100 million; revise the commercial item exemption in 48 CFR 9903.201-1(b)(6); and make related CAS reforms as recommended by the Section 809 Panel to reduce compliance costs, which are the biggest barrier to entry in defense.
- DoD, GSA, and Office of Management and Budget invest in modernizing SAM.gov and related DoD websites that publish contract opportunities to improve user design, alerts, DoD-industry collaboration, processes, and status. Many find SAM.gov onerous to use.
- Fully resource and drive the Defense Counterintelligence and Security Agency to streamline processes, increase staffing, and pursue novel approaches to reduce the large backlog of individual and facility security clearances that impose long delays on contractors to begin work or scale.
- USD(A&S) and SAEs assign visible leaders for SBIRs, OTs (including OT Consortia), Middle Tier of Acquisitions, and Commercial Solutions Openings to champion adoption; set vision; simplify processes; curate leading strategies; and improve guidance, training, structures, and direction to continuously improve adoption. Update policies and guidelines to ensure efforts conducted under OTs count for past performance and small disadvantaged business goals to incentivize industry and government use.
- USD(A&S), USD(R&E), and services establish a team to map and improve processes to scale successful research and prototypes into new or existing acquisition programs. This includes requirements, acquisition, budget, contracting, engineering, and testing, among others.
- USD(A&S) and SAEs establish a working group, to include primes and NDCs, to explore how to incentivize primes to better leverage technology start-up companies. The objective is to fuel disruptive defense innovation from novel tech companies and leverage the primes to scale integration and production of weapon systems to create an enduring battlefield advantage.

Success Measure: USD(A&S) reports an increase in the number of new companies in the industrial base by 5 percent, offsetting the recent trend of 5 percent decrease annually. At least ten NDCs are awarded contracts of more than \$50 million that address validated defense requirements. Defense primes significantly increase partnerships, subcontracts, and acquisitions of start-ups and NDCs to integrate their technologies into weapon systems.

Notional Example: A leading technology company with viable solutions for defense that historically avoided defense contracts is now receptive (with board support) to pursue contracts given the higher CAS thresholds, reduced unique compliance requirements, and improved clearance processes.

RECOMMENDATION 7:

USD comptroller proposes streamlined budget justification and chief digital and artificial intelligence officer (CDAO) modernizes supporting details in congressionally accessible information system for the president’s FY 2026 budget request.

Addresses challenge 7.

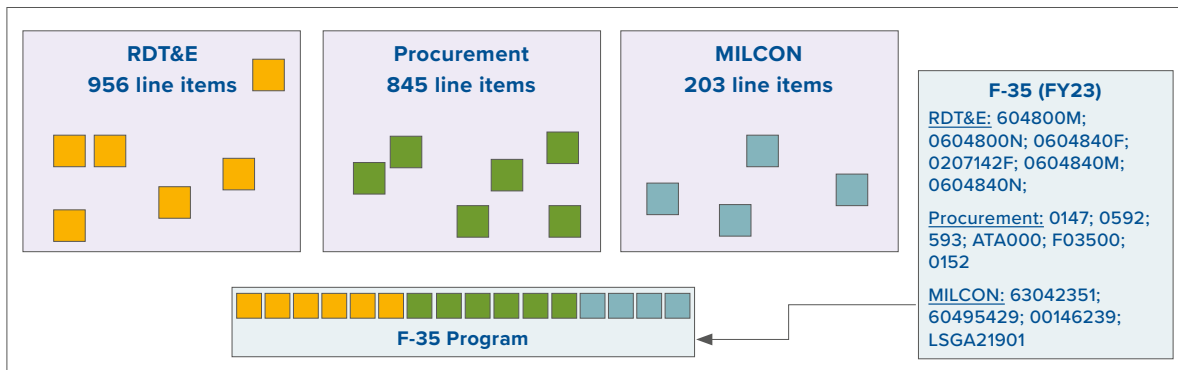
- USD comptroller proposes a format for streamlining budget justification documents in the investment accounts, focusing on cogent six-page program overviews at the BLI/PE level (R-1 and P-1) with hyperlinks to supporting details.
 - Seek implementation for the president’s FY 2026 budget request.
- CDAO leads the effort to create a query tool and dashboard tied to Advana’s backend data that delivers insight down to the existing level of justification material, allowing for more frequent updates.
 - This tool should be capable of replicating Financial Management Regulation Volume 2B, Chapters 4 and 5 presentations.

- Prototype early access to congressional staff with the president’s FY 2025 budget request, in addition to the traditional format.
- This tool should seek to incorporate budget execution data such as quarterly DD1416s and contract obligations as data integration improves.

Success Measure: Congressional staff use the new information system for their budgetary and program analysis; staff desires expansion into other accounts, including Operations and Maintenance and Military Personnel.

Notional Example: Congressional staff can find up-to-date information on DoD program activities without having DoD officials provide the information directly to a committee.

Budget Justification Not Supporting Congressional Oversight



Current budget justifications are submitted across tens of thousands of pages that often obscure program oversight. The F-35 program, for example, had total or partial interest in more than fifty investment and military construction line items since 2002, and was spread between sixteen line items in FY23 alone. This cumbersome system reduces trust and transparency between Congress and the DoD. Credit: Eric Lofgren

RECOMMENDATION 8:

Tying experimentation to acquisition outcomes: Scaling and accelerating successful demonstrations.

Addresses challenges 1, 4, and 8.

The DoD and industry invest significant time, funding, and resources to conduct operational exercises that experiment and demonstrate emerging capabilities and technologies in an operationally relevant environment. Even after a major exercise in which senior commanders agree on the success of demonstrated capabilities and demand to acquire these at scale, there is often a two- to four-year lag time for DoD to formally define requirements, secure funding, and shape acquisition and contract strategies. For example, even successful capabilities selected by USD(R&E)'s Rapid Defense Experimentation Reserve (RDER) still must go through the Program Objective Memorandum and Deputy Secretary's Management Action Group processes to begin scaling.

- Congress to pilot providing \$250 million to scale operationally relevant technologies demonstrated at operational exercises that address the preeminent challenge of deterring the People's Republic of China, such as RDER. The funds will facilitate the acceleration and scaling of novel capabilities into the hands of the warfighter at the speed of relevance, help vendors cross the Valley of Death, and incentivize new nontraditional companies to work with the DoD. This will significantly shorten the traditionally long lag times for successful vendors to receive funding while the DoD finalizes requirements, funding, and contracts. The associated funds would be particularly useful for the technology needed to integrate military forces that will revolve around digital tools and other foundational "middleware" technologies that sometimes fall in the seams of traditional major hardware-centric acquisition.

The fund should:

- Be allocated in FY 2024 spending bill to specific programs or initiatives no later than 180 days from completion of the exercise on discovered solutions.
- Be limited to five or fewer high-potential capabilities to ensure they are properly resourced to meaningfully scale.
- Be directly allocated to an acquisition organization, such as a program executive office, to rapidly acquire capabilities that have demonstrated success in order to address priority operational risks or opportunities.
- Use Defense Production Act Title III or adapt authorities available to other agencies and departments to provide credit guarantees or other funding approaches in support of technology and capability providers.

Success Measures: Increased number of technologies and capabilities demonstrated successfully that are transitioned at scale to the warfighter; increased number of vendors incentivized to demonstrate at exercises.

Notional Example: A company demonstrates a swarm of small undersea intelligence, surveillance, and reconnaissance drones at the Rim of the Pacific 2024 exercise. The firm is awarded a low-rate initial production contract within sixty days and deploys its capability with the Navy in 2025.

RECOMMENDATION 9:

USD(A&S) and acquisition executives propose realigning existing organizations to adopt the Space Development Agency (SDA) model, and Congress grants additional enabling authorities to those organizations in FY25 NDAA.

Addresses challenges 2 and 4.

- USD(A&S) and SAEs charter a small team to build out a model, structure, key elements, and a framework replicating the SDA and lessons learned from rapid acquisition.
 - SDA provides an early model for preemptive disruption within the Space Force. The disruptive units should focus on current technologies from the labs and industry that can be quickly fielded and scaled within existing rapid acquisition authorities. Mature defense and commercial capabilities, along with broader portfolio requirements, can shape a streamlined process. This model builds upon successful organizations like the Air Force Rapid Capabilities Office, Big Safari, and Special Operations Command’s acquisition and SOFWERX organizations.
- Service leadership identifies priority capability areas that are ripe for disruption—ones where the current operational model is outmoded for the digital age and/or where novel technologies offer radically different operational capabilities at greater speed and scale to achieve mission priorities.
- Each identified service and defense agency employs an SDA model to a priority capability area and repurposes organizations, funding, and resources to implement.
 - Identify the right charismatic leader who embodies these characteristics: high technical acumen, proven product manager, well-defined vision, extensive personal network in warfighting and industry communities, commitment to a five-year tenure, and an intangible “wild card” quality. Provide statutory protections to extend top cover beyond the length of time of political appointees for the new organizations to disrupt entrenched mindsets on major systems, operations, and force structures employed for decades.
 - DoD leaders continually discuss and iterate on the new model with key stakeholder organizations across the DoD and congressional defense committees.

Success Measure: Congressional buy-in, with a small set of targeted projects identified for each organization and underway in FY 2024 to prepare for rapid scaling in FY 2025 with capabilities initially fielded by FY 2027.

Notional Example: US Navy leadership, in its commitment to autonomous systems, bundles PEO Unmanned and Small Combatants, Task Force 59, Unmanned Task Force, and the director of unmanned systems into a new naval autonomy organization with authorities and flexibilities similar to SDA and related rapid-innovation organizations.

RECOMMENDATION 10:

The Vice Chairman of the Joint Chiefs of Staff (VCJCS) and services establish a team to collaboratively modernize JCIDS and service requirements processes by September 2024.

Addresses Challenges 2, 4, and 5

The DoD’s JCIDS is a complex, disjointed bureaucracy across Joint Staff and the services. The DoD requires a streamlined, tailored requirements framework and processes that iterate operational needs and threats with technology solutions, while also aligning requirements, acquisition, and budget systems.

- VCJCS and services charter a team or multiple teams to modernize DoD’s requirements enterprise to include:
 - Design a requirements framework that better incorporates bottom-up capability requirements from the warfighter and addresses joint strategic capability concerns. It must align service/agency and JROC core processes while allowing some tailoring and flexibility.
 - Enable a requirements system that breaks from the mindset of locking down all requirements up front to a dynamic model that enables software-intensive commercial solutions and emerging technologies that meet

changing or evolving warfighting needs to iteratively shape capability developments.

- Overhaul, streamline, and tailor requirements documents based on capability size, urgency, product vs. service, and hardware vs. software. Develop new process to rapidly validate the military utility of a commercial solution instead of the traditional JCIDS.
- Aggressively streamline capability requirement development, coordination, and approval timelines from operational commands, through component commands, and Joint Staff. Impose tripwires for exceeding six months for software and twelve months for hardware to get senior leader involvement.
- Develop enduring overarching requirements for capability portfolios. Include a set of mission impact measures to focus investments and acquisitions to continuously improve.
- Retire the outmoded DoD Architecture Framework and focus on application programming interfaces per DepSecDef's data decree, architectures, and standards to enable interoperability. Strike the right balance between enterprise, service, and portfolio orchestration with flexibility for program and industry solutions.
- Modernize the analysis of alternatives processes to enable a more streamlined and iterative approach that values prototypes, experiments, minimum viable products, and commercial solutions with warfighter and other user feedback over lengthy headquarters staff analysis.
- Better integrate threat and technology assessments early and throughout the process.
- The team must include external change management experts and collaborate with industry (traditional and nontraditional) and the DoD S&T community to get their input and feedback on providing options to inform DoD requirements.
- Develop a career path, structure, and improved training for DoD requirements managers.
- Publish new policies, guidance, and templates in dynamic online formats instead of five-hundred-page PDFs.
- Congress directs the Government Accountability Office to assess the DoD's requirements management processes, policies, and practices to include timelines; alignment to the DoD budget and acquisition processes, mission outcomes, portfolio management; and harnessing commercial technologies.
- The Senate Armed Services Committee and/or House Armed Services Committee hold hearings with the VCJCS and the service chiefs on modernizing DoD requirements processes to enable greater speed, agility, and innovation.

Success Measure: Joint Staff and service stakeholder organizations collaboratively develop a modern approach to managing defense requirements. The new requirements system integrates the key elements outlined above by September 2024.

Notional Example: The Air Force establishes an uncrewed aerial systems (UAS) portfolio requirements document that aggressively streamlines all future UAS requirements, bakes in interoperability standards, and enables many novel commercial solutions.

VIGNETTES: WHAT SUCCESS LOOKS LIKE

The commission's recommendations offer bold, actionable reforms to transform the enterprise to enable greater innovation adoption. They include scaling the great work of many dedicated professionals who explored novel practices to accelerate deliveries and increase mission impact. Furthermore, some recommendations require Congress to drive statutory changes or new language to enable greater innovation adoption.

To ensure the recommendations put forth in our interim report were clear, impactful, and achievable, the commission included metrics for how it would measure the implementation of the recommendations, in addition to offering examples of what successful execution would look like. In our final report, we sought to leverage real examples of recent successes of DoD and industry pursuing novel approaches and pathways for technology transition and scaling to ultimately improve mission outcomes for the end user. These real-world vignettes are not only meant to underscore what success

looks like, but also highlight the excellent work of select DoD officials, organizations, and industry vendors who work tirelessly in pursuit of innovation adoption for a more resilient and adaptable force.

The following vignettes outline key challenges the department has faced, the solutions and processes it followed to address them, and the outcome of its efforts. Furthermore, they outline how these examples align with the commission's recommendations and reinforce the key themes and objectives to modernize the department and its broader ecosystem to strengthen national security. All of the commission's recommendations are reflected, with the exception of Recommendation 3, which suggests modernizing budget documents, because the DoD has yet to do so. However, the deputy secretary of defense directed the department to adopt any suggestions made in the Commission on Planning, Programming, Budgeting, and Execution (PPBE) Reform's Interim Report that can be implemented now, which reiterates our third recommendation.

VIGNETTE 1: LEVERAGING OPERATIONAL INNOVATION AND EXPERIMENTATION TO DEMONSTRATE THE VALUE OF COMMERCIAL CAPABILITIES TO MEET OPERATIONAL NEEDS

Challenge: The US Navy's Fifth Fleet, overseeing key chokepoints like the Suez Canal and Strait of Hormuz, was facing key capability gaps due to shrinking allied defense budgets and growing operational commitments, including daily weapons smuggling, shipping harassment, drone attacks, speedboat interdictions, and military threats. Facing constrained bandwidth, the fleet needed novel approaches to conduct maritime domain awareness.

Solution and process: NATO's experience with the Maritime Unmanned Systems Initiative underscored the role that maritime robotics could play when combined with machine learning and artificial intelligence (AI) in achieving more precise deployments of limited-crewed assets for enhanced maritime domain awareness, a concept previously untested in real-world conditions. A design sprint in Bahrain, leveraging the Chief of Naval Operations' Unmanned Task Force, sought to integrate robotics and AI into fleet operations to meet mission demands and laid the groundwork for what would become Task Force 59 (TF-59).

Innovation occurred continuously in the live "lab" of the operational environment, with a focus not on technology adoption in a vacuum, but creatively leveraging and empowering people and dynamic leaders and partnerships, transforming processes and rethinking tempo to ultimately achieve operational problem solving and operational innovation.

This rapid innovation was driven by two pivotal process changes: capability as a service and the capability sprint model. When traditional government funding to procure capabilities was denied, the task force pivoted to the "capability as a service" model, which delivered instant access to cutting-edge technology, software updates, and maintenance. This cost-effective approach saved millions in operational expenses compared to traditional methods, and also enabled strong partnerships with a large number of industry partners. When the acquisition process did not accommodate purchasing or renting drones, TF-59 transitioned to a data-as-a-service model and collaborated with the Naval Information Warfare Center Atlantic to establish a comprehensive data lake—a centralized repository that securely stores and processes large

amounts of data. These adaptations illustrate the dividends of process innovation and highlight that a focus on iterative improvement can deliver execution in complex, multi-stakeholder environments.

From an organizational perspective, four principal innovations are notable.

Problem holder inclusion: By integrating those facing challenges directly into technological-development discussions, operations drove innovation.

Ideas over rank: A genuine meritocracy was implemented, in which the best ideas prevailed, regardless of the rank of those who proposed them.

Problem-centric organization: TF-59 adopted a start-up structure oriented around the problems at hand. This focus created a dynamic environment in which solutions were devised with a clear understanding of the actual challenges faced.

Team of teams execution: Recognizing the vast scope of the mission, TF-59 cultivated a wide network of collaboration with partners across government, academia, and industry.

Outcome: In January 2023, US Fifth Fleet Commander Admiral Brad Cooper declared TF-59 had achieved initial operational capability after logging more than thirty-five

thousand hours of maritime robotics operations, executing more than twenty multinational exercises, deploying more than twenty disruptive technologies, and creating a data lake of more than twenty million data points, all of which made a strong future hybrid fleet.

The culmination of this work was demonstrated at the International Maritime Exercise—the largest-ever maritime unmanned-systems exercise. This exercise demonstrated the viability of what has been termed a “digital ocean”—a domain of sensors collecting new data from “ships, unmanned systems, subsea sensors, satellites, buoys...[with an] intelligent synthesis of around-the-clock inputs” that provides unprecedented maritime domain awareness.¹

Aligns with Atlantic Council recommendations 1, 4, and 10:

This anecdote highlights the importance of adopting a portfolio approach that allows the pursuit of multiple technical solutions. This was critical for TF-59 to be able to experiment and prototype with multiple vendors with differing solutions to help solve enduring operational challenges. DIU connected TF-59 with vendors that could provide a viable solution and business arrangements that could be suitable for nontraditional vendors. This vignette also shows that detailed requirements approved and validated years ago do not add value when it comes to rapidly advancing commercial technology and how it can solve operational needs using solutions that operators would not have envisioned.

VIGNETTE 2: PURPOSEFUL EXPERIMENTATION AND SCALING SBIRS FOR MORE RAPID AND WELL-ALIGNED TECH ADOPTION

Challenge: The US Air Force Special Operations Command (AFSOC) identified the integration of AI for Small Unit Maneuver (AISUM) as a key mission priority to enhance warfighters’ situational awareness by providing a comprehensive 360-degree view, expediting threat identification and removal, and ultimately ensuring operator safety. In pursuit of that, AFSOC seeks to create teams of multi-agent unmanned aerial systems (UAS) that can operate and collaborate autonomously in complex, unstructured environments.

Solution and process: AFWERX Autonomy, in collaboration with the US Air Force Research Laboratory (AFRL) Sensors Directorate, selected vendors to conduct multiple flight

demonstrations and evaluations to provide a baseline of current autonomous capabilities. A five-day flight event took place at Camp Roberts in California, during which autonomous UAS employed onboard autonomous software to circumvent obstacles and communicate elements of the surrounding environment while executing missions.

Outcome: As a result of successful performance, a start-up specializing in defense-focused autonomous drones won a \$60-million contract through the Strategic Funding Increase (STRATFI) program to provide the AI technologies it used and unmanned systems to AFSOC. STRATFI is designed to identify companies that consistently meet the requirements

¹ Brandi Vincent, “Navy’s Task Force 59 reaches full operational capability as it works to build a ‘digital ocean’ of connected assets,” DefenseScoop, January 10, 2023, <https://defensescoop.com/2023/01/10/navys-task-force-59-reaches-full-operational-capability-as-it-works-to-build-a-digital-ocean-of-connected-assets/>

of the Department of Defense and are well positioned to win multiple programs of record. The program aims to keep start-ups funded while they navigate the DoD's acquisition cycles, enabling contracts to be issued more quickly compared to the traditional two-year budget cycle.

Companies that demonstrate potential for meaningful contributions to the DoD can receive up to \$60 million over a span of three years. This funding structure provides \$15 million each year for the first two years, and an additional \$30 million in the third year, from either government or private-capital investment sources. The start-up, for its part, attracted funds from venture firms for its STRATFI award. Due to this expanded contract vehicle, not only are the start-up's drones deployed alongside AFSOC operators, but it is also working with AFWERX and AFRL Sensors Directorate to deploy V-BATs team capabilities to conduct detect, identify, locate, and report operations in Global Positioning System- and communications-denied environments next year.

Aligns with recommendations 5, 6, and 8: This anecdote is a successful example of finding novel pathways to scale successfully demonstrated technologies that are aligned to mission outcomes and getting them across the valley of death between Phase II and Phase III SBIRs.

By utilizing STRATFI to expand SBIRs, more funding is made available for vendors to effectively demonstrate their capabilities. This approach also enables both the department and vendors to benefit from capital market investments in critical defense technologies. In turn, capital market investors receive a strong demand signal and have the potential for a return on investment by backing technology companies supporting the department. This positive cycle should help funnel more capital market dollars into defense technologies and encourage nontraditional entrants to do business with the DoD.

VIGNETTE 3: TYING EXPERIMENTATION TO ACQUISITION OUTCOMES AND LEVERAGING DIU COMMERCIAL-LANDSCAPE MONITORING

Challenge: During operations in Syria and Afghanistan, US Army units acknowledged the significant role of small drones in offering intelligence and surveillance at the unit level. As a result, these units frequently procured commercially available off-the-shelf (COTS) systems from Chinese companies prior to these units' deployments. After the department grounded Chinese-made COTS drones due to security risks in 2019, the Army needed an accelerated acquisition process to rapidly identify and field secure, capable solutions.

Solution and process: The Army short-range reconnaissance program sought a rucksack-portable system capable of providing real-time situational awareness to infantry platoons. Recognizing the advances in the commercial drone market, the Army bypassed its traditional industry partners and leveraged the DIU to build partnerships with more than thirty nontraditional drone providers to submit solutions. Five finalists were chosen for rigorous testing at the Small UAS Master Trainer Schoolhouse in Fort Benning, Georgia, before the winner was selected.

Outcome: This initiative, spearheaded in late 2019, not only generated the Army's first program of record for a much-needed

capability, but also represented a prototype for the delivery of more than one thousand systems in less than three years. Although the DIU led the Army-sponsored prototype competition, additional services and US government agencies benefited from the pipeline by being able to rapidly procure Blue UAS platforms to meet their small UAS program needs.

Aligns with recommendations 4 and 8: This anecdote showcases technology companies demonstrating capabilities in operationally relevant environments. It also demonstrates success generating an acquisition outcome that procures and scales mission-aligned technologies to be transitioned to the warfighter. This assessment highlights how the commission envisions the US military services utilizing the DIU's commercial scanning capability to not only source leap-ahead, dual-use tech capabilities, but to find appropriate alternatives when existing vendors are no longer trusted nor the most efficient or cost-effective option. This process not only brings the best of what the private sector has to offer for US soldiers, but also allows the department to benefit from capital market dollars being spent on technology development and maturation.

VIGNETTE 4: PIVOTING TO MODERN INFORMATION-TECHNOLOGY CAPABILITY PORTFOLIO MANAGEMENT

Challenge: In the 2010s, the US Navy was acquiring a series of disparate information-technology (IT) products in a manner that was cost-inefficient, performance ineffective, and put the burden on its customers to integrate solutions.

Solution and process: The Navy's PEO Digital leaned forward over the last few years to adopt modern portfolio-management practices. In 2021, PEO Digital reorganized from traditional program management offices into eight portfolios, with five focused on delivering modern IT enterprise services and three oriented to other purposes. Portfolio support and control were provided through governance, common tools, staffing, and coordination.

PEO Digital modernized to be more service based, customer-centric, innovative, and agile. The PEO empowered employees and teams, while holding them accountable to a new set of mission-performance measures. A primary objective of the new structure was to foster greater collaboration across their programs and functional areas to reduce redundancy and increase agility.

PEO Digital published its "Technical Vision and Modern Service Delivery" report to convey how it will implement interoperable modern technologies to free warfighters' time to focus on warfighting tasks. Five of the eight IT service portfolios provide capabilities that align with the Modern Service Delivery Design Concepts and function as the proving ground for enhanced customer-centric solutions. PEO Digital's customers are not simply users of individual acquisition

programs. They are a diverse community of warfighters, dependents, civilians, and contractors who consume technologies across the Cyber and Operations, Digital Workplace Services, Infrastructure Services, Platform Application Services, and End-User Services portfolios. PEO Digital is also adopting modern architectures and industry frameworks. To remain at the forefront of modern service delivery, it coordinates acquisition, service delivery, and contract administration to maximize the Navy's purchasing power and return on investment. The remaining portfolios focus on specific areas that demand tailored acquisition support.

Outcome: The Modern Service Delivery portfolios provide maximum flexibility to shift investments to address priorities, risks, and opportunities for maximum mission impact. The modern structure supports legacy-technology divestments through a rationalized portfolio of services instead of portfolios of programs, illuminates organizations that provide new services, and delivers shared services across the US Department of the Navy.

Aligns with recommendations 1 and 3: This anecdote is a successful example of acquiring an integrated suite of capabilities instead of stovepiped programs. By consolidating budget accounts, the PEO was able to structure the acquisition and technology underpinnings to increase mission impact. This also exemplifies the commission's vision of continuous improvement through user-centric designs and feedback. Instead of imposing mandated IT solutions, PEO Digital sought to understand perspectives and proposed solutions.

VIGNETTE 5: MODERNIZING CAPABILITY REQUIREMENTS

Challenge: Defining, staffing, and approving enterprise IT system requirements is often a lengthy, cumbersome process that predates modern technologies and operations.

Solution and process: PEO Digital partnered with the Office of the Deputy Chief of Naval Operations for Information Warfare, the largest requirements sponsor, to pilot top-level requirements and modernize a set of decade-old enterprise IT and network requirements. The team employed high-level areas, outcome-oriented metrics, agile development and integration trains, and horizon pipelines. It fully embraced contemporary IT development practices like Agile that prioritize user needs, flexibility, and iterative processes.

Outcome: A ten-page requirements document replaced the outdated and overly prescriptive five-hundred-page legacy document. This new requirements document is a model for others

across the Office of the Deputy Chief of Naval Operations for Information Warfare to hold their acquisition agents accountable for continuously improving mission outcomes.

Aligns with recommendations 1 and 10: This anecdote is a successful example of shifting from a program-centric to a customer-centric requirements document for portfolios to enhance mission outcomes. Instead of detailed system requirements, such a document provides a strategic perspective that compels value delivery to the customer. This anecdote demonstrates a collaborative agreement between the acquisition and user community that aligns technology investment decisions with enhanced mission outcomes. It shifts the focus of acquisition management from the minimum acceptable support levels and system specifications that fail to optimize the benefit to the warfighter to a focus on operational capability needs and outcomes.

VIGNETTE 6: COMMUNICATING DEMAND SIGNAL TO LEVERAGE COMMERCIAL-SECTOR INNOVATION AND ADOPT PRIVATE-SECTOR BEST PRACTICES

Challenge: Many programs across DoD develop and execute acquisition strategies and make investment decisions without fully appreciating the leading technology solutions. These programs focus primarily on cost, schedule, and performance against a predefined baseline, failing to consider technology's value to the mission. Adoption of new technologies is stretched across multiple years due to duplicative development work and technical assessments, delaying warfighter capabilities, atrophying the tech value, and increasing development costs. The disconnect between acquisitions and the user community is a detriment to lethality.

Solution and process: PEO Digital partnered with the DIU, National Security Innovation Network (NSIN), Office of Naval Research, DARPA, other Department of the Navy PEOs, and NATO's Defence Innovation Accelerator for the North Atlantic, to improve tech scouting. The organizations provided access to a diverse talent network across government, vendors, and academics. They collaborated with venture-capital firms to share their vision and mission needs, learn about emerging technologies, and generate opportunities for industry to innovate to advance the Department of the Navy's Information Superiority Vision. The coordination across government and industry reduced capability deployment time and costs. Using

early development work and empirical evidence of technology impacts on mission outcomes in similar contexts informed investment decisions.

PEO Digital implemented the World-class Alignment Metrics framework to establish a centralized, data-driven investment-prioritization model to align technology outcomes and mission outcomes. This approach increases mission context and simplifies the impacts of technology investments for rapid business decisions. The framework reduces reporting burdens to the metrics demonstrating the most significant relationship between technology and mission outcomes. A study by technology analysis firm Gartner reinforced the framework's validity and benchmarked the organization against industry giants of similar size and complexity, such as large defense contractors, FedEx, and McDonalds. The five mission outcomes that technology investments must improve are: user time lost, operational resilience, customer satisfaction, cost per user, and adaptability/mobility. Each mission outcome has subordinate technical outcomes generated by the PEO.

Outcome: PEO Digital improved the efficacy of investment decisions while accelerating decision timelines from months to minutes. The approach significantly enhanced customer

outcomes and diversified vendor and procurement mechanisms using the PEO's R&D budget. The pilots achieved acquisition lead times as low as thirty days, reducing award times by eight months. They diversified vendor access and strengthened negotiating power. The organization delivers enhanced value faster and at a lower cost. Their collaboration with NSIN also attracted new talent for the defense sector.

Aligns with recommendations 1 and 4: This anecdote exemplifies the successful implementation of capability portfolio management to realign acquisition, contracting, engineering, and other elements to achieve portfolio outcomes. This example also demonstrates the commission's vision of leveraging commercial solutions, including the latest technologies from allies and partners, as well as adopting business practices used by leading commercial companies to strategically allocate investments, design solutions, and allocate resources.

VIGNETTE 7: LEVERAGING WARFIGHTING INSIGHTS AND COMMERCIAL PRODUCT VISION TO DEVELOP NEW INNOVATIVE PRODUCTS

Challenge: The commander of US Northern Command (USNORTHCOM) knew that his operational staff did not have the tools to integrate, process, and display all available intelligence that could help inform different courses of action rapidly and accurately. He worried that his ability to proactively identify threats and provide national leadership with decision space was becoming severely limited in an age of increasing threats. Service efforts to improve North American Aerospace Defense (NORAD) Command and USNORTHCOM systems, as part of large formal programs of record, had resulted in some improvements but still failed to meet combatant-commander needs.

Solution and process: In 2017, USNORTHCOM engaged the DIU to assist in finding a vendor that could not only support USNORTHCOM in developing tools to address these challenges, but also use its own corporate R&D funds, as well as funds awarded as part of the Air Force SBIR program. The DIU used its processes to identify commercial companies with the appropriate expertise, conducted a streamlined down-select process, and eventually awarded a contract to a vendor using DIU's Other Transaction (OT) vehicle. Specifically, the DIU adopted evaluation criteria that enabled the vendor to focus on integrating live mission tracks to demonstrate their value rather than developing extensive proposals or detailed slide decks. This vendor's product became known as the Joint Effects for Real-time Integrated Command and Control Operations (JERIC2O).

This steady stream of direct user feedback from USNORTHCOM personnel resulted in continuing success, as each release delivered more capability that addressed specific operator pain points. The application eventually grew to the point that it needed to be rolled into the Air Force's Advanced Battle Management System (ABMS) portfolio to

address broader challenges. This also resulted in the effort to move from the DIU contract to a more enduring ABMS Indefinite Delivery/Indefinite Quantity contract vehicle. This success was instrumental in USNORTHCOM collaborating with Joint Staff to issue a Joint Requirements Oversight Council Memorandum (JROCM) directing that the legacy system (which had never met user needs) be retired by the ABMS program, providing an opportunity for the vendor's products to be scaled more broadly.

The vendor's willingness to invest its own funds and staff its organization with military and technical experts who inherently understood USNORTHCOM's detailed operational needs and how to solve them provided it with a significant advantage in being able to achieve desired outcomes. The vendor's financial posture, in which leadership was willing to accept a lower growth trajectory, provided the firm the ability to more effectively compete against the major defense primes in later awards.

Outcome: In July 2023, the vendor was awarded a three-year, \$61-million contract to continue the development of this critical capability as part of the now formal program, Cloud Based Command and Control (CBC2), under the ABMS umbrella. The JERIC2O capabilities now reside in the vendor's Command Center product, which provides a world-class geospatial data-visualization and actions platform, ingests large amounts of data, applies real-time threat analysis, makes AI-generated recommendations, and delivers intelligent insights and actions across all domains for customers beyond USNORTHCOM.

The month following the CBC2 award, a Dallas-based private-equity firm announced the acquisition of the vendor, thanks in no small part to its work with USNORTHCOM that demonstrated its ability to rapidly deliver actionable insights

to warfighter using AI innovations. The vendor now has active contracts with multiple government customers, including the US Space Force, the Department of Homeland Security, the National Aeronautics and Space Administration (NASA), the US Army, and the National Reconnaissance Office. It plans on growing its two-hundred-person team and expanding its customer base to include working with the US European Command, the US Indo-Pacific Command (USINDOPACOM), and the US Central Command—as the firm successfully did with USNORTHCOM.

Aligns with recommendations 1, 5, 6, and 10: This anecdote demonstrates the value of a capability portfolio model, in which smaller vendors can bring outsized capabilities to solve specific user problems that would likely have been impossible under the standard program-centric model, in which all requirements would be consolidated into one massive program. A portfolio approach also provides more options for deprecating a larger legacy system rather than moving from one behemoth system to another.

This example also illustrates the importance of using government tools that incentivize tech companies to do business with the DoD by using alternative contracting vehicles, like Other Transactions, that are better aligned with commercial business models; evaluation techniques such as oral and video demonstrations; or hyperlinked proposals that reduce the burden on small companies and are more suitable for those vendors with limited expertise working with the government. If DIU had used the standard procurement process, it is unlikely that this vendor would have been able to participate. This success story also illustrates how current requirement processes need to be more influenced by available commercial technology. Rather than having users articulate every need in advance, the DoD should establish mechanisms (as USNORTHCOM did) in which users are more directly tied in with the developers to enable delivery of capability that iteratively addresses users' biggest pain points. Finally, this instance demonstrates the importance of funding flexibility, given how crucial it was for ABMS to be able to reallocate funds from other activities to support the continued development of this critical capability.

VIGNETTE 8: INCORPORATING ROBUST USER FEEDBACK WITH GOVERNMENT AND PRIVATE SEED FUNDING TO DELIVER UNIQUE COMMERCIAL CAPABILITY

Challenge: After years of relying on the M4 carbine for executing infantry and special-operation missions, the US Army concluded that it needed a more cost-effective and powerful weapon to deal with emerging threats on the battlefield. In 2020, it initiated the Next Generation Squad Weapon (NGSW) program to meet a broad set of requirements, including the use of a certain type of fire-control system, weight, accuracy, and caliber. There were also requirements for integrating digital technology that would improve the ability to provide soldiers with real-time information about the weapons status (like round counts), as well as provide more detailed situational-awareness information.

Solution and process: The Army carried out a sequence of prototype experimentation events and evaluations, which led to the identification of seven vendors and the selection of one to finalize development and enter into initial production for the NGSW. A prime contractor competitor for the NGSW contract partnered with a research company as a key subcontractor.

The research company's journey to fill this subcontractor role started as a beneficiary of an SBIR Phase I award, which provided modest funding but, more importantly, provided entry into the federal market. The awarding agency also offered an opportunity for accelerated achievement of SBIR Phase

III awards. This was influenced by the Army's Vista Initiative, which urged program offices to incorporate small-business partnerships as evaluation criteria with larger prime contractors. The larger companies were motivated by the prospect of receiving higher technical ratings during the selection process. This arrangement benefited the Army, as it allowed the service access to innovative technology that might otherwise be unavailable as a system subcomponent.

Despite receiving limited support from US government sponsors after the initial SBIR award, the subcontractor utilized its network to establish connections with relevant users that could offer feedback on its initial product. This involved creating use cases and conducting customer discovery with various stakeholders, such as the Army's PEO Soldier, home of the NGSW program office.

Outcome: The user feedback was overwhelmingly positive, instilling confidence that the subcontractor's product was suitable for a government contract. This feedback justified internal investments in further developing and enhancing the product. Shortly after securing \$1 million in seed funding from venture-capital investors, the subcontractor embarked on a six-month R&D pivot. This strategic shift sought to enhance its data-analytic capabilities to improve round-count detection

and weapon stress detection. These advancements were crucial for making informed decisions regarding condition-based maintenance. The successful implementation of this feature update proved beneficial for the company as it entered the NGSW competition.

Following its partnership with the prime, the subcontractor also announced the award of a five-year, \$60-million SBIR Phase III contract with the DoD and General Services Administration as part of the Joint All-Domain Command and Control project portfolio. These projects focus on fusing data from AI-enabled edge computing sensors with other battlefield data sources to transmit decision-quality information to tactical forces through mobile and mixed-reality platforms. This capability is expected to greatly improve ground teams' abilities to conceptualize line-of-fire dynamics and threat movements.

In April 2022, the US Army awarded a \$4.5-billion production contract for the NGSW program to Sig Sauer, the configuration of which included the subcontractor's round-count and inventory-management system. This system translates to all future orders of the XM5 rifle (replacing the M4/M4A1 carbine) and the XM250 automatic rifle (replacing the M249 squad

automatic weapon) including the ARC system, which provides a long-term revenue path for the company, given the number of soldiers expected to require those new weapons.

Aligns with recommendations 5, 6, and 8: This anecdote highlights the significance of enhancing the government's approach to conducting business with the tech industry. The utilization of evaluation criteria, which encompass nontraditional small businesses as innovation partners for significant contracts, proved to be a potent tool available to the government. This example also demonstrates the significance of utilizing private capital, which enabled ARC to adapt its product design while also using connections made through the SBIR award to obtain user feedback, which played a crucial role in informing the pivot. The acceleration into a SBIR Phase III instilled confidence in investors, as it demonstrated the government's serious commitment to this technology. Despite the private-capital injection, ARC was left with a two-year gap between having a viable contract and awaiting the award of the NGSW contract to affirm its position as the subcontractor. This emphasizes the need for more bridge-fund opportunities to ensure promising subcontractors are able to stay viable through long source-selection periods and remain a viable part of the defense supply chain.

IMPLEMENTATION ACTIONS TO DATE

Following publication of the commission’s interim report and engagement with key stakeholders, Congress and the DoD took the following actions (as of November 2023) consistent with the commission’s recommendations. These actions indicate the resonance of the report findings with key stakeholders in implementing reforms to ensure defense resources are maximized to meet challenges. At this time, Congress has not conferenced on the final FY 2024 National Defense Authorization Act (NDAA) or defense appropriation bills.

1. Introduce a new capability portfolio model. The assistant secretary of the Navy (research, development, and acquisition), citing this commission, designated PEO Integrated Warfare System (IWS) as the Department of Navy’s pilot PEO for portfolio management, effective immediately (September 2023). Other PEOs have moved, or plan to move, out on some portfolio-management practices with promising progress, to include Navy PEO Digital as noted in the vignettes in this report. William LaPlante, under secretary of defense for acquisition and sustainment and a public champion of capability portfolios, hosted a PEO Summit in July to discuss common challenges and solutions for delivering capability at speed and scale. He also updated DoD Directive 7045.20 on Capability Portfolio Management to reflect related practices at the Office of Secretary of Defense and Joint Staff levels.

2. Consolidate program elements. In its interim report, the congressionally directed Planning, Programming, Budgeting, and Execution (PPBE) Commission recommended a systematic review and consolidation of budget line items among the “actions that can be implemented now.” The deputy secretary of defense directed the department to adopt all actions (PPBE Commission recommendations) that can be implemented now. The Senate version of the defense appropriations bill noted that the Army should consolidate Other Procurement Army funding lines.

3. Reset reprogramming authorities. The PPBE Commission’s interim report considered several alternatives to modify reprogramming authorities and policies. It seeks further inputs from congressional and DoD stakeholders on this potential recommendation. Its interim report has 215 mentions of reprogramming, a hot topic of discussion for challenges and reform opportunities. The deputy secretary of defense directed the department to adopt all actions from the PPBE Commission interim report that can be implemented now.

4. Modernize the DoD to align with the twenty-first-century industrial base. The secretary of defense elevated the DIU to be a direct report, and required a plan of actions, milestones, and resource requests. USINDOPACOM established a Joint Mission Accelerator Directorate (JMAD) to help connect with the commercial sector. A DIU leader serves as the JMAD deputy director and chief technology officer. The Defense Subcommittee of the US House of Representatives Appropriation Committee (HAC-D) recommends \$1 billion funding in the FY 2024 defense appropriations bill for a hedge portfolio fund run by the DIU for smart, affordable, modular, and sustainable systems—\$600 million of that is allocated for agile research, development, test and evaluation, procurement, production, modification, operations, and maintenance. The House Armed Services Committee NDAA is supportive of DIU’s success and directs the DIU to identify a consolidation plan for DoD innovation organizations to engage nontraditional technology partners more effectively. The Senate NDAA Section 806 calls for reduction of barriers for commercial products and services. The House NDAA bill directs the Government Accountability Office to study reforming requirements, including processes to rapidly validate the military utility of commercial solutions to meet capability needs or opportunities. The Senate NDAA Section 212 supports the DoD’s providing up to \$15 million per year to participate in NATO’s Defence Innovation Accelerator for the North Atlantic. The House NDAA Section 853 establishes a public-private partnership pilot program to accelerate scaling, production, and acquisition of advanced capabilities for national security. This measure is intended to bolster the defense industrial base and domestic supply-chain resilience.

5. Strengthen alignment of capital markets to defense outcomes. The House NDAA Section 883 directs the services’ SBIR offices to conduct a study on expanding STRATFI programs beyond the Air Force to help small businesses seek Phase III awards. The Senate NDAA Section 845 extended Small Business Innovation Research and Small Business Technology Transfer (STTR) programs to transfer to production. Senate NDAA Section 831 generated a Defense Industrial Base Advanced Capabilities Pilot Program that focuses on public-private partnerships with equity. Additionally, DARPA, Army, Navy, and Air Force have allowed majority VC-owned companies to participate in SBIR/STTR. Senate NDAA Section 845 extended the pilot program for streamlined technology transition from the SBIR/STTR programs by five years. Senate NDAA Section 834 generated a Program on Capital Assistance

to Support Investment in the Defense Industrial Base. The Senate NDAA Section 901 amends Title X to establish the Office of Strategic Capital in statute. The House defense appropriations bill directed a report on opportunities for additional strategic capital tools, and other needed resources or authorities that could allow the Office of Strategic Capital to achieve greater impact.

6. Incentivize tech companies to do business with the DoD.

The Senate NDAA, page 284, directs USD(A&S) to ensure that contracting officers are aware of Nontraditional Defense Contractor (NDC) statutes and practices and brief plans for a streamlined process for contractors to attest their status as an NDC. The office of the under secretary of defense for research and engineering tasked the Defense Innovation Board to deliver a study on lowering the barriers to innovation. The Senate NDAA Section 805 requires the DoD to create at least three new commercial solutions openings (CSOs) each year. CSOs were made a permanent authority in the FY 2022 NDAA.

7. Modernize budget documents. The House defense appropriations bill recommends the Chief Data and AI Office (CDAO) submit a report on a web interface that can provide access to data described for DIU project reporting to Congress and recommends \$50 million to support this effort. The congressionally directed PPBE Commission, in its interim report, recommended among the “actions that can be implemented now” to establish classified and unclassified enclaves for DoD-congressional information sharing, to include electronic transmission of budget-justification books. It further recommended restructuring the justification books to provide the needed content in a common format. The deputy secretary of defense directed the department to adopt all actions (PPBE Commission recommendations) that can be implemented now.

8. Establish a bridge fund for successfully demonstrated technologies. The House defense appropriations bill includes a hedge portfolio that allocates \$220 million for helping the DIU field capabilities with combatant commands (COCOMs).

HAC-D also recommended adding \$200 million to the department’s \$100-million request for the Accelerated Procurement and Fielding of Innovative Technologies program. The House NDAA Section 851 establishes a pilot program for recurring awards for production, investment, and deployment through competitions. These are intended to solve urgent operational needs of attritable systems.

9. Scale the space development agency model. Deputy Secretary of Defense Kathleen Hicks announced a Replicator initiative to field thousands of attritable, autonomous systems at scale and in multiple domains within the next 18–24 months. The House Armed Services Committee Cyber, Information Technologies, and Innovation subcommittee held a hearing on “Outside Perspectives on DoD’s Replicator Program.” The Silicon Valley Defense Group led an industry letter supporting a DIU and Service Non-Traditional Innovation Fielding Enterprise-led Hedge portfolio. Navy leaders established the Disruptive Capabilities Office to rapidly field technologies to the fleet. This office would integrate and expand upon the Unmanned Task Force and related naval autonomy organizations and initiatives. The House Defense Appropriations bill includes a \$1-billion hedge portfolio fund, which would empower the DIU and new Non-Traditional Innovation Fielding Enterprise to rapidly acquire many smaller capabilities harnessing commercial solutions. Space Acquisition Executive Frank Calvelli continues to praise the SDA and views its approach as a model for the broader space acquisition enterprise.

10. Modernize the DoD’s requirements system. The Senate NDAA, Section 802, requires the secretary of defense, through the VCJCS, and in cooperation with the military departments and combatant commands, to modernize DoD’s requirements process, consistent with the commission’s interim report, with reform elements and a report to Congress by October 2025. The House NDAA report page 269 expressed concern with the lack of modernization in the DoD’s requirements process, calling for a Government Accountability Office (GAO) report and recommendations.

CONCLUSION

This commission's final report reiterated the actionable recommendations offered to elected officials and senior DoD leaders in the interim report, and showcased timely and replicable examples of successful adoption of dual-use technologies. The commission is pleased to witness considerable progress on many of the challenges identified

in its interim report, reflected under "Implementation Actions to Date," but acknowledges that broader, strategic matters will take time to reach full implementation. While that may be true, failure to adopt emerging technology at an effective pace would impede the DoD's ability to deter China, a primary objective of the United States' current National Defense Strategy.

BIOGRAPHIES



The Hon. Mark T. Esper, PhD
Board Director and Co-Chair of the
Commission, Atlantic Council;
27th US Secretary of Defense

The Honorable Mark T. Esper is a partner and board member of the venture-capital firm Red Cell Partners and a board director at the Atlantic Council. He was sworn in as the twenty-seventh secretary of defense on July 23, 2019, and served in that capacity until November 9, 2020. He previously served as acting secretary of defense from June 24, 2019, to July 15, 2019. Esper was confirmed as the twenty-third secretary of the US Army in November 2017.

In the private sector, Esper was vice president for government relations at the Raytheon Company. He earlier served concurrently as executive vice president of the US Chamber of Commerce's Global Intellectual Property Center and as vice president for European and Eurasian affairs from 2008 to 2010. From 2006 to 2007, He was chief operating officer and executive vice president of defense and international affairs at the Aerospace Industries Association.

In addition to his work in the private sector, Esper served in a range of positions on Capitol Hill and in the Defense Department. He served as legislative director and senior policy adviser to former Senator Chuck Hagel. He was a senior

professional staff member on the Senate Foreign Relations and Senate Governmental Affairs committees, policy director for the House Armed Services Committee, and national security advisor for former Senate Majority Leader Bill Frist. During the President George W. Bush administration, he served as deputy assistant secretary of defense for negotiations policy at the Pentagon. He was national policy director to the late Senator Fred Thompson for his 2008 presidential campaign and was a Senate-appointed commissioner on the US-China Economic and Security Review Commission.

Esper began his career in the US Army. He is a 1986 graduate of the United States Military Academy and received his commission in the infantry. Upon completion of Ranger and Pathfinder training, he served in the 101st Airborne Division and participated in the 1990–1991 Gulf War with the “Screaming Eagles.” He later commanded a rifle company in the 3-325 Airborne Battalion Combat Team in Vicenza, Italy. He retired from the Army in 2007 after spending ten years on active duty and eleven years in the National Guard and Army Reserve. After leaving active duty, he served as chief of staff at the Heritage Foundation think tank.

He is a recipient of the Department of Defense Medal for Distinguished Public Service. Among his many military awards and decorations are the Legion of Merit, a Bronze Star Medal, the Kuwait Liberation Medal, Kuwait Liberation Medal-Saudi Arabia, and the Combat Infantryman Badge. Esper holds a PhD from the George Washington University.



The Hon. Deborah Lee James
Board Director and Co-Chair of the
Commission, Atlantic Council; 23rd
US Secretary of the Air Force

The Honorable Deborah Lee James is chair of the Defense Business Board and board director at the Atlantic Council. Previously, she served as the twenty-third secretary of the US Air Force and was responsible for the affairs of the Department of the Air Force, including the organizing, training, equipping, and providing for the welfare of its nearly 660,000 active-duty, National Guard, Reserve, and civilian airmen and their families. She also oversaw the Air Force's annual budget of more than \$139 billion. James has thirty years of senior homeland and national security experience in the federal government and the private sector. Prior to her Air Force position, James served as president of Science

Applications International Corporation's (SAIC's) technical and engineering sector, where she was responsible for 8,700 employees and more than \$2 billion in revenue.

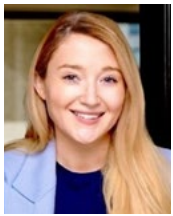
For twelve years, James held a variety of positions with SAIC, including senior vice president and director of homeland security. From 2000 to 2001, she was executive vice president and chief operating officer at Business Executives for National Security, and from 1998 to 2000 she was vice president of international operations and marketing at United Technologies. During the Bill Clinton administration, from 1993 to 1998, James served in the Pentagon as assistant secretary of defense for reserve affairs. In that position, she was senior adviser to the secretary of defense on all matters pertaining to the 1.8 million National Guard and Reserve personnel worldwide. In addition to working extensively with Congress, state governors, the business community, military associations, and international officials on National Guard and Reserve component issues,

James oversaw a \$10-billion budget and supervised a staff of more than one hundred. Prior to her Senate confirmation in 1993, she served as an assistant to the assistant secretary of defense for legislative affairs.

From 1983 to 1993, James worked as a professional staff member on the House Armed Services Committee, where

she served as a senior adviser to the Military Personnel and Compensation Subcommittee, the NATO Burden Sharing Panel, and the chairman's Member Services team.

James earned a BA in comparative area studies from Duke University and an MA in international affairs from the Columbia University School of International and Public Affairs.



Whitney M. McNamara
Vice President, Beacon Global Strategies;
Author, Commission on Defense Innovation
Adoption, Atlantic Council

Whitney McNamara is a vice president at Beacon Global Strategies and a nonresident senior fellow with *Forward Defense*. Prior to that, McNamara worked in the Office of the Secretary of Defense for Research and Engineering, where she served as the S&T portfolio lead at the Defense Innovation Board, whose mission is to provide the secretary of defense, deputy secretary of defense, and other senior leaders with recommendations on emerging technologies and innovative approaches that DoD should adopt to ensure US technological and military dominance. Before that, McNamara was an emerging-technologies policy subject-matter expert supporting the Department of Defense's chief information officer (CIO). Prior to that, she was a senior analyst at national security think tank the Center for Strategic and Budgetary Assessments, focusing on emerging technologies, future operating concepts, and informationized warfare in the context of long-term technological and military competition with great powers.



Peter Modigliani
Vice President, Beacon Global Strategies;
Author, Commission on Defense Innovation
Adoption, Atlantic Council

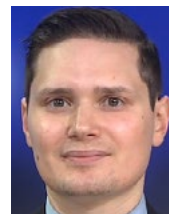
Peter Modigliani is a vice president at Beacon Global Strategies. Prior to that, he was a defense acquisition leader within the MITRE Corporation, enabling the DoD and intelligence community to deliver innovative solutions with greater speed and agility. He works with acquisition and CIO executives, program managers, the Section 809 Panel, congressional staffs, industry, and academia to shape acquisition reforms, strategic initiatives, and major program strategies. Modigliani champions digitally transforming the acquisition enterprise to modernize and accelerate operations. He launched MITRE's digital acquisition platform, AiDA. Prior to MITRE, Modigliani was an Air Force program

manager for C4ISR programs and an assistant vice president with Alion Science and Technology, supporting the Air Force Acquisition Executive's Information Dominance division.



Matthew MacGregor
Acquisition subject-matter expert (SME),
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Sciences, MITRE; Author, Commission on
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Council

Matt MacGregor is an acquisition SME at MITRE's Center for Acquisition and Management Sciences. Matt spent twenty-two years as a military and civil-service program manager (PM) across the space, command and control, weather, and aircraft portfolios. His last PM assignment was as the F-35 deputy program manager. His last five years in government before joining MITRE were at the Pentagon, where he served as a division chief in multiple headquarters acquisition roles. His work at MITRE has spanned multiple OSD-level organizations and program offices with specific emphasis on accelerating the fielding of digital capabilities to the warfighter.



Eric Lofgren
Professional Staff Member, Seapower and
Acquisition Lead, US Senate Committee
on Armed Services; Former author,
Commission on Defense Innovation
Adoption, Atlantic Council

Eric Lofgren is a professional staff member and the seapower and acquisition lead for the United States Senate Committee on Armed Services. His work on this commission was completed while he was a research fellow at the Center for Government Contracting at the George Mason University (GMU) School of Business, where he performed research, wrote, and led initiatives on business, policy, regulatory, and other issues in government contracting. He manages the daily blog Acquisition Talk and produces the Acquisition Talk podcast, on which he interviews leading experts in the field. Lofgren was an emergent-ventures fellow at GMU's Mercatus Center. Prior to joining

GMU, he was a senior analyst at Technomics Inc., supporting the Defense Department’s Cost Assessment and Program Evaluation office. He has also supported government analyses for the Government Accountability Office, Naval Sea Systems Command, Canada Public Works, and the Office of the Deputy Assistant Secretary of the Army for Cost and Economics.



Stephen Rodriguez
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Stephen Paul Rodriguez is the Managing Partner of One Defense, a strategic advisory firm that leverages machine learning to identify advanced software and hardware commercial capabilities and accelerate their transition into the defense industrial base. He is also an investor at Refinery Ventures, an early-scale fund investing in dual-use technologies across the country.

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LIST OF ACRONYMS

ABMS: Advanced Battle Management System

AFRL: Air Force Research Laboratory

AFSOC: Air Force Special Operations Command

ATR: Above threshold reprogramming

BLI: Budget line item

CAS: Cost accounting Standards

CBC2: Cloud Based Command and Control

CDAO: Chief Digital and Artificial Intelligence Officer

COCOM: Combatant command

COTS: Commercially available off the shelf CSO: Commercial Solutions Opening

DARPA: Defense Advanced Research Projects Agency

DepSecDef: Deputy Secretary of Defense

DIU: Defense Innovation Unit

DoD: US Department of Defense

FFRDC: Federally Funded Research and Development Center

GSA: General Services Administration

HAC-D: Defense Subcommittee of the US House of Representatives Appropriation Committee

IRAD: Independent research and development

JCIDS: Joint Capabilities Integration and Development System

JERIC20: Joint Effects for Real-time Integrated Command and Control Operations

JMAD: Joint Mission Accelerator Directorate

JROC: Joint Requirements Oversight Council

IT: Information technology

MCWL: US Marine Corps Warfighting Laboratory

NDAA: National Defense Authorization Act

NDC: Nontraditional defense company/contractor

NGSW: Next Generation Squad Weapon

NSIN: National Security Innovation Network

OSC: Office of Strategic Capital

OSD: Office of the Secretary of Defense

OT: Other Transaction

PE: Program elements

PEO: Program executive officer/office

RDER: Rapid Defense Experimentation Reserve

RDT&E: Research, development, testing, and evaluation

S&T: Science and technology

SAE: Service acquisition executive

SBA: Small Business Agency

SBIR: Small Business Innovation Research program

SDA: Space Development Agency

SOCOM: US Special Operations Command

STRATFI: Strategic Funding Increase

STTR: Small Business Innovation Research and Small Business Technology Transfer

UAS: Uncrewed aerial system

USD(A&S): Under Secretary of Defense for Acquisition and Sustainment

USD(C)/CFO: Under Secretary of Defense (comptroller) / Chief Financial Officer

USD(R&E): Under Secretary of Defense for Research and Engineering

USD: Under Secretary of Defense

USINDOPACOM: US Indo-Pacific Command

USNORTHCOM: US Northern Command

VC: Venture capital/venture capitalist

VCJCS: Vice Chairman of the Joint Chiefs of Staff

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