ACCELERATING INNOVATION ADOPTION FOR DEFENSE PRIORITIES

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MITRE

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INTRODUCTION

Recent Executive Orders and Directives require the Department of Defense (DoD) to prioritize innovation in the commercial marketplace and streamline processes to rapidly deliver solutions to our warfighters. Success for achieving DoD priorities, such as Golden Dome for America, Border Security, and Autonomous Systems, will depend on innovative industry solutions—combining new approaches with today's capabilities and bringing in non-traditional industry partners, quickly and flexibly.

Innovation adoption processes are widely recognized as fragmented, cumbersome, and slow to produce the needed capability to enable mission overmatch against our rapidly evolving adversaries. Core to the approach of breaking down barriers is the alignment of commercial industry technical capability with identified mission gaps to efficiently and effectively direct resources addressing the right parts of the right problems with the right solutions. Golden Dome for America, a key example of a DoD priority, is a multi-dimensional, complex undertaking that needs to address a series of critical actions for mission success: finding, fixing, tracking, targeting, engaging, and assessing threats across multiple domains and against varied threat types.

MITRE hosted a "Breaking Barriers in Defense Acquisition" summit that discussed key challenges and actionable solutions to accelerate capability delivery to warfighters, strengthen the defense industrial base, and deepen collaboration with allies and partners.

Key Objectives

- Achieve a market-based acquisition approach that capitalizes on industry technical capability, creativity, and innovation to drive streamlined, mission-focused, and evidence- or merit-based defense innovation adoption and acquisition.
- Rapidly reduce the time from problem identification to contract award by combining mission challenges with the right technology solution, an inclusive ecosystem, deliberate experimentation, and flexible acquisition methods.

ACCELERATING INDUSTRY INNOVATION ADOPTION FOR DOD PRIORITIES

There are three central efficiency challenges to overcome in a new approach:

1. **Capability Gap Identification—** Define specificity on the right part of the right problem and implement mission engineering to understand and break down mission gaps and share these problem gaps with industry in a way that does not impede creativity or innovation.
2. **Capability Connection and Advancement—** Connect "supply" with "demand," conduct effective market research, and have a flexible ability for industry to rapidly test, experiment, and prototype existing commercial technology, such as through shared data and lab access at multiple classification levels.
3. **Capability Scaling and Adoption—** Unleash access to commercial production and manufacturing; fast track acquisitions using available acquisition mechanisms.

A Flexible and Efficient Approach

Drawing on experience defining mission objectives, collaborating with industry to co-design effective solutions, and rapidly iterating, prototyping, and testing to produce capabilities for mission success, MITRE proposes the following framework to quickly and effectively meet the technology and capability needs for DoD priorities.

UNLEASHING INDUSTRY INNOVATION ADOPTION FOR WARFIGHTER LETHALITY

Mission Gap Identification and Clarification

The first step is identifying specific mission gaps—the right part of the right problem—and sharing these mission needs with the industry ecosystem: traditional defense primes, dual-use technology companies, and nontraditionals such as start-ups, private capital, and commercially focused companies. Industry-Engaged Mission Engineering (ME) starts by developing a clear understanding of the mission problem and a characterization of the driving mission context. This is followed by development of a model-based representation of the baseline mission architecture and an operational analysis of the impact of baseline capabilities on mission outcomes, and, subsequently, on mission gaps. Together, these provide a comprehensive picture of the mission need, which will aid industry partners to better understand the operational use cases and the mission gap priorities.

Making this baseline available to industry allows for the identification of a wider set of relevant innovative approaches than is available from government alone, and it has the potential to reduce the time to field new capabilities by engaging industry earlier in program lifecycles. Focusing on the mission problem that needs to be addressed versus specific and detailed requirement statements will give industry partners the flexibility to apply real innovation and creativity to urgent and complex operational problems.

Connecting Gaps with Industry Capabilities

The rapid and continuous invention and maturation of commercial technologies with the potential for "dual use" presents the DoD with a significant opportunity to deliver advanced capabilities at speed and scale, sometimes without adaptation. With the proliferation of privately backed defense startups and the growing "defense tech" ecosystem, technology scans and scouting informed by pacing mission challenges are critical. There is no shortage of supply. The knowledge of both the supply and demand serves to provide an objective picture of where the DoD should acquire commercial solutions or integrate efforts with private industry. DoD must incentivize more transparent dialogue between the problem owners and the technology innovators, ideally getting to a place where capability gaps can be bridged more quickly and earlier in the development process.

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In the design and adaptation phase, and later in the testing and prototype phases, stakeholder engagement is important to validate that capability needs are met or to reprioritize feature development. Opportunities for transparent exchanges are critical to shaping industry capabilities over time to meet specific mission needs. A significant benefit of stakeholder engagement is that consistent demand signals create interest and investment in industry, which attracts private capital and mobilizes long-term commitment to new ventures that strengthen the supply of solutions.

Rapid Prototyping and Fielding

Rapid prototyping and fielding focus on designing early prototypes for evaluation and testing, experimenting with technologies in operationally representative environments, and rapidly iterating the design and validation cycle for evolving threats and mission needs. MITRE has utilized a rapid prototyping approach that leverages extensive state-of-the-art in-house labs and engineering talent to work alongside solution providers

while providing guidance and mentorship that increase the speed of solution development. These approaches are designed to support industry partners and their commercial solutions through the technology development phases while remaining connected to the often-classified operational gaps and needs.

A common challenge for early prototype winners is an inability to scale production to allow for rapid fielding. MITRE has focused on analyzing the impact of incentives to existing and new suppliers to expand critical production, and on the value of building public-private partnerships early within the technology development process. These partnerships can leverage resources, technology, and expertise to enable more efficient and scalable production processes or connect start-ups with established production entities. There is also benefit to investments in manufacturing innovation and adoption, including automation and advanced manufacturing, to enable more cost-effective and efficient production lines. These manufacturing innovations can enable new entrants to overcome the daunting task of producing sufficient quantity for Low-Rate Initial Production (LRIP) of a defense capability within the capital constraints of an early- stage business.

Reducing Barriers through Enabling Infrastructure.

Critical steps in agile innovation adoption are reducing barriers for industry partners to interact with mission or classified data through digital platforms and data, and providing access to physical tools, platforms, and labs to bridge commercial offerings and mission needs. Non-traditional industry partners face common barriers that include limited or no access to classified computing resources and to classified or mission-relevant data, and a lack of classified modeling, simulation, and analysis tools. From a DoD perspective, programs experience challenges and obstacles by not implementing best practices, which include:

1. Incorporate a Modular Open Systems Approach (MOSA)
2. Refine high-level operational needs into a Minimum Viable Product (MVP)
3. Develop a full system-level digital twin
4. Develop a digital thread
5. Test a system-level integrated fully digital prototype in a digital operational environment
6. Test a system-level integrated fully physical prototype in an operational environment, with data from the testing connected to a digital twin or digital thread

These best practices are often missing in DoD production cycles, particularly with non-traditional industry partners, because of a lack of access to classified infrastructure, resources, and data. Mission-enabling digital and physical infrastructure access for industry should be resourced to allow for rapid development of industry innovation capabilities that are fully supported by constant and iterative understanding of mission needs.

Digital: Digital infrastructure complements the physical infrastructure to support project or stakeholder engagement activities. The digital infrastructure must provide a secure and scalable digital platform with knowledge management tools to support gap analysis and technology scanning efforts, as well as the tools to support collaborative engineering analysis and experimentation. A common repository of legacy system models and virtualized interfaces, mission scenarios, threat models, and tools to measure mission effectiveness provide solution providers a critical virtual test bed.

Physical: Affordable access to a variety of trusted labs, innovation spaces, and equipment lowers the cost of entry without the commitment of expensive long-term capital facilities and hardware for any individual small and medium-sized enterprises, and it creates confidence with mission partners that technology will be operationally relevant. The demonstration of real-world performance in an operational environment is crucial to adoption of a proposed solution. The objective is to evaluate performance when exposed to real-world variables, ensuring technology solutions are fit for deployment.

Agile Capability Adoption

The final phase of transition and acquisition focuses on navigating acquisition processes and fast-tracking procurement through multiple flexible and agile acquisition or transition methods, such as Other Transaction Agreements (OTAs), challenge-based acquisitions, and commercial contract offerings.

Agile acquisition begins by collaborating with program offices to develop procurement strategies that quickly transition successful prototype contracts to production for use at scale.

MITRE made significant contributions to the most recent acquisition reform effort—designing and establishing the Adaptive Acquisition Framework (AAF) that replaced the previous acquisition system in January 2020—resulting in a significant increase in flexibility, speed, and alignment with operations. MITRE also provides a suite of free resources to help small businesses and non-traditional providers navigate the defense acquisition and contracting ecosystem, via our Demystifying Defense Acquisition website. It includes everything from basic terminology to process overviews to identifying various organizations and their roles in the process. In addition, MITRE developed and uses a Transition Maturity Framework (TMaF) to gain an objective view of a project's status.

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