



Research Report

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Integrating Innovation into U.S. Department of War Requirements Reform



SUMMARY

Innovation that enhances warfighter capabilities is critically important to the U.S. Department of War (DOW).^a As DOW modernizes its joint requirements development system, the department has an opportunity to fully leverage its innovation organizations and align them with the new system. We examine how defense innovation can be effectively integrated into the reformed joint requirements system and identify how lessons from defense innovation organizations can inform and improve how requirements are developed and matured.

Over time, many of DOW's innovation organizations have received statutory or delegated flexibilities that have allowed them to bypass the Joint Capabilities Integration and Development System (JCIDS). This is a key consideration as DOW builds a new requirements system. To help ensure that the new system is designed to consistently and transparently convert innovation into sustained warfighting effect, we identify three focus areas:

- Reinforce a capabilities-based approach in which requirements derive from demonstrable mission outcomes and lessons learned through innovation activities.
- Recalibrate cost, schedule, and performance trade-offs to enable defensible risk-taking.
- Strengthen back-end functions for sustaining and scaling proven innovations across the department-wide enterprise.

The effectiveness of these three reform areas depends on how the broader innovation ecosystem is governed. The central policy tension is straightforward: Innovation organizations need speed and autonomy to experiment, but without structured governance interfaces, their products might not yield enduring joint capability. Solving that tension requires a governance model that preserves agility while enforcing enterprise coherence. We offer several policy options to facilitate this model and drive positive outcomes from DOW innovation initiatives. These options are intended to strengthen connections between innovation activities and capability outcomes by improving measurement, governance, and transition processes through the following:

- **Metrics and evaluation for capability transition:** Establish a concise set of indicators tied to fielding, adoption, sustainment, and learning to assess whether innovation efforts yield measurable warfighting value.
- **A formal handoff and evidence package:** Create a common set of materials (e.g., user feedback, performance data, cost estimates) that accompany innovations from experimentation to acquisition.
- **Pathway decision rules and risk bands:** Define clear criteria and risk thresholds to guide when and how innovations advance through development and transition pathways.
- **A standing integration and transition function:** Establish a dedicated mechanism to coordinate across innovation entities, requirements sponsors, and acquisition programs, ensuring continuity and accountability.
- **Transition of innovation initiatives to consistent funding:** Provide predictable funding mechanisms that sustain promising innovations beyond prototype stages and into programs of record or enduring capability portfolios.

^a The Department of War is designated the Department of Defense under Public Law 81-216, National Security Act Amendments of 1949.

In April 2025, President Donald Trump signaled a decisive shift toward accelerating the delivery of integrated capabilities to address urgent operational challenges.¹ Secretary of War Pete Hegseth followed in November 2025 with the U.S. Department of War’s (DOW’s) acquisition transformation strategy.² DOW’s joint requirements process, the Joint Capabilities Integration and Development System (JCIDS), the starting point for future capabilities, has long been criticized as cumbersome, antiquated, and an impediment to U.S. national security. In July 2025, then-Vice Chairman of the Joint Chiefs of Staff Admiral Christopher Grady noted in a report to Congress that “the requirements process must be faster, more flexible, and prioritize delivering capabilities at the speed of relevance.”³

This moment has catalyzed broad reforms to DOW’s joint requirements system, creating a generational opportunity to better align innovation with operational needs. It led to Secretary Hegseth’s announcement disestablishing JCIDS and reorienting the Joint Requirements Oversight Council (JROC) with the goal of “streamlining and accelerating” requirements-setting and acquisitions.⁴ Against this backdrop, we examine how defense innovation can be effectively integrated into the reformed joint requirements system and identify how lessons from innovation organizations can inform and improve how requirements are developed and matured.⁵

The Expansion of Organizations with Exemptions to JCIDS and the Rise of Parallel Requirements Authorities

Across DOW, many organizations have been established in response to operational or process failures, often as targeted fixes rather than elements of a cohesive strategy. Figure 1 situates this trend within the broader history of requirements modernization. Over time, these organizations—particularly those in the defense innovation ecosystem—have often received exemptions from JCIDS to accelerate the definition of requirements and fielding of capabilities.⁶ This patchwork of statutory and policy exemptions foreshadowed current reform efforts, and the orga-

nizations and processes that make up the innovation ecosystem demonstrate alternative approaches to capability development that offer lessons for designing a reformed joint requirements system.

Before the current requirements reform effort, both DOW and Congress focused less on systemic reform and more on granting exemptions or creating work-arounds that allowed alternative requirements generation processes. These changes effectively devolved authority for requirements generation and validation to the military services and individual DOW components. This devolution grew more complex with the extension of requirements authority to U.S. Special Operations Command and U.S. Cyber Command, reflecting the combatant commands’ cross-service, specialized equities.⁷

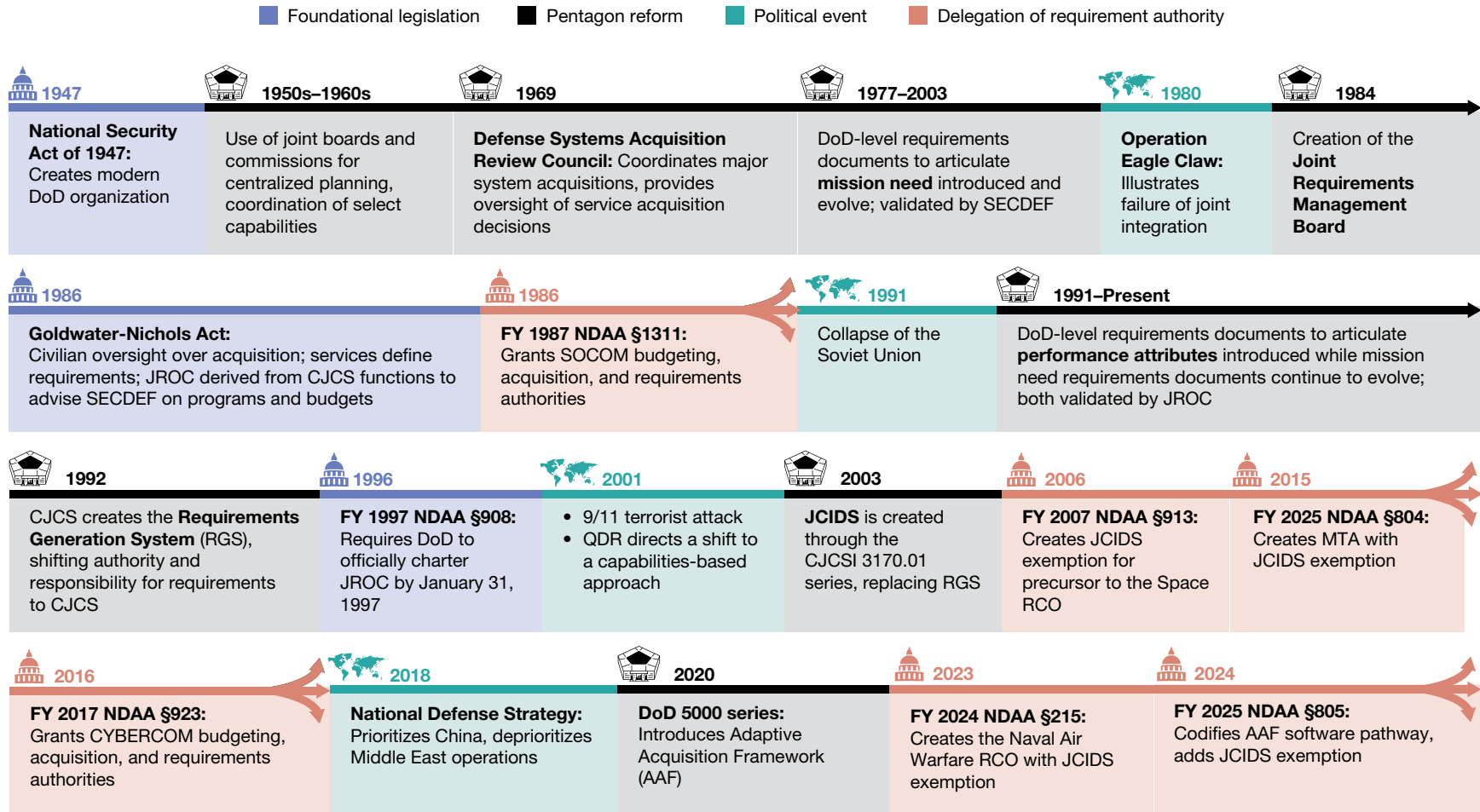
These exemptions created a two-tiered approach to requirements generation, with one tier focused on specific categories of systems and the other on organizations. Within the system-based tier, the middle tier of acquisition (MTA)—intended to enable rapid prototyping and fielding of sufficiently mature capabilities—was statutorily exempt from

Abbreviations

CJCSI	Chairman of the Joint Chiefs of Staff Instruction
DICE	Defense Innovation Community of Entities
DoD	U.S. Department of Defense
DOW	U.S. Department of War
FY	fiscal year
GAO	U.S. Government Accountability Office
JCIDS	Joint Capabilities Integration and Development System
JRAC	Joint Rapid Acquisition Cell
JROC	Joint Requirements Oversight Council
MEIA	Mission Engineering and Integration Activity
MTA	middle tier of acquisition
MVP	minimum viable product
NDAA	National Defense Authorization Act
RCO	rapid capabilities office
SDA	Space Development Agency
TRL	technology readiness level

FIGURE 1

Historical Backdrop for U.S. Department of War Requirements Modernization



SOURCE: Features information from DoD, *Fiscal Year 2024 National Defense Authorization Act: Section 811: Modernizing the Department of Defense Requirements Process*.

NOTE: CJCS = chairman of the Joint Chiefs of Staff; CYBERCOM = U.S. Cyber Command; QDR = Quadrennial Defense Review; SECDEF = Secretary of Defense; SOCOM = U.S. Special Operations Command.

JCIDS and the processes in DoD Directive 5000.01.⁸ Requirements development for MTA programs uses streamlined processes established by each DOW component.⁹

Similarly, the Adaptive Acquisition Framework software acquisition pathway was exempted from JCIDS, first by DoD policy and then by statute in the National Defense Authorization Act (NDAA) for fiscal year (FY) 2025.¹⁰ Under DoD Instruction 5000.87, each DoD component must define streamlined requirements processes for software programs, including the development of a *capability needs statement* that articulates related capability gaps or enhancements in sufficient detail to “define various software solutions as they relate to the overall threat environment.”¹¹ Each capability needs statement must be paired with a *user agreement*, which describes an agreement between a capability sponsor and a program manager for “continuous user involvement and assigned decision making authority” in iteratively developing and delivering software capabilities.¹²

Congress also granted blanket JCIDS exemptions for specific DoD components. The FY 2007 NDAA exempted Air Force Space Command’s Operationally Responsive Space program—the precursor to the Space RCO—from JCIDS.¹³ More recently, the FY 2024 NDAA created the Naval Air Warfare RCO with a similar exemption.¹⁴ The FY 2023 NDAA directed a review of whether the Space Development Agency (SDA) should also be exempted.¹⁵

In practice, these exemptions reflected both genuine deficiencies in JCIDS—its slow cycle times and documentation bias—and a broader consensus, including in Congress, that urgent needs could not wait for systemic reform. Consequently, multiple stakeholders built parallel processes to accelerate delivery, often without mechanisms to share data or integrate results across the enterprise.

Over time, well-intentioned work-arounds—statutory exemptions, RCOs, and alternative pathways—have fragmented oversight and coordination across the innovation ecosystem. What once solved urgent bottlenecks now risks creating blind spots in data, oversight, and synchronization across the joint force.

Key stakeholders have acknowledged an “unclear role for [the] defense innovation ecosystem in [the] JCIDS process,” noting that “JCIDS does not capitalize on potential for DoD innovation organizations to increase the speed of prototyping, acquisition, and delivery of technology to the warfighter.”¹⁶ Congress has also recognized the need for a strategy for “fostering and strengthening the defense innovation ecosystem.”¹⁷ The FY 2023 NDAA required the department to develop a strategy and implementation plan for the defense innovation ecosystem, to be updated in 2027 and every four years thereafter.¹⁸

Despite the lack of a unified strategy for defense innovation, innovation organizations now serve as models for the broader department. For example, Executive Order 14265, signed in April 2025, directed broader departmental use of policies from service-level RCOs to speed acquisition.¹⁹

A multitude of innovation organizations now operate under different authorities, structures, and priorities. The Office of the Under Secretary of War for Research and Engineering identifies more than 100 innovation organizations (see the appendix). We examined a subset of these organizations to understand their processes and identify practices that might inform future modifications to the requirements system. This subset consisted of

- AFWERX
- the Department of the Air Force RCO
- the Army Applications Laboratory
- the Army Rapid Capabilities and Critical Technologies Office
- the U.S. Indo-Pacific Command Joint Mission Accelerator Directorate (J8x)
- the U.S. Marine Corps Warfighting Laboratory
- the Naval Air Warfare RCO
- NavalX
- the U.S. Navy Disruptive Capabilities Office
- the Defense Innovation Unit
- the Joint Rapid Acquisition Cell (JRAC)
- SDA
- the Space RCO.

The extent to which innovation organizations work within or outside the JCIDS process varies. For example, under DoD Directive 5000.71, the JRAC

executive director oversees intake and evaluation of validated joint urgent operational needs, joint emergent operational needs, and other urgent issues. The JRAC designates DOW components to fulfill such needs and monitors progress to ensure timely fielding.²⁰ As noted earlier, Congress exempted several other organizations from JCIDS (e.g., Naval Air Warfare RCO, Space RCO). Other military services and DOW components (e.g., SDA) employ the statutory JCIDS exemption under the MTA pathway. Notably, although SDA does not follow the JCIDS process, it periodically briefs the JROC (though it is not required to do so) and works to align and integrate its efforts with other platforms and warfighting concepts.

Because these organizations focus on accelerating capability delivery, they emphasize tighter coupling between requirements definition and acquisition than is typical in traditional programs. While requirements development is not wholly separate from resourcing and acquisition in traditional programs, innovation organizations tend to shorten feedback loops and align resources and requirements updates more directly with iterative development and fielding. For example, SDA structures capability delivery around *tranches* designed to provide incremental improvements roughly every two years, though planning and requirements definition for each tranche typically begin several years before fielding. Many organizations—such as the Defense Innovation Unit, the various RCOs, the Navy’s Dis-

ruptive Capabilities Office, and NavalX—focus on leveraging and adapting commercial technologies for military use. These organizations stress maintaining awareness of current and emerging commercial technology and engaging industry early in development. For example, NavalX uses a five-phase framework to find and field technologies: (1) source user needs, (2) translate user needs, (3) discover product-mission fit, (4) broker solutions, and (5) field and appropriately scale relevant solutions.²¹

Some organizations highlight the benefits of having a “short and narrow chain of command,”²² such as reporting to a board of directors or having single validation authority, rather than working through traditional leadership hierarchies.²³ They also emphasize close engagement with warfighters and industry, funding stability, agility, and highly skilled personnel adept at understanding and tailoring laws, regulations, policies, and DOW processes to achieve results. Many of these innovative processes succeed in adapting relatively mature technologies for specific use cases, though they may be less suitable for less mature technologies.

What We Mean by *Innovation*

The terms *defense innovation* and *defense innovation ecosystem* are often used without being defined. In 2023, Brodi Kotila, Jeffrey A. Drezner, and colleagues at RAND defined these terms as follows:

- *Defense innovation*: “The processes of generating and fielding technologies and other products, services, processes, or practices that are new or improved in the defense context.”
- *Defense innovation ecosystem*: “The set of defense innovation organizations, activities, functions, and processes that develop, produce, and field new or improved technologies and capabilities for military use.”²⁴

Kotila, Drezner, and their colleagues acknowledged that definitions of defense innovation can focus on different facets of the innovation process, such as identifying, developing, or adopting new technologies or realizing their outcomes. In practice, defense innovation does not always involve creating new technologies; it can also arise from employ-

Defense innovation does not always involve creating new technologies; it can arise from employing existing technologies in new ways.

ing existing technologies in new ways. Recognizing that innovation may take both forms is important for understanding how DOW can better connect innovation activities, such as prototyping and experimentation, to operational needs because many promising advances may depend less on invention than on novel application, integration, or scaling of existing capabilities.²⁵

Congress also defined *innovation ecosystem* to guide its required strategy and implementation plan. Section 236(g) of the FY 2023 NDAA defines it as “a regionally based network of private sector, academic, and government institutions in a network of formal and informal institutional relationships that contribute to technological and economic development in a defined technology sector or sectors.”²⁶ Congress purposely adopted a broad definition so that its mandated strategy would include a wide variety of organizations that support DOW’s missions.

For our purposes, we adopt the definitions in Kotila, Drezner, et al. to frame how defense innovation relates to operational needs and capability development within the department.²⁷ We focus on the relationship between innovation and operational needs as a central challenge for the department. Within DOW, innovation originates from many sources—service laboratories, RCOs, and such organizations as the Defense Innovation Unit, AFWERX, and NavalX—and these efforts often operate under different authorities and incentives. The problem we examine is how this diverse innovation ecosystem can be aligned with joint operational needs, translated into enduring programs, and governed to preserve agility, ensure enterprise coherence, and systematically capture and apply lessons learned for future capability development.

Focus Areas for Reform

DOW’s joint requirements system is imperfectly aligned with the defense innovation ecosystem. Even as new pathways and organizations have proliferated, the process is still often driven by document compliance and consensus-based compromises that can dilute focus or produce overly complicated sets of requirements. However, some challenges com-

monly attributed to the requirements system—such as excessive risk aversion or difficulty scaling—also stem from downstream incentives in acquisition and contracting. For example, although Capability Development Documents often include threshold and objective requirements to provide trade space and support risk management, these flexibilities can narrow as contracting officers impose fixed requirements for clarity and accountability during the next phase, when contracts are awarded for acquisition of the capability. Similarly, scaling requirements are frequently set early and at ambitious levels, sometimes adding unnecessary complexity and cost.

At the same time, JCIDS embodied important strengths, including disciplined joint validation and analytical rigor, interoperability standards, and enterprise architecture alignment. A more adaptive approach—in which initial scaling estimates inform early architectural decisions and are refined as concepts of employment mature²⁸—could better balance innovation, feasibility, and program discipline. Such an approach would integrate the agility and user-centered learning of the innovation ecosystem with the rigor and coordination mechanisms needed to ensure interoperability, sustainment, and scalability across the joint force.

Consistent with the department’s newly articulated priorities for a transformed acquisition system—to field technology faster, foster calculated risk-taking, and expand production capacity²⁹—we identify three areas that merit attention: reinforcing joint capabilities-based requirements development; recalibrating cost, schedule, and performance trade-offs; and strengthening back-end functions for scaling.

Center Joint Requirements on Warfighter Effect

The first reform area centers the joint requirements system on enabling measurable outputs: fielding, adoption, sustainment, and learning. This ensures that requirements are structured to support the transition of innovations into capabilities that deliver warfighter effect.³⁰ This focus also underpins the other two reform areas discussed later: recalibrating

cost, schedule, and performance to enable defensible risk-taking and building back-end mechanisms that scale proven innovations across the enterprise.

Innovation is only a means; the end is improved warfighter effect.³¹ Requirements should therefore be weighed against their ability to enable fielding, adoption, sustainment, and learning that closes operational gaps and strengthens joint integration.

A capabilities-based orientation defines success by whether innovation activities contribute to operational advantage, which can take the form of transition or learning. Transitioning an innovation into operational use demonstrates tangible impact, but innovation can be just as successful when it enables rapid learning that clarifies technical or operational risks and reduces associated uncertainties.³² At times, these objectives may conflict: Defining success by transition alone can impose joint integration requirements too early and slow innovation. A balanced approach would define success along a continuum, from generating knowledge that informs future requirements and investments to transitioning and scaling innovations once risks are sufficiently reduced. This continuum suggests the need for an established decision system within DOW to determine whether an innovation activity should be treated as a learning tool or a candidate for transition. Program managers already make these judgments informally when deciding whether to adopt prototypes. Formalizing and documenting these decisions—and ensuring that knowledge gained from non-transitioned activities is systematically captured and shared—could strengthen institutional learning and improve alignment between innovation activities and operational needs.

The joint requirements system should therefore enable the translation of innovation activities into capabilities by ensuring that progress is evaluated along multiple lines: *fielding* (how quickly a capability reaches units that need it), *adoption* (whether warfighters actually integrate it into their missions), *sustainment* (whether it remains viable and supported over time), and *learning* (what evidence or insights are generated to inform subsequent decisions).³³

GAO has long stressed that requirements should describe capabilities in operational terms with measurable attributes that anchor cost, schedule, and

performance baselines.³⁴ Acquisition programs should likewise be achievable and informed by end-user feedback.³⁵ At the joint level, this imperative is even sharper: Requirements must drive interoperability and common adoption across the services while enabling defensible risk-taking and iterative learning. When requirements function in this way—as operational performance and learning commitments—they connect innovation activities directly to the warfighter effect they are meant to produce.

In practice, however, outputs are often undervalued and overshadowed by a focus on processes and activities. According to some observers, JCIDS and related processes prioritized documentation and consensus over transition, producing detailed specifications without mechanisms to track fielding or adoption. For example, Bill Greenwalt and Dan Patt observed that JCIDS “constrain[ed] American creativity and innovation potential” by enforcing document-driven consensus instead of enabling fielding and adoption.³⁶ The result is an ecosystem in which the volume of activity substitutes for operational effect. Even within the defense innovation ecosystem, measuring outcomes has been elusive. For example, GAO found that the Defense Innovation Unit tends to measure success by the number of prototype projects awarded and completed, with insufficient data on transition performance.³⁷

A capabilities-based approach requires measurement against operationally meaningful benchmarks. Without such measures—and systems to consistently collect and evaluate them—defense innovation organizations risk duplication, overlap, and missed opportunities for improvement.³⁸ By contrast, leading companies implement such practices and measures as iterative user engagement, adoption rates, and scaled investment tied to demonstrated value.³⁹ Translating these practices and measures to defense, useful metrics might include time to first fielding, adoption rates among operational units, and the number or quality of validated insights generated through prototyping and experimentation.

Prototyping and experimentation can fit this model when treated as means of accelerating learning toward fielding, adoption, and sustainment rather than as ends in themselves. Industry routinely treats prototypes and minimum viable products (MVPs)

as structured learning tools that generate validated knowledge to inform subsequent requirements and investment decisions.⁴⁰ Prototyping and experimentation can even precede requirements definition to clarify trade-offs among technology, cost, and operational effectiveness.⁴¹ Under this view, the deliverable is not the prototype alone but the actionable evidence it provides, whether through user feedback, operational performance data, or clarified risk.⁴²

Recalibrate Cost, Schedule, and Performance to Accept Greater Risk

The second reform area builds on the capabilities-based approach by addressing the conditions under which innovation can move responsibly toward fielding. Turning proven concepts into sustainable capabilities requires a joint requirements system that tolerates measured variation in cost, schedule, and performance while maintaining accountability. This involves explicitly recalibrating risk to sustain momentum from discovery to delivery. In adapting lessons from the innovation ecosystem, the reformed joint requirements system should retain JCIDS's emphasis on traceability and analytical rigor while introducing flexibility in managing cost, schedule, and performance. Rigor may need to be applied selectively, tightening controls where integration demands and loosening them where learning accelerates the maturation of capabilities and joint requirements processes.

Innovation activities involve higher failure rates than traditional acquisition, but the joint requirements process remains largely designed to minimize risk rather than enable defensible risk-taking. According to John L. Birkler, Paul Bracken, and Gordon Lee, “[DOW’s] highly formalized acquisition system is too risk averse. This aversion to risk and failure is built into [DOW’s] acquisition process and works to impede [DOW’s] ability to fully participate in today’s technological revolution.”⁴³ The system assumes predictability and penalizes deviation from cost, schedule, and performance baselines, conditions ill-suited to fast-moving technology areas. As Greenwalt and Patt put it, this posture “enforces rigid

The existing system assumes predictability and penalizes deviation from cost, schedule, and performance baselines, conditions ill-suited to fast-moving technology areas.

prediction over adaptation . . . kill[ing] agility in fast-evolving threat environments.”⁴⁴

In practice, these conditions create an environment in which deviation from initial parameters is treated as failure, discouraging experimentation and incremental advances that often precede breakthrough capabilities. To harness innovation, policymakers must accept that not all investments will succeed and that some cost growth, schedule delay, or performance shortfall is the price of creating pathways for novel technologies to mature into operational advantage. Translating this mindset to government programs is challenging given public expectations for near-term returns on the investment of tax dollars.

The joint requirements system should instead be calibrated to technology maturity and mission urgency. GAO has shown that pushing immature technologies into development creates predictable cost and schedule failures,⁴⁵ while requiring extensive documentation, analysis, and validation for mature commercial technologies slows adoption unnecessarily. Analyses in the literature we reviewed converge on a common principle: Tailor the rigor of requirements development to context instead of applying uniform standards that either expose DOW to excessive risk or stifle timely adoption. A practical triage model consists of

- fast adoption for mature, commercially proven technologies that already meet most operational needs with limited adaptation; these require lighter documentation and faster contracting to avoid needless delay⁴⁶
- iterative prototyping for emerging technologies with plausible but uncertain performance; this emphasizes short development cycles, MVPs, user feedback loops, and staged investment tied to demonstrated progress⁴⁷
- deliberate analysis for novel or high-risk systems involving large budgets, system-of-systems integration, or high assurance requirements; these require fuller analyses of alternatives, higher technology readiness level (TRL) thresholds before production, and more-conservative cost and schedule baselines.⁴⁸

Programs should be routed into these pathways based on clear criteria, such as TRL, demonstrated operational performance, mission urgency, and integration complexity. Leading firms follow similar logic, scaling rigor with demonstrated value and discontinuing projects that fail to deliver user uptake.⁴⁹ DOW should do the same by mapping decision triggers (e.g., TRL thresholds, user-validated MVP outcomes, critical interoperability tests) to these pathways so that development efforts enter the appro-

priate stream from the outset. For joint requirements development, joint portfolio managers should coordinate pathway assignments to prevent divergence in how similar innovations are assessed across services.

Decision rules must then specify what levels of cost growth, schedule slip, and performance shortfall are acceptable within each pathway. While the Nunn-McCurdy Act defines cost growth thresholds for major programs,⁵⁰ those thresholds reflect traditional acquisition risk tolerances, not the higher-variance profiles typical of many innovation activities. Congress might need to reevaluate risk tolerances or create tailored exemptions to enable disciplined but risk-aware innovation. Establishing tolerances up front would legitimize calculated risk, reduce second-guessing, and let programs operate within a defensible envelope.

Table 1 synthesizes potential elements for a recalibrated risk decision-rule package. These elements, drawn from the literature,⁵¹ define the boundaries of acceptable variation, specify escalation triggers, and help ensure that oversight authorities and program teams share a common understanding of when to intervene and when to allow innovation activities to proceed.

Explicitly recalibrating cost, schedule, and performance trade-offs creates institutional space for defensible risk-taking. By setting clear tolerances,

TABLE 1
Potential Elements of a Recalibrated Risk Decision-Rule Package

Element	Rationale
Risk bands tied to pathways (mature technology, prototype, high-risk novel)	Clarifies acceptable levels of cost, schedule, and performance deviation for each technology type
Preapproved tolerances and triggers for escalation	Provides clear thresholds for when leadership review or corrective action is required
Delegated authorities and funding lines to handle overruns	Anticipates potential need for responding to deviations while preserving momentum
Stop/go gates tied to user-validated evidence	Ensures that continuation decisions are grounded in fielding and adoption potential
Transparent reporting to oversight bodies on deviations	Keeps oversight authorities informed of risk exposure and decision rationale
Periodic reassessment as technology and operational context evolve	Allows innovation efforts to adjust pathways and tolerances over time
Exit plans for efforts that no longer warrant continuation	Facilitates reallocation of resources from underperforming activities to higher-value opportunities

stop/go gates, delegated authorities, and reporting rules up front, programs gain clarity on acceptable deviations and decisionmakers gain documented authority to manage them.⁵² Explicit rules also align incentives: Program offices, innovation organizations, and sponsors know what evidence justifies continued investment and what conditions require mitigation or termination.⁵³ By executing exit plans for efforts that are not meeting expectations, the department can better focus its efforts and learn from “fail fast” outcomes.

Scale Successful Prototyping and Experimentation by Maturing the Back End

The third reform area focuses on ensuring that—once needed capabilities are determined and risk is better managed—successful innovation activities can scale. Strengthening back-end functions, including transition pathways, sustainment planning, and integration into joint forces, translates individual successes into enduring, enterprise-level warfighting advantage.

Promising innovation activities can stall because of gaps in DOW’s capacity to scale them.⁵⁴ In industry, firms bridge this gap by building organizational capacity to manage the handoff from research and development to production, ensure interoperability, and integrate products into established supply and distribution channels. These back-end structures are not an afterthought; they are foundational to enabling innovation to reach users at scale and remain sustainable once capabilities are fielded.⁵⁵

DOW’s innovation ecosystem emphasizes prototyping and experimentation but could better develop back-end mechanisms for fielding, adoption, and sustainment (the so-called valley of death).⁵⁶ Even successful innovation activities risk stalling as one-off pilots without clear sponsors, transition routes, or resources. Programs may hesitate to adopt promising prototypes not only because of scalability challenges but also because of concerns about long-term durability and interoperability. These attributes—interoperability, scalability, and durability—depend

on sound enterprise architecture, which is shaped by requirements development.

DOW can learn from commercial practices by maturing three back-end functions:

1. Stronger interfaces between innovation organizations and capability sponsors. Early synchronization on sustainment, integration, and upgrade planning ensures that promising prototypes can be absorbed into portfolios and baselines instead of being orphaned.⁵⁷
2. Defined transition pathways and stable funding lines. Dedicated mechanisms, such as flexible reprogramming authorities, standing transition funds, or permanent integration offices, could help pull technologies into broad operational use.⁵⁸
3. Deliberate integration into enterprise systems. Innovation activities should evolve in step with enterprise data, communications, and logistics systems, including Joint All-Domain Command and Control architectures and sustainment pathways, for smooth transition and scaling.⁵⁹

Maturing these back-end functions provides the connective tissue that turns innovation into durable capability. Prototyping and experimentation remain critical for discovery, but without mature back-end support, they cannot deliver joint warfighting effect. Furthermore, these back-end functions could align closely with the emerging Mission Engineering and Integration Activity (MEIA) construct discussed below.

Aligning the Innovation Ecosystem

The effectiveness of these three reform areas ultimately depends on how the broader innovation ecosystem is governed. Aligning independent innovation organizations and the joint requirements community ensures that capabilities-based metrics, risk-aware pathways, and back-end scaling mechanisms operate as a coherent system rather than as disconnected initiatives.

Numerous organizations now pursue innovation under different authorities and incentives, producing

redundancy, unclear handoffs, or uneven outcomes.⁶⁰ GAO warns that without clearer pathways and metrics, this activity risks “duplication and overlap,” undermining effective transition to fielded capabilities.⁶¹ At the same time, some degree of decentralization and specialization is necessary to support innovation activities. Distinct mission areas and emerging technologies (e.g., software development, counter-unmanned aerial systems) benefit from tailored approaches and incentives.

The central policy tension is straightforward: Innovation organizations need speed and autonomy to experiment, but without structured governance interfaces, their efforts may not translate into enduring joint capabilities. Solving that tension requires a governance model that preserves agility while enforcing enterprise coherence.⁶²

Integrating defense innovation into the reformed joint requirements system therefore requires governance mechanisms that translate innovation activities into interoperable and sustainable capabilities. Innovation organizations offer practical lessons: Their emphasis on iterative development, user-centered design, flexible problem framing, and avoidance of premature specification can help keep requirements focused on operational needs. These practices may also help prevent piling on disparate or even conflicting requirements that are intended to broaden appeal but can dilute focus. Embedding such lessons into the reformed joint requirements system could help DOW preserve agility and responsiveness while meeting joint needs for interoperability, sustainment, and enterprise alignment.

One recent effort to address this challenge is the establishment of MEIA. Its mandate is to “engage with industry, conduct mission engineering analysis to refine capability requirements, and conduct rapid integration of capabilities and structured and iterative experimentation campaigns addressing [Key Operational Problems].”⁶³ These activities aim to integrate industry contributions and DOW’s analytical capabilities to refine problem understanding and accelerate joint solutions, positioning MEIA as a potential bridge between the innovation ecosystem and formal requirements processes. If implemented as envisioned, MEIA could reduce the fragmentation described above by providing a structured feed-

back loop between operational analysis, innovation activities, and resource allocation. MEIA also offers a venue to institutionalize lessons from innovation organizations within the joint requirements system itself.

Separate-but-Connected Governance

Operational separation of innovation organizations is necessary because innovation activities depend on speed, rapid iteration, and relative freedom from bureaucratic constraint. Short decision chains, dedicated resources, and close user ties make innovation organizations agile and able to move quickly, test concepts, iterate, and fail inexpensively.⁶⁴ GAO’s reviews of industry practice show that leading firms use overlapping design and validation cycles (e.g., MVPs, digital threads) to refine products with users in near-real time, an approach that requires autonomy from heavyweight, linear acquisition milestones.⁶⁵ Traditional requirements and acquisition systems, by contrast, emphasize predictability, oversight, and accountability for major investments. Forcing innovation organizations into traditional acquisition governance may slow them to irrelevance.

Sustaining impact, however, requires coordination and deliberate handoffs across the broader innovation ecosystem. Multiple studies find promising efforts that fail to transition because they lack no clear sponsors, funding paths, or integration plans for sustainment and enterprise adoption.⁶⁶ Fragmented efforts often duplicate work and miss opportunities to aggregate solutions across units,⁶⁷ producing local innovation activity but little joint effect. For the joint force, capabilities must interoperate, be sustained, and align with broader force design choices.⁶⁸ The “connected” dimension refers to structured links into joint portfolio governance, the mechanisms by which cross-service capability portfolios, integration boards, and joint councils set priorities and resource decisions. These connections translate innovative concepts into interoperable joint capabilities rather than isolated service solutions.

The challenge is not to choose one system over the other but to design a hybrid model that preserves innovation autonomy while providing on-ramps into enterprise planning and resourcing. A “separate-

but-connected” hybrid model should map when an innovation stays in the agile stream and when it must enter enterprise processes, assigning responsibility for that transition in advance. Doing so preserves speed where it matters and enforces coherence where it is essential for joint portfolio alignment and capability integration.

A reformed joint requirements system can draw from this hybrid model by embedding flexible validation checkpoints—similar to innovation feedback loops—within formal requirements reviews. This approach allows requirements to evolve iteratively while maintaining the traceability and interoperability needed for joint adoption and sustainment.

A separate-but-connected model accepts duplication and failure as inherent to innovation activity but manages them by clarifying when autonomy is appropriate and when alignment is necessary. Innovation organizations can explore widely, but only the most promising solutions should be routed into enterprise processes. This approach reflects lessons from both commercial practice and prior DOW reforms: Incubation must be fast and independent, but transition to production requires coordination with established portfolios, sustainment systems, and joint standards.

At the same time, the reformed joint requirements system should distinguish between innovation activities that must be interoperable, sustainable, or scalable and those that do not need to be. For early experiments and prototypes, imposing enterprise-level requirements too soon can slow development and discourage exploration. Deferring full joint integration expectations until an innovation activity demonstrates operational promise would allow innovation organizations to move quickly while ensuring that solutions ready to transition meet joint interoperability and sustainment needs.

Enterprise-Level Coordination

Separate-but-connected governance depends on structured enterprise connections. Without routinized handoffs, common standards, and assigned ownership, promising innovation activities tend to stall.⁶⁹ Enterprise-level coordination provides these

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mechanisms by making transition pathways visible, accountable, and repeatable. These interfaces include

1. predetermined decision gates where sponsors assess whether a prototype merits adoption; these handoff points specify required evidence—e.g., operational performance data, sustainment intent, integration risk—and designate the entity responsible for acceptance
2. common data models, interface expectations, and minimum modularity principles that define what *enterprise-ready* means while remaining adaptable across mission areas
3. structured opportunities for operators and enterprise architects to confirm both mission utility and integration fit before transition decisions
4. clear designation of which organization will assume integration, sustainment planning, and resource pursuit through transition, preventing stranded capabilities.

These interfaces should be calibrated to the maturity of the innovation activity—lightweight for early experimentation, more structured for capabilities nearing transition—to balance speed with enterprise coherence. Their purpose is to create transparent transition routes without constraining innovation organizations’ agility. They provide the connec-

tive tissue from innovation activities to funded, sustainment-backed capability and allow capabilities-based metrics and back-end scaling functions to work in practice rather than remain aspirational.

A key lesson from the innovation ecosystem is the use of shared digital environments to validate and evolve requirements collaboratively. Embedding these practices within enterprise data architectures—through digital engineering,⁷⁰ common metadata, and iterative validation—could help the joint requirements system maintain visibility into ongoing innovation while preserving agility.

Strategic Grounding and Leadership Continuity

Aligning the innovation ecosystem requires more than governance and coordination interfaces; it also demands that innovation activity be anchored to enterprise priorities and sustained beyond individual champions. Without strategic grounding, innovation fragments into projects that may excite local stakeholders but fail to deliver joint value. Without continuity, even well-aligned efforts collapse when leaders rotate or temporary funds expire. Strategic alignment and durable ownership are therefore the conditions that make the broader ecosystem coherent rather than episodic.

Innovation activities should be explicitly mapped to operational gaps identified in strategy documents and portfolio roadmaps. This linkage legitimizes transition decisions and clarifies enterprise trade-offs. Greenwalt and Patt argue that requirements should be “problem-centric” to give operators and innovators latitude to experiment around real gaps rather than rigid blueprints.⁷¹ Leading firms follow a similar approach by coupling product roadmaps to strategic visions, ensuring that investments support enterprise goals rather than isolated experiments.⁷² Within DOW, this principle can be institutionalized through explicit alignment statements, portfolio-level targets, and periodic strategic reviews.⁷³ Such practices give both sponsors and innovation organizations a defensible basis for resource requests and transition planning.

Momentum can stall when champions rotate or temporary funding expires. Start-stop cycles waste progress and erode industry confidence.⁷⁴ To prevent resets, organizations should assign institutional owners for transition pathways wherever feasible, while recognizing that DOW tour rotations can limit continuity. In such cases, embedding responsibilities in statute or directive language, supplemented by consistent funding structures that survive annual budget cycles, could provide for continuity.⁷⁵ Continuity can also be reinforced through governance bodies that conduct annual strategic assessments—bringing together operators, technologists, and acquisition leaders—to decide which pilots merit scale and which should be off-ramped.⁷⁶ Finally, formal learning loops—documented test results, digital threads, and after-action analyses—should feed into enterprise planning so that subsequent leaders inherit clear evidence and lessons learned.⁷⁷

Potential Policy Levers

Building on the preceding analysis, Table 2 synthesizes potential policy levers drawn from the literature and ongoing policy discussions.⁷⁸ These options serve as practical ways to operationalize this report’s central themes. Each lever addresses a gap identified earlier, and the table provides a brief discussion of the rationale for each lever.

Metrics and Evaluation for Capability Transition

Adopt a concise set of key performance indicators centered on fielding, adoption, sustainment, and learning. Regular reporting against these metrics would allow senior leaders and Congress to assess whether innovation efforts yield measurable warfighting value. To build evidence quality, pair quantitative indicators with brief qualitative evidence (e.g., user feedback, operational case studies).

Formal Handoff and Evidence Package

Develop a concise, standardized evidence template to justify transition decisions. Requiring operational

TABLE 2
Potential High-Impact Policy Levers

Policy Lever	Description	Rationale
Metrics and evaluation for capability transition	A small set of key performance indicators tied to fielding, adoption, sustainment, and learning; regular reporting to oversight bodies	Operationalizes a capabilities-based approach and supports governance
Formal handoff and evidence package	A standardized template specifying the evidence required to request enterprise or joint adoption (e.g., user data, a sustainment plan, integration risks)	Links capabilities-based measurement to enterprise coordination
Pathway decision rules and risk bands	Rules that route efforts into one of three streams—fast adoption, iterative prototyping, or deliberate analysis—with preapproved tolerances	Implements recalibrated risk triage and defensible risk acceptance
Standing integration and transition function	A permanent productization function within existing infrastructure that shepherds accepted prototypes into fielding, adoption, and sustainment pipelines	Strengthens back-end scaling and leadership continuity
Transition of innovation initiatives to consistent funding	Consistent appropriations to finance transition from innovation activities into fielding, adoption, and sustainment planning	Strengthens back-end scaling and leadership continuity

performance data, a statement of sustainment intent, and an assessment of integration risk could clarify what qualifies as enterprise-ready and link innovation outputs to the metrics emphasized earlier. The template should be lean and codesigned with capability sponsors to ensure that it enables rigor without imposing undue burden on pilot efforts.

Pathway Decision Rules and Risk Bands

Formalize three development pathways—fast adoption, iterative prototyping, and deliberate analysis—with preapproved tolerances for cost, schedule, and performance. This approach implements the triage model outlined earlier and makes risk acceptance explicit and defensible. Decision gates could be based on clear TRL and mission urgency triggers, reducing ad hoc judgments. The principal trade-off to balance is unnecessary complexity, as diffuse categories or vague decision gates could diminish accountability and reduce the lever’s effectiveness.

Standing Integration and Transition Function

Institutionalize a permanent productization function within existing infrastructure—such as the Defense Innovation Unit or the newly formed Defense Innovation Community of Entities (DICE)—to turn innovation outputs into acquisition programs or joint capabilities. This function could address back-end capacity gaps and provide sustained leadership to support fielding, adoption, and sustainment. Responsibilities should be clearly defined and delineated from existing program management structures to avoid duplication of effort.

Transition of Innovation Initiatives to Consistent Funding

Establish consistent appropriations accounts dedicated to initial fielding, adoption, and sustainment planning. The objective is to provide a reliable, predictable source of bridge funding so that proven experiments and prototypes can be further developed under limited operational use. Eligibility should depend on a formal handoff and evidence pack-

age demonstrating operational value to maintain accountability. The principal trade-off is fiscal: Oversight bodies should expect clear guardrails and evidence that the fund enables effective transitions.

Implementation Considerations

These policy levers are not end states but rather starting points for the new joint requirements framework: tools that anchor innovation governance while DOW finalizes the new system.

To make these levers actionable, DOW could pilot the proposed reforms in several joint innovation efforts by applying the evidence package and pathway decision rules to a limited set of transition fund awards and establishing an interim integration and transition cell within the Defense Innovation Unit or DICE. Together, these pilots would test how outputs, risk rules, and funding mechanisms align in practice while generating evidence to inform broader scaling.

Implementation should be incremental and pragmatic: Establish clear authorities and responsibilities at the outset, keep documentation lean and data collection disciplined, and build accountability through portfolio reviews and regular performance updates. In the spirit of iterative development, allocate modest resources for refinement, scaling only those reforms that demonstrably reduce time to field and increase adoption while redirecting effort from those that do not.

Conclusion

Several questions remain concerning where to focus limited transition resources, how to assign clear ownership for handoffs, and what metrics and governance structures will make risk-taking defensible. We offer policy levers intended to promote innovation to better position the department to harness technological advantages for future conflict.

Anchoring innovation activities to measurable capabilities-based outcomes, risk-calibrated pathways, and mature back-end structures would enable the reformed joint requirements system to serve as an engine for sustained warfighting advantage. Taken together, these reforms would lay the foundation for a coherent, evidence-based approach that consistently moves proven innovations to fielding, adoption, and enduring capability.

APPENDIX

List of U.S. Department of War Innovation Organizations

Table A.1 lists more than 100 DOW innovation organizations across the services, combatant commands, and Office of the Secretary of War that existed as of the writing of this report.

TABLE A.1
U.S. Department of War Innovation Organizations

Component	Innovation Organizations
Air Force	<ul style="list-style-type: none"> • AFWERX • Air Force Concept Development and Management • Air Force Rapid Sustainment Office • Air Force RCO • CYBERWORX • Department of the Air Force Digital Transformation Office • Integrated Capabilities Directorate
Army	<ul style="list-style-type: none"> • 75th Innovation Command • Army Applications Laboratory • Army Expeditionary Technology Search • Army Futures and Concepts Center • Army Futures Command • Army Rapid Capabilities and Critical Technologies Office • Army SBIR/STTR Program • Artificial Intelligence Integration Center • Combat Capabilities Development Command (DEVCOM) • DEVCOM Armaments Center • EAGLEWERX • Innovation Exchange Lab
Combatant commands	<ul style="list-style-type: none"> • Special Operations Forces Acquisition, Technology, and Logistics • U.S. Indo-Pacific Command Joint Mission Accelerator Directorate (J8x) • U.S. Special Operations Command Directorate of Science and Technology • U.S. Transportation Command Research, Development, Test, and Evaluation
Marine Corps	<ul style="list-style-type: none"> • Marine Innovation Unit • USMC Systems Command • USMC Warfighting Laboratory (MCWL) <ul style="list-style-type: none"> - MCWL Experiment Division - MCWL RCO - MCWL Science and Technology Division: Current Technology Office, Future Technology Office, Office of Science and Technology Integration - MCWL Wargaming Division
National Guard	<ul style="list-style-type: none"> • ARCWERX • Army National Guard Business Transformation • Corsair Ranch • Massachusetts National Guard Innovation Team • Michigan National Guard Kelly Johnson Joint All-Domain Innovation Center • Texas Military Department Innovation Unit
Navy	<ul style="list-style-type: none"> • FATHOMWERX • Naval Postgraduate School <ul style="list-style-type: none"> - Acquisition Research Program - America's Sea Land Air Military Research Initiative - Joint Interagency Field Experimentation Program - Naval Innovation Center - Office of Research and Innovation • Naval Research Laboratory • NavalX • Navy SBIR/STTR • Navy Warfare Development Center • NSWC Carderock • NSWC Corona • NSWC Crane • NSWC Dahlgren • NSWC Indian Head • NSWC Panama City • NSWC Philadelphia • NSWC Port Hueneme • NUWC Keyport

Table A.1—Continued

Component	Innovation Organizations
Office of the Secretary of War	<ul style="list-style-type: none"> • NUWC Newport • Office of Naval Research <ul style="list-style-type: none"> – Center for Naval Metalworking – Composites Manufacturing Technology Center – Electro-Optics Center – Energetics Manufacturing Technology Center – Institute for Manufacturing and Sustainment Technologies – Naval Shipbuilding and Advanced Manufacturing Center of Excellence • U.S. Navy Disruptive Capabilities Office <ul style="list-style-type: none"> • APEX Accelerators • Center for Advancing Science, Technology, Learning, and Engagement • Chief Digital and Artificial Intelligence Office • Defense Advanced Research Projects Agency • Defense Digital Service • Defense Innovation Accelerator for the North Atlantic • Defense Innovation Board • Defense Innovation Unit <ul style="list-style-type: none"> • Defense Logistics Agency J68 Research and Development • Defense Science Board • Developmental Test, Evaluation, and Assessment • Environmental Security Technology Certification Program • Irregular Warfare Technical Support Directorate • Joint Hypersonics Transition Office • Joint Rapid Acquisition Cell • Laboratory for Advanced Cybersecurity • Laboratory for Analytic Sciences • Laboratory for Physical Sciences • Laboratory for Telecommunication Sciences • Marne Innovation and Technology Center • Microelectronic Commons • Moonshot Labs • National Geospatial-Intelligence Agency • National Security Innovation Capital • National Security Innovation Network • Office of Acquisition Enablers • Office of Small Business Programs • Office of Strategic Capital • SBIR/STTR • Strategic Environmental Research and Development Program • Test Resource Management Center
Space Force	<ul style="list-style-type: none"> • SDA • Space Commercially Augmented Mission Platform • Space RCO • Space Systems Command • SpaceWERX

SOURCE: Office of the Under Secretary of War for Research and Engineering, "Innovation Organizations."

NOTE: NSWC = Naval Surface Warfare Center; NUWC = Naval Undersea Warfare Center; SBIR/STTR = Small Business Innovation Research and Small Business Technology Transfer; USMC = U.S. Marine Corps. In August 2025, the Department of the Navy established the Naval RCO to consolidate multiple innovation organizations, including the Disruptive Capabilities Office, NavalX, the Maritime Accelerated Response Capability Cell, and the Navy's portion of the DOW Replicator initiative. The Naval RCO is intended to serve as a single accountability node for identifying urgent operational gaps and delivering solutions within a three-year horizon (Ceder, "Phelan Establishes New Naval Rapid Capabilities Office").

Notes

¹ Executive Order 14265, “Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base.”

² Hegseth, “Transforming the Defense Acquisition System into the Warfighting Acquisition System to Accelerate Fielding of Urgently Needed Capabilities to Our Warriors.” The Department of War is designated the Department of Defense under Public Law 81-216, National Security Act Amendments of 1949.

³ U.S. Department of Defense (DoD), *Fiscal Year 2024 National Defense Authorization Act: Section 811: Modernizing the Department of Defense Requirements Process*. JCIDS defines *capability* as “the ability to complete a task or execute a course of action under specified conditions and level of performance” (Chairman of the Joint Chiefs of Staff Instruction [CJCSI] 5123.01I, *Charter of the Joint Requirements Oversight Council and Implementation of the Joint Capabilities Integration and Development System*, p. GL-8). The term may also be used more broadly to describe enduring operational characteristics, such as stealth or precision fires, rather than specific task-based abilities (Davis, Shaver, and Beck, *Portfolio-Analysis Methods for Assessing Capability Options*, pp. 19–20). Both understandings of the term are relevant in the context of defense innovation.

A *requirement* specifies the task to be accomplished, the conditions under which it must be performed, and the standard or level of performance it must meet. In the joint context, certain performance parameters that are critical to interoperability or affect multiple DOW components are designated *joint performance requirements* (CJCSI 5123.01I, *Charter of the Joint Requirements Oversight Council and Implementation of the Joint Capabilities Integration and Development System*, pp. GL-8–GL-10). Requirements describe what must be developed, procured, or sustained to deliver or improve a capability.

⁴ Hegseth and Feinberg, “Reforming the Joint Requirements Process to Accelerate Fielding of Warfighting Capabilities.”

⁵ After the authors completed this analysis in November 2025, Secretary Hegseth issued a memorandum that directs actions consistent with several concepts presented in this report (Hegseth, “Transforming the Defense Innovation Ecosystem to Accelerate Warfighting Advantage”). As DOW implements the memorandum’s broader mandates, the analytical framework and policy levers discussed here continue to apply, particularly in the context of joint requirements.

⁶ As used in this report, the term *defense innovation ecosystem* encompasses the full range of organizations and processes that generate and field new or improved technologies and capabilities for military use, from long-standing entities within the traditional requirements and acquisition system to newer organizations, such as the Defense Innovation Unit, AFWERX, and the rapid capabilities offices (RCOs). The defense innovation ecosystem also includes the mechanisms through which lessons learned from prototyping, experimentation, and other innovation activities are captured and applied to refine requirements, inform concepts of employment and investment decisions, and improve subsequent capability development.

⁷ See Public Law 99-661, National Defense Authorization Act for Fiscal Year 1987, Section 1311, Special Operations Forces (codified in U.S. Code, Title 10, Section 167); and Public Law 114-328, National Defense Authorization Act for Fiscal Year 2017,

Section 923, Establishment of Unified Combatant Command for Cyber Operations (codified in U.S. Code, Title 10, Section 167b).

⁸ See Public Law 114-92, National Defense Authorization Act for Fiscal Year 2016, Section 804, Middle Tier of Acquisition for Rapid Prototyping and Rapid Fielding (codified in U.S. Code, Title 10, Section 2302; later renumbered U.S. Code, Title 10, Section 3602); and DoD Instruction 5000.80, *Operation of the Middle Tier of Acquisition*, p. 4.

⁹ A 2023 U.S. Government Accountability Office (GAO) report found that DoD components with MTA authority have not yet fully developed and implemented all aspects of these processes as directed in DoD Instruction 5000.80 (GAO, *Middle-Tier Defense Acquisitions*, pp. 21–22).

¹⁰ See Public Law 118-159, Servicemember Quality of Life Improvement and National Defense Authorization Act for Fiscal Year 2025, Section 805, Revision and Codification of Software Acquisition Pathways (codified in U.S. Code, Title 10, Section 3603); and DoD Instruction 5000.87, *Operation of the Software Acquisition Pathway*, p. 10. A 2021 revision to the JCIDS Manual introduced a new Software Initial Capabilities Document to be submitted to the Joint Staff for review and determination of joint equities associated with software development-focused acquisition programs, with validation through an expedited JROC review.

¹¹ DoD Instruction 5000.87, *Operation of the Software Acquisition Pathway*, pp. 16, 20, 28.

¹² DoD Instruction 5000.87, *Operation of the Software Acquisition Pathway*, p. 31.

¹³ Public Law 109-364, John Warner National Defense Authorization Act for Fiscal Year 2007, Section 913, Operationally Responsive Space (codified in U.S. Code, Title 10, Section 2273a).

¹⁴ Public Law 118-31, National Defense Authorization Act for Fiscal Year 2024, Section 215, Naval Air Warfare Rapid Capabilities Office (codified in U.S. Code, Title 10, Section 8029).

¹⁵ Public Law 117-263, James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, Section 1601, Requirements for Protection of Satellites.

¹⁶ DoD, *Fiscal Year 2024 National Defense Authorization Act: Section 811: Modernizing the Department of Defense Requirements Process*, p. 27.

¹⁷ U.S. Code, Title 10, Section 4001.

¹⁸ U.S. Code, Title 10, Section 4001.

¹⁹ Executive Order 14265, “Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base.”

²⁰ DoD Directive 5000.71, *Rapid Fulfillment of Combatant Commander Urgent Operational Needs and Other Quick Action Requirements*.

²¹ Jaeger, “Charting the Future,” p. 2.

²² Department of the Air Force, “Rapid Capabilities Office.”

²³ See U.S. Army, “U.S. Army Rapid Capabilities Office”; Kirtland Air Force Base, “Space Rapid Capabilities Office.”

²⁴ Kotila et al., *Strengthening the Defense Innovation Ecosystem*, p. 4.

²⁵ Sargent et al., *Improving Space-Related Science and Technology Processes for the U.S. Space Force*.

²⁶ U.S. Code, Title 10, Section 4001.

²⁷ We recognize that these definitions and the terms *defense innovation* and *defense innovation ecosystem* predate the President's signing of Executive Order 14347, which authorizes the use of the name Department of War as a secondary title for DoD (Executive Order 14347, "Restoring the United States Department of War"). Because key defense innovation organizations, including the Defense Innovation Unit, had not changed names at the time this report was written, we continue to use the word *defense* when referring to these terms.

²⁸ Implementing such an adaptive approach would be challenging under current contracting structures. Capability Development Documents could include initial scaling estimates to guide architectural decisions and later adjust them as concepts of employment mature, but contractual mechanisms may limit flexibility once programs are on contract. By contrast, commercial firms can make just-in-time adjustments to innovation activities more readily because they act as both acquirer and producer, allowing internal alignment of technical and market decisions. This observation was raised by Bonnie L. Triezenberg, whose insights on the relationship between requirements development, acquisition programs, and contracting incentives substantially informed this discussion.

²⁹ U.S. Department of War, *Acquisition Transformation Strategy*, p. 2.

³⁰ While the requirements process does not directly execute such activities as fielding or sustainment, it shapes the conditions for their success by aligning capability needs with acquisition pathways and operational priorities.

³¹ The term *innovation* is used as both a noun (e.g., a new product or process) and a verb (e.g., the act of developing a new product or process), which can obscure meaning. We use *innovation activity* (e.g., prototyping, experimentation) to refer specifically to the verb form. This distinction helps focus assessment on "product outcomes, process outcomes, and mission outcomes . . . the 'output' of the innovation effort," rather than activity alone (Birkler, Bracken, and Lee, "Innovating Innovation in the U.S. Department of Defense Looking to Large Corporations for Inspiration," p. 6).

³² Sargent et al., *Improving Space-Related Science and Technology Processes for the U.S. Space Force*.

³³ While innovation activities may be evaluated along many lines, the selection of these four is inspired largely by Kotila et al., *Strengthening the Defense Innovation Ecosystem*; and Sargent et al., *Improving Space-Related Science and Technology Processes for the U.S. Space Force*.

³⁴ DoD Directive 5000.01, *The Defense Acquisition System*.

³⁵ GAO, *Leading Practices: Agency Acquisition Policies Could Better Implement Key Product Development Principles*, pp. 63–77.

³⁶ Greenwalt and Patt, *Required to Fail*, p. 18.

³⁷ GAO, *Defense Innovation Unit*, pp. 19–22.

³⁸ GAO, *Defense Innovation Unit*, pp. 35–36.

³⁹ GAO, *Leading Practices: Iterative Cycles Enable Rapid Delivery of Complex, Innovative Products*, pp. 49–50; GAO, *Leading Practices: Agile Portfolio Management and Iterative Business Cases Drive Innovative Product Development*.

⁴⁰ GAO, *Leading Practices: Iterative Cycles Enable Rapid Delivery of Complex, Innovative Products*, pp. 49–50; GAO, *Leading Practices: Agile Portfolio Management and Iterative Business Cases Drive Innovative Product Development*.

⁴¹ Modigliani et al., *Modernizing DoD Requirements*, p. 4.

⁴² See Drezner, *The Nature and Role of Prototyping in Weapon System Development*; and Drezner and Huang, *On Prototyping*.

⁴³ Birkler, Bracken, and Lee, "Innovating Innovation in the U.S. Department of Defense Looking to Large Corporations for Inspiration," p. 2.

⁴⁴ Greenwalt and Patt, *Required to Fail*, pp. 7, 36.

⁴⁵ GAO, *Army Modernization*, pp. 17–19.

⁴⁶ GAO, *Army Modernization*.

⁴⁷ GAO, *Leading Practices: Iterative Cycles Enable Rapid Delivery of Complex, Innovative Products*; Modigliani et al., *Modernizing DoD Requirements*.

⁴⁸ GAO, *Army Modernization*; GAO, *Leading Practices: Agency Acquisition Policies Could Better Implement Key Product Development Principles*.

⁴⁹ GAO, *Leading Practices: Agile Portfolio Management and Iterative Business Cases Drive Innovative Product Development*.

⁵⁰ See Neenan, "DOD Cost Overruns and the Nunn-McCurdy Act."

⁵¹ Representative sources include Modigliani et al., *Modernizing DoD Requirements*; Kotila et al., *Strengthening the Defense Innovation Ecosystem*; GAO, *Leading Practices: Iterative Cycles Enable Rapid Delivery of Complex, Innovative Products*; and GAO, *Defense Innovation Unit*.

⁵² GAO, *Leading Practices: Agency Acquisition Policies Could Better Implement Key Product Development Principles*; GAO, *Leading Practices: Agile Portfolio Management and Iterative Business Cases Drive Innovative Product Development*.

⁵³ GAO, *Leading Practices: Iterative Cycles Enable Rapid Delivery of Complex, Innovative Products*; Modigliani et al., *Modernizing DoD Requirements*; Kotila et al., *Strengthening the Defense Innovation Ecosystem*.

⁵⁴ Kotila et al., *Strengthening the Defense Innovation Ecosystem*; GAO, *Other Transaction Agreements*.

⁵⁵ Iansiti, "Real-World R&D"; Kotila et al., *Strengthening the Defense Innovation Ecosystem*.

⁵⁶ See Newton, "Bridging the Valley of Death and Thriving Beyond—Improving Transition Success with Metrics."

⁵⁷ Kotila et al., *Strengthening the Defense Innovation Ecosystem*; GAO, *Leading Practices: Agency Acquisition Policies Could Better Implement Key Product Development Principles*.

⁵⁸ Modigliani et al., *Modernizing DoD Requirements*; GAO, *Leading Practices: Agile Portfolio Management and Iterative Business Cases Drive Innovative Product Development*; Kotila et al., *Strengthening the Defense Innovation Ecosystem*.

⁵⁹ Greenwalt and Patt discuss similar functions in the Mission Engineering and Integration Activity concept (Greenwalt and Patt, *Required to Fail*, pp. 58–61).

⁶⁰ Kotila et al., *Strengthening the Defense Innovation Ecosystem*.

⁶¹ GAO, *Defense Innovation Unit*, p. 35.

⁶² By *enterprise coherence*, we mean deliberate coordination across decentralized innovation efforts to ensure that diverse activities align with shared objectives, contribute to learning through information-sharing, and ultimately synchronize with available transition pathways. Enterprise coherence does not imply uniformity or centralization, but rather structured connectivity that supports specialization without fragmentation.

⁶³ Hegseth and Feinberg, “Reforming the Joint Requirements Process to Accelerate Fielding of Warfighting Capabilities,” p. 2. Attachment 1 to this memo defines *Key Operational Problems* as “the Joint Force’s most pressing joint operational problems,” prioritized by the JROC and “synchronized with the annual Program and Budget Review process” (p. 4).

⁶⁴ Kotila et al., *Strengthening the Defense Innovation Ecosystem*.

⁶⁵ GAO, *Leading Practices: Iterative Cycles Enable Rapid Delivery of Complex, Innovative Products*.

⁶⁶ Kotila et al., *Strengthening the Defense Innovation Ecosystem*; GAO, *Defense Innovation Unit*; GAO, *Leading Practices: Agency Acquisition Policies Could Better Implement Key Product Development Principles*.

⁶⁷ Kotila et al., *Strengthening the Defense Innovation Ecosystem*; GAO, *Defense Innovation Unit*.

⁶⁸ Modigliani et al., *Modernizing DoD Requirements*.

⁶⁹ GAO, *Defense Innovation Unit*; Kotila et al., *Strengthening the Defense Innovation Ecosystem*.

⁷⁰ Digital engineering requires a systematic, life-cycle approach that integrates elements beyond just information technology tools, including governance, systems thinking, and stakeholder collaboration. See, for example, Mayer et al., *Transforming Capability Requirements Development in the United States Space Force*, pp. 56–73.

⁷¹ Greenwalt and Patt, *Required to Fail*, p. 56.

⁷² GAO, *Leading Practices: Iterative Cycles Enable Rapid Delivery of Complex, Innovative Products*; GAO, *Leading Practices: Agile Portfolio Management and Iterative Business Cases Drive Innovative Product Development*.

⁷³ GAO, *Leading Practices: Agile Portfolio Management and Iterative Business Cases Drive Innovative Product Development*; Kotila et al., *Strengthening the Defense Innovation Ecosystem*.

⁷⁴ GAO, *Defense Innovation Unit*.

⁷⁵ Birkler, Bracken, and Lee, *Innovating Innovation in the U.S. Department of Defense Looking to Large Corporations for Inspiration*; Greenwalt and Patt, *Required to Fail*.

⁷⁶ GAO, *Leading Practices: Agile Portfolio Management and Iterative Business Cases Drive Innovative Product Development*; GAO, *Leading Practices: Iterative Cycles Enable Rapid Delivery of Complex, Innovative Products*.

⁷⁷ GAO, *Leading Practices: Iterative Cycles Enable Rapid Delivery of Complex, Innovative Products*; Greenwalt and Patt, *Required to Fail*.

⁷⁸ Representative sources include GAO, *Defense Innovation Unit*; Kotila et al., *Strengthening the Defense Innovation Ecosystem*; Modigliani et al., *Modernizing DoD Requirements*; and Greenwalt and Patt, *Required to Fail*.

References

Birkler, John L., Paul Bracken, and Gordon Lee, “Innovating Innovation in the U.S. Department of Defense Looking to Large Corporations for Inspiration,” *Journal of Management Policy and Practice*, Vol. 22, No. 4, December 2021.

Ceder, Riley, “Phelan Establishes New Naval Rapid Capabilities Office,” *Navy Times*, August 26, 2025.

Chairman of the Joint Chiefs of Staff Instruction 5123.01I, *Charter of the Joint Requirements Oversight Council and Implementation of the Joint Capabilities Integration and Development System*, October 30, 2021.

CJCSI—See Chairman of the Joint Chiefs of Staff Instruction.

Davis, Paul K., Russell D. Shaver, and Justin Beck, *Portfolio-Analysis Methods for Assessing Capability Options*, RAND Corporation, MG-662-OSD, 2008. As of November 26, 2025: <https://www.rand.org/pubs/monographs/MG662.html>

Department of Defense Directive 5000.01, *The Defense Acquisition System*, U.S. Department of Defense, September 9, 2020, change 1, July 28, 2022.

Department of Defense Directive 5000.71, *Rapid Fulfillment of Combatant Commander Urgent Operational Needs and Other Quick Action Requirements*, U.S. Department of Defense, October 18, 2022.

Department of Defense Instruction 5000.80, *Operation of the Middle Tier of Acquisition*, U.S. Department of Defense, December 30, 2019, change 1, November 25, 2024.

Department of Defense Instruction 5000.87, *Operation of the Software Acquisition Pathway*, U.S. Department of Defense, October 2, 2020.

Department of the Air Force, “Rapid Capabilities Office,” webpage, November 2020. As of October 27, 2025: <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/2424302/rapid-capabilities-office>

DoD—See U.S. Department of Defense.

DoD Directive—See Department of Defense Directive.

DoD Instruction—See Department of Defense Instruction.

Drezner, Jeffrey A., *The Nature and Role of Prototyping in Weapon System Development*, RAND Corporation, R-4161-ACQ, 1992. As of November 6, 2025: <https://www.rand.org/pubs/reports/R4161.html>

- Drezner, Jeffrey A., and Meilinda Huang, *On Prototyping: Lessons from RAND Research*, RAND Corporation, OP-267-OSD, 2009. As of November 6, 2025: https://www.rand.org/pubs/occasional_papers/OP267.html
- Executive Order 14265, “Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base,” Executive Office of the President, April 9, 2025.
- Executive Order 14347, “Restoring the United States Department of War,” Executive Office of the President, September 5, 2025.
- GAO—See U.S. Government Accountability Office.
- Greenwalt, Bill, and Dan Patt, *Required to Fail: Beyond Documents: Accelerating Joint Advantage Through Direct Resourcing and Experimentation*, Hudson Institute, February 2025.
- Hegseth, Pete, “Transforming the Defense Acquisition System into the Warfighting Acquisition System to Accelerate Fielding of Urgently Needed Capabilities to Our Warriors,” memorandum for senior Pentagon leadership, commanders of combatant commands, and defense agency and Department of War field activity directors, U.S. Department of War, November 7, 2025.
- Hegseth, Pete, “Transforming the Defense Innovation Ecosystem to Accelerate Warfighting Advantage,” memorandum for senior Pentagon leadership, commanders of combatant commands, and defense agency and Department of War field activity directors, U.S. Department of War, January 9, 2026.
- Hegseth, Pete, and Steve Feinberg, “Reforming the Joint Requirements Process to Accelerate Fielding of Warfighting Capabilities,” memorandum for senior Pentagon leadership, commanders of combatant commands, and defense agency and Department of War field activity directors, U.S. Department of War, November 7, 2025.
- Iansiti, Marco, “Real-World R&D: Jumping the Product Generation Gap,” *Harvard Business Review*, Vol. 71, No. 3, May–June 1993.
- Jaeger, Alan, “Charting the Future,” briefing slides, NavalX Ventura Tech Bridge, August 2024.
- Kirtland Air Force Base, “Space Rapid Capabilities Office,” webpage, undated. As of October 27, 2025: <https://www.kirtland.af.mil/About-Us/Fact-Sheets/Display/Article/2212823/space-rapid-capabilities-office>
- Kotila, Brodi, Jeffrey A. Drezner, Elizabeth M. Bartels, Devon Hill, Quentin E. Hodgson, Shreya S. Huilgol, Shane Manuel, Michael Simpson, and Jonathan P. Wong, *Strengthening the Defense Innovation Ecosystem*, RAND Corporation, RR-A1352-1, 2023. As of October 13, 2025: https://www.rand.org/pubs/research_reports/RRA1352-1.html
- Mayer, Lauren A., Megan McKernan, Yool Kim, William Shelton, Jim Mignano, Sarah W. Denton, Arianne Collopy, Heidi Peters, Grace Van Valkenburg, Igor M. Brin, and Kristin J. Leuschner, *Transforming Capability Requirements Development in the United States Space Force*, RAND Corporation, RR-A2332-1, 2024. As of December 4, 2025: https://www.rand.org/pubs/research_reports/RRA2332-1.html
- Modigliani, Pete, Dan Ward, Tyler Lewis, and Wayne McGee, *Modernizing DoD Requirements: Enabling Speed, Agility, and Innovation*, MITRE Corporation, March 2020.
- Neenan, Alexandra G., “DOD Cost Overruns and the Nunn-McCurdy Act,” Congressional Research Service, IF13027, June 12, 2025.
- Newton, Richard, “Bridging the Valley of Death and Thriving Beyond—Improving Transition Success with Metrics,” *Defense Acquisition*, Vol. 51, No. 4, July–August 2022.
- Office of the Under Secretary of War for Research and Engineering, “Innovation Organizations,” webpage, undated. As of October 27, 2025: <https://www.ctoinnovation.mil/innovation-organizations>
- Public Law 99-661, National Defense Authorization Act for Fiscal Year 1987, November 14, 1986.
- Public Law 109-364, John Warner National Defense Authorization Act for Fiscal Year 2007, October 17, 2006.
- Public Law 114-92, National Defense Authorization Act for Fiscal Year 2016, November 25, 2015.
- Public Law 114-328, National Defense Authorization Act for Fiscal Year 2017, December 23, 2016.
- Public Law 117-263, James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, December 23, 2022.
- Public Law 118-31, National Defense Authorization Act for Fiscal Year 2024, December 22, 2023.
- Public Law 118-159, Servicemember Quality of Life Improvement and National Defense Authorization Act for Fiscal Year 2025, December 23, 2024.
- Sargent, Matthew, Bonnie L. Triezenberg, Brian Dolan, Arianne Collopy, Jordan Logue, Edward Parker, Jon Schmid, Chad Heitzenrater, Graham Griffin, Jim Mignano, Thomas Van Bibber, Alexandra Greco, Debra Knopman, Marjory S. Blumenthal, and Benjamin J. Sacks, *Improving Space-Related Science and Technology Processes for the U.S. Space Force*, RAND Corporation, RR-A2334-1, 2024. As of November 6, 2025: https://www.rand.org/pubs/research_reports/RRA2334-1.html
- U.S. Army, “U.S. Army Rapid Capabilities Office,” webpage, December 5, 2019. As of October 27, 2025: https://www.army.mil/article/174166/u_s_army_rapid_capabilities_office
- U.S. Code, Title 10, Section 167, Unified Combatant Command for Special Operations Forces.
- U.S. Code, Title 10, Section 167b, Unified Combatant Command for Cyber Operations.
- U.S. Code, Title 10, Section 2273a, Space Rapid Capabilities Office.
- U.S. Code, Title 10, Section 2302, Definitions.
- U.S. Code, Title 10, Section 3602, Middle Tier of Acquisition for Rapid Prototyping and Rapid Fielding.
- U.S. Code, Title 10, Section 3603, Software Acquisition Pathways.
- U.S. Code, Title 10, Section 4001, Research and Development Projects.
- U.S. Code, Title 10, Section 8029, Naval Air Warfare Rapid Capabilities Office.
- U.S. Department of Defense, *Fiscal Year 2024 National Defense Authorization Act: Section 811: Modernizing the Department of Defense Requirements Process*, July 14, 2025.
- U.S. Department of War, *Acquisition Transformation Strategy: Rebuilding the Arsenal of Freedom*, 2025.

U.S. Government Accountability Office, *Army Modernization: Steps Needed to Ensure Army Futures Command Fully Applies Leading Practices*, GAO-19-132, January 23, 2019.

U.S. Government Accountability Office, *Leading Practices: Agency Acquisition Policies Could Better Implement Key Product Development Principles*, GAO-22-104513, March 10, 2022.

U.S. Government Accountability Office, *Middle-Tier Defense Acquisitions: Rapid Prototyping and Fielding Requires Changes to Oversight and Development Approaches*, GAO-23-105008, February 7, 2023a.

U.S. Government Accountability Office, *Leading Practices: Iterative Cycles Enable Rapid Delivery of Complex, Innovative Products*, GAO-23-106222, July 27, 2023b.

U.S. Government Accountability Office, *Defense Innovation Unit: Actions Needed to Assess Progress and Further Enhance Collaboration*, GAO-25-106856, February 27, 2025a.

U.S. Government Accountability Office, *Other Transaction Agreements: Improved Contracting Data Would Help DOD Assess Effectiveness*, GAO-25-107546, September 3, 2025b.

U.S. Government Accountability Office, *Leading Practices: Agile Portfolio Management and Iterative Business Cases Drive Innovative Product Development*, GAO-25-107130, September 17, 2025c.

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About This Report

As adversaries narrow or surpass long-held U.S. advantages in defense capabilities, the Trump administration and Congress have directed sweeping acquisition reform through executive and legislative action, respectively. Requirements modernization—an essential part of this reform—represents what policymakers and experts describe as generational change. The U.S. Department of War's (DOW's) decision to replace its legacy joint requirements process, the Joint Capabilities Integration and Development System, provides an opportunity to align defense innovation—including new and improved technologies, capabilities, and supporting processes—with operational needs. This report presents potential policy levers to enable this transition.

The authors of this report assisted DOW in answering Congress's mandate in Section 811 of the fiscal year 2024 National Defense Authorization Act: Modernizing the Department of Defense Requirements Process. In this report, they expand on how defense innovation can be incorporated into a reformed joint requirements system to better align with operational needs.

This report should interest those concerned with defense requirements modernization. The intended audience includes government officials responsible for these processes and industry partners who interact with them.

RAND National Security Research Division

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