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**Transforming Acquisition for Speed, Agility, and
Effectiveness**

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Transforming Acquisition for Speed, Agility, and Effectiveness

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Abstract

Acquisition programs face several common challenges in adopting the Department of War (DoW) Software Acquisition Pathway (SWP) and acquiring artificial intelligence (AI) capabilities. This paper describes these challenges and the work underway to address them and help programs move swiftly from high-level policy to battlefield-ready practice.

Introduction

Over the past year, the urgent need for acquisition reform has been a strong and recurrent theme in White House, Department of War (DoW), and Congressional communications. The April 9, 2025, White House Executive Order, *Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base* (The White House, 2025), laid the groundwork for the Secretary of War’s (SecWar’s) *Acquisition Transformation Strategy* (DoW, 2025) and the associated memo, released on November 7 (Hegseth, 2025b). These documents include phrases such as “accelerate defense procurement,” “emphasis on speed, flexibility, and execution,” and “state-of-the-art capabilities at speed and scale” (The White House, 2025, p. 1).

Prior to the release of the memos cited above, the SecWar’s March 6 memo, *Directing Modern Software Acquisition to Maximize Lethality* (Hegseth, 2025a), emphasized software’s critical role “at the core of every weapon and supporting system we field” (p. 1) and the need to immediately shift to a modern software acquisition construct. Leveraging advanced technology and the commercial ecosystem, modern software acquisition practices provide the ability to deliver, scale, and evolve capabilities to outpace our adversaries.



This focus on modernizing and accelerating software acquisition aligns with Senator Roger Wicker’s report, *Restoring Freedom’s Forge: American Innovation Unleashed* (Wicker, 2024) and is reflected in the Senate’s *Fostering Reform and Government Efficiency in Defense (FoRGED) Act* (2024) and in the House of Representatives’ *Streamlining Procurement for Effective Execution and Delivery (SPEED) and National Defense Authorization Act for Fiscal Year 2026* (2025). Five acquisition transformation themes are woven through these memoranda, policy changes, and proposals:

1. Eliminate bottlenecks and barriers.
2. Encourage high levels of innovation.
3. Support rapid decision-making and intelligent risk-taking.
4. Revitalize the defense industrial base.
5. Streamline budgeting/contracting processes.

This paper reports on research findings and recommendations that align with the above themes to promote speed, agility, and effectiveness. It begins by discussing the genesis of the Software Acquisition Pathway (SWP), which operationalizes the five themes for software. Next, the paper describes common SWP adoption challenges that DoW programs have encountered, and a collection of techniques and tools that can facilitate successful outcomes. In addition, with an expanding drive to adopt artificial intelligence (AI) enabled capabilities, the paper presents results from a workshop on AI acquisition, including effective practices for acquiring AI-enabled capabilities (Rishel et al., 2025).

Challenges in Software Acquisition and AI Adoption for National Security

Modern software engineering approaches reflect the four fundamental values articulated in the *Agile Manifesto* (Beck et al., 2001): Interactions and people over processes and tools, working software over comprehensive documentation, customer collaboration over contract negotiation, and responding to change over following a plan. These values recognize that software’s real power is its inherent flexibility, and its real value is in meeting user needs. However, until recently, DoW lacked a policy framework to realize the full benefit of this flexibility and its potential to deliver game-changing capabilities to the warfighter.

Software Acquisition Pathway (SWP): Capability and Agility at the Speed of Need

Traditional DoW acquisition frameworks were designed for hardware, not rapidly evolving, dynamic software. Aligned with the manufacturing- and production-oriented needs and timelines of hardware, these frameworks revolved around infrequent, major milestone reviews rather than rapid, iterative feedback loops. Interactions with user representatives were not codified, value was not measured, and neither was a requirement to “demonstrate the viability and effectiveness of capabilities for operational use not later than 1 year” (DoD, 2020, p. 3) after funds are first obligated for development. Without early opportunities for user feedback or to work out integration issues, programs have struggled to deliver software capability at the speed required for modern missions.

Beginning with the Software Acquisition and Practices (SWAP) study, *Software Is Never Done: Refactoring the Acquisition Code for Competitive Advantage* (Defense Innovation Board, 2019), the DoW and SEI sought to develop policy constructs more suitable for software. They designed and implemented pilot programs used to inform, test, and refine the policy constructs underlying the SWP, which are defined in DoD Instruction 5000.87, *Operation of the Software Acquisition Pathway* (DoD, 2020). The SWP is one of several acquisition pathways introduced in DoD Instruction 5000.02, *Operation of the Adaptive Acquisition Framework (AAF)* (DoD, 2022),



a major revision of policy that establishes a foundation for adapting acquisition processes to a variety of contexts.

The objective of the SWP is to enable capability delivery to the warfighter “at the speed of mission need” (Defense Innovation Board, 2019, p. i), which eliminates unneeded and onerous requirements. Accordingly, the SecWar directed the adoption of the SWP “as the preferred pathway for all software development components of business and weapon system programs in the Department” (Hegseth, 2025a). The SWP emphasizes modern software practices focused on frequent, iterative delivery cycles that enable user feedback and update early in the life cycle, when cost and schedule impacts are much lower. In the end, the target result is a delivered capability that meets warfighter needs on schedule and within budget.

The SWP offers great potential benefits to the acquisition community. However, it represents a significant departure from previous software acquisition practice and requires a commitment to learning and practicing a new—and better—way of working. Based on work with programs adopting and learning about the SWP, the SEI identified five challenges commonly encountered along the way. These are described in Table 1.

Table 1. Key Barriers to Adopting the Software Acquisition Pathway (SWP)

SWP ADOPTION CHALLENGE	DESCRIPTION
SWP Readiness	Entering the <i>SWP Planning phase</i> requires a signed Acquisition Decision Memorandum (ADM) and draft Capability Needs Statement (CNS) (Warfighting Acquisition University, n.d.-a, n.d.-b, n.d.-c). But SWP success requires additional preparation for the program team to be adequately organized and equipped for successful execution. It’s necessary to gain an adequate understanding of what modern software development approaches and Agile methodologies look like in practice as well as how to provide a framework that enables them to function well in your program and facilitate early detection when execution drifts off course.
Capability Needs Statement (CNS) (Requirements) Issues	Many users and program office teams struggle to shift from a <i>Capability Development Document (CDD)</i> articulation of needs to a CNS at the appropriate level (Warfighting Acquisition University, n.d.-b, n.d.-c). In some cases, the result is a CNS that is merely CDD content that has been copied and pasted into the CNS template, making it overly detailed. The specificity required of a CDD runs counter to the flexibility and adaptability the SWP is designed to enable. In other cases, the CNS lacks the information needed for foundational system architecture work (e.g., reliability, testability, and maintainability requirements). An appropriate CNS provides the right level of detail to enable the needed flexibility.
Poorly Specified User Agreements (UAs)	A UA is a vital handshake that explicitly links the development of capabilities to real-world warfighter outcomes. UAs are closely linked to Value Assessments (VAs), which provide feedback and return on investment data on the value delivered. Often, UAs are implemented at the wrong level (i.e., too far removed from the day-to-day work of users), or they don’t sufficiently consider different types of end users who have a stake in the capability being delivered.
Confusion About Software and Program Metrics	Program teams often learn about a slip in a delivery date or a cost overrun too late to do anything about it. Metrics provided by product teams may fail to expose risks early enough to mitigate them before they become problems that are difficult and costly to resolve.
Ineffective Scoping of Capability Releases	Many program teams begin their SWP journey without an adequate understanding of Minimum Viable Product (MVP) and Minimum Viable Capability Release (MVCR). An inadequate definition and scoping of a release’s MVP and MVCR can lead to misaligned expectations between the program team and stakeholder groups (e.g., warfighters, certifiers, testers).



Proven practices for overcoming the challenges identified in Table 1, along with application guidance, are provided in the “Overcoming the Challenges: Acquisition Resources and Effective Practices” section of this paper.

Since the SWP’s introduction in 2020, a burst of innovation and investment in AI produced results that turned DoW interest into an urgent pursuit of AI capabilities. The software acquisition process can accommodate AI-enabled software acquisition. However, AI is inherently different from conventional software in its development cycle and its behavioral characteristics. AI software development includes activities and artifacts that are not part of conventional software development. In addition, some conventional software life-cycle activities must be modified for AI. The next section discusses AI adoption challenges related to differences between AI and conventional software.

Ubiquitous Artificial Intelligence (AI): Adoption Challenges for AI Acquisition

The field of AI research was founded in the 1950s with capabilities and technologies advancing in spurts (Stone et al., 2016, Appendix I). The disappointing pace of progress led to pauses in funding in the 1970s and 1990s; and then, almost 30 years ago, the pace picked up again. What is now called “traditional” AI primarily utilizes machine learning (ML) and has been in constant use since then, with a dramatic increase over the past 5 years in more advanced AI-enabled capabilities offered to the general public.

Large language models (LLMs) are an ML system that have quickly become ubiquitous. ChatGPT, released in November 2022, was the first publicly available LLM-enabled chatbot, and within 2 months it was estimated to have reached 100 million monthly active users (Hu, 2023). When Pew Research Center conducted a survey around that time, only 30% of U.S. adult respondents were able to correctly recognize six examples of AI in everyday life (Kennedy et al., 2023). In contrast, by 2025, another Pew Research Center survey showed that most American respondents (79%) had heard at least a little about ChatGPT, and 58% of adults under 30 had used it (Sidoti & McClain, 2025). However, ChatGPT and other LLM-enabled chatbots are only one of many types of AI people use each day, often without realizing it. Figure 1 depicts a hierarchy of AI categories and where ChatGPT fits.

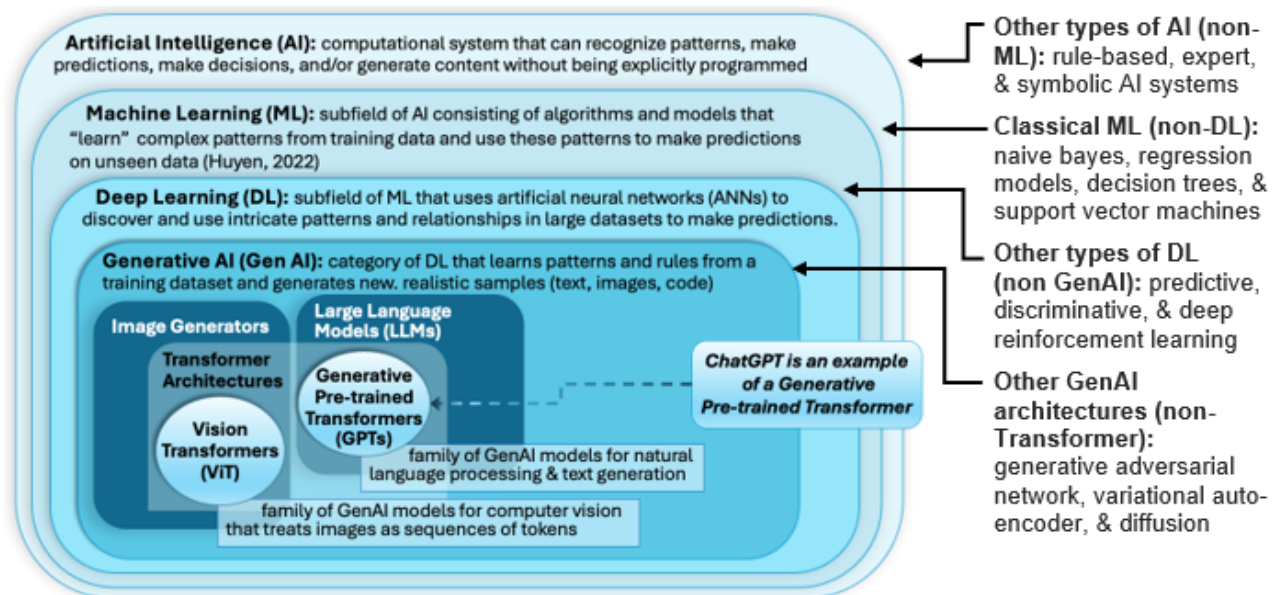


Figure 1. Artificial Intelligence (AI): Example Subfields, Approaches, and Architectures

Like any tool or technology, some types of AI are better than others for certain tasks, and knowledge of these systems is necessary to effectively identify an AI technology suitable for a particular need. For example, LLMs are good at generative text-based tasks such as writing letters and summarizing content. However, they are not as good at retrieving facts or responding as consistently as other types of systems. LLMs respond with incorrect information more frequently than other systems and may combine unrelated pieces of information in unexpected and even nonsensical ways, which produce results often referred to as “hallucinations.”

Data Is the Cornerstone of AI-Enabled Systems

A key difference between conventional software and AI-enabled systems is that for AI-enabled systems, data serves as the cornerstone, the foundation on which the algorithms, models, and architecture are constructed. To develop an ML capability, a data scientist or ML engineer provides a set of training data inputs and corresponding results¹ that have been reviewed by a subject matter expert, to an ML model. The model learns the patterns inherent in the data and the parameters are adjusted until a loss (error) function is minimized and correct results are produced. After the model has learned the patterns, the model can apply the learned patterns to produce correct results from new data (inputs it hasn't yet encountered).

Since AI-enabled systems are heavily dependent on data for their development and operation, identifying datasets that are relevant to a specific use case and at the appropriate classification is paramount for the system to be successful. For example, when there is a need to provide access to military doctrine, a helpful chatbot system may be the first choice. Chatbots can be fine-tuned and methods such as retrieval augmented generation (RAG) can further improve their responses. However, since LLMs, such as chatbots, are typically trained on the entire internet, they contain a lot of irrelevant information and will be slow compared to other options. Finally, preparing data for an AI system may require a considerable commitment of time and resources, and using AI may not be worth the time and cost. In this case, a different type of system may be much more effective.

Considerations for Using AI in National Security Contexts

AI adoption for national security use cases is more challenging than for consumer products for several reasons. First, the overall risk is higher, particularly in terms of the more serious consequences of failure. A mistake in a commercial chatbot might cause momentary confusion. A mistake in an intelligence summary could lead to mission failure. Second, AI tools must often interoperate or be integrated with legacy systems, and these systems may not adequately support modern software. Finally, AI systems require relatively large sets of digitized data that have some variation and are relevant to the use case. Much of the data used in national security contexts is sensitive or classified and must be safeguarded at all phases of the AI life cycle.

These requirements can complicate development and maintenance of the model over time, particularly if the model is trained using sensitive or classified data. For example, changing conditions in the environment are likely to result in changes to the distribution of input data. As the input data diverges from the training data, the model's behavior will drift, and it will not produce correct results. To detect these kinds of changes, a monitoring system and human oversight are needed. To correct the situation, it may be necessary to fine-tune or retrain the

¹ When a machine learning model is given correct results along with training data inputs, it is using supervised learning. Known results “supervise” the model's predicted results and feed the error back through the model, which results in updates to the model's parameters. Other types of learning include unsupervised, semi-supervised, and reinforcement learning.



model. Having available staff and resources to collect data and do the fine-tuning or retraining in a timely manner, particularly if sensitive or classified, is likely to be challenging.

In addition to the above, Novak (2021) identified other acquisition- and policy-focused challenges in the literature. These challenges fall into a variety of categories and include technical, data, acquisition approach, adoption and culture, organizational, and legal and ethical challenges (pp. 2–3). Although the report is several years old, many are still relevant.

Overcoming the Challenges: Resources and Effective Practices

Over the past year, the SEI has engaged with DoW acquisition organizations and programs and the software engineering community to develop and share practices and resources that address the challenges identified above. The Software Acquisition Go Bag (SEI, n.d.-b) is a resource that identifies essential, effective practices for navigating the SWP. These are described next, followed by a set of proven practices for AI acquisition that were discussed and developed during an SEI-led workshop (Rishel et al., 2025).

Software Acquisition Go Bag: Delivering Software at the Speed of Need

The SEI has extensive knowledge and experience sharpening software acquisition practices based on decades of work with acquisition programs; most recently, it implemented the SWP in DoW programs and their partner organizations. In *Directing Modern Software Acquisition to Maximize Lethality*, SecWar Hegseth (2025a) amplified the DoW's commitment to moving programs to the next level of acquisition capability, a goal firmly aligned with the SEI's purpose. Determined to continue that mission and be instrumental in helping DoW programs and others improve their acquisition practices, in 2025, the SEI launched the Software Acquisition Go Bag—"Go Bag" for short (SEI, n.d.-b).

Go Bag is a system of resources designed to help users (e.g., program teams, user representatives, and their industry partners) confidently make acquisition decisions, including how to implement the SWP in their unique environments to achieve the desired outcomes. These resources include

- *Tactical Guides* that contain actionable information about a specific software acquisition topic
- *Live Webcasts and Podcasts* that enable participants to ask questions and share thoughts and are recorded for later viewing/listening
- *Blog Posts* that compile the latest news and Go Bag offerings
- *Templates and Other Tools* that support software acquisition activities

Go Bag enables users to collect and tailor the resources they need to devise strategies, practices, and execution plans to overcome their software acquisition challenges. You can "Pack Your Go Bag" with resources that include tips for following modern software acquisition, development, and deployment practices (SEI, n.d.-a).

To simplify SWP adoption, the SEI created an initial collection of resources called the SWP Essentials Kit (SEI, 2025). This kit includes fact sheets, blog posts, webcasts, tactical guides, supplements, and short video clips focused on concepts and artifacts that are essential to begin a successful SWP journey.

Table 2 describes the Go Bag resources aimed at responding to each SWP Adoption Challenge identified in Table 1. As of the date this paper was written, three of the resources listed in the table are published on the Software Engineering Institute Website



(<https://sei.cmu.edu>), another is in final publication, and two more are in progress and soon to be published.

Table 2. Resources for Transcending Barriers to Software Pathway SWP Adoption

TO OVERCOME THIS CHALLENGE	TRY THESE RESOURCES
SWP Readiness	<p><i>What Is the SWP?</i> is an easy-to-follow guide to SWP basics. https://www.sei.cmu.edu/library/what-is-the-swp/</p> <p><i>SWP: Ready, Set, Go!</i>: The SWP allows for the rapid acquisition and delivery of software that provides warfighters/users with innovative capabilities they need to outpace our adversaries and win the next fight. Sounds like just what’s needed, right? But it’s true that the details of the SWP can get confusing. Since not all programs are a good fit for following the SWP, this guide helps you determine if your program fits with the SWP and if it is ready. https://www.sei.cmu.edu/library/swp-ready-set-go/</p>
CNS (Requirements) Issues	<p><i>Cracking the CNS Code: Getting the Capability Needs Statement (CNS) Right</i> unlocks substantial benefits, for example, with guidance on developing an acquisition strategy and cost estimates. Taking time to engage effectively with users and other stakeholders is critically important; skipping this or getting it wrong can create avoidable pitfalls, for example, making it more difficult to prioritize the backlog. User feedback on early prototypes through usability testing will help validate the CNS. This guide provides tips and examples for developing a CNS that addresses your program’s unique objectives at the right level of detail. https://www.sei.cmu.edu/library/cracking-the-cns-code/</p>
Poorly Specified User Agreements (UAs)	<p><i>In progress</i></p> <p>A UA is only as good as the solution that is generated. Cycles of iterative development and usability testing will provide confidence that the interface and data the system provides meet program needs and expectations. This tactical guide helps you develop an effective UA. Collaboration among the PMO, product team, and users is paramount to success in software acquisition, and the UA is the cornerstone of that collaboration.</p>
Confusion About Software and Program Metrics	<p><i>In final publication</i></p> <p>The <i>Pack Light, Measure Right</i> tactical guide and its supplements will support your program’s ability to pack only the measures that “earn their keep.”</p>
Ineffective Scoping of Capability Releases	<p><i>In progress</i></p> <p>This tactical guide will describe the intended content and purpose of three types of capability release: The <i>minimum viable product (MVP)</i>, <i>Minimum Viable Capability Release (MVCR)</i>, and subsequent <i>Releases</i>. This guide will also share the keys to successful <i>Release Planning</i>.</p>

When the resources in the SWP Essentials Kit (SEI, 2025) are complete, the SEI will move forward to develop Go Bag resources on new topics as well as more detail, where



needed, on the topics in listed Table 2. One of the topics planned for a future Go Bag resource is acquiring AI-enabled capabilities and systems.

Effective Practices and Guidelines Identified at the AI Acquisition Workshop

AI acquisition and implementation continue to be challenging for many programs. Common questions include why and when to adopt AI and how to choose an AI-enabled solution. In a 2025 workshop the SEI conducted, participants shared practices and guidelines they found useful in answering these questions, and below is a curated list (Rishel et al., 2025).

- **Start with a mission need.** Understand the problem to be solved, the context of use, and the end users' needs, and then choose a solution that addresses those needs and is likely to improve the situation. An AI-enabled solution may not be the best choice.
- **Select data.** Ensure datasets selected for training are appropriate and pass a robust assessment process, as described under "Ensuring AI Is a Match for the Operational Context."
- **Prepare data.** Data preparation can consume considerable time and resources in determining dataset quality and adequacy. In addition, missing values, imbalanced datasets, and outliers need to be handled. For some solutions, feature selection and engineering will be needed.
- **Manage data.** Of the many aspects of data management, security and protection of sensitive and classified information are particularly applicable to national security systems. Giving an AI solution access to a shared data repository with a variety of sources increases the risk of classified data spillage (Novak, 2021).
- **Ask how the model works.** Vendors should be expected to describe the training process of the model, the data it uses, how it makes decisions, and how and when it will be updated to a variety of audiences, both technical and non-technical. Disregard AI systems that are described as opaque or as a black box. Vendors do not need to divulge intellectual property to share this level of information.
- **Prioritize trustworthy systems.** AI systems are not reliable in the same way traditional software is. A trustworthy system provides an experience that matches end-users' expectations and is appropriately transparent to them. For example, an AI system should indicate to warfighters when its performance is degraded due to concept drift, or it is not working as intended. Trustworthy systems provide evidence for how outcomes are produced and meet (or exceed) performance metrics.
- **Choose modular systems.** Instead of seeking versatile solutions, identify tools that perform well on specific tasks, fit within the existing operating environment, and can be added or removed easily to reduce risk and prevent being tied to one vendor.
- **Run a pilot before issuing a contract.** Start with a small-scale experiment in the target environment with warfighters in realistic conditions. Partner with end-users to explore the system and to confirm that it does what they need it to. Continue to use the environment to evaluate the system prior to significant scaling in nominal and off nominal conditions, and throughout its deployment. Warfighters can also help refine requirements and identify risks, prior to updates of contract language.



- **Build in feedback and human oversight.** AI systems are dynamic by nature, and analysts and operators must be capable of identifying and reporting mistakes. Along with testing and evaluation efforts, AI systems need continuous monitoring for undesirable changes in model behavior (model drift) particularly in higher risk, sensitive, or classified environments. In addition, the system should notify an operator or administrator of issues so they can determine what action to take.
- **Plan for failure.** Even high-performing models will fail, and teams should understand the existing capabilities, constraints, and possible consequences. AI systems should be designed to be resilient so that they detect and recover from issues when possible, and the team should have a plan for when it cannot.

The above practices and guidelines suggest actions that acquirers can take to reduce risk and increase the likelihood that an AI-enabled system or capability will effectively perform its intended functions and be adaptable to change. While not comprehensive, they are broadly applicable and worthwhile areas for knowledge and skill building.

Conclusion

The research described in this paper represents progress in two areas relevant to transforming acquisition for speed, agility, and effectiveness. The first is the Software Acquisition Go Bag, a collection of easy-to-use, accessible resources to facilitate software acquisition. The SWP Essentials Kit is the first set of resources in the collection, designed to accelerate and expand the successful adoption of the SWP, which enables deployment of adaptable software at the speed of need. Three of the five SWP Essentials Kit resources have been published on the Go Bag website, and additional resources are planned. New resources will be added to the website as they are published.

The exponential rise and sudden ubiquity of AI-enabled systems and capabilities have created an urgent need for guidance in acquiring AI. The SEI's AI Acquisition workshop produced a starter set of broadly applicable practices and guidelines for organizations to use, but more work is needed to produce a comprehensive set. As the practical use of AI expands and matures, acquisition and AI practitioners and researchers, industry associations, professional societies, and standards bodies have published and are continuing to develop comprehensive guidance documents and standards. Several of these adapt conventional development and acquisition phases, activities, and practices for AI governance, oversight, and procurement. For example, *IEEE Standard for the Procurement of Artificial Intelligence and Automated Decision Systems* (IEEE, 2025) focuses on procuring commercial AI products and services within a contractual framework, excluding development done in house or acquirer-supplier development.

With a plethora of approaches, use cases, contexts, and risks, organizations navigating AI acquisition must start with a solid understanding of the mission need and requirements of the operational environment, context, and constraints. In addition, they must have a solid grasp of the risks and uncertainties inherent in AI development and operational use. To speed the innovation and adoption of AI capabilities, blending this knowledge with the streamlined requirements of the SWP will provide a foundation for the rapid delivery of effective capability to the warfighter.

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