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Evaluating Digital Modernization

Enhancing Analytical and Decision Support in
Department of Defense Acquisition Management



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About This Report

The Department of Defense (DoD) is actively pursuing digital acquisition, a strategic objective that aims to enhance acquisition outcomes by leveraging digital technologies and methodologies.¹ By integrating digital capabilities into its acquisition processes, DoD aims to bolster its operational effectiveness and maintain a competitive edge in an increasingly complex and rapidly changing global security environment. The RAND National Defense Research Institute (NDRI) was asked to conduct an independent assessment of the digital acquisition effort in response to a request from Congress.

Congressional focus on digital acquisition has been evident for the past several years, with significant legislative impetus from Section 836 of the Fiscal Year 2021 National Defense Authorization Act. Section 836 mandates a comprehensive report and assessment of efforts toward achieving digital acquisition. Initially, the Defense Innovation Board (DIB) was tasked to perform an independent assessment due in July 2021, but DIB operations were suspended, and the DIB was unable to complete the assessment.² RAND was subsequently asked to conduct an independent assessment of DoD's digital acquisition efforts. This report documents the results of that assessment.

RAND National Security Research Division

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For more information on the RAND ATP Program, see www.rand.org/nsrd/atp or contact the director (contact information is provided on the webpage).

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¹ Executive Order 14347, signed September 5, 2025, authorized the use of Department of War as a secondary name for the Department of Defense. This publication refers to the secretary and department by their current statutory names under Public Law 81-216, National Security Act Amendments of 1949.

² An interim report was produced in September 2022. See Office of the Under Secretary of Defense for Acquisition and Sustainment, *Report on the Department of Defense's Digital Modernization of Analytical and Decision-Support Process for Managing and Overseeing Department of Defense Acquisition Programs*, U.S. Department of Defense, September 2022.

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Summary

The Department of Defense (DoD) is pursuing digital acquisition, a strategic objective aimed at enhancing acquisition outcomes by leveraging digital technologies and methodologies.¹ By integrating digital capabilities (e.g., automated data transfer, digital engineering, modeling and simulation) into its acquisition processes, DoD aims to accelerate the fielding of capabilities, increase agility, bolster its operational effectiveness, and maintain a competitive edge in an increasingly complex and rapidly changing global security environment.

Issue and Objective

Digital acquisition has the potential to accelerate the fielding of capabilities to the warfighter by improving information flows, streamlining review and decision-support processes, and tightening technology development through improved modeling and simulation.

Congress has prioritized digital acquisition for the past several years, notably through Section 836 of the Fiscal Year 2021 National Defense Authorization Act, which requires a comprehensive assessment of progress toward integrating digital technologies into DoD acquisition processes. In July 2024, RAND was asked to conduct an independent assessment of progress toward digital acquisition.² This report documents the assessment's findings.

Approach

Our research approach consisted of two primary activities: (1) a comprehensive review of strategies, policies, directive-type memorandums, research reports on related topics, and documentation of digital modernization activities and initiatives and (2) semi-structured discussions with stakeholders. Through the document review, we identified key initiatives spearheaded by OUSD(A&S) and other relevant stakeholders. Additionally, the stakeholder discussions captured detailed insights into the specific activities that various DoD organizations are engaged in to support digital modernization efforts, which include changes to business processes, as well as the challenges they face in executing these activities. These results yield a comprehensive perspective on the state of DoD digital acquisition, enabling us to identify both successes to date and opportunities for further progress.

¹ Executive Order 14347, signed September 5, 2025, authorized the use of Department of War as a secondary name for the Department of Defense. This publication refers to the secretary and department by their current statutory names under Public Law 81-216, National Security Act Amendments of 1949.

² An interim report was produced in September 2022. See Office of the Under Secretary of Defense for Acquisition and Sustainment (OUSD[A&S]), *Report on the Department of Defense's Digital Modernization of Analytical and Decision-Support Process for Managing and Overseeing Department of Defense Acquisition Programs*, U.S. Department of Defense, September 2022.

Findings and Recommendations

DoD has made significant progress in governing acquisition data. This progress has included identifying a core set of data needed for managing and overseeing acquisition programs, understanding the performance of the acquisition system both as a whole and within individual acquisition pathways, creating data standards, and aligning Office of the Secretary of Defense (OSD) and service acquisition data. In another area of progress, DoD is using and analyzing acquisition data in important applications that support decisionmaking. These include life-cycle management, digital engineering, modeling and simulation, automated reporting, and Integrated Acquisition Portfolio Reviews.

The analysis identified the following opportunities for further progress going forward:

- *DoD lacks an up-to-date, overarching strategy for digital acquisition.* DoD should develop, publish, and maintain a digital acquisition strategy that defines terms, goals, roles, and responsibilities. An updated strategy focused on digital acquisition should articulate the desired future state, provide guidance, and enable collaboration and coordination across the DoD enterprise.
- *There is no single owner of digital acquisition policy and strategy.* Implementation of the strategy requires a single senior leader to own both the digital acquisition–related policies and strategy. A single owner would coordinate the digital transformation in acquisition with technological changes in other areas (requirements generation, budgeting, operations). The Under Secretary of Defense for Acquisition and Sustainment is the leadership position that most aligns with ownership of digital acquisition since that office (OUSD[A&S]) is responsible for acquisition and sustainment policy and outcomes across the enterprise. This office would also be responsible for coordinating digital acquisition activities within OSD and the services.
- *Leadership support and engagement have not been consistent.* While there are numerous directives and memorandums on data and digital acquisition–related activities, follow-up and enforcement have been lacking. The digital acquisition strategy requires sustained leadership engagement and support to make progress, with focused attention on boosting demand for digital products. Related policies, strategies, and processes in other functional areas must also be owned by relevant senior leadership in those areas.
- *Digital acquisition stakeholders are working in a stovepiped manner, increasing the likelihood of duplicative work.* DoD should increase coordination across stakeholders by officially chartering the Acquisition Visibility Steering Group and Acquisition Visibility Working Group (established and led by OUSD[A&S] to govern acquisition data with participation of the services) to provide more-formal authority to coordinate digital modernization activities related to acquisition. There have been other forums, both formal and informal, that are trying to improve coordination and collaboration, including the initial implementation of capability portfolio management and associated requirements, technology, and acquisition reviews.
- *There is a lack of reliable and consistent funding for both the information technology infrastructure required for digital acquisition and specific applications.* Staffing constraints were also noted by some stakeholder organizations. DoD should prioritize digital acquisition, recognizing it will take years of continued resources to fully implement.

- *There is no metric or measurement system to track progress toward digital acquisition. DoD should develop a maturity model tailored to digital acquisition to track the effort's progression. Metrics to measure progress should include both digital acquisition capabilities and outcome and mission indicators that provide insight into whether the application of digital acquisition capabilities is having the desired effect.*
- *The defense acquisition workforce is improving its digital literacy, but additional training and upskilling are required.*
- *There remain cultural barriers to sharing data across organizational and functional boundaries. For the most part, these barriers are more important than the technical barriers that constrain progress in moving toward digital acquisition.*
- *Efforts thus far have focused on acquisition category I defense programs; smaller programs lack the necessary attention to match progress. DoD should expand digital acquisition's footprint to all defense acquisition programs. The services have digitized the acquisition data for smaller programs. Broadly sharing these data, perhaps eventually storing them in a single authoritative database, supports many enterprisewide use cases, such as capability portfolio management.*

Pursuing these opportunities, as well as other changes necessary to move acquisition processes and practices toward a more data-driven digital environment, should be carefully thought out and incremental (i.e., change a few things at a time across the enterprise) even while the goal is a more radical transformation. Accounting for the factors affecting lasting institutional change through the application of a change management framework can help ensure and sustain institutional change.

Contents

About This Report.....	iii
Summary	v
Figures and Tables	ix
CHAPTER 1.....	1
Background and Context on Digital Acquisition.....	1
What Is Digital Acquisition?.....	1
Why Is Digital Acquisition Necessary?.....	2
How Is Digital Acquisition Achieved?	3
Congressional Focus on Digital Acquisition.....	4
Objective and Research Approach	4
Organization of This Report	5
CHAPTER 2.....	6
Summary of Digital Modernization Activities in Acquisition.....	6
Categorization of Digital Modernization Activities	6
CHAPTER 3.....	17
Digital Acquisition Use Cases	17
Use Case 1: Capability Portfolio Management	17
Use Case 2: Digital Engineering.....	20
Use Case 3: Implementing Executive Orders and Congressional Acts on Acquisition Reform	22
Use Case 4: Advanced Technology Adoption.....	24
Use Case 5: Air Force’s Digital Materiel Management	26
Common Themes: Potential Benefits, Constraints, and Enablers	27
CHAPTER 4.....	29
Assessment of Progress.....	29
Assessment Overview	29
Digital Acquisition Progress	30
Gaps and Opportunities	31
CHAPTER 5.....	37
Recommendations	37
Implementation Considerations.....	41
APPENDIX A.....	43
Digital Modernization Catalog.....	43
APPENDIX B	46
FY 2021 NDAA Section 836.....	46
Abbreviations	51
Bibliography	53

Figures and Tables

Figures

Figure 2.1. Flow of Digital Modernization Activities, by Category 8
Figure 3.1. Strategic Goals and the AI Hierarchy of Needs 24
Figure 5.1. Example Graphic for Tracking Digital Acquisition–Related Initiatives 39
Figure 5.2. Example Change Management Framework 42

Tables

Table 2.1. Digital Modernization Activity Categories 7
Table 2.2. Strategy Activities, by Type 9
Table 2.3. Data Governance Activities 11
Table 2.4. Data Storage and Sharing Activities, by Type 13
Table 2.5. Data Analytics and Reporting Activities, by Type 14
Table 2.6. Workforce Activities, by Type 15
Table 4.1. Summary of Gaps and Opportunities 31

Background and Context on Digital Acquisition

The Department of Defense (DoD) is pursuing digital acquisition, a strategic objective that aims to enhance acquisition outcomes by leveraging digital technologies and methodologies.¹ This initiative aligns closely with the broader National Defense Strategy and the goals of the *Acquisition and Sustainment Data and Analytics Strategic Implementation Plan*.² By integrating digital capabilities into its acquisition processes, DoD aims to accelerate delivery of capabilities to the warfighter, increase the speed and agility of business processes, bolster its operational effectiveness, and maintain a competitive edge in an increasingly complex and rapidly changing global security environment.

Section 836 of the Fiscal Year (FY) 2021 National Defense Authorization Act (NDAA) mandates a comprehensive report and assessment of efforts toward achieving digital acquisition.³ An interim report was released in September 2022.⁴ In July 2024, RAND was asked to conduct an independent assessment of DoD's digital acquisition efforts. This report documents the findings of that assessment.

What Is Digital Acquisition?

There are several terms that are used in and around the effort of digital acquisition, including *digital modernization*, *digital transformation*, and *digital engineering*. However, these terms often lack clear and consistent definitions, including in research, policies, and DoD efforts to promote digital acquisition. We have relied on the literature and discussions with acquisition stakeholders to define these terms for use in our analysis as follows:

¹ Executive Order (EO) 14347, signed September 5, 2025, authorized the use of Department of War as a secondary name for the Department of Defense. This publication refers to the secretary and department by their current statutory names under Public Law 81-216, National Security Act Amendments of 1949.

² DoD, *2022 National Defense Strategy of the United States of America Including the 2022 Nuclear Posture Review and the 2022 Missile Defense Review*, October 2022; Office of Acquisition Enablers, *Acquisition and Sustainment Data and Analytics Strategic Implementation Plan*, Office of the Under Secretary of Defense for Acquisition and Sustainment, U.S. Department of Defense, December 2020.

³ Public Law 116-283, William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, January 1, 2021.

⁴ See Office of the Under Secretary of Defense for Acquisition and Sustainment (OUSD[A&S]), *Report on the Department of Defense's Digital Modernization of Analytical and Decision-Support Process for Managing and Overseeing Department of Defense Acquisition Programs*, U.S. Department of Defense, September 2022.

- *Digital acquisition* is the use of digital information, models, data, and analysis to improve acquisition workforce decisions, policies, functions, and processes.⁵ Digital acquisition includes the widespread use of *digital engineering*, the practice of “using and integrating digital models and the underlying data to support the development, test and evaluation, and sustainment of a system.”⁶
- *Digital modernization* is the process by which digital acquisition is achieved, and it encompasses a wide variety of activities, including the digitization of physical assets, the establishment of data standards to track programs and systems, the development of platforms to host and share data, the application of business intelligence tools to develop data visualizations, and the use of artificial intelligence (AI) and machine learning to uncover acquisition insights, among others. If digital acquisition is a desired state of DoD acquisition, digital modernization is the means to attain that state.
- *Digital transformation* refers more broadly to the cultural and technological innovation that accompanies these digital modernization efforts. This transformation includes both the adoption of novel digital techniques and widespread organizational change regarding the practices of data sharing and data-driven decisionmaking.

Why Is Digital Acquisition Necessary?

The need to achieve digital acquisition is critical for the United States to keep pace with peer rivals, such as the People’s Republic of China, by streamlining business processes, improving decisionmaking, and accelerating delivery of capabilities to the warfighter. This urgent need has been highlighted by recent analyses from the Defense Business Board, Defense Innovation Board (DIB), and the Acquisition Innovation Research Center (AIRC),⁷ all of which stress the need to prioritize digital acquisition within DoD. Digital acquisition is expected to help accelerate and improve decisionmaking through data sharing and analytics.

Digital acquisition goals are ambitious, aiming to transform DoD’s acquisition processes through digital modernization. One primary objective is to integrate all aspects of the Defense Acquisition System (DAS), including research and development, test and evaluation, acquisition, sustainment, and enablers, such as digital engineering and workforce training. By creating a cohesive and interconnected system, DoD aims to enhance efficiency and ensure that each phase of the acquisition life cycle is seamlessly aligned with the others. Digital acquisition also has the potential to improve information flows and analytics and to streamline review and decision-support processes, thereby accelerating delivery of new capabilities to the warfighter.

⁵ Our definition is based on briefing material from the Acquisition Visibility Working Group (AVWG).

⁶ Department of Defense Instruction (DoDI) 5000.97, *Digital Engineering*, Office of the Under Secretary of Defense for Research and Engineering, U.S. Department of Defense, December 21, 2023, p. 8.

⁷ AIRC is a multi-university partnership led by the Stevens Institute of Technology and sponsored by DoD through its Systems Engineering Research Center—a DoD university-affiliated research center (UARC).

Digital acquisition also aims to transition acquisition processes from analog to digital.⁸ This shift is expected to streamline operations, reduce redundancies, and enable more agile and responsive decisionmaking. By digitizing workflows, DoD can improve data accuracy and accessibility, which are essential for timely and informed decisionmaking across various levels of the organization. Enhanced accessibility and interoperability are also key goals, because they ensure that systems and platforms can communicate effectively, thereby facilitating smoother collaboration both within DoD and with external partners.

Finally, a critical objective of digital acquisition is to support a variety of use cases that require a digital environment to accomplish. For example, DoD is pursuing data-driven capability portfolio management (CPM).⁹ CPM is intended to revolutionize how DoD oversees its diverse range of programs and projects. By leveraging advanced data analytics, DoD can make more-strategic decisions about resource allocation, risk management, and program prioritization. CPM not only enhances decisionmaking but also supports DoD's broader goals of maintaining operational readiness and technological superiority. CPM has the potential to more clearly link resource, capability development, and acquisition decisions to operational effects.

Another use case is DoD's adoption of digital engineering. DoDI 5000.97 requires major weapon system program offices to implement digital engineering to the maximum extent practical. To accomplish this, a digital ecosystem is required. These use cases, along with others, are outlined in Chapter 3.

How Is Digital Acquisition Achieved?

Digital acquisition requires the following critical steps that DoD has completed or is working on to various degrees:

- Establish **strategy** to guide the digital acquisition journey.
- Engage and sustain **leadership** to create demand, use cases, and accountability.
- Develop **data governance** to ensure standardization, quality, and trust.
- Create **data storing and sharing** across the enterprise.
- Advance **data analytics and reporting** for analysts and decisionmakers.
- Train and enable the **workforce** in digital acquisition best practices.

These steps—the enablers of digital acquisition—provide the framework for this analysis.

While it is possible to define and describe a *digital acquisition end-state* (i.e., the widespread use of data and digital tools to support acquisition-related analysis and inform decisionmaking), it is also important to acknowledge that that end-state reflects a set of technologies and applications at a given point in time. The digital acquisition end-state is dynamic, with capabilities and applications reflecting

⁸ In this context, *analog* refers to processes that are not digital or not computerized.

⁹ CPM is an acquisition approach designed to optimize the management and development of defense capabilities across various domains and services. CPM is closely related to concepts of mission engineering, which replaces traditional weapon categories in favor of flexible categories based on function. In theory, it will allow DoD to more effectively manage its wide array of defense capabilities. See Department of Defense Directive (DoDD) 7045.20, *Capability Portfolio Management*, Office of the Under Secretary of Defense for Acquisition and Sustainment, U.S. Department of Defense, September 25, 2023.

available technologies, threats, emergent policy or process issues requiring decisions, and leadership preferences.

Congressional Focus on Digital Acquisition

DoD has been actively pursuing digital acquisition efforts to enhance its capabilities in managing and overseeing acquisition programs since the 1990s. A significant legislative push in this direction came from the FY 2021 NDAA, specifically Section 836,¹⁰ which mandates a comprehensive report and assessment of these digital modernization efforts. The primary aim of this mandate is to improve analytical and decisionmaking processes across DoD's acquisition landscape, ensuring that DoD remains agile and efficient in meeting its strategic objectives. This initiative was expected to provide valuable insights into how DoD could best leverage digital technologies to streamline and enhance its acquisition processes. The responsibility for conducting the assessment was eventually transferred to OUSD(A&S), which asked RAND to conduct this independent assessment of DoD's digital modernization efforts.¹¹

More-recent congressional interest in the digital transformation of acquisition is reflected in the introduction of the FoRGED and SPEED Acts.¹² Similarly, EO 14265, "Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base," mandates policy and process changes, as well as reviews that will require digital capabilities.¹³ These legislative and executive branch proposals and mandates make changes in acquisition-related policies, programs, and organizations best enabled in a digital environment.

Objective and Research Approach

The objective of this research is to conduct an independent assessment of DoD's digital modernization of analytical and decision-support processes for managing and overseeing DoD acquisition programs in response to the FY 2021 NDAA Section 836. This report is written in response to paragraph (f)(2) in Section 836—conduct a second, independent assessment of the progress toward digital acquisition.¹⁴

Our research approach consists of two primary activities: (1) a comprehensive review of strategies, policies, directive-type memorandums, research reports on related topics, and documentation of digital modernization activities and initiatives and (2) discussions with stakeholders. Through this review, we identified the key initiatives spearheaded by OUSD(A&S) and other relevant stakeholders. Our analysis of sponsor-provided sources, not all of which are publicly available or formally published

¹⁰ For reference, Section 836 is reproduced in Appendix B of this report.

¹¹ OUSD(A&S) produced an interim report in September 2022. See OUSD(A&S), 2022.

¹² U.S. Senate, Fostering Reform and Government Efficiency in Defense (FoRGED) Act, S.5618, December 19, 2024; U.S. House of Representatives, Streamlining Procurement for Effective Execution and Delivery (SPEED) Act, H.R.3838, August 19, 2025.

¹³ EO 14265, "Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base," Executive Office of the President, April 9, 2025.

¹⁴ See Appendix B for the complete text.

(e.g., AVWG briefings) and other cited sources informs the data catalog (described in Appendix A) and the summary tables in Chapter 2. These initiatives and activities represent the foundational steps taken as of August 2025 to advance digital modernization of acquisition processes, highlighting DoD's strategic direction and priorities.

In addition to the broad document review, we conducted semi-structured interviews with stakeholders responsible for elements of the digital modernization effort. These interviews were designed to capture detailed insights into the specific activities that stakeholders are engaged in to support digital modernization efforts, as well as the challenges they face in executing these activities. A focus on use cases helped to structure our interviews. By engaging directly with stakeholders, we were able to gather qualitative data that enrich our review of digital modernization activities and provide an appreciation for the obstacles these stakeholders face. The dual approach of reviewing documentation and conducting interviews provides a comprehensive perspective on the current state of digital modernization, enabling the identification of both successes to date and opportunities for further growth in digital acquisition capabilities.

The results of this research include an authoritative (though not comprehensive) list of past and ongoing acquisition-related digital modernization initiatives and activities captured in a data catalog, a summary of some digital acquisition use cases, and identification of gaps and opportunities that can inform next steps.

There are limitations to our research that are important to note. Firstly, we could not hold discussions with every internal and external stakeholder, so it is possible that we missed a perspective or did not fully capture all relevant activities and challenges. Secondly, with a research area as broad and complex as digital acquisition, it is impossible for the research to be entirely comprehensive. There are digital modernization efforts occurring across multiple organizations at various levels, and we are unable to include everything. This topic area is fast paced and constantly changing. Thirdly, it is difficult to determine the exact status of many of the initiatives identified during our analysis. We assess these initiatives to the best of our knowledge and ability.

Organization of This Report

This report provides results from the analysis intended to fulfill the mandate of Section 836 of the FY 2021 NDAA for an independent assessment of DoD's progress in moving toward digital acquisition. Chapter 2 outlines current initiatives being undertaken by DoD. Chapter 3 summarizes several digital acquisition use cases. Chapter 4 provides an assessment of gaps and opportunities of the current state of acquisition-related digital modernization. Chapter 5 outlines recommendations for digital acquisition progress. Appendix A describes the data catalog of digital acquisition initiatives in more detail. Appendix B contains the text of FY 2021 NDAA Section 836.

Summary of Digital Modernization Activities in Acquisition

This chapter outlines a list of policies, platforms, standards, digital environments, and other activities and initiatives that move DoD toward achieving digital acquisition. These can be broadly characterized as digital modernization activities. Major digital modernization activities include the implementation of data standards for the Adaptive Acquisition Framework (AAF), the shift to Modernized Selected Acquisition Reports (MSARs), the adoption and integration of new digital platforms, and research conducted by federally funded research and development centers (FFRDCs) and UARCs. While some of these efforts are led and initiated by the armed services (i.e., the U.S. Air Force, Space Force, Army, Navy, and Marine Corps), others are funded and coordinated by organizations within the Office of the Secretary of Defense (OSD), including OUSD(A&S), Office of the Under Secretary of Defense for Research and Engineering (OUSD[R&E]), and the Chief Digital and Artificial Intelligence Office (CDAO).

Categorization of Digital Modernization Activities

DoD has pursued a state of digital acquisition for several decades prior to the more recent introduction of the formal term. These efforts have been wide-ranging, including the establishment of data governance standards, the development of digital engineering systems-of-systems, and the creation of novel acquisition management paradigms.

We reviewed numerous government-furnished information documents to develop a catalog of existing digital modernization activities and assess DoD progress toward a state of digital acquisition. A description of the compiled data catalog, as of May 2025, is included in Appendix A. Note that the catalog was first developed using a collection of OUSD(A&S) digital acquisition initiatives and consequently contains more OUSD(A&S) efforts compared with those of the services, the Fourth Estate, or other OSD organizations. We recognize that this catalog of activities does not capture all of the digital acquisition activities across DoD, but it contains enough information to inform our assessment.

For this analysis, we drew on the *Acquisition and Sustainment Data and Analytics Strategic Implementation Plan*,¹⁵ as well as documentation from the OUSD(A&S)-led Acquisition Visibility Steering Group (AVSG) and AVWG to group each digital modernization activity into one of five primary categories. These five categories are described in Table 2.1.

¹⁵ See Office of Acquisition Enablers, 2020.

Table 2.1. Digital Modernization Activity Categories

Category	Description	Relevance
Strategy	Activities that provide guidance, vision, and implementation protocol for the digital modernization of acquisition, including policies, directives, working groups, and strategy documents	Strategic leadership and policies are necessary to promote, guide, and oversee digital modernization efforts.
Data governance	Activities that establish, promulgate, and implement data standards, data definitions, and data security measures	Data standards, definitions, and security measures are foundational to enabling secure data-driven insights across the acquisition enterprise, including leadership insight into the health of programs, portfolios, and the DAS as a whole.
Data storage and sharing	Activities related to the digital storage and sharing of acquisition data, including the integration and modernization of databases	Data must be stored in digital platforms and shared via APIs to enable enterprise-level analytics.
Data analytics and reporting	Activities that apply analytical and visualization techniques to draw insights from data and/or report data to key decisionmakers	Data analytics transform data into visualizations and metrics that are used to inform key leadership decisions.
Workforce	Activities that support digitally upskilling the current workforce and attracting new talent	Developing a digitally educated and data-oriented workforce is foundational to DoD's digital modernization efforts, which require both cultural buy-in and technical know-how.

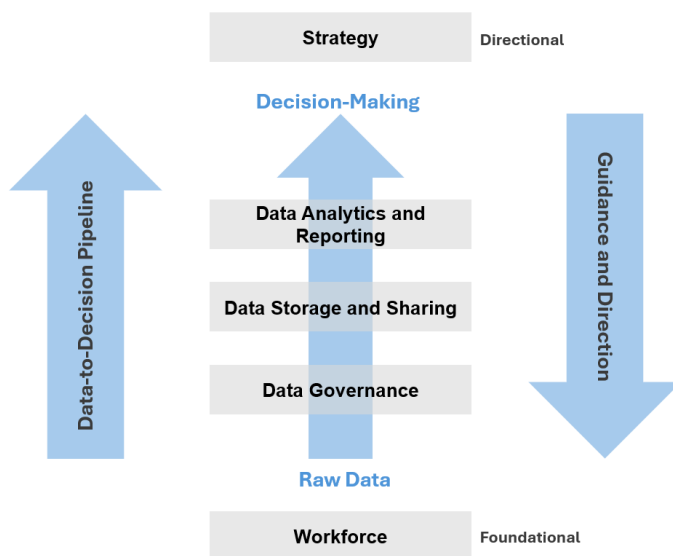
SOURCE: Authors' analysis of data from Office of Acquisition Enablers, 2020, as well as AVWG and AVSG documentation.

NOTE: API = application programming interface.

These five categories of digital modernization activities closely correspond to stages in the *data-to-decision pipeline*, the process by which raw data are transformed into a strategic asset for decisionmakers.¹⁶ Once generated and collected, data must be digitized and digitally stored, secured, standardized, shared, and analyzed and visualized. Three of the digital modernization categories—*data governance*, *data storage and sharing*, and *data analytics and reporting*—describe this data-to-decision process. The remaining two categories of digital acquisition activities represent unique efforts that provide support and directional guidance for the pipeline. Activities categorized as *strategy* provide vision and direction to the entire data-to-decision process and should be viewed as a feedback loop providing guidance and direction back down the flow. Activities categorized as *workforce* serve as foundational components of the pipeline, equipping employees with crucial data skills and knowledge. Figure 2.1 depicts the flow of this process and the position of each of the five digital modernization activity categories.

¹⁶ Office of Acquisition Enablers, 2020.

Figure 2.1. Flow of Digital Modernization Activities, by Category



SOURCE: Authors’ analysis of data from the Office of Acquisition Enablers, 2020, and AVWG and AVSG documentation.

The subsequent sections in this chapter provide a sample of key activities that fall under each of the five digital modernization activity categories. Each activity is listed along with the *type* of activity it represents (e.g., policy, data standard, working group, data platform), the office of primary responsibility (OPR), and a brief description.

While the majority of digital modernization activities fall within the five categories discussed here, we also identified a collection of efforts that fell outside these domains. These innovative digital modernization efforts entail the research or exploration of novel digital practices in acquisition, including new software, partnerships, programs, platforms, and strategic frameworks. Many of these innovative activities support all or multiple levels of the data-to-decision pipeline, not just a single stage of the process. These types of activities are identified and discussed later in this chapter.

Strategy

Digital acquisition efforts are guided by a body of strategic documents, including but not limited to the 2018 *Department of Defense Digital Engineering Strategy*, DoD’s 2020 *Digital Data Strategy for Acquisition and Sustainment*, the 2020 *Acquisition and Sustainment Data and Analytics Strategic Implementation Plan*, OSD’s 2021 “Creating Data Advantage” memorandum, and the 2023 memorandum from the Under Secretary of Defense for Acquisition and Sustainment providing “Guidance on Acquisition Data for Managing and Overseeing Department of Defense Acquisition Programs.” These documents provide strategic-level guidance on the vision and direction of the digital acquisition movement. More-recent publications containing strategic recommendations include DIB’s 2024 report on *Building a DoD Data Economy* and the Defense Business Board’s 2024 assessment on

Creating a Digital Ecosystem across DoD. These documents emphasize the urgent need to modernize DoD’s digital management and analytic capabilities.

Research publications from FFRDCs and UARCs also provide suggestions on the direction to take for the digital modernization of defense acquisition. One such organization is AIRC, which was established by Congress to strategically promote and explore innovative acquisition practices through partnerships with U.S.-based universities. AIRC regularly publishes reports and develops new technical methods for the advancement of CPM, mission engineering, digital engineering, digital transformation, and the requirements process. AIRC’s 2024 report *Implementing the DoD’s Digital Data Strategy for Acquisition and Sustainment* and recommendations from various FFRDCs (e.g., RAND National Defense Research Institute, MITRE, Institute for Defense Analysis) also support innovative digital acquisition practices through research on digital engineering, information access, Joint Capabilities Integration and Development System reform,¹⁷ and the planning, programming, budgeting, and execution (PPBE) process.

In addition to strategic documentation, guidance and coordination have been provided through the acquisition visibility (AV) governance structure, which consists of the AVSG and the AVWG. These groups were established in 2014 and have included participation from stakeholders with equities in or responsibilities for acquisition data, such as the services, OUSD(A&S), OUSD(R&E), and the Force Structure, Resources, and Assessment Directorate (J-8). Together, the AVWG and the AVSG have provided strategic and implementation guidance for acquisition functions on digital modernization efforts, and they play a key role in establishing and promoting acquisition-wide data standards. The AV governance structure has complemented the Cost Assessment and Program Evaluation (CAPE)–led Analysis Working Group (AWG), which tracks new and innovative acquisition-related analytical practices.

Table 2.2 outlines a nonexhaustive list of digital modernization activities categorized under strategy, by type of activity.

Table 2.2. Strategy Activities, by Type

Activity Type	Activity	OPR
Strategy document	2018 Artificial Intelligence Strategy	DoD
	2018 Digital Engineering Strategy	DoD
	2019 Digital Modernization Strategy	DoD
	2020 DoD Data Strategy	DoD
	2020 DoD AI Ethical Principles	DoD
	2022 National Defense Strategy	DoD
	Strategic Management Plan	DoD
	2023 Data, Analytics, and Artificial Intelligence Adoption Strategy	CDAO
	Acquisition Digital Data Strategy	OUSD(A&S)
	2020 Acquisition and Sustainment Data and Analytics Strategic Implementation Plan	OUSD(A&S)
	2022 Acquisition and Sustainment Goals and Priorities	OUSD(A&S)

¹⁷ The requirements process has been revised. See OSD, “Reforming the Joint Requirements Process to Accelerate Fielding of Warfighting Capabilities,” memorandum for senior Pentagon leadership, commanders of Combatant Commands, and defense agency and DoD field activity directors, U.S. Department of Defense, August 20, 2025.

Activity Type	Activity	OPR
Research	Establishment of AIRC	OUUSD(A&S)
	Defense Business Board: DoD Digital Ecosystem	OSD
	DIB: DoD Data Economy	OSD
	Digital Acquisition Roadmap	OUUSD(A&S)
	Implementing the DoD’s Digital Data Strategy for A&S	OUUSD(A&S)
Working group	AVSG activities	OUUSD(A&S)
	AVWG activities	OUUSD(A&S)
	AWG activities	CAPE
Policy	2021 Creating Data Advantage memorandum	OSD
	Data Transparency memorandum	OUUSD(A&S)
	Guidance on Acquisition Data	OUUSD(A&S)

Data Governance

The primary framework used to standardize acquisition data is the Acquisition Visibility Data Framework (AVDF), an authoritative source of data definitions, standards, sources, use cases, data owners, and other metadata established by OUUSD(A&S) and its predecessor, the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, as early as 2013. Within the AVDF are standards for each of the six adaptive acquisition pathways and fields related to key acquisition data, including schedule, performance, contracts and earned value management (EVM), and operating and support cost. Acquisition data standards are fundamental for acquisition processes; they enable CPM, the Defense Acquisition Executive Summary (DAES), MSARs, pathway reporting and evaluation, and advanced analytics, as well as a range of other crucial capabilities. The services have made efforts to align their acquisition platforms (e.g., the Air Force’s Program Management Resource Tools [PMRT], the Army’s PMRT, and the Navy’s Research Development and Acquisition Information System) with the standards in the AVDF; the services’ efforts to comply with the 2023 guidance on acquisition data are ongoing.¹⁸

New data standards, including standards to track sustainment; nuclear command, control, and communications (NC3); and foreign military sales (FMS), have been incorporated into the AVDF. The AVDF has also expanded to include new data categories and elements, including the Low-Rate Initial Production (LRIP) data fields and the Joint Capability Area (JCA) for enabling CPM. New data standards have also been introduced to track programs and weapon systems, such as the Centralized Unique Program Identification (CUPID) acquisition program number (PNO), established by the Assistant Secretary of Defense for Acquisition (ASD[A]) to track unique programs, and the Centralized Unique Systems Identification (CUSID), an initiative established by the Assistant Secretary of Defense for Sustainment (ASD[S]) to track unique weapon systems. Table 2.3 outlines digital acquisition activities categorized under data governance—specifically, data standards.

¹⁸ William A. LaPlante, Under Secretary of Defense for Acquisition and Sustainment, “Guidance on Acquisition Data for Managing and Overseeing Department of Defense Acquisition Programs,” memorandum for secretaries of the military departments; Commander, U.S. Special Operations Command; and directors of DoD field activities, U.S. Department of Defense, September 22, 2023.

Table 2.3. Data Governance Activities

Activity	Description	OPR
FMS data standards and requirements	Data elements in the AVDF used to track FMS	OUUSD(A&S)
Sustainment data visibility efforts	Data definitions and standards established by ASD(S) to track sustainment metrics	OUUSD(A&S)
CUSID	Code used as a unique identifier for tracking weapon systems	OUUSD(A&S)
CUPID	Code or PNO that serves as a unique identifier for acquisition programs	OUUSD(A&S)
AAF pathway data standards	Data standards for each of the AAF pathways: MTA, MCA, UCA, SA, DBS, AoS	OUUSD(A&S)
IAPR cross-portfolio data requirements	An ongoing effort to define data requirements that span multiple portfolios in support of IAPRs	OUUSD(A&S)
E&ER data standards	Data standards in the AVDF to track E&ER	OUUSD(A&S)
MTA exportability data definitions	New data definitions to track exportability-related data for MTA, including Legacy System Sales, Planning for Foreign Sales, and Anti-Tampering Status	OUUSD(A&S)
Deferred LRIP and deliveries and expenditure data areas in the AVDF	New categories added to the AVDF	OUUSD(A&S)
RDAIS 3.0 mapping to the AVDF	Ongoing effort to map RDAIS 3.0 to the AVDF	Navy
PMRT mapping to the AVDF	Ongoing effort to map PMRT to the AVDF	Air Force
JCA and JCA taxonomy	Data fields used to categorize programs into a capability area and standardize language for CPM	Joint Staff

NOTE: AoS = acquisition of services; DBS = Defense Business System; E&ER = Energy/Supportability and Demand Reduction; IAPR = Integrated Acquisition Portfolio Review; MCA = major capability acquisition; MTA = middle tier of acquisition; RDAIS = Research Development and Acquisition Information System; SA = software acquisition; UCA = urgent capability acquisition.

Data Storage and Sharing

Data storage and sharing activities include the platforms and methods used to host and share acquisition data. The primary repository for acquisition data and applications is the Defense Acquisition Visibility Environment (DAVE). DAVE is an online portal that provides access to acquisition program information to support analysis, oversight, insight, and decisionmaking. DAVE was first released in 2017 and was designed to replace the legacy Defense Acquisition Management Information Retrieval (DAMIR) system. DAVE was developed with a focus on API access, prioritizing consistency, reusability, and adaptability. DAVE includes links to acquisition-related databases and reference materials, including the Acquisition Information Repository, the EVM database, and the AVDF.

Digital platforms used by the services to track acquisition programs are the primary sources of DAVE's data. The Navy relies on RDAIS, now updated and renamed RDAIS 3.0. The Air Force relies on the PMRT platform, which hosts an array of acquisition-related applications. In addition to the Air Force, the Army and Special Operations Command have also adopted the use of PMRT for acquisition management.

While a full list of the digital platforms, systems, and databases related to acquisition data is outside the scope of this assessment, AIRC has developed a technical catalog in its Acquisition Decision Landscape Model. The related report provides a strong foundation in framing the complexity and bounds of the acquisition decision space and a more comprehensive description of the acquisition data environment.¹⁹

In addition to the development of individual platforms, there are ongoing efforts to connect data across systems and platforms. The Resourcing to Requirements Data Dashboard effort is a Joint Staff initiative to link program requirements to acquisition budget data. This initiative crosses both functional and organizational boundaries to derive insight from across the DoD enterprise. Other activities are aimed toward creating interoperable system-of-systems environments across the program life cycle, integrating data and systems in the design, development, testing, production, and sustainment stages. Such activities are broadly referred to as *digital engineering*. The services are working to implement digital engineering across the life cycle of major weapon systems to improve design outcomes and speed time to delivery. In support of this effort, CDAO has developed the Open Data and Applications Government-owned Interoperable Repositories (OpenDAGIR) framework, which supports the rapid acquisition of digital technology and integration of contractor data. Meanwhile, FFRDCs and UARCs continue to support innovative digital engineering techniques and assessment through such research as AIRC's 2023 report *Acquisition with Digital Engineering* and RAND's 2024 report *The Impact of Digital Engineering on Defense Acquisition and the Supply Chain*.²⁰

Table 2.4 further outlines nonexhaustive digital acquisition activities categorized under data storage and sharing, by activity type.

¹⁹ Natalie Wells and Maegen Nix, *Implementing the DoD's Digital Data Strategy for Acquisition and Sustainment: Strategic Implementation Approaches and Options*, Acquisition Innovation Research Center, July 2024.

²⁰ Tom McDermott and Geoff Kerr, *Acquisition with Digital Engineering*, Acquisition Innovation Research Center, October 2023; Brittany Clayton, Obaid Younossi, Sarah W. Denton, Hilary Reininger, Angela Yun, David M. Adamson, Thao Liz Nguyen, Jonathan Roberts, Padmaja Vedula, Thomas Light, Augustine Bravo, Oluwatimilehin Sotubo, and Mohammad Ahmadi, *The Impact of Digital Engineering on Defense Acquisition and the Supply Chain: Insights from an Industry Survey*, RAND Corporation, RR-A2333-2, 2024.

Table 2.4. Data Storage and Sharing Activities, by Type

Activity Type	Activity	Description	OPR
Digital platform	Advancing Analytics (ADVANA) platform	DoD’s platform for data visualization and analytics; CDAO-administered platform	CDAO
	DAVE	An online portal that provides access to acquisition program data to support analysis, oversight, insight, and decisionmaking; host of the Acquisition Information Repository and the EVM databases; replacement for the legacy DAMIR system	OUSD(A&S)
	PMRT	A digital platform used by the Air Force, Army, and the Special Operations Command to input, store, and analyze acquisition program data	Air Force
	RDAIS	A digital platform used by the Navy to collect, store, and analyze acquisition program data; upgraded from RDAIS 2.0 to RDAIS 3.0.	Navy
Framework	CDAO data mesh principles	A federated framework for managing and sharing data in which data owners take responsibility for cleaning, governing, and making data accessible to other parties in the larger data ecosystem	CDAO
	OpenDAGIR	A CDAO framework that supports the rapid acquisition of digital technology and integration of contractor data	CDAO
Software	Digital engineering efforts	Initiatives within the services and OUSD(R&E) to create interoperable system-of-systems environments across the program life cycle, integrating data and systems in the design, development, testing, production, and sustainment stages	Services OUSD(R&E)
	ADVANA and DAVE integration with service-level platforms	APIs used to push acquisition data from the services’ digital platforms to ADVANA and DAVE	Services
	Resourcing to Requirements Data Dashboard	Joint Staff initiative working to link program requirements to acquisition budget data	J-8
Research	FFRDC and UARC digital engineering research	FFRDC and UARC research that has extended and promoted the conceptual and actual capabilities of digital engineering	Services OUSD(A&S) OUSD(R&E)

Data Analytics and Reporting

ADVANA serves as DoD’s federated analytic and visualization platform. ADVANA pulls acquisition information from DAVE, PMRT, RDAIS, and other authoritative sources via APIs to support analysis and decisionmaking. ADVANA hosts a wide variety of acquisition-related applications and dashboards, including visualizations that support CPM, dashboards that report on the health of programs and AAF pathways, Strategic Management Pulse Metrics dashboards, the DAES application, and reporting functions for the Deputy’s Management Action Group (DMAG). ADVANA also hosts a handful of congressional applications, which give lawmakers access to current and historical MSARs and Selected Acquisition Reports and insight into MTA programs.

In support of such acquisition data analytics, the Acquisition Analytics Forum has provided coordination and collaboration between acquisition functions, including the standardization of metrics and measurements and the sharing of best analytic practices in ADVANA. This forum has relied on the creation and promulgation of the AVDF data standards, without which analyses cannot be conducted.

While there are many data analytics and reporting activities across OSD and the services, integration and interoperability remain a challenge. DoD has chosen ADVANA as the single enterprise data platform; however, there are challenges to managing data pipelines and visualizations within ADVANA that reduce the agility and responsiveness of the existing acquisition data environment.

Table 2.5 outlines a nonexhaustive list of digital acquisition activities categorized under data analytics and reporting, by activity type.

Table 2.5. Data Analytics and Reporting Activities, by Type

Activity Type	Activity	Description	OPR
Working group	Acquisition Analytics Forum	Forum that has provided coordination and collaboration between acquisition functions, including the standardization of metrics and measurements and the sharing of best analytic practices in ADVANA	OUSD(A&S)
	Transition Tracking Action Group	OUSD(R&E) group that has tracked technology transitions through the use of data analytics policy	OUSD(R&E)
Dashboard	AAF pathway analytics	ADVANA dashboards for SWP, UCA, MTA, MCA, DBS, and AoS pathways	OUSD(A&S)
	ADVANA dashboards	Dashboard to track FMS; dashboard to assist with IAPR reporting	OUSD(A&S)
Research	FFRDC and UARC data analytics research	AIRC data analytics research: portfolio performance analysis and visualization; the DARCIE platform	OUSD(A&S)

Activity Type	Activity	Description	OPR
Application	DAES application	An ADVANA-based application for the DAES report	OUSD(A&S)
	Congressional applications	A suite of congressional applications housed in ADVANA that provides Congress with access to acquisition data, including Selected Acquisition Reports and AAF pathway data	OUSD(A&S)

NOTE: DARCIE = Defense Acquisitions Research, Collaboration and Innovation Environment; SWP = Software Acquisition Pathway.

Workforce

There are a variety of activities across DoD supporting the development of a digitally skilled workforce.

Acquisition Policy and Innovation has collaborated with AIRC and university partners to develop the Defense Civilian Training Corps (DCTC), a program that prepares university students to enter the acquisition workforce. DCTC provides a crucial pipeline for developing digital talent and evolving the DoD acquisition culture. Other efforts to upskill the acquisition workforce include the Air Force’s Digital University, which provides online training on data and technology; ADVANA University, an ADVANA-hosted educational tool; Defense Acquisition University (DAU) courses on data and analytics; and the Public Private Talent Exchange, which allows DoD personnel to spend time learning and upskilling in private industry.

Some initiatives aim to develop data-driven leadership, including the CDAO’s Executive Training series in data, analytics, and AI fundamentals; the Army’s Data Driven Leadership Certificate Program; and the Air Force Digital Transformation Office’s (DTO’s) Digital Facilitators Academy. Other activities include the CDAO’s Digital Talent Hub, which supports digital and data careers; the Air Force DTO’s Digital Agents of Change Program, which incentivizes the growth of digital skills; and the Defense Innovation Unit’s AI tool GigEagle, which helps match individuals with DoD work needs. Table 2.6 outlines a nonexhaustive list of digital acquisition activities categorized under workforce, by type.

Table 2.6. Workforce Activities, by Type

Activity Type	Activity	Description	OPR
Training program	CDAO Executive Training Series	Three-day training session that trains DoD leaders on data- and AI-related management techniques	CDAO
	ADVANA University	A pilot program led by Digital University and the ADVANA team to provide data and tech upskilling courses to DoD members	CDAO Air Force
	Digital University	An online educational platform run by the Air Force, which includes training courses on data, analytics, and AI	Air Force

Activity Type	Activity	Description	OPR
	DTO's Digital Facilitators Academy	Training program focused on developing digital leadership skills	Air Force
	DCTC	AIRC and university partner program to train undergraduates for careers in DoD acquisition	OUSD(A&S)
	Army's CMU Data-Driven Leadership Course	A certificate program designed to train DoD personnel for data-oriented leadership	Army
Digital platform	Digital Talent Hub	A digital platform to assist DoD personnel with careers in data and AI	CDAO

NOTE: CMU = Carnegie Mellon University.

As mentioned above, there are other digital modernization activities that fall outside the scope of the five categories in our analysis. Nevertheless, these activities support the development of a digitally enabled acquisition process. A number of these programs are uniquely innovative in ways that support all parts of the data-to-decision pipeline, and many involve applications of generative AI. Some examples include the Defense Innovation Unit's AI-powered Digital OnRAMP, which helps match "tech products and services with business opportunities in the defense sector";²¹ CDAO's Tradewinds platform, which aims to "accelerate the adoption of artificial intelligence/machine learning, digital, and data analytics solutions";²² and the joint CDAO–Defense Innovation Unit AI Rapid Capabilities Cell.²³

²¹ Kristen Smith, "DIU Developing Digital Platform for Simplifying DoD Solicitations," ExecutiveGov, April 7, 2025.

²² CDAO, "Tradewinds: The CDAO's Acquisition Ecosystem," webpage, undated.

²³ "CDAO and DIU Launch New Effort Focused on Accelerating DoD Adoption of AI Capabilities," U.S. Department of Defense, press release, December 11, 2024.

Digital Acquisition Use Cases

Digital acquisition is a long-term journey and has a dynamic end-point; near-term goals and longer-term directions can be articulated and projected forward, but the actual path taken should be expected to change in response to changes in enabling technologies, evolving leadership questions and use cases, and lessons learned as digital modernization activities are implemented.

To illustrate the benefits of digital acquisition and the challenges of digital modernization activities, we have selected five acquisition use cases to outline: (1) CPM, (2) digital engineering, (3) AI and advanced analytics, (4) acquisition reform, and (5) weapon system life-cycle management. Our analysis of these use cases suggests that there are a common set of benefits, constraints or challenges, and enablers of digital acquisition. By focusing on these enablers, acquisition leadership can address the challenges inherent in many digital acquisition use cases, which will in turn enable the realization of expected benefits. In other words, properly facilitating the enablers of digital acquisition removes a common set of challenges constraining progress and unlocks an array of potential benefits of digital acquisition applications. Focusing on a specific use case will identify constraints and challenges that need to be addressed to implement that use case. Those constraints and challenges are common to the broader set of digital acquisition use cases.

Use Case 1: Capability Portfolio Management

DoDD 7045.20 defines CPM as an approach to prioritize requirements and allocate resources at the enterprise portfolio level. This is accomplished through robust analytic methods, which are enabled by digital acquisition. Per the directive, CPM will do the following:

- Drive strategic alignment across planning, requirements, technology, acquisition, sustainment, programming, budgeting, and execution.

- Be data driven.

- Be focused on maximizing capability effectiveness, enabled through mission integration management (MIM) and mission engineering, to advise DoD leadership on ways to optimize overall mission capability through managing strategy driven, achievable, and affordable capability portfolios that balance near-term and long-term objectives.

- ... frame DoD-level capability decisions in a mission context to ensure delivery of integrated and innovative risk-informed solutions to meet strategic objectives.²⁴

²⁴ DoDD 7045.20, 2023, pp. 3–4.

Achieving these policy goals requires a wide variety of digitized and structured information shared across multiple community, organizational, and functional boundaries.

Defining portfolios and implementing CPM are significant challenges. Any single mission area portfolio comprises potentially hundreds of systems or programs of various sizes in various stages of their life cycles and managed by different organizations within and across the services and other DoD components. Each of those systems may be part of multiple mission engineering threads (i.e., mission-essential tasks, also thought of as kill chains) within that mission area while potentially being part of mission engineering threads in multiple other mission areas. Such interconnectedness implies that a tremendous amount of data and information needs to be governed and managed across both organizational and functional boundaries. Digitizing CPM would improve the speed and quality of analysis and make the process more dynamic and responsive to leadership questions and decision contexts.

As of August 2025, current practice requires much of this to be done manually, which makes it a very labor-intensive process. There are three different organizations—the Joint Staff, OUSD(R&E), and OUSD(A&S)—performing portfolio reviews (e.g., Capability Portfolio Management Review [CPMR], Technology Modernization Transition Review [TMTR], IAPR), using different data, data calls, assumptions, and approaches that reflect processes on very different time frames (requirements, technology development, and acquisition). These organizations also define a portfolio differently, adding to the challenge of aligning both concepts and the data needed for analysis. Each review component of CPM tends to be unique to a mission area or specific questions and issues of interest. One way the data and complexity issues are addressed in current practice for IAPRs is to decompose the mission area portfolio into smaller groupings (e.g., all communications systems in a mission area), which makes the data issue more manageable.

Although called out in DoDD 7045.20, as of this writing, the Under Secretary of Defense (Comptroller)/Chief Financial Officer is not yet directly engaging with the CPM process, which means that the budgeting aspect of CPM is not currently captured. Similarly, the sustainment community is not integrated into CPM processes yet, although there is interest in doing so. The directive also states that the Chairman of the Joint Chiefs of Staff should synchronize CPMR, TMTR, and IAPRs and that the military departments should “provide data needed for IAPRs, TMTRs, CPMRs, and other CPM metric visualizations and roadmaps.” The directive includes multiple references to digital engineering and mission engineering or mission integration throughout, thus emphasizing the data-driven and mission area orientation aspects of CPM. It gives CDAO authority for providing data standard guidance.²⁵

There is also a separate memorandum of agreement (MoA) between the chair of the Joint Requirements Oversight Council, the Under Secretary of Defense for Research and Engineering, and the Under Secretary of Defense for Acquisition and Sustainment that mandates collaboration and data sharing to enable CPM.²⁶ The MoA establishes interim guidance for implementing CPM while a

²⁵ DoDD 7045.20, 2023, p. 12.

²⁶ Memorandum of Agreement Between the Under Secretary of Defense for Research and Engineering, Under Secretary of Defense for Acquisition and Sustainment, and Chair, Joint Requirements Oversight Council, U.S. Department of Defense, [on the Execution of Capability Portfolio Management within the Department of Defense,] July 2024.

formal DoD Instruction containing implementation guidance is being developed.²⁷ A 2023 memorandum from the Under Secretary of Defense for Acquisition and Sustainment directs the sharing of acquisition data across the enterprise to support data-driven processes and decisionmaking, a foundation of digital acquisition.²⁸ While the directive-style MoA and data sharing memorandum mandate or direct certain data sharing, there remain many institutional and cultural challenges to overcome to enable the needed collaboration.

Research conducted under AIRC developed a set of analytic tools intended to provide decision support and inform IAPRs. The prototype software demonstrated “mission engineering and portfolio optimization of an anti-surface warfare (ASuW) mission thread” in September 2022.²⁹

Additionally, the reform of the requirements process, including the establishment of a Mission Engineering and Integration Activity for the rapid advancement of mission engineering analysis,³⁰ offers an opportunity to apply digital modernization to the requirements process, which could help instantiate parts of CPM.

Challenges associated with CPM implementation to date include the following:

- *Uniqueness of portfolio issues and characteristics across mission areas and differences in leader and/or decisionmaker questions and preferences across organizations and over time as leadership turns over.* As a result, each CPM activity tends to be unique to a point in time associated with how the portfolio is defined and which stakeholder personnel are involved. That variation makes it difficult to institutionalize CPM practices in a way that makes them more enduring.
- *Lack of data transparency.* This includes acquisition data for small programs (acquisition category [ACAT] II–IV), constraints and external factors affecting concepts of operations or technology, requirements and budget-related data. In general, there is a lack of a central and standardized database or repository that stakeholders agree is the authoritative source for that set of data. Some of these data may exist at different organizations, but they are not visible and accessible to all CPM stakeholders.
- *Misaligned processes (acquisition, technology development, requirements, budget) among stakeholder communities (OUSD[A&S], OUSD[R&E], Joint Staff, Comptroller).* This misalignment includes the goals, timing (cycles and milestones or events), and stakeholder interests associated with those processes.
- *A lack of incentives to align those key processes,* as well as to create and share data associated with those processes.
- *Incompatible, inconsistent, or unaligned data governance, management, and analytics.* These include data policies setting collection, processing, and storage requirements; assumptions associated with those functions; and analytic methods. As a result, there is no standardization across data from different processes and organizations, no authoritative source of truth, and

²⁷ At the time of this writing (August 2025), the draft implementation guidance was in the approval process.

²⁸ LaPlante, 2023.

²⁹ Daniel A. DeLaurentis and Jitesh H. Panchal, *Data-Driven Capability Portfolio Management Pilot*, Acquisition Innovation Research Center, November 2022.

³⁰ See OSD, 2025.

no institutional mechanism to coordinate across organizations. This factor also makes integration and automation across organizational and functional boundaries difficult.

- *Lack of trust in and understanding of others' data.* This factor results from the lack of consistent data governance across datasets and organizations. As a result, the various stakeholders tend to make unique and separate data calls to gather data for analysis rather than importing or accessing an existing dataset.

These factors are not necessarily unique to the CPM use case, but they are common to many use cases and have been issues that DoD officials are aware of needing to be addressed as the department moves toward becoming a more data-driven, digital organization. That said, it is important to remember that CPM implementation is still in its infancy, and DoD is still learning how best to implement the concept. Most of these factors are not technical in nature; rather, they are institutional.

CPM connects acquisition data to mission effects. It uses acquisition data (cost, schedule, performance) in a different context, requires data not normally integrated or aligned with typical acquisition program data, and requires a degree of data sharing across organizational and functional boundaries that is not typical of historical practices.

Use Case 2: Digital Engineering

One primary use case of digital acquisition is the practice of digital engineering. Digital engineering is “a means of using and integrating digital models and underlying data to support the development, test and evaluation, and sustainment of a system.”³¹ DoD’s digital engineering journey started in 2018 with the original digital engineering strategy.³² The practice of digital engineering focuses on building models and tools that are interconnected across program office functions. There is an emphasis on establishing an authoritative source of truth, such that all stakeholders in the program (engineers, testers, budgeters, cost estimators, risk managers, etc.) are all working from the latest and best information about the system. Stakeholders outside the acquisition and program communities, including requirements and operators, may also use information in such a database. The implementation of digital engineering should take a balanced approach, not all or nothing.³³ Program offices must identify how digital engineering fits into their platform and determine the best path forward. In some cases, digital engineering activities should touch every phase of a system’s life cycle in order to maximize benefits, beginning in early concept development and continuing through sustainment of the system. Although many digital engineering investments are required early in the research and development phase, weapon system benefits (performance, cost, schedule, reliability) may not be experienced until much later, such as during the sustainment phase.³⁴ Digital artifacts, such as

³¹ DoDI 5000.97, 2023, p. 8.

³² Office of the Deputy Assistant Secretary of Defense for Systems Engineering, *Department of Defense Digital Engineering Strategy*, U.S. Department of Defense, June 2018.

³³ Defense Science Board, *Digital Engineering Capability to Automate Testing and Evaluation: Final Report*, Office of the Under Secretary of Defense for Research and Engineering, U.S. Department of Defense, May 2024.

³⁴ Many digital engineering pilot programs within DoD have yet to complete the full digital engineering arc, meaning that the programs are still in the design or production phases and have yet to reach sustainment where proposed benefits will come to fruition. There exist few examples of defense programs that claim cost or schedule savings as a result of digital engineering.

digital twins and digital threads,³⁵ will make this continuity across life-cycle phases possible. Configuration management and organization of these digital artifacts are critical to making this continuity possible. The actual application of digital engineering should be tailored to a program's characteristics. For instance, not every major system or subsystem needs a digital twin, but programs of every size and type should be digital at program initiation; digital engineering will need to be tailored to the program as part of its acquisition strategy, just like other business processes and tools.

Digital acquisition and digital engineering are distinct but deeply interconnected efforts. Both efforts aim to accelerate acquisition timelines and improve the quality of the fielded system through the use of data and analytics. However, while digital engineering focuses mostly on the technical domain of system design, production, and sustainment, digital acquisition encompasses the wider programmatic and decisionmaking aspects of these systems.

Digital acquisition and digital engineering are mutually dependent. Digital acquisition enables digital engineering by establishing the digital environments, tools, and governance required to conduct effective digital engineering. These environments create the infrastructure with which to house and accommodate digital engineering artifacts. In turn, digital engineering supports digital acquisition by generating model-based technical data with which to inform programmatic, cost, and scheduling decisions. Data generated by digital engineering also provide early insights into potential areas of technical risk. In their most mature state, digital acquisition and digital engineering work in tandem to rapidly deliver reduced cycle times and increased capability.

DoDI 5000.97 requires defense programs to plan for and incorporate digital engineering across the entire life cycle of a platform. This instruction provides the policy necessary to enforce the movement toward digital engineering. It enables program offices to dedicate resources to funding digital engineering efforts and establishing requirements for digital engineering artifacts from their contractors. DoDI 5000.97 also defines the organizations responsible for managing and overseeing digital engineering implementation. Digital engineering falls under the governance of the Under Secretary of Defense for Research and Engineering, even though some functional activities that touch digital engineering activities (e.g., contracting, sustainment) are outside the scope of the research and engineering community. The digital engineering initiative benefits from one organization owning related policy and guidance. The services are able to look to one organization for guidance, direction, best practices, data standards, and so on. They can also clearly communicate where they experience challenges in digital engineering adoption. Other key stakeholders are included in the policy, with roles and responsibilities clearly defined.³⁶

The digital engineering initiative has garnered significant momentum, with the defense acquisition community leaning into digital engineering practices. Much of the initiative's energy stems from the

³⁵ A *digital twin* is "a set of virtual information constructs that mimic the structure, context and behavior of an individual/unique physical asset . . . , is dynamically updated with data from its physical twin throughout its life cycle and informs decisions that realize value" (AIAA Digital Engineering Integration Committee, "Digital Twin: Definition & Value," American Institute of Aeronautics and Astronautics and Aerospace Industries Association, December 2020, p. 5).

A *digital thread* is "a collection of linked authoritative digital information pertaining to a process, product, or system, whose consistency is actively managed throughout the life cycle" (AIAA Digital Engineering Integration Committee, "Digital Thread: Definition, Value, and Reference Model," American Institute of Aeronautics and Astronautics, Aerospace Industries Association, and NAFEMS, June 2023, p. 5).

³⁶ DoDI 5000.97, 2023.

fact that industry has been a critical partner, often adopting digital engineering efforts before DoD mandated them. For many industry partners, advancing digital engineering practices is both a necessity and an inevitability. Digital engineering aligns with how the technical community is evolving, and organizations that delay adoption risk falling behind.

To support the transition to digital engineering, DoD, industry partners, and academia have participated in numerous working groups, forums, conferences, and workshops. These platforms enable stakeholders to share knowledge, discuss challenges, and share lessons learned. They also foster collaboration among participants to collectively advance digital engineering adoption.

That is not to say there are no challenges. Many program offices have communicated issues with tool interoperability, data classification, and workforce inexperience. The many benefits touted by DoD for digital engineering have not been well documented to date. On a survey conducted of government and industry partners supporting DoD-related projects, digital engineering “has not yet resulted in notable cost savings or schedule reduction, most benefits to date are anecdotal.”³⁷

The digital acquisition effort can take some lessons learned from the digital engineering effort. The policy behind digital engineering enables the enforcement of digital engineering practices from the OSD level down through the services. Clearly defining roles and responsibilities in the effort enables the acquisition community to better organize and take direction from the right groups. It enables those in charge to define requirements and best practices to implement digital acquisition. Energizing the program offices and industry partners to engage in digital acquisition practices will improve the likelihood for success in the long run. Finally, creating platforms for users and decisionmakers to share challenges and lessons learned in an open forum will help progress the digital acquisition initiative.

Use Case 3: Implementing Executive Orders and Congressional Acts on Acquisition Reform

There has been much discussion recently surrounding defense acquisition reform. This reform will likely touch all aspects of defense acquisition, including the requirements process, the PPBE process, and acquisition program reviews. Several recent EOs and congressional proposals directly call out the need for digital acquisition as part of reforming such processes or indirectly introducing ideas and activities that will require digital acquisition–related capabilities to implement.

EO 14265, “Modernizing Defense Acquisition and Spurring Innovation in the Defense Industrial Base,” sets a policy to “accelerate defense procurement and revitalize the defense industrial base” through reform of acquisition and requirements processes and the associated workforce.³⁸ From the digital point of view, this EO calls for a number of reviews that will require data, such as rightsizing a workforce with the appropriate skill sets, regulatory authorities, and major defense acquisition programs (MDAPs). There are both acquisition workforce data and MDAP acquisition data in existing structured and governed databases that can be tapped for parts of these reviews. Most regulations are also in digital form, which may facilitate that review. While the terms *digital* and *data* are not present in the EO’s language, the mandated reviews require various kinds of data.

³⁷ Clayton et al., 2024, p. vi.

³⁸ EO 14265, 2025.

Guidance for implementing EO 14265 will likely include digital acquisition–related mandates. For instance, improving system engineering through model-based system engineering (MBSE) and digital engineering requires datasets with the relevant content and readable and sharable formats. Creating a digital test and evaluation environment is another area that may be in the implementation guidance, particularly because this area is explicitly mentioned in Section 836 of the FY 2021 NDAA. In general, any policy or process reform mentioning data-driven decisionmaking, process alignment, interoperability, or integration requires digitized data in the appropriate format. Draft guidance implementing EO 14265 mentions modernizing system engineering through data and digital tools, as well as data-driven decisionmaking.³⁹

The FoRGED Act was introduced in the Senate in December 2024. The SPEED Act was introduced in the House of Representatives in June 2025. The bills are likely to be reconciled in the FY 2026 NDAA.⁴⁰

The FoRGED Act includes acquisition and requirements processes and organizational reforms emphasizing commercial practices, innovation, rationalized decisionmaking, and accelerated delivery of capabilities.⁴¹ Reform proposals include reducing statutory and regulatory reporting and other mandates that slow down the process, implementing portfolio management by changing the name of program executive officers (PEOs) to portfolio acquisition executives (PAEs) while increasing their authorities, attracting innovative commercial firms and increasing competition, and changing the budget structure and process to better enable portfolio management. Digital engineering and AI are mentioned directly in a paper describing the intent behind the FoRGED Act; the paper’s author outlines the overall reform concepts as activities or approaches that should be more widely used outside the current pilot programs, and data of various kinds (technical, management, etc.) are mentioned directly in the bill’s language.⁴² Data governance and management and making use of appropriate data to implement the proposed reforms are clearly implied as key enablers of change.

The SPEED Act also contains reforms on the requirements and acquisition processes, as well as regulatory streamlining, but its emphasis is more on establishing an environment intended to result in cultural change, moving from a compliance orientation to a mission-focused orientation.⁴³ The term *data* occurs 43 times in a variety of contexts (technical, program management, etc.) implying the need for formal data governance and management. The act’s proposed creation of a Mission Engineering and Integration Activity suggests alignment with the concepts underlying CPM, which also requires formal data governance to implement. Digital manufacturing, digital networks, and digital models are also explicitly mentioned.

Both the FoRGED and SPEED Acts note the need to move to a portfolio orientation in managing capability development. The FORGED Act would mandate an organizational change to better enable this orientation: moving from the current PEO structure to a PAE structure in the

³⁹ The draft guidance was still in the approval process at the time of this writing (August 2025).

⁴⁰ Madeline Field, “The SPEED and FoRGED Acts Compared,” *War on the Rocks*, July 1, 2025.

⁴¹ See also Roger Wicker, *Restoring Freedom’s Forge: American Innovation Unleashed*, U.S. Senate Armed Services Committee, undated.

⁴² See Wicker, undated; and U.S. Senate, 2024.

⁴³ See U.S. House of Representatives, 2025; see also Jennifer Stewart, “SPEED Act Promises Meaningful Acquisition Reform,” *National Defense*, June 26, 2025.

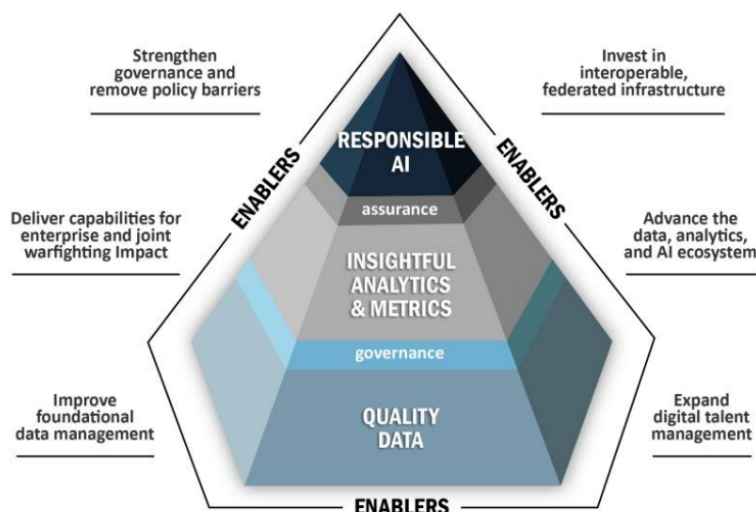
services and giving the PAEs more authority to manage programs within their portfolios. However, challenges such as those discussed above with respect to CPM remain, including how a portfolio is defined across different communities, business processes, and operational domains.

While not necessarily calling out digital acquisition directly, the reviews and reforms proposed in EO 14265 and in the ForGED and SPEED Acts will require digital acquisition capabilities to implement and to achieve the intended impact on acquisition-related processes.

Use Case 4: Advanced Technology Adoption

DoD increasingly relies on emerging technologies, such as AI and large language models, to maintain its competitive edge. The goals of DoD’s data analytic efforts are defined in DoD’s advanced data analytics strategy, published in 2023.⁴⁴ As shown in Figure 3.1, the strategic goals are to strengthen governance and remove policy barriers; deliver capabilities for enterprise (business) and joint warfighting impact; improve foundational data management; invest in interoperable, federated infrastructure; advance the data, analytics, and AI ecosystem; and expand digital talent management. CDAO was established in 2022 to manage these types of emerging technology for DoD and speed time to capability. CDAO was realigned under the Under Secretary of Defense for Research and Engineering in 2025, which is intended to “accelerate Department-wide AI transformation.”⁴⁵

Figure 3.1. Strategic Goals and the AI Hierarchy of Needs



SOURCE: Reproduced from DoD, 2023, p. 7.

The potential benefits of adopting advanced analytics and AI technologies are significant. They offer an “unprecedented opportunity to equip DoD leaders at all levels with the data they need to

⁴⁴ DoD, *Data, Analytics, and Artificial Intelligence Adoption Strategy: Accelerating Decision Advantage*, June 27, 2023.

⁴⁵ CDAO, “CDAO Re-Alignment to USD(R&E) Accelerates AI Transformation at DoD,” press release, August 20, 2025.

make better decisions faster, from the boardroom to the battlefield.”⁴⁶ Anticipated benefits of adopting AI and advanced analytics include superior battlespace awareness and understanding; adaptive force planning and application; fast, precise, and resilient kill chains; resilient sustainment support; and efficient enterprise business operations.⁴⁷ To fully harness the potential of emerging technologies, data must be organized in a consistent and comprehensive manner to ensure that their application produces reliable and repeatable results. Achieving this requires acquisition and other related data to be digitally stored and systematically managed, creating a foundation for optimizing the impact of these advanced technologies. In other words, documented AI benefits can only be realized once digital acquisition is a reality.

One concrete example of the potential impact AI can have is in the area of contracting. Within any program office, contracts are developed and negotiated ahead of any work being done by the contractor. Writing and refining these contracts is labor-intensive and can be complex with legal jargon. If implemented correctly, AI can help draft statements of work and other contracting paperwork, removing hours of necessary work. AI could also work to identify elements of a program’s contracting strategy to determine optimal contract types.

To optimize the impact of advanced technologies, DoD must address several foundational requirements, many of which are integral to the digital acquisition effort. These include ensuring the availability of high-quality data, establishing robust governance frameworks, developing digital talent, implementing effective data management practices, and building interoperable infrastructure. The *DoD Data Strategy* focuses on the dimensions of data quality by using the VAULTIS framework for ensuring quality data management.⁴⁸ This requirement neatly aligns with digital acquisition efforts, which also leverage the VAULTIS framework.

DoD has embraced an agile and iterative approach to adopting AI and advanced analytics. This approach focuses on three key activities performed iteratively to promote learning and improvement: product orientation, continuous experimentation and deployment, and user feedback.⁴⁹ This iterative approach prioritizes speed and continuous improvement over perfection, enabling DoD to adapt and refine its adoption strategies over time. Recognizing the technical vulnerabilities that AI and other advanced technology can introduce, DoD’s strategy is designed to manage risks by continuous use and improvement based on user feedback. DoD should employ a similar approach to digital acquisition: Establish pilot programs to employ digital acquisition strategies and datasets from inception to create a proof of concept. Pilot programs should be small, simple programs that teams can get their hands around. They should be relatively short, progressing quickly through development to production or fielding and to operations quickly so the entire life cycle of the platform may be examined or managed with digital acquisition in mind. Lessons learned and recommendations for each phase of the program should be documented, providing valuable insights for subsequent efforts. This iterative and feedback-

⁴⁶ DoD, 2023, p. 2; CDAO, “2023 Data, Analytics, and AI Adoption Strategy: Accelerating Decision Advantage,” fact sheet, U.S. Department of Defense, 2023.

⁴⁷ DoD, 2023.

⁴⁸ VAULTIS refers to the following seven attributes that data must have for DoD to truly become data-centric: visible, accessible, understandable, linked, trustworthy, interoperable, and secure (DoD, *DoD Data Strategy*, 2020).

⁴⁹ DoD, 2023.

driven approach would enable digital acquisition to evolve incrementally, ensuring continuous improvement while minimizing risks and fostering innovation.

Use Case 5: Air Force's Digital Materiel Management

In 2021, the Air Force established the DTO,⁵⁰ which is dedicated to advancing digital practices across the entire enterprise. Central to its core mission is the concept of digital materiel management (DMM), which emphasizes a digital-first culture. The DMM effort encompasses digital engineering and digital acquisition in many respects. It promotes digital practices throughout the life cycle of defense platforms and throughout various functions within the Department of the Air Force. DMM focuses on developing digital strategies, structuring and securing data, providing access to digital and DMM tools, and training a digitally skilled workforce. The DMM initiative was created to keep pace with adversaries that are developing and fielding advanced weapon systems at unprecedented speeds. The Air Force views this concept as an imperative, stating that it “must shatter existing paradigms and adopt enterprise Digital Materiel Management (DMM) capabilities to radically accelerate our fielding, sustainment, and modernization.”⁵¹

The DMM effort emphasizes the need for seamless integration across all phases of the weapon system life cycle, from concept initiation through sustainment and disposal. Achieving such integration requires connective tissue between each phase to ensure interoperability and data or model continuity. Furthermore, DMM touches every function within a weapon system program office. The program management team, engineers, contract specialists, logistics support, cost and budget analysts, test and evaluation team, and risk managers all need to have a data-centric orientation.⁵² For DMM to succeed, all stakeholders must adopt a digital-first mindset to solving the program's problems.

To guide this digital transformation, the DTO has published a digital guide,⁵³ which is a user reference on the purpose, objectives, main benefits, and best practices of digital transformation. Included in the guide is a digital maturity assessment that allows users to measure their organization's level of digital maturity against benchmarks set for digital programs. It leverages the International Council on Systems Engineering (INCOSE) maturity model for assessing a program's level of digital maturity.

The DMM effort goes hand in hand with the concepts of digital acquisition, and in fact, it leverages much of the foundational work established by the digital acquisition initiatives. One factor that helps the progress of the DMM effort is that it is solely owned by the DTO, even though many of the DMM activities fall outside the scope of the DTO. This arrangement enables all users to look to one place for training, references, and best practices and to provide feedback or make suggestions for improvement. This centralized ownership ensures consistency across the Air Force's digital transformation efforts and accelerates the adoption of enterprisewide DMM practices.

⁵⁰ Airforce Technology, “USAF Announces Launch of New Digital Transformation Office,” June 10, 2021.

⁵¹ J. Kyle Hurst, Steven A. Turek, Chadwick M. Steipp, and Duke Z. Richardson, *An Accelerated Future State*, Air Force Materiel Command, undated, p. 2.

⁵² Hurst et al., undated.

⁵³ Department of the Air Force, “DAF Digital Maturity Guide,” version 2.0, undated.

Common Themes: Potential Benefits, Constraints, and Enablers

These use cases reveal common themes. The potential *benefit* of these use cases is to improve acquisition outcomes, including both speed to capability and improved decisionmaking. Speeding time to fielded capability is an increasing imperative due to the pace at which U.S. adversaries are fielding weapon systems. Historically, the acquisition life cycle of most weapon system platforms has been long, often spanning years or decades. Much of the focus of digital acquisition and its use cases is to decrease this time to a more competitive level. Getting fielded capabilities to the warfighter more quickly will enable dominance on the battlefield. In addition to achieving capabilities more quickly, another focus of digital acquisition and its use cases is to improve decisionmaking. Enabling leadership to more effectively track the progress of ongoing acquisition programs will improve how future decisions are made, potentially enabling better (i.e., more-informed) decisions to be made faster. Likewise, moving away from paper-based reviews and toward more-dynamic, model-driven reviews will give decisionmakers the tools to better understand the decision landscape and the trade-offs that result. This latter point has an important counterpoint: Dynamic reviews can be impressive and helpful, but they can also create unnecessary churn if the model does not behave as expected or the what-if drill is outside the bounds of the model. Opening up a model in front of leadership without having tested and confirmed the results can introduce risks to both the analyst and the quality of information supporting a decision.

Recurring *constraints* can be observed across these use cases as well. Training the workforce on new digital tools and processes will take time and resources that may not be readily available. Although we have observed new training courses and digitally intensive curricula in several areas, workforce training needs to continue to be a priority for DoD. The workforce needs to not only be trained on using digital tools but also put them into practice. Learning the technology is one hurdle; adopting it is a separate challenge that will take more time to overcome. In many instances, adopting technology is not the biggest challenge—shifting the culture of the workforce is.

Changing a well-established culture of being a paper-driven organization to a data- and technology-centric organization will take time and effort. It most certainly will require a shifting of expectation from leadership. Leadership cannot take a back seat in this digital transformation but instead must take an active role in encouraging and expecting digitally created deliverables. Continuing business as usual will make the DoD's digital transformation goals take much longer to accomplish or cause them to entirely stall out.

To execute the use cases discussed in this report, common *enablers* are required. For starters, data sources that are digitally formatted and easily accessible are imperative. Data need to be consistently reported and traceable, with digital tools producing repeatable results. All program office functions—program managers, analysts, engineers, logisticians, and maintainers—must trust the data that they are analyzing. Data repositories that lack the trust of their users will not be used and will sink resources. Data must be governed by comprehensive data standards that are used DoD-wide.

Each use case benefits (or would benefit) from a single owner—one organization to set strategy and the desired end-state, establish rules and share best practices, and monitor and track progress. Some use cases have an established single owner (e.g., OUSD[R&E] in the case of digital engineering), but others should follow suit. Even if initiatives each have a single designated owner, DoD should still strive for an all-in philosophy on digital best practices. This will enable digital transformation to occur

more quickly and produce the best results. From decisionmakers to analysts, all must hold stakes in fostering DoD's digital culture.

Assessment of Progress

This chapter offers an independent assessment of DoD's progress toward digital acquisition. We conducted this assessment by first developing an understanding of the current digital acquisition landscape as of August 2025 and identifying ongoing and completed initiatives. We outline the details of these initiatives in Chapter 2, but we summarize key successes in this chapter. Then, we pinpoint gaps within an existing digital modernization activity and highlight opportunities to address each identified gap.

Assessment Overview

There appears to be consensus on the need for digital transformation and modernization in acquisition-related processes and in the high-level principles, technology, concepts, and goals associated with digital acquisition. Many, but not all, of the technical and conceptual foundations enabling digital acquisition exist and are relatively mature. However, we could not assess the extent to which digital acquisition is fulfilling its promise of improved outcomes (i.e., improved decisionmaking, faster time to fielded capabilities, cost savings from improved design and test activities). While there are anecdotes that some digital modernization activities improve parts of the acquisition process, output and outcome metrics are not systematically collected.

There are a very large number of acquisition-related digital modernization activities and initiatives across the DoD enterprise at multiple organizations and levels. However, and with some exceptions (i.e., AVDF), these activities are largely stovepiped within organizations, with little coordination and collaboration across organizational and functional boundaries. While some progress has been made across a wide array of policies and processes, it is not as much progress as might be expected given the policy consensus and large number of past and ongoing activities. The fundamentals of data collection, curation, standardization, and sharing are also less mature or practiced than expected given the relative consensus on technical and conceptual foundations.

The factors adversely affecting progress appear to be less about goals, concepts, or technology and more about policy, resources, workforce, and culture. There is a lack of policy ownership, strategy, collaboration, and accountability for digital acquisition. There is also inconsistent leadership demand for digital products, and use cases vary widely because of that inconsistency. There are misaligned incentives, cultural factors affecting data sharing, and a lack of formal mechanisms for coordination and collaboration. Finally, investment in digital modernization activities and the enablers of those activities (e.g., information technology [IT] infrastructure, tool development and standardization, workforce knowledge) has been inconsistent over time.

That said, DoD has made progress toward digital acquisition. There is now an opportunity to make additional progress and accelerate change by demonstrating and documenting the benefits of

what has been done to date. Building on that progress is the starting point to support current and future digital acquisition initiatives and priorities.

Digital Acquisition Progress

Efforts to digitize acquisition date back at least several decades, beginning with the development of the DAMIR system to capture a core set of acquisition data—required by legislation and policy—presented digitally in Selected Acquisition Reports and DAES reports. Those ongoing efforts laid important foundational elements enabling digital acquisition as currently conceived, including identifying a core set of needed acquisition data, setting data standards for that core set of data, establishing and maintaining other databases of related data (e.g., EVM), and using data to inform acquisition policy decisions and understand the performance of the acquisition system.⁵⁴ Stakeholders of the effort include a diverse group in the acquisition community, such as OUSD(A&S), OUSD(R&E), CDAO, CAPE, the Joint Staff, the military services, and others. This group offers a variety of perspectives, capabilities, and lessons learned. The establishment of digital acquisition–related steering groups and working groups promote collaboration across these stakeholders. When participation is maximized and consistent, these will be a helpful tool in digital acquisition coordination across DoD.

Each of these large stakeholder organizations has at least one organization dedicated to one or more aspects of digital acquisition through different kinds of activities. For example, the Air Force has an Office of Digital Transformation. Special Operations Command (which is unique among combatant commands because it has acquisition authority) has a PEO for Special Operations Forces Digital Applications. CDAO has an acquisition division. The Navy, Army, Air Force, and OUSD(A&S) all have organizations dedicated to governing and managing acquisition data. The existence of these organizations and the activities they focus on indicate that data and digital transformation in acquisition processes is receiving attention.

The promotion of independent research has also increased as a result of DoD's focus on digital acquisition. Several FFRDCs and UARCs have been conducting research and analysis in the digital acquisition space for several years now. The creation of AIRC, an independent research organization, complements FFRDC and other UARC efforts in providing analytic rigor to the digital acquisition journey. AIRC has produced several reports on the topic of digital acquisition and has worked to highlight the strengths and weaknesses of the effort thus far.⁵⁵ While AIRC's primary focus is on

⁵⁴ See, for example, the annual Performance of the Defense Acquisition System reports. Two examples are Office of the Under Secretary of Defense for Acquisition and Sustainment; Acquisition, Analytics, and Policy; Data Analytics Division, *Updates to Performance of the Defense Acquisition System Series, 2018 SARs Update*, U.S. Department of Defense, 2019; and Office of the Under Secretary of Defense, Acquisition, Technology, and Logistics, *Performance of the Defense Acquisition System: 2016 Annual Report*, U.S. Department of Defense, 2016.

⁵⁵ See, for instance, Wells and Nix, 2024; Mark R. Blackburn, Dinesh Verma, Matthew MacGregor, and Philip S. Anton, *Minimally Viable Digital Acquisition Environment/Ecosystem*, Acquisition Innovation Research Center, undated; Philip S. Anton, Laura Freeman, Christina Houfek, and Maegen Nix, *Innovative, Data-Enabled Acquisition Strategy (IDEAS): Concepts for Driving the Digital Transformation of Defense Acquisition*, Acquisition Innovation Research Center, March 2025; and Laura Freeman, Stephanie DeHart, Kelli Esser, Scott Lucero, and Mary Nerayo, *Digital Data Strategy Pilots: Enhancing Supply Chain Risk Management and Reliability Data Integration for DoD Acquisition and Sustainment*, Acquisition Innovation Research Center, June 2025.

acquisition, it is closely aligned with the digital engineering effort, sharing numerous best practices that enhance both initiatives.

DoD has done much to standardize the way acquisition data are labeled and collected. The AVDF is the primary effort to standardize acquisition data. It provides an authoritative framework for a variety of necessary information, including data definitions, standards, and sources. It includes standards for the six adaptive acquisition pathways and various data categories, which are essential for such processes as CPM and advanced analytics. Additional efforts underway include standards for tracking sustainment, NC3, FMS, and new data categories and such elements as LRIP and JCA. CUPID and CUSID have been introduced to enable the consistent tracking of unique programs and systems throughout their service lives. While there is more to do in standardizing the breadth of acquisition data across DoD, progress has been made.

Another area of progress is data collection and storage. The technology platform ADVANA is designed to “change decision-making behavior across the DoD enterprise using data, analytics, and artificial intelligence (AI).”⁵⁶ It serves as DoD’s analytic and visualization hub, pulling acquisition data from such authoritative sources as DAVE, PMRT, and RDAIS. With more than 500 sources contributing data and information to the platform and more than 100,000 account holders as of May 2024,⁵⁷ ADVANA provides a single source of truth for DoD data that is promulgated through all levels of decisionmaking and analysis. It hosts a variety of acquisition-related applications and dashboards to be used by analysts and decisionmakers. By collectively using the ADVANA platform, stakeholders can more readily achieve integration between programs and across DoD.

Gaps and Opportunities

Although accomplishments span the digital acquisition effort, gaps still must be addressed. These gaps present opportunities to improve future outcomes. A summary of these gaps and associated opportunities are captured in Table 4.1 and discussed below.

Table 4.1. Summary of Gaps and Opportunities

Gap	Opportunity
DoD lacks an up-to-date, overarching strategy for digital acquisition; there is no strategic mandate to force compliance with digital modernization activities.	Develop and publish a digital acquisition strategy that defines terms, goals, roles, and responsibilities.
Stakeholders are working in a stovepiped manner, increasing the likelihood of duplicate work and limiting integration and interoperability.	Increase coordination across stakeholders; officially charter the AVWG and the AVSG to give that coordination formal authority.
There is a lack of reliable and consistent funding required to establish digital modernization solutions and sustain them.	Prioritize the digital acquisition effort, recognizing that it will take years of continued resources to fully implement and will require continuous improvement.

⁵⁶ CDAO, “Advana 101 Briefing Deck,” May 2024.

⁵⁷ CDAO, 2024.

Gap	Opportunity
The digital acquisition effort currently lacks a tailored maturity model or road map to guide activities and assess progress and implementation.	Develop a maturity model tailored to digital acquisition to track the effort’s success.
The focus of the effort has been on ACAT I defense programs; data on smaller programs are not widely shared.	Expand digital modernization to smaller programs to enable a holistic view of DoD acquisition.
There are workforce knowledge gaps and limited training; additional workforce training could be made available to encourage the shift from paper-based to digital processes.	Continue to expand the available training to all levels of the acquisition workforce.

Provide Strategic Direction

DoD lacks a digital acquisition strategy that provides a vision of the desired end-state and helps guide and coordinate activities intended to move DoD toward that vision. Relatedly, there is no senior leader designated as the “policy owner” for digital acquisition. Together, these issues result in the widespread but uncoordinated digital acquisition–related activities as observed and the lack of an engaged leadership that enforces compliance with the vision.

DoD urgently needs an official strategy document to guide digital modernization activities and a designated senior leader with the authority to enforce DoD’s digital acquisition vision. The strategy document should serve as a foundational framework, ensuring that all stakeholders are aligned and equipped to collaborate effectively. An essential component of the strategy must be the definition of key terminology. This will establish a common understanding among stakeholders and prevent the loss of valuable time and resources that occurs when personnel are occupied with negotiating definitions of key terms and concepts. By providing clear definitions, the strategy will facilitate smoother collaboration and focus efforts on achieving tangible progress toward digital acquisition.

Identifying an OPR for the digital acquisition effort is challenging. The OUSD(A&S) is best positioned for this role because this office is responsible for all DoD acquisition and sustainment policy and outcomes across the enterprise; thus, the Under Secretary of Defense for Acquisition and Sustainment is the leadership position that most closely aligns with ownership of the digital acquisition effort. However, organizations accomplishing digital modernization activities fall outside the jurisdiction of OUSD(A&S). Therefore, related policies, strategies, and processes in other functional areas must also be owned by relevant senior leadership in those areas.

Additionally, the strategy must clearly identify the primary goals of digital acquisition, outlining what needs to be accomplished to successfully implement it across DoD. This clarity will provide much needed guidance, direction, and focus to ensure all investments are aligned with overarching objectives. The strategy should delineate roles and responsibilities across DoD to identify who owns digital acquisition and give those owners the appropriate authorities to enforce the strategy.

If efforts are shared across organizations, the strategy must clearly divide responsibilities to prevent overlap and ensure accountability. By establishing these elements, the strategy document can help establish the right incentives and will serve as a vital tool in progressing the digital acquisition initiative and fostering a unified approach across DoD.

Increase Collaboration Across Stakeholders

A significant gap in the current digital acquisition landscape is the lack of coordination among key stakeholders. Greater collaboration and proactive sharing of lessons learned could yield more-effective outcomes and maximize the value derived from investments. While the AVSG and AVWG meetings represent initial steps toward fostering coordination and collaboration, they are not formally chartered and thus lack the structure and authority needed to drive engagement further. Additionally, the infrequency of these meetings, coupled with their presentation-focused agendas, means that they often miss delving into the critical details necessary for continued progress.

A direct approach to filling this gap is to officially charter the AVSG and the AVWG, providing them the strategic mandate and resources necessary to facilitate comprehensive stakeholder engagement, information-sharing, and problem-solving. These groups should be revitalized with regular, structured meetings that encourage active participation and contributions from all digital acquisition stakeholders. By establishing a consistent rhythm of collaboration, stakeholders can collectively explore the intricacies of digital modernization initiatives, share insights, and develop innovative solutions that align with broader strategic objectives. In tandem with a digital acquisition strategy, responsibilities within the AVSG and the AVWG will be better understood, information-sharing improved, and collaborative problem-solving increased, reducing the risk of duplicate efforts.

Prioritize Resources to Implement and Sustain Digital Modernization Initiatives

Funding for acquisition-related digital modernization activities is disparate and difficult to track. Funding or budget data are not systematically collected in a way that identifies a particular activity as being related to digital acquisition. Digital acquisition represents a transformation in the acquisition community, a cultural change in the approach to how DoD designs, acquires, and sustains weapon system platforms. It will take years for DoD to fully implement and benefit from digital modernization initiatives. Therefore, reliable and consistent funding will be imperative to ensure the successful implementation and longevity of digital acquisition. Funding for the software and IT infrastructure required to enable digital acquisition, as well as for distinct digital modernization initiatives and use cases, is necessary.

A key aspect of these initiatives, particularly the data storage platforms, is their continuous sustainment. Over time, such platforms not only become more widely used (as the workforce grows familiar with using them) but also increasingly more valuable (as a more comprehensive dataset is collected). Continuous sustainment of these tools requires funding and resources.

Consistent, traceable funding is also required to drive continuous improvement in digital processes and environments.

Develop a Tailored Maturity Model to Assess Progress

Assessing the progress of digital acquisition within DoD is currently a challenging task due in part to the absence of clearly defined goals and metrics and an established baseline against which to measure progress. Without these, DoD lacks a standardized method to determine when digital

acquisition has been fully achieved or assess what progress has been made toward that goal. The absence of official metrics means that stakeholders are either not tracking progress or are independently creating their own metrics. This could lead to inconsistencies in how progress is measured and may hinder effective collaboration and alignment across stakeholders.

To address this issue, DoD could benefit from developing a maturity model and associated metrics to level-set all stakeholders to the same digital acquisition rubric and establish a baseline against which to measure progress and identify gaps. Models such as the INCOSE MBSE capability matrix and the Department of the Air Force's digital maturity guide provide structured approaches to assessing maturity in complex systems.⁵⁸ By tailoring these models to the specific context of digital acquisition, DoD can facilitate consistent tracking of progress, enabling stakeholders to work toward common goals. Maturity models can also be used as a guide to communicate next steps or what capabilities future investments should address. Similarly, a digital acquisition capability road map can be used for the same two purposes (measuring progress and indicating logical next steps).

Expand Efforts to Include Smaller Defense Programs

To date, the digital acquisition effort has primarily concentrated on large defense acquisition programs, which account for the majority of funding across acquisition programs. While this focus was a logical place to start, it has resulted in smaller defense acquisition programs not receiving the same level of attention or making comparable progress. Consequently, DoD now faces the challenge of catching up these smaller programs to ensure comprehensive advancement in digital acquisition across all ACAT levels.

The services capture the same or similar acquisition data for their smaller programs as for their larger programs, although other than the metadata identifying a program, these data are not shared outside the service. And because they are smaller, these programs tend to not have the resources to implement digital modernization initiatives; additional funding and possibly personnel may be required. It is worth noting, however, that it is the smaller programs that provide the venue for training the next generation of program managers and other functional subject-matter experts. Introducing digital elements for these smaller programs can provide the experience needed to implement digital modernization initiatives in larger, more complex programs.

Make Training Available and Accessible to All Levels of the Workforce

As mentioned previously, digital acquisition requires a cultural shift in the way the acquisition community accomplishes its work, from day-to-day, analyst-level activities to high-level decisionmaking. Therefore, every member of the acquisition workforce will be required to adjust the way they do business. DoD currently lacks a cohesive training and education program to address not only the entire workforce up through senior leadership but also the full spectrum of data and digital

⁵⁸ INCOSE, *INCOSE Model-Based Capabilities Matrix and User's Guide*, version 1.0, January 2020; Department of the Air Force, undated.

literacy required to transition to a digital acquisition environment. Existing training is disjointed and covers a specific topic or tool without conveying the larger picture of digital acquisition.

Training must be available and accessible to all levels of the acquisition workforce. Training courses for a data storage or visualization tool should be tailored to required roles of the workforce. Basic training should be offered for those in leadership positions who need to understand the tool's outputs and verification and validation processes but do not require in-depth knowledge of its functionality. Practitioner courses should be available for those who actively engage with the data to perform a specific task or analysis. And advanced training should be offered for those who require comprehensive knowledge of the data tool. Table 2.6 in Chapter 2 highlights some of the available training for the acquisition workforce. DoD should continue to review and expand its training opportunities to support the acquisition workforce at all levels.

One critical source of training is the DAU. Our review of open-source information on the DAU website suggests the lack of a digital modernization or a digital acquisition courseload. We could find only one course that refers to digital acquisition, "Introduction to Digital Acquisition." The course description equates digital acquisition to digital engineering and assigns the official definition of *digital engineering* to the term *digital acquisition*.⁵⁹ This contradicts multiple other sources that delineate these terms. Consistency and precision of terms need be applied to training courses. DoD should conduct a review of current course offerings to ensure consistency of terminology.

Other Gaps and Opportunities

Other gaps and opportunities associated with current DoD efforts toward digital acquisition include the following:

- *Minimum required data and changing questions from leadership.* Staff are struggling to define a minimum set of acquisition-related data to collect, process, and maintain that addresses leadership questions. Part of the issue here is that questions from leadership will change as a result of turnover, emergent issues, personal preferences and interests, and external factors. Additionally, changes in digital technology and capabilities continuously open up new areas, use cases, and sets of questions. A related issue is that consistently articulating a full set of questions is challenging.
- *Some acquisition data are available in digital form, but they may not be trusted outside the communities and organizations that develop and maintain them.* This is partly a cultural issue but may also be tied to not understanding the assumptions and processing that underpin a certain dataset, or the perception that the data are incomplete, and therefore, available data are unusable. The result is that responding to leadership questions or preparing an IAPR involves a unique data call specific to that purpose. Taking the time to understand the details of a data standard may be perceived as harder than simply conducting a new data call.
- *Some digital platforms are really just repositories for documents (in PDF format).* While useful for purposes of historical preservation, such repositories are not what is meant by digital

⁵⁹ DAU, "Introduction to Digital Acquisition," ETM 3130, webpage, undated; DoDI 5000.97, 2023.

acquisition. These repositories—such as the Acquisition Information Repository—represent historical unstructured data that cannot be exploited because the data are not really digitized.⁶⁰

- *There is an apparent emphasis on creating new tools, new processes, or new datasets rather than maturing existing tools, processes, and datasets.*

⁶⁰ The Acquisition Information Repository contains the documentation required in acquisition policy for ACAT I programs and MDAPs as these programs move through each milestone in the acquisition process. Example documents include acquisition strategies, acquisition decision memorandums, and test and evaluation master plans, among others.

Recommendations

DoD has made significant progress over the past several decades in implementing data governance, management, and analysis; investing in IT infrastructure; and establishing policies that lay the foundation for digital acquisition. The challenges affecting DoD's ability to achieve a digital acquisition end-state present opportunities for improvement. The recommendations below are intended to enable DoD to take advantage of opportunities for improvement and address or mitigate the challenges identified in this assessment.

Key Areas to Address

Policy, strategy, and leadership. DoD lacks a current overarching strategy of digital acquisition. DoD should develop, publish, and maintain a digital acquisition strategy that defines terms, goals, roles, and responsibilities. An updated strategy focused on digital acquisition is needed to articulate the desired future state, provide guidance, and enable collaboration and coordination across the DoD enterprise. This strategy should build on existing policy that identifies data as an enterprise resource that should be shared widely. The strategy should name an organization that has ownership of and authority over activities related to digital acquisition. Thus, a digital acquisition strategy should be aligned to and consistent with the broader digital modernization initiatives across DoD. The digital acquisition strategy should also be recognized as something that can and will change as technologies, threats, and organizational needs change over time. The strategy should include a road map in some form that lays out lines of effort and specific capability milestones to guide activities in the near term (one to two years) and middle term (three to five years), recognizing that these will also change as technology, threats, and needs change.⁶¹

Leadership also plays a critical role in developing, approving, and implementing the digital acquisition strategy. Leadership engagement sends a signal that the effort is a priority and helps create an environment more conducive to the cultural change needed to ensure that digital modernization activities are effective and achieve the desired benefits. Perhaps most critically, this means that senior leadership, most likely the Under Secretary of Defense for Acquisition and Sustainment, would take full ownership of digital acquisition policy, strategy, and implementation. This would include consistently articulating a demand for digital products (i.e., dashboards, not static Microsoft PowerPoint briefing slides). Such demand sets the tone and provides critical incentives throughout the workforce. This may be more challenging to senior leaders than it appears; interpreting analytical results on a dashboard linked to live data requires the user—in this case, senior leadership—to take the time to understand the data standards and models used, just like an analyst does (perhaps to a

⁶¹ As noted earlier, as of August 2025, AIRC is developing such a road map.

lesser degree). Such engagement implies a more closely collaborative relationship between leadership (decisionmakers) and the analysts providing data and analysis to inform decisions. Although leadership does not need to have the same level of understanding that the analysts have, leadership must be able to broadly understand what the data are telling them (which requires them to understand context) and trust the data (perhaps through an awareness of the data validation and verification process).

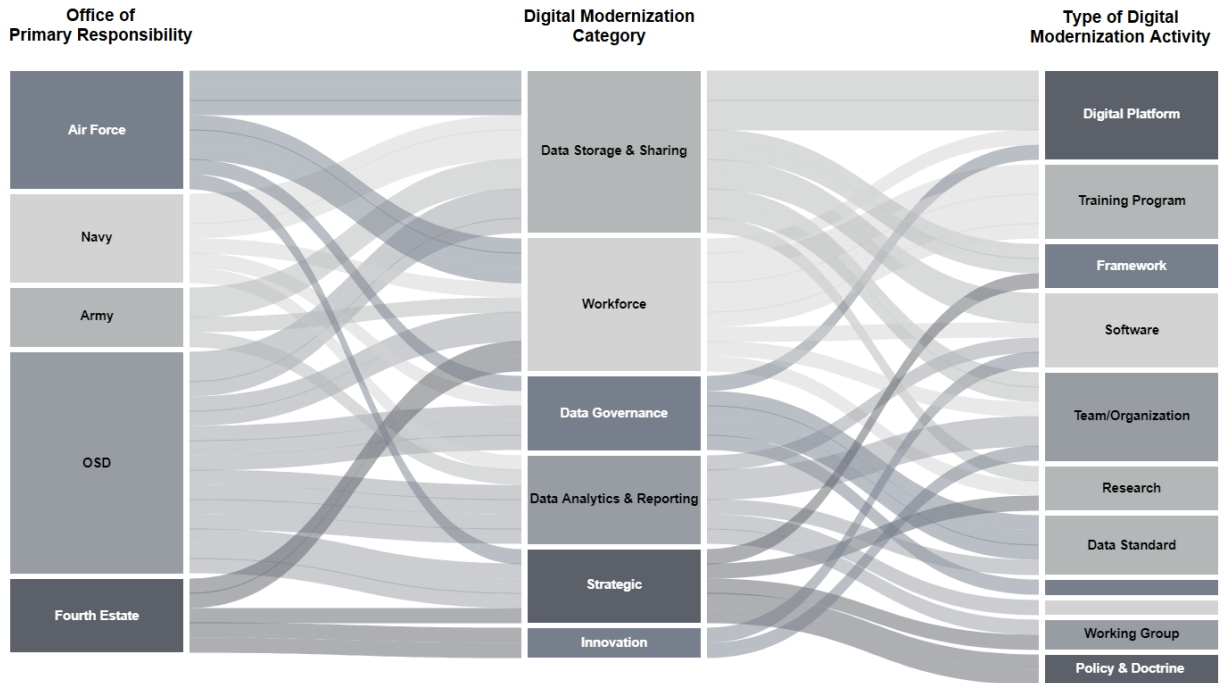
Coordination and collaboration. Digital acquisition stakeholders are working in a stovepiped manner, increasing the likelihood of duplicate work. DoD should increase coordination across stakeholders by officially chartering the AVSG and the AVWG to provide more-formal authority to coordinate digital modernization activities related to acquisition. Similarly, venues for increasing coordination and collaboration within other communities—requirements, mission engineering, and budgeting—need to be established in order to create opportunities to share the results of digital activities and lessons learned and to plan next steps.

Formal venues also need to be established to enable information-sharing, coordination, and collaboration across organizational and functional boundaries. This is critically important to implementing CPM, which requires the alignment of requirements; system and mission engineering; acquisition, sustainment, and operational data; and functional communities. CPM also involves multiple service organizations, the Joint Staff, combatant commands, CAPE, OUSD(R&E), and OUSD(A&S). Building on existing working groups and similar established entities (formal or informal) should be the norm to the extent possible.

In a similar manner, acquisition stakeholders would benefit from a method to catalog and coordinate digital modernization activities across the acquisition enterprise. We developed a catalog of digital modernization activities throughout the course of our research. The catalog serves as a database containing basic descriptive information and metadata on digital acquisition activities and initiatives. It is useful for capturing, organizing, and storing descriptive information, as well as tracking the status of activities and visualizing relationships between digital modernization efforts. As explained in Chapter 2, the catalog we developed is not comprehensive; it does not include every historical or current digital acquisition–related initiative. However, a more complete and updated catalog of activities could be a useful tool at both the leadership and working levels.

Figure 5.1 maps a sample of digital modernization efforts to a corresponding OPR, category of digital modernization, and activity type. The figure demonstrates the type of analysis that could be made if such a catalog were maintained by DoD. Note that the diagram represents a group of initiatives for which we had complete information, and therefore, it should not be interpreted as comprehensively representing all acquisition-related digital modernization efforts. Additionally, the catalog was first developed using a collection of OUSD(A&S) digital modernization initiatives and consequently contains more OUSD(A&S) activities relative to those of the services or the Fourth Estate. This should not be interpreted as a full accounting of every ongoing digital modernization effort in DoD. Because of this limitation, we are not presenting any statistics or correlations based on this figure, as these would be misleading.

Figure 5.1. Example Graphic for Tracking Digital Acquisition–Related Initiatives



NOTE: Moving left to right, the shading of the lines corresponds with each OPR and digital modernization category, and the weight (thickness) of each line reflects the relative number of activities associated with that OPR or digital modernization category, by type.

Data governance. Data are the foundation of digital acquisition. DoD needs to build on the progress already made in governing, managing, and analyzing acquisition-related data. Full implementation of data standards across the enterprise needs to be enforced, and additional standards established as needed. Particular attention should be paid to ensure that all stakeholders understand how the data are collected, processed, and stored and how they can be used in analyses and interpreted. The focus should be on building trust in the data among users.

Data governance will require some degree of centralization, particularly in coordinating and enforcing standards and establishing authoritative sources of data of different kinds and on different topics. As with digital acquisition strategy, a single organization within OUSD(A&S) should have this responsibility and requisite authority for acquisition data.⁶² Similar responsibilities and authorities should be vested in organizations in other functional areas. Coordination should be through the cross-organizational AVSG and AVWG.

Resourcing. Reliable and consistent funding is required to establish digital acquisition solutions and sustain them. DoD should prioritize digital acquisition, recognizing that it will take years of continued resources to fully implement. Digital acquisition has the potential to accelerate the fielding of capabilities to the warfighter by improving information flows, streamlining review and decision-

⁶² The responsibility for acquisition data governance lies with Acquisition Policy and Innovation within OUSD(A&S). This organization, together with its partners in the services, has made significant advances in data governance, management, and analytics that provide a strong foundation for moving forward.

support processes, and tightening technology development through improved modeling and simulation.

Along with sufficient funding to enable the desired digital modernization in acquisition processes, sufficient staffing in the organizations executing those activities is required. While estimating the funding and staffing shortfall and required levels was beyond the scope of this analysis, we consistently observed both funding and staffing challenges. This is yet another area in which leadership needs to play a key role in prioritizing digital acquisition and making sufficient resources available to accomplish the stated goals.

DoD should also continue to fund research into digital acquisition capabilities, including the IT infrastructure underlying those capabilities, software development designed to help government manage and integrate data of various kinds, and models and other applications that can improve business processes and outcomes. In this context, AI can be thought of as a tool, and its application to acquisition and related business processes deserves focused attention.

Monitoring progress. Digital acquisition may benefit from a tailored maturity model and associated metrics, road map, or similar mechanism to establish a baseline of activities and assess implementation progress. Monitoring progress, including collecting data on how policies and activities are implemented and whether they are having the expected impact, is critical to learning from experience and making progress toward established goals. Metrics should be outcome-oriented to the extent possible, and automated data collection can ease any reporting burden. Monitoring progress will also entail collecting and understanding qualitative data that provide important context for interpreting performance metrics and understanding lessons.

Scope. Efforts thus far have focused on large ACAT I defense programs; smaller programs are lacking the necessary attention to match progress in this area. DoD should expand its application of digital acquisition to all defense acquisition–related programs. In some cases, it is the subsystem on a platform that might be of interest, particularly in the context of CPM and mission engineering. Data at that level of detail are not ordinarily collected and governed.

As noted above, the scope of digital acquisition goes beyond the DoD acquisition community to include other organizations and functions. The scope of digital acquisition also includes industry and research organizations (universities, UARCs, FFRDCs) that generate and own critical data or develop and advance digital methods, technology, models, and applications. We recommend that the implementation of a digital acquisition strategy explicitly establish and maintain ties and capabilities with these external organizations, which are critical stakeholders and contributors to the digital environment. Such organizations include both the sustainment community and operators to obtain accurate operations and support data.

Workforce. The sheer volume of these efforts presents a challenge for the workforce, which requires time and resources to learn and implement the existing digital modernization initiatives. DoD might consider a strategic pause in developing new initiatives, focusing instead on refining and institutionalizing current efforts. This would allow the acquisition workforce to fully adopt existing digital modernization tools and processes to ensure their long-term use and application.

We also recommend a more formal education, training, and upskilling program to generate the skill set and data orientation that digital acquisition requires. While hiring specific capabilities is part

of this, attention should also be given to training the existing workforce to use digital tools and conduct business processes differently.

Implementation Considerations

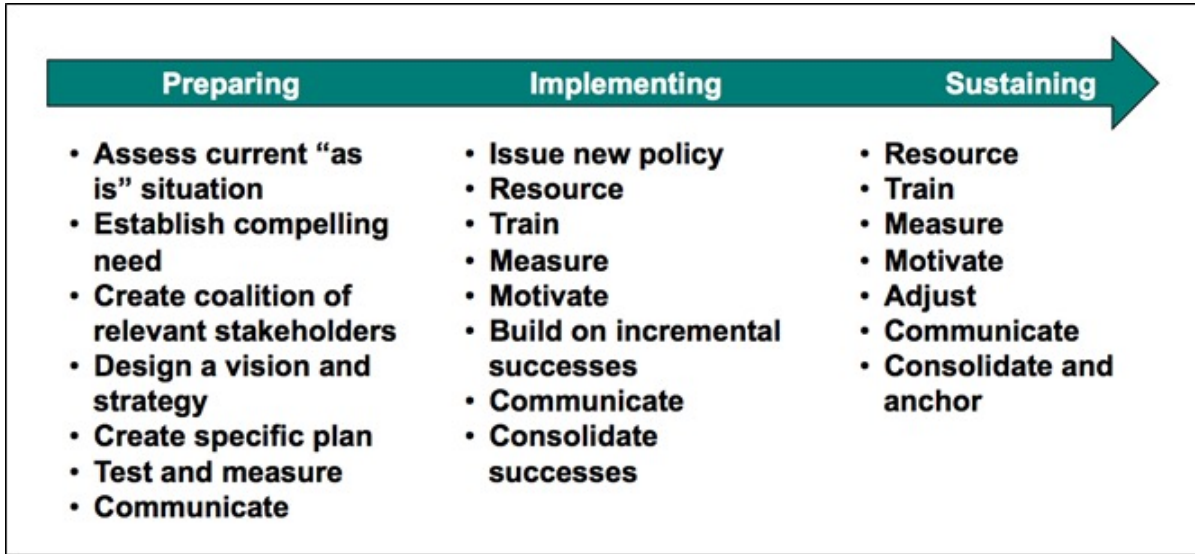
A key finding is that the most significant challenges affecting DoD's ability to achieve digital acquisition and obtain the desired benefits are cultural, not technical. These include such challenges as data sharing, which have been present in DoD for decades. There are technical challenges, of course, but these have technical solutions, which can be identified. Changing organizational culture is more difficult and less precise.

There is considerable research that can help DoD address cultural challenges to make lasting, positive changes. Such research is often part of the business process re-engineering or change management literature. We strongly recommend, as part of implementing the recommendations outlined in this report and any other digital modernization activities, that DoD identify, tailor, and use a change management framework to help ensure the successful implementation of digital acquisition and lasting institutional change.⁶³

While it was beyond the scope of this study to identify and tailor such a framework, an example framework and the factors that are often part of these change management frameworks are depicted in Figure 5.2.

⁶³ See, for instance, J. P. Kotter, *Leading Change*, Harvard Business School Press, 1996; Arnold S. Judson, *Changing Behavior in Organizations: Minimizing Resistance to Change*, Basil Blackwell, 1991; Timothy J. Galpin, *The Human Side of Change: A Practical Guide to Organization Redesign*, 1st ed., Jossey-Bass Publishers, 1996; Nancy Y. Moore, Laura H. Baldwin, Frank Camm, and Cynthia R. Cook, *Implementing Best Purchasing and Supply Management Practices: Lessons from Innovative Commercial Firms*, RAND Corporation, DB-334-AF, 2002; Frank Camm, Jeffrey A. Drezner, Beth E. Lachman, and Susan A. Resetar, *Implementing Proactive Environmental Management: Lessons Learned from Best Commercial Practice*, RAND Corporation, MR-1371-OSD, 2001; Sergio Fernandez and Hal G. Rainey, "Managing Successful Organizational Change in the Public Sector," *Public Administration Review*, Vol. 66, No. 2, March–April 2006; David Osbourne and Ted Gaebler, *Reinventing Government: How the Entrepreneurial Spirit Is Transforming the Public Sector*, Penguin Books, 1993; and Michael Hammer and James Champy, *Reengineering the Corporation: A Manifesto for Business Revolution*, HarperCollins, 1993.

Figure 5.2. Example Change Management Framework



SOURCE: Authors’ analysis of multiple sources cited in the footnote on the previous page.

Change management involves three phases depicted in Figure 5.2: preparing (planning) for change, implementing (executing) it, and sustaining (institutionalizing) it. Each phase includes activities that need to be accomplished to bring about changes to policy, process, and organizational structure. For instance, in the preparing phase, leaders need to establish and communicate a compelling need for change and articulate a specific plan to accomplish it. As they implement change, leaders need to issue new policies, institute workforce training, and establish metrics and other systems to measure the change’s progress and effectiveness. And to sustain change, they will have to pursue activities necessary to institutionalize it and make it the new day-to-day routine.

Each activity in each phase requires more-detailed actions or elements. Those actions or elements are directly related to, and tailored for, the specific initiative being implemented. For instance, *communicate* and *measure* are activities in two phases, but the specific actions taken may differ among initiatives and from one phase to the other. At the same time, different initiatives may progress along the framework at different paces. This framework can be used to understand the implementation of digital modernization activities and progress to date and to develop recommendations for enhancing implementation success. The framework can be used in tandem with the maturity model or road map recommended earlier to continuously measure progress and make adjustments to improve outcomes.

We have also recommended establishing pilot programs as part of early implementation activities. These pilot efforts should be focused on a specific use case and include smaller, new acquisition programs that are digital from the start, rather than imposing digital requirements on large, complex existing programs. The intent of these pilot efforts should be to identify lessons that can be applied at a larger scale and demonstrate the utility of digital acquisition within a use case. To achieve that objective, the pilot efforts should be straightforward, short (in terms of design-to-fielding duration) and unclassified, and they should include monitoring and data collection that documents the pilot effort in detail and provides insight into the contribution of the pilot’s digital elements to program and mission outcomes.

Digital Modernization Catalog

This appendix describes the list of DoD digital modernization activities that we compiled in a digital modernization data catalog over the course of this study, which we delivered to the sponsor in October 2025. We developed it to track key initiatives, software, policies, programs, and organizations related to digital acquisition. The catalog is useful for informing leadership what has been accomplished in the DoD digital acquisition space, what work is ongoing, and what gaps are necessary to fill. It contains fields that note information about each of the digital modernization activities. The fields are defined as follows:

- *Activity*: the name of the activity
- *Description*: a short description of the digital modernization activity
- *Activity Type*: the nature or class of the digital modernization activity. Values are as follows:
 - Strategy Document
 - Research
 - Policy
 - Data Standards
 - Software
 - Framework
 - Database
 - Working Group
 - Data Visualization
 - Application
 - Training Program
 - Digital Platform.
- *Category of Activity*: the primary category of digital modernization that corresponds to the activity (as described in Chapter 2, these are strategy, data governance, data storage and sharing, data analytics and reporting, and workforce)
- *Activity Tag*: a field for relevant tags, including AVDF, MSAR, DAVE, DMAG, AIRC, ADVANA, Digital Engineering, Innovation, and other labels that may help define or further categorize the digital modernization activity
- *Primary API Objective*: an acquisition data–related taxonomy derived from multiple official A&S source documents (in this case, API = Acquisition Policy and Innovation; i.e., the sponsoring office for this work that no longer exists)
- *Source Documentation*: the memo, policy, or internal documentation that provides authoritative information or evidence of the digital modernization activity

- *Office of Primary Responsibility (OPR)*: the stakeholders responsible for achieving digital modernization
- *Year*: the calendar year in which the digital modernization effort was initiated (for ongoing efforts) or implemented (for complete efforts)
- *Implementation Status*: a qualitative evaluation of the implementation status of each digital modernization effort.

The data catalog has a number of limitations. Firstly, the database is complete to the best of our knowledge as of August 2025. It is not an exhaustive list of all digital modernization efforts, and the absence of an initiative or activity should not be seen as evidence of its nonexistence. Secondly, the database represents a point-in-time snapshot of digital modernization efforts related to digital acquisition. These efforts are ever-changing and maturing. Consequently, the relevance of the catalog will wane with time unless it is continuously updated.

Below are two examples of activities listed in the catalog with accompanying metadata. Note that not all activities have values for each field in the catalog.

Example 1: Centralized Unique Program Identification (CUPID)

- *Activity*: Centralized Unique Program Identification (CUPID)
- *Description*: The CUPID code, or the PNO, serves as a unique identifier for acquisition programs
- *Activity Type*: Data Standard
- *Category of Activity*: Data Governance
- *Activity Tag*: AVDF/Data Standards
- *Primary API Objective*: DAS Insight
- *Source Documentation*: ASD(A) Memo: Centralized Unique Program Identification (CUPID) Implementation
- *Office of Primary Responsibility (OPR)*: OUSD(A&S)
- *Year*: 2022
- *Implementation Status*: Close to full adoption for Army and Air Force programs. The Navy has not yet tagged its lower ACAT programs.

Example 2: Defense Civilian Training Corp (DCTC)

- *Activity*: Defense Civilian Training Corp (DCTC)
- *Description*: An A&S led program that partners with universities to train students to enter the acquisition workforce, with an emphasis on digital skills. The program curriculum is developed and delivered by AIRC.
- *Activity Type*: Training Program
- *Category of Activity*: Workforce
- *Activity Tag*: DCTC
- *Primary API Objective*: Workforce

- *Source Documentation:* AV Governance Documentation
- *Office of Primary Responsibility (OPR):* OUSD(A&S)
- *Year:* 2023
- *Implementation Status:* The DCTC program is currently being piloted at four U.S. universities.

FY 2021 NDAA Section 836

In this appendix, we reproduce the text of Section 836 of the FY 2021 NDAA.⁶⁴

SEC. 836. DIGITAL MODERNIZATION OF ANALYTICAL AND DECISION SUPPORT PROCESSES FOR MANAGING AND OVERSEEING DEPARTMENT OF DEFENSE ACQUISITION PROGRAMS.

(a) DIGITAL DATA MANAGEMENT AND ANALYTICS CAPABILITIES.—

(1) IN GENERAL.—The Secretary of Defense shall iteratively develop and integrate advanced digital data management and analytics capabilities, consistent with private sector best practices, that—

(A) integrate all aspects of the defense acquisition system, including the development of capability requirements, research, design, development, testing, evaluation, acquisition, management, operations, and sustainment of systems;

(B) facilitate the management and analysis of all relevant data generated during the development of capability requirements, research, design, development, testing, evaluation, acquisition, operations, and sustainment of systems;

(C) enable the use of such data to inform further development, acquisition, management and oversight of such systems, including portfolio management; and

(D) include software capabilities to collect, transport, organize, manage, make available, and analyze relevant data throughout the life cycle of defense acquisition programs, including any data needed to support individual and portfolio management of acquisition programs.

(2) REQUIREMENTS.—The capabilities developed under paragraph (1) shall—

(A) be accessible to, and useable by, individuals throughout the Department of Defense who have responsibilities relating to activities described in clauses (A) through (C) of paragraph (1);

(B) enable the development, use, curation, and maintenance of original form and real-time digital systems by—

(i) ensuring shared access to data within the Department;

(ii) supplying data to digital engineering models for use in the defense acquisition, sustainment, and portfolio management processes; and

(iii) supplying data to testing infrastructure and software to support automated approaches for testing, evaluation, and deployment throughout the defense acquisition, sustainment, and portfolio management processes; and

(C) feature—

⁶⁴ Pub. L. 116-283, 2021, pp. 3756–3760.

- (i) improved data management and sharing processes;
- (ii) timely, high-quality, transparent, and actionable analyses; and
- (iii) analytical models and simulations.

(3) ENABLING DATA INFRASTRUCTURE, TOOLS, AND PROCESSES.—In developing the capability required under paragraph (1), the Secretary of Defense shall—

(A) move supporting processes and the data associated with such processes from analog to digital format, including planning and reporting processes;

(B) make new and legacy data more accessible to, and usable by, appropriate employees and contractors (at any tier) of the Department of Defense and members of the Armed Forces, including through migration of program and other documentation into digital formats;

(C) modernize the query, collection, storage, retrieval, reporting, and analysis capabilities for stakeholders within the Department, including research entities, Program Management Offices, analytic organizations, oversight staff, and decision makers;

(D) automate data collection and storage to minimize or eliminate manual data entry or manual reporting;

(E) enable employees and other appropriate users to access data from all relevant data sources, including through—

(i) streamlining data access privileges;

(ii) sharing of appropriate data between and among Federal Government and contractor information systems; and

(iii) enabling timely and continuous data collection and sharing from all appropriate personnel, including contractors;

(F) modernize existing enterprise information systems to enable interoperability consistent with technical best practices; and

(G) provide capabilities and platforms to enable continuous development and integration of software using public and private sector best practices.

(b) PORTFOLIO MANAGEMENT.—The Secretary of Defense shall establish capabilities for robust, effective, and data-driven portfolio management described in subsection (a)(1)(C), using the capability established in this section, to improve the Department of Defense-wide assessment, management, and optimization of the investments in weapon systems of the Department, including through consolidation of duplicate or similar weapon system programs.

(c) DEMONSTRATION ACTIVITIES.—

(1) IN GENERAL.—The Secretary of Defense shall carry out activities to demonstrate the capability required under subsection (a).

(2) ACTIVITY SELECTION.—Not later than July 15, 2021, the Secretary of Defense shall select decision support processes and individual acquisition programs to participate in the demonstration activities under paragraph (1), including—

(A) decision support processes, including—

(i) portfolio management as described in subsection (b);

(ii) one or more acquisition data management test cases; and

(iii) one or more development and test modeling and simulation test cases to demonstrate the ability to collect data from tests and operations in the field, and feed the data back into models and simulations for better software development and testing;

(B) individual acquisition programs representing—

(i) one or more defense business systems;

(ii) one or more command and control systems;

(iii) one or more middle tier of acquisition programs;

(iv) programs featuring a cost-plus contract type, and a fixed-price contract type, and a transaction authorized under section 2371 or 2371b of title 10, United States Code; and

(v) at least one program in each military department.

(3) EXECUTION OF DEMONSTRATION ACTIVITIES.—As part of the demonstration activities under paragraph (1), the Secretary shall—

(A) conduct a comparative analysis that assesses the risks and benefits of the digital management and analytics capability used in each of the programs participating in the demonstration activities relative to the traditional data collection, reporting, exposing, and analysis approaches of the Department;

(B) ensure that the intellectual property strategy for each of the programs participating in the demonstration activities is best aligned to meet the goals of the program; and

(C) develop a workforce and infrastructure plan to support any new policies and guidance implemented in connection with the demonstration activities, including any policies and guidance implemented after the completion of such activities.

(d) POLICIES AND GUIDANCE REQUIRED.—Not later than March 15, 2022, based on the results of the demonstration activities carried out under subsection (c), the Secretary of Defense shall issue or modify policies and guidance to—

(1) promote the use of digital data management and analytics capabilities; and

(2) address roles, responsibilities, and procedures relating to such capabilities.

(e) STEERING COMMITTEE.—

(1) IN GENERAL.—The Secretary of Defense shall establish a steering committee to assist the Secretary in carrying out subsections (a) through (c).

(2) MEMBERSHIP.—The steering committee shall be composed of the following members or their designees:

(A) The Deputy Secretary of Defense.

(B) The Chief Information Officer.

(C) The Director of Cost Assessment and Program Evaluation.

(D) The Under Secretary of Defense for Research and Engineering.

(E) The Under Secretary of Defense for Acquisition and Sustainment.

(F) The Director of Operational Test and Evaluation.

(G) The Service Acquisition Executives.

(H) The Director for Force Structure, Resources, and Assessment of the Joint Staff.

(I) The Director of the Defense Digital Service.

(J) Such other officials of the Department of Defense as the Secretary determines appropriate.

(f) INDEPENDENT ASSESSMENTS.—

(1) INITIAL ASSESSMENT.—

(A) IN GENERAL.—The Defense Innovation Board, in consultation with the Defense Digital Service, shall conduct an independent assessment and cost-benefits analysis to identify recommended approaches for the implementation of subsections (a) through (c).

(B) ELEMENTS.—The assessment under subparagraph (A) shall include the following:

(i) A plan for the development and implementation of the capabilities required under subsection (a), including a plan for any procurement that may be required as part of such development and implementation.

(ii) An independent cost assessment of the total estimated cost of developing and implementing the capability, as well as an assessment of any potential cost savings.

(iii) An independent estimate of the schedule for the development approach, and order of priorities for implementation of the capability, including a reasonable estimate of the dates on which the capability can be expected to achieve initial operational capability and full operational capability, respectively.

(iv) A recommendation identifying the office or other organization of the Department of Defense that would be most appropriate to manage and execute the capability.

(C) REPORT.—Not later than July 15, 2021, the Defense Innovation Board, in consultation with the Defense Digital Service, shall submit to the Secretary of Defense and the congressional defense committees a report on the findings of the assessment under subparagraph (A), including the findings of the assessment with respect to each element specified in subparagraph (B).

(2) SECOND ASSESSMENT.—

(A) IN GENERAL.—Not later than March 15, 2023, the Defense Innovation Board and the Defense Science Board shall jointly complete an independent assessment of the progress of the Secretary in implementing subsections (a) through (c). The Secretary of Defense shall ensure that the Defense Innovation Board and the Defense Science Board have access to the resources, data, and information necessary to complete the assessment.

(B) INFORMATION TO CONGRESS.—Not later than 30 days after the date on which the assessment under subparagraph (A) is completed, the Defense Innovation Board and the Defense Science Board shall jointly provide to the congressional defense committees—

(i) a report summarizing the assessment; and

(ii) a briefing on the findings of the assessment.

(g) DEMONSTRATIONS AND BRIEFING.—

(1) DEMONSTRATION OF IMPLEMENTATION.—Not later than October 20, 2021, the Secretary of Defense shall submit to the congressional defense committees a demonstration and briefing on the progress of the Secretary in implementing subsections (a) through (c). The briefing shall include an explanation of how the results of the demonstration activities carried out under subsection (c) will be incorporated into the policy and guidance required under subsection (d), particularly the policy and guidance of the members of the steering committee established under subsection (e).

(2) BRIEFING ON LEGISLATIVE RECOMMENDATIONS.—Not later than February 1, 2022, the Secretary of Defense shall submit to the Committees on Armed Services of the Senate and of the House of Representatives a briefing that identifies any changes to existing law that may be necessary to facilitate the implementation of subsections (a) through (c).

(3) DEMONSTRATION OF PORTFOLIO MANAGEMENT.—In conjunction with the budget of the President for fiscal year 2023 (as submitted to Congress under section 1105(a) of title 21, United States Code), the Deputy Secretary of Defense shall schedule a demonstration of the portfolio management capability developed under subsection (b) with the congressional defense committees.

Abbreviations

AAF	Adaptive Acquisition Framework
ACAT	acquisition category
ADVANA	Advancing Analytics
AI	artificial intelligence
AIRC	Acquisition Innovation Research Center
AoS	acquisition of services
API	application programming interface
ASD(A)	Assistant Secretary of Defense for Acquisition
ASD(S)	Assistant Secretary of Defense for Sustainment
AV	acquisition visibility
AVDF	Acquisition Visibility Data Framework
AVSG	Acquisition Visibility Steering Group
AVWG	Acquisition Visibility Working Group
AWG	Analysis Working Group
CAPE	Cost Assessment and Program Evaluation
CDAO	Chief Digital and Artificial Intelligence Office
CPM	capability portfolio management
CPMR	Capability Portfolio Management Review
CUPID	Centralized Unique Program Identification
CUSID	Centralized Unique Systems Identification
DAES	Defense Acquisition Executive Summary
DAGIR	Data and Applications Government-owned Interoperable Repositories
DAMIR	Defense Acquisition Management Information Retrieval
DAS	Defense Acquisition System
DAU	Defense Acquisition University
DAVE	Defense Acquisition Visibility Environment
DBS	Defense Business System
DCTC	Defense Civilian Training Corps
DIB	Defense Innovation Board
DMAG	Deputy's Management Action Group
DMM	digital materiel management
DoD	Department of Defense
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction

DTO	Digital Transformation Office
EO	Executive Order
EVM	earned value management
FFRDC	federally funded research and development center
FMS	foreign military sales
FoRGED	Fostering Reform and Government Efficiency in Defense
FY	fiscal year
IAPR	Integrated Acquisition Portfolio Review
INCOSE	International Council on Systems Engineering
IT	information technology
J-8	Force Structure, Resources, and Assessment Directorate
JCA	Joint Capability Area
LRIP	Low-Rate Initial Production
MBSE	model-based system engineering
MCA	major capability acquisition
MDAP	major defense acquisition program
MoA	memorandum of agreement
MSAR	Modernized Selected Acquisition Report
MTA	middle tier of acquisition
NC3	nuclear command, control, and communications
NDAA	National Defense Authorization Act
OpenDAGIR	Open Data and Applications Government-owned Interoperable Repositories
OPR	office of primary responsibility
OSD	Office of the Secretary of Defense
OUSD(A&S)	Office of the Under Secretary of Defense for Acquisition and Sustainment
OUSD(R&E)	Office of the Under Secretary of Defense for Research and Engineering
PAE	portfolio acquisition executive
PEO	program executive officer
PMRT	Project Management Resource Tools
PNO	program number
PPBE	planning, programming, budgeting, and execution
RDAIS	Research Development and Acquisition Information System
SPEED	Streamlining Procurement for Effective Execution and Delivery
UARC	university-affiliated research center
UCA	urgent capability acquisition
VAULTIS	visible, accessible, understandable, linked, trustworthy, interoperable, and secure

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