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Data, Analytics, and Artificial Intelligence Adoption Strategy (Updated)

Accelerating Decision Advantage

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Preface

The Department of Defense (DoD) has been investing in artificial intelligence (AI) and responsibly fielding data- and AI-enabled systems for over 60 years. Today, data, analytics, and AI technologies are increasingly available to DoD Components and providing value to our service members.

Alongside industry's advancements, DoD has for years made steady and swift improvements to its data foundation and analytics capabilities: experimenting with AI through research and development, integrating these technologies into business and warfighting functions, and laying the foundation for their use at scale. As our investment, experimentation, and innovation continues and accelerates, our task now is to drive the diffusion of these technologies across the enterprise.

Although our strategic competitors have ambitious aims for AI, the United States and its military possess strong structural advantages in talent, warfighting experience, technology availability, and systems integration — not to mention the values that guide everything we do. Equipping our people with the tools and resources to make better decisions faster will increase the efficiency of DoD business operations, make our warfighting capabilities and the people who command them more effective, and create opportunities to employ novel operational concepts.

Responsibly and rapidly realizing the full promise of data, analytics, and AI is not the sole job of a single organization or program; it's on all of us. Providing DoD data as an enterprise resource, for instance, requires more sharing and collaboration, not less. We seek an agile strategic approach that guides decentralized action across DoD, inspires campaigns of learning, and leverages all our people, processes, and enabling technologies.

As we have integrated analytics and AI applications, we have observed their benefits and learned crucial lessons about their limitations. From the boardroom to the battlefield, more work remains, such as improving data quality and network infrastructure. This Strategy serves as a guide for how we will strengthen the organizational environment in which DoD deploys data, analytics, and AI capabilities for enduring decision advantage.

Successfully defending the nation depends on our people. As we have always done, DoD will continue to trust, support, empower, and invest in our people. We will not outpace our adversaries through imitation. We will succeed by leading with our strengths: our democratic values, our diverse and open society, our culture of ingenuity, our second-to-none innovation base, and our globe-spanning network of Allies and partners. Together, we will harness data, analytics, and AI for the defense, security, and prosperity of the American people and the world.

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Strategic Environment

As the 2022 National Defense Strategy (NDS) makes clear, the United States possesses strengths that our competitors cannot match, among them our diverse and open society, our culture of ingenuity, our innovation base, and our globe-spanning network of Allies and partners. The Department leverages these strengths by distributing authority, empowering leaders in our All-Volunteer Force to innovate at the edge and apply their own judgment to combine old and new capabilities into superior operational concepts. The latest advancements in data, analytics, and artificial intelligence (AI) technologies enable leaders to make better decisions faster, from the boardroom to the battlefield. **Therefore, accelerating the adoption of these technologies presents an unprecedented opportunity to equip leaders at all levels of the Department with the data they need, and harness the full potential of the decision-making power of our people**.

The NDS also describes the need for the United States to sustain and strengthen deterrence against the People's Republic of China and other strategic competitors, which have widely communicated their intentions to field AI for military advantage. Accelerating adoption of data, analytics, and AI technologies will enable enduring decision advantage, allowing DoD leaders to prioritize investments to strengthen deterrence; link cross-cutting campaign outcomes that counter our competitors' coercive measures; and deploy continuous advancements in technological capabilities to creatively address complex national security challenges in this decisive decade.

The urgency of the strategic environment and the scale at which the Department must operate are formidable. The Department is well-positioned to excel because it has established a foundation of strategic guidance informed by lessons learned from hands-on initiatives over the last several years.[1] The Department's first AI Strategy, published in 2018, and revised Data Strategy, published in 2020, are two of these foundational efforts. The 2018 AI Strategy emphasized the need to build centralized infrastructure for AI development, to bridge AI technology developments from the Department's research and engineering communities, and to exercise international leadership in military ethics and AI safety. The 2020 Data Strategy envisioned the Department as a data-centric organization that can employ data supporting advanced capabilities for operational advantage and increased efficiency, and oriented enterprise data management activities toward the VAULTIS goal framework.[2]

Since these strategies were published, industry has produced more tools, platforms, and services for federated environments, enabling more effective, decentralized data management, and analytics and AI development. Adoption of these commercial offerings has allowed organizations within the Department to focus on necessary internal transformation efforts and deploy government-owned tools, services, and platforms for military use cases. The Department has matured collaboration with academia, industry, as well as Allies and partners, and promoted best practices on data management, responsible AI, and AI readiness. Experimentation and fielding have resulted in a deeper understanding of the degrees of data quality and availability required to develop and deploy advanced analytics and AI capabilities at scale.

This DoD Data, Analytics, and AI Adoption Strategy builds upon and supersedes the 2018 AI Strategy and the 2020 Data Strategy to continue the Department's digital transformation. The Department will continuously seize opportunities presented by iterative technology advancements, at the speed of relevance and at the scale of our global mission. To do so, the Department requires a unified approach across data, analytics, and AI activities; an educated, empowered workforce skilled at incorporating commercial teams and tools; continued advanced research and rapid experimentation; and effective integration with our Allies and partners. The Department cannot succeed alone. Our integration of data, analytics, and AI technologies is nested within broader U.S. government policy, the network of private sector and academic partners that promote innovation, and a global ecosystem. We need a systematic, agile approach to data, analytics, and AI adoption that is repeatable by all DoD Components. This strategy outlines our approach to improving the organizational environment within which our people can deploy data, analytics, and AI capabilities for enduring decision advantage.

Key Outcomes

Summary

As a result of implementing this strategy, DoD leaders and warfighters will be able to make rapid, well-informed decisions by expertly leveraging high-quality data, advanced analytics, and AI as part of a continuous, outcome-driven, and user-focused development, deployment, and feedback cycle.

The Department's investments in data, analytics, and AI will address key operational problems identified in the 2022 NDS, fill validated gaps to enhance the warfighting capabilities of the Joint Force, and strengthen the enterprise foundation required to sustain enduring advantages. Fielding data, analytics, and AI capabilities across this continuum from the boardroom to the battlefield recognizes that warfighting decision advantage is enabled by hundreds, or thousands, of decisions made by personnel and program offices at great distances from the frontline. Strengthening decision advantage for the Department's warfighting and

business operations is key to maintaining a resilient future force that can address a broader array of operational problems, dynamically campaign and deter, and prevail in conflict, if necessary.

Decision advantage is a competitive condition characterized by the following outcomes:
- Battlespace awareness and understanding
- Adaptive force planning and application
- Fast, precise, and resilient kill chains
- Resilient sustainment support
- Efficient enterprise business operations

Agile, user-focused, product-centric development is essential to achieving these outcomes because humans and machines will work together in the responsible, effective employment of data, analytics, and AI-enabled capabilities.

Today, there are multi-disciplinary teams throughout the Department that leverage common technology development best practices. These practices include:
- Employing Agile development fundamental principles and approaches
- Building intuitive interfaces to accelerate human adoption of new technology
- Developing products with cross-functional teams focused on customer needs
- Offering product portfolios with shared digital foundations
- Experimenting with minimum viable products in operational environments to identify new concepts for use, improve capability, and manage emergent risks

More is needed now, and at scale. The Department will pursue a multi-disciplinary approach and implement these best practices to strengthen its technology, human capital, processes, and culture. This approach has implications analogous to pivoting from a heavy armor force to one with greater maneuverability. **The Department will enhance its competitive edge through a vigorous and continuous capability delivery pipeline that can respond with agility to changing environments and technologies**.

The Department's agile approach to adoption (Figure 1) ensures a tight feedback loop between technology developers and users through a continuous cycle of iteration, innovation, and improvement of solutions that enable decision advantage. Practicing agility and learning by doing will accelerate deployment speed–measured in hours or days, not months or years. Creating effective, iterative feedback loops among developers, users, subject matter experts, and test and evaluation (T&E) experts will ensure capabilities are more stable, secure, ethical, and trustworthy.

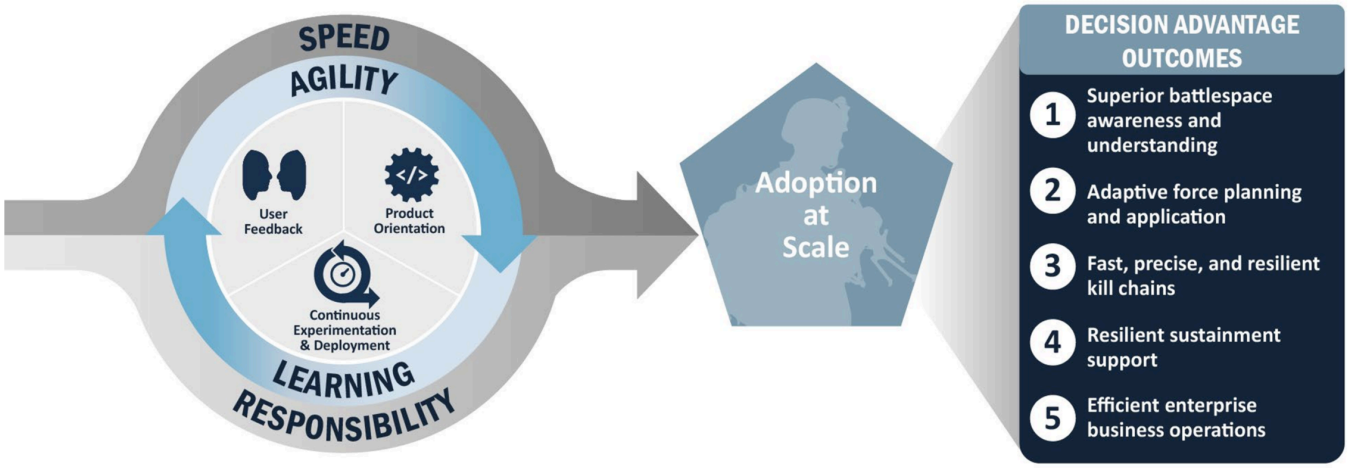

Figure 1: FIGURE 1: Employing an Agile Approach to Adoption to Scale Decision Advantage Outcomes

An agile approach to adoption emphasizes ***speed*** of delivery and continuous improvement, prioritizing outcomes over processes. Valuing speed necessitates organizational agility and learning through early and ongoing real-world feedback. The Department will move toward greater integration, transparency, and knowledge sharing across organizational boundaries. Increased diffusion of data, analytics, and AI technologies will introduce technical vulnerabilities that require rigorous protection measures. *These risks will be managed not by flawless forecasting, but by continuous deployment powered by campaigns of learning*. Developing

capability in this way enables ***responsibility***, ensuring not only the sustained quality, stability, and security of DoD systems, but also providing the means by which engineers can reduce unintended bias and instill justified confidence with their users.

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Strategic Goals

The Department will focus strategic efforts on several interdependent goals that support the DoD AI Hierarchy of Needs (Figure 2). The AI Hierarchy of Needs is a pyramid with quality data as its foundation since all analytic and AI capabilities require trusted, high-quality data to support decision makers. The next layer in the Hierarchy is insightful analytics and metrics, the foundational models and visualizations required for DoD leaders to understand their domain and the key variables impacting outcomes in those domains. At the top of the pyramid is Responsible AI, the Department's dynamic approach to the design, development, deployment, and use of AI capabilities in accordance with the DoD AI Ethical Principles while delivering better, faster insights and improved mission outcomes.[3] The layers of the Hierarchy are supported by robust sets of processes. Increased data quality and insightful analytics are achievable through effective enterprise data governance. Sound assurance processes for testing, evaluation, validation, and verification are imperative for Responsible AI. Around the pyramid are enablers, such as digital talent management, that help sustain the Hierarchy of Needs.

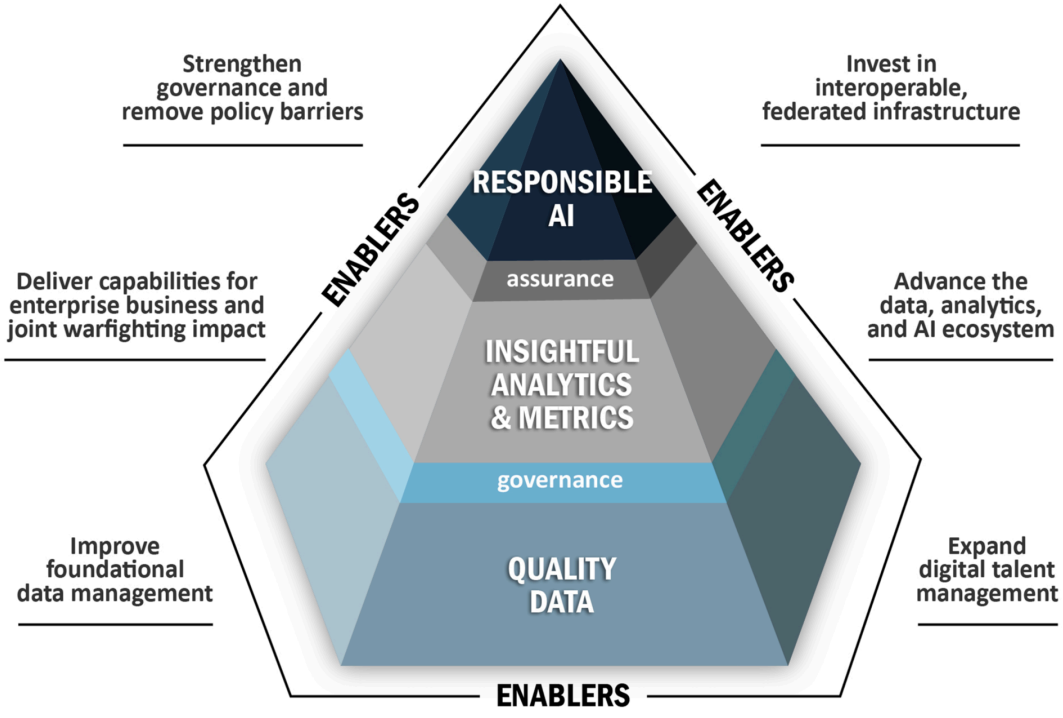

Figure 2: FIGURE 2: Strategic Goals and the AI Hierarchy of Needs

The Hierarchy is helpful as a framework for assessing DoD AI readiness, and for guiding the Department's goals to accelerate adoption of data, analytics, and AI technologies to build enduring decision advantage. These interdependent goals, and their supporting activities and investments, cut across technology, human capital, process, and culture areas, and are described in further detail on the next few pages.

APPENDIX A - References

1. This guidance includes the DoD AI Strategy (2018), the DoD Digital Modernization Strategy (2019), the DoD Data Strategy (2020), the DoD Enterprise DevSecOps Strategy Guide (2021), the DoD Software Modernization Strategy (2022), the Trusted AI and Autonomy Critical Technology Roadmap (2022), and the DoD Zero Trust Strategy (2022).
2. The 2020 DoD Data Strategy outlined the following seven goals (VAULTIS): Visible – Consumers can locate the needed data. Accessible – Consumers can retrieve the data. Understandable – Consumers can find descriptions of data to recognize the content, context, and applicability. Linked Consumers can exploit complementary data elements through innate relationships. Trustworthy – Consumers can be confident in all aspects of data for decision-making. Interoperable – Consumers and producers have a common representation and comprehension of data. Secure Consumers know that data is protected from unauthorized use and manipulation.
3. For more information on the Department's Responsible AI plan, see the "US Department of Defense Responsible Artificial Intelligence Strategy and Implementation Pathway."