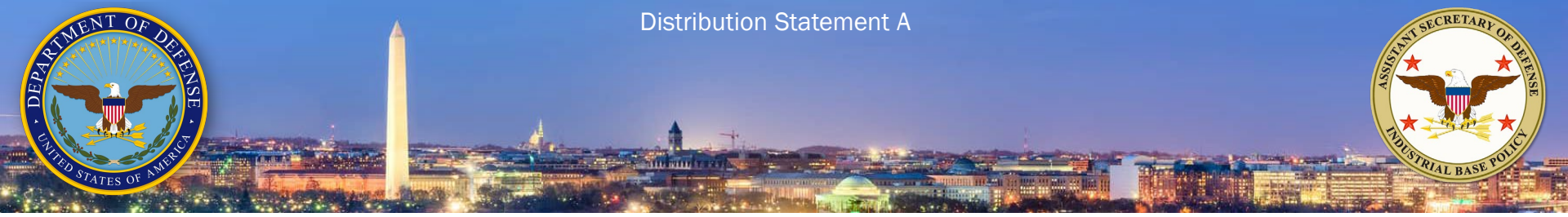

Artificial Intelligence (AI) in Defense: A Roadmap for the Future of the Defense Industrial Base (DIB)

Strategizing Integration, Ensuring Security, and Pioneering Innovations in Defense through Artificial Intelligence

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Introduction

INTRODUCTION

Artificial Intelligence (AI) is a growing enabler for defense applications. Further, the Department of Defense (DoD) recognizes the importance of investing in the Defense Industrial Base's (DIB) ability to incorporate AI into the design, development, operations, maintenance, and support of defense systems. Executive Order (E.O.) 14179, "Removing Barriers to American Leadership in Artificial Intelligence," highlights the importance of integrating AI securely and effectively.

SCOPE

To assess the ability of the DIB to produce new **systems with AI-enabled capabilities**, Industrial Base Policy (IBP) sought to **understand the industry and government forces** impacting the development of AI and **develop a roadmap of actions** the DoD can take to support AI and warfighter capabilities within the DIB.

APPROACH

To assess the DIB's potential for AI-enabled systems and develop the roadmap to its AI-driven future, IBP:

- Analyzed current and future AI processes and capabilities
- Identified leading trends and applications of AI within industry—including the defense industry
- Conducted an environmental scan to identify current actions within the DoD
- Leveraged insights from the Request for Information (RFI) titled "Defense Industrial Base Adoption of Artificial Intelligence for Defense Applications"

Executive Summary

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KEY FINDINGS

- **AI Growth:** AI capabilities are expanding and maturing. Industry is applying AI to drive overall productivity and product capability.
- **DIB and Defense Use Cases:** AI is being deployed by DIB suppliers for business operations and weapons system integration. Capabilities and use cases are rapidly increasing to rebuild the military.
- **Increasing DoD Resources:** The DoD has established guidance, tools, and acquisition pathways to facilitate AI acquisition for DoD problem sets.
- **Opportunities for AI Adoption:** There is opportunity for the DoD to further improve AI adoption with short-, medium-, and long-term actions in the following categories to achieve the following objectives:

Infrastructure and Supply Chain:

Reduce reliance on foreign suppliers for AI infrastructure by investing in domestic production capabilities to promote a more reliable and resilient supply chain.

Workforce and Education:

Coordinate with the broader AI ecosystem of academia, industry, and other government partners to establish and **expand training programs and curricula for both the current and future workforce.**

Innovation:

Develop **frameworks and standards to support data sharing**, AI development, and system interoperability.

Acquisition, Policy, and Regulatory Environment:

Simplify and expedite the acquisition process for emerging technology and **leverage more rapid contracting pathways** such as Other Transaction Agreements (OTAs).

IBP is positioned to support AI adoption in the DIB by informing, influencing, and supporting the Services and across the Office of the Secretary of Defense to execute the short-, medium-, and long-term actions of the AI roadmap.

AI Overview

AI is a rapidly evolving and global field, driving new capabilities for applications across all industries.

What is AI?

AI is the ability of machines to perform tasks that normally require human intelligence[1]

FOUR MAIN TYPES OF AI[2]

REACTIVE MACHINES

Programmed to respond to specific inputs with specific outputs, without the ability to learn or store memories. They are task-specific and deterministic.

LIMITED MEMORY

Uses historical data and pre-programmed information to make predictions and perform classification tasks. It does this by temporarily storing data from interactions or observations, which is then used as a reference or context for making decisions.

THEORY OF MIND

Refers to the ability of AI to understand and model the thoughts, intentions, and emotions of other agents, such as humans or other artificial intelligences. This is theoretical and not yet developed.

SELF AWARE

Represents a speculative and futuristic vision of artificial intelligence, where machines would possess consciousness, self-awareness, and even sentience. This is theoretical and not yet developed.

COMMON AI TERMINOLOGY

MACHINE LEARNING (ML)[3]

A subset of artificial intelligence that allows a machine or system to learn and improve from experience. Instead of direct programming, ML leverages algorithms to analyze large data sets, learn from the data and insights, and then make informed decisions. Machine learning algorithms can improve over time as they intake additional data.

- **Relationship to AI:** ML is an application of AI where machines extract insights from data and learn from it.
- **Examples:** Facial recognition, spam filtering

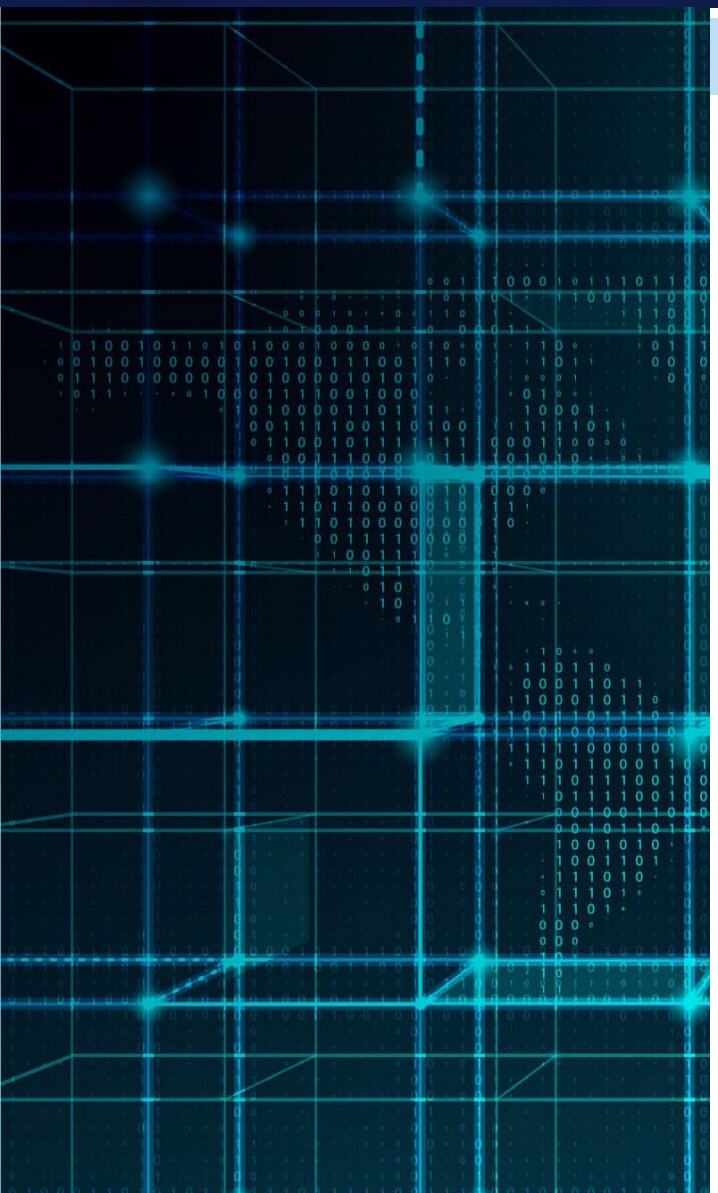
GENERATIVE AI (GEN AI)[4]

Gen AI refers to the use of AI to create new content such as text, images, and videos.

- **Relationship to ML:** Gen AI uses ML to analyze datasets of human-created content. It then detects patterns within the datasets and uses these learned patterns to generate new content.
- **Examples:** OpenAI's GPT-4 and DALL-E for generating images

1. DAU Overview of Artificial Intelligence (AI) in the DoD
2. Understanding the 4 Types of Artificial intelligence
3. Artificial Intelligence (AI) vs. Machine Learning (ML)
4. What is generative AI?

AI Trends



AI usage is surging, but faces headwinds and unknowns

RAPID GROWTH AND INVESTMENT[1]

The AI market is projected to reach $407 billion by 2027. AI investment surged in 2022 to reach $25.2 billion. Major players in the Gen AI space, such as OpenAI, have seen substantial fundraising rounds.

INDUSTRY SEEKS PRODUCTIVITY[2]

64% of businesses believe that AI will help increase their overall productivity. Additionally, 25% of companies are looking to AI solutions for labor shortages. However, semiconductor production capacity is limiting AI model progress which could delay productivity improvements.

DESIRE FOR STANDARDIZATION[1]

Research shows there is a lack of standardization in responsible AI reporting. Industry leaders such as OpenAI and Google test their models against different responsible AI benchmarks. This makes it difficult to consistently and systematically compare leading AI models.

CONSUMER SENTIMENT IS WAVERING[1]

Most consumers believe AI will dramatically affect their lives in the next three to five years. Over half of consumers expressed apprehension towards AI products and services. Similarly, over half of consumers feel more concerned than excited about AI, an increase of 13% from 2022.

1. AI Index Report 2025
2. 22 Top AI Statistics and Trends

AI Use Cases

AI use cases are expanding in reach and maturing in capability

SUPPLY CHAIN OPTIMIZATION[1]

AI and Gen AI have the potential to **positively impact aspects of supply chain resilience.** For example, identifying priorities of an organization's supply chain strategy, proactively responding to risk events, effectively driving risk mitigation, and continuous monitoring of risk profiles in complex multi-tier supply chain networks.

HEALTHCARE ADVANCEMENTS[2]

AI can improve diagnostic accuracy through image recognition technologies, assist in drug discovery, analyze complex biological data, and improve patient experience. Integrating AI in healthcare **reduces operational cost and enhances the standard of care**.

AUTONOMOUS SYSTEMS[3]

Autonomous vehicles are an example of autonomous systems that use sensor hardware to detect the location of surrounding objects. Data is then transmitted to algorithms which respond by **making decisions about vehicle actions and performance**.

NATURAL LANGUAGE PROCESSING (NLP)[4]

NLP has enabled the surge in Gen AI. Large language models (LLMs), a subset of NLP, can understand requests and generate text, image, and video responses. NLP also plays a growing role in enterprise solutions that **streamline and automate business operations.**

AI IN ACTION[5]

- In April 2024, an autonomous fighter jet, VISTA, competed against an F-16 in the **first-ever artificial intelligence-fueled dogfight**.
- The jets performed the exercise with VISTA flying at speeds of up to **1,200 miles per hour and within 2,000 feet of the manned F-16**, including nose-to-nose passes and vertical maneuvering.

1. Report: Generative AI-powered supply chain resilience
2. AI in healthcare: Use cases, applications, benefits, solution, AI agents and implementation
3. What is autonomous AI?
4. What is NLP (natural language processing)?
5. US Air Force stages dogfights with AI-flown fighter jet

AI in Defense Applications

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AI has a variety of applications for defense operations

INTELLIGENCE WITH DATA[1]

Integration of AI into the collection and interpretation of satellite and drone surveillance data feeds to provide a clearer picture of a conflict or crisis dynamic, analysis of historical mission data, environmental factors, and more. Use of autonomous vehicles, such as submarines and land machines, enhanced with reinforcement learning algorithms to **perform reconnaissance and discover targets**.

PREDICTIVE ASSET MAINTENANCE[1]

Sensor technology and assisted vision can be used to **detect flaws and system failures in equipment before they occur**. Deep learning and planning algorithms can determine maintenance schedules based on operating standards for various components, reducing accidents, and unplanned delays. AI can also **Consolidate and analyze** real estate assets to create improved management and maintenance strategies.

LOGISTICS AND MISSION PLANNING[1]

Combines environmental, asset, and historical mission data to better **predict mission scenarios and ensure resources are allocated advantageously**. Improve coordination between missions, operations, or task forces. Identifies optimal areas for camps and evacuation supply routes for both military and humanitarian efforts.

ENHANCED OPERATIONS[1]

Uses sensor technology to track troop movements and **quickly identify unknown objects** in the field, thereby better informing command decisions. **Deploys autonomous vehicles** to provide life-saving duties for wounded soldiers in the field.

1. Report: The AI advantage in defence and security

AI in Industry

Industry is investing heavily in AI research and development (R&D) and producing new AI models and capabilities but faces headwinds and risks due to rapid growth.

AI in Industry

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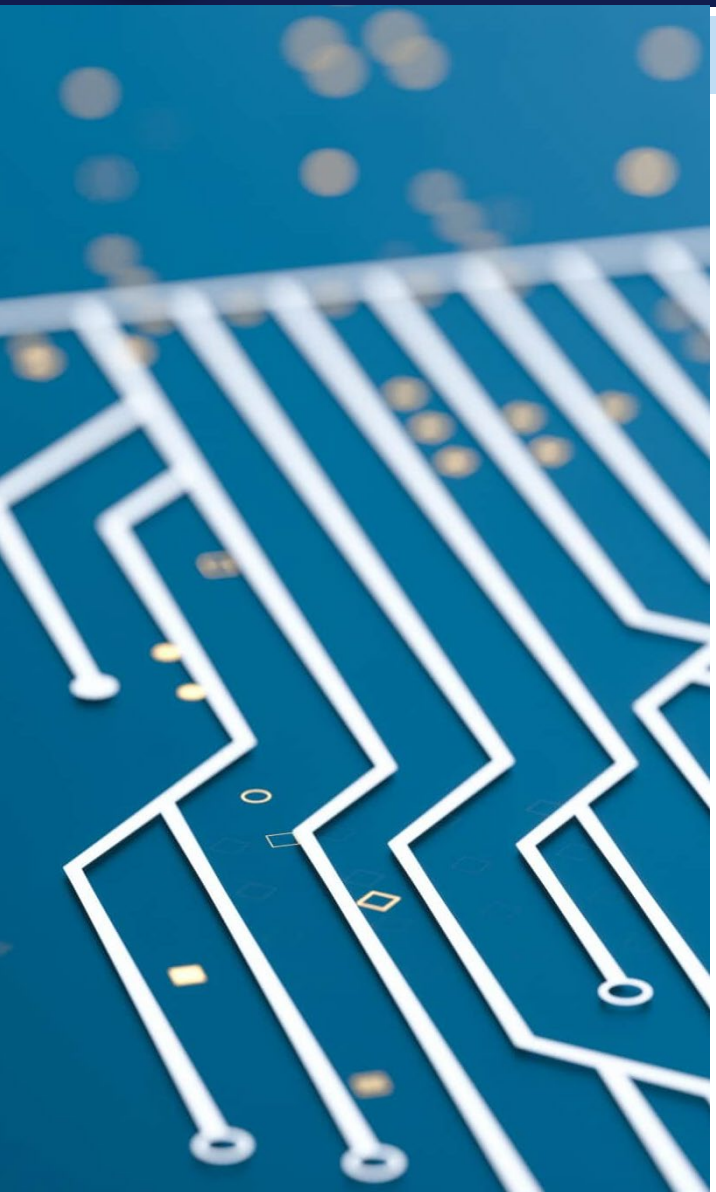


Innovation is booming but capacity, resiliency, and workforce lag

INNOVATION

China leads in AI research publications, while the U.S. leads in the practical application of research and the greatest number of significant AI models. Further, the U.S. dominates the AI startup market. Many defense contractors are also investing in AI R&D.

SUPPLY CHAIN RESILIENCE

Semiconductors are a critical component of AI infrastructure. Advanced AI chips are required for AI models to function effectively. While investments in semiconductor capacity and supply sources have improved supply chain resiliency, there are still many risks to overcome. For example, geopolitical tensions between the U.S. and China create the risk of import and export restrictions, or potential conflict, which could inhibit or stop the flow of goods supporting AI infrastructure.

MANUFACTURING CAPACITY

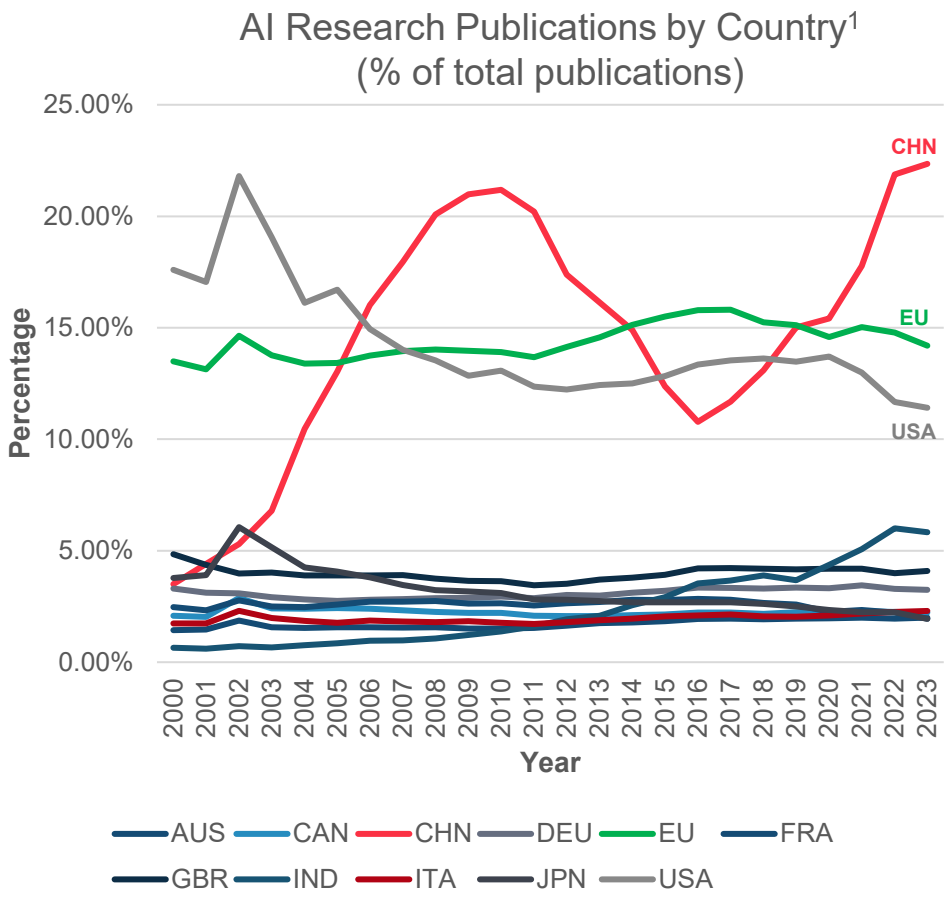
Increasing demand for AI has led to an increasing demand for AI hardware, primarily AI semiconductors. This surge has resulted in supply chain bottlenecks causing production shortages within the supply chain. Public and private investment, is fueling domestic capacity and capability expansion required to meet forecasted demand levels. AI in manufacturing can enhance data capture and Internet of Things (IoT) technologies with flexible robotics, advanced machine and process controls, automated quality control, and modular manufacturing equipment.

WORKFORCE AND EDUCATION

Talent shortages are creating challenges for the U.S. as companies rely on foreign talent and shift R&D abroad to meet their needs. Globally, AI-related degree programs and training programs are expanding to catch up with AI demand.

Innovation

China leads in AI research publications, but the U.S. leads in AI application



CHINA'S R&D PROGRESS[1]

Proliferation of research publications over time is **an indicator of a country's progress in AI development.** China increased its percentage of AI publications since 2016, **coinciding with its New Generation AI Development Plan** in 2017. In 2023, China represented 22% of global AI publications.

U.S. LEADING IN AI MODELS[2]

While China and the European Union (EU) are ahead of the U.S. in research publications, the U.S. is **leading in the practical application of research in AI models**. 61 notable AI models were created by U.S.-based organizations, outpacing both the EU (21 models) and China (15 models) in 2023.

U.S. CREATION OF AI STARTUPS[3]

From 2013 to 2023, the **U.S. produced 5,509 AI startups.** This is more than both China (1,446) and the EU (727) combined.

DEFENSE INVESTING IN AI[4]

Defense companies, such as Lockheed Martin, Raytheon, Northrup Grumman, BAE Systems, and the Thales Group are investing in AI R&D. AI in the military market is expected to **grow at a Compound Annual Growth Rate (CAGR) of 33.3% from 2023 to 2028**.

1. The Organisation for Economic Co-operation and Development Report on Artificial Intelligence
2. AI Index Report 2025
3. The Number of AI Startups by Country
4. Artificial Intelligence in Military Companies

Supply Chain Resilience

AI infrastructure requires resilient semiconductor supply chains

FUNDING AVAILABILITY[1]

Funding, primarily from the **public sources has provided much needed capital** to promote increases in domestic supply and source redundancy. Private investment has followed and further bolstered the semiconductor sector.

INVESTING IN CAPABILITIES[2]

Public and private investments are being allocated across AI semiconductor manufacturing capabilities spanning both emerging and developed markets to reduce bottlenecks. This includes capabilities across the value chain such as **fabrication, packaging, materials, assembly, and test.**

FOREIGN PARTNERSHIPS[3]

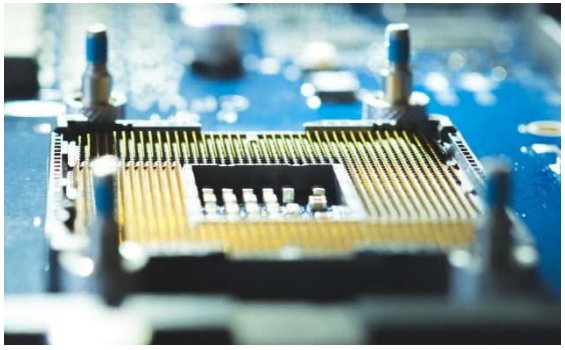
The U.S. is exploring foreign partnerships to promote more resilient and secure semiconductor value chains. For example, the **U.S. and India announced a new partnership** which will begin with analysis of India's semiconductor ecosystem, regulatory framework, workforce, and infrastructure. Outputs will provide a baseline for joint initiatives to strengthen the sector between the two countries.

GEOPOLITICAL RISKS[4]

There is a high geographic concentration of wafer fabrication operations within the semiconductor value chain, with most production occurring within East Asia. Growing geopolitical **tensions within the region and with the U.S. can lead to export restrictions** which could inhibit supply flows to the U.S. Similarly, in the event of conflict, supply of AI semiconductors could be cut off entirely.

AI CHIPS[5]

- Leading AI models are trained using graphics processor units (GPUs), a type of semiconductor or "chip."
- GPUs leverage parallel processing which enables faster training on larger data sets compared to central processing units (CPUs).
- To train the largest AI models, many chips are connected and clustered with other hardware to enable processing.



1. Emerging Resilience in the Semiconductor Supply Chain
2. Strengthening the Global Semiconductor Supply Chain in an Uncertain Era
3. United States – India Joint Leaders Statement
4. Congressional Research Service Report: Semiconductors and Artificial Intelligence
5. Many logic chips are connected in large clusters with other semiconductor hardware such as memory and networking chips to enable training of the largest AI models.

Manufacturing Capacity

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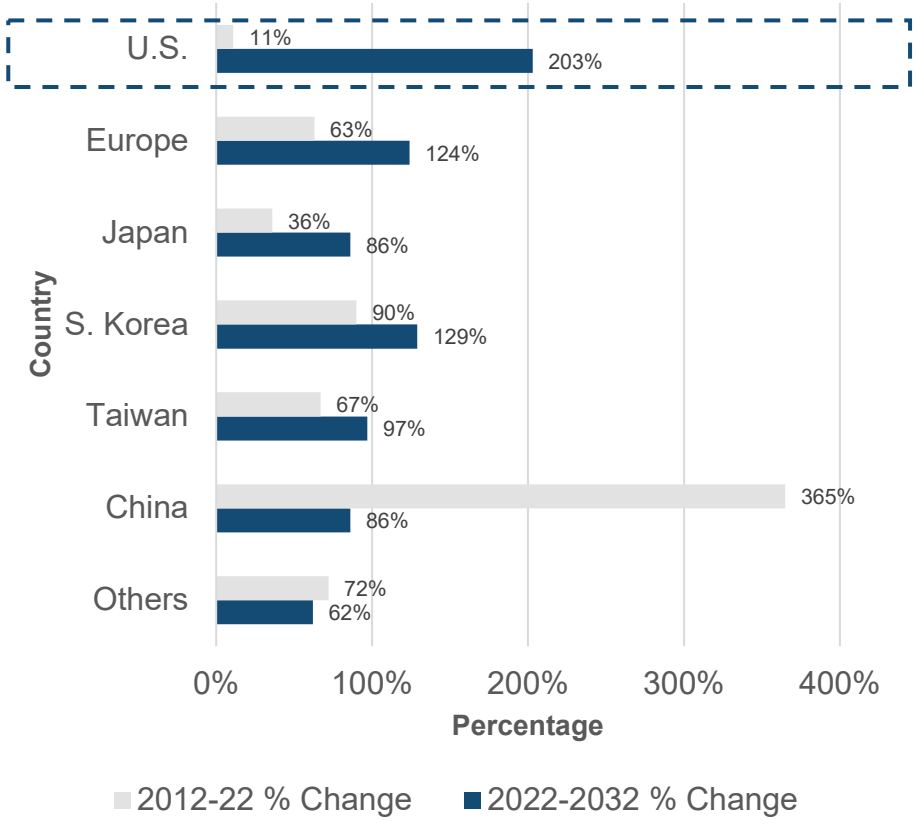
Domestic manufacturing capacity is expected to surge in the next decade to catch up to demand

Global Semiconductor Capacity Increase by Location 2012-22 vs 2022-32[1]



NEAR TERM CHALLENGES[2, 4]

AI chips are expected to be in short supply as manufacturers face long ramp-up timelines to increase production coupled with large capital expenditures. Upstream materials, such as chip-grade silicone, and manufacturing equipment are also facing shortages.

PRODUCTION CAPACITY GROWTH[1]

U.S. production **capacity is forecast to triple** from 2022 to 2032, spurred public and private investment. For the first time in decades, the U.S. is forecast to increase its share of global fab capacity to 14% by 2032.

ADVANCED CHIP CAPACITY[1]

The U.S. has historically relied on foreign sources for advanced chips. Moving forward, the U.S. is expected to grow its share **from 0% in 2022 to 28% by 2032**.

U.S. LEADING IN AI MODELS[3]

61 notable AI models were created by U.S.-based organizations, **outpacing both the E.U. (21 models) and China (15 models)** in 2023.

1. Emerging Resilience in the Semiconductor Supply Chain
2. AI boom to keep supply of high-end memory chips tight
3. AI Index Report 2025
4. News Article: A tiny town just got slammed by Helene

Workforce and Education

AI's growth is creating talent shortages, leading to outsourcing

WORKFORCE SHORTAGES[1]

Globally there is a shortage of AI talent, particularly in the U.S., the consequence of this shortage is that **U.S. companies are moving AI R&D abroad** which negatively effects the domestic workforce and broader economy.

GLOBAL TALENT DEPENDENCY[1]

The **U.S. relies heavily on global talent for AI-related roles**. Research shows more than 50 percent of computer scientists with graduate degrees employed in the U.S. were born abroad.

EVOLVING RELEVANT TECHNICAL SKILLS[2]

As AI becomes more prevalent, technical skills such as **prompt engineering, AI literacy, and AI ethics and responsible AI are becoming more relevant**. Conversely, technical skills such as basic programming, content creation, and data management are expected to become less relevant.

INCREASING AI DEGREE PATHWAYS[3]

Globally, colleges and universities are creating AI-focused degree programs. Since 2017, **AI-related postsecondary degree programs have tripled** with over 2,500 programs offered in English globally.

1. Strengthening the U.S. AI Workforce
2. AI and the Workforce
3. AI Index Report 2025

AI in the DoD

The DoD is eager to expand acquisition of AI capabilities and has developed guidance and tools to facilitate effective and efficient acquisition.

AI in the DoD

The DoD has developed guidance and tools for AI acquisition

DOD ETHICAL PRINCIPLES

These five principles are designed to ensure that AI is used responsibly and ethically within the DoD.

TRADEWINDS

In November 2022, Tradewinds launched the Tradewinds Solutions Marketplace to expedite the acquisition process for solutions that address the DoD's AI/ML, data and digital analytics problem sets.

AI ADOPTION STRATEGY

The DoD published the *AI Data, Analytics, and Artificial Intelligence Adoption Strategy*. It seeks to accelerate the adoption of advanced AI capabilities and provide decision advantage for the warfighter. Furthermore, the strategy outlines measures to be taken to strengthen governance and remove policy barriers.

RESPONSIBLE AI (RAI) TOOLKIT

The RAI Toolkit is a key deliverable within the broader *DoD RAI Strategy & Implementation Pathway (RAI S&I Pathway)*. The toolkit outlines a process to identify, track, and improve alignment of AI projects to RAI best practices and the DoD's AI principles.

AI RAPID CAPABILITIES CELL (AI RCC)

Established by the Chief Digital and Artificial Intelligence Office (CDAO) in December 2024, the AI RCC accelerates the DoD's adoption of cutting-edge AI capabilities by rapidly prototyping, evaluating, and scaling high-impact AI solutions.

DOD DIRECTIVE 3000.09

DoD Directive *AUTONOMY IN WEAPON SYSTEMS* establishes policy, assigns responsibilities, establishes guidelines, and establishes the Autonomous Weapon Systems Working Group.

DoD Ethical Principles

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Five ethical principles assist the DoD in upholding its legal, ethical, and policy commitments

1. RESPONSIBLE[1]

DoD personnel will exercise appropriate levels of judgment and care while remaining **responsible for the development, deployment and use** of AI capabilities.

2. EQUITABLE[1]

The Department will take deliberate steps to **minimize unintended bias** in AI capabilities.

3. TRACEABLE[1]

The Department's AI capabilities will be developed and deployed such that relevant personnel possess an appropriate understanding of the technology, development processes and operational methods applicable to AI capabilities, including with **transparent and auditable methodologies**, data sources and design procedures, and documentation.

4. RELIABLE[1]

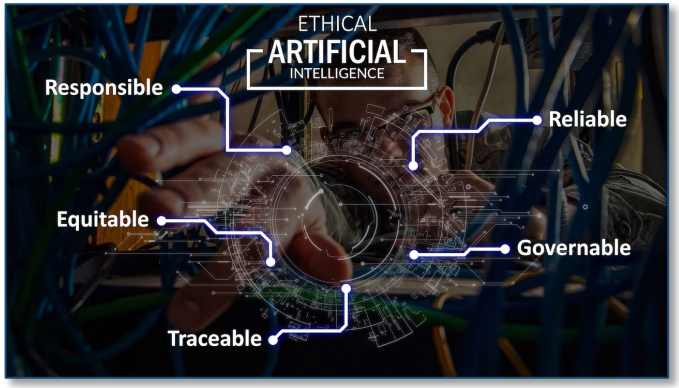
The Department's AI capabilities will have explicit, well-defined uses, and the safety, security and effectiveness of such capabilities will be subject to **testing and assurance within those defined uses** across their entire life cycles.

5. GOVERNABLE[1]

The DoD will design and engineer AI capabilities to fulfill their intended functions while possessing the ability to **detect and avoid unintended consequences. Additionally, deployed systems will be equipped with the ability to disengage or deactivate** if they exhibit unintended behavior.

ABOUT THE PRINCIPLES[1]

- The Defense Innovation Board spent 15 months developing the principles and consulted with **leading AI and technical experts**, as well as with current and former DoD leaders and the American public.
- The principles apply to both **combat and non-combat situations**.
- The adoption of AI ethical principles **aligns with the DoD AI strategy** objective directing the U.S. military lead in AI ethics and the lawful use of AI systems.



1. DOD Adopts 5 Principles of Artificial Intelligence Ethics

DoD Tradewinds

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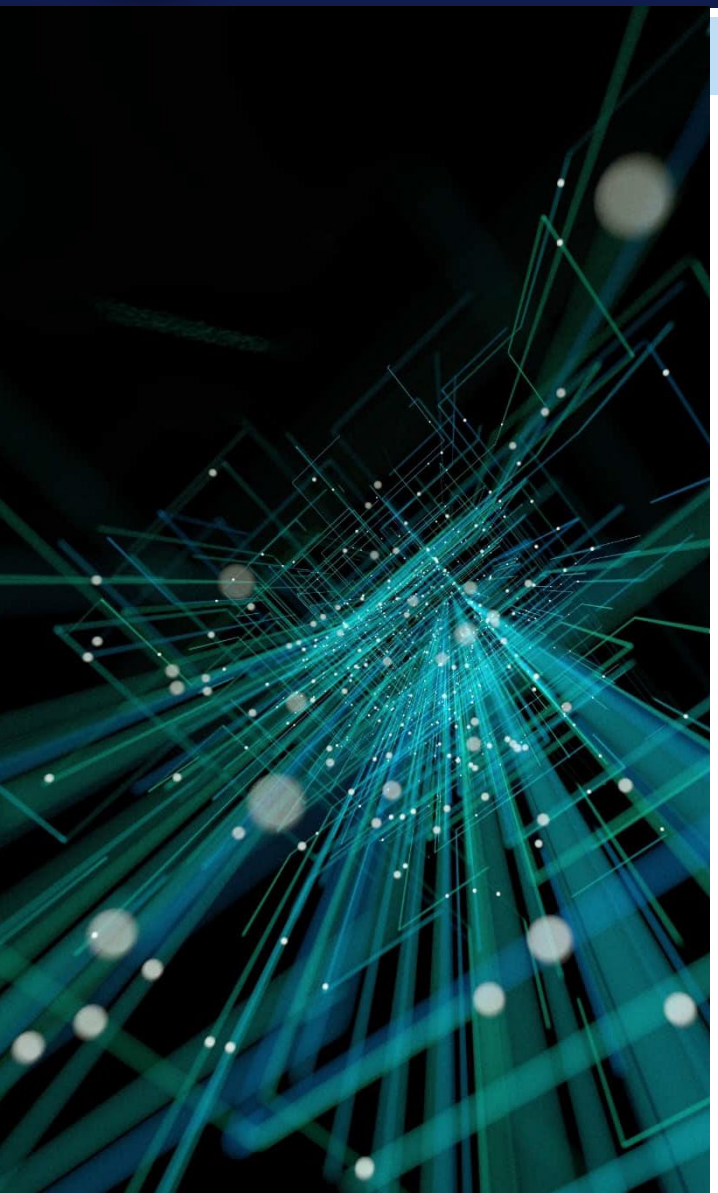

Designed to accelerate the adoption of AI/ML solutions

SUITE OF SERVICES[1]

Tradewinds is a suite of services designed to accelerate the adoption of artificial intelligence/machine learning, digital, and data analytics solutions throughout the DoD.

- Tradewinds Network: A core pillar of Tradewinds is the Tradewinds Network **where industry, academia, and other innovators can connect the Government**, and identify contracting opportunities.
- Tradewinds Solutions Marketplace: Tradewinds launched the Tradewinds Solutions Marketplace, a **digital repository of post-competition, readily-awardable pitch videos**, which address the Government's greatest challenges in AI/ML, digital, and data analytics space.

MULTI-FACETED OPERATIONS[1]

- Managed Service: **Interfaces with the DoD to understand AI needs, problems, and challenges** that have the potential to be solved by AI.
- Funding Vehicle: **A $4 billion Other Transaction Agreement (OTA)** funding vehicle that allows DoD to simply and accelerate the acquisition and transition of AI capabilities to meet challenges and objectives.
- Online Marketplace: **Allows CDAO to broadcast and manage AI opportunities to industry** and interface with a network of partners and companies that can delivery AI technologies and capability.

1. About the Tradewinds Solutions Marketplace

DoD AI Adoption Strategy

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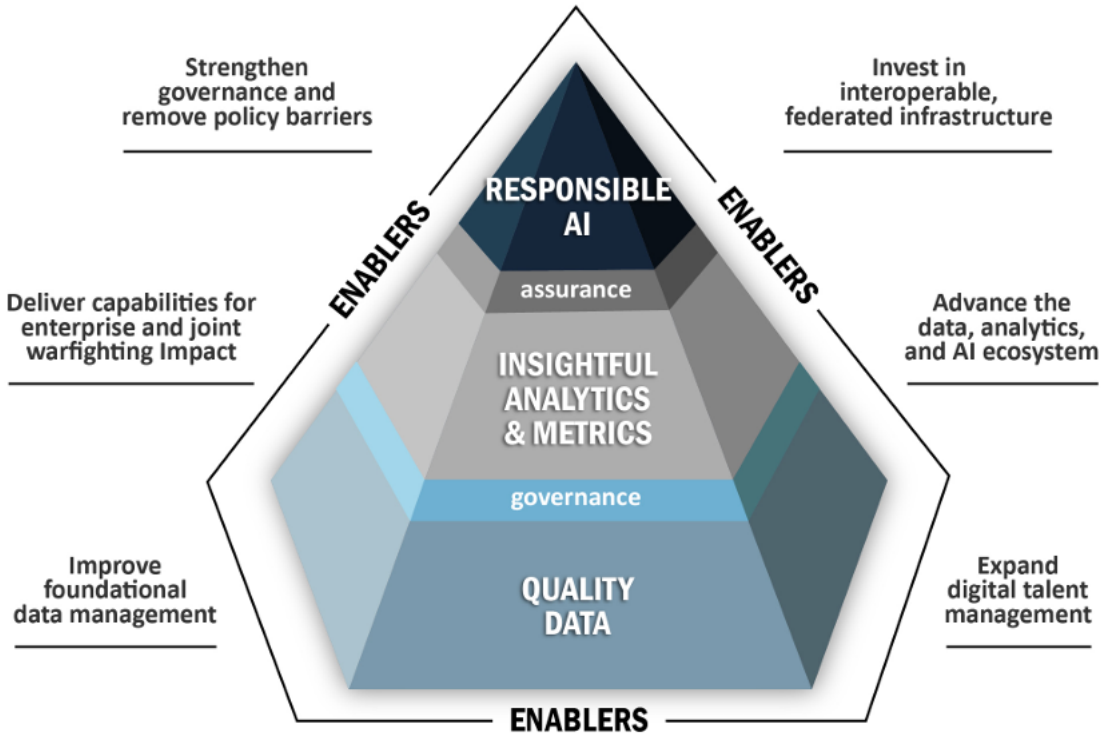
DoD strategy to accelerate the adoption of advanced AI capabilities to ensure decision superiority

HIERARCHY OF NEEDS[1]

- The DoD will focus strategic efforts on **several interdependent goals that support the DoD AI Hierarchy of Needs.**



DECISION ADVANTAGE[2]

The strategy prescribes an agile approach to AI development and application centered on a tight feedback loop between end users and capability developers, emphasizing speed of delivery and adoption at scale leading to **five specific decision advantage outcomes**:

- Superior battlespace awareness and understanding
- Adaptive force planning and application
- Fast, precise and resilient kill chains
- Resilient sustainment support
- Efficient enterprise business operations

OUTCOME ORIENTED[1]

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.

1. DoD Data, Analytics, and Artificial Intelligence Adoption Strategy Fact Sheet
2. DoD Releases AI Adoption Strategy Press Release

RAI Toolkit

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The toolkit outlines a process to identify, track, and improve alignment of AI projects to DoD requirements

RAI S&I PATHWAY[1]

The DoD signed the RAI Strategy and Implementation Pathway, which outlined 64 lines of effort across the DoD for building the capability to support alignment with the five principles in the toolkit. The RAI Toolkit is **the cornerstone of the RAI Strategy & Implementation Pathway.**

FIVE PRINCIPLES[1]

The CDAO developed the RAI Toolkit to support the DoD community, with five principles as its focus:

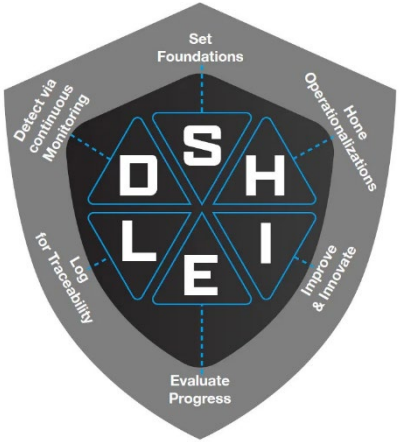
- **Modular and Tailorable** – The RAI Toolkit is built to be customized because every project differs in use case, context, or priorities.
- **Aligned to RAI Matrix** – The RAI Toolkit makes it clear who is best situated to answer each question or execute on each action item and helps to more clearly delineate roles and responsibilities.
- **Holistic** – The RAI Toolkit provides resources for evaluating and improving AI systems — it's not just about engineering them.
- **DoD AI Ethical Principles** – The RAI Toolkit incorporates the DoD AI Ethical Principles.
- **Tools List** – The RAI Toolkit offers a list of 70+ tools to assist in mitigating risks or improving development of AI systems.

LIVING DOCUMENT[1]

The RAI Toolkit is a living document. It will be **continually updated with new capabilities, as they become available.** The CDAO's RAI team plans to add data/model/system card templates, RAI project management tools, harms and impact analysis templates, an acquisition toolkit with standardized contract language, and a human-machine teaming red-teaming guidebook in the near future.

S.H.I.E.L.D.[1]

- The RAI Toolkit is built around the SHIELD assessment, an acronym for the following six sequential activities:



- The essence of SHIELD are short factual statements that identify risks projected in models called Statements of Concern (SOCs). These SOCs provide a **starting point to personnel at all stages of the AI lifecycle to develop mitigation plans.** They also provide a list of issues that innovators and users can continually reference as their products develop.

1. The Reliable Artificial Intelligence (RAI) Toolkit

AI Rapid Capabilities Cell

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AI RCC takes over as a centralized hub for DoD AI Adoption

OVERVIEW[1]

The DoD recognizes the need to maximize AI usage while also ensuring its responsible deployment. Launched in December 2024 by CDAO, the AI Rapid Capabilities Cell (AI RCC) works with the Defense Innovation Unit (DIU) to catalyze the deployment of cutting-edge AI tools across the DoD. The AI RCC replaces Task Force Lima, which was sunset in late 2024. A summary of its accomplishments is available online.[2]

THREE PHASES

As of early 2025, the AI RCC is prioritizing pilot support, as previously identified by Task Force Lima. Within warfighting, the AI RCC is focusing on issues including operational planning, logistics, weapons development, uncrewed and autonomous systems. Under enterprise management AI RCC has worked on financial systems, human resources, enterprise logistics and supply chain, and health care information management.

LOOKING AHEAD

Current AI RCC focus includes a $35 million investment in Generative AI development for pilots, $20 million in computing for AI development, experimentation and testing within government networks, and $40 million for new and emerging companies working with Generative AI as part of a Small Business Innovation Research (SBIR) grant. Total investments will reach $100 million in FY 2024 and FY 2025 alongside CDAO and DIU. Lastly, the DoD is seeking to pilot frontier AI to better serve the warfighter.

1. Overview of CDAO's AI-Rapid-Capabilities-Cell
2. Task Force Lima Executive Summary

DoD Directive 3000.09

THE OFFICE OF THE SECRETARY OF DEFENSE FOR INDUSTRIAL BASE POLICY

In 2023, the DoD published the Directive to support autonomous weapon system acquisition[1]

RESPONSIBILITIES

Establishes policy and assigns responsibilities for developing and using autonomous and semiautonomous functions in weapon systems, including armed platforms that are remotely operated or operated by onboard personnel.

FAILURE MINIMIZATION

Establishes guidelines designed to minimize the probability and consequences of failures in autonomous and semi-autonomous weapon systems that could lead to unintended engagements.

AUTONOMOUS WEAPON SYSTEM WORKING GROUP

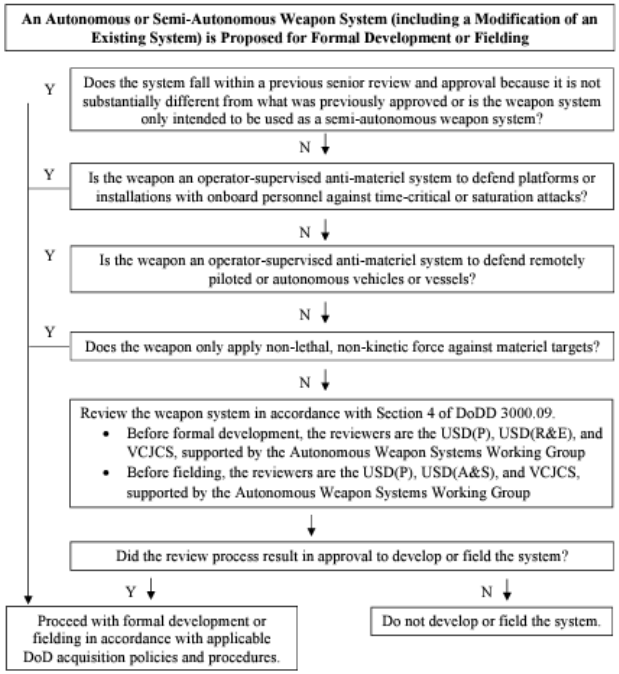
The working group responsibilities include review of autonomous weapon systems before formal development, advise whether a given weapon system requires senior-level approval in accordance with this directive, and help identify and advise on addressing potential issues presented by a given weapon system during a potential senior-level review in accordance with this directive.

Membership includes:

- Under Secretary of Defense for Policy
- Under Secretary of Defense for Acquisition and Sustainment
- Under Secretary of Defense for Research and Engineering
- General Counsel of the Department of Defense
- Chief Digital and Artificial Intelligence Officer
- Director of Operational Test and Evaluation
- Chairman of the Joint Chiefs of Staff representatives from:
  - ❑ Director for Strategy, Plans, and Policy (Joint Staff J5)

GUIDELINES FOR REVIEW

The Directive illustrates the senior review process flow chart and can help determine whether a weapon system needs to undergo senior review.



1. DoD Directive 3000.09 on Autonomy in Weapons Systems

AI RFI

While the DoD has issued guidance and developed tools, there is room for opportunity to improve AI adoption within the Defense Industrial Base (DIB). Therefore, the DoD sought public input from academic, industry, and individuals through an RFI.

AI RFI Overview

THE OFFICE OF THE SECRETARY OF DEFENSE FOR INDUSTRIAL BASE POLICY

DoD sought input through a RFI on AI adoption in the DIB

BACKGROUND

- IBP published a RFI in the Federal Register on May 22, 2024, titled ***Defense Industrial Base Adoption of Artificial Intelligence for Defense Applications***, soliciting comments between the dates of May 22, 2024 and July 22, 2024.

INTENDED OUTCOME

The aim of the RFI was to understand **actions the DoD can take to enable the DIB to continue to adopt AI for defense applications**. RFI questions were posed in the following four categories:

- Infrastructure/supply chain resilience
- Workforce
- Innovation
- Acquisition, policy, and regulatory environment

RESPONSE SUMMARY

The RFI received **48 submissions.** Submissions were made by a diverse set of respondents including enterprises, small businesses, associations, consulting firms, private individuals, and other organizations. RFI respondents identified a range of **barriers inhibiting AI adoption within the DIB as well as recommendations for how to overcome these challenges**.

RFI Barriers & Recommendations

RFI respondents identified barriers for AI adoption and recommendations for improvement

BARRIERS

DATA SHARING

Respondents highlighted challenges with decentralized and isolated data repositories. These challenges restrict access to pertinent data that the DIB requires to develop AI models. Require data sharing throughout the DIB ecosystem and make it accessible for successful development of AI models.

WORKFORCE & EDUCATION

Respondents stated that the lack of DoD AI-specific education and overall insufficient STEM education is a main contributor to the AI industry's lack of a sufficiently staffed workforce.

ACQUISITION PROCESSES

Respondents overwhelmingly stated that government acquisition processes are complicated, making it difficult to navigate the acquisition landscape- especially for small businesses.

SUPPLY CHAIN

Respondents emphasized that overreliance on foreign suppliers is a key barrier, as many inputs, including microelectronics, and rare earth elements in the upstream value chain, are heavily sourced from foreign suppliers.

INTELLECTUAL PROPERTY

Ownership and rights to AI-generated inventions and data can be complex, especially in collaboration between the DoD, prime contractors, and subcontractors. This ambiguity can lead to disputes, hinder technology transfer, and slow down innovation.

RECOMMENDATIONS

DATA SECURITY

Data integrity and security are recurring themes throughout respondent recommendations, highlighting the need for robust data governance policies, secure access controls, and privacy-preserving technologies.

WORKFORCE & EDUCATION

Respondents recommend establishing and expanding education and training programs that equip individuals with the skills needed to work on AI equities, such as data analysis and programming.

ACQUISITION PROCESSES

Respondents indicated that there is clear opportunity for AI to support DoD acquisition processes. An example opportunity is using AI to automate routine and complex acquisition tasks, like proposal evaluations to increase speed.

SUPPLY CHAIN

Respondents identify one of the first steps to securing the AI supply chain is to develop a comprehensive risk management framework to identify and mitigate potential supply chain disruptions, particularly critical AI components.

INTELLECTUAL PROPERTY

Publishing clear and transparent IP policies provides certainty to industry partners. Offering flexible licensing options allows for both government and commercial use of AI technologies.

A Path Forward

The DoD can take short-, medium-, and long-term actions to scale AI adoption within the DIB, while adhering to ethical guidelines and incorporating feedback from the RFI.

Actions Overview

THE OFFICE OF THE SECRETARY OF DEFENSE FOR INDUSTRIAL BASE POLICY

The DoD can take actions in four key focus areas

INFRASTRUCTURE AND SUPPLY CHAIN

Reduce reliance on foreign suppliers for AI infrastructure by investing in domestic production capabilities to promote a more reliable and resilient supply chain. Dependence on fragile supply chains supporting AI infrastructure will inhibit the ability of the U.S. to rapidly and securely, expand adoption of AI within defense applications.

WORKFORCE AND EDUCATION

Coordinate with the broader AI ecosystem of academia, industry, and other government partners to establish and **expand training programs and curricula for both the current and future workforce.** A lack of qualified workforce required for AI capabilities directly inhibits the ability of the DIB to further adopt and field AI-integrated defense systems.

GUIDANCE AND STANDARDS

Develop frameworks and standards to support data sharing, AI development, and system interoperability. This would promote more rapid innovation cycles and broader adoption of AI capabilities within defense applications. Without these frameworks and standards, current challenges will proliferate.

ACQUISITION PROCESSES AND POLICIES

Simplify and expedite the acquisition process for emerging technology and **leverage more rapid contracting pathways** such as Other Transaction Agreements (OTAs). Current processes are complicated, costly, and difficult to navigate, especially for smaller and non-traditional contractors. This can delay acquisition of AI capabilities or prevent acquisition entirely.

Actions Alignment

Actions within the roadmap are aligned with DoD and White House strategies

EXECUTIVE ORDER (E.O.) 14179[1]

The E.O., titled *Removing Barriers to American Leadership in Artificial Intelligence*, was published in January 2025. This document aims to reassert American dominance in AI by revising existing regulations to **enable innovation**. The E.O. mandates the creation of an action plan to promote the development of AI free from partiality while prioritizing economic competitiveness and national security.

NATIONAL DEFENSE INDUSTRIAL STRATEGY (NDIS)[2]

The NDIS offers a strategic vision to coordinate and prioritize actions to build a modernized defense industrial ecosystem that is fully aligned with the National Defense Strategy. The NDIS lays out four long-term strategic priorities to serve as guiding beacons for industrial action and resource prioritization in support of the development of this modernized defense industrial ecosystem: **Resilient Supply Chains, Workforce Readiness, Flexible Acquisition**, and **Economic Deterrence**.

NDIS IMPLEMENTATION PLAN (NDIS IP)

The plan outlines specific actions to strengthen and **modernize the DIB**, putting the NDIS into action. The DoD's AI efforts directly support the NDIS goal to improve intellectual property (IP) and data analysis across the DIB. The NDIS-IP's core objectives for AI are to safeguard critical IP, **deliver more effective Warfighting capabilities**, and advance data analytics and AI across the Department.

AI ADOPTION STRATEGY[3]

The 2023 strategy orients the Department's data, analytics, and AI adoption activities toward 'AI Hierarchy of Needs', with quality data as its foundation, and a focus on speed, agility, learning, and responsibility. 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.

ACTIONS:

Infrastructure & Supply Chain | Workforce & Education | Guidance & Standards | Acquisition Processes & Policies

1. Executive Order on Removing Barriers to American Leadership in Artificial Intelligence
2. National Defense Industrial Strategy
3. DoD Data, Analytics, and Artificial Intelligence Adoption Strategy

Actions Roadmap

THE OFFICE OF THE SECRETARY OF DEFENSE FOR INDUSTRIAL BASE POLICY

Short-, medium-, and long-term actions can improve AI adoption for defense applications within the DIB

FOCUS AREA	SHORT-TERM (0-1YRS)	MEDIUM-TERM (1-3YRS)	LONG-TERM (3+YRS)
INFRASTRUCTURE AND SUPPLY CHAIN	• Invest in domestic AI chip manufacturing capacity • Invest in AI chip value chain (e.g., rare earth minerals) • Monitor and mitigate AI supply chain risks • Assess DoD's technical capacity for AI adoption	• Convene with industry to determine where to invest in emerging AI capabilities and underlying infrastructure • Reduce risks in the end-to-end AI chip value chain	• Form strategic alliances with allied nations to create a resilient and secure global AI supply chain network • Invest in synergistic capabilities that can enhance AI capability and capacity (e.g., Quantum)
WORKFORCE AND EDUCATION	• Convene with industry to identify top-priority skills gaps • Determine opportunities workforce upskilling and reskilling • Improve internal DoD AI workforce training and promote AI literacy	• Invest in workforce development programs for top-priority AI skills for both the current workforce and talent pipeline • Continue training DoD personnel on AI and emerging use cases and capabilities	• Engage with K-12 education systems to inspire and prepare the next generation of AI professionals • Develop long-term AI career pathways within the DoD to acquire and maintain AI talent
INNOVATION	• Liaise with industry to determine top-priorities for IP and data sharing standards and guidance • Begin development of updated data sharing standards and guidance	• Deploy updated data sharing standards and guidance • Create clear IP policies for industry partners • Engage with industry for areas of opportunity for standards, guidance, and policy improvement	• Position the DoD as a leader in AI standards and best practices by futureproofing its AI ecosystem • Create adaptive frameworks for IP and data sharing that can evolve with AI technology advancements and use cases
ACQUISITION, POLICY, AND REGULATORY ENVIRONMENT	• Market existing and rapid contracting pathways, such as OTAs, to AI contractors • Identify inefficient acquisition processes and policies for modification	• Increase usage of rapid contracting pathways • Update and publish agile acquisition processes and policies which emphasize transparency	• Develop acquisition processes and platforms that leverage AI to expedite and optimize procurement • Continuously monitor and refine acquisition policy as AI evolves

■ *Action where IBP could inform, influence, or support.*

Summary

IBP is positioned to support AI adoption in the DIB

KEY TAKEAWAYS

- **AI capabilities and use cases are expanding and maturing.** The DIB is deploying AI for business operations and weapon system integration.
- Safe and secure AI adoption is a top priority for the DoD and White House. **Policy and guidance will need to be continuously monitored as AI evolves.**
- **The DoD can take actions within the following four categories to promote safe and secure adoption of AI within the DIB:**
  - Infrastructure and Supply Chain
  - Workforce and Education
  - Guidance and Standards
  - Acquisition Processes and Policies
- **IBP can inform, influence, or support on the following actions:**
  - Convene with industry to determine where to invest in emerging AI capabilities and underlying infrastructure and identify top-priority skills gaps
  - Liaise with industry to determine top-priorities for standards and guidance
  - Continually engage with industry for areas of opportunity for standards and guidance improvement
  - Market existing and rapid contracting pathways, such as OTAs, to AI contractors
  - Identify inefficient acquisition processes and policies for modification
- **As AI evolves, actions may need to be revised and/or created to meet the current needs of the operating environment.**