

PUBLIC SUBMISSION

Received: May 29, 2025 Tracking No. mb9-se5z-nj12 Comments Due: May 28, 2025 Submission Type: Web
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Docket: NSF-2025-OGC-0001
NITRD_FRDOC_0001

Comment On: NSF-2025-OGC-0001-0001
Request for Information: Development of a 2025 National Artificial Intelligence Research and Development Strategic Plan

Document: NSF-2025-OGC-0001-DRAFT-0244
Comment on FR Doc # 2025-07332

Submitter Information

Organization: Partnership for AI Infrastructure

General Comment

See attached file(s)

Attachments

Partnership for AI Infrastructure Response to National AI RD Strategic Plan RFI



PARTNERSHIP FOR AI INFRASTRUCTURE

May 29, 2025

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Subject: Response to Request for Information on the Development of a 2025 National AI R&D Strategic Plan (Docket ID No. NSF-2025-OGC-0001)

In an era of rapid technological advancement, the United States must make bold, strategic investments in artificial intelligence (AI) research and development (R&D) to safeguard national security, drive scientific discovery, promote human flourishing, and maintain global technological superiority. The Partnership for AI Infrastructure, a coalition of technology leaders — Advanced Micro Devices, Inc. (NASDAQ: AMD), Arm Ltd. (NASDAQ: ARM), Hewlett Packard Enterprise Company (NYSE: HPE), and Intel Corporation (NASDAQ: INTC) — aims to advance these national priorities through strategic public-private partnerships to develop world-leading AI infrastructure in support of federal AI R&D.

Federal investments in AI R&D initiatives, in particular those led by the National Labs and leading AI companies, are essential to advancing national priorities due to the deep coordination, infrastructure, and data required. The Partnership for AI Infrastructure is positioned to provide the advanced computing tools, infrastructure, and expertise necessary to secure America's prominence in the global AI race.

I. EXECUTIVE SUMMARY

The National AI R&D Strategic Plan will serve as the roadmap for federal AI research initiatives that will shape the next generation of scientific discovery. As the potential applications of AI technologies are limitless, the Partnership has provided recommendations for areas of research which align with the Administration's priorities of strengthening national security, lowering the cost of energy, and powering up American manufacturing. Government-led priorities should focus on initiatives such as AI-accelerated design of advanced defense systems, fusion-reactor control and other high-fidelity energy simulations, real-time protection of critical infrastructure, and automated materials discovery that cuts innovation cycles from years to weeks.

To ensure the successful implementation of the Strategic Plan, the federal government should seek to: (1) promote sustained federal investments in high-performance computing, interoperable AI infrastructure; (2) develop public-private partnerships to leverage private industry expertise in the pursuit of national science and security priorities; and (3) build a federal workforce equipped to lead government-scale AI

R&D initiatives. These steps will best position the U.S. to secure its position as the global leader in AI-driven supercomputing and innovation for generations to come.

II. THE CASE FOR FEDERAL INVESTMENTS

The private sector alone cannot meet the scale, security, and long-term investment needed to address the U.S.'s most pressing challenges in national security, scientific discovery, manufacturing, and energy innovation. For example, AI models require vast amounts of data, including classified and national security-sensitive information, which cannot be entrusted to private firms. The risk of proprietary control, monopolization, and potential foreign acquisition further underscores the need for government leadership in AI supercomputing. Government investment in leadership-scale AI supercomputers is not just an option—it is a national imperative. In the pre-AI era, the 2017-2021 Trump Administration recognized the importance for these types of strategic investments, leading to delivery of the three fastest supercomputers in the world at the U.S. Department of Energy National Labs. To build on that success, the Partnership is calling on the new Administration to make strategic investments that will leverage those systems, expand their capabilities, and procure new systems to support the AI era.

Only the Federal Government can shoulder the long-horizon, high-risk research—and the secure, leadership-scale infrastructure on which it depends—that keeps our nation ahead of global competitors. Government investment in AI supercomputing should be done in collaboration with leading technology firms, research institutions, and energy companies through public-private partnerships. Such efforts would ensure access to cutting-edge hardware, software and AI models while maintaining control over critical national security applications. Private companies are equipped to provide the platforms to conduct research that may not be financially viable under purely private-sector funding models. These partnerships should also help support workforce development initiatives to train the next generation of AI and HPC experts who will drive innovation across both the public and private sectors.

By marrying bold research goals with the infrastructure, partnerships, and talent needed to achieve them, the Strategic Plan can convert America's current lead into an enduring technological advantage that drives growth, fortifies security, and advances human flourishing for decades to come.

III. FEDERAL PRIORITIES FOR AI R&D

(1) Strengthening Our National Security

Advanced AI systems can improve the security and reliability of the nuclear stockpile, process vast amounts of data to bolster intelligence information analysis and

assessment, accelerate the development and deployment of more advanced robust defense systems, and enable real-time threat detection and response, safeguarding critical infrastructure and countering adversarial AI threats. The development of these national security priorities cannot be left solely to the private sector as companies are unable to provide the level of security and long-term investment these projects require.

Development of Advanced Defense Systems

What It Is: By intelligently integrating AI, modeling and simulation, and data analytics, our national security community will have the ability to dramatically accelerate the time to develop and deploy a full range of defense weapons systems and at lower cost, including drones, hypersonic vehicles, directed energy systems, missile defense systems and more. Imagine a next generation fighter jet taking 7 or 8 years to develop compared to 30 years or more as we see today.

Why It Matters: Our nation's adversaries are investing rapidly in strategic AI technologies which threaten our national security, and the U.S. must continue innovating to maintain our technological advantage.

Why It Requires Federal Leadership: The development of these capabilities requires robust security protocols and the handling of highly-sensitive data, which should be dictated and managed by the Federal government.

Modernizing the Nuclear Stockpile

What It Is: AI systems that automatically analyze decades of nuclear weapons design, testing, and manufacturing records.

Why It Matters: Reduces months of manual work in root-cause failure analysis and helps flag design vulnerabilities faster, increasing national security and program efficiency.

Why It Requires Federal Leadership: Only the government owns this classified data. No commercial market exists for AI tools that analyze nuclear detonation reports or weapon schematics, but the private sector has the computing power and know-how to analyze this data efficiently and expeditiously.

Advanced Weather Forecasting to Protect Americans from Extreme Weather

What It Is: AI “surrogate” models replicate complex weather simulations an order of magnitude faster than traditional methods.

Why It Matters: This allows scientists to run thousands of “what if” scenarios to improve forecasts and provide more certainty about forecasts.

Why It Requires Federal Leadership: Building these surrogates requires massive datasets and infrastructure—including satellite and ground-based weather monitoring systems and historical data only available through agencies like

NOAA/NWS. Through partnerships to provide computing power, this infrastructure can be leveraged to create advanced weather models that better protect Americans from disasters like hurricanes, tornadoes, floods, and fires.

Coordination of Real-Time Digital Twins of Public Infrastructure and Data Centers

What It Is: Virtual, AI-powered replicas of data centers, defense systems, and infrastructure like electric grids that update and diagnose performance in real time.

Why It Matters: AI digital twins allow early detection of faults and optimized system operations—improving reliability, predictability, and resilience across critical infrastructure.

Why It Requires Federal Leadership: Building integrated models across fragmented infrastructure ownership (e.g. energy grids, smart cities, water) requires coordination, trust, and scale only achievable through Federal partnerships.

(2) Breakthroughs to Lower the Cost of Energy

AI-driven supercomputers will play a vital role in addressing challenges in energy security and sustainability. Breakthroughs in energy efficiency through the optimization of industrial processes and power generation, advancement of next-generation energy storage systems, and grid modernization via improvements in predictive analytics for electricity demand could all be realized by leveraging government-scale AI supercomputing.

Fusion Energy AI Control Systems

What It Is: AI models that predict and control plasma behavior in fusion reactors with dramatic speedups over conventional methods.

Why It Matters: Enables real-time control during experiments, helping stabilize fusion—a limitless energy source.

Why It Requires Federal Leadership: Only DOE labs have the expertise, infrastructure, experimental data, and specialized compute environments necessary to support this effort.

High-Fidelity Simulations of Physical Systems

What It Is: AI-integrated simulations that blend models from microphysics to full system behavior—for example, in energy grids or high-energy physics.

Why It Matters: These simulations enable design and analysis of highly complex systems too intricate for conventional models, accelerating engineering and scientific innovation.

Why It Requires Federal Leadership: Substantial computing resources, diverse datasets, and multi-disciplinary integration lie beyond what most firms can support or profit from — these require government-scale investments.

Modernization of Legacy Scientific Codes with AI

What It Is: AI systems that automatically adapt old scientific codes for use on new high-performance computing platforms.

Why It Matters: Keeps critical simulation tools functional on next-gen systems without the need for costly manual rewriting—saving time and preserving scientific accuracy.

Why It Requires Federal Leadership: These niche systems have no private customer, but are critical to the scientific work of the country.

(3) Scientific Advances to Power Up American Manufacturing

Manufacturing competitiveness relies on cutting-edge materials, predictive modeling, and automation—all of which benefit from AI supercomputing. AI supercomputing can enable predictive maintenance, optimize supply chains, and improve quality control processes, leading to more efficient and cost-effective manufacturing. Government AI investment for manufacturing ensures that critical advancements in nanotechnology, advanced materials, and industrial automation remain under U.S. control, rather than being dominated by foreign competitors.

Long-Term AI-Driven Materials Discovery

What It Is: AI inverse design tools that work backward from desired traits (e.g., conductivity, durability) to propose new materials or molecules.

Why It Matters: This speeds up the discovery of new batteries, superconductors, or drugs—essential for national security, clean energy, and healthcare.

Why It Requires Federal Leadership: Long timelines and uncertain returns deter private investment. Many breakthroughs in materials discovery, however, already trace back to government-funded research and when partnered with the private sector, such efforts could be drastically accelerated.

AI-Guided “Self-Driving” Labs

What It Is: Labs where AI and robotics autonomously run and learn from experiments.

Why It Matters: Accelerates discovery in materials science, chemistry, and national security by enabling faster testing, learning, and optimization cycles.

Why It Requires Federal Leadership: These platforms require a national initiative, and public-private partnerships are needed to scale beyond niche, fragmented efforts.

IV. CONCLUSION

The Partnership for AI Infrastructure is ready to collaborate with the Administration, lawmakers, and Federal agencies to bring these national priorities to fruition. With strong commitments, effective public-private alliances, and strategic policies to attract and retain AI talent, the United States will secure its position as the global leader in AI.

Sincerely,

The Partnership for AI Infrastructure

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