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Submitter Information

Organization: Siemens USA

General Comment

See attached file for a response on behalf of Siemens USA.

Attachments

Siemens Response to National AI Research and Development Strategic Plan RFI

SIEMENS

May 29, 2025

Networking & Information Technology R&D Office
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RE: Siemens USA Response to NSF and OSTP's Request for Information on the Development of a 2025 National Artificial Intelligence (AI) Research and Development (R&D) Strategic Plan.

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Introduction & Executive Summary

As a committed partner in American manufacturing, Siemens USA commends the administration for its commitment to driving a National AI R&D Strategic Plan prioritizing innovation, advancing competitiveness, and bolstering American technology leadership. Siemens is pioneering America's industrial tech sector and is at the forefront of industrial artificial intelligence (Industrial AI). We appreciate the United States' focus on AI as a national priority positioned to strengthen domestic manufacturing, empower the American workforce, and drive digitalization across all sectors.

Siemens is proud that the U.S. is the company's largest market, having invested more than $90 billion in America over the past 20 years. Most recently, Siemens invested nearly $700 million in new manufacturing facilities and factory expansions in North Carolina, South Carolina, California, Texas, Wisconsin, and New York. With 45,000 employees and 12,000 local suppliers nationwide, Siemens' solutions are deployed to support critical infrastructure and vital industries forming the backbone of the American economy.

Harnessing expertise as the largest global provider of industrial automation hardware and software, Siemens deploys solutions with unique capabilities to combine the real and digital worlds. This domain know-how coupled with a proven track record of developing and advancing industry and infrastructure enables Siemens to provide valuable guidance to government leaders on the development of tech policy frameworks. At Siemens, we demonstrate our commitment to AI innovation by investing approximately 8% of global revenue – over $6 billion annually – in research and development. Our R&D strategy combines internal innovation with strategic partnerships across academia, industry, and government to accelerate the development of AI technologies that drive industrial transformation.

The AI R&D Strategic Plan will help to inform the federal focus on innovation that will propel the U.S. to the cutting edge, and frontier developments in Industrial AI are essential to this national priority. While we appreciate the priorities included in both the 2019 and 2023 updates to the R&D Strategic Plan, we would strongly encourage this administration to update the strategy to reflect a focus on Industrial AI. As federal leaders prioritize boosting AI innovation and fortifying U.S. national R&D infrastructure, a dedicated focus on industrial applications and reliable use in manufacturing settings is critical. The industrial tech sector is pioneering research to explore new algorithms and models, continuously improve AI capabilities, and tailor uses across all sectors of industry. The gains made possible by

Industrial AI and its applications are essential to fulfilling the administration's commitment to onshoring domestic manufacturing.

Below, we highlight several essential priorities to advance in a federal R&D strategy supporting the Trump Administration's goals of enhancing national security and competitiveness, promoting human flourishing, and securing U.S. technological leadership. We encourage the Administration to consider more frequent updates to the Strategic Plan, given the rapidly progressing nature of AI and the speed of research and development.

Advance Industrial AI R&D and Frontier Model Development

Siemens has been working on Industrial AI since the 1970s, when R&D teams first began incorporating AI into the company's products. Industrial AI differs significantly from AI used in commercial or consumer settings, as it must meet the rigorous requirements and standards of the most demanding industrial environments. With the ability to process large amounts of machine data and recognize complex patterns, Industrial AI helps organizations of all sizes accelerate their digital transformation at scale. Industrial AI stands to revolutionize manufacturing processes across product and production line design, operations, and a full suite of services.

Industrial AI R&D efforts are far from static. Today, there are over 1,400 AI experts around the world and more than 500 active AI patent families at Siemens. As federal leaders prioritize boosting AI innovation and fortifying U.S. national R&D infrastructure, a dedicated focus on industrial applications and reliable use in manufacturing settings is critical. Siemens has focused R&D teams working to develop cutting-edge solutions for augmenting large language models (LLMs) to fit the industrial context, as well as to build security mechanisms inside the AI systems to maximize their reliability.

To meet the rigorous demands of industry, AI must be able to understand the language of engineering across the entire value chain. Existing GenAI technologies often fall short when dealing with complex industrial data modalities, as industrial tasks require deep domain knowledge that is more complex than typical AI tasks handled by large language models. That's why Siemens is developing Industrial Foundation Models that take AI in industry to the next level. Our vision is foundation models that understand not only text and images, but also 3D models, 2D drawings, and other complex industry-specific structures. This will significantly increase productivity and efficiency in engineering and automation with use cases such as identifying machining features and recommending strategies, accelerating P&ID creation, processing complex engineering data, and more.

In order to unleash the full potential of Industrial AI and achieve the most meaningful efficiency gains possible, the federal government must strengthen support for industrial frontier models. We encourage the National AI R&D Strategic Plan be updated to reflect a priority on supporting industrial development across the federal enterprise.

Drive Investments in the R&D & Innovation Ecosystem

The growth of innovation in Industrial AI presents significant opportunities for transforming operational technology at the intersection of industry and AI. As operational environments are highly complex and rigid, Industrial AI – especially using Generative AI (Gen AI) – swiftly synthesizes knowledge of an operational system, combines it with planning information and engineering data, and allows operators to see their options for maximizing efficiency and optimizing productivity.

However, significant work remains to fully harness the potential of AI for industrial applications – starting at the model level. The U.S. is well positioned to advance policies and seed an innovation ecosystem to optimize manufacturing for the benefit of every industry through greater efficiency. The federal government must dedicate funding to drive innovation through R&D programs, create a favorable environment to incentivize the private sector to further invest in R&D, and work across industry, academia, and government to accelerate these investments. Siemens looks forward to building on industry partnerships to implement solutions and recommends the following:

- *Supporting dedicated AI R&D programs focused on industrial applications*: Across the federal ecosystem, agencies must ensure their R&D programs include specific focus on industrial applications for AI and frontier models. These resources are necessary over the long term to ensure models are created and continuously upgraded as industrial contexts are updated with new frontier developments in digitalization. By allocating resources towards industrial technologies and manufacturing ecosystems, federal agencies can create a favorable environment to incentivize the private sector to further invest in R&D. These efforts would be well positioned in several agencies including, but not limited to, the Departments of Commerce, Defense, and Energy, and the National Science Foundation. We also support continued broader investment in public-private semiconductor R&D research programs, which are foundational to AI advances.

- *Convening public-private research collaborations*: Especially when it comes to Industrial AI, a large share of the cutting-edge research and development is already taking place in the private sector. However, partnerships are crucial to driving new developments and capturing the full potential of Industrial AI. While there are several notable collaborations already underway between the private sector and academia, it would be constructive for the federal government to join Industrial AI-focused research partnerships to align priorities with the national policy agenda.

Increase Access to Data and Computational Resources

The strength of AI depends on the quality of computational resources and the ongoing research and development activities pushing American technology leadership to the cutting-edge. The ability to advance innovation for AI systems is dependent on access to large and diverse sets of both structured and unstructured data to effectively train models. A central challenge in building models – especially those needed to predictively maintain and forecast improvements for a manufacturing environment – is gathering enough data to train robust AI systems. The administration should prioritize national efforts – in partnership with national labs and existing research institutes – to make more datasets available in machine-readable and industrial-deployable formats. These priorities must include support for shared, domain-specific testing environments and testing data to lower R&D costs and enable better validation.

- *Endorsing a shared national research resource for AI*: There is bipartisan congressional support for the National AI Research Resource (NAIRR), a shared national research infrastructure bringing together computational, data, software, AI models and training, and user support resources for research institutions and academia across the country. This shared resource will ensure companies of all sizes and researchers from all disciplines have access to advanced AI systems, computing power, testbeds, and high-powered computational tools. It would be impactful for the administration to support the NAIRR or a similar alternative, as well to work with Congress to authorize this essential initiative to accelerate the pace of AI R&D in the U.S.

- *Providing broader resources for data*: Federal resources for data and computational tools are essential for AI R&D, as they enable researchers and developers to build, test, and deploy AI models efficiently and at scale across applications. Several federal programs must continue to provide these valuable resources to the AI ecosystem, especially NIST's National Vulnerability Database, a critical resource for identifying and managing risks in software and hardware, including those related to AI systems.

Conclusion

Siemens is committed to advancing U.S. manufacturing and pioneering the future of industrial technology. Innovation in Industrial AI is essential to driving technology development, digitalizing the manufacturing sector, and achieving the administration's core priorities of economic dominance and national security. As federal leaders seek to solidify and enhance American technology leadership, Siemens looks forward to continued opportunities for guiding these efforts to fortify the innovation ecosystem and harness the full potential of Industrial AI to revolutionize the next generation of American manufacturing.

Respectfully submitted:

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