ASSOCIATION FOR ADVANCING AUTOMATION

October 17, 2025

Office of Strategic Industries and Economic Security
Bureau of Industry and Security
U.S. Department of Commerce
1401 Constitution Avenue, NW
Washington, D.C., 20230

Docket No. 2025-0257
BIS-2025-0257 XRIN 0694-XC138

RE: Association for Advancing Automation Comments on Section 232 National Security Investigation of Imports of Robotics and Industrial Machinery, and their Parts and Components

To Whom it May Concern:

The Association for Advancing Automation ("A3") welcomes the opportunity to publicly comment on the U.S. Department of Commerce's National Security Investigation of Imports of Robotics and Industrial Machinery pursuant to Section 232 of the Trade Expansion Act of 1962, as amended.

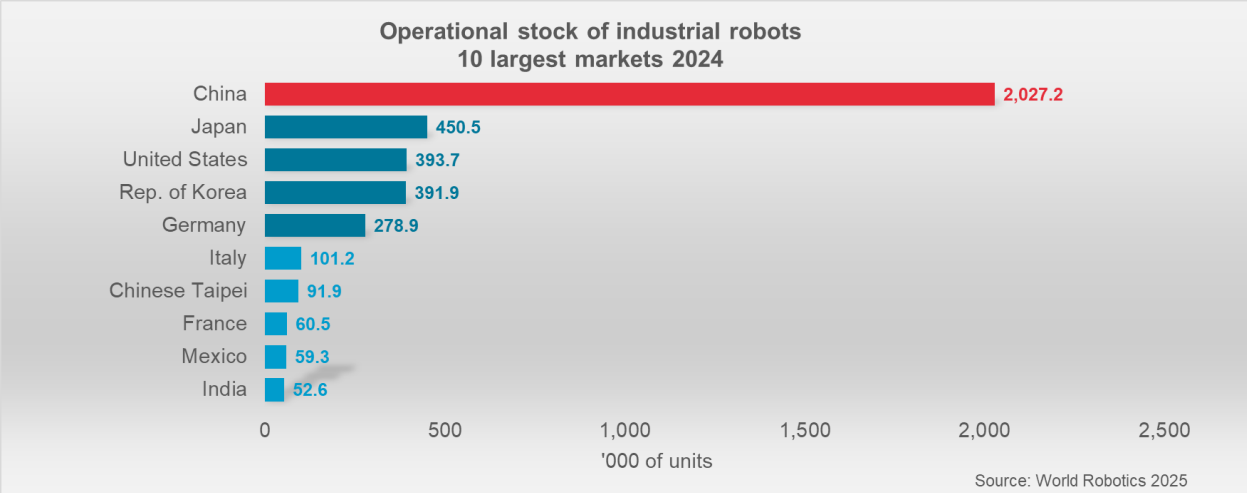
Founded in 1974 and based in Ann Arbor, Michigan, A3 is the world's largest robotics and automation trade association, representing over 1,400 organizations involved in robotics and enabling technologies including artificial intelligence, machine vision, motion control and motors, and related automation technologies. A3's membership spans the entire robotics and industrial machinery ecosystem and includes manufacturers, component suppliers, startups, system integrators, research groups, consulting firms and end users. While A3 now proudly has a worldwide membership, A3 remains committed to helping the U.S. advance its robotics technologies and capabilities and re-establish its place as a global leader in robotics.

On behalf of A3's 1,400 members, A3 strongly urges the Department of Commerce not to impose tariffs on countries whose robots and key components are crucial to making the American robotics industry stronger, but rather to adopt a comprehensive national robotics strategy to regain robotics leadership and address the national security concerns raised by the President and Department of Commerce.

I. A Lack of a National Robotics Strategy Contributed to the U.S. Losing its Robotics Leadership to Countries with a National Strategy

The U.S. pioneered the robotics industry in the late 1950s, with the first industrial robot being deployed in a General Motors plant in New Jersey in 1961. For decades, American innovation set the global standard in robotics manufacturing and application. However, over time, U.S. leadership has eroded: first to Japan in the 1980s and most recently to China. The operational stock of the U.S. is now far behind both Japan and China as demonstrated below in Chart A.

Chart A – Operational Stock of Industrial Robots in the 10 Largest Markets in 2024



Japan and China achieved robotics supremacy partially through the adoption and implementation of a national strategy designed to excel in robotics. The U.S. has never had a national strategy and absent one finds itself in jeopardy of falling further behind as tariffs on steel and aluminum increase the costs of manufacturing robotics systems in the U.S. Further tariffs – both on robotics themselves and on the components critical to their production – may continue to increase the price of development in the U.S. Conversely, a comprehensive national strategy on robotics, which can inform the Administration's tariff policy, will allow the U.S. government to respond to the legitimate national security concerns raised by the President while encouraging development inside the U.S.

II. Increasing Domestic Capacity for Robotics, and their Parts and Components Must be Part of a Comprehensive National Plan

Any U.S. attempt to increase domestic capacity for robotics must be the result of a comprehensive national robotics strategy. A3 believes that it is nearly impossible in the near term to increase domestic capacity for robotics in a way that supports the U.S. industry as:

- There is currently a shortage of essential components – such as controllers, motors, drives, castings and gearboxes – that are manufactured in the U.S. While A3 understands that the Department of Commerce is attempting to remediate this through onshoring incentivized by tariffs, A3 believes that substantial tariffs on the robotics industry at this time risks increasing the cost of U.S. production and harming key U.S. businesses such as system integrators that contribute to the U.S. supply chain. Further, onshoring efforts are likely to take years as producing these key components in the U.S. requires substantial investment and time to train a skilled workforce.

- U.S. domestic demand for robotics is insufficient for international robotics companies to dramatically increase their production capacity in the U.S. High demand – combined with easy access to key components and government incentivizes – encouraged companies to manufacture in China; the U.S. currently has none of these conditions necessary to support a robust domestic industry.

- The U.S. has a shortage of skilled people with expertise in the design and manufacture of robots and their key components. Further, there are not enough workforce development programs in place to significantly increase the number of skilled workers in the near term. Once again, this is contrasted with China which currently has an abundance of skilled workers.

However, A3 believes it is possible in the long-term to substantially increase domestic robotics capacity in the U.S. and reduce reliance on imported robots and components. A national robotics strategy – such as the one A3 has outlined below – will allow the U.S. to work to achieve all of these goals.

1) **Establish a Federal Government Robotics Office**. There is a critical need for a centralized office to create, oversee, and steer a national robotics strategy. Currently there is no federal agency or office that is solely focused on robotics initiatives and interfacing with the robotics industry on innovation, challenges and opportunities. Such an office would complement the efforts undertaken by the Trump Administration to establish the U.S. as the global leader in AI and other emerging technologies.

2) **Incentivize Adoption of Robotics**. U.S. manufacturing companies are currently hesitant to invest in robotics. The U.S. government – through an Office of Automation and Robotics – should incentivize both the end users of robotics and robotics manufacturers themselves.

    a. **Policies for Robotics End Users**: The Office of Automation and Robotics should adopt policies favorable to robotics end users through tax credits. We commend the One Big Beautiful Bill for making industrial robots a tax write-off in the first year. Further tax credits and incentives for U.S.-based end users will encourage investments in robotics and should address the cost of systems integration and workforce training. This will allow companies to de-risk their investments in robotics and achieve a rapid return on

investment, establishing a sophisticated workforce that can maintain the installed robotics. This will help bolster the domestic demand – and labor supply – necessary to support a robust U.S.-based robotics manufacturing industry.

b. **Policies for Robotics Manufacturers:** The adoption of the above-described policies for end users should be coupled with reforms designed to benefit robotics manufacturers. We commend the measures taken in the One Big Beautiful Bill to allow reasonable expenditures for domestic research and development and encourage further policies that would go a step further and incentivize U.S. adoption of robotics as increased domestic adoption of robotics is crucial to support American manufacturers. Such policies could include refundable credits on capital expenditures for robotics and making full expensing for automation equipment permanent to provide investment certainty. Competitive grants and loan guarantees for companies to adopt industrial robots and automation could also support first-time adopters through Manufacturing Extension Partnerships and regional innovation hubs.

3) **Adopt Robotics on a Federal Level**. Where possible the U.S. government should embrace and extensively use robotics. U.S. government spending accounts for over 22% of the national gross domestic product, and federal agencies are involved in a broad range of industrial and logistics projects including transportation, warehousing, facility maintenance and security, public safety, infrastructure, and scientific research and national defense. These fields have tremendous potential for improvement by the increased use of robotics, and the U.S. government can set an example for private enterprise by being early, enthusiastic adopters of robotics. Therefore, a key component of a national strategy would be adopting robotics in the U.S. government's operations. The U.S. government can then demonstrate the ways in which it has received the "double benefit" of robotics – namely improved efficiency and advancement of robotic technologies. The government should communicate to private industry openly and frequently about its adoption of robotics, explaining the benefits and productivity gains. This would continue the long legacy of U.S. government leadership in innovative fields, as embodied by the Trump Administration's recent investments in the semiconductor industry. Further, public commitment to the industry from the U.S. government would incentivize domestic manufacturing.

4) **Establish and Expand Government Funded Training Programs**. The U.S. needs skilled and knowledgeable workers. The national strategy should develop and expand government funded STEM and robotics education and training programs. These programs will preserve and create jobs and allow workers to transition to more automated facilities, making their jobs safer, easier and more productive. These programs are critical to the national strategy, as neither government nor industry can implement robotics technology and become more efficient without a trained

workforce that knows how to integrate and operate robotics technology. Small and medium-sized companies in particular need support and access to such initiatives.

5) **Fund Academic Research and Commercial Innovation**. Many robotics innovations that have been commercialized successfully originated in university robotics research labs, where the U.S.'s brightest students are trained. The U.S. national strategy should launch research funding initiatives building on the prior National Robotics Initiative ("NRI"). Funded programs should extend beyond the NRI to support commercial and industry-led research and adoption of robotics.

6) **Encourage the Development of New Standards**. A forward-looking national robotics strategy must include the development and implementation of modern standards that support the next generation of robotics – particularly in areas such as education, workforce training, and safety. As new form factors like humanoid robots emerge, clear and adaptive standards will be essential to ensuring global competitiveness. The federal government should serve as a convener and facilitator of industry-led standardization efforts, as it has successfully done in other advanced technology sectors. Industry standards are crucial to education, training and safety. They build public trust and consumer confidence. However, robotics standards were developed when robots were simpler machines, fixed-in-place, and operating separately from human workers. While these standards have established and advanced the industry, they have not evolved with the new era of AI-powered robots that navigate using novel mechanisms such as legs, that manipulate objects in the world with new sensors and end effectors, and that are being put to work with human workers and in communities, manufacturing plants, warehouses, and our homes.

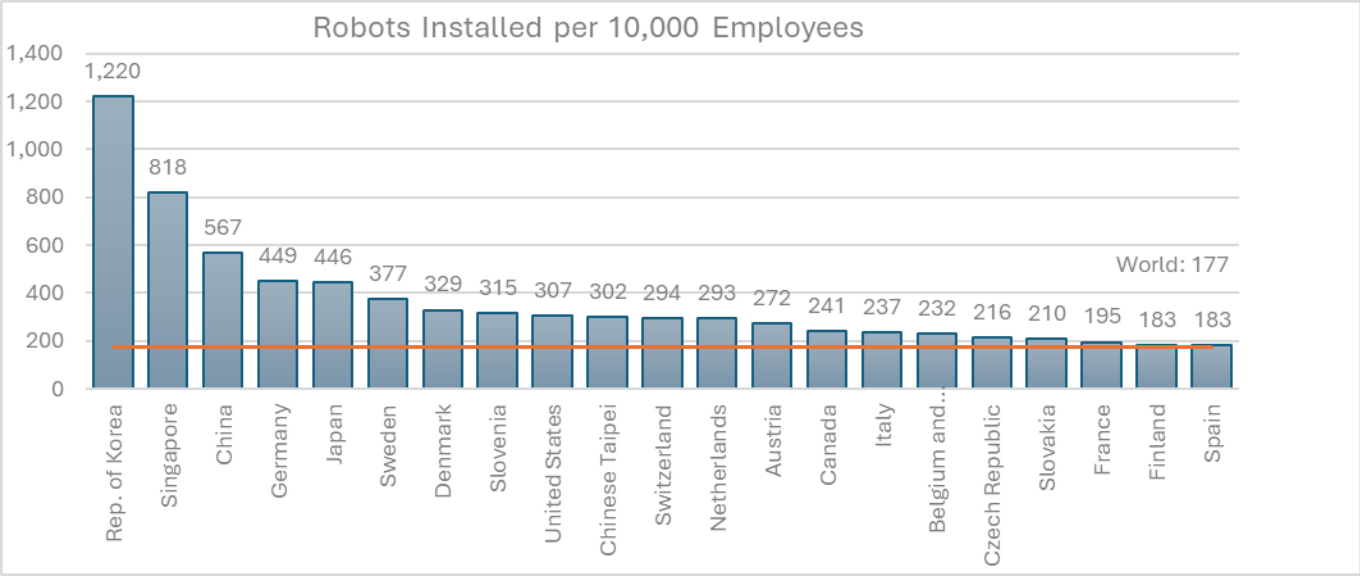
In sum, a national strategy promulgated by the U.S. government is needed to re-establish the U.S.'s leadership in robotics. Such a strategy will address the long-term needs of the robotics industry in the U.S., allow the U.S. to manufacture and develop robotics domestically, and ensure that American workers are competitive and able to work seamlessly with robotic counterparts.

III. Increased Tariffs Will Harm Domestic System Integrators, a Key Component of the Robotics Supply Chain

While manufacturers are responsible for manufacturing robotics, system integrators are largely responsible for successfully installing robots and incorporating them in real-world applications. A3 estimates that the U.S. has over 1,000 robotics system integration companies – both large and small – who employ approximately 60,000 American workers. These companies are the backbone of successful utilization of robotics in our country. While the robot itself is just one part of a robot system that integration companies install, they often represent up to half of the cost. As tariffs raise the cost of robots from foreign companies, and demand stays flat or falls, many of these integrators who are largely small businesses are struggling. Should tariffs continue to rise, many of these companies may be forced out of

business, leading to higher unemployment in the sector, and dampening growth and innovation in the cutting-edge industry. In sum, system integrators in the U.S. are facing decreased demand that is being exacerbated by high tariffs and uncertainty. As a result, robot density in the U.S. manufacturing industry is falling far behind China and Japan.

Chart B – Robot Density in the Manufacturing Industry in 2024



U.S. manufacturing companies have proven to be hesitant to invest in robots and are instead becoming reliant on a shrinking work force despite more and more Americans shunning the "dull, dirty and dangerous" jobs that robots are best at. Imposing tariffs on robotics risks increasing the cost of the robots purchased by crucial American system integration companies at a time when they are already facing a lag in installation figures. Further, while U.S. installation figures slow, robot use is increasing in other countries. Tariffs risk furthering this decline, allowing other countries to become more competitive while American companies fall further behind. This lag is also dampening an opportunity for a smooth transition for manufacturing workers to work in the growing robotics industry.

IV. Current Trade Policies Risk Domestic Adoption of Robotics, and Increased Tariffs Further Threaten Domestic Manufacturing

A3's members have identified a slow growth of new robot orders attributable to market uncertainty and higher costs. Current policies, such as the 50% tariff on steel and aluminum products, have had a negative impact on robotics sales to U.S. companies. Further, quarterly robot sales in the U.S. in the past decade have largely been stagnant, and quarterly sales have decreased from sales during the height of the coronavirus pandemic.

U.S. robotics sales have decreased despite interest in robotics increasing. A3's Automate trade show in Detroit in 2025 – which is the largest robotics and automation trade show in North America – had a record registration of 45,000 people, up 46% from the Automate 2023 show in Detroit. The majority of attendees indicated that they plan to invest in robotics and related equipment in the near future. The U.S. should do more to capitalize on this soaring interest in robotics by providing more incentives for U.S. based companies to purchase robots.

President Trump's goal of reshoring manufacturing to the U.S. cannot happen without increased robotics purchases as nearly every new manufacturing facility built in the U.S. will be highly automated. If companies must pay more for the most innovative automation technologies, they will be disincentivized from returning manufacturing to the U.S. To build these facilities, the U.S. will need a significant number of new robots soon, and current robots come largely from our ***allied*** trading partners. Even if allied nations open new robot manufacturing facilities in the U.S., it will likely take at least a five to ten years to have enough domestically supplied robots and components, and trained workers, to meet the increased demand that reshoring could create. As demonstrated by the recent minimal growth in new robot orders, announcements of new plants coming to the U.S. have not led to a corresponding jump in demand for robots.

Increased costs of robotics as a result of tariffs risks slowing down the ability of the U.S. robotics industry to keep up with the expected demand. Enabling the free-flow of robotics technology into the U.S. will facilitate the Trump Administration's goals of reshoring manufacturing to the U.S., and will support the growth of a domestic robotics industry. A3 supports the Administration's goals in bolstering domestic industry and reducing foreign dependence and security risks, but believes a more gradual, targeted, approach will best achieve these goals in the uniquely-situated robotics sector.

V. AI-Powered Highly Advanced Mobile Robots May Warrant Further Investigation

Highly mobile robots that are increasingly powered by artificial intelligence software methodologies are different in kind from industrial robotics discussed elsewhere in this comment. These newer robotic technologies, which often take the shape of humanoids, have seen stunning investments and advancements in recent months. Foreign governments have made substantial investments into these new kinds of robotics that is as of yet unmatched by the U.S., and some of these technologies may be dual-use in nature.

A3 therefore recognizes that these robots, unlike the wide variety of more functionally-fixed industrial robots we have discussed elsewhere in our comment, introduce new national security considerations that warrant further study from the U.S. government. Ensuring domestic production capabilities and establishing U.S technological leadership of these systems is important to national security in ways that differ from robotics discussed elsewhere in this comment. Moreover, as these types of robots are mostly

still in development and not yet deployed widely in any industry, there is not yet a U.S. manufacturing dependency on these robots.

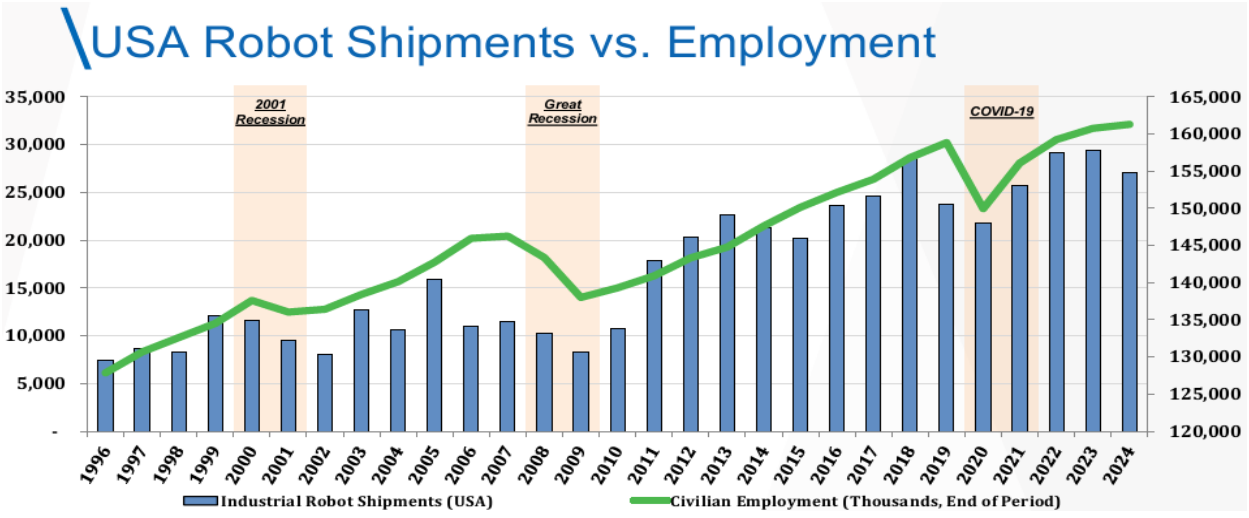
Therefore, the concerns A3 expresses herein about negative effects from new tariffs on robotics and equipment do not directly apply to humanoid robotics (and similar mobile robot technologies). Indeed, A3 believes that early policy action that is supportive of these newer types of robots is a way to reduce the possibility of U.S. dependence on foreign imported advanced robots in the future. We therefore recommend that the Department of Commerce differentiate these robotics products from industrial manufacturing robotics referred to elsewhere in this comment, and encourage Commerce to focus this investigation on these types of emerging technologies so as to tailor a unique strategy that does not risk disincentivizing the development of other robotic technologies in the U.S.

VI. **The Lack of Use of Robotics in U.S. Manufacturing Risks Harming U.S. Competitiveness**

A3 welcomes recent statements from Secretary of Commerce, Howard Lutnick, recognizing robotics and automation as keys to a "manufacturing renaissance." A3 agrees robotics not only will increase productivity but also lead to a surge in new jobs for robot developers, operators, programmers, installers, maintenance technicians, and other key roles.

A3 has tracked the impact of robots on employment for decades. When robot sales in the U.S. increase, unemployment decreases. Conversely, when robotics sales decrease, unemployment increases. During the period from 2010-2019, the greatest period of robot adoption in U.S. history, robot sales soared, and unemployment fell to near record-lows. A3 believes this is because when companies are automating with robots and other advanced technologies they are winning new business, opening more facilities, and hiring more people.

Chart C – U.S. Robot Shipments Compared to U.S. Civilian Employment



Today's jobs in manufacturing and other highly automated industries require new skills as repetitive tasks are now often done by robots, enabling workers to more efficiently handle complex manufacturing processes. According to the Bureau of Labor Statistics, there is a shortage of some 400,000 manufacturing workers in the U.S. This number is expected to grow as America reshores manufacturing and grows domestic industry. The U.S. government should be a partner in helping the robotics and automation industry tell the story of how robotics can be used to bring back jobs to the U.S. and increase productivity.

These new jobs will likely be better, safer and higher paying jobs that people will want to do – and that current and former manufacturing workers can transition to – but they will need training. As part of A3's vision for a national strategy – as discussed above – we encourage significant investment in workforce training, not just at the university level, but in technical schools and community colleges that teach the skills that will be required to design, install, maintain, operate and oversee robots and associated systems. This training should begin early: not just as part of extracurricular activities in middle school and high school, but as early as elementary school where children can be exposed to robots at an early age to prepare them for the vast number of jobs expected in the future.

Foreign robot manufacturers from Japan, Korea, Germany and other allied countries that have facilities in the U.S. are facing similar challenges. A3 believes there are at least 30,000 American jobs currently at these companies. These numbers could grow substantially if reshoring occurs and demand for robots increases; but they will potentially fall if new tariffs are imposed that further reduce demand and curtail reshoring efforts. The continued existence and growth of these facilities will be critical to the growth of the domestic industry, as U.S. companies and workers can learn from their more advanced international counterparts – on U.S. soil while benefitting the U.S. economy – and use their experiences to advance beyond international competition.

VII. Foreign Suppliers from Japan and Western Europe Serve an Important Role in Meeting U.S. Demand for Robotics that Tariffs will Jeopardize

Leading robot manufacturers from Japan and Western Europe all have a major presence in the U.S. and employ tens of thousands of workers. Some of these companies already manufacture and perform final assembly of their robots for the U.S. market in states like Michigan and Ohio, and others are announcing plans to expand their manufacturing capability in the U.S. However, tariffs on steel and aluminum and imported goods have already increased the costs of robot systems and created uncertainty that has stalled the growth of robot adoption in the U.S. Further tariffs risk negatively impacting companies from allied countries that are already committed to increasing their operations in the U.S.

VIII. **Conclusion**

It is time for the U.S. to adopt a national robotics strategy and re-establish itself as the global leader in robotics. With each passing day without a national strategy, the U.S. falls further behind other nations that have fully embraced robotics and consider robots, aided by artificial intelligence, as the most important technology of the 21st century. Falling behind presents a far greater national security risk than our current reliance on foreign robots and components, which is why A3 urges the Department of Commerce not to implement new tariffs on robots and robotic components that are essential for helping the U.S. reestablish robotics leadership. A3 believes the best way forward is to adopt a comprehensive national robotics strategy that fully addresses all U.S. opportunities and national security concerns.

We stand ready to assist in any way that we can and thank you for the opportunity to comment.

Jeff Burnstein
President, Association for Advancing Automation