TESTIMONY OF

Michael Robbins
President and Chief Executive Officer
Association for Uncrewed Vehicle Systems International (AUVSI)

BEFORE

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Subcommittee on Research and Technology

“Robots Made in America: Advancing U.S. Leadership in Manufacturing and Automation”

ON

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Chairman Obernolte, Ranking Member Stevens, and distinguished Members of the Subcommittee, thank you for the opportunity to testify today.

My name is Michael Robbins, and I am President and Chief Executive Officer of the Association for Uncrewed Vehicle Systems International, or AUVSI, the world's largest trade association for robotics, uncrewed systems, and autonomous technologies. Our members build and deploy advanced systems across the air, ground, and maritime domains in sectors ranging from manufacturing and logistics to agriculture, public safety, and defense. Because the stakes for U.S. competitiveness are so high, AUVSI recently launched our Partnership for Robotics Competitiveness to help strengthen American leadership in robotics and physical AI while addressing the cybersecurity, supply-chain, and national-security risks tied to connected robotics systems.[1]

The central point AUVSI wants to leave with the Subcommittee is simple: robotics is no longer a narrow industrial toolset. It is becoming a foundational layer of modern economic power. The next era of manufacturing competitiveness will not be determined by software alone. It will be determined by which countries can combine AI, hardware, production capacity, deployment, and real-world operational learning into a durable industrial advantage. As Matthew Malchano from Boston Dynamics noted at a House Committee on Homeland Security hearing last month, advanced robots are the physical embodiment of artificial intelligence.[2] That is exactly right. If AI is the brain, robotics is increasingly the body through which AI creates value in the real economy. This race is already visible in the market: Last year, China installed 80% of all humanoid robots, while in 2023, China installed 276,288 industrial robots, compared with just 37,587 in the United States, and more than the rest of the world combined.[3] [4]

The United States stands at a pivotal moment in the evolution of robotics and physical artificial intelligence, a moment defined not by speculative future potential but by the rapid, ongoing integration of these systems into the fabric of the modern economy. While robotics of some form have been deployed in a range of applications for decades, a new generation of robots, physical artificial intelligence, or embodied AI, is poised to have a transformational impact.

This new generation of robotic systems is already being deployed around the world: across manufacturing facilities, semiconductor fabrication plants, logistics networks, agricultural

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[1] Association for Uncrewed Vehicle Systems International (AUVSI), Partnership for Robotics Competitiveness White Paper, 2026: https://www.auvsi.org/wp-content/uploads/2026/02/AUVSI-PFRC-Whitepaper.pdf

[2] Testimony of Matthew Malchano, Boston Dynamics, Before the U.S. House of Representatives Homeland Security Committee Cybersecurity & Infrastructure Protection Subcommittee on the topic of "DeepSeek and Unitree Robotics: Examining the National Security Risks of PRC Artificial Intelligence, Robotics, and Autonomous Technologies and Building a Secure U.S. Technology Base," March 17, 2026: https://homeland.house.gov/wp-content/uploads/2026/03/Subcommittee-on-Cybersecurity-and-Infrastructure-Protection-Hearing-Testimony.pdf

[3] Information Technology & Innovation Foundation, "A Time to Act: Policies to Strengthen the US Robotics Industry," July 28, 2025, https://itif.org/publications/2025/07/18/time-to-act-policies-to-strengthen-us-robotics-industry/

[4] Iris Deng, "China Dominates Global Humanoid Robot Market with Over 80% of Installations," *South China Morning Post*, April 12, 2026, https://www.scmp.com/tech/big-tech/article/3340142/china-dominates-global-humanoid-robot-market-over-80-installations

operations, energy infrastructure, and public safety environments. They are no longer confined to controlled industrial settings; rather, these systems are increasingly deployed in dynamic, real-world environments where they directly influence productivity, resilience, and operational effectiveness.

With this sophistication has also come versatility: the robots of today – general purpose humanoids, intelligent collaborative robots, and other multifunction robots – are capable of an ever wider and more complicated set of tasks. The utility this brings, and what it can mean for the global economy, cannot be overstated. Comparing the robots in development today to the robots prior to the diffusion of artificial intelligence technology would be akin to comparing a simple word processor to an AI chat agent.

AI is giving modern robotics and autonomous systems far greater capability in perception, navigation, and decision-making. And that is what makes this strategically important: leadership in software alone will not ensure U.S. leadership in robotics if the systems themselves are designed, built, and deployed elsewhere. In this race, advantage will belong not only to those who lead in AI, but also to those who can manufacture at scale, integrate software with hardware, field systems widely, and improve them through real-world operation.[5] The United States still leads in much of the underlying research, but our challenge is not invention; it is turning innovation into production, adoption, and scale. That matters not only for economic competitiveness, but for national security, because the same robotics systems shaping the future of manufacturing will also shape supply-chain resilience, critical infrastructure, and the defense industrial base. Further, if physical AI systems tied to adversary-controlled ecosystems are deployed in sensitive sites, they do not just pose a market risk; they can create real vulnerabilities for surveillance, disruption, and even physical harm.

This is where robotics becomes a matter of national competitiveness and national security. Physical AI cannot scale on software alone. It requires factories, components, supply chains, and the ability to deploy systems in the real world. The countries that lead will be those that can align research, industrial capacity, and deployment at scale. The United States still has major strengths in innovation, but we are not converting those strengths into production and adoption fast enough. The Information Technology & Innovation Foundation reports that only 8.3 percent of U.S. manufacturing firms have incorporated robots at all.[6] That dismal statistic should be a call to action, because the upside for productivity, competitiveness, and resilience is still very much ahead of us.

Robotics and Physical AI as a Driver of U.S. Manufacturing Competitiveness

[5] Deloitte, "Physical AI and Humanoid Robots: The Future of Adaptive Robotics," December 10, 2025, https://www.deloitte.com/us/en/insights/topics/technology-management/tech-trends/2026/physical-ai-humanoid-robots.html
[6] Information Technology & Innovation Foundation, "A Time to Act: Policies to Strengthen the US Robotics Industry," July 28, 2025, https://itif.org/publications/2025/07/18/time-to-act-policies-to-strengthen-us-robotics-industry/

As AI-enabled robotics systems become more capable and more widely deployed, they are increasingly shaping the future of advanced manufacturing and industrial competitiveness, particularly in the context of strategic competition with China. These systems are now operating across factory floors, semiconductor fabrication facilities, logistics networks, and industrial supply chains, where they directly influence productivity, cost structures, and the ability to scale production. In these environments, robotics is not simply a tool for automation; it is a foundational capability that determines how efficiently goods are produced, how quickly supply chains respond to demand, and how effectively a nation can sustain and expand its industrial base.

In this context, robotics systems are not isolated machines. They are integrated, data-driven platforms that combine sensing, software, connectivity, and physical execution to optimize production in real time. They enable continuous monitoring of operations, adaptive workflows, and iterative improvement through data collection and machine learning. This integration of digital intelligence with physical production is what defines modern manufacturing competitiveness. It is also what creates a widening gap between nations that deploy these systems at scale and those that do not.

That is what makes the competitive stakes so significant: a factory equipped with advanced robotics does not simply produce more. It produces smarter, faster, and at lower marginal cost, while continuously improving over time. These systems generate operational data that refines processes, enhances quality control, and accelerates innovation, creating compounding advantages for firms and countries that achieve scale. China has recognized this dynamic and has pursued a coordinated strategy to dominate advanced manufacturing and robotics through state-backed investment, industrial policy, and aggressive scaling of domestic production. The result is not only increased manufacturing output, but also the potential to set global standards, control supply chains, and shape the future of industrial competition.

Because robotics sits at the intersection of manufacturing, data, and supply chains, leadership in this domain will determine where production occurs, who captures economic value, and how resilient industrial systems are in times of disruption. In this sense, robotics is not simply an efficiency tool; it is a strategic asset that underpins economic strength and national security capabilities. Without sustained investment and coordinated policy to support domestic deployment and scaling, the United States risks ceding leadership in the very systems that will define the next generation of manufacturing and global competition.

PRC Dominance: State-Backed Scale, Market Capture, and the Risk of U.S. Dependence

The People's Republic of China has recognized that robotics and physical AI will be central to the next era of economic, industrial, and military competition, and it has made leadership in this sector a core national objective. Through Made in China 2025, its 14th Five-Year Plan for Robot Industry Development, state-backed venture capital, subsidized financing, and coordinated provincial investment, Beijing is not simply supporting domestic robotics firms; it is executing a deliberate strategy to dominate the deployment, manufacturing, and supply-chain layers of embodied AI. [7] This is not an abstract future concern. It is already visible in the market: China installed 276,288 industrial robots in 2023, compared with 37,587 in the United States, and in fact installed more robots that year than the rest of the world combined.[8]

Scale in robotics is not just a commercial metric. It drives cost reduction, deployment experience, data collection, supply-chain depth, and continuous iteration. Further, the competition in AI is moving beyond models alone and toward implementation in the physical world. The country that can deploy robots broadly across factories, logistics networks, ports, warehouses, and critical infrastructure will gain structural advantages in productivity, resilience, and national power. China is pursuing that advantage through state direction and subsidized scale, while the United States still lacks a specific, actionable, and fully funded national strategy for robotics and physical AI.

The United States has seen this playbook before. In the drone market, Chinese firms leveraged coordinated industrial policy, scale, and supply-chain support to capture global market share and erode U.S. domestic manufacturing capacity.[9] The same risk now confronts the robotics sector. If heavily subsidized PRC-origin systems continue to suppress prices, absorb market share, and expand their footprint in American industry, the result will not simply be tougher competition for U.S. firms. It will be the gradual hollowing out of trusted domestic production, increased dependence on adversary-linked technology, and wider exposure of U.S. infrastructure and industrial environments to cyber-physical and data-security risks. This is exactly what happened to the drone industry.

The PRC is executing the same centrally planned playbook in advanced robotics that it used to decimate the U.S. commercial drone industry: flooding the market with subsidized, below-cost systems to drive American manufacturers out of business. Backed by Made in China 2025 and billions more in state investment funds, Chinese robotics firms are suppressing prices and starving U.S. companies of the revenue needed to scale domestic capacity and maintain technological leadership.

That strategy is being powered by state subsidies, preferential financing, industrial planning, and coordinated investment across the robotics stack. China's top economic planning agency has announced a ¥1 trillion yuan, or roughly $137 billion, venture capital fund for robotics, artificial intelligence, and other advanced technologies.[10] Local governments and state-backed funds are adding to that push, including a $14 billion robotics and AI fund in Beijing and a $77 million

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[7] Congressional Research Service, "'Made in China 2025' Industrial Policies: Issues for Congress," updated December 12, 2024, https://crsreports.congress.gov/product/pdf/IF/IF10964

[8] Information Technology & Innovation Foundation, "A Time to Act: Policies to Strengthen the US Robotics Industry," July 28, 2025, https://itif.org/publications/2025/07/18/time-to-act-policies-to-strengthen-us-robotics-industry/

[9] Association for Uncrewed Vehicle Systems International (AUVSI), Partnership for Drone Competitiveness White Paper, 2025: AUVSI-Partnership-for-Drone-Competitiveness-White-Paper.pdf

[10] Keith Bradsher, "China Has an Army of Robots on Its Side in the Tariff War," The New York Times, April 23, 2025, https://www.nytimes.com/2025/04/23/business/china-tariffs-robots-automation.html

embodied AI fund in Shanghai. Meanwhile, China's state-controlled banks have increased industrial lending by roughly $1.9 trillion over the past four years to bankroll factory construction and robotic automation.[11]

Robotics is also increasingly dual-use. Just as commercial drones rapidly became strategic military hardware on the battlefields of Ukraine, many commercial robotics and physical AI systems are already having implications for warfighting. The People's Liberation Army is already militarizing robotics, integrating robot dogs and other uncrewed ground systems into operational exercises and assault scenarios, which reinforces that these are increasingly dual-use technologies with clear defense implications. That is why "making robots in America" is not just an economic issue – it is also about ensuring the United States retains trusted industrial capacity, resilient supply chains, and control over technologies that can shape future defense and national security outcomes.

Recognizing this, the United States must act with urgency to lead in the next robotics race rather than respond after the market is already lost. We cannot afford to repeat in robotics what happened in small drones, where a strategic competitor took advantage of failed U.S. policy and used scale, state support, and supply-chain leverage to entrench itself before the United States mounted a coherent response. In robotics and physical AI, the stakes are even higher: this is not just about one product category, but about the systems that will shape manufacturing capacity, industrial resilience, and long-term economic and national security. Leadership will not be decided by software alone, but by who wins on implementation, deployment, and the broader ecosystem that supports both. The United States is underperforming in both robotics adoption and production, and while the window to act is still open, it will not stay open indefinitely. AUVSI therefore commends the Committee for holding this hearing and for focusing on the policy actions needed to strengthen American leadership before PRC dominance becomes more deeply embedded in global markets and U.S. supply chains.

Deployment: The Decisive Battleground

Deployment is one of the central hurdles in this competition. The United States continues to produce world-class advances in robotics and AI, but too often we fail to turn that innovation into scaled production, broad adoption, and lasting industrial advantage. Other countries are doing a better job of connecting research to manufacturing, workforce, financing, and market deployment.

That matters because deployment is not just an outcome; it is a strategic asset. Robotics systems improve through real-world use, not design alone. Every deployment generates data, integration experience, and operational feedback that improve future systems and expand the lead of the firms and countries that scale first. The real contest is not just over innovation in software, but over implementation, deployment, and the broader ecosystem that turns technology into durable

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[11] Ibid

advantage. And when adversary-linked systems are deployed in the United States, that deployment is not neutral. It generates revenue, data, and learning that can strengthen those firms globally over time. That is why the United States must do two things at once: accelerate adoption of trusted robotics here at home and take a far more disciplined approach to foreign adversary-linked systems in critical sectors.

A central feature of this challenge is the persistent gap between research and deployment. The United States continues to produce world-leading advances in robotics and artificial intelligence through its universities, national laboratories, and private-sector innovation ecosystem. However, these advances are not necessarily translated into scaled production or widespread implementation and adoption. Instead, manufacturing capacity and deployment ecosystems often develop in other countries, where coordinated industrial strategies support scaling and integration. Illustrative of this point, China leads in humanoid robot installations by a massive margin, with over 80% of global installations.[12] This, coupled with China's sustained lead in installation of industrial robots, indicates a sustained lead in installing not only legacy systems but also the leading edge of the technology.[13]

This dynamic reflects structural fragmentation in U.S. policy, where research funding is not always connected to industrial policy, workforce development, or market adoption. The result is a disconnect between where innovation occurs and where its economic value is ultimately realized.

The importance of deployment cannot be overstated. Robotics systems improve through use and iteration, not merely through design. Each deployment generates data that informs system performance, refines foundation models, and enhances operational capability. This creates a feedback loop in which deployment drives improvement, and improvement enables further deployment. Over time, this cycle produces compounding advantages for firms and countries that achieve scale. Access to real-world data and operational environments has been identified as a critical driver of progress in embodied or "physical AI" systems, reinforcing the importance of deployment as a strategic asset.[14]

This dynamic introduces a key consideration for policymakers. The deployment of robotics systems is not neutral. When systems developed by foreign adversary-linked firms are deployed within the United States, they do more than provide a service. They generate revenue for that industry, collect data, and contribute to iterative system improvement that may strengthen those systems globally. In a domain where scale drives performance, widespread deployment can translate directly into competitive advantage. This raises important questions about how the

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[12] Iris Deng, "China Dominates Global Humanoid Robot Market with Over 80% of Installations," *South China Morning Post*, April 12, 2026, https://www.scmp.com/tech/big-tech/article/3340142/china-dominates-global-humanoid-robot-market-over-80-installations

[13] Information Technology & Innovation Foundation, "A Time to Act: Policies to Strengthen the US Robotics Industry," July 28, 2025, https://itif.org/publications/2025/07/18/time-to-act-policies-to-strengthen-us-robotics-industry/

[14] World Economic Forum and Boston Consulting Group, Physical AI: Powering the New Age of Industrial Operations, 2025, https://reports.weforum.org/docs/WEF_Physical_AI_Powering_the_New_Age_of_Industrial_Operations_2025.pdf

United States approaches both domestic adoption and the role of foreign systems within critical sectors, with significant implications for geopolitical competition and national security.

Cyber-Physical Risk, Supply Chain Vulnerabilities, and National Security Implications

As robotics systems become more deeply embedded across industry, they must be understood not only as tools of productivity, but as connected cyber-physical systems that introduce a distinct and consequential category of risk. These systems integrate sensing, computation, connectivity, and physical actuation, enabling them to interact dynamically with real-world environments. While this integration is the source of their value, it also expands the attack surface in ways that differ fundamentally from many traditional information technology systems. Cyber-physical systems link digital and physical processes, meaning that vulnerabilities in software or connectivity can manifest as real-world operational disruptions, safety hazards, or infrastructure failures.[15]

A useful way to understand these risks is through three interrelated dimensions: data exposure, remote disruption, and persistent access. Robotics systems continuously generate and process large volumes of operational data, including environmental mapping, facility layouts, workflow patterns, and human-machine interactions. Over time, this data can provide a highly detailed picture of industrial processes and infrastructure operations. In aggregate, such information can reveal sensitive insights into supply chain dependencies, production capacity, and operational vulnerabilities. In this sense, robotics systems function not only as tools of automation, but also as persistent data collection platforms embedded within critical environments.

The risks associated with this data are compounded by the connectivity required for modern robotics systems to function effectively. Many platforms rely on cloud-based architectures, remote diagnostics, and over-the-air updates to maintain performance and incorporate improvements. While these features enhance capability, they also introduce pathways through which systems may be accessed or manipulated. If vulnerabilities exist within software, firmware, or communications infrastructure, unauthorized actors may be able to gain access to system controls or data streams. Because robotics systems operate physically within environments, such access can translate into tangible consequences, including operational disruption or safety risks.[16] Documented vulnerabilities in commercially available robotics platforms, including instances where unauthorized users were able to access control interfaces and video feeds, illustrate how these risks can materialize in practice.[17]

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[15] National Institute of Standards and Technology (NIST), "Cyber-Physical Systems," https://www.nist.gov/el/cyber-physical-systems

[16] Testimony of Matthew Malchano, Boston Dynamics, Before the U.S. House of Representatives Homeland Security Committee Cybersecurity & Infrastructure Protection Subcommittee on the topic of "DeepSeek and Unitree Robotics: Examining the National Security Risks of PRC Artificial Intelligence, Robotics, and Autonomous Technologies and Building a Secure U.S. Technology Base," March 17, 2026: https://homeland.house.gov/wp-content/uploads/2026/03/Subcommittee-on-Cybersecurity-and-Infrastructure-Protection-Hearing-Testimony.pdf

[17] Dave Lawler, "Threat Spotlight: Backdoor Found in Chinese Robots," Axios, April 1, 2025, https://www.axios.com/2025/04/01/threat-spotlight-backdoor-in-chinese-robots-future-of-cybersecurity

Persistent access represents a third and often underappreciated dimension of cyber-physical risk. Robotics systems are rarely static; they are continuously updated, maintained, and monitored through vendor-managed systems. These ongoing relationships create long-term access points that, if not properly secured, may be exploited over time. Unlike traditional equipment that may operate in isolation, modern robotics systems often remain connected throughout their lifecycle, increasing both their capability and their exposure.

In parallel with these cyber-physical risks, supply chain dependencies introduce an additional layer of vulnerability. Robotics systems rely on complex, multi-tiered supply chains that include critical components such as sensors, actuators, batteries, power electronics, and rare earth materials. Many of these components are difficult to substitute and require specialized manufacturing processes and long development timelines.

One of the clearest examples of how strategic dependence can become a national security vulnerability is critical minerals and rare earths. China's dominance over the processing and production of key inputs, including the neodymium-iron-boron magnets used in high-performance motors and actuators, creates a chokepoint over the materials that power robotics, autonomy, advanced manufacturing, energy systems, and defense applications. The United States remains too dependent on imports in this area, leaving key sectors exposed to disruption from export controls, market manipulation, or geopolitical pressure.

The good news is the United States has begun to move. The Defense Department's 2025 public-private partnership with MP Materials is aimed at accelerating an end-to-end U.S. rare earth magnet supply chain,[18] while the government has also backed Vulcan Elements and ReElement with a $1.4 billion commitment to expand domestic separation, metallization, and magnet production for a fully domestic rare earth magnet supply chain.[19] In January 2026, USA Rare Earth announced a U.S. government letter of intent covering up to $1.6 billion to help build out a domestic heavy rare earth and magnet value chain.[20] The next step is to build on that momentum through innovation, recovery, recycling, allied coordination, and greater use of robotics itself as part of the solution, including in domestic mining, processing, and materials recovery, where automation can improve safety, efficiency, and scale. These actions on rare earths are exactly the kind of playbook the United States should be using across the robotics stack: identify a strategic dependency, use public-private partnership and targeted federal support to help trusted domestic capacity scale, and do it before adversary-controlled supply chains become even harder to unwind.

Further, these supply chain dynamics are particularly challenging because hardware systems cannot be easily reconfigured. Unlike software, where updates can be deployed rapidly, changes

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[18] MP Materials: https://mpmaterials.com/news/mp-materials-announces-transformational-public-private-partnership-with-the-department-of-defense-to-accelerate-u-s-rare-earth-magnet-independence/
[19] Vulcan Elements: https://vulcanelements.com/vulcan-elements-forges-1-4-billion/
[20] USA Rare Earth: https://investors.usare.com/news-releases/news-release-details/usa-rare-earth-announces-letter-intent-us-government-access-16

to hardware components often require redesign, recertification, and adjustments to system performance. This makes diversification and resilience more difficult to achieve, and it underscores the importance of proactive investment in domestic and allied manufacturing capacity.

These dynamics point to a broader shift in how technological competition should be understood. As noted, leadership is not defined solely by innovation, but by the ability to deploy systems at scale, secure supply chains, manage data, and integrate technologies across real-world environments. When viewed through this lens, the presence of foreign adversary-linked robotics systems and components within the United States is a matter of long-term strategic positioning. Systems that are widely deployed generate data, improve over time, and shape the standards that define global markets. In this sense, scale itself becomes a form of power, determining who leads, who follows, and who sets the terms of competition.

Another particularly important aspect of this risk landscape is the role of advanced sensing technologies, especially Light Detection and Ranging, or LiDAR. These systems are integral to many robotics platforms, enabling high-resolution, three-dimensional mapping of physical environments. This capability allows robots to navigate complex spaces, avoid obstacles, and perform tasks with precision. However, it also enables the creation of detailed digital representations of the environments in which these systems operate. In sensitive settings, such as industrial facilities, infrastructure sites, or military and intelligence-community facilities, this data can reveal spatial layouts, equipment configurations, and operational patterns. Over time, the aggregation of such data can provide a comprehensive understanding of how critical systems function. Recent efforts by Chinese intelligence to use this technology to surveil U.S. military installations in the Philippines underscores the potential for these technologies to be leveraged in ways that extend beyond their intended use.[21]

LiDAR uniquely crystallizes the challenges faced here. In June 2025, AUVSI wrote to New York state and city officials warning about potential security risks associated with LiDAR sensors manufactured by Livox, a Chinese company owned by DJI, after such sensors were observed deployed at JFK International Airport and Penn Station in New York City.[22] As described in that letter, LiDAR sensors can collect detailed real-time spatial data that could reveal sensitive information about transportation infrastructure, security postures, and crowd flow patterns if compromised or accessed by adversaries. In this case, these sensors were deployed in a static setting, affixed to certain points at these facilities; deploying them in a dynamic setting, such as on a robotic platform, further compounds the threat.

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[21] Jack Burnham and Johanna Yang, "Philippines Busts Chinese Spy Ring Targeting U.S. and Allied Military Infrastructure," Foundation for Defense of Democracies, February 3, 2025, https://www.fdd.org/analysis/2025/02/03/philippines-busts-chinese-spy-ring-targeting-u-s-and-allied-military-infrastructure/

[22] Association for Uncrewed Vehicle Systems International (AUVSI), Letter Regarding Security Risks of Livox LiDAR Deployments at JFK Airport and Penn Station, March 2026, https://www.auvsi.org/wp-content/uploads/2026/03/AUVSI-Livox_JFK_PennStation.pdf

At the same time, PRC-made LiDAR sensors dominate the global market, thanks to China's same playbook of unfair economic practices, with an overwhelming majority of the global market based on the most recent statistics.[23] And LiDAR sensors are widely being used in modern robotics, often in irreplaceable use cases. Altogether, this presents not only a supply chain chokehold for American industry but also potential dependence on a highly unsecure product from an adversarial country that occupies a dominant market position achieved through a range of unfair economic practices.

PRC Law and the Structural Risk in Connected Robotics

These technical and supply chain risks must be understood within the legal and regulatory frameworks in which they exist. In the case of firms based in the People's Republic of China, national laws impose obligations that are fundamentally different from those in market-based systems. China's National Intelligence Law requires organizations and individuals to support and cooperate with state intelligence efforts, while related laws governing cybersecurity and data security establish broad authority over data flows and networked systems.[24] [25] [26] Taken together, these laws create a structural environment in which commercial entities may be compelled to provide access to data or systems upon request by state authorities as well as to comply with and serve as an instrument of the PRC's economic, national security, and geopolitical objectives.

In the context of robotics, this creates a form of jurisdictional risk that extends beyond individual vulnerabilities. Even in the absence of a specific technical flaw, the legal framework governing a company can introduce potential exposure. Robotics systems rely on continuous data collection, connectivity, and remote management, meaning that access to systems and data is often built into their operation. When those systems are subject to legal regimes that mandate cooperation with state intelligence services, the risk is not hypothetical; it is structural.

This dynamic creates a fundamental asymmetry in global competition. Firms operating under market-based legal systems are generally constrained by regulatory frameworks, contractual obligations, and privacy protections that limit access to user data. By contrast, firms operating under state-directed legal systems may face obligations that supersede these constraints. This asymmetry has implications not only for security, but also for market competition, as it affects trust, transparency, and the perceived reliability of systems deployed in sensitive environments.

A Strategic Policy Framework for U.S. Leadership in Robotics and Physical AI

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[23] Dhruva Gogoi, "BriefCASE: Chinese Suppliers Gain Strong Foothold in Global LiDAR Market," *S&P Global Mobility*, June 26, 2024, https://www.spglobal.com/automotive-insights/en/blogs/2024/6/briefcase-chinese-suppliers-gain-strong-foothold-lidar-market

[24] People's Republic of China, "National Intelligence Law of the People's Republic of China (2017)," https://www.chinalawtranslate.com/en/national-intelligence-law-of-the-p-r-c-2017/

[25] People's Republic of China, "Cybersecurity Law of the People's Republic of China (2016)," https://www.chinalawtranslate.com/en/2016-cybersecurity-law/

[26] People's Republic of China, "Data Security Law of the People's Republic of China (2021)," https://www.chinalawtranslate.com/en/2021-data-security-law/

As robotics and physical AI become more embedded across manufacturing, industrial production, and advanced supply chains, they are becoming a key source of economic strength and competitive advantage. These systems will increasingly shape how efficiently goods are made, how resilient supply chains remain under pressure, and how effectively industrial capacity can scale to meet both commercial and national security demands. In this race, innovation alone will not be enough. The United States needs a coordinated strategy that connects research, manufacturing, deployment, workforce, and market demand into a durable industrial advantage. That is why policymakers must act with purpose, and it is exactly why AUVSI launched its Partnership for Robotics Competitiveness.

Accordingly, AUVSI urges Congress to consider the following policy priorities:

- **Congress should support the development of a coordinated national strategy for robotics and physical AI that includes robust workforce development as a core pillar.** Robotics is rapidly becoming foundational infrastructure for modern economies and future military operations, yet the United States still lacks a comprehensive federal strategy to guide policy across research, manufacturing, deployment, workforce, and supply-chain security. Bipartisan legislation such as the **National Robotics Commission Act**, introduced by Chairman Obernolte and Congresswoman McClellan, would help align federal efforts, set measurable goals, and strengthen long-term U.S. leadership in this strategically important domain. That strategy should also prioritize workforce development by helping workers transition into higher-skilled roles in programming, system integration, and maintenance, addressing labor shortages, improving safety in hazardous environments, and supporting U.S. manufacturing competitiveness, including through tools such as workforce development tax credits.
- **Congress should take action to address the threat posed by adversary-linked uncrewed ground vehicles, including robotics, in federal procurement.** Legislation introduced this Congress, such as the **American Security Robotics Act** (H.R. 8189 / S. 4235) would take crucial steps to protect against serious threats posed by foreign adversary-made systems. This would restrict government procurement of any uncrewed ground system – from small multipurpose robots to large autonomous vehicles. Beyond managing the serious risks posed by deployment of these systems by the federal government, federal procurement policies play a powerful role in shaping emerging technology markets. Accordingly, we urge Congress to take up this measure again as a standalone bill as well as in this year's National Defense Authorization Act.
  - Other legislation, such as Sen. Cassidy's **Humanoid ROBOT Act** (S. 3275), would take similar action related to foreign adversary-made humanoid robots as well as other actions related to foreign adversary investments in humanoid robots within the United States.
- **Congress should prioritize strengthening the U.S. robotics industrial base and building secure allied supply chains for critical technologies.** Addressing the cyber-

physical risks requires not only restricting unsafe technologies but also accelerating the growth of trusted alternatives. Congress should support policies that expand and invest in U.S. robotics manufacturing, use federal procurement and demand signals to support trusted systems, and encourage private investment in domestic production to build resilient supply chains for critical robotics components, including sensors, batteries, rare earth magnets, and advanced electronics.

  - **Congress should support a national robotics adoption initiative led through the National Institute of Standards and Technology (NIST) and the Manufacturing Extension Partnership** to help small and mid-sized manufacturers evaluate, pilot, and deploy robotics systems, including through shared test environments and best-practices demonstration projects.
  - **Congress should increase funding for NIST's Manufacturing USA program**, including the ARM Institute, and support regional robotics centers that connect research, workforce training, and industrial deployment.
  - **Congress should support the development of trusted robotics data infrastructure and test environments**, including efforts to improve data collection, sharing, and standards for physical AI systems operating in real-world environments.
  - **Congress should pursue a broader industrial strategy for the robotics stack, especially for critical inputs such as rare earth magnets, sensors, power electronics, and advanced components.** The recent federal actions supporting MP Materials, Vulcan Elements and ReElement, and USA Rare Earth show the right model: treat these as strategic industrial inputs, use targeted public-private support to scale trusted domestic capacity, and reduce dependence before adversary-controlled supply chains become even harder to unwind. That same playbook should extend across robotics through investment tax credits for domestic production, low-cost financing for equipment, support for first-of-a-kind qualification runs, procurement and domestic-content incentives, and permitting reform that helps American production scale faster.

- **Congress should continue advancing risk-based restrictions on adversary-linked technologies deployed in critical infrastructure and other sensitive environments, including key enabling technologies used in robotics and autonomous systems**. Technologies such as LiDAR are foundational to modern robotics, but their ability to generate detailed spatial and environmental data also creates serious security concerns when deployed in sensitive settings. Legislation such as the **Securing Infrastructure from Adversaries Act** (H.R. 4802 / S. 4000) and the **SAFE LiDAR Act** (H.R. 6576) reflects the real risks posed by foreign-adversary-made sensors and related technologies embedded within operational environments, including surveillance vulnerabilities, data exposure, and persistent access pathways. **Congress should establish clear authorities**

to evaluate and restrict adversary-linked technologies in critical infrastructure while promoting greater transparency across the robotics technology stack.

Conclusion

Robotics and physical artificial intelligence are becoming foundational to the U.S. industrial base, shaping manufacturing systems, logistics networks, supply chains, and advanced production environments. As these technologies are deployed more broadly, they are not only improving productivity and efficiency but also redefining how and where economic value is created. Leadership in robotics will determine which countries control the next generation of manufacturing, how resilient industrial systems are to disruption, and how effectively nations compete in an increasingly technology-driven global economy and geopolitical landscape.

The competitive challenge posed by the People's Republic of China underscores the urgency of this moment. Through coordinated industrial policy, sustained state-backed investment, and deliberate efforts to scale domestic production, China is working to establish dominance across key segments of the robotics and advanced manufacturing ecosystem. This approach is designed not only to capture market share, but also to create long-term dependencies that can weaken domestic U.S. industries and constrain the ability of U.S. firms to compete globally.

For the United States, the stakes are both economic and strategic. Ensuring that robotics systems are developed, manufactured, and deployed within a resilient and trusted industrial ecosystem will be critical to maintaining long-term competitiveness and national security. This requires aligning innovation with deployment, strengthening domestic manufacturing capacity, securing supply chains, and supporting a workforce capable of operating and scaling these technologies. It also requires recognizing that deployment itself is a source of competitive advantage, shaping the data, experience, and market position that define leadership in this domain.

With deliberate and coordinated action, Congress can help ensure that robotics and physical AI strengthen U.S. industrial capacity rather than erode it. A clear policy framework that supports domestic production, accelerates deployment, and reinforces trusted supply chains will position the United States to lead in the next generation of manufacturing and compete effectively in a rapidly evolving global landscape. AUVSI and its members stand ready to work with Congress and federal agencies to advance that effort.