Technology Leadership & Strategy Initiative

Council on Competitiveness

Compact for America

A Call to Action for a New, Tech-Driven Industrial Base and National Innovation Ecosystem

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The United States' capacity and capability to innovate at speed and scale will determine if the 21st century is another American Century.

We are in an age defined by rapid technological disruption and discontinuity. Advanced microelectronics and semiconductors, artificial intelligence (AI), quantum technologies and computing, biotechnology, advanced materials, and numerous other platform technologies are transforming industries and altering how we live and work. Advanced technologies like these—and the benefits that arise from their deployment—are shaping society at a speed never seen before. And in addition to the swift emergence of these individual technologies, their convergence presents remarkable opportunities to tackle society's most pressing challenges and for the United States to secure its technological dominance. Consider how the convergence of these platform technologies is already affecting our lives:

- Farmers find themselves at the intersection of the digital and analog, optimizing crop yields through the deployment of satellites, sensors, and AI.
- Physicians are on the verge of deploying personalized medical treatments by leveraging and co-mingling new insights from AI and the human genome.
- Hyperscalers; local, state, and regional authorities; national laboratories; universities; and entrepreneurs are looking to re-invent America's energy system—with a new look at renewables as well as traditional and advanced nuclear technologies, including fusion.
- City administrators are leveraging data analytics and smart city infrastructure to reduce inefficiencies that have plagued urban life for decades.
- Cyber security professionals use advancements in AI to protect critical infrastructure, detect and respond to cyberattacks, and analyze complex threat landscapes.
- Business leaders are using advanced sensors and AI-powered data analytic engines to predict demand, manage inventory, and ensure timely delivery of products to customers.
- Financers look to tap quantum computing to perform risk analysis, portfolio optimization, and derivative pricing at unprecedented speeds and accuracy.
- Manufacturers are tapping bio-based materials for applications in textiles, construction, and packaging, which provide sustainable alternatives to traditional materials.
- The warfighter is using AI to rapidly decrease software update time in threat environments, providing real-time, Over-the-air-Updates (OTAU) to weapons systems in response to complex and evolving threats.
- The Defense Industrial Base (DIB) is investing in hypersonics to enhance U.S. defensive systems, including the Golden Dome and non-kinetic capabilities coupled with enhanced strike capabilities. These initiatives are designed to strengthen defenses against a variety of high-speed threats, such as hypersonics, ballistic missiles, and advanced cruise missiles.

This list could go on and on, as technological convergence and its resultant innovations drive what economist Joseph Schumpeter called "creative destruction"—the phenomenon of innovations disrupting established businesses and industries, only to spur economic growth. Today, creative destruction is happening in nearly every sector and industry. This evolution is staggering in its speed and impact. In 2024, the average lifespan of a company on the S&P 500 is under 20 years; in 1980, it was more than 35 years.

Technology's expanding power and influence is happening not only in the United States, but across the globe, making technology a critical element in geopolitical competition, affecting both economic standing and national security. As the stakes rise, the global race for technological supremacy intensifies, with technology leaders poised to reshape the global competitiveness landscape. President Trump expressed this sentiment in his March 26, 2025, letter to White House Office of Science and Technology Policy (OSTP) Director Michael Kratsios, writing "…today, rivals abroad seek to usurp America's position as the world's greatest maker of marvels and producer of knowledge." The United States now confronts its most significant competitor in nearly 250 years: China, whose ambitious strategies aim to dominate the global economy and reshape global security.

If the United States is to maintain its position as the dominant global player in this tech-driven, innovation-based global competitiveness landscape, leaders from across the innovation ecosystem—from researchers and academicians to policymakers and influencers to entrepreneurs and Fortune 500 CEOs—must collectively respond to the challenges President Trump identified in his letter to Mr. Kratsios:

1. How can the United States secure its position as the unrivaled world leader in critical and emerging technologies—such as artificial intelligence, quantum information science, and nuclear technology—maintaining our advantage over potential adversaries?
2. How can we revitalize America's science and technology enterprise—pursuing truth, reducing administrative burdens, and empowering researchers to achieve groundbreaking discoveries?
3. How can we ensure that scientific progress and technological innovation fuel economic growth and better the lives of all Americans?

Reflecting on these important questions, and President Trump's "Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base" Executive Order, issued on April 9, 2025, the Council on Competitiveness' Technology Leadership and Strategy Initiative (TLSI) is introducing a *Compact for America: A Call to Action for a New Tech-Driven Industrial Base and National Innovation Ecosystem*.

The *Compact for America* synthesizes the experiences, insights, and recommendations of the TLSI members—some 50 Chief Technology Officers from across business, academia, and the U.S. Department of Energy National Laboratories—offering a roadmap for actionable policies designed to foster the technologies and resulting innovations that will underpin national productivity and economic growth, prosperity, and national security. The report includes 10 key recommendations, organized under four strategic pillars, including:

Pillar 1: Accelerate Technology Translation, Scaling, and Commercialization—Shorten the Time for Technology Maturation and Market Integration

Pillar 2: Rapidly Expand Commercial Innovation into the Defense Industrial Base—Broaden the Deployment of Dual-use Technologies

Pillar 3: Win the Global Technology Competition—Set Standards, Secure Research, and Forge Strategic International Partnerships

Pillar 4: Grow the Number of Innovation Ecosystems Across America—Extend Place-Making Innovation Best Practices from Coast to Coast

This is a moment in need of technology strategic investments in emerging technology and action that expands U.S. innovation capacity and capability. The convergence of a wide range of tech-

nologies is creating a perfect storm—will it upend the world order, or will the United States emerge as the pacesetter and leader in a new era of innovation and sustainable growth?

On behalf of the entire TLSI membership, we are pleased to introduce the *Compact for America*, which is organized into an executive summary, followed by a review of the current technology-driven competitiveness landscape, and concludes with a deeper dive into the four pillars and 10 recommendation for a new tech-driven defense industrial base and national innovation ecosystem.

We appreciate the opportunity to share the TLSI's recommendations to influence a proactive, coordinated, and cross-sector national strategy for innovation. We look forward to working with leaders across the country's innovation ecosystem to enhance technology and innovation-driven U.S. productivity, prosperity, and security.

Sincerely,

The Hon. Patricia Falcone
Deputy Director for Science and Technology, Lawrence Livermore National Laboratory

TLSI Co-chair

Dr. Sally Morton
Executive Vice President, Arizona State Knowledge Enterprise, Arizona State University

TLSI Co-chair

Dr. Steven H. Walker
Former Vice President and Chief Technology Officer, Lockheed Martin; Distinguished Fellow, Council on Competitiveness

TLSI Co-chair

The Hon. Deborah Wince-Smith
President & CEO, Council on Competitiveness

Mr. Chad Evans
Executive Vice President and Chief Operating Officer, Council on Competitiveness

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Executive Summary

The Technology Leadership and Strategy Initiative (TLSI), established in 2009, is a dialogue among the country's foremost science and technology leaders aiming to enhance U.S. innovation and technology capabilities critical for national security and economic competitiveness. As part of the Council on Competitiveness, the TLSI unites nearly 50 Chief Technology Officers (CTOs) from technology intensive businesses, universities, and the U.S. Department of Energy National Laboratories. This coalition of cross-sector collaborators identifies strategic technologies and grand challenges, develops pathways for building more productive research partnerships across, and advances policies to speed new products to market.

The TLSI Dialogues have focused over the past two years on a specific mission: to deliver strategic recommendations for policymakers and influencers that will modernize the U.S. industrial base and equip it for the shifting landscape of innovation and global competition. To that end, TLSI Dia-

Compact for America Strategy: 4 Pillars + 1 Foundation of Innovation

Creating a new Tech-Driven Industrial Base and
National Innovation Ecosystem to Make America Innovative Again

PILLAR 1
Accelerate Technology Translation, Scaling, and Commercialization
Shorten the Time for Technology Maturation and Market Integration

PILLAR 2
Rapidly Expand Commercial Innovation into the Defense Industrial Base
Broaden the Deployment of Dual-use Technologies

PILLAR 3
Win the Global Technology Competition
Set Standards, Secure Research, and Forge Strategic International Partnerships

PILLAR 4
Grow the Number of Innovation Ecosystems Across America
Extend Place-Making Innovation Best Practices from Coast to Coast

+

Foundation for Enabling American Innovation

Innovation Capability/Capacity

Global Pacesetter for Innovation

Strategic Investments in Emerging Tech

logues 27-31, guided by the TLSI's distinguished co-chairs—the Hon. Patricia Falcone, Deputy Director at Lawrence Livermore National Laboratory; Dr. Sally Morton, Executive Vice President of Knowledge Enterprise at Arizona State University; and Dr. Steven H. Walker, Former Vice President and Chief Technology Officer at Lockheed Martin—fostered vigorous exchanges of ideas and insights focused on the challenges facing the U.S. defense industrial base, the broader innovation ecosystem, and the Trump Administration's national priorities for U.S. competitiveness in science and technology. It is from these foundational discus-sions that the *Compact for America* has emerged.

The *Compact for America* features ten actionable recommendations designed to modernize the United States' innovation ecosystem and enhance the country's technological capability and capac-ity. These measures are intended to strengthen the defense industrial base (DIB) and foster a stronger, broader innovation-driven economy, ultimately reinforcing both economic and national security for all Americans. The Compact aims to ensure sustained technological leadership in an increasingly competitive global landscape. These ten recommendations are organized under five pillars, including:

Pillar 1: Accelerate Technology Translation, Scaling, and Commercialization—Shorten the Time for Technology Maturation and Market Integration

Critical technologies face challenges during the scaling process, which is significant because global competitors can leverage stolen U.S. intellectual property to advance their own techno-logical capabilities with extraordinary speed. The United States must expedite the maturation and commercialization of technology by incentivizing rapid technology translation from innovation to the marketplace or battlefield, as well as remove barriers that stand in the way of this goal.

Recommendation 1: Expand use-inspired research across the U.S. R&D enterprise to meet the nation's economic and security needs.

Recommendation 2: Expand investment and activities focused on the rapid scaling of critical technologies. Efforts should prioritize driving technological advancement and removing obstacles to swift deployment and scaling.

Recommendation 3: Ramp up engagement, develop new pathways and interfaces, and reduce the transfer time to move new technology faster from developers in universities and national laboratories to users across industry.

Recommendation 4: Secure the United States' position as the unrivaled world leader in critical and emerging areas of technology, and their convergence, by expanding investment, encouraging multidisciplinary research collaboration, and fostering the development of innovation ecosystems.

Pillar 2: Rapidly Expand Commercial Innovation into the Defense Industrial Base—Broaden the Deployment of Dual-use Technologies:

Today, innovation and new technologies critical to achieving national security objectives primarily reside in commercial enterprises. To capture this value—in addition to the supportive directives included in President Trump's "Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base" Executive Order—the Department of Defense (DoD) can strengthen the defense industrial base (DIB) by: incentivizing the development of dual-use technologies (that is, technologies that can be used for civilian and military purposes); broadening competition to include a wider range of participants in the DIB; and fostering collaboration between commercial sectors, defense entities, academia, venture capital, and other stakeholders that drive the innovation economy.

Recommendation 5: Reimagine the defense industrial base to include, under proper conditions and governance, commercial companies developing important dual-use technologies for national security.

Pillar 3: Win the Global Technology Competition—Set Standards, Secure Research, and Forge Strategic International Partnerships:

The United States and its allies face challenges in leveraging each other's specialized strengths, which hampers their ability to compete against global competitors who can quickly share or steal critical intellectual property. To strengthen U.S. tech leadership, it is critical to regain influence in global standards-setting bodies, address significant security gaps in protecting intellectual property, and enhance collaboration for joint research with close allies.

Recommendation 6: Elevate the imperative of U.S. leadership in standards setting.

Recommendation 7: Elevate the focus on research security and deploy strong research security plans while limiting their administrative burdens.

Recommendation 8: Engage U.S. allies to expedite the research, development, and scaling of technologies critical for economic security and joint security.

Pillar 4: Grow the Number of Innovation Ecosystems Across America—Extend Place-Making Innovation Best Practices from Coast to Coast:

The U.S. science and technology enterprise is not fielding a full team. To effectively compete with China and India, which have many times larger populations, the United States must expand the number of individuals and communities contributing to and benefiting from the innovation economy. This will require partnerships across industry, universities, and all levels of government, as well as place-making initiatives—that is, the intentional, strategic creation of an investment, research, and policy ecosystem that makes a place come to life with a vigorous, vibrant, and innovation-driven economy.

Recommendation 9: Build and bolster innovation capacity and capability across the nation by fostering and expanding place-making innovation beyond the high-tech superstars on the U.S. coasts.

Recommendation 10: Ensure skills scale in tandem with scaling of new technologies.

Before providing specific, actionable recommendations for each of these five pillars, this report provides greater context of the modern, dynamic innovation and technology landscape.

TLSI Dialogues 27-31 Shaped the *Compact for America*

TLSI Dialogue 27
June 29, 2023

Lockheed Martin's Advanced Technology Center—explored opportunities to enhance the U.S. defense industrial base for economic and national security needs.

TLSI Dialogue 28
September 21, 2023

Lawrence Livermore National Laboratory—focused on U.S. innovation culture and narrative, workforce expansion and enhancement, and building dynamic innovation ecosystems.

TLSI Dialogue 29
February 26, 2024

Arizona State University—produced actionable recommendations and outlined the *Compact for America* for U.S. innovation leaders.

TLSI Dialogue 30
October 31, 2024

Lockheed Martin Global Vision Center—the TLSI celebrated its 15th anniversary, received input for the *Compact for America* from the Assistant to the President for Science and Technology, and reviewed and finalized the *Compact for America* within the context of the rapidly changing technological and political environment.

TLSI Dialogue 31
April 2, 2025

Lockheed Martin's Deep Creek and Waterton campuses—examined the Trump Administration's science and technology priorities and ensured the Compact's recommendations align effectively with the nation's scientific objectives.

Revolution in the Technology Landscape

Setting the Stage for the *Compact for America's* 10 Recommendations

Since the founding of the Council on Competitiveness Technology Leadership and Strategy Initiative (TLSI) more than 15 years ago, there have been dramatic changes in the technology landscape, global competition, the U.S. innovation system, and the role of government in research, technology development, and commercialization. The TLSI evolved along with these dramatic shifts, conducting new analyses, addressing potential economic and national security impacts of technologies emerging on the horizon, identifying new opportunities for American innovation, and considering solutions to new problems and challenges these developments present.

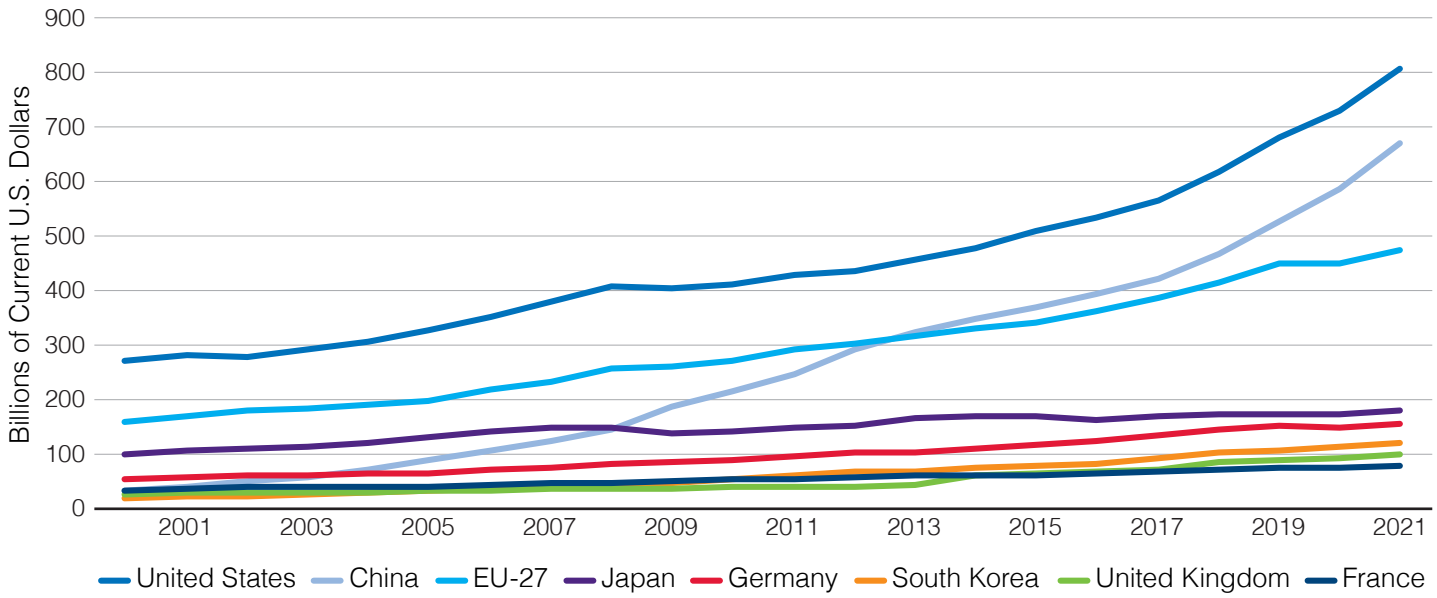
Shifts in the Technology Landscape

In the past decade, the technology landscape has shifted radically along numerous dimensions. Change is accelerating to unprecedented speed, and the United States faces its strongest challenger ever in the technology arena.

The Fierce Competition Shaping the Future of Innovation

Gross Domestic Expenditures on R&D, by Selected Region, County, or Economy, 2000–21

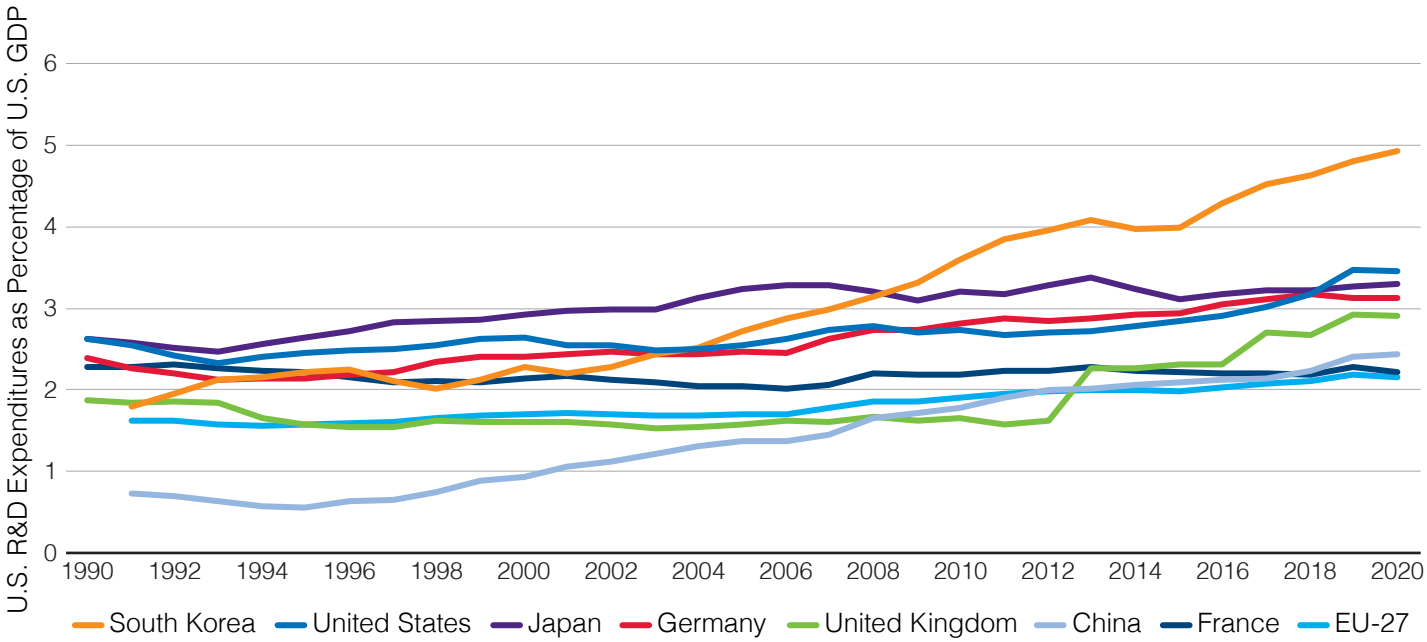
Source: National Center for Science and Engineering Statistics | NSB-2024-6



Global Competitors Dramatically Increase Innovation Investments to Ignite Growth

GERD as a Share of Gross Domestic Expenditures on R&D, by Selected Region, Country, or Economy

Source: National Center for Science and Engineering Statistics | NSB-2024-6



The TLSI documented this shift with a significant 2015 study in conjunction with Deloitte—the Advanced Technologies Initiative—to provide insights on U.S. and global innovation trends and highlight the challenges faced by U.S. innovation stakeholders in maintaining or improving their tech-based innovation competitiveness. The TLSI uncovered how other nations beyond the United States and the European Union—namely, China—were dramatically transforming their innovation investments and national growth strategies. The research and survey work also marked a dramatic change over a very short period—the TLSI leaders' perception that the European Union would be the most innovation-competitive rival flipped—with China now at the top of the list; and with data for the first time demonstrating China's ambitions.

The effort reflects how the United States' top tech and innovation leaders were chartering unknown territory brought about by a major technological discontinuity, creating great uncertainty about the future. These disruptive changes have brought about a powerful duality—the promise of heretofore unimaginable opportunity, but they also have shaken and threatened the world order.

Some Key Factors Underpinning the Modern State of Innovation and Technological Competition

- **U.S. leadership in critical technologies has risen to the top of the nation's economic, national security, and geopolitical agenda.**

These revolutionary technologies include advanced digital and telecommunications technologies, biotechnology, hypersonics, autonomous systems, quantum, and the apex technology of artificial intelligence. These technologies are reshaping and driving the global economy, military capabilities, and the global competitive battleground. They are the platform technologies from which the industries that will underpin the future are now arising.

Consider, as an example, how AI is fundamentally transforming the healthcare industry by significantly accelerating drug development and enhancing diagnostic accuracy. The Food and Drug Administration has already approved more than 800 AI/ML devices,[1] and the number of AI-discovered drugs in clinical trials has surged from 17 in 2020 to 67 in 2023.[2] In just on example, a firm using AI took just 18 months and $3 million to identify a drug candidate for treating pulmonary fibrosis, a process that normally would have taken $430 million out-of-pocket expenses and 3-6 years.[3]

Artificial Intelligence is also similarly revolutionizing materials development. By rapidly identifying and simulating millions of materials for specific applications, AI drastically reduces the time required for discovery, as was the case with a collaboration between the Pacific Northwest National Laboratory and a leading software company, which analyzed over 32 million inorganic materials and identified 18 promising candidates for batteries in under 80 hours. This task traditionally would have taken years.[4]

1 Testimony of Patrizia Cavazzoni, M.D., et.al, Food and Drug Administration before the Subcommittee on Health, Committee on Energy and Commerce, U.S. House of Representatives, May 22, 2024.
2 How Successful are AI-discovered Drugs in Clinical Trials? A First Analysis and Emerging Lessons, Madura KP Jayatungo, et.al, Drug Discovery Today, Vol. 29, Issue 6, June 2024.
3 From Start to Phase 1 in 30 Months: AI-discovered and AI-designed Anti-fibrotic Drug Enters Phase 1 Clinical Trial, Insilico Medicine, press release, February 24, 2022.
4 Accelerating Computational Materials Discovery with Artificial Intelligence and Cloud High-Performance Computing: From Large-scale Screening to Experimental Validation, Chi Chen, et.al., Azure Quantum, Microsoft, Pacific Northwest National Laboratory, January 8, 2024.

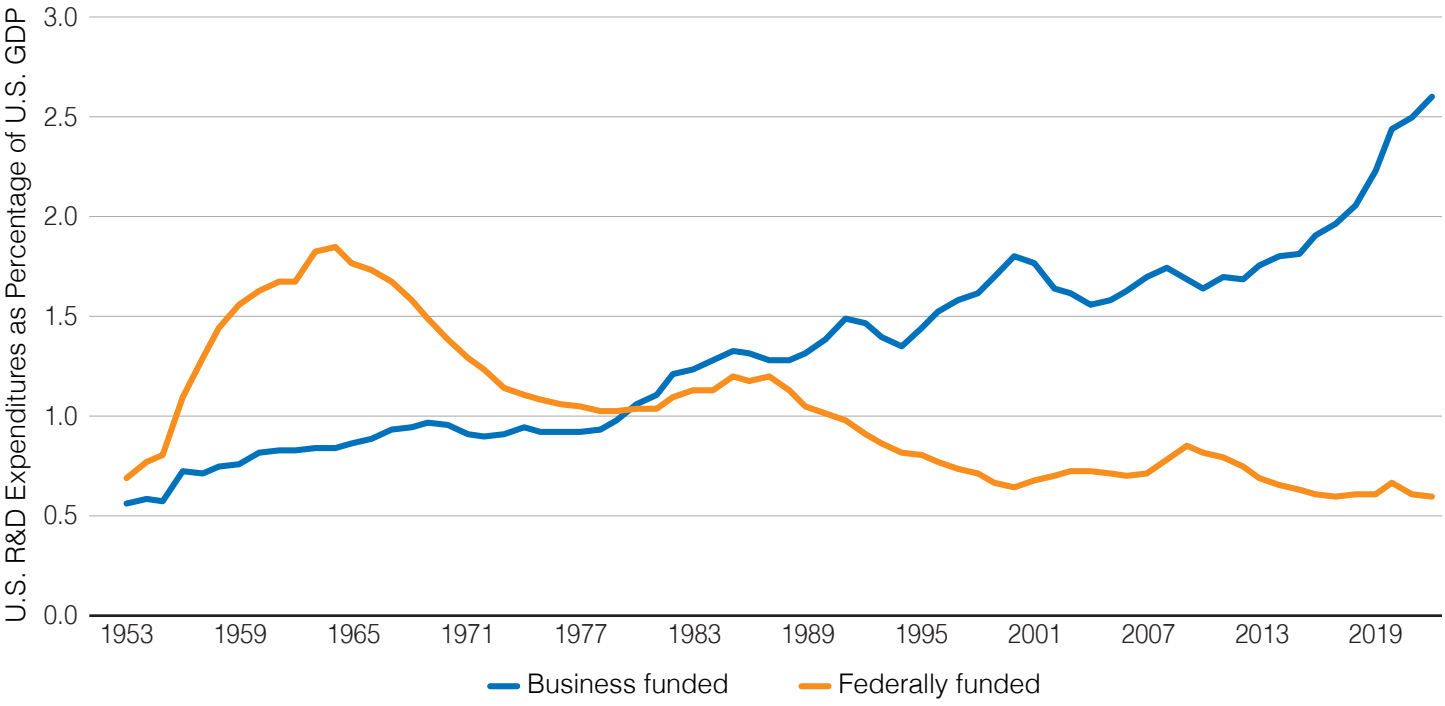
- **The U.S. private sector's R&D intensity (R&D measured as a percentage of economic output, or GDP) continues to increase; however, federally funded R&D investment intensity is in structural decline.**

The private sector's investment in R&D is a critical advantage for U.S. innovation and economic competitiveness—as it supports the nation's ability to develop and deploy applied work to the marketplace.

U.S. Federal Investments in R&D Reach Lowest Intensity in Modern History

Ratio of U.S. R&D Expenditures to GDP by Funding Source

Source: National Center for Science and Engineering Statistics | NSB-2024-6



The federally funded R&D investments serve a different but just as important role in the nation's tech and innovation ecosystem. Typically, this federally funded work is long-term in orientation; is fundamental in its approach; non-appropriable by any one company or sector; and serves as the basis for the applied and development work that leads to innovative outcomes over many years. Federally funded basic research—like that which led to the internet and countless other innovations—is the feedstock for future industries and businesses.

So, the concern over a structural decline in the intensity of this particular type of investment class, when the overall economy has been historically strong, is real. Without a strong commitment by a nation to support basic research, the country is underfunding and putting at risk its long-term innovation capacity and capability.

A significant step toward enhancing the U.S. position on the global stage for the middle and second half of the 21st century would be to reverse the trend of structural decline in federally funded research intensity—moving the nation back up to historically high levels of near two percent of GDP. This would benefit both defense and non-defense research efforts.

- **A new competitive reality is demanding an expanded vision for U.S. innovation capacity and capability.**

While the federal government cannot singlehandedly drive innovation in the United States, it can co-create with the private sector a strategic vision and prioritize key initiatives for investment and action. In doing so, the United States can achieve global leadership in the dual-use technologies that will platform the "next economy"—from transformational computing (e.g., AI and quantum), to advanced energy solutions (e.g., small modular reactors (SMRs), and advanced biology (e.g., bioscience, biotechnology, and biomanufacturing).

The CHIPS and Science Act is a good example of how federal investment in R&D can spur significant private investment and economic activity. The CHIPS Program Office (CPO) has announced $32.54 billion in grant awards and up to $5.5 billion in loans, distributed among 32 companies involved in 48 projects across 23 states.[5] These projects have lowered the financial risks associated with large-scale private investments, catalyzing a projected total investment of over $380 billion over the next two decades, with a significant portion expected by 2030.

The takeaway is that as technological advancements accelerate annually and as global competitors scale tech-based innovations at blistering speeds, the United States cannot solely rely on private enterprises—often dominated by a small group of technology firms—for innovation. Instead, the country must deploy cutting-edge technologies across all sectors of the economy and expedite innovation. Business, government, academia, and national laboratories must all be empowered to move more quickly to test, validate, and scale innovations, ensuring every sector of the U.S. economy and defense benefits from the most advanced products, services, and technical solutions.

- **China has risen as the most formidable strategic competitor the United States has ever faced.**

China seeks to supplant the United States as the world's economic, technological, military, and geopolitical leader. It has put technology and innovation at the center of its economic, military, and geo strategies. Chinese President Xi said, "Scientific and technological innovation has become the main battlefield of the international strategic game…"[6]

5 Tracking the CHIPS Incentives Program Awards, Semiconductor Industry Association, January 22, 2025

6 May 28, 2021, speech by Chinese President Xi Jinping at a meeting of the members of the Chinese Academy of Sciences and the Chinese Academy of Engineering, and the national congress of China Association for Science and Technology.

China seeks to become a world S&T superpower and to use this technological superiority for economic, political, and military gain. Beijing is implementing a whole-of-government effort to boost indigenous innovation and promote self- reliance, and is prioritizing advanced power and energy, AI, biotechnology, quantum information science, and semiconductors. Beijing is trying to fast- track its S&T development through investments, intellectual property acquisition and theft, cyber operations, talent recruitment, scientific and academic collaboration, and illicit procurements.

Annual Threat Assessment of the U.S. Intelligence Community
Office of the Director of National Intelligence
February 2024

The PRC is the only competitor with both the intent to reshape the international order and, increasingly, the economic, diplomatic, military, and technological power to do it. Beijing has ambitions to create an enhanced sphere of influence in the Indo-Pacific and to become the world's leading power. It is using its technological capacity and increasing influence over international institutions to create more permissive conditions for its own authoritarian model, and to mold global technology use and norms to privilege its interests and values.

National Security Strategy
The White House
October 2022

In 2009, China invested $183 billion in R&D. By 2022, its investment had increased to $686 billion (constant dollars)—a nearly 270 percent increase.[7] It is using every tool in its arsenal to build a science and technology capability rivaling those of the United States—pursuing aggressive plans for every strategic critical technology, backed by hundreds of billions of dollars in investment. This includes a multi-pronged strategy to acquire technologies from other countries—especially the United States. As one illustrative example of China's strategic focus on global tech leadership, China is rapidly expanding its seabed mining capability, a critical resource for rare metals necessary for producing electronics, clean energy products, and microchips, and setting up institutes on deep-sea research, and dozens of colleges on marine sciences, while President Xi has directed that China "master key technologies for entering the deep sea."[8]

China is also spreading its global influence in the technology landscape, aiming to shape large swaths of the global economic and trading system, and write the rules of the 21st century economy in its state-directed model. It is using its growing role in multilateral institutions—such as the UN's scientific agencies, WIPO, and international standards-setting bodies—to help achieve its geopolitical goals. It seeks to bring other nations into its sphere through efforts such as Belt and Road Initiative, Digital Silk Road, and Maritime Silk Road—long-term strategies to forge lasting global partnerships rooted in technology entanglement.

7 OECD Main Science and Technology Indicators
8 China Set to Dominate the Deep Sea and Its Wealth of Rare Metals, Washington Post, October 19, 2023.

- **Members of Congress and the FBI raised alarms about U.S. research collaborations with China and China's expanding footprint on American university campuses.**

While the scientific community generally views the free and open exchange of information as vital to scientific research, China has employed a variety of mechanisms to influence and exploit the openness of the U.S. research enterprise. These include foreign talent recruitment programs, forming partnerships with U.S. research universities, setting up research centers in the United States, financing joint research programs, and sending students to the United States for science and engineering graduate studies. Instances uncovered include U.S. researchers failing to disclose foreign funding and associations; theft of intellectual property; and violations of the peer review process by sharing confidential grant applications. Congress and the Executive Branch instituted new disclosure requirements on applicants for federal R&D funding, especially regarding foreign support, and specific policies governing federal employee and grantee participation in foreign talent recruitment programs. Increased scrutiny of international collaboration is placing significant pressures on universities. There is a growing challenge in finding a balance between fostering international R&D partnerships and safeguarding U.S. technology. Additionally, there is a need to address the expectations of U.S. taxpayers, who expect to see tangible benefits from public R&D investments made in U.S. universities and national laboratories.

- **Rising geopolitical risk has given strong momentum to repatriating the manufacturing of critical technologies back to the United States, particularly microelectronics, and securing supply chains for critical materials and minerals.**

The CHIPS and Science Act, passed in 2020, appropriated $50 billion for: financial assistance to establish semiconductor fabrication, assembly, testing, advanced packaging, or R&D in the United States; a new National Semiconductor Technology Center; a National Advanced Packaging Program; microelectronics metrology research; and ManufacturingUSA institutes on semiconductor manufacturing. Two hundred million dollars was provided for workforce education and training, $2 billion for a Department of Defense National Network for Microelectronics Research and Development, and $500 million for international technology and supply chain security and innovation activities.

- **The U.S. response to COVID-19 demonstrated remarkable dynamism and adaptability within the innovation ecosystem, yielding key lessons for strengthening its capacity and capability.**

When the pandemic prompted nationwide lockdowns, millions of white-collar workers transitioned to telework almost overnight, compelling companies to rapidly reengineer work processes, communications, and management structures. Digital strategies initially planned for months or years were implemented in days, and the home delivery sector expanded its workforce by hundreds of thousands. Organizations across various industries adapted by implementing new safety protocols, with distilleries pivot-

ing to produce hand sanitizer, sports equipment manufacturers crafting face shields, and fashion houses sewing masks. Additionally, companies modified production to meet consumer needs, repurposing hotel spaces to accommodate medical workers and enhancing telehealth services. The research community and regulators also mobilized swiftly, developing tests and vaccines in 100 days—a previously unprecedented pace.

- **The federal government continues to target research and innovation in critical and emerging technologies and industries of the future.**

These include: artificial intelligence, quantum information science, advanced communications, microelectronics, nanotechnology, high-performance computing, biotechnology and biomanufacturing, robotics, advanced manufacturing, financial technologies, undersea technologies, and industrial space.

- **The lines between commercial technology and national security and defense technology have all but disappeared.**

U.S. defense capabilities are being reshaped by dual-use emerging technologies and game-changing technology-enabled concepts such as artificial intelligence, machine learning, autonomy, next-generation communications, spectrum technologies, space, biotech, and digital technologies that weave defense platforms together for different mission applications and changing battlefield conditions. Leadership in many of these dual-use technologies is in commercial firms, high-tech start-ups, universities, and national laboratories. The U.S. Department of Defense—for example, through President Trump's April 9, 2025, Executive Order on modernizing defense acquisitions—and the defense primes are making plans to tap highly innovative commercial firms, small businesses, and start-ups to bring advanced technologies to military systems. But the commercial sector is moving so fast, and the investments are so big, the defense industry cannot keep up.

While amazing technology is being developed across the whole U.S. ecosystem, it can take years for it to have its intended impact for national security. Recently, the U.S. Government Accountability Office found that the Department of Defense continues to struggle with delivering innovative technologies quickly. Recent reforms were intended to lead to faster results, but slow, linear development approaches persist. GAO found that leading commercial companies deliver complex, innovative products with speed through iterative cycles of design, development, and production. But the average major defense acquisition program (MDAP) yet to deliver initial capability plans to take over 10 years to do so. Cycle time is increasing. GAO found that, for MDAPs major that have delivered capability, the average amount of time it took to do so increased from 8 years to 11 years—an average increase of 3 years from their original planned date.[9]

9 Weapon Systems Annual Assessment, DOD Is Not Yet Well-Positioned to Field Systems with Speed, Government Accounting Office, June 2024.

- **The "valley of death" is a stubborn bottleneck in U.S. innovation.**

The "valley of death," a term universally disliked yet a persistent bottleneck in the U.S. innovation system, which prevents many potentially valuable innovations from reaching the marketplace or slowing their progress toward commercialization, and keeping many start-ups from a pathway to growth. In the valley of death, companies cannot obtain the capital needed to prototype, demonstrate, test, and validate their innovations, lowering risk and generating the performance and cost data needed to attract commercial financing. This occurs when technologies arise in the start-up sector, and when they are transferred or "spin-out" from universities into the private sector for application and commercialization. The federal government has made efforts to bridge the valley of death, for example, funding an extension of Phase II Small Business Innovation Research program grants, and providing funding for prototype development and pilot demonstrations.

- **The National Science Foundation's mission was expanded.**

The CHIPS and Science Act established a new NSF Directorate on Technology, Innovation, and Partnerships. This historic—and, as of this writing, still fragile—initiative expands the Foundation's mission, with NSF now tasked with fostering technology development, innovation, and the growth of regional innovation ecosystems.

- **The federal government has taken on a significant role in building innovation ecosystems beyond the U.S. coastal superstars.**

Going forward, cities, states, and regions should double down and build on efforts to attract private sector engagement and to coordinate more local, "place-making" ecosystem building efforts to leverage these past investments.

  - In 2023, the Department of Energy launched seven Regional Hydrogen Hubs with $7 billion.
  - In 2023, the National Science Foundation selected ten inaugural Regional Innovation Engines—on technologies such as advanced energy, biotech, advanced materials, advanced computing, semiconductors, robotics and advanced manufacturing, and disaster prevention and mitigation. Each engine is eligible for up to $160 million in funding over ten years.
  - To fulfill authorities appropriated under the CHIPS and Science Act, the Department of Defense has awarded nearly $669 million to eight regional innovation hubs that form its Microelectronics Commons.
  - In 2024, the U.S. Department of Commerce awarded $720 million to 18 technology hubs across the United States on technologies ranging from autonomous systems, quantum, and biotech to energy, critical minerals, semiconductor manufacturing, and materials manufacturing. This has led to a total of $6 billion of public and private investment across all 31 designated tech hubs.

- **A new age of commercial space has opened.**

Moving at a blistering pace, SpaceX is disrupting a market dominated by governments for a half-century—disrupting satellite launch, space exploration, and the industry's ecosystem. It launched its workhorse Falcon 9 rocket 134 times in 2024. And in 2024, the Falcon 9 completed 52 percent of all global orbital rocket launches and delivered 84 percent of total mass to orbit.[10] At an event with the Center for Strategic and International Studies (CSIS), SpaceX President and COO Gwynne Shotwell stated that the company was aiming for 175 to 180 launches in 2025.[11] With its heavy lift rocket Starship in undergoing a test flight campaign, SpaceX aims to send 100-ton payloads to the moon and Mars for $10 million a trip.[12]

- **Researchers at the Lawrence Livermore National Laboratory achieved nuclear fusion ignition.**

After 60 years of work, on December 5, 2022, researchers at Lawrence Livermore National Laboratory's National Ignition Facility for the first time anywhere by any approach achieved a fusion experiment that produced more fusion energy than the laser energy required to trigger the reaction—a huge advancement for the field, repeated in no less than four subsequent experiments. Nuclear fusion has the potential to deliver an inexhaustible supply of cheap clean energy. The United States has at least 25 companies working on different concepts, and most of the investment. In 2023, the Department of Energy awarded $43 million to eight of these companies to fund R&D and deliver within 18 months an early fusion pilot plant design.[13] Many commercial companies are targeting the early 2030s for putting fusion energy on the grid, and a few start-ups have even more aggressive timelines.

In addition, other efforts at sustainably using and expanding the country's energy sources—including advanced nuclear R&D for modular, as well as Generation IV nuclear reactors, and enhancing U.S. energy infrastructure—are underway. The Council has called for the nation to launch a "Nuclear Energy Moonshot" to accelerate next-generation nuclear technologies, and turbocharge the production of clean, baseload energy.

- **The Age of AI suddenly arrived.**

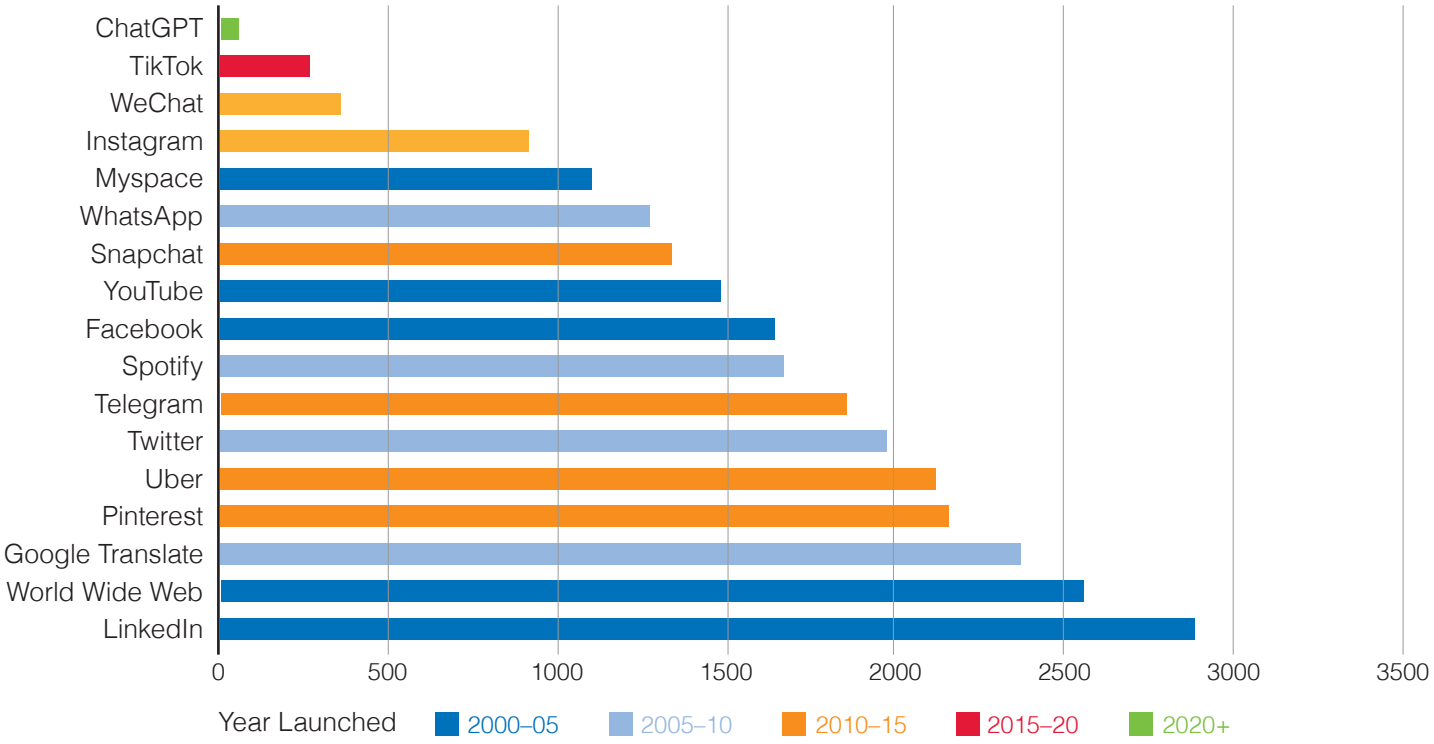
In late-2022, a generative AI model—ChatGPT—was released to the public, reaching 1 million users in five days, and 100 million users in two months.[14] According to BOND's June 2024 report, this was the fastest user ramp ever for a standalone product; and generated the fastest software ramp ever (OpenAI hit a $2 billion revenue run rate in the first full year post-launch of ChatGPT).

10 Space Trends in 2024, American Enterprise Institute, January 13, 2025.
11 SpaceX launch surge helps set new global launch record in 2024, Space News, January 1, 2025.
12 What is SpaceX's Starship? It's Really a Mars Ship. New York Times, March 14, 2024.
13 Preconceptual design addresses the same issues as a conceptual design but at lower levels of fidelity and with greater uncertainties.
14 ChatGPT Sets Record for Fastest-Growing User-base—analyst note, Reuters, February 2, 2023.

AI's Unprecedented Speed of Adoption

Digital Platform Years to Reach 100MM Users

Source: Company Filings, Press, Netflix represents streaming business.



The advance of AI will drive the biggest and fastest technology disruptions in history. Businesses, researchers, educators, government officials, and others are beginning to experience disruption as AI begins to transform the relationships between human and machines, shatter the time and cost calculus for a widening array of human endeavors, rewrite the process of scientific discovery, and drastically alter military capabilities and the very character of war. It could drive a collapse in some product life cycles, supercharge the forces of creative-destruction, and propel a leap in productivity. In a recent study, top economists estimated that we could see a near doubling of output after 20 years from an AI-enabled productivity growth rate 44 percent higher than the baseline projections of the U.S. Congressional Budget Office.[15]

On January 20, 2025, Chinese AI development firm DeepSeek disrupted the broad belief that the United States was the undisputed global leader in AI. DeepSeek released its R1 LLM at a tiny fraction of the development cost and workforce as OpenAI and other competitors, while providing its R1 models under an open source license, enabling free use. DeepSeek promises to improve the efficiency and speed of search.

15 Machines of the Mind, The Case for a n AI-powered Productivity Boom, Martin Neal Baily, Erik Brynjolfsson, and Anton Korinek, Brookings, May 10, 2023.

Many of the world's largest companies by market cap—Amazon, Alphabet, Meta, Apple, Microsoft, Nvidia, etc.—are competing fiercely for leadership in AI. And we are seeing some of the biggest injections of capital into a specific technology in the history of Silicon Valley. In the first quarter of 2024 alone, Microsoft spent $14 billion, Google spent $12 billion, and Meta spent more than $6 billion. They all increased their spending projections for the year ahead.[16] These three companies, along with Apple, are the top R&D spenders in the world.

The AI boom is rapidly increasing demand for compute power, placing pressure on American data centers and the supply of electricity that powers them. The IEA reported that data centers' total electricity consumption could double to more than 1,000 terawatt-hours by 2026.[17] That is roughly equivalent to the electricity consumption of Japan. IEA forecasts that electricity consumption from data centers in the European Union in 2026 will be 30 percent higher than 2023 levels. By 2033, power demand from Europe's data centers could be equivalent to the total power

Five Big Tech Giants Spent $229 Billion on R&D in the Last Year

Ranked: R&D (Research & Development) expense by 10 most valuable companies of Nasdaq in LTM (last 12 months). Total = $255 Billion.

Notes: Nvidia and Broadcom data shown for LTM (last 12 months) ending April 2024.

Source: Stockanalysis dot com.

Company	R&D Spend, LTM ending March 31, 2024*	R&D Spend, % of Gross Profit
amazon	$85.6B	30%
Alphabet	$45.9B	25%
Meta	$39.1B	34%
Apple	$30.4B	17%
Microsoft	$28.2B	17%
NVIDIA	$9.5B	16%
BROADCOM	$7.5B	27%
ASML	$4.4B	30%
TESLA	$4.4B	26%
COSTCO WHOLESALE	Not reported	Not reported

Total = $229B

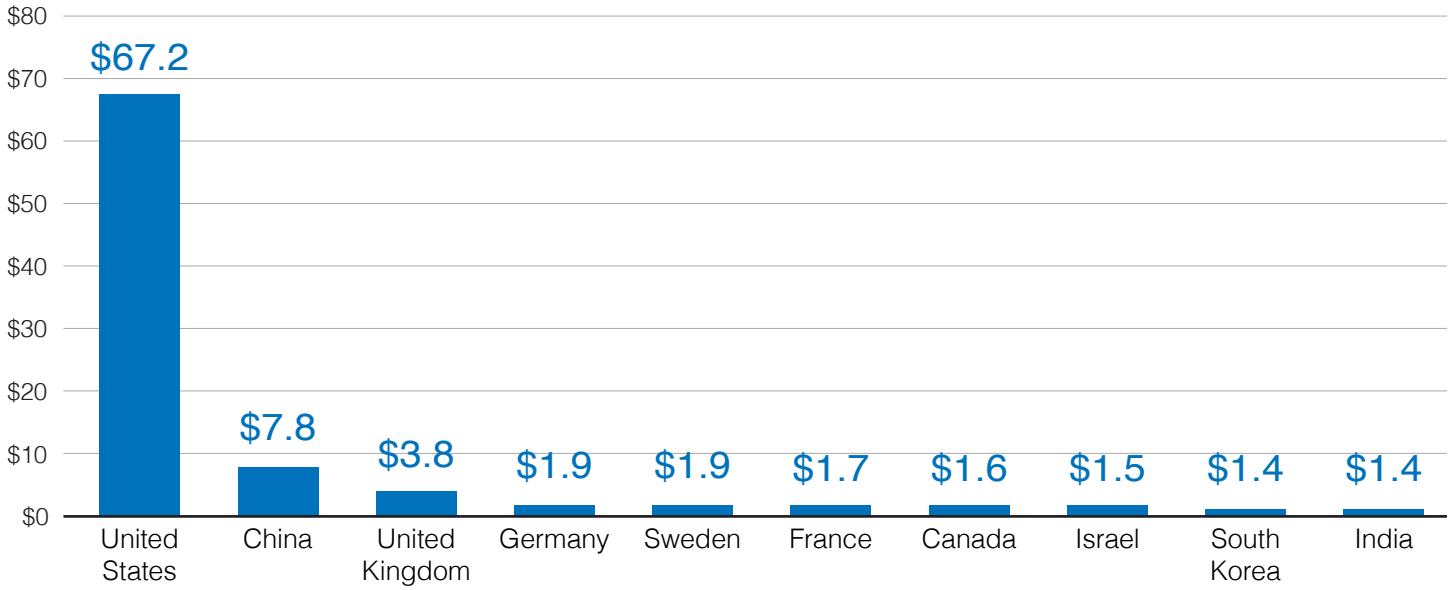
16 Alphabet, Microsoft Earnings Show Heft AI Bets are Driving Growth, Reuters, April 26, 2024; Big Tech Keeps Spending Billions on AI. There's No End in Sight, Washington Post, April 25, 2024.

17 Electricity 2024, Analysis and Forecast to 2026, International Energy Agency, January 2024.

The United States' Advantage in Private Investments

Private Investment in AI by Geographic Area ($B), 2023

Source: 2024 Standford AI Index Report, Quid. 2023.



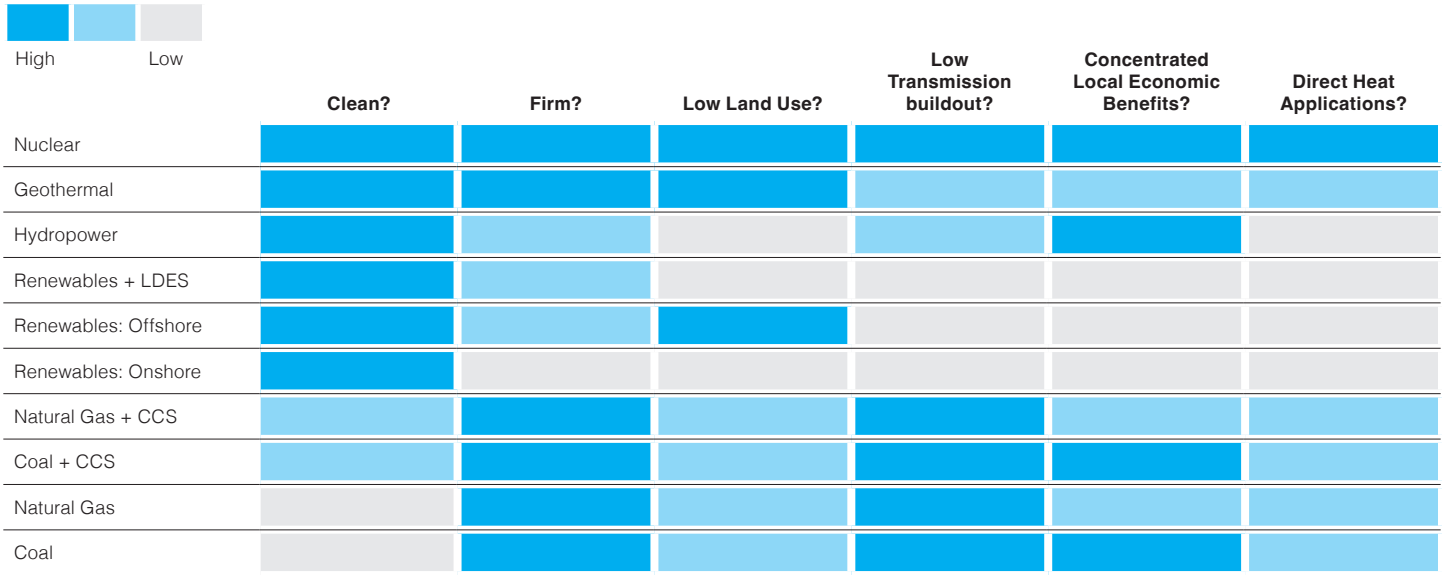
consumption of Portugal, Greece, and the Netherlands.[18] Ireland's AI-related consumption could reach 32 percent of the country's total electricity demand in 2026.[19] In the United States, a new study reports that data centers could consume up to nine percent of electricity generation by 2030, more than double the consumption today.[20]

Due to surging AI-driven demand for electricity, utilities predict the United States will need the capacity of 34 new nuclear power plants in the next five years. To meet their needs, major technology companies like Microsoft and Amazon are reviving old nuclear facilities like Three Mile Island and signing long-term, exclusive power purchasing agreements with utilities, as well as investing in next-generation nuclear reactors. Recently, Google announced a deal to source energy from small modular reactors (SMRs) being developed by Kairos Power, while Amazon revealed investments in four SMRs operated by Energy Northwest to support data centers in Oregon. Oracle is also designing an AI data center to be powered by three SMRs. The first next-generation reactors are anticipated to be operational in the early 2030s.[21]

18 Powering Up Europe: AI Data Centers and Electrification to Drive +c.40%-50% Growth in Electricity Consumption, Goldman Sachs, April 29, 2024.
19 Electricity 2024, Analysis and Forecast to 2026, International Energy Agency, January 2024.
20 Press Release, EPRI Study: Data Centers Could Consume up to 9% of U.S. Electricity Generation by 2030, Electric Power Research Institute, May 28, 2024.
21 AI Goes Nuclear, Bulletin of the Atomic Scientists, December 2024.

Nuclear Offers a Unique Value Proposition for a Net Zero Grid

Source: Pathways to Commercial Liftoff: Advanced Nuclear, U.S. Department of Energy, September 2024.



- **The United States faces significant competition from China in the nuclear industry.**

For example, the United States leads in the development of nuclear energy technologies, but it has fallen behind China and Russia in deployment. As of April 2024, China has 23 commercial reactors under construction, another estimate indicates 30 under construction, and the United States has none, though it opened the Plant Vogtle in Georgia in March 2024. The United States has the largest nuclear fleet, with 94 reactors, but it took nearly 40 years to add the same nuclear power capacity China added in 10 years.[22] Also, China is rapidly building the world's first onshore small modular nuclear reactor, scheduled for operation in 2026.

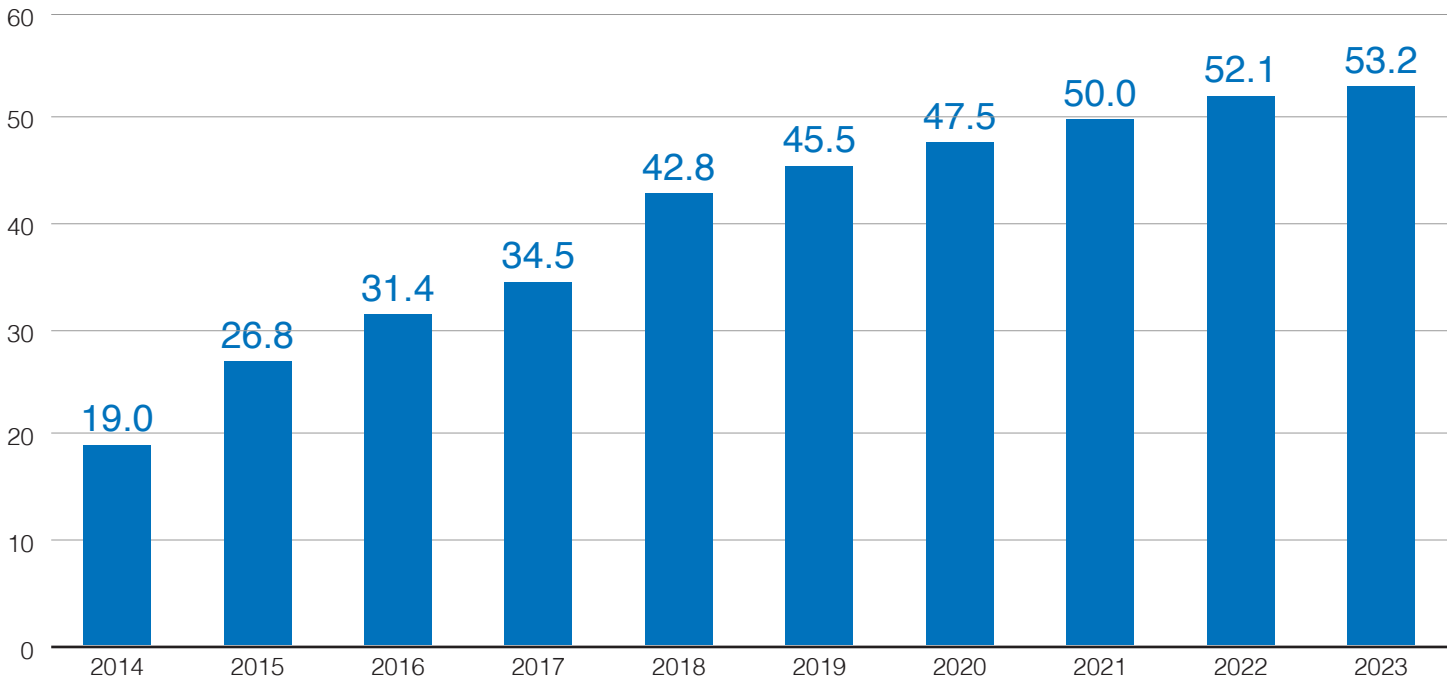
- **New initiatives extend U.S. global statecraft to critical technologies.**

Rules for the 21st century technology-driven global economy, technology standards, and regulations on powerful emerging technologies are being set in international institutions, with competing visions and values on what these models should be. The United States is deploying a new technology statecraft and working with allies and like-minded nations to ensure these new rules of the road adhere to free market principles and democratic values.

22 China Continues Rapid Growth of Nuclear Power Capacity, In-Brief Analysis, U.S. Energy Information Administration, U.S. Department of Energy, May 6, 2024; Nuclear Power in China, World Nuclear Association, August 13, 2024.

Annual Installed Net Nuclear Power Capacity in China (Gigawatts)

Source: U.S. Energy Information Administration and the International Atomic Energy Agency



For example, the U.S. Department of State established a Special Envoy for Critical and Emerging Technology to cooperate with allies and partners on critical and emerging technologies; lead planning for international technology diplomacy to support national security priorities; and coordinate policy around new global technology developments including in AI, quantum, and biotechnology. The U.S.-EU Trade and Technology Council, formed in 2022, is focused on transatlantic cooperation on development and deployment of new technologies such as AI, 6G, quantum, and biotech based on shared democratic values, including encouraging compatible standards and regulations. Pillar II of AUKUS—a trilateral security partnership for the Indo-Pacific Region between Australia, the United Kingdom, and the United States—aims to improve joint capabilities and interoperability in cyber, AI, quantum, and undersea capabilities. Recently launched, NATO's Defense Innovation Accelerator for the North Atlantic is supported by joint funds to support competitively awarded grants and accelerators to develop technologies that, if successful, can move to the warfighter, NATO nations, or industrial base.

A National Competitiveness Imperative

A Call to Action for a New Tech-Driven Industrial Base and National Innovation Ecosystem

Over the past two years—and building on the work and findings of the past 15 years—the TLSI convened five Dialogues under the leadership of its co-chairs Dr. Patricia Falcone, Deputy Director, Science and Technology at Lawrence Livermore National Laboratory; Dr. Sally Morton, Executive Vice President, ASU Knowledge Enterprise, Arizona State University; and Dr. Steven H. Walker, Former Vice President and Chief Technology Officer, Lockheed Martin. Participants—includ-ing CTOs and technology experts from tech-nology-intensive industry sectors, universities, national laboratories, and the federal govern-ment—discussed the unprecedented pace and scale of today's technological advancement and the effects on U.S. competitiveness.

- On June 29, 2023, Lockheed Martin hosted TLSI Dialogue 27 at its Palo Alto Advanced Technology Center. Participants explored the forces, challenges, and opportunities reshaping the U.S. defense industrial base, and ways to develop an adaptive and agile industrial base to meet U.S. economic and national security needs.
- On September 21, 2023, Lawrence Livermore National Laboratory hosted TLSI Dialogue 28. Discussions centered around three key themes: changing the culture of research and innovation ecosystems, enhancing the innovation workforce in critical technologies and industries, and building innovation ecosystems through national domestic strategies.
- On February 26, 2024, Arizona State University hosted TLSI Dialogue 29. Discussions focused on challenges and opportunities for building an agile, adaptive defense industrial base, and reshaping the U.S. innovation ecosystem for an era of rapid technological change.
- On October 31, 2024, Lockheed Martin's Global Vision Center hosted the 30th Dialogue—and 15th anniversary of the TLSI. This milestone further informed the TLSI's *Compact for America* report, with the conversation focusing on priorities to strengthen the U.S. research security, to incent the commercialization of innovations, and to promote greater strategic partnerships to enhance the U.S. innovation ecosystem.
- On April 2, 2025, Lockheed Martin's Deep Creek and Waterton campuses hosted TLSI Dialogue 31. During the meeting, leaders examined the science and technology-related priorities established by the Trump Administration and ensured that the recommendations of the Compact align effectively with the nation's scientific objectives.

These five Dialogues, along with comprehensive research and fact-finding initiatives, serve as the foundation for the recommendations presented in the TLSI's *Compact for America*. It was through these discussions that the TLSI concluded that revolutionizing and enhancing the U.S. innovation

model is essential for maintaining national competitiveness, a conclusion built upon seven foundational insights:

1. **Intensifying Global Competition.** Increasingly, technology-driven competition is becoming a critical factor in global geopolitical leadership, now equally as important to, and deeply entangled with, U.S. economic strength and military capabilities. Geostrategic competitors seek to disrupt the current world order by gaining an advantage in key future technologies, which threatens our economic competitiveness, military superiority, and geopolitical influence. The United States' ability to innovate rapidly and at scale is vital for overcoming this competitive challenge and maintaining our position as a global leader.
2. **Accelerating Technological Change.** The pace and scale of technology-driven disruption are unprecedented. Traditional models for developing and commercializing new technologies are no longer sufficient to meet today's rapid demands. There is a need for more adaptable, collaborative, cross-sectoral frameworks that facilitate faster innovation cycles, attract more capital, and enable more seamless transitions from research to market. This is particularly important in the context of the defense industrial base and the criticality of deploying dual-use technologies.
3. **Evolving Landscape of Research and Development.** While private-sector-led research and development is expanding, particularly in areas traditionally categorized as basic research, this concentration presents both opportunities and challenges. Ensuring a robust, complementary system of private and public funding and conducting of research and development is essential.
4. **Opportunity from Converging Platform Technologies.** The convergence of transformative technologies such as artificial intelligence, quantum computing, advanced biosciences, advanced nuclear technology, next-generation semiconductors, etc. presents unprecedented opportunities for productivity and societal progress. To capitalize on these opportunities, cohesive strategies that encourage interdisciplinary collaboration and focused federal and private investment in next-generation technologies are essential.
5. **New Successful Large-scale Innovation Models.** Federal investment in research and development has proven to stimulate significant private investment and economic growth. As the President's Science and Technology Advisor Michael Kratsios noted in his April 14, 2025, Golden Age of Innovation speech, "prizes, advance market commitments, and other novel funding mechanisms, like fast and flexible grants, can multiply the impact of government-funded research." These creative solutions can be applied to artificial intelligence, quantum computing, nuclear fusion, advanced bioeconomy, and other national technology priorities—helping to de-risk long-term investment and unleash private sector participation necessary to dramatically accelerate innovation.
6. **Growing Demand for Tech Talent.** The demand for skilled talent across various technological domains is at an all-time high. To sustain and enhance U.S. innovation, the United States must build a global-leading pipeline of talent by reimagining and radically expanding the U.S. system of K-12 and university education, as well as bolstering training, up-skilling, and private-public collaborative initiatives.

7. **Shifting Global Collaboration and Priorities.** The interconnected nature of today's problems and the global economy necessitates a collaborative, but also secure, approach to innovation.

Reasserting U.S. Global Technology Dominance

The U.S. innovation model, rooted in Vannevar Bush's 1945 report Science—The Endless Frontier, has fueled economic prosperity for decades and has been a cornerstone of the country's standing in the post-WWII order. This system is supported by substantial federal investment in basic research and development (R&D), a strong intellectual property framework, and universities and national laboratories that act as innovation hubs. Together, these elements have fostered a culture of creativity and entrepreneurship that underpins every aspect of U.S. competitiveness. However, as successful as this model has been, today it is insufficient to meet the accelerated pace of innovation and the demands of the modern competitive landscape.

This is a watershed moment for the U.S. scientific enterprise, and the United States must have a focused all-of-nation strategy to lead in these technologies, which will determine the global order.

To meet the moment, a new model is needed for harnessing the power of innovation—that is, the non-linear interaction of imagination, insight, ingenuity, invention, and impact. The model must feature greater adaptability, a robust and efficient model for expanding basic research, a greater focus on applied research, extensive interdisciplinary and cross-domain collaboration, and a broadening of the number of people and places participating in and benefiting from the innovation economy. Key priorities should include investing in and deploying dual-use technologies, reducing bureaucratic hurdles, significantly enhancing workforce development to sustain a skilled talent pipeline, and leveraging public-private partnerships to expedite innovation in critical sectors.

Moreover, the entire system must focus on efficiency and work to accomplish more with less, including by reducing administrative burdens and cultivating an environment that empowers researchers to pursue rigorous, evidence-based discoveries without hindrance. Additionally, the U.S. federal government must invest heavily in fundamental research while also strategically prioritizing technologies that will shape the country's future global competitiveness.

The TLSI has developed the recommendations presented in the next section to strengthen U.S. economic competitiveness and reinforce the country's defense industrial base. In so doing, U.S.-based scientific advancements and technological innovations will improve productivity, drive economic growth and, critically, improve the quality of life for all Americans.

Deeper Dive into the *Compact for America* Recommendations

The TLSI's *Compact for America* comprises 10 recommendations organized under four pillar areas of focus, each aimed at enhancing the United States' scientific progress and technological innovation to support a stronger defense industrial base (DIB) and innovation-driven economy. These recommendations are intended to revitalize America's science and technology enterprise—strengthening the United States' economic and national security, geopolitical leadership, and the future productivity and prosperity for all Americans.

Compact for America Strategy: 4 Pillars + 1 Foundation of Innovation

Creating a new Tech-Driven Industrial Base and
National Innovation Ecosystem to Make America Innovative Again

PILLAR 1
Accelerate Technology Translation, Scaling, and Commercialization
Shorten the Time for Technology Maturation and Market Integration

PILLAR 2
Rapidly Expand Commercial Innovation into the Defense Industrial Base
Broaden the Deployment of Dual-use Technologies

PILLAR 3
Win the Global Technology Competition
Set Standards, Secure Research, and Forge Strategic International Partnerships

PILLAR 4
Grow the Number of Innovation Ecosystems Across America
Extend Place-Making Innovation Best Practices from Coast to Coast

+

Foundation for Enabling American Innovation

Innovation Capability/Capacity

Global Pacesetter for Innovation

Strategic Investments in Emerging Tech

Pillar 1: Accelerate Technology Translation, Scaling, and Commercialization—Shorten the Time for Technology Maturation and Market Integration

Recommendation 1: Expand use-inspired research across the U.S. R&D enterprise to meet the nation's economic and security needs.

The "Endless Frontier" science and technology model that emerged in the post-WWII environment is no longer sufficient in serving contemporary needs. A siloed approach to techno-industrial policy—characterized by the perception of universities as dominant research hubs, the commercial sector operating largely independently within markets, and the government relegated to specific missions—must evolve in response to the complexities introduced by the convergence of platform technologies. To accelerate technology and innovation in the United States, greater integration and collaboration across sectors and an expanded focus on and greater federal investment in applied research is required. The following action would support this goal:

a. The federal government, in collaboration with industry leaders, the research community, and organizations dedicated to driving societal progress, should undertake a concerted effort to identify the most pressing economic, national security, societal, sustainability, and government mission challenges facing the nation.

b. This comprehensive assessment of challenges, once prioritized by the most critical problems or needs, should then be addressed by a multidisciplinary, multidomain community of leaders.

c. By catalyzing collective action, the federal government and institutional leaders can align research and development efforts, program investments, and resources to drive meaningful solutions.

d. This process should also identify opportunities for a robust market presence for the private sector, enabling the development of commercially viable solutions that can drive innovation and economic growth.

Recommendation 2: Expand investment and activities focused on the rapid scaling of critical technologies. Efforts should prioritize driving technological advancement and removing obstacles to swift deployment and scaling.

Expanding beyond the research and technology community, engagement is needed across all stakeholders and institutions within the innovation ecosystem to accelerate the commercialization of new technologies and ideas. The following actions would accelerate the commercialization of innovation in the United States:

a. Engage university and national laboratory researchers, industry, and other non-governmental partners at the beginning of federally funded pilots and demonstrations. Early engagement will help researchers better understand industry requirements for manufacturing and commercialization, identify potential applications and industry uses, and provide mechanisms for cost-sharing and the de-risking of pre-competitive technologies.

b. In pre-competitive consortia focused on critical technologies, engage downstream stakeholders that will ultimately be needed for commercialization and deployment at scale. For example, a pre-competitive consortium on autonomous vehicles could have auto manufacturers, vehicle safety and regulatory experts, legal and insurance companies, etc., in addition to researchers and technology developers.

c. The federal government should assess the potential regulatory impacts after key research and technology development projects (e.g., the accelerated timeframe for the release of the COVID-19 mRNA vaccines)—exploring if and how the regulatory regime needs to adapt.

d. Establish a corps of "Tech Reg Sherpas" to help small companies with innovative technologies navigate the regulatory system.

Recommendation 3: Ramp up engagement, develop new pathways and interfaces, and reduce the transfer time to move new technology faster from developers in universities and national laboratories to users across industry.

To match or drive the pace of change, quickly seize emerging technology and market opportunities, scale innovations faster than our competitors, and deploy solutions to global grand problems more quickly, the following actions should be implemented:

e. Marquee federal research sponsors should place greater emphasis on researchers collaborating with industry, technology translation, and commercialization as a priority for gaining R&D awards and other support.

f. Where appropriate, allocate a small percentage of federal research grant funds specifically for technology transfer activities to incentivize both funding agencies and grantees to prioritize technology transfer, promoting the commercialization and practical application of research findings.

g. Launch a comprehensive education campaign to raise awareness and institutionalize best practices on the benefits of technology transfer, providing targeted training to researchers, universities, and businesses.

h. Expand cooperative extension for research and technology translation across other industry sectors and user communities. Extension services would connect university faculty to local businesses, community organizations, interest groups, and citizens, disseminating new knowledge and technology, and providing practical education to targeted audiences. Under this model, research faculty would engage with businesses and other potential users to better understand their needs, including current and future research priorities, while community organizations, industry partners, and local government agencies identify where infrastructure investments, education, and skill-building efforts are most needed. These extension centers can be used for both commercial and non-commercial translation.

i. Build common test capabilities. Of particular interest would be common centers for space testing (e.g., electronics radiation testing), hypersonics testing (hi-temp and hi-enthalpy), and chip design (micro-foundries or foundries that can batch process 10-1,000 widgets to allow researchers better development opportunities without requiring use of a large foundry production line).

Recommendation 4: Secure the United States' position as the unrivaled world leader in critical and emerging areas of technology, and their convergence, by expanding investment, encouraging multidisciplinary research collaboration, and fostering the development of innovation ecosystems.

The convergence of AI with other enabling technologies—such as biotechnology, advanced manufacturing, autonomous systems, and advanced computing—holds the potential to open a new age of discovery and innovation. This convergence of technologies underpins innovative production models, which increase both efficiency and customization.

a. The federal government should enhance the creativity and effectiveness of public research and development funding to clearly reflect national priorities in fields such AI, quantum technologies, biotech, and next-generation semiconductors.

b. Innovative funding mechanisms, advanced market commitments, and flexible grants should be used to maximize the impact of government-funded research, help de-risk large-scale and long-term investments, and catalyze greater private sector investment.

Pillar 2: Rapidly Expand Commercial Innovation into the Defense Industrial Base—Broaden the Deployment of Dual-use Technologies

Recommendation 5: Re-imagine the defense industrial base to include, under proper conditions and governance, commercial companies developing important dual-use technologies for national security.

The national security technology ecosystem is a major driver of U.S. competitiveness. Today, cutting-edge technology increasingly rests in commercial companies and universities—including the technologies the Department of Defense (DoD) and defense primes need. The defense industrial base must therefore find ways to open up and engage more productively with the private sector and optimize dual-use opportunities—for the battlefield but also in cyber defense and economic defense.

In response, the DoD has established dozens of organizations, programs, and other initiatives to foster partnerships with commercial companies. However, this has created "silos of opportunity" that are difficult for commercial companies, especially small businesses, to navigate. Building on the April 9, 2025, "Modernizing Defense Acquisitions and Spurring Innovation in the Defense Industrial Base" Executive Order, the TLSI recommends the following specific actions to address the challenge of accelerating the development and deployment of dual-use technologies for national defense:

a. Developers of some dual-use technologies—for example, artificial blood that could be used in civilian hospitals and on the battlefield—face significant challenges in gaining access to the DOD, which leads many firms to remain on the sidelines. These companies often find it more profitable to focus on civilian applications, where they encounter less stringent regulation. Defense systems integrators should serve as a "bridge" between commercial innovation and defense application, working with leading-edge commercial firms to integrate and deliver their advanced technologies to the Department of Defense.

b. The DoD should efficiently catalyze a new technology and innovation ecosystem to meet national security needs by opening competition to more firms, and integrating and leveraging the different capabilities and skillsets of commercial firms, defense primes, universities, incubators and accelerators, and the venture capital community.

c. The DoD should optimize its R&D enterprise to leverage the modern defense industrial base (DIB) and what it has to offer. This means reforming the DoD lab enterprise and the many new agencies and organizations that were created to engage the private sector. To this end, the DoD should rationalize, streamline, and adequately fund its organizations and programs that serve as gateways to the defense market for commercial firms of all sizes. USD(R&E) should take the lead here and optimize the labs and this new outreach for success.

d. National laboratories should serve as conveners for pre-competitive consortia and research initiatives, bringing together industry, defense, commercial sectors, and universities for collaborative research.

e. The DoD should consider procurement requirements that reward partnerships between defense contractors and commercial entities. Public-private and private-private partnerships should be encouraged through solicitations, encouraging greater partnerships to solve DoD challenges.

f. A new DIB can leverage the existing workforce and manufacturing capabilities within the traditional DIB, minimizing disruption during the modernization process. Joint manufacturing efforts between commercial and defense companies could also be pursued.

g. The federal government must make bigger bets and assume greater risk to drive innovation more quickly. These should be national initiatives that encourage the entire R&D ecosystem to be brought to bear to solve defense challenges

h. For small businesses performing DoD-funded research and technology development, the DoD should articulate clear pathways and provide support in advancing their innovations to Technology Readiness Level 5 (TRL-5) and above, and help transition them to a national security application, a systems integrator, a defense service, or program of record.

i. Establish secure facilities for interactions between universities, companies, and the Department of Defense. Perceived as neutral grounds, universities could be a place to establish secure facilities for multiple users. Regional secure facilities and government facilities on industry sites should also be considered for this purpose. This would allow larger firms to help small businesses and start-ups secure access to facilities.

Pillar 3: Win the Global Technology Competition—Set Standards, Secure Research, and Forge Strategic International Partnerships

Recommendation 6: Elevate the imperative of U.S. leadership in standards setting.

The stakes for global leadership in standards setting is a growing strategic priority due to the rise of advanced and emerging dual-use technologies with economic and national security benefits. Currently, the United States is being outflanked by both friendly and hostile global competitors, which are using standards setting to gain commercial dominance for their technology. They do so by getting their domestic technology specifications into global standards, using these standards as nontariff barriers to market entry, and protecting their existing or nascent industries.

For example, China is expanding its global influence through multinational platforms and China-led initiatives, like the Belt and Road Initiative (BRI), the Global Development Initiative, and the Global Security Initiative. These efforts promote alternatives to established international development and security frameworks, which are often Western dominated. A key component of this strategy involves advancing China's preferred standards worldwide, both through the BRI and through active participation in international standards bodies.

China leverages its initial infrastructure sales under the BRI to establish associated technical standards. The success of Chinese technology companies in establishing China-favored standards in BRI host countries hinders the ability of Western companies to compete in these markets. As noted in a Council on Foreign Relations report, China's Action Plan for Standards Connectivity for the Joint Construction of the Belt and Road

promotes uniform technical standards across BRI host countries, and 49 countries have signed agreements for mutual standards recognition.[23]

Adding to its influence, China has more than doubled its financial contributions to the United Nations' regular budget since 2015, becoming the second-largest contributor after the United States. China strategically engages with international law, participating actively in forums where it can exert influence while selectively undermining those that conflict with its objectives. In the former case, China focuses on shaping rules in emerging areas of international law with significant commercial potential, such as cyber governance and industrial space. In 2023, China introduced its Global AI Governance Initiative to garner international support for its vision of AI governance.[24]

To maintain—and in some cases regain—U.S. leadership in standards setting:

a. There must be a deep partnership between the public and private sectors in standards setting, as this helps facilitate alignment on important issues such as timing to avoid stymying innovation. To facilitate this, forge a new compact for a proactive standards-setting process that reinforces the primacy of private sector leadership, strengthens the United States' international engagement in standard setting, and elevates U.S. firms' seat at the table in global standards-setting bodies—because as standards are set, markets follow.

b. Expand the National Institute of Standards and Technology's (NIST) role in international standards setting, particularly in critical technologies like Artificial Intelligence and quantum.

Recommendation 7: Elevate the focus on research security and deploy strong research security plans while limiting their administrative burdens.

Research security is a top competitiveness issue, affecting U.S. productivity, resilience, security, and prosperity. However, following research security best practices is resource-intensive and can hinder innovation. Many institutions, particularly small ones, struggle to comply with research security measures, including following the new rules requiring institutions that receive more than $50 million in federal R&D funding to develop a research security plan. Conversely, the United States has proven it can move quickly when needs be; for example, the COVID-19 mRNA vaccines were developed in 100 days. The following steps will help secure the nation's research while also minimizing the administrative and resource burden of doing so:

a. Set clear, consistent, and streamlined expectations related to data protection, data sharing, and data management.

b. Reduce the compliance burden while also providing targeted support and resources to universities to help them develop and implement best practices in research security. One example would be developing common documentation and classifications for work, manufacturing, testing, et. This will ensure universities and researchers are well-equipped to safeguard sensitive information and technologies while innovating quickly and pursuing appropriate IP protections.

23 China's Belt and Road: Implications for the United States, Council on Foreign Relations, March 2021.
24 China's Ambitions for Global AI Governance, East Asia Forum, September 2024

c. To raise awareness of threats to intellectual property and improve research security practices, launch an education campaign directed at small businesses, start-ups, university researchers, and students. Support this with comprehensive training programs in collaboration with the DoD.

d. Develop curriculum to train student researchers on private sector requirements for managing and protecting intellectual property and data. This is especially critical in university-industry partnerships, and where students do internships or co-ops with industry.

e. Develop clearer rules and guidelines for partnerships, especially around intellectual property and data management.

f. Increase the United States' presence in global patents, not just U.S. patents.

g. Preserve the Bayh-Dole Act's "march-in" rights for government agency research sponsors without using such rights to force industry price controls.

Recommendation 8: Engage U.S. allies to expedite the research, development, and scaling of technologies critical for economic security and joint security.

By tapping the strengths, expertise, and resources of allied nations, the United States can drive innovation and enhance its technological capacity, while simultaneously strengthening geopolitical relationships. This cooperation will enable a more cohesive response to global challenges and threats, help address immediate security needs, and create more resilient supply chains. To foster greater partnerships with allies, the United States should consider the following:

a. Identify specific technology and scientific areas in which collaboration would benefit the United States and its allies, including where allies have leading-edge specializations or need to build capacity.

b. Identify where strategic alliances with like-minded partners will be an important counterbalance to near-peer economic competitors. Provide pathways for broader engagement with global partners, such as signing MOUs to secure collaboration around specific projects or technologies.

Pillar 4: Grow the Number of Innovation Ecosystems Across America—Extend Place-Making Innovation Best Practices from Coast to Coast

Recommendation 9: Build and bolster innovation capacity and capability across the nation by fostering and expanding place-making innovation beyond the high-tech superstars on the U.S. coasts.

There is a risk posed by a hyper-concentration of America's innovation attention and assets in a few increasingly crowded and expensive hubs. To garner the full potential of America's $30 trillion, 333-million-people, content-sized economy, the country must engage every person and place in the United States in the innovation economy. Today, with new technologies, individuals and institutions across the United States have the power and potential to discover, conceptualize, develop, and scale innovation as never before—and in places previously overlooked as innovation hotbeds. To maximize the innovation capacity and capability of the United States, we must redefine "place" beyond the historic innovation coastal hotbeds to ensure every community can contribute to and reap the benefits from the innovation economy. To deepen, broaden, and engage a larger portion of the nation in the innovation economy, the TLSI recommends the following:

a. To build support for expanding state and local investment in research and place-making innovation, universities and state and local political leaders should offer compelling narratives about the importance of R&D and its commercialization to the community, state, and regional economies, as well as for growing the industrial base, jobs, and national security. Taking this impact-based narrative will help constituents understand the value proposition for their tax-funded investments.

b. State and local governments, in partnership with economic development offices, should increase resourcing of state and regional innovation efforts such as investing in public university research, R&D infrastructure, and programs aimed at translation, deployment, and commercialization. Communities should foster the physical co-location of innovation assets, for example, by building innovation districts. Regions should consider cost-sharing investments to establish large-scale or expensive infrastructure shared by universities and their industry partners.

c. Where assets can be accessed through the internet or other remote technologies, research institutions across the region, country, or even among U.S. allies should form collaborations and partnerships to co-fund and operate them, and to provide access regardless of location.

d. Develop models to coordinate where appropriate the efforts of the major innovation hubs supported by federal investments, to better leverage them for both economic and national security, and to develop clear pathways to transition their innovations into production. This includes leveraging the 31 EDA hubs and 10 NSF regional innovation engines in which the federal government is committed to investing as much as $10 billion.

Recommendation 10: Ensure skills scale in tandem with scaling of new technologies.

The single greatest advantage but also need for the U.S. technological competitiveness is its people; however, K-12 math and science scores are falling compared to global competitors, and the number of college graduates earning a bachelor's degree has been flat for the past decade. The United States must increase the pathways for developing the workforce of the future by tailoring educational models, exposing a greater number of people to STEM careers and younger ages, providing essential skills through hands-on experiences that address the demands of modern technology, lowering the costs of higher education, fostering local partnerships that align training with industry needs, etc. To enhance the talent pipeline and better prepare individuals for high-demand job opportunities, the TLSI recommends:

a. Across the nation, in rural and urban communities, reestablish skilled trade, vocational, and technical education programs and programming for the modern technology era. This includes high school work release and internship programs that allow students to take required high school courses, technical courses, and work at local businesses. These programs should focus on emerging technologies and production processes. These could begin through partnerships with local technical schools in the regions where federally-supported technology, energy, and manufacturing hubs are located.

b. Increase the number of pathways from community college, vocational/trade, and technical schools into the workforce by expanding the use of certificate programs or credentialing.

c. Encourage multidisciplinary research and degree programs.

d. Enact a version of the "National Defense Education Act 2.0" to significantly enhance STEM education and workforce development in the United States to help address the current STEM talent crisis. The act would increase the supply of highly trained individuals in critical STEM fields by investing in local STEM ecosystems, allowing states and communities to tailor efforts to their specific needs.

About the Council on Competitiveness' Technology Leadership and Strategy Initiative

The Council on Competitiveness' pathbreaking **National Innovation Initiative (NII)**, which ran from 2003-2005, was a large-scale effort to mobilize leaders across various sectors in the United States to address the country's declining innovation capacity and develop a comprehensive strategy to maintain its competitive edge in the global economy, culminating in the landmark report, *Innovate America: Thriving in a World of Challenge and Change*. Through this work, Council leadership identified and addressed significant shifts taking place in the nation and around the world that would shape the United States' innovation capacity and capabilities; however, they sorely underestimated the pace of change unfurling around the world at the turn of the century.

Council leaders quickly faced a churning, evolving, increasingly global technology landscape that called for a broader, more strategic effort to develop policies and actions to optimize America for a future in which innovation would be key to competitiveness.

To characterize that turbulent and transforming landscape, and to develop an action agenda to ensure U.S. technology leadership into the future, the Council launched in 2009 the **Technology Leadership & Strategy Initiative (TLSI)**, shepherded by its founding co-chairs: Dr. Ray O. Johnson and Dr. Mark M. Little (at the time and respectively, Senior Vice President and Chief Technology Officer for Lockheed Martin, and Senior Vice President and Director of GE Global Research for the General Electric Company).

The Council and the founding co-chairs established the TLSI with the following goals:

Identify critical technology and policy roadmaps to ensure that the United States sustains the innovation and technology advantage required for national security and economic competitiveness.

Convene technology leaders from America's premier companies, universities, and laboratories to understand technology investment drivers and strategies.

Establish a new paradigm for collaboration between the public and private sectors to optimize America's investments in research, talent, and technology.

To work toward meeting these goals, the TLSI assembled nearly 50 of the Nation's Chief Technology Officers from industry, academia, and national laboratories to meet in progressive dialogues and serve as an internal "think tank" at the Council to assess the 21st century technology landscape, explore the frontiers of emerging technologies that could bolster America's competitive edge, identify barriers that slow or prevent U.S. innovation, and design a policy strategy that maximizes America's ability to leverage new technology for national security and economic competitiveness.

And to prime the pump for the TLSI's early efforts, the Council struck a strategic partnership with the Department of Defense, spanning multiple administrations, to help the Department improve its connectivity to the private sector innovation engine. The Department recognized its future depended on greater osmosis: increasing the flow into the Pentagon of ideas, technologies, and innovations from companies, large and small, and on commercial terms; as well as opening the aperture on how it could collaborate better with academia. Over the TLSI's 15-year history, Department of Defense technology leaders, defense primes, and companies that develop defense technology and serve national security-related missions have participated in the TLSI.

Since its inception, the TLSI has convened 30 Dialogues to conduct new analyses, address potential economic and national security impacts of technologies emerging on the horizon, identify new opportunities for American innovation, and consider solutions to new problems and challenges these developments present.

TLSI Leadership Current

CO-CHAIRS

Dr. Patricia Falcone
Deputy Director for Science and Technology, Lawrence Livermore National Laboratory

Dr. Sally C. Morton
Executive Vice President of Knowledge Enterprise, Arizona State University

Dr. Steven H. Walker
Former Vice President & Chief Technology Officer, Lockheed Martin; Distinguished Fellow, Council on Competitiveness

CHAIR EMERITI

Dr. Jahmy Hindman
Chief Technology Officer, John Deere

Dr. Keoki Jackson
Senior Vice President, MITRE National Security (former CTO, Lockheed Martin)

Mr. Christopher Myers
Former Vice President, Advanced Technology and Engineering, Deere & Company

Dr. Greg Hyslop
Chief Engineer Emeritus, Boeing

Dr. John J. Tracy
Retired Chief Technology Officer and Senior Vice President, Engineering, Operations & Technology, Boeing

Dr. Klaus G. Hoehn
Retired Vice President, Advanced Technology and Engineering, Deere & Company

Dr. Mark M. Little
Retired Senior Vice President and Chief Technology Officer, General Electric Company, and Former Director, GE Global Research

Dr. Ray O Johnson
Operating Partner, Bessemer Venture Partners (Retired Senior Vice President and Chief Technology Officer, Lockheed Martin)

TLSI Dialogues 27-30 Agendas and Participant Lists

These four leadership meetings convened many of the nation's leading Chief Technology Officers for robust ideation and debate. These meetings significantly informed the recommendations included in the *Compact for America: A Call to Action for a new Tech-Driven Industrial Base and National Innovation Ecosystem*.

TLSI Dialogue 27 Agenda

MORNING

8:30 Registration—Continental Breakfast

9:00 Welcoming Remarks

The Hon. Deborah L. Wince-Smith
President & CEO, Council on Competitiveness

Dr. Steven Walker
Vice President and Chief Technology Officer, Lockheed Martin; TLSI Co-Chair

9:20 Framing Options for the TLSI 2023 Agenda—Shape of the Dialogue

This session will review at a high level a set of potential TLSI project and engagement opportunities —summarized in the "ideas starter" paper shared prior to the Dialogue. Each idea presented in the paper will be discussed across the day.

Mr. Chad Evans
Executive Vice President, Council on Competitiveness

Dr. Steven Walker
Vice President and Chief Technology Officer, Lockheed Martin; TLSI Co-Chair

Dr. Sally Morton
Executive Vice President, Knowledge Enterprise, Arizona State University; TLSI Co-Chair

Dr. Patricia Falcone
Deputy Director of Science and Technology, Lawrence Livermore National Laboratory; TLSI Co-Chair

9:45 Innovation & Competitiveness Partnerships—A New Defense Industrial Base for the 21st Century

IDEA—Develop an Adaptive and Agile Industrial Base to Meet U.S. Economic, National Security, Energy, and Sustainability Needs

A host of emerging technologies are generating growing number of game-changing applications across the entire commercial sector, as well as in the broad defense, space, and energy sectors. Equally on the rise is demand for greater sustainability across the economy and society.

Increasingly, the defense and space industries are reaching into the commercial sector and the start-up ecosystem for technologies, innovations, and solutions. And on the flip side, many across the commercial sector are benefitting from advanced technologies originally developed to meet defense and space missions.

Yet, traditionally, many of these sectors have been treated as distinct, even as emerging technologies are increasingly dual-use, and flow back and forth across these sectors blurring their boundaries.

Discussion Questions and Possible Guidance for TLSI Action

- How can the United States overcome these traditional separations and boundaries to accelerate toward a more competitive, innovative, and integrated industrial base?
- What are the key challenges in adapting and aligning the defense, space, and commercial sectors to lever emerging technologies?
- What new or revised policies and regulatory frameworks could facilitate the flow of technologies and expertise across sectors, while ensuring national security and protecting intellectual property?
- How can the United States prioritize and allocate resources to support the development of an adaptive and agile industrial base that can quickly respond to evolving economic, national security, energy, and sustainability needs?

Confirmed Kick-off Discussant(s) to Date

Dr. David Parekh
Chief Executive Officer, SRI International

Mr. Justin Taylor
VP of Artificial Intelligence, Lockheed Martin

Moderator

Dr. Steven Walker
Vice President and Chief Technology Officer, Lockheed Martin; TLSI Co-Chair

10:45 Coffee Break

11:00 Innovation & Competitiveness Partnerships—A New Defense Industrial Base for the 21st Century

IDEA—Optimizing the Growing Reliance on New Knowledge and Technology Developed in the Commercial Sector and Universities

U.S. businesses and universities perform about a half trillion in U.S. R&D, generating new knowledge and technologies. Universities are also a major source of new high-tech start-ups.

The U.S. public sector in general, including the Department of Defense and its contractors, is reaching more frequently and deeply into these creators of new knowledge and technology for mission applications, and the commercial sector is reaching into universities for new knowledge, cutting-edge technology, and talent.

These connections will become more important with accelerating technological advancement, and in translating new generational U.S. investments in R&D, critical technologies, and clean energy into economic and national security impacts for the United States.

They also have the potential to undergird a new industrial base that integrates defense and commercial sectors to propel U.S. competitiveness, and national and energy security.

Discussion Questions and Possible Guidance for TLSI Action

- What strategies can foster, strengthen, reinforce, make more globally competitive a culture of collaboration and knowledge-sharing between technology users and creators, including the exchange of ideas, expertise, and research findings?
- What role can startups and small businesses play in driving innovation and integrating emerging technologies into the industrial base? How can they be effectively supported and incentivized?
- What measures can be taken to ensure a skilled workforce capable of adapting to and harnessing emerging technologies, particularly in sectors of incredible technology convergence (defense and space, bio, information tech, etc.)?

Confirmed Kick-off Discussant(s) to Date

Dr. Joe Elabd
Vice Chancellor for Research, The Texas A&M University System

Dr. Tommy Gardner
Chief Technology Officer, HP Federal, HP

Moderator

Dr. Sally Morton
Executive Vice President, Knowledge Enterprise, Arizona State University; TLSI Co-Chair

11:45 Innovation & Competitiveness Partnerships—a New Defense Industrial Base for the 21st Century

IDEA: Introduce Changes in the Department of Defense—Lowering DOD Cultural Barriers to Increased Use of Commercial Technologies, and Reforming Acquisitions to Speed Insertion of Cutting-Edge Tech

DOD's increasing need for technologies developed by commercial companies for commercial markets is creating challenges including developing or modifying organizations and business models to access the technology, and adapting DOD culture to seek and apply technologies developed outside of DOD, the United States, and its traditional contractor base.

Experiences have shown that major cultural change and new model adoption are challenging in large, long-established organizations like DOD. How can we help introduce change?

Additionally, a long-standing challenge in accelerating defense fielding of new technologies and concepts has involved the acquisition process, the budgeting process, and system integrators, but there have not been serious changes to that system.

Discussion Questions and Possible Guidance for TLSI Action

- What new strategies or initiatives could promote a cultural shift within the DOD that values and actively seeks out technologies developed outside of its traditional contractor base—and how do we encourage implementation?
- What are the key factors and stakeholders impeding reforms in the defense acquisition process to acquire new technologies?
- What role can Congress or the White House/ Administration play in driving changes in the defense acquisition process? What specific statutes or regulations need to be amended or created to allow for new business models and the inclusion of non-traditional partners?
- What are the barriers that prevent non-traditional partners and start-ups with innovative technologies from effectively contributing to meeting the DOD needs? How can these barriers be overcome?

Confirmed Kick-off Discussant(s) to Date:

Mr. Rob McHenry
Deputy Director, Defense Advanced Research Projects Agency (DARPA)

Dr. Dinesh Verma
Professor and Executive Director, School of Systems and Enterprises, Stevens Institute of Technology

Moderator

Dr. Patricia Falcone
Deputy Director of Science and Technology, Lawrence Livermore National Laboratory; TLSI Co-Chair

AFTERNOON

12:30 Group Photo

12:40 Lunch & Keynote

Dr. Nelson Pedreiro
Vice President, Lockheed Martin Advanced Technology Center, Lockheed Martin

Introduction by

Dr. Steven Walker
Vice President and Chief Technology Officer, Lockheed Martin; TLSI Co-Chair

1:30 Innovation & Competitiveness Partnerships—A New Defense Industrial Base for the 21st Century

IDEA: An Emerging Parallel System for Defense Innovation

A parallel DOD innovation ecosystem is emerging, driven by the need to access technology from non-traditional sources, and accelerate technology development and acquisition. DOD and its services branches have established a range of initiatives to this end. For example: DOD established the Defense Innovation Unit, and increasingly uses other transaction (OTA) authorities and limits R&D competitions to OTA consortia. Some efforts to acquire defense systems are based on desired product or system capabilities rather than traditional acquisition specifications. The Army established an Army Venture Capital Corporation, and Army Futures Command/Army Applications Lab, organized around eight broad cross functional teams. The Air Force established AFWERX as the Air Force's innovation arm, and Space Force set up SpaceWerx as its innovation arm. Some of these new innovation operations have outposts in U.S. high-tech hubs, and are working to making it easier for companies to bring their technologies to DOD.

Discussion Questions

- What lessons can be learned from the initiatives within the DOD's emerging innovation ecosystem that can be applied to moving technologies with commercial potential from universities, small businesses, and start-ups through the "valley of death" and towards scaling up for defense applications?
- What is the significance of establishing outposts in U.S. high-tech hubs for these innovation operations? How does this geographical presence contribute to making it easier for companies to bring their technologies to the DOD?
- What challenges and barriers exist in scaling up technologies from universities, small businesses, and start-ups for defense applications? How can the emerging innovation ecosystem address these challenges and facilitate the successful transition of technologies across the "valley of death"?
- What collaborative opportunities exist between the DOD's emerging innovation ecosystem and other stakeholders, such as universities, research institutions, and industry, to foster a more robust and inclusive innovation ecosystem?

Confirmed Kick-off Discussant(s) to Date

Mr. Chris Moran
Vice President, GM LM Venture, Lockheed Martin

Moderator

Mr. Chad Evans
Executive Vice President, Council on Competitiveness

2:00 Deploying Technology Statecraft with Strategic Allies

How do we ignite a transformational technology and pro-innovation statecraft with strategic allies and partners (AUS, UK, AUSUK, Japan, EU, transatlantic, etc.)? For example, the CHIPS Act includes $500 million in funding for an International Technology Security and Innovation Fund to provide for international information and communications technology security and semiconductor supply chain activities, including support for the development of secure and trusted telecommunications technologies and semiconductors. In addition, the new U.S.-EU Trade and Technology Council is providing a platform for the U.S.-EU to advance cooperation and democratic approaches to trade, technology, and security.

Discussion Questions

- How do we deploy a statecraft that advances U.S. domestic interests, advances liberal market principles globally, and counterbalances the technology statecraft China is attempting to deploy around the world?
- Can the AUKUS agreement be used as an exemplar of a new statecraft at least where the U.S., UK and AUS are concerned?
- Can we re-start the US-AUS CTO dialogue? Other options (UK, Japan, India)?

Confirmed Kick-off Discussant(s) to Date

Dr. Tony Lindsay
Director, Science Technology Engineering Leadership and Research Laboratory (STELaRLab), Lockheed Martin

Moderator

The Hon. Deborah L. Wince-Smith
President & CEO, Council on Competitiveness

2:30 Final Discussion, Summary Remarks, and Next Steps

Mr. Chad Evans
Executive Vice-President, Council on Competitiveness

Dr. Sally Morton
Executive Vice President, Knowledge Enterprise, Arizona State University; TLSI Co-Chair

Dr. Patricia Falcone
Deputy Director of Science and Technology, Lawrence Livermore National Laboratory; TLSI Co-Chair

Dr. Steven Walker
Vice President and Chief Technology Officer, Lockheed Martin; TLSI Co-Chair

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

3:00 Exploring the Advanced Space Tech Center

A Set of Onsite Visits

Participants will divide into two groups. Two tours will be offered concurrently—the first group will start with the Space Sciences Lab Tour and finish with the AI Lab Tour; the second group with start with the AI Lab Tour and finish with the Space Sciences Lab Tour. Each tour will be about 50min long.

Space Sciences Lab Tour

Guide: Dr. Alison Nordt
Director of Space Science and Instrumentation, Lockheed Martin Advanced Technology Center

The AI Lab Tour

Guide: Dr. Eric Smith
Director of AI, Lockheed Martin Advanced Technology Center

5:00 Dialogue Adjourns

TLSI Dialogue 27 Participants

TLSI CO-CHAIRS & COUNCIL LEADERSHIP

The Hon. Patricia Falcone
Deputy Director for Science and Technology
Lawrence Livermore National Laboratory

Dr. Sally C. Morton
Executive Vice President, Knowledge Enterprise
Arizona State University

Dr. Steven Walker
Vice President & Chief Technology Officer
Lockheed Martin

The Hon. Deborah L. Wince-Smith
President & CEO
Council on Competitiveness

Mr. Chad Evans
Executive Vice President &
Board Secretary & Treasurer
Council on Competitiveness

KEYNOTE SPEAKER

Dr. Nelson Pedreiro
Vice President
Advanced Technology Center
Lockheed Martin

PARTICIPANTS

Ms. Christina Bain
Deputy Director
Hypersonics and Advanced Materials
Lockheed Martin
Advanced Technology Center

Dr. Kenneth W. Bayles
Vice Chancellor for Research
University of Nebraska Medical Center

Mr. Omar Choudhry
Chief of Staff—Corporate Technology Office
Lockheed Martin

Ms. Amy Cooprider
Space Security &
Communications Directorate Lead
Lockheed Martin Space
Advanced Technology Center

Dr. Walter Copan
Vice President for Research and
Technology Transfer
Colorado School of Mines

Ms. Margaret Donoghue
U.S. Country Head
CSIRO

Dr. Joe Elabd
Vice Chancellor for Research
The Texas A&M University System

Dr. Thomas Gardner
Chief Technology Officer, HP Federal
HP Inc.

Mr. Kyle Helland
Director, Hypersonics and Advanced Materials
Lockheed Martin Advanced Technology Center

Dr. Tony Lindsay
Director, Science Technology Engineering
Leadership and Research Laboratory
(STELaRLab), Lockheed Martin

Mr. Rob McHenry
Deputy Director
Defense Advanced Research Projects Agency
(DARPA)

Dr. J. Michael McQuade
Special Advisor to the President
Carnegie Mellon University

Dr. Andre Marshall
Vice President of Research,
Innovation and Economic Impact
George Mason University

Mr. Chris Moran
Vice President, GM LM Venture
Lockheed Martin

Dr. Alison Nordt
Director of Space Science and Instrumentation
Lockheed Martin Space
Advanced Technology Center

Dr. Bradford Orr
Associate Vice President
for Research
Natural Sciences and Engineering
University of Michigan

Dr. David Parekh
Chief Executive Officer
SRI International

Ms. Lizy Paul
Director, 5G.MIL Programs
Lockheed Martin

Dr. Jeff Rhoads
Vice President for Research
University of Notre Dame

Ms. Aura Roy
Program Management Associate Manager
Lockheed Martin

Dr. Eric Smith
Director, AI
Lockheed Martin Space
Advanced Technology Center

Ms. Mary Snitch
Principal, External Engagements
Lockheed Martin

Dr. Vassilis Syrmos
Vice President for Research and Innovation
University of Hawaii

Mr. Justin Taylor
Vice President of Artificial Intelligence
Lockheed Martin

Dr. Gary Thunen
ATC Chief Scientist and LM Senior Fellow
Lockheed Martin Space
Advanced Technology Center

Dr. Dinesh Verma
Professor and Executive Director
School of Systems and Enterprises
Stevens Institute of Technology

Dr. Marianne Walck
Deputy Laboratory Director for Science and Technology and Chief Research Officer
Idaho National Laboratory

Dr. James Weyhenmeyer
Vice President of Research
Auburn University

COUNCIL TEAM

Mr. Bill Bates
Senior Advisor

Ms. Candace Culhane
Senior Advisor

Ms. Yasmin Hilpert
Senior Policy Director

TLSI Dialogue 28 Agenda

MORNING

9:00 Registration, Snacks/Coffee

9:15 Welcoming Remarks

Dr. Patricia Falcone
Deputy Director of Science & Technology,
Lawrence Livermore National Laboratory
TLSI Co-Chair

Dr. Sally Morton
Executive Vice President—Knowledge Enterprise,
Arizona State University
TLSI Co-Chair

Mr. Chad Evans
Executive Vice President, Council
on Competitiveness

9:30 SESSION 1: Changing the Culture of Research and Innovation Ecosystems

Time matters—the need for speed. Leadership in many of the technologies transforming the economic, energy and national security landscape is in commercial firms, high-tech start-ups, universities, and national laboratories. But the commercial sector is moving so fast, the public sector finds it often cannot keep up. The inability to transition key technologies into key public sector partners in a timely manner is arguably one of the largest strategic threats to the United States today. We are innovating amazing technology across the whole ecosystem, but it can take years for it to have its intended impact for national and economic security.

The federal defense, research, and acquisition culture creates barriers that inhibit engagement with commercial firms and bringing game-changing technologies to the public sector quickly. That culture has arisen from a complex of rules and regulations, policies, practices, controls, metrics, and incentives—a bureaucracy focused on low cost, risk avoidance, and fear of failure. Embedded in the organizational DNA, they drive the culture to which people respond in the course of their work. Similarly, university faculty incentives, including promotion and tenure criteria, revolve around publications and recognition from peers, and technology transition is often not treated as a priority.

At a recent meeting of the Council's National Commission on Innovation and Competitiveness Frontiers, a U.S. national laboratory director discussed how, despite enormous investments in modeling, simulation, and computation, the time it takes to move a new nuclear weapon from idea to first production has doubled since the 1980s' Cold War speed. They found red tape, bureaucracy, and death by a thousand cuts had slowed the process down. Employees were responding to an expectation of perfection, as opposed to excellence, because excellence involves risk taking, and learning from things that do not work.

Contracting officers, program managers, and university faculty are responding to the culture created by tangible rules, regulations, policies, procedures, metrics, and incentives.

Discussion Questions and Possible Guidance for TLSI Action:

- Can the culture be changed? If not, what are the alternatives?
- Are there regulations, rules, policies, or procedures that could be changed or modified to reduce barriers to speed and flexibility, while still maintaining the integrity of the system?
- Could training help? What new training content could help, and offered to which professionals in the ecosystem?
- What could significant federal research funders do to change the culture?
- How can the United States prioritize and allocate resources to support culture change—and the development of an adaptive and agile industrial base that can quickly respond to evolving economic, national security, energy, and sustainability needs?

Moderator

Dr. Patricia Falcone
Deputy Director of Science & Technology,
Lawrence Livermore National Laboratory
TLSI Co-Chair

10:15 SET UP FOR SESSIONS 2 & 3

Over the course of the past year several critical developments have emerged—each of which, on their own, merit attention by TLSI:

Implementation of CHIPS and IRA: Both CHIPS and IRA celebrated their one-year anniversary this August, with both bills firmly in the implementation phase. Capitalizing on investments in commercialization and critical technologies will be key to promoting the innovation ecosystem.

Congressional Focus on China: Congress continues to focus on China, particularly around technology and innovation, as evidenced by the growing interest in a "China 2.0" bill to address competitiveness issues in critical technologies.

Push for Technology Regulation: In recent months, momentum has been growing for expanded technology regulation, particularly of artificial intelligence. Careful policy design will be critical to ensuring that federal action boosts, rather than diminishes, innovation in critical technologies.

Critical Talent Shortages: Talent shortages in critical areas (e.g., semiconductors and cybersecurity) continue to pose a significant barrier to innovation and leadership in key tech.

In this context, Sessions 2 and 3 will touch on several key points:

10:15 SESSION 2: Enhancing the Innovation Workforce in Critical Technologies and Industries

Discussion Questions and Possible Guidance for TLSI Action:

- What technologies and industries are facing the most critical talent shortages? Do these differ in the short run and long run?
- Are there opportunities for the public and private sector to collaborate on addressing talent shortages? Do we need new partnerships or new models of education and workforce training?
- What role does high-skill immigration play in filling talent gaps in critical technologies? Does the current immigration system need any reforms to support this goal?

Moderator

Dr. Sally Morton
Executive Vice President—Knowledge Enterprise,
Arizona State University
TLSI Co-Chair

11:00 SESSION 3: Building Innovation Ecosystems through National Domestic Strategies

- How can the United States leverage or reconfigure existing governance structures to create a coordinated national approach to innovation competitiveness?
- How can communication and collaboration between the public and private sector on key innovation challenges be strengthened?
- How can state and regional leadership capitalize on local resources to build innovation ecosystems? What role do these localized efforts play in an integrated, national innovation ecosystem?

Moderator

Mr. Chad Evans
Executive Vice President, Council on Competitiveness

11:45 Lunch

AFTERNOON

1:00 NIF Tour

2:15 High Performance Computing Tour

3:15 Bus transport back to the Livermore Valley Open Campus

3:25 Summary Remarks/Reflections—Next Steps for TLSI in 2023 and 2024

Dr. Patricia Falcone
Deputy Director of Science & Technology, Lawrence Livermore National Laboratory
TLSI Co-Chair

Dr. Sally Morton
Executive Vice President—Knowledge Enterprise, Arizona State University
TLSI Co-Chair

Mr. Chad Evans
Executive Vice President, Council on Competitiveness

4:00 Dialogue Adjourns

TLSI Dialogue 28 Participants

TLSI CO-CHAIRS & COUNCIL LEADERSHIP

The Hon. Patricia Falcone
Deputy Director for Science and Technology
Lawrence Livermore National Laboratory

Dr. Sally C. Morton
Executive Vice President, Knowledge Enterprise
Arizona State University

Mr. Chad Evans
Executive Vice President &
Board Secretary & Treasurer
Council on Competitiveness

PARTICIPANTS

Dr. Carol Burns
Deputy Laboratory Director for Research
Lawrence Berkeley National Laboratory

Dr. Walter Copan
Vice President for Research and
Technology Transfer
Colorado School of Mines

Ms. Megan Crocker
Director, Strategic Partnerships
CSIRO

Ms. Margaret Donoghue
Country Head USA
CSIRO

Dr. Peter Dorhout
Vice President for Research
Iowa State University

Dr. Thomas Gardner
Chief Technology Officer, HP Federal
HP Inc., and
Co-Chair, Alliance for Transformational
Computing, Council on Competitiveness

Dr. Helen Holder
Chief Technologist for HP Personal Systems
HP

Dr. Andre Marshall
Vice President of Research,
Innovation and Economic Impact
George Mason University

Dr. Theresa Mayer
Vice President for Research
Carnegie Mellon University

Dr. Rob Neely
Program Director for Weapon Simulation and
Computing, Lawrence Livermore National
Laboratory, and
Co-Chair, Alliance for Transformational
Computing, Council on Competitiveness

Dr. Alison Nordt
Director, Space Sciences & Instrumentation
Lockheed Martin

Dr. Bradford Orr
Associate Vice President for Research
Natural Sciences and Engineering
University of Michigan

Dr. Eric Smith
Director, Artificial Intelligence
Lockheed Martin

Dr. Timothy Stemmler
Interim Vice President for Research, and
Professor of Pharmaceutical Sciences
Wayne State University

Dr. Marianne Walck
Deputy Laoratory Director for Science and
Technology and Chief Research Officer
Idaho National Laboratory

COUNCIL TEAM

Mr. Mike Nelson
Director of Interactive
Subject Matter+Kivvit

Mr. Dhruva Someshwar
Senior Research Assistant
Keybridge

TLSI Dialogue 29 Agenda

MORNING

8:00 Registration—Continental Breakfast

8:30 Welcoming Remarks and an Introduction to the Innovative World of ASU and the Knowledge Enterprise

The Hon. Deborah L. Wince-Smith
President & CEO, Council on Competitiveness

Dr. Sally Morton
Executive Vice President—Knowledge Enterprise, Arizona State University; TLSI Co-Chair

9:00 A Focus on the 2024 TLSI Call to Action

This session will review key opportunities and recommendations included in the DRAFT TLSI 2024 Call to Action, which was informed by the two 2023 TLSI Dialogues and is intended to guide the Council's 2024 policy statement that will be delivered to Congress and the administration in the fall. (The draft was shared with all TLSI members in advance of the Dialogue.)

The 2023 Dialogues focused on two critical national imperatives: (1) Building a New Agile and Adaptive Defense Industrial Base for the 21st Century, and (2) Reshaping the U.S. Innovation Ecosystem for an Era of Rapid Technological Change.

From these imperatives, eight overarching themes and 17 high-level recommendations emerged. The first three sessions of the day will assess the Call to Action and identify opportunities to enhance these recommendations for guiding U.S. technology policy.

Kick-off Discussants

Dr. Sally Morton
Executive Vice President—Knowledge Enterprise, Arizona State University; TLSI Co-Chair

The Hon. Patricia Falcone
Deputy Director of Science & Technology, Lawrence Livermore National Laboratory; TLSI Co-Chair

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin; TLSI Co-Chair

Mr. Chad Evans
Executive Vice President, Council on Competitiveness

9:15 Session 1: Review Draft Call to Action Recommendations—Building a New Agile and Adaptive Defense Industrial Base for the 21st Century

In this session, we will examine the key themes and supporting recommendations focused on modernizing the defense industrial base. See either the draft call to action—or, more directly, the addendum to this agenda—for key themes and recommendations.

Discussion Questions—Reviewing and Revising Recommendations for Modernizing the Defense Industrial Base:

1. As it relates to building an agile and adaptive defense industrial base, where might the United States' defense be vulnerable beyond those key theme/priorities identified in the Draft Call to Action? And what steps should the United States take to overcome them?
2. There are many detailed recommendations in the Draft Call to Action. Are there any you take issue with, find confusing, or could be strengthened?
3. Are there missing recommendations from the Draft Call to Action?
4. Beyond brief mentions, the Draft Call to Action does not emphasize specific technologies (e.g., AI) nor competitors (e.g., China). Would it be strengthened if it did?
5. Are there one or two priorities that should be elevated as most critical? Conversely, are there any listed that, while important, may draw attention away from the most critical recommendations and should be removed?

Kick-off Discussant & Roundtable Moderator

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin; TLSI Co-Chair

10:00 Coffee Break

10:30 Session 2: Review Draft Call to Action Recommendations—Reshaping the U.S. Innovation Ecosystem for an Era of Rapid Technological Change

In this session, we will examine key themes and supporting recommendations for modernizing the U.S. innovation ecosystem. See either the draft call to action—or, more directly, the addendum to this agenda—for key themes and recommendations.

Discussion Questions—Reviewing and Revising Recommendations for Modernizing the U.S. Innovation Ecosystem

1. As it relates to reshaping the U.S. innovation ecosystem for an era of rapid technological change, does the Draft Call to Action identify the right three key themes/priorities?
2. Are there industries or technologies that are in particular need of STEM talent?
3. Universities, businesses, government, and labor all have critical role sin upskilling and building a modern workforce? How can we foster greater collaboration and partnerships across these stakeholders to address the need?
4. How do we manage the need for international talent with the greater security risk it creates?
5. What is the role of AI in filling the talent gap? And what are the benefits and risks of AI doing so?
6. There are many detailed recommendations in the Draft Call to Action. Are there any you take issue with, find confusing, or could be strengthened?
7. Are there one or two priorities that should be elevated as most critical? Conversely, are there any listed that, while important, may draw attention away from the most critical recommendations and should be removed?

Kick-off Discussant & Roundtable Moderator

The Hon. Patricia Falcone
Deputy Director of Science & Technology, Lawrence Livermore National Laboratory; TLSI Co-Chair

11:15 Session 3: TLSI Call to Action Opportunities

In this session, we will have a more expansive conversation around the final deliverable of the Call to Action. We will consider if there are any major national priorities, themes, or recommendations missing, as well as discuss how the Call to Action should be positioned, packaged, and distributed once finalized.

Discussion Questions—Revising TLSI Call to Action and How to Promote It:

1. We all have ideas for why this Call to Action is needed—the rise of a powerful competitor that doesn't hold the same democratic values of the United States, existential challenges such as climate change and hunger, the incredible transformations resulting from advanced computing and bioscience, etc. But what is the right context to present these findings to ensure policy makers use them.
2. What are our global competitors doing today that put them at a strategic technological advantage over the United States? Are there missing recommendations to the Call to Action that might put the U.S. on more competitive footing?
3. How is the United States hindering its own progress in technology and innovation? What can be done to adapt and improve the situation?
4. What are the United States' greatest strengths in technology and innovation? How do we further exploit them?
5. What are our greatest weaknesses? How do we overcome them?
6. How does the United States maintain its global leadership as the technology standard bearer? What role does ethics play, and how do we get the world to adhere to a core set of rules?
7. In what form should the Call to Action be communicated?

Kick-off Discussant & Roundtable Moderator

The Hon. Deborah L. Wince-Smith
President & CEO, Council on Competitiveness

11:45 Session 4: Developing an Adaptive and Agile Industrial Base to Meet U.S. Economic, National Security, Energy, and Sustainability Needs

A Conversation about the Southwest Advanced Prototyping (SWAP) Hub

Arizona State University leads one of the eight CHIPS Plus Science Act-enabled and Department of Defense-funded hubs in the national Microelectronics Commons. The Southwest Advanced Prototyping (SWAP) Hub received a $39.8 million in its first year to create a regional network for microelectronics education, research, and development in the Southwest. SWAP is working to deliver rapidly flexible, scalable, and low-cost microelectronics prototyping capabilities. It unites over 150 semiconductor and defense companies, academia, and national laboratories from Arizona, Colorado, New Mexico, and across the nation to share lab-to-fab capabilities, and deliver prototype projects tailored to Department of Defense needs in AI Hardware, 5G/6G Technologies, and Commercial Leap Ahead.

Discussion Questions

1. What are the benefits of bringing together semiconductor and defense companies, academia, and national laboratories in the SWAP Hub?
2. How is ASU managing the complexity of the over 150 partners to meet the goals of the CHIPS & Science Act and enable the lab-to-fab transition of microelectronics innovations in the United States?

3. What type of organizations have thrived as partners, and which have struggled, if any?
4. SWAP Hub funding was a fraction of the $238 million total in CHIPS Act funding for eight microelectronic commons across the country. How does the SWAP Hub coordinate, collaborate, and/or compete with the other seven microelectronic commons to spur innovation and cater to the specific needs of the Department of Defense?
5. How does the SWAP Hub relate to other microelectronics efforts, including workforce development, at ASU?
6. How could the Hub model be applied for the advancement of other technologies and industries, particularly for the Department of Defense?

Kick-off Discussants & Roundtable

Moderator

Dr. Sally Morton
Executive Vice President—Knowledge Enterprise, Arizona State University; TLSI Co-Chair

Mr. Kevin McGinnis
Managing Director, Strategic Technology Initiatives, Office of University Affairs, Arizona State University

Dr. Zachary Holman
Professor, School of Electrical, Computer and Energy Engineering; Vice Dean for Research and Innovation, Fulton Schools of Engineering; Senior Global Futures Scientist, Global Futures Scientists and Scholars; Vice Dean (ACD) and Professor, Affiliated Staff and Faculty, Arizona State University

AFTERNOON

12:15 Keynote over Lunch

The Honorable Barbara McQuiston
Board Chair, NATO DIANA (Defence Innovation Accelerator for the North Atlantic), and Director of Defense for Research and Engineering, for Research and Technology U.S. Department of Defense

1:00 Group Photo

Waterfall by Fulton Center

1:10 Walk to Dreamscape Learn Experience

1:30 Dreamscape Learn Experience

About Dreamscape Learn: A collaborative venture between Dreamscape Immersive and Arizona State University, merging the most advanced pedagogy with the entertainment industry's best emotional storytelling. Dreamscape Learn redefines teaching and learning in the 21st century, while aiming to eliminate student learning gaps

2:30 Walk to World's First Compact X-ray Free Electron Laser (CXFEL)

3:00 CXFEL Tour

About CXFEL: The compact X-ray free electron laser (CXFEL) being developed at Arizona State University will be the first of its kind in the world. It will provide X-ray pulses so short that they outrun all X-ray damage processes. As a result, scientists can conduct novel science to explore the structure and dynamics of nature and materials as never before.

3:30 Golf Cart to Fulton Center

3:45 Summary Remarks/Reflections—Next Steps for TLSI in 2024

The Hon. Patricia Falcone
Deputy Director of Science & Technology, Lawrence Livermore National Laboratory; TLSI Co-Chair

Dr. Sally Morton
Executive Vice President—Knowledge Enterprise, Arizona State University; TLSI Co-Chair

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin; TLSI Co-Chair

The Hon. Deborah L. Wince-Smith
President & CEO, Council on Competitiveness

Mr. Chad Evans
Executive Vice President, Council on Competitiveness

4:00 Dialogue Adjourns

TLSI Dialogue 29 Participants

TLSI CO-CHAIRS & COUNCIL LEADERSHIP

The Hon. Patricia Falcone
Deputy Director for Science & Technology
Lawrence Livermore National Laboratory

Dr. Sally C. Morton
Executive Vice President, Knowledge Enterprise
Arizona State University

Dr. Steven Walker
Vice President &
Chief Technology Officer
Lockheed Martin

The Hon. Deborah L. Wince-Smith
President & CEO
Council on Competitiveness

Mr. Chad Evans
Executive Vice President
Council on Competitiveness

GUEST SPEAKER

The Hon. Barbara McQuiston
Board Chair
NATO DIANA & Director of Defense for Research & Engineering, for Research & Technology
U.S. Department of Defense

PARTICIPANTS

Dr. VR Basker
R&D Senior Vice President
PepsiCo

Mr. Brian Bone
Principal Director
Commercial Space Futures
The Aerospace Corporation

Dr. Walt Copan
Vice President,
Research & Technology Transfer
Colorado School of Mines

Dr. Deborah Crawford
Vice Chancellor
Research, Innovation, & Economic Development
University of Tennessee—Knoxville

Ms. Margaret Donoghue
Country Head-US
CSIRO

Dr. Peter Dorhout
Vice President, Research
Iowa State University

Mr. Sean Dudley
Associate Vice President,
ASU Knowledge Enterprise
Arizona State University

Dr. Thomas Gardner
Chief Technology Officer
HP Federal

Dr. Kim Holloway
Vice Provost
Research Development
Northeastern University

Dr. Zachary Holman
Professor, School of Electrical, Computer and Energy Engineering; Vice Dean for Research and Innovation, Fulton Schools of Engineering; Senior Global Futures Scientist, Global Futures Scientists and Scholars; Vice Dean (ACD) and Professor, Affiliated Staff and Faculty
Arizona State University

Dr. Matt Hulver
Vice President of Research & Professor
ASU Knowledge Enterprise, &
Vice President & Professor
College of Health Solutions
Arizona State University

Ms. Adriana Kuiper
Associate Vice President & COO,
ASU Knowledge Enterprise
Arizona State University

Dr. Andre Marshall
Vice President
Research, Innovation & Economic Impact
George Mason University

Mr. Kevin McGinnis
Managing Director
Strategic Technology Initiatives
Office of University Affairs
Arizona State University

Mr. Jon McIntyre
Distinguished Fellow
Council on Competitiveness

Mr. Tom Mildenhall
Managing Director—Global Head of Technology
Business Development & Venture Capital
Coverage
Bank of America

Mr. Daniel Moczydlower
President & CEO, Embraer-X
Head of Global Innovation Ecosystems
Embraer-X

Mr. Mike Nelson
Vice President
Council on Competitiveness

Dr. Brad Orr
Associate Vice President
Natural Sciences & Engineering
University of Michigan

Ms. Grace O'Sullivan
Vice President, Corporate Engagement
& Strategic Partnerships
Arizona State University

Dr. Jeff Rhoads
Vice President
Research
Notre Dame University

Dr. Erin Searcy
Acting Deputy Laboratory Director
Science & Technology, &
Chief Research Officer
Idaho National Laboratory

Ms. Jaclyn Shaw
Senior Associate Vice Provost
Research Strategy & Operations
Tufts University

TLSI Dialogue 30 Agenda

MORNING

8:30 Registration and Breakfast

9:10 Opening Remarks from TLSI Leadership

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin

The Hon. Patricia Falcone
Deputy Director for Science and Technology, Lawrence Livermore National Laboratory

Dr. Sally Morton
Executive Vice President, Arizona State Knowledge Enterprise, Arizona State University

The Hon. Deborah L. Wince-Smith
President and Chief Executive Officer, Council on Competitiveness

9:50 Snapshot of the Day

Mr. Chad Evans
Executive Vice President and Chief Operating Officer, Council on Competitiveness

10:00 Vision From the White House–The State of U.S. Technology and Innovation Competitiveness

Dr. Steve Walker will introduce the TLSI's 15th-anniversary special guest, who will participate in a chat and then take questions.

Dir. Arati Prabhakar
Former Assistant to the President for Science and Technology, and Former Director, Office of Science and Technology Policy, The White House

In her roles as Former Assistant to the President for Science and Technology and Former Director, Office of Science and Technology Policy, The White House, Dir. Arati Prabhakar was the leading voice defining, designing, and advocating for a cross-administration, forward-looking, technology policy. TLSI members had the chance to learn from her experiences in shaping the trajectory of U.S. global science and technology leadership.

11:00 Break

11:15 Working Lunch—In Conversation with the Special Competitive Studies Project

11:35 Dr. Steve Walker introduced the TLSI's luncheon keynote speaker

Mr. Ylli Bajraktari
President and Chief Executive Officer, Special Competitive Studies Project and SCSP Action Program

Mr. Bajraktari shared insights and priorities for more robust national policies related to AI and other emerging technologies—and how to understand and address the competitiveness challenges posed by China.

AFTERNOON

12:15 Break

12:30 Lockheed Martin Global Vision Center Tour

Participants moved beyond the meeting room and toured elements of the Global Vision Center

Space Experience Center is a customer mission-focused demonstration environment bridging distance and knowledge for LM and our customers' missions. Inside the SEC is a modular area with displays and virtual reality devices with content on our Space, Missile Defense, and Strategic Programs. You will also see the Pulsar, a non-program specific environment where Government stakeholders can influence and interact with emerging LM and non-LM products integrated to demonstrate thought leadership and innovation in space security, resiliency, and multi-domain command and control through realistic threat vignettes.

LM Digital Engagement Center is a focused mission demonstration environments that enable the telling of highly visual, captivating stories using interactive visual exploration technologies and provide customized experiences for our customers. Every wall, every surface, and even the ceiling is digitally immersed with visuals everywhere the eye moves. There is no "static" content so every story can be personalized and customized depending on the audience.

Fighter Demonstration Center aims to provide an engaging and educational experience for our customers, showcasing LM's premier 5th generation fighter, the F-35 while also highlighting the various programs within our Aeronautics business area.

Rotary Wing Innovation Center is a world-class, interactive setting created to support customers' current and future mission success by highlighting LM's advanced technologies and proven performance in rotary wing aviation and mission systems.

1:30 Break

1:45 Framing the TLSI's *Compact for America*

TLSI Members reviewed the current edition of the *draft* *Compact for America*, and deliberate ideas and options for a 2025 release.

The *Compact* focuses on two major themes:

- Building a New Agile and Adaptive Defense Industrial Base for the 21st Century, and
- Reshaping the U.S. Innovation Ecosystem for an Era of Rapid Technological Change.

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin

The Hon. Patricia Falcone
Deputy Director for Science and Technology, Lawrence Livermore National Laboratory

Dr. Sally Morton
Executive Vice President, Arizona State Knowledge Enterprise, Arizona State University

The Hon. Deborah L. Wince-Smith
President and Chief Executive Officer, Council on Competitiveness

2:00 Session 1: Review, Refine, and Commit to Recommendations

In this session, we examined the key themes and recommendations surrounding the creation of a more secure and robust innovation ecosystem in the United States to ensure the future of the country's economic competitiveness, national security, and global leadership.

See the draft call to action for key themes and recommendations.

Moderator

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin

Kick-off Discussants

Dr. Carol Burns
Deputy Laboratory Director for Research, Lawrence Berkeley National Laboratory

Dr. Deb Crawford
Vice Chancellor, Office of Research, Innovation and Economic Development, University of Tennessee, Knoxville

Dr. Tommy Gardner
Chief Technology Officer, HP Federal, HP Inc.

3:00 Session 2: Brainstorm a 2025 Release Strategy

In this session, participants discussed elements of a strategy to release the *Compact for America*—timing, forum, method(s) to convey, etc.

Discussion question: "How to maximize the impact of 'A Compact for Economic and National Security?''

Moderator

The Hon. Patricia Falcone
Deputy Director for Science and Technology, Lawrence Livermore National Laboratory

Kick-off Discussants

Dr. Walter Copan
Vice President of Research & Technology Transfer, Colorado School of Mines

Dr. Andre Marshall
Vice President for Research, Innovation & Economic Impact, George Mason University

Dr. Padma Raghavan
Vice Provost for Research & Innovation, Chief Research Officer, Vanderbilt University

3:30 Council on Competitiveness—Catch Up: Competitiveness Conversations Across America and the National Competitiveness Forum

Mr. Chad Evans
Executive Vice President and Chief Operating Officer, Council on Competitiveness

3:45 Closing Comments

The Hon. Patricia Falcone
Deputy Director for Science and Technology, Lawrence Livermore National Laboratory

Dr. Sally Morton
Executive Vice President, Arizona State Knowledge Enterprise, Arizona State University

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin

The Hon. Deborah L. Wince-Smith
President and Chief Executive Officer, Council on Competitiveness

4:00 Dialogue 30 Adjourns

TLSI Dialogue 30 Participants

TLSI CO-CHAIRS & COUNCIL LEADERSHIP

The Hon. Patricia Falcone
Deputy Director
Science & Technology
Lawrence Livermore National Laboratory

Dr. Sally C. Morton
Executive Vice President
Knowledge Enterprise
Arizona State University

Dr. Steven Walker
Vice President & Chief Technology Officer
Lockheed Martin

The Hon. Deborah L. Wince-Smith
President and CEO
Council on Competitiveness

Mr. Chad Evans
Executive Vice President and
Chief Operating Officer
Council on Competitiveness

GUEST SPEAKERS

Dir. Arati Prabhakar
Former Assistant to the President for Science and Technology, and Former Director, Office of Science and Technology Policy, The White House

Mr. Ylli Bajraktari
President & CEO
Special Competitive Studies Project & SCSP Action Program

PARTICIPANTS

Dr. Martin Blair
Vice President, Research & Economic Development
Idaho State University

Ms. Laura Brent
Director, Strategic Initiatives
Lockheed Martin

Dr. Carol Burns
Deputy Laboratory Director for Research
Lawrence Berkeley National Laboratory

Dr. Walter Copan
Vice President, Research & Technology Transfer
Colorado School of Mines

Dr. Deb Crawford
Vice Chancellor, Office of Research, Innovation and Economic Development
University of Tennessee, Knoxville

Ms. Candy Culhane
Program/Project Director
Los Alamos National Laboratory

Dr. Tommy Gardner
Chief Technology Officer, HP Federal
HP Inc.

Dr. Nancy Glenn
Vice President, Research and Economic Development
Boise State University

Mr. Clenilson Goncalves
Business Development Director
Embraer-X

Dr. Joanna Groden
Vice Chancellor, Research
University of Illinois Chicago

Dr. Tony Lindsay
Director, Advanced Systems & Technologies (AST)
Lockheed Martin

Dr. Andre Marshall
Vice President, Research, Innovation and Economic Impact
George Mason University

Dr. J. Michael McQuade
Director, Technology & Geopolitics Project
The Belfer Center for Science & International Affairs

Mr. Michael Nelson
Vice President
Council on Competitiveness

Dr. Ezemenari Obasi
Vice President, Research & Innovation
Wayne State University

Dr. Shashank Priya
Vice President, Research & Innovation
University of Minnesota

Dr. Padma Raghavan
Vice Provost, Research & Innovation & Chief Research Officer
Vanderbilt University

Mr. Chris Reynolds
Technical Assistant to the Chief Technology Officer
Lockheed Martin

Ms. Aura Roy
MUSE Deputy Program Manager
Lockheed Martin

Ms. Navva Sedigh
Special Assistant, Office of Science & Technology Policy
The White House

Ms. Jacyln Shaw
Sr. Associate Vice Provost, Research, Strategy and Operations, Office of the Vice Provost for Research
Tufts University

Mrs. Mary Snitch
Principal
Lockheed Martin

COUNCIL ON COMPETITIVENESS TEAM

Mr. Spencer Ballus
Research Associate

Mr. Bill Bates
Senior Advisor

Mr. Casey Moser
Research Associate

TLSI Dialogue 31 Agenda

MORNING

9:30 Opening Remarks from TLSI Leadership, Roundtable Introductions, and the Take on 2025

The TLSI Cochairs will share opening remarks, after which all attendees will introduce themselves and have the opportunity to share their perspectives on the current technology and innovation landscape.

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin

The Hon. Patricia Falcone
Deputy Director for Science and Technology, Lawrence Livermore National Laboratory

Dr. Sally Morton
Executive Vice President, Arizona State Knowledge Enterprise, Arizona State University

The Hon. Deborah L. Wince-Smith
President & CEO, Council on Competitiveness

10:15 Snapshot of the Day

Mr. Chad Evans
Executive Vice President & Chief Operating Officer, Council on Competitiveness

10:20 Finalizing the Compact for America Discussion—Session 1

Participants will review the near-final version of the Compact for America: A Call to Action for a New Tech-Driven Industrial Base and National Innovation Ecosystem and offer final comments to strengthen the organization and/or recommendations of Pillars 1-3 of the report.

Stage Setter

The Hon. Deborah Wince-Smith will review changes made to the report since TLSI 30, which was held on October 31, 2024.

Moderator

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin

Pillar 1: Cultural Change—Developing a New Narrative on Technology's Primacy in National Competitiveness

Kick-off Discussants

Dr. Padma Raghavan
Vice Provost, Research & Innovation and Chief Research Officer, Vanderbilt University

Pillar 2: Commercial Innovation Integration—Accelerating and Expanding Dual-Use Technologies

Dr. Carol Burns
Deputy Laboratory Director for Research, Lawrence Berkeley National Laboratory

Pillar 3: Acceleration of Technology Translation, Scaling, and Commercialization – Shortening the Time for Technology Maturation and Market Integration

Dr. Peter Dorhout
Vice President for Research, Iowa State University

11:00 Break

11:10 Finalizing the Compact for America Discussion—Session 2

This session will closely examine Pillars 4-5 of the Compact. Additionally, participants will share any final recommendations to improve the organization, positioning, or recommendations included within the report.

Pillar 4: U.S. Tech Global Leadership—Setting Standards, Securing Research, and Forging Strategic International Partnerships

Kick-off Discussants

The Hon. Walter Copan
Vice President, Research & Technology Transfer, Colorado School of Mines

Pillar 5: Focus on Place-Making Innovation—Growing Innovation Ecosystems Across America

Dr. Nancy Glenn
Vice President, Research & Economic Development, Boise State University

11:40 The Compact for America Release and Action Strategy

Participants will discuss the Compact for America release strategy, including timing, audiences, and tactics for gaining visibility and maximizing the impact of the report.

Moderators

Mr. Chad Evans
Executive Vice President & Chief Operating Officer, Council on Competitiveness

Mr. Mike Nelson
Vice President, Council on Competitiveness

AFTERNOON

12:00 Working Lunch

12:35 Igniting a New Future in Space

In response to the rapid pace of innovation and disruption in the space industry, Lockheed Martin created Ignite, its business R&D unit designed to push the boundaries of space-based technology. Dr. Tahllee Baynard, Vice President, Ignite, Lockheed Martin Space, will share his perspective on the future of the U.S. space industry, and Lockheed Martin's role in shaping it. A Q&A session with Dr. Baynard will follow his initial remarks.

Dr. Tahllee Baynard
Vice President, Ignite, Lockheed Martin Space

1:15 Council on Competitiveness Engagement Opportunities and Future TLSI Strategic Priorities

Participants will receive an update on the Council's programs, including the National Commission and its "Competitiveness Conversations Across America" series, as well as the bioeconomy project. They will also discuss the U.S.–Australia Innovation Partnership Phase 2 trip scheduled for July 2025, the Alliance for Transformational Computing, and the focus of the University Leadership Forum. Participants will

also discuss future priorities for the TLSI and look ahead to the TLSI 32 meeting, which will take place at Lockheed Martin's Air Force Plant 4 in Fort Worth, Texas, on November 4, 2025.

Mr. Chad Evans
Executive Vice President & Chief Operating Officer, Council on Competitiveness

1:45 Closing Comments

The Hon. Patricia Falcone
Deputy Director for Science and Technology, Lawrence Livermore National Laboratory

Dr. Sally Morton
Executive Vice President, Arizona State Knowledge Enterprise, Arizona State University

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin

The Hon. Deborah L. Wince-Smith
President & CEO, Council on Competitiveness

2:00 Break and Transition to Shuttle

2:10 Shuttle to Waterton Campus

2:30 Tours of Lockheed Martin Space Facilities

Participants will tour three of Lockheed Martin's Space Facilities:

1. GPS High Bay—Built in Lockheed Martin's former rocket assembly building, the GPS III Processing Facility has nearly 40,000 square feet of assembly and test areas for GPS satellites. A 32,900 square foot, SCIF-level, Class 100K clean room high bay serves as the "factory floor" and houses assembly stations, a solar array test fixture, and a space vehicle transfer fixture. A 962 square foot thermal vacuum chamber and a 2,880 square foot two-story anechoic test chamber are also inside the facility.
2. Space Operations Simulation Center (SOSC)—The Space Operations Simulation Center (SOSC) provides an ultra-stable environment to develop, evaluate, and test precision instruments and navigation systems used in space vehicles. Sophisticated facilities allow for full- and sub-scale simulations of ranging, rendezvous, docking, imaging, descent, and landing operations—all of which are necessary for the success of manned and robotic missions to earth-orbiting platforms and celestial bodies. The 41,000 square foot building contains a 16,000 square foot high bay with a robot wing and an air lock, four mission operations centers, two control rooms, a two-story lobby, and support spaces.
3. Orion Integrated Test Lab—This lab features a full-scale mockup of the Orion crew module and adaptor for testing and risk reduction. The Orion mockup is mated to hardware emulations of the full spacecraft stack comprised of the Orion crew module, European Service Module, second stage booster, the Space Launch System, and ground support equipment. The team is able to simulate and test every aspect of each Artemis mission from launch to splash down.

4:15 Shuttle to ENG 330

4:30 Photo Op & Showcase in the Atrium

4:40 Shuttle Back to Deer Creek

5:00 Dialogue Concludes

TLSI Dialogue 31 Participants

TLSI CO-CHAIRS & COUNCIL LEADERSHIP

The Hon. Patricia Falcone
Deputy Director, Science & Technology
Lawrence Livermore National Laboratory

Dr. Sally C. Morton
Executive Vice President, Knowledge Enterprise
Arizona State University

Dr. Steven Walker
Vice President and Chief Technology Officer
Lockheed Martin

The Hon. Deborah L. Wince-Smith
President and CEO
Council on Competitiveness

Mr. Chad Evans
Executive Vice President and
Chief Operating Officer
Council on Competitiveness

ONSITE HOST

Dr. Tahllee Baynard
Vice President, Ignite
Lockheed Martin Space

PARTICIPANTS

Mr. Spencer Ballus
Research Associate
Council on Competitiveness

Dr. Carol Burns
Deputy Laboratory Director, Research
Lawrence Berkeley National Laboratory

Dr. Parag Chitnis
Vice President, Research & Economic
Development
University of Wyoming

The Hon. Walter Copan
Vice President, Research & Technology Transfer
Colorado School of Mines

Dr. Peter Dorhout
Vice President, Research
Iowa State University

Dr. Nancy Glenn
Vice President, Research & Economic
Development
Boise State University

Dr. Kristyn Kadala
Program Engineer Senior Staff
Lockheed Martin

Dr. Andre Marshall
Vice President, Research, Innovation &
Economic Impact
George Mason University

Mr. Michael Nelson
Vice President
Council on Competitiveness

Dr. Ezemenari Obasi
Vice President, Research & Innovation
Wayne State University

Dr. Padma Raghavan
Vice Provost, Research & Innovation
and Chief Research Officer
Vanderbilt University

Mr. Chris Reynolds
Technical Assistant to the
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Contact

For more information, please contact:

Mr. Chad Evans
Executive Vice President and
Chief Operating Officer
Secretary and Treasurer to the Board
cevans@compete.org

Council on Competitiveness
900 17th Street, NW
Suite 700
Washington, D.C. 20006

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About the Council on Competitiveness

For nearly four decades, the Council on Competitiveness (Council) has championed a competitiveness agenda for the United States to attract investment and talent, and spur the commercialization of new ideas.

While the players may have changed since its founding in 1986, the mission remains as vital as ever—to enhance U.S. productivity and raise the standard of living for all Americans.

The members of the Council—CEOs, university presidents, labor leaders and national laboratory directors—represent a powerful, nonpartisan voice that sets aside politics and seeks results. By providing real-world perspective to Washington policymakers, the Council's private sector network makes an impact on decision-making across a broad spectrum of issues—from the cutting-edge of science and technology, to the democratization of innovation, to the shift from energy weakness to strength that supports the growing renaissance in U.S. manufacturing.

The Council's leadership group firmly believes that with the right policies, the strengths and potential of the U.S. economy far outweigh the current challenges the nation faces on the path to higher growth and greater opportunity for all Americans.