Summary of the National Security Commission on Artificial Intelligence's 2020 Interim Report and Third Quarter Recommendations

Line of Effort (LOE) 1: Invest in AI Research and Development (R&D)

Progress to Date: Research remains the foundation of America's technological leadership, and the government must make the investments to solidify this foundation for artificial intelligence (AI). In the First Quarter (Q1), the Commission recommended doubling non-defense AI R&D funding, focusing investments on six priority research areas, and launching a pilot of a National AI Research Resource. In the Second Quarter (Q2), the Commission examined the Department of Defense (DoD) research enterprise and recommended ways to overcome bureaucratic and resource constraints to accelerate national security-focused AI R&D.

TAB 1 — Strengthening the Triangular Alliance for AI R&D

Focus: America's ability to harness innovation is predicated on a rich interplay between academia, government, and industry—and organizations that straddle those lines—where each sector benefits from and relies on the advances of the others. To support the level of AI research, development and application that will underpin future U.S. technological leadership, the government must take action to strengthen the alliance by exploring new mechanisms to support research and enable partnerships with industry.

Objective: In order to strengthen the triangular alliance and position the United States for an AI-enabled future, the Commission proposes actions to address three priority issue areas: 1) Supporting the growth of nationwide AI R&D through novel funding mechanisms; 2) Posturing the defense and intelligence AI R&D communities to address national-security specific problems and capabilities through establishment of a modern digital ecosystem; and 3) Expanding the role of industry in the DoD's AI R&D to pursue next-generation capabilities.

Issue 1: Supporting AI Research through Novel Funding Mechanisms

Recommendation 1: Create an AI Innovator Award Program to Invest in Top Talent. Foster high-risk, exploratory research through the launch of a program that makes long-term, high-value awards that provide top researchers the flexibility to pursue big ideas without prescribed outcomes.

Recommendation 2: Invest in Research Teams Pursuing Transformative Ideas in AI. Establish a team award that supports multi-disciplinary, bold research initiatives to apply AI to solve complex problems or pursue use-inspired basic research efforts.

Recommendation 3: Create AI Testbeds to Serve the Academic and Industry Research Communities. Develop a set of national, domain-specific AI testbeds to provide ready infrastructure, benchmarking

standards, and build communities of discovery and practice around application areas for AI that are in the public interest.

Recommendation 4: Support AI Data Set Curation and Maintenance. Start a program to curate, host, maintain, and make publicly accessible complex, exemplar data sets to help drive research progress in AI and its application to other fields of study.

Recommendation 5: Launch an AI Research Challenge. Open a Defense Advanced Research Projects Agency (DARPA) Grand Challenge around an ambitious AI-enabled goal that would focus on accelerating progress on third wave AI capabilities and advancing technology that could plausibly drive future defense capabilities, such as human-robotics teaming and human-AI collaboration.

Issue 2: Creating a Digital Ecosystem for National Security AI R&D

It is necessary to equip researchers and developers within the national security community with the services, tools, and environments necessary to accelerate innovation in AI. This should be accomplished through a networked architecture supporting a diversity of AI approaches that connects researchers and developers to federated repositories hosting data, trained AI models, and AI software tools made accessible through user-based authentication; along with AI testbeds and test ranges; and distributed computing resources and support. *NOTE: Implementation recommendations will be developed for inclusion in the final report.*

Issue 3: Expanding Industry's Role in DoD's AI R&D to Develop Next-Generation Capabilities

Recommendation 6: Communicate DoD Modernization Priorities to Industry through Issuance of Technology R&D Objectives. Publish R&D objectives through the Office of the Undersecretary of Defense for Research and Engineering (OUSD(R&E)) to support existing modernization priority roadmaps and the Technology Annex to the *National Defense Strategy*. The R&D objectives should be tied to subsets or components of the modernization priorities on which the government envisions the private sector playing a major role in building future capabilities.

Recommendation 7: Strengthen Return on Small Business Innovation Research (SBIR) Investments. Optimize the DoD's SBIR program to more effectively develop and deploy AI solutions to meet warfighter needs. Enable successful prototypes to scale through sufficient funding, early access to customers and operators, and better due-diligence. Review, modernize, and streamline DoD SBIR process to encourage broader participation of American technology start-up and small business companies.

Recommendation 8: Launch an AI Catalyst Initiative. Overseen by a joint council composed of OUSD(R&E), the JAIC, and Service leadership and executed by DARPA or the Services' innovation entities, the AI Catalyst Initiative (AICI) would accelerate research by non-traditional contractors into longer-time-horizon, next-generation defense capabilities—supporting the evolution from basic research to easily scalable prototypes. The initiative would fund and facilitate several multi-year partnerships between operators/end-users and teams of private sector researchers driving toward a slate of research priorities.

LOE 2: Applying AI for National Security

Progress to Date: The United States must maintain global leadership in AI/ML application for U.S. national security and defense. In Q1 the Commission recommended top-down leadership mechanisms to strengthen existing AI initiatives and accelerate DoD AI application in the near-term by establishing a Steering Committee on Emerging Technology, tri-chaired by the Deputy Secretary of Defense, the Vice Chairman of the Joint Chiefs of Staff, and the Principal Deputy Director of National Intelligence; elevating the Director of the Joint Artificial Intelligence Center (JAIC) to report directly to the Secretary of Defense (or Deputy Secretary of Defense); and endorsing the need for the JAIC Director to remain a three-star billet with extensive operational expertise. Q2 recommendations focused on establishing clear guidance to direct resourcing and investments in disruptive technologies via a classified technology annex linked to the operational challenges identified in the National Defense Strategy. Q2 recommendations also proposed actions to incorporate AI/ML into concept development through Joint and Service exercises; bolster experimentation efforts; and increase the Department's institutional agility through modernization of its core administrative functions.

TAB 2 — Applying Artificial Intelligence for National Security Missions

Focus: The Commission proposes options to maximize the impact of DoD's Chief Technology Officer (CTO), the Under Secretary of Defense for Research & Engineering (USD(R&E)), and to designate an Intelligence Community (IC) CTO. The seven options below are not mutually exclusive from one another and build on the recommendations made in Q1 and Q2.

Objective: To maintain advantage in a technological competition with near-peer competitors, the DoD and the IC must organize for speed and agility, integrating the perspectives of technologists and operators at every level. The options below aim to deliver this integration by driving closer coordination with the military services and intelligence entities as they conduct R&D, planning, budgeting, and acquisition activities; and providing funding mechanisms to incubate and mature promising technology that would otherwise not make it from lab to field.

Recommendation 1: USD(R&E) should integrate DoD's technology scouting community of practice, leveraging AI-enabled analytics to provide authoritative technology inputs for national security planning. Assign USD(R&E) as the Executive Agent responsible for producing the *National Defense Strategy* Technology Annex, convening a technology scouting community of practice to collaborate in development of the Annex. Reestablish the Strategic Intelligence Analysis Cell (SIAC) Director as a direct report to the USD(R&E). Increase SIAC funding for expanded investments in AI tools, commercial data, and a diverse technology fellows program.

Recommendation 2: USD(R&E) should be appointed the Co-Chair and Chief Science Advisor to the Joint Requirements Oversight Council (JROC) for Joint and cross-domain capabilities. To accelerate application of AI and other emerging technologies for competitive advantage, USD(R&E) must play a central role in connecting technological advancements in research and development to joint operational requirements.

Recommendation 3: USD(R&E) should have a dedicated fund to mature, operationally prototype, and transition exceptionally promising AI-enabled technologies. DoD's budget process poses a significant obstacle to transitioning advances in the lab to capabilities in the field. In the current budget system, and given today's rate of technological change, program managers will increasingly struggle to rapidly identify, fund, and incorporate promising technologies into their programs. Without available program funds at the end of a defense science and technology (S&T) project's life cycle, the technology can stall or be

abandoned before it can be evaluated in a realistic environment and a determination made as to the capability improvement it could deliver. To move as fast as U.S. competitors and maintain the defense advantage, DoD must have a means to support promising AI projects beyond early-stage research and development even when planned program funding is not yet in place.

Recommendation 4: Within the Office of the Director of National Intelligence (ODNI), the Director of S&T should be designated as the IC's CTO and empowered to enable the IC to adopt AI-enabled applications to solve operational intelligence requirements. To ensure top-down prioritization of emerging technologies and provide leadership the resources and authorities to support tech development, the Director of S&T should be designated as the IC CTO and granted additional authorities for establishing policies on, and supervising, IC research and engineering, technology development, technology transition, appropriate prototyping activities, experimentation, and developmental testing activities. Additionally, the Director of S&T should have a fund that would allow the ODNI to identify and invest in AI applications with outsized potential that may not have an identified source of agency or program funding as they near the end of their S&T life cycle.

Recommendation 5: The IC CTO, in coordination with USD(R&E), should develop a technology annex to the National Intelligence Strategy that establishes technology roadmaps to adopt AI-enabled applications to solve operational intelligence requirements. This annex would mirror the Office of the Secretary of Defense technology annex developed by USD R&E. It should identify emerging technologies and applications that are critical to enabling specific capabilities to address the IC's most pressing intelligence requirements. The main objective of the annex should be to chart a clear course for identifying, developing, fielding, and sustaining those critical emerging and enabling technologies, and to speed their transition into operational capability.

Recommendation 6: The IC CTO should establish common technical standards and policies necessary to rapidly scale AI-enabled applications across the IC and have the authority to enforce them across the IC. For the IC to integrate AI-enabled applications into its operations, it must first establish common technical standards and policies. ODNI should establish these standards and policies in close coordination with industry, adopting those standards and practices that have emerged as best practices and industry standards.

Recommendation 7: The IC should develop a coordinated and federated approach to applying AI-enabled applications to open source intelligence. The explosive ubiquity of commercial networked connectivity a.k.a the internet of everything, has generated data and information that rivals government-owned intelligence gathering systems. While there will always be a need for traditional intelligence methods and classified intelligence, the IC must rethink integrating AI-enabled analysis of open source and publicly available information into all of its work streams. AI-enabled analysis of open source and publicly available information can expose patterns and trends that human analysts would not recognize, and should be used to inform all kinds of intelligence products.

LOE 3: Talent and Workforce

Progress to Date: The *2019 Interim Report* concluded that the United States Government workforce faces a major deficit in AI knowledge and technical expertise, both military and civilian. Most of the Commission's recommendations on Federal Government recruiting, hiring, and training seek to work within the current personnel system. But the Commission has also advanced more ambitious ideas in areas where the current system falls short. Q1 recommendations addressed the government's hiring process, identifying existing talent in the civilian and military ranks, improving pipelines between universities and government, and increasing public-private talent exchanges. Q2 recommendations

focused on expanding the government's base of digital talent by establishing a National Reserve Digital Corps and a United States Digital Service Academy.

TAB 3 — Train and Recruit AI Talent

Part I: Recommendations to Strengthen the AI Workforce

Focus: The United States Government needs to improve the AI literacy and proficiency of its technical workforce, organizational leaders, junior leaders, policy experts, and acquisition workforce. Without these improvements, the government will remain unprepared to buy, build, and use today's digital technology. A more digitally proficient government workforce will spend taxpayer dollars more efficiently, better secure the U.S. population and critical infrastructure, accelerate bureaucratic processes, and better represent American interests during negotiations with U.S. partners, allies, and competitors.

Objective: For departments and agencies to become AI effective enterprises, they must first overcome the challenge of developing a digitally proficient workforce, including those skilled in AI and AI adjacent roles. United States defense and intelligence agencies need a workforce with expanded AI skills and expertise. Many federal employees will require more specialized training and education to buy, build, and use AI tools and AI related technology effectively and responsibly. Just as importantly, workforce development is a journey that will change as technology, missions, and organizational structures evolve. Today's workforce initiatives are helpful, but insufficient to meet the government's needs. Bolder, more aggressive actions are needed.

Issue 1: Existing Initiatives within the Military Services

Recommendation 1.1: Support the Army AI Task Force's AI and Data Science Workforce Initiative. The Commission recommends appropriators set aside $5 million of Army Operations & Maintenance (O&M) appropriations funding in Fiscal Year (FY) 2022, and $6 million in FY 2023 and subsequent years, for the U.S. Army AI Task Force's AI and data
science workforce initiative to allow the U.S. Army to continue to educate its senior leaders, begin building its technical workforce, and educate a significant portion of its end users.

Recommendation 1.2: Support the Navy Community College. The Armed Services committees should sustain support for the U.S. Naval Community College (NCC). The NCC will enroll 40,000 personnel, with 100 percent of instruction online.

Recommendation 1.3: Support the Air Force Digital University. The Armed Services committees should sustain support for the U.S. Air Force Digital University. The Commission recommends House and Senate appropriators set aside $10 million in U.S. Air Force O&M funding for the U.S. Air Force Digital University in order to allow the U.S. Air Force to significantly expand the portion of its workforce with digital skills.

Recommendation 1.4: Support the Air Force Computer Language Initiative (CLI). The Commission recommends appropriators set aside $10 million in U.S. Air Force O&M funding for the CLI in order to increase the portion of the U.S. Air Force able to code in relevant software languages.

Recommendation 1.5: Support the U.S. Air Force/Massachusetts Institute of Technology (MIT) AI Accelerator. The Commission recommends appropriators set aside $15 million in Air Force R&D funding

for FY 2021 in order to accelerate the U.S. Air Force's ability to adopt AI both by improving the technology it has access to and training its workforce to build and use it.

Issue 2: Managing Civilian Subject Matter Experts

Recommendation 1.6: Accelerate Existing Occupational Series Initiatives. The Office of Personnel Management (OPM) should create software development, software engineering, data science, and knowledge management occupational series. Rather than waiting for agencies to provide a formal request for a new occupational series, OPM should ask agencies to provide supporting documents and subject matter experts to study and draft a classification policy for each occupational series.

Recommendation 1.7: Create an AI Occupational Series. OPM should create an AI occupational series. Rather than waiting for agencies to provide a formal request for a new occupational series, OPM should ask agencies to provide supporting documents and subject matter experts to study and draft a classification policy for each occupational series.

Issue 3: Recruiting Civilian Subject Matter Experts

Recommendation 1.8: Enact the Science, Technology, Engineering, and Mathematics (STEM) Corps Proposal. The DoD should, with congressional authorization and appropriation, establish an office to manage and establish a STEM Corps, including a scholarship program, advisory board, private-sector partnership program, and STEM Corps member management program. Appropriators should set aside $5 million for a STEM Corps for FY 2022 and each fiscal year thereafter.

Recommendation 1.9: Endorse an AI Scholarship for Service Proposal. Once authorized by Congress, the National Science Foundation (NSF), in coordination with the OPM, should establish an AI Scholarship for Service program modeled after CyberCorps: Scholarship for Service. This should include establishing criteria for AI centers of excellence, tuition, stipends, and a service obligation.

Recommendation 1.10: Create Digital Talent Recruiting Offices. The Departments of Defense (including U.S. military services), Energy, Homeland Security, and the ODNI should create digital talent recruiting offices that monitor their agencies' need for specific types of digital talent; recruit technologists by attending conferences, career fairs, and actively recruiting on college campuses; integrate federal scholarship for service programs into agency recruiting; offer recruitment and referral bonuses; and partner with their agencies' human resource teams to use direct-hire authorities to accelerate hiring.

Recommendation 1.11: Establish a public-private talent exchange (PPTE) program at non-DoD national security agencies. The Departments State, Treasury, Commerce, Energy, Homeland Security, and the IC should establish public-private talent exchange programs.

Issue 4: Managing Military Subject Matter Experts

Recommendation 1.12: Create New Career Fields. The military services should create career fields that allow military personnel to focus on software development, career fields that allow military personnel to focus on data science, and career fields that allow military personnel to focus on artificial intelligence. Military personnel should be able to join these career fields either upon entry into the military, or by transferring into the field after serving a period in another career field, and should have options that allow personnel to either follow a path to senior leadership positions, or specialize and focus on technical skill sets.

Recommendation 1.13: Create Additional Skill Identifiers (ASIs), Additional Qualification Designators (AQDs), Additional Military Occupational Specialties (AMOSs), and Special Experience Identifiers (SEIs) for Topics Related to AI. Military services should create or purchase training for certifications and continuing education in AI mission engineering, data engineering, safety and responsible AI engineering, and AI hardware technicians.

Issue 5: Junior Leader Training and Education

Recommendation 1.14: Integrating Digital Skill Sets and Computational Thinking into Military Junior Leader Education. The military services need to integrate understanding problem curation, the AI lifecycle, data collection and management, probabilistic reasoning and data visualization, and data-informed decision-making into pre-commissioning or entry-level training for junior officers and training for both junior and senior non-commissioned officers.

Recommendation 1.15: Integrating Digital Skill Sets and Computational Thinking into Civilian Junior Leader Education. Civilian national security agencies should identify the components of their workforce that need to receive training, the type of training they need to receive, and how they should receive the training needed to create enterprise AI. This should include an assessment of which positions need to understand problem curation, the AI lifecycle, data collection and management, probabilistic reasoning and data visualization, and data-informed decision-making.

Issue 6: Educating Organizational Leaders

Recommendation 1.16: Integrate Emerging Technologies Material into Courses for Officers as part of Service-level Professional Military Education. The DoD should incorporate emerging technology courses for its military officers across all phases of Service-level professional military education and should build on each other as officers progress in rank. The courses should include an introduction to the latest technology, the benefits and challenges of adapting new technologies, and ethical issues surrounding the uses of emerging technologies, including the impact of biases in these technologies.

Recommendation 1.17: Require A Short Course for General and Flag Officers and Senior Executive Service (SES) Leadership Focused on Emerging Technologies. The DoD should require emerging technology short courses for general and flag officers and SES-level organizational leaders. The courses should be taught on an iterative, two year basis, should identify the latest, most relevant technologies for senior leaders, analyze how emerging technologies can impact their organization, explain the use of AI by U.S. competition in a global context, and require a level of knowledge about emerging technology to be conversant about the latest technology, trends, and limitations.

Recommendation 1.18: Create Emerging Technology Coded Billets Within the DoD. The Armed Services committees should use the FY 2022 National Defense Authorization Act (NDAA) to require the DoD to create emerging technology critical billets within the DoD that must be filled by emerging technology certified leaders. The process to become emerging tech certified would resemble the joint qualification system.

Issue 7: Creating AI Policy Experts

Recommendation 1.19: Require Short Courses for Policy Personnel with AI-Related Portfolios. The Departments of State, Defense, Commerce, Energy, Homeland Security, and ODNI should identify

policy experts whose portfolios affect or will be affected by AI, then require these personnel to successfully complete short courses covering AI, its capabilities, and policy relevant topics.

Issue 8: Training Acquisition Professionals

Recommendation 1.20: Require Emerging Technology Training for Specific Acquisition Functional Areas. The Defense Acquisition University, in partnership with USD (R&E), should annually assess the AWF's emerging technology education needs. As necessary, Defense Acquisition University (DAU) should design and offer courses addressing new AWF needs.

Recommendation 1.21: Support DAU Pilot Programs Attempting to Use AI to Tailor Pedagogy and Content to Individuals. The DoD should resource ongoing DAU pilot programs intended to AI to both curate existing DoD Acquisition Workforce curriculum content as well as to tailor the delivery of that content to individual users.

Part II: Recommendations to Improve STEM Education

Focus: This set of recommendations is designed to boost American innovation in AI. The Commission's recommendations address needs at the undergraduate and postgraduate education, and reskilling/upskilling of workers once they are in the workforce.

Objective: The Commission has focused on the gaps in talent and workforce that the United States needs in order to remain a global leader in AI. The current model of STEM education in America will not meet the challenges of tomorrow. AI is becoming ubiquitous, but the United States continues to have a lack of available AI talent. As a result, the United States faces a host of serious national security challenges that are made worse as the gap between the workforce that it needs and the talent that is available continues to widen. The United States needs to increase efforts to provide a strong STEM education to all Americans in order to create a strong economy and increase the available talent, thereby increasing its ability to compete globally and improve national security.

Issue 1: Strengthening Universities as Talent Pipelines

Recommendation 2.1: National Defense Education Act II. Much like an independent task force sponsored by the Council on Foreign Relations, the Commission recommends that Congress fund 25,000 STEM undergraduate scholarships, 5,000 STEM graduate fellowships, and 500 postdoctoral positions. The Commission recommends that Congress authorize the National Science Foundation to spend $8.05 billion to fund those scholarships over a five-year period.

Recommendation 2.2: Mid-Career Faculty Fellowships. The Commission's *Interim Report* noted the trend of AI experts leaving academia for industry as a problem for cutting edge R&D research and a remedy for the keeping quality STEM teaching talent in universities is a mid-career fellowship for recently tenured faculty. The Commission recommends that Congress support the mid-career fellowship award for AI and set aside $15 million for the fellowship.

Recommendation 2.3: Support Creation of Pilot Program for Artificial Intelligence Technology and Education Improvements for Community Colleges. In order to address the growing need for a wide range of AI proficient workers, the Federal Government should invest in a new pilot program for AI upgrades for community colleges. The Commission recommends that Congress establish the Artificial Intelligence

Technology and Education Improvement Program pilot program for community colleges and set aside $30 million to fund the pilot.

Recommendation 2.4: Creation of AI-Specific Government Internships. In order to increase AI knowledge and capabilities within the United States Government, the Departments of Defense and Energy as well as National Institute of Standards and Technology (NIST) should create paid AI-specific internship positions that focus on AI R&D, AI application, and other related AI topics. The Commission recommends that Congress support the creation of an AI-specific internship program for utilization across the Federal Government and set aside $2 million for the program for the creation of 340 internships.

Issue 2: Reskilling the Workforce

Recommendation 2.5: Increase Incentives for Public-Private Job Reskilling Training. The reskilling of America's workforce is essential for the United States to keep pace with the pace of technological change and The Strengthening Career and Technical Education for the 21st Century Act to begin to address this issue. The Commission recommends that Congress support the Strengthening Career and Technical Education for the 21st Century Act and set aside $2.7 billion for the program.

Issue 3: Microelectronics Education

Recommendation 2.6: Create a Scalable and Replicable Microelectronics Capable Workforce Development Model. This option provides a reliable, sustained pipeline of microelectronics capable workforce talent to the private sector—especially the aerospace and defense industry—and the United States Government. The Commission recommends that Congress authorize and fully fund the existing Private-Public-Academic-Partnership program in FY 2021 and expand it to include an AI-specific consortium in FY 2022.

Recommendation 2.7: Create a National Microelectronics Scholar Program. At $60 million per year, this program would tentatively produce 750 graduates a year with B.S., M.S., or Ph.D. EE/CE degrees. The Commission recommends that Congress authorize and fully fund a National Microelectronics Scholar Program.

LOE 4: Protect and Build on U.S. Technology Advantages

Progress to Date: The United States must promote and protect advantages in hardware to sustain its leadership in AI and associated technologies. In Q1, the Commission recommended investing in microelectronics leadership through the revitalization of domestic fabrication of state-of-the-art microelectronics. In Q2, the Commission focused on technology protection principles and recommendations for improving export controls and investment screening for emerging technologies.

TAB 4 — Protect and Build Upon U.S. Technology Advantages

Focus: AI exists within a constellation of emerging technologies. While AI is the lynchpin of this constellation given its ability to enable or be enabled by such a wide variety of technologies, their interconnected nature is why the Commission's mandate includes AI and "associated technologies." It is imperative that the United States continue posturing itself for a sustained technology competition that extends beyond AI and encompasses a broader suite of associated, emerging technologies.

Objective: The following recommendations pertain to steps the United States must take to ensure continued U.S. leadership in key technologies associated with AI, to include biotechnology, quantum computing, and microelectronics, as well as how the Executive Office of the President can better organize itself for technology competition.

Part I: Biotechnology

Recommendation 1.1: Prioritize U.S. Leadership in Biotechnology as a National Security Imperative and Pursue Whole-of-Government efforts to Support U.S. Biotechnology Advantages and Ensure the United States is a World Leader in Ethical Genomic Data Aggregation and Analysis. Given the ways in which AI will transform biotechnology applications, the United States Government must increase its support for the biological sciences, including funding for basic research, forecasting of future breakthroughs, and talent promotion efforts, to ensure continued U.S. leadership. It should specifically expand existing efforts which aggregate genetic data in a secure manner, such as the All of Us initiative, to enhance the ability of U.S. researchers to utilize AI for large-scale biotechnology research and innovation and reduce their reliance on Chinese entities for large-scale genomic research databases.

Recommendation 1.2: Increase the Profile of Biosecurity Issues and Biotechnology Competition within the U.S. National Security Departments and Agencies, Treat Chinese Advancements in Biotechnology as a National Security Priority, and Update the U.S. National Biodefense Strategy to Include a Wider Range of Biological Threats. The United States must treat China's attempts to gain strategic advantage by leveraging AI to achieve breakthroughs in biotechnology as a national security priority and increase the profile of and resource devoted to biosecurity and biotechnology issues in all U.S. national security departments and agencies. It should update the *National Biodefense Strategy* to include a wider vision of biological threats, such as AI-enabled human enhancement or how U.S. competitors could utilize biotechnology or biodata advantages as an instrument of national power.

Recommendation 1.3: Launch a Strategic Communications Campaign to Highlight BGI's Links to the Chinese Government and How China is Utilizing AI to Enable Ethically Problematic Developments in Biotechnology and Strengthen International Bioethical Norms and Standards Regarding Genomics Research. The United States should take a more aggressive public posture regarding BGI—China's de facto national champion in genetic sequencing and research—and senior officials should publicly highlight its links to the Chinese government and the national security risk that the company poses to the United States and its allies. Additionally, the United States should more aggressively highlight and condemn ethically problematic AI-enabled biotechnology research or applications by the researchers in China or the Chinese government, while simultaneously leading global efforts to emphasize and define bioethical guardrails for experiments involving AI applied to genetics and synthetic biology.

Recommendation 1.4: Pursue Global Cooperation on Smart Disease Monitoring. The United States should seek to collaborate with all nations to utilize AI to enhance global cooperation on disease monitoring. Such an international effort, which could combine data about zoonotic spillovers with other open-source data capable of estimating disease activity, would improve global pandemic defense while also providing an important model for large-scale global cooperation on AI toward issues of collective benefit.

Part II: Quantum Computing

Recommendation 2.1: Publicly Announce Government Interest in Specific Quantum Use Cases to Incentivize Transition from Basic Research to National Security Applications. In order to further

practical applications of quantum technologies, the United States Government should consider publicly announcing a set of specific use cases for quantum computers that it is interested in pursuing. Public announcements of priority applications will help spur private sector investment and innovation in transitioning quantum technologies despite the absence of an integrated technology procurement apparatus within the United States Government.

Recommendation 2.2: Make Quantum Computing Accessible to Researchers via the National AI Research Resource. The United States should provide access to both classical and quantum computers via the National AI Research Resource, which the Commission recommended establishing in its *First Quarter Recommendations*. Doing so would help industry, academia, and government researchers build and test software tools and algorithms that leverage both classical and quantum computers in a hybrid fashion.

Recommendation 2.3: Foster a Vibrant Domestic Quantum Fabrication Ecosystem. Because quantum computing could exponentially increase the power of AI, the United States must take steps now to cement its long-term status as the global leader in the design and manufacturing of quantum processing units. Congress should enact a package of provisions that incentivizes the domestic design and manufacturing of quantum computers and their constituent materials, including tax credits and loan guarantees for relevant expenditures.

Part III: Microelectronics Leadership and Critical Technology Supply Chain Resilience

Issue 1: Developing a Resilient Domestic Microelectronics Industrial Base

Recommendation 3.1: Incentivize Domestic Leading-Edge Microelectronics by Authorizing and Fully Funding Key Provisions of the CHIPS for America Act, including the Advanced Packaging National Manufacturing Institute. To incentivize the development by the private sector of a state-of-the-art domestic commercial foundry, Congress should authorize and fully-funding provisions from the CHIPS for America Act (H.R.7178 / S.3933) included in the Senate and House versions of the NDAA via amendments. Key provisions would boost semiconductor research funding and development of advanced packaging and interconnect technologies and establish national centers of excellence for microelectronics and an incubator for semiconductor startup firms.

Recommendation 3.2: Create Private Sector Incentives for Developing a Leading-Edge Merchant Fabrication Facility Through Refundable Investment Tax Credits. Congress should pass legislation adopting a 40 percent tax credit on semiconductor manufacturing equipment and facilities for use in the United States through 2024. Closing the gap between U.S. tax rates on semiconductor capital equipment and other advanced industrial nations such as South Korea, Japan, and Taiwan will incentivize U.S. firms to construct facilities domestically while also attracting foreign firms such as the Taiwan Semiconductor Manufacturing Company.

Issue 2: Promoting Resilient Supply Chains for Critical Technologies

Recommendation 3.3: Improve Supply Chain Analysis, Reporting, and Stress Testing. The United States must establish a unit within NIST charged with understanding U.S. capabilities and gaps in domestic advanced technology production while also directing agencies to update their methodologies for collecting and publishing detailed supply chain data. The Federal Government should also work with industry to

design and execute supply chain stress testing for companies in critical industries for national security, starting with microelectronics.

Recommendation 3.4: Centralize Reshoring and Supply Chain Management. The Executive Branch should bring together representatives from the Department of State, Defense, Commerce, U.S. Trade Representative, Small Business Administration, export promotion agencies, and others as needed into a fusion cell for reshoring and promote the resilience of critical elements of supply chains. As a next step, the recommendation also directs the Executive Branch to conduct an analysis of alternatives for organizations to lead domestic supply chain reshoring by drawing on expanded authorities and financial incentives, to include government agencies, consortia, and nonprofits.

Part IV: A Technology Competitiveness Council: Logic and Options

Recommendation 4.1: Develop a Comprehensive Technology Strategy and Empower an Entity within the White House to Ensure Continued Leadership Across Emerging Technologies. The United States must strengthen executive leadership in technology policy in the White House by empowering a single entity to develop a comprehensive technology strategy for the United States. The Commission offers a range of organizational models which could perform this function and recommends creating a new Technology Competitiveness Council chaired by the Vice President with an Assistant to the President serving as the day-to-day coordinator.

LOE 5: Marshalling International AI Partnerships

Progress to Date: The world is entering a dangerous period of international politics. International dialogue about the AI-enabled future must be part of any strategy, and cooperation even with competitors will be important in areas like smart disease monitoring. In Q1, the Commission proposed a National Security Policy Framework for AI Cooperation and recommended AI-related military concept and capability development with allies and partners, beginning with a focus on the Five Eyes alliance. In Q2, the Commission proposed reorienting the Department of State to lead coalitions of free and open states and organizations to prevail on emerging technology issues in an era of great power competition.

TAB 5 — Marshal Global AI Cooperation & Ethics

Focus: Leverage relationships with allies and partners, which represent asymmetric advantages over competitors/adversaries, to confront new threats and prevail over authoritarian regimes.

Objective: Identify opportunities for the United States to marshal global cooperation around AI & emerging tech to promote common interests and values of like-minded nations and to shape worldwide AI norms and use.

Pillar I: Deepening Global AI Coordination for Defense and Security

Recommendation 1: The Departments of State and Defense should provide clear policy guidance and resource support to NATO's AI initiatives by aligning resources and providing technical expertise to assist NATO in its adoption of AI to achieve: Accelerated development and adoption of operational practices to implement overarching AI principles and enable incorporation of AI-related technologies; Coordination of data sharing practices with a focus on privacy-enhancing technologies and methods; Development of NATO's technical expertise; Adoption of technical standards and architecture to promote

interoperability; and Implementation of simulations, wargaming, experimentation, and pilot projects to develop use cases for data fusion, data exploitation, and interoperability across the Alliance. This recommendation focuses on steps that Departments of State and Defense should take to strengthen the ability of NATO—including the NATO Alliance and Allies—to develop and incorporate AI into operations consistent with the rule of law, the law of war, and democratic values. These steps include a recommendation for the Secretaries of State and Defense to issue a joint memorandum encouraging the Departments, as they liaise with NATO, to emphasize critical areas from the NSCAI's *Key Considerations* as strategic priorities for NATO member alignment. The Departments should elevate areas across the *Key Considerations* document as appropriate, while giving particular weight and emphasis to achieving common documentation requirements; establishing confidence in 'systems of systems'; and ensuring robustness and reliability, including mitigating adversarial machine learning attacks.

Recommendation 2: The Departments of State and Defense should negotiate formal AI cooperation agreements with Australia, India, Japan, New Zealand, South Korea, and Vietnam. This recommendation builds on growing support for the Quadrilateral Security Dialogue, a strategic forum among the US, Australia, India, and Japan, and calls for formalizing relationships with these and other nations in the Indo-Pacific region to focus on AI cooperation for defense and security purposes.

Pillar II: Shaping Global AI Cooperation through Multilateral Forums

Recommendation 3: The United States, through the Department of State, should lead in developing the international AI environment by working with partners and adopting a "coalition of coalitions" approach to multilateral efforts. This recommendation calls on the United States Government—led by the Department of State and coordinated through the proposed Technology Leadership Council—to engage proactively with promising multilateral efforts across the AI landscape that involve key partners and allies. It focuses on the following efforts: the OECD, the OECD AI Policy Observatory, the D-10 coalition, the Global Partnership for AI, new Department of State-led initiatives such as Clean Networks, and a new U.S.-India-Israel initiative as a potential model for additional focused efforts involving more than two nations. The report includes detail on a broad array of AI-related efforts and provides guidance for the United States Government to prioritize engagement with each.

Recommendation 4: The President, through the Department of State, should initiate efforts to establish a Digital Coalition of democratic states and the private sector to coordinate efforts and strategy around AI and emerging technologies, beginning with a Digital Summit. The Commission proposes a Digital Summit as a necessary step to coordinate with democratic allies and partners, identify gaps in existing projects, develop a shared research agenda, operationalize AI principles, and develop a stronger framework to safeguard against malign/adversarial uses of AI.

Recommendation 5: The President should issue an Executive Order to prioritize United States Government-efforts around technical standards through improved interagency coordination and improved collaboration with U.S. industry. This recommendation, if implemented, would establish an interagency coordination task force to promote collaboration with industry, direct federal agencies to resource international standardization efforts, and require NIST, through the Director of NIST and the Standards Coordinator, to encourage a private sector-created Standardization Center. These steps (and those in Recommendations 6-8) will strengthen United States Government and U.S. industry positions in international technical standards development.

Recommendation 6: Congress should appropriate funds to NIST and key agencies for a dedicated interagency AI standards team to support the U.S. AI Standards Coordinator. This recommendation reflects a need for the United States Government to have personnel dedicated to the international technical standards development processes. With a focus on U.S. national security, this recommendation

calls for at least five full-time equivalent personnel at NIST and at least one each from the Departments of State, Defense, Energy, Homeland Security, ODNI, and other agencies as may be appropriate.

Recommendation 7: Congress should establish a Small Business Administration grant program to enable small- and medium-sized U.S. AI companies to participate in international standardization efforts. This recommendation would create a $1 million annual grant program to support engagement of small- and medium-sized U.S. AI companies in international technical standards development; this is a gap identified by industry and United States Government reps and is important as these companies are critical to developing new AI technologies and applications. Evaluation would be undertaken by the Small Business Administration in coordination with NIST.

Recommendation 8: Under NIST's lead, the United States Government, in coordination with U.S. industry and U.S. allies, should promote international standardization in areas that further U.S. and allies' national security and defense interests in the appropriate and responsible use of AI. This recommendation leverages NSCAI's *Key Considerations for Responsible Development & Fielding of AI* and focuses on United States Government input on national security-related needs, which is uniquely in the United States Government domain. The Department of State's technology officers in international tech hubs should facilitate international alignment in coordination with NIST.

Pillar III: Building Resilient AI Cooperation with Key Allies and Partners

Recommendation 9: The United States should center its Indo-Pacific relationships around India including by creating a U.S.-India Strategic Tech-Alliance. This recommendation calls for the United States to center its Indo-Pacific relations around India with emerging tech as a key focal point; recognizing the importance of India as the world's largest democracy; the growing geopolitical challenges faced by India; the shared commitment to freedom, democratic principles, and the rule of law; and the many shared interests of the two nations, including strong innovation and technical infrastructures. The Department of State, in coordination with the Departments of Defense and Commerce, must lead the creation of the UISTA, —through high-level dialogues and regular working groups—should build on potential for strong collaborative work in the region for R&D, defense and security purposes, promoting innovation, strengthening talent exchanges and flows, and other aspects of the AI landscape. The Commission intends to provide a deep dive assessment of the potential for this Alliance in the final report.

Recommendation 10: The Department of State should create a Strategic Dialogue for Emerging Technologies with the European Union (EU). This recognizes the critical role of U.S.-EU relations across virtually all areas of emerging technology and international affairs, and calls for a Cabinet and Secretary-level Strategic Dialogue, accompanied by working group-level discussions, to further the relationship between the United States and EU, explore concrete avenues for collaboration, and address geopolitical challenges from a perspective of shared democratic values. The Commission intends to provide a deep dive assessment of the potential for deepening U.S.-EU relations around AI in the final report.

Recommendation 11: The United States Government, led by the Department of State, should engage in high-level and working group meetings with select key partners and allies on concrete, operational AI projects and applications and use the proposed Blueprint for AI Cooperation to assess and identify areas to deepen the relationship. The Commission proposes a Blueprint for AI Cooperation that includes concrete, operational guidance across eight critical areas: defense & security cooperation, standards & norms development, joint R&D, data-sharing ecosystem, innovation environment, human capital, countering information operations, & AI to benefit humanity. In the final report, the Commission intends

to develop the Blueprint based on feedback and use it to assess and provide a roadmap for bilateral AI cooperation with India, the EU, and a number of other allies and partners.

LOE 6: Ethics & Responsible AI

Progress to Date: In the *2019 Interim Report*, the Commission argued that American AI must reflect American values, including the rule of law. The Commission also noted the basic convergence among national security officials and those in the AI development and ethics community on the need for trustworthy AI. The Commission has sought to provide recommendations on how to develop and field AI responsibly. Q1 recommendations focused on responsible AI training, documentation strategies, and the need for assessments of whether agencies are adequately relying on multidisciplinary analysis in AI procurement decisions. In Q2, the Commission issued a Key Considerations "paradigm" that includes 32 recommended practices across the AI lifecycle for the responsible development and fielding of AI.

TAB 5 — Marshal Global AI Cooperation & Ethics

Focus: The Commission recommends that the Departments of Defense and State elevate the Key Considerations paradigm in consultations with NATO, as a blueprint for how the alliance can put into practice overarching principles on the responsible development and fielding of AI.

Objective: To put into practice overarching principles on the responsible development and fielding of AI.

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