

**Senate Armed Services Committee**  
**Advance Policy Questions for the Honorable Heidi Shyu**  
**Nominee to be Under Secretary of Defense for Research and Engineering**

**Duties and Qualifications**

**Section 133a of title 10, U.S. Code, provides that the Under Secretary of Defense for Research and Engineering (USD(R&E)) shall be appointed from civilian life from among persons who have an extensive technology, science, or engineering background and experience with managing complex or advanced technological programs.**

**1. What is your understanding of the duties and functions of the Under Secretary of Defense for Research and Engineering?**

It is my understanding that the USD(R&E) serves as the principal staff assistant and advisor to the Secretary and Deputy Secretary of Defense for all matters regarding the DoD Research and Engineering (R&E) Enterprise, defense R&E, technology development, technology transition, developmental prototyping, experimentation, and developmental testing activities and programs, and unifying defense R&E efforts across the DoD.

The USD(R&E) also serves as the Chief Technology Officer of the Department with the mission of advancing technology and innovation. USD(R&E) also advises the Secretary of Defense on all matters related to research; engineering; manufacturing; developmental test and evaluation; and technology development, innovation, and protection activities and programs in the DoD and occurring internationally.

**2. What background and experience do you possess that qualify you to perform these duties?**

As an industry and government leader in research and engineering, I have developed a broad understanding of the science, technology, innovation ecosystems, platform integration, and flight testing that will be essential to this role. Over the course of my career, I have managed research, technology and engineering programs on a broad range of technologies, including electronic protection, advanced radar systems, electronic warfare systems, unmanned combat vehicles, and major Intelligence, Surveillance & Reconnaissance systems in the defense industry. My previous service in government as the Assistant Secretary of the Army for Acquisition Logistics and Technology gave me a deep understanding of the Department's approach to managing research and technology, since I was the Principal Science Advisor to the Secretary of the Army as well as the Army Acquisition Executive for 12 Program Executive Offices spanning across Aviation, Ground Combat Systems, Combat Support/Combat Service Support, Ammunition, Tactical Command & Control, Computers, Chemical & Biological Defense, Intelligence & Electronic Warfare Systems, Enterprise Information Systems, Missile & Space, Soldier Systems, Simulation, Training & Testing and demil of chemical weapons. My 10 years of experience serving on

the Air Force Scientific Advisory Board (AFSAB) gave me a broad understanding of the key challenges to the Air Force. As a member of the AFSAB, I participated in the annual S&T quality review of the Air Force Research Laboratory and participated and led studies on behalf of the Chief of Staff of the Air Force and the Secretary of the Air Force. Since leaving the Army, I have served on the boards of several small start-up companies and gained insight into struggles of small innovative companies in doing business with the DoD.

## **Relationships**

**Please describe your understanding of the relationships and areas of collaboration between the USD(R&E) and the following officials and organizations:**

### **3. The Under Secretary of Defense for Acquisition and Sustainment**

Although they have important missions independent of one another, USD(R&E) and USD(A&S) are two offices that absolutely must work closely together to ensure that DoD is able to rapidly insert the latest technologies into the next generation of weapons systems. If confirmed, I am committed to working in close collaboration with USD(A&S) to ensure that DoD makes real progress on its modernization priorities.

### **4. The Under Secretary of Defense for Policy**

USD(R&E) supports the policy development process, particularly on matters of missile defense and our research and engineering programs with our allies and partners. Both the President and the Secretary of Defense have made clear working closely with our Allies is a critical element of our national security. They are an absolute force multiplier when it comes to science and technology and if confirmed, I am committed to working closely with my counterparts in Policy to ensure we maintain and expand our science and technology partnerships around the globe.

### **5. The Under Secretary of Defense for Personnel and Readiness**

One of the keys elements of the Department's efforts to modernize and build a culture of innovation is its people. USD(R&E) and USD(P&R) must work closely together to make sure that DoD makes the best use of its hiring flexibilities and is recruiting a workforce that reflects the Nation's diversity. Additionally, USD(R&E) will continue to partner with USD (P&R) in the development and fielding of training capabilities to meet the needs of the warfighter.

### **6. The Director of Operational Test and Evaluation**

If confirmed, I will work with the Director of Operational Test and Evaluation to enhance the effectiveness, suitability, and survivability of DoD systems. I will communicate frequently with the Director to discuss strategic test and evaluation (T&E) policy and review the status of current collaboration efforts that include developing a joint strategic plan, publication of an Office of the

Secretary of Defense (OSD) T&E Oversight List, development of T&E Guidebooks to address common T&E areas supporting the Adaptive Acquisition Framework pathways, and publication of updated joint T&E cybersecurity policy.

## **7. The Directors of the Defense Intelligence Agencies**

The Under Secretary of Defense for Research and Engineering (USD(R&E)) works closely through the Under Secretary of Defense for Intelligence and Security (USD(I&S)) to communicate the intelligence needs of the research and engineering enterprise to the Directors of the Defense Intelligence Agencies, and also to the wider intelligence community, in order to make informed technology development and protection decisions.

## **8. The Director of the Defense Advanced Research Projects Agency (DARPA)**

The Defense Advanced Research Projects Agency falls under the purview of the Under Secretary of Defense for Research and Engineering and receives broad guidance and direction from that office. I am committed to ensuring that DAPRA, one of the crown jewels of the Department of Defense, continues to have the support it needs to conduct the kind of breakthrough research that led to the mRNA-based vaccine for COVID-19. I am committed to help to accelerate DARPA's innovation into the Services.

## **9. The Director of the Defense Innovation Unit (DIU)**

The Defense Innovation Unit (DIU) falls under the purview of the Under Secretary of Defense for Research and Engineering and receives broad guidance and direction from that office. The DIU plays an important role as the gateway through which many of firms on the cutting edge of technology first come into contact with the Department of Defense. I am committed to ensuring that DIU continues to play an important role the Department's innovation ecosystem and bring forth new dual-use technologies and products to the Services

## **10. The Director of the Defense Microelectronics Activity**

The Defense Microelectronics Activity (DMEA) is a small, but critical, organizational element providing reliable microelectronics to the Department of Defense (DoD). The Defense Microelectronics Activity (DMEA) was part of USD(R&E) until January 2021 when DMEA was transferred and placed under the authority, direction and control (ADC) of the USD(A&S). If confirmed, I will work closely with USD(A&S) and the Director of the DMEA to maintain, and sustain our legacy systems, and to seamlessly transfer and integrate microelectronics quantifiable assurance standard developed under the Trusted and Assured Microelectronics program under the USD(R&E).

## **11. The Administrator of the Defense Technical Information Center**

On behalf of USD(R&E), the Defense Technical Information Center (DTIC) administers Science and Technical policy (S&T), captures the results of research into a central base of knowledge, and delivers

that knowledge to the community. DTIC reaches across Service and Agency silos to connect people and activities. On behalf of the USD(R&E), DTIC operates Information Analysis centers which manage research and development contracts that support research and analysis services to DoD and ensures its protection.

## **12. The Director of the Test Resource Management Center**

The Director of the Test Resource Management Center duties are fulfilled by the Director, Defense Research and Engineering for Advanced Capabilities, who is a direct report to the USD(R&E). TRMC is charged with oversight over the Department's testing and range facilities. If confirmed, look forward to providing direction to ensure the TRMC is able to accomplish its departmental roles and responsibilities supporting DoD modernization.

## **13. The Director of the Joint Artificial Intelligence Center**

The JAIC was formed in 2018 to accelerate the fielding and adoption of mature artificial intelligence (AI) technologies, while the Office of USD(R&E) is responsible for advancing and maturing AI technologies for DoD. The JAIC, as well as the Services' software development teams, DIU, and other rapid prototyping offices, are utilizing mature AI technologies to provide new capabilities for the Department as it modernizes its information technologies and weapon systems. USD(R&E) and the broader S&T enterprise are focused on maturing emerging AI technologies by leveraging deep learning and neural networks to unlock more efficient and effective capabilities. If confirmed, I look forward to collaborating with JAIC to help ensure that promising AI technologies are rapidly fielded and adopted.

## **14. The Director of the Defense Digital Service**

The Defense Digital Service's (DDS) mission is to implement breakthrough technologies and methodologies to better government services, strengthen national defense, and care for service members and their families. Through the Principal Director (PD) for Cyber, OUSD(R&E) is assisting DDS with a new operational technology (OT) initiative, which will greatly enhance the resilience of DoD critical infrastructure systems. The PD for Cyber has had longstanding relationships with members of the DoD S&T community who are addressing OT security and resiliency challenges. If confirmed, I will ensure that USD(R&E) continues to collaborate with DDS, in order to advance its mission of implementing breakthrough technologies.

## **15. The Director of the Space Development Agency**

The Space Development Agency currently falls under the purview of the Under Secretary of Defense for Research and Engineering and receives broad guidance and direction from that office. However, as currently planned, the agency will transfer to the Space Force in FY23. Until that transfer takes place, I will work to ensure the agency continues to have the support it needs to execute its mission to enhance space superiority.

## **16. The Director of the Missile Defense Agency**

The Missile Defense Agency (MDA) falls under the purview of the Under Secretary of Defense for Research and Engineering and receives broad guidance and direction from that office. I look forward to working closely with the director of MDA to ensure we maintain a robust multi-layered missile defense system capable of defending the homeland and our forward deployed forces as well as our allies.

## **17. The Service Acquisition Executives**

If confirmed, I would work closely with the Secretaries of the Military Departments and the Service Acquisition Executives. Technology maturation, mission engineering, and systems engineering efforts are areas where it is critical for USD(R&E) and the services to have close relationships to ensure that technology is efficiently transitioned to meet warfighting capability. If confirmed, I will also work with the Service Acquisition Executives through USD(R&E)'s Independent Technical Risk Assessments and Developmental Test Sufficiency Assessments of Service acquisition programs.

## **18. The Service Science and Technology Executives**

The Director of Defense Research and Engineering for Research and Technology (DDRE(R&T)) chairs the Science and Technology (S&T) executive committee (EXCOM) composed of the S&T executives from the Services and Agencies. The S&T EXCOM provides a forum to unify and coordinate DoD S&T strategy, budget, and execution decisions. Through the S&T EXCOM, USD(R&E) oversees, coordinates, and aligns investments to maximize the Department's resources, avoids unnecessary duplication, and creates the future capabilities required by the nation.

## **19. The Joint Requirements Oversight Council**

USD(R&E) serves as the principal advisor to the Secretary and Deputy Secretary of Defense for all matters regarding the DoD research and engineering enterprise, to include technology development and transition, developmental prototyping, experimentation, and developmental testing; while unifying defense R&E efforts across the Department. This includes advising the Joint Requirements Oversight Council (JROC) on matters within the USD(R&E) authority and expertise to provide mission-based analysis to inform requirements, warfighting concepts, capabilities-based assessments, concepts of operation, and other matters related to USD(R&E)'s Mission Integration Management (MIM) responsibilities as outlined in Section 855 of the FY17 NDAA. I understand that USD(R&E)'s support to the JROC focuses on technology issues related to linking joint warfighting concepts to prototyping, experimentation, capability development and fielding, and associated budget priorities. If confirmed, I will work closely with the JROC to synchronize warfighting concepts, technologies, requirements, capabilities, and programs to guide decisions focused on the end-to-end mission.

## **20. The Committee on Foreign Investment in the United States**

The Office of USD(R&E) is responsible for providing expertise in the technical and technology portion of the CFIUS case reviews. Additionally, USD(R&E) subject matter experts review cases associated with the long-term technology modernization priorities and help the Defense Technology Security Agency to determine technology protection strategies which strike a proper balance between allowing U.S. industry to compete overseas while retaining control over technologies which enable U.S. military advantage.

## **21. The Defense Science Board**

The Defense Science Board falls under the purview of the Under Secretary of Defense for Research and Engineering and receives broad guidance. That direction includes providing study topics of interest to the Defense Science Board. It is my understanding that the Secretary is currently conducting a zero based review of the Department's boards. Should the Secretary decide to maintain the board, I look forward to working with its staff to re-constitute its membership and put it to work in support of the Department's innovation efforts.

## **22. The Defense Innovation Board**

The Defense Innovation Board falls under the purview of the Under Secretary of Defense for Research and Engineering and receives broad guidance and direction from that office. That direction includes the review of annual study plans, personnel and culture, technology and capabilities, practices and operations. It is my understanding that the Secretary is currently conducting a zero based review of the Department's boards. Should the Secretary decide to maintain the board, I look forward to working with its staff to re-constitute its membership and put it to work in support of the Department's innovation efforts.

## **23. Federally Funded Research and Development Centers**

USD(R&E) has the responsibility for setting the policy for DoD's ten Federally Funded Research and Development Centers (FFRDCs). In addition, the USD(R&E) is the primary sponsor for the MITRE National Security Engineering Center (NSEC), the Massachusetts Institute of Technology Lincoln Laboratory, and the Carnegie-Mellon University Software Engineering Institute. USD(R&E) collaborates with the entire Department to ensure that the FFRDCs are focused on the Department's priorities while also ensuring that they maintain the requisite core competencies to enable the Department's studies, system engineering, and R&D.

## **24. The Commanding General of Army Combat Capabilities Development Command**

The Commanding General of the Army Combat Capabilities Development Command is responsible for ensuring that the Army's S&T enterprise investments are unified and coordinated to meet Army's

capabilities needed for the future. If confirmed, I will work closely with the Army Combat Capabilities Development Command to collaborate DoD S&T with the Army's S&T.

## **25. The Chief of Naval Research**

The Chief of Naval Research is responsible for ensuring that the Navy's S&T enterprise investments are unified and coordinated to meet Navy's capabilities needed for the future. If confirmed, I will work closely with the Chief of Naval Research to collaborate DoD S&T with the Navy's S&T.

## **26. The Commander of the Air Force Research Laboratory**

The Commander of the Air Force Research Laboratory is responsible for ensuring that the Air Force's S&T enterprise investments are unified and coordinated to meet Air Force's capabilities needed for the future. If confirmed, I will work with the Commander of the Air Force Research Laboratory to collaborate DoD S&T with the Air Force's S&T.

## **27. The Director of the White House Office of Science and Technology Policy**

The USD(R&E) works in close collaboration with the White House Office of Science and Technology Policy to ensure the Department of Defense's science and technology efforts fit within broad administration policy. This includes national priorities like the fielding of 5G technology and ensuring the nation's access to microelectronics.

### **Relations with Congress**

## **28. What actions would you take to create a productive and mutually beneficial relationship between the office of the USD(R&E) and the Congress generally, and this Committee, in particular?**

If confirmed, I am committed to maintaining a close working relationship with Congress in general and this Committee in particular. I will make myself and my staff available to you and your staff when requested. I will also commit to regular briefings and updates on the programs, activities, and initiatives being undertaken by the office of the USD(R&E) and seek out regular interaction with you and your staffs.

### **Office of the Under Secretary of Defense for Research and Engineering**

## **29. What is your vision for the Office of the USD(R&E)?**

The White House's Interim National Security Strategy states that "America must reinvest in retaining our scientific and technological edge" and "seize the opportunities that advances in

technology present.” The Office of the USD(R&E) is DoD’s primary means for achieving these ends.

My vision is to work collaboratively with universities, commercial & defense industry, FFRDCs & UARCS and other DoD organizations, across the Services and our Allies to rapidly deliver innovative technical solutions to solve the toughest problems for National security. I see my role in setting the overarching DoD strategy for technology, address critical warfighting challenges by delivering innovative technology solutions to stay ahead of our threats.

If confirmed, I plan to seek not only to enable scientific breakthroughs but also to leverage these investments to train the next generation of technologists—a cadre of preeminent scientists and engineers who reflect our Nation’s diversity.

**30. If confirmed, what recommendations, if any, would you make regarding changes to the organization, management, and resourcing of the Office of the USD(R&E) so as better to execute its duties and responsibilities?**

The Office of the USD(R&E) was established in 2018; as such, its organization, management, and resources were constructed to meet the then-current objectives in National Defense. If confirmed, I will review the Office’s organization, management, and resources in the context of a new national defense strategy. I will also review these items in the context of the Secretary’s and Deputy Secretary’s priorities, which include developing innovative operational concepts, prototyping and experimenting with new capabilities, and fielding cutting-edge capabilities to the force.

**31. Subordinate elements of the Office of the USD(R&E) are led by Directors—as opposed to the Senate-confirmed Assistant Secretaries of Defense who lead most subordinate elements in other Under Secretary-level offices in DOD? Does the lack of ASDs in the Office of the USD(R&E) affect mission accomplishment, in your view?**

DoD is a hierarchical institutional where rank and position matter, and where directors may not enjoy the same authority and influence as Senate-confirmed Assistant Secretaries. If confirmed, I will review USD(R&E)’s organizational structure, assess impacts mission effectiveness, and communicate recommendations to Congress.

**32. Are there other assets, including staffing and resources that you believe the Office of the Under Secretary of Defense for Research and Engineering requires to optimize mission accomplishment?**



The Office of USD(R&E) sets priorities and policies for DoD's science and technology (S&T) investments and develops roadmaps to guide the development and fielding of critical technologies, including artificial intelligence and biotechnology. Among other responsibilities, the Office also sets priorities and policies for developmental prototyping and engineering and performs independent technical risk assessments for select acquisition programs. These activities, while critical, are focused primarily on implementation. If confirmed, I will review the Office's ability not only to implement the above activities, but also to shape DoD's technical trajectory. Just as DoD employs military strategists, it should look to the Office of the USD(R&E) to serve as the military's technology strategists.

**33. If confirmed, how would you ensure effective collaboration between your office, the Office of the Under Secretary of Defense for Acquisition and Sustainment, and the Services?**

DoD is challenged to divest from legacy platforms and to shift its investments toward modern, innovative systems. To address this challenge, the Offices of USD(R&E) and USD(A&S), as well as the military services, must work collaboratively and leverage each other's strengths and experiences. USD(R&E) offers its technical insight, vision and expertise for the future, as well as its expertise in identifying and mitigating technical risks in programs. USD(A&S) offers innovative contracting, program management experiences and knowledge of the defense industrial base. The military services, in turn, offer program management execution expertise, fielding and weapon system utilization. If confirmed, I look forward to sharing USD(R&E)'s technical expertise with its USD(A&S) and military service partners to rapidly transition critical technologies to meet the Service's needs. I look forward to working closely with USD(A&S) to establish joint town-hall style meetings and joint press conferences as an example of close collaboration.

**If confirmed as USD(R&E), you would be vested with somewhat less statutory directive and decision making authority than previous Under Secretaries for Acquisition, Technology, and Logistics.**

**34. If confirmed, how would you guide the Defense Department's overall approach to research, engineering, and technology—given powers and authorities provided you?**

USD(R&E) has the authority to set policies and supervise research, engineering, technology development, technology transition, developmental prototyping, experimentation, and developmental test. If confirmed, I will: Assess if we are organized in the most efficient way to

accelerate transition of technologies into critical capabilities needed by the Services; increase sharing of technologies across the Service Labs; establish metrics for the DoD labs, FFRDCs and UARCs to assess transition successes; increase outreach to small companies and commercial companies to enable them to easily do business with the DoD; work collaboratively with USD(A&S) and DOT&E to ensure modern testing methodologies are utilized from development testing to operational testing; increase technology sharing and joint testing with our Allies to increase lessons learned; grow our STEM workforce by creating more opportunities for fellowships and internships; maintain balance between basic and applied research.

**35. In your view, should the USD(R&E) be vested with additional statutory powers and authorities? Please explain your answer.**

If confirmed, I will review USD(R&E)'s statutory powers and authorities. If additional authorities are needed, I will brief Congress to seek its approval and any requisite authorities.

**Major Challenges and Priorities**

**36. What are the major challenges that confront the next USD(R&E), in your view?**

The next USD(R&E) will be challenged to advance technologies and leverage the incredible amount of innovation that exists across this Nation and work collaboratively across the commercial and defense industries, universities, FFRDCs & UARCs, and Allied partners to rapidly deliver technical solutions to our warfighters to counter near-Peer threats.

**37. If confirmed, what would you do to address each of these challenges?**

If confirmed, I would focus DoD's research and development investments on the innovative technologies that DoD uniquely needs but that the commercial sector is not developing on its own. At the same time, I would leverage the commercial sector's tremendous investments and accelerate DoD's ability to incorporate innovative commercial technologies.

**38. If confirmed, what broad priorities would you establish in terms of issues that must be addressed by the USD(R&E)?**

Today, sustainment makes up 70% of total weapon system cost, with development and procurement making up 30%. If confirmed, I would strive to change this ratio and invest more in the development of new technologies that can reduce our sustainment cost. If confirmed, I would seek to prioritize investments in emerging technologies of advanced materials that can increase strength, reduce weight, increase reliability, reduce maintenance, increase power density, and fuel efficiency. These advanced materials have the tremendous opportunity to

reduce the logistics footprint and maintenance. Other priorities include advanced manufacturing technologies such as additive manufacturing which can significantly reduce the need for our supply chain storage.

Another critical area that I will focus on is providing mission assurance: technologies that can provide software assurance, supply chain assurance, trust of Artificial Intelligence/Machine Learning, trusted autonomy, and design of robustness and security into our highly networked complex weapon systems.

**39. In your view, what technologies do you consider the highest priorities for development in the DOD, based upon the ability of each to contribute to DOD mission accomplishment in the short- and longer-terms?**

USD(R&E) has identified 11 technology areas as modernization priorities. If confirmed, I will review these technology areas in the context of the forthcoming national defense strategy and assess the completeness of these priorities. After my assessment, I will brief the SASC on a potentially updated list of priorities.

**40. If confirmed, how would you connect your technology strategies and plans with the efforts of other DOD components?**

USD(R&E)'s technology strategies and plans should connect with the efforts of other DoD components through concepts and capabilities. If confirmed, I will ensure that USD(R&E) supports technology-informed concept development, facilitates rapid prototyping and experimentation, and champions innovation technologies to cross the "valley of death" and transition into programs for the Services.

**41. What scientific fields do you consider the most important for shaping and developing the new technologies, concepts, and capabilities that will be most relevant for future warfighting and defense missions?**

USD(R&E) has identified 11 technology areas as modernization priorities. If confirmed, I will review these technology areas in the context of the forthcoming national defense strategy and assess potential gaps. I will gladly brief the SASC on my findings and recommendations.

**42. In your view, are any technology areas that should be added or removed from the current list of DOD's modernization priorities? If so, please explain your rationale.**

If confirmed, I will review DoD's modernization priorities in the context of the forthcoming national defense strategy. I will pay close attention to technology areas where the commercial sector is leading and where DoD could simply implement the commercial technologies instead of developing the Defense-unique capabilities. I will also evaluate critical technology areas not being developed by the commercial industry that the DoD uniquely needs to meet mission capabilities.

### **Chief Technology Officer**

**If confirmed as USD(R&E), you would serve as the Chief Technology Officer (CTO) of the Department of Defense.**

**43. What do you perceive to be the current role of the CTO of the Department of Defense?**

The CTO's current role is to advise the Secretary of Defense on research, engineering, manufacturing, developmental test and evaluation, technology development, innovation, and technology protection activities occurring within DoD, as well as internationally.

**44. Should the role of the CTO be modified in any way to enhance its effectiveness?**

The Deputy Secretary recently chartered an Innovation Steering Group, which is led by USD(R&E) and which reports to the Deputy's Management Action Group (DMAG). This new governance body strengthens USD(R&E)'s ability to advise the Secretary and Deputy Secretary on matters related to science, technology, and technology transition. The Innovation Steering Group has the potential to enhance USD(R&E)'s role as DoD's CTO. If confirmed, I will leverage the Innovation Steering Group to amplify USD(R&E)'s voice as CTO, and will also look for other opportunities to enhance the CTO's effectiveness.

**45. Given the growing role of information technology and software in military capabilities, what do you understand to be the differences in roles, responsibilities, and authorities between the DOD Chief Information Officer and the CTO?**

The CIO advises the Secretary on enterprise information technology whereas the CTO advises the Secretary on a wide range of emerging technologies needed to meet the capabilities that the Services need to stay ahead of our adversaries.

**46. Do you believe the position of USD(R&E) currently possesses adequate authorities to exercise the responsibilities of a CTO? Please explain your answer.**

If confirmed, I will review the authorities needed for the DoD CTO. If additional authorities are needed to increase the effectiveness of the CTO, I will inform the SASC and undertake steps necessary to request the needed authorities.

### **Investment in Science and Technology**

**47. If confirmed, what metrics would you use to assess the suitability of the size and portfolio of investments made under the defense science and technology (S&T) program?**

If confirmed, I will work with the Intelligence Community to understand where threats are heading, and work the Services to understand their vision, mission and capability shortfalls. I will assess the DoD S&T portfolios to see if the research areas are well mapped in addressing the capability shortfalls and stay ahead of the threats. I will establish metrics to assess technology transitions into programs.

**48. In your view, should the Secretary of Defense's Defense Planning Guidance include guidance on minimum funding levels for the science and technology programs of the Military Departments? Please explain your answer.**

Yes. Defense S&T investments represent a down-payment on our Nation's future security. As such, I believe that the Defense Planning Guidance should include guidance on minimum S&T funding levels.

**49. Do you believe that the Defense Planning Guidance should include guidance on minimum investment levels for Military Department research and testing infrastructure? Please explain your answer.**

DoD's infrastructure resources are scarce. If confirmed, I will evaluate options to ensure that DoD makes necessary investments in research and testing infrastructure. These options may include providing guidance on minimum investment levels in the Defense Planning Guidance.

**50. What role should the USD(R&E) play in the detailed development and coordination of Military Department and Defense Agency/Field Activity S&T investment strategies, programs, and budgets, in your view?**

USD(R&E) should continue to lead the Reliance 21 S&T executive committee (EXCOM), which was chartered to coordinate, synchronize, and align Military Department, Defense Agency/Field Activity S&T portfolios. The Reliance 21 EXCOM includes the Service S&T executives and representatives of the Joint Staff and Defense Agencies/Field Activities.

**51. What role should the USD(R&E) play in the development and coordination of Military Department research and test infrastructure investment strategies, programs, and budgets, in your view?**

USD(R&E) should continue to lead the Reliance 21 S&T executive committee (EXCOM), which was chartered to coordinate, synchronize, and align Military Department and Defense Agency/Field Activity S&T portfolios, to include laboratories and test facilities. The Reliance 21 EXCOM includes the Service S&T executives and representatives of the Joint Staff and Defense Agencies/Field Activities., Through the Test Resource Management Center (TRMC) USD(R&E) also ensures the readiness of test and evaluation (T&E) infrastructure and workforce to support DoD modernization. If confirmed, I look forward to supporting the development and coordination of Military Department research and test infrastructure investment strategies, programs, and budgets, through this governance structure.

**52. What S&T areas do you consider underfunded by the DOD?**

If confirmed, I will evaluate DoD's S&T portfolio in the context of the forthcoming national defense strategy and administration priorities to assess areas that may be underfunded.

**53. In your judgment, will the funding levels in these areas affect the Department's ability to meet the threats of the future?**

If confirmed, I will evaluate the funding level across the DoD technology portfolios to enable the Services to rapidly operate in a highly contested environment consistent with the National Defense priorities.

**54. If confirmed, what factors would you consider in assessing whether the Department's S&T investment strategy strikes the appropriate balance between funding innovative, disruptive technologies and addressing near-term operational needs and military requirements?**

High fidelity models and wargaming can provide insight into the effectiveness of innovative disruptive technologies vs near-term systems to meet operational needs. With these results, a

collective informed decision can then be made to balance near-term needs vs the potential of a disruptive capability.

**55. If confirmed, how would you work to ensure that the Department's leadership is aware of the successes resulting from science and technology programs and organizations in supporting defense missions?**

Annual S&T reviews across the Services can provide the statistics on the program transition metrics. Successful transition of a technology into a program will be a key measure.

**Basic Research**

**56. Given the continuing nature of basic research and the broad implications and applications of discovery-focused and innovation-focused sciences, what criteria would you use to measure the success of DOD basic research programs and investments, if confirmed?**

Basic research is the early and an essential part of DoD's entire research ecosystem. Traditional metrics involving schedules and planned milestones do not apply, given basic research's high-risk and exploratory nature. The success of basic research can only be measured long term when basic research progresses into advanced research and into a prototype then into a program.

**57. What concerns do you have, if any, about current levels of funding for Department of Defense basic research? How would you plan to address those concerns, if confirmed?**

The Council on Competitiveness, the National Academies of Science, and other experts recommend the percentage allocated to basic research be at least 20% of the total S&T budget. In the FY21 Congressional appropriation, the proportion allocated for basic research is below 16%, and has been steadily decreasing for the over the past 5 years. If confirmed, I will work with the Secretary and Deputy Secretary to evaluate options for and assess the implications of various basic research funding levels. If deemed appropriate, I will undertake steps necessary to request the resource levels needed to make basic research investments using the recommended share of its total budget.

**58. If confirmed, what steps, if any, would you take to increase efforts in unfettered exploration, which has historically been a critical enabler of the most important breakthroughs in military capabilities?**

The DoD plays an essential role in supporting unfettered scientific exploration. As the Nation faces problems of unprecedented complexity and scale, DoD must continue to play this essential role. As I understand it, the Vannevar Bush Faculty Fellowship (VBFF) program exemplifies the type of DoD-sponsored, far-reaching, exploratory research with transformative potential that is highly prized by the academic community. The Multi-University Research Initiative (MURI) is another example for multi-disciplinary research. I believe that DoD should sustain basic research activities not only with the appropriate level of funding, but also with policies, guidelines, and oversight that promote the conduct of basic research, and embedding it into the entire S&T ecosystem at DoD. If confirmed, I will support the DoD S&T ecosystem's ability to pursue such unfettered exploration and revolutionary breakthroughs, unconstrained by near-term objectives.

**59. If confirmed, how would you ensure that DOD's basic and applied research programs are executed in a manner consistent with National Security Decision Directive 189?**

As I understand it, the Department has been well-served by the open research environment in fundamental research established by National Security Decision Directive – 189 (NSDD-189). The implementation of NSDD-189 at the Department has been made through previous USD(R&E) Memoranda and broadly defines fundamental research at the Department as basic and applied research performed at universities, or basic research performed at defense labs and in industry. If confirmed, I would continue to promote the execution of fundamental research free from restrictions on publications or participation by individuals such as foreign nationals.

**60. What efforts would you make, if confirmed, to enable the Department to benefit from open innovation in fundamental research, while protecting such research from undue foreign interference?**

Fundamental research generally involves areas of research that are speculative in nature and without a single, well-defined application in mind. As such, fundamental research benefits from open collaboration and the perspectives of exceptional researchers, regardless of their country of origin or citizenship. There is a long history of foreign-born scientists and engineers training and working in the United States, and they make essential contributions to our preeminence in science, engineering and technology today. Maintaining U.S.'s lead will require us to continue to attract and retain the best scientific talent globally. DoD should promote openness and transparency in fundamental research and promote collaboration to continue to develop the best ideas. The application of research for specific military uses should be protected from undue foreign interferences. If confirmed, I will work with the interagency, academia, and Congress to balance the openness and security of fundamental research that has military applications and to ensure that top research talent continues to view the U.S. as the research destination of choice.



**61. If confirmed, what are your ideas for working with the academic community to limit undue foreign influence on university research programs, and limit unwanted foreign access to research expertise and results, without creating a chilling effect on the open and collaborative nature of the research community?**

I believe that the academic community and DoD should work collaboratively to solve the problem of undue foreign influence on university research programs. If confirmed, I will work with the National Academy of Sciences and with other interested agencies to implement consistent policies and procedures that U.S. government agencies, as well as the academic community, can implement in order to target specific behaviors which are counter to open and transparent international norms for research and intellectual property development.

**62. In your view, what steps could the USD(R&E) put in place to ensure that regulations pertaining to Department-funded university research are consistently applied by DOD and well understood by the university community?**

I understand universities have communicated to DoD that inconsistencies in fundamental research designations and the application of fundamental research policy have resulted in research delays. In an era of increasing international competition for scientific breakthroughs, DoD cannot afford these delays. If confirmed, I would work with Department stakeholders, the DoD Components, the National Academy of Sciences and the academic community to review and, if necessary, to update DoD's fundamental research policy. Important considerations may include keeping basic and applied research open at universities, providing clear guidelines for research conducted under grants, cooperative agreements, contracts, and ensuring that policy is consistent across the Department.

**63. If confirmed, what steps would you take to protect U.S. research and intellectual property from undue foreign influence, without unjustly singling out researchers from certain nations?**

For early-stage basic research, the innovative ideas and approaches are most readily available from academia. To protect this research, DoD should promote transparency through disclosures of actual or potential conflicts of interest and commitment. DoD should encourage universities to promote education and training in scientific ethics to include research integrity, conflicts of interest and commitment. Early-stage researchers who fulfill these requirements accurately and completely should be welcomed in the defense research enterprise. Once applications for basic research are identified or work becomes more sensitive, DoD should transfer research to cleared facilities or DoD labs where appropriate controls can be maintained. If confirmed, I will work to promote research security by providing tight protections around DoD's most sensitive work. I will also promote openness and transparency in basic research to ensure that DoD has access to breakthrough science, regardless of national origin.

## **Expanding the DOD Academic Research Base**

### **64. If confirmed, what steps would you take to increase DOD research engagement with Historically Black Colleges and Universities and other Minority-serving Institutions?**

If confirmed, I will commit to strengthening DoD's engagements with Historically Black Colleges and Universities and Minority-Serving Institutions (HBCUs/MIs). HBCUs/MIs are vital to DoD modernization priorities and are an important source of diverse science, technology, engineering, and mathematics (STEM) talent. I will continue to support investments in HBCUs/MIs through funding opportunities for research and equipment grants as well as through cooperative agreements to establish additional centers of excellence in defense priority areas. In addition, I will support programs that bring HBCU/MI students and faculty into DoD research facilities to engage in research efforts alongside DoD staff. These may include summer internships for students and faculty fellowships, including sabbaticals, to facilitate relationships, exposure to state-of-the-art equipment and instrumentation, and the opportunity for both students and faculty to work with DoD scientists. I will seek opportunities to expand these and other initiatives and strengthen DoD's outreach efforts to HBCUs/MIs.

### **65. If confirmed, what steps would you take increase DOD engagement with universities participating in the Defense Established Program to Stimulate Competitive Research?**

If confirmed, I will ensure that the Department continues to increase engagement with universities in the Defense Established Program to Stimulate Competitive Research (DEPSCoR). DoD should also continue participating in the EPSCoR Interagency Coordinating Committee, which serves as a working group for interagency coordination and communication and meets on a regular basis to coordinate federal EPSCoR and EPSCoR-like programs. DoD should also continue participating in conversations with the EPSCoR Foundation to receive feedback from the EPSCoR community and to provide funding opportunity announcements.

### **66. If confirmed, what steps would you take to increase the funding for and quality of fundamental research at defense laboratories?**

Our defense laboratories are a key component of the department's research and engineering ecosystem and it is critical that they remain at the cutting edge of research. If confirmed, I will commit to reviewing the ongoing work of the labs to ensure they remain at the fore front of the science and technology in regard to the research that we are doing in the Department.

### **67. If confirmed, what would you do to expand DOD's academic research base to include more researchers from the social sciences, medical sciences, management and business schools, and other disciplines relevant to defense missions?**

Defense missions are increasingly impacted by the social and medical sciences, as well as by management and business disciplines. Cyber, AI, bio-threats, autonomous vehicles, climate and environmental change, acquisition programs, etc.—are all complex interdisciplinary problems that need to be informed by social, medical information, management, and business disciplines. If confirmed, I will expand the research base by increasing inter-disciplinary research areas to enhance DoD’s ability to solve complex problems.

### **Science and Technology Activities of Civilian Agencies**

**68. Do you believe that Department of Defense and other national security missions benefit from robust funding for scientific research in civilian agencies? Please explain your answer?**

I believe that DoD and other national security missions do benefit significantly from our Federal partners' funding for scientific research. Federal basic scientific research, in areas such as quantum science and biotechnology for example, provides fundamental discoveries and insights that stimulate novel concepts and ideas for the Department to conduct applied research and technology development towards future military capabilities. Federal applied scientific research advances National capabilities, such as weather forecasting, vaccine development, or earth system monitoring and prediction technologies, that the Department can build on or directly leverage to address its specific needs for the Joint Force, our Service Members, and their dependents.

**69. How do the following civilian science agency activities support Department of Defense missions?**

- **A. National Science Foundation basic science funding**
- **B. National Aeronautics and Space Administration (NASA) research hypersonics and other space research and NASA testing facilities**
- **C. National Institutes of Health medical research and vaccine development activities**
- **D. National Institute of Standards and Technology cybersecurity, quantum science, and manufacturing research programs**

I understand that DoD collaborates with NSF, NASA, NIH and NIST in various research areas and that these civilian agencies provide important support for DoD missions. For example:

- NSF funds basic research in critical technology areas such as artificial intelligence and quantum science. NSF also coordinates basic research policies and grant management procedures.

- NASA supports DoD missions through a series of partnerships and joint projects, particularly in materials and advanced manufacturing; position, navigation, and timing (PNT); propulsion; communication; space intelligence, surveillance, and reconnaissance (ISR); space situational awareness; and space resilience.
- DoD closely partners with NIH and leverages its medical research and vaccine development activities to advance DoD military medical capabilities, particularly by building upon and advancing the foundational health and medical discoveries that arise from NIH investments. The Department's core medical research and development activities are focused on advancing military health system and operational medical capabilities in medical simulation and information systems, military infectious diseases, military operational medicine, combat casualty care, and medical countermeasures against chemical, biological, radiological, and nuclear threats. Where NIH has investments in these focus areas, DoD program managers communicate with their NIH colleagues to identify promising advances and breakthroughs that could be incorporated into future DoD investments from applied research and advanced technology development through system development and demonstration.
- The NIST research activities in the areas of quantum sensing based timing (i.e, the next generation atomic clocks) are very well coordinated and collaborative with the DoD's efforts in this area. For example, the Joint Quantum Institute at the University of Maryland, was established collaboratively by NIST and Army Research Lab to not only perform scientific research in this area, but also establish a local STEM talent pipeline for both organizations. Furthermore, the value of NIST Cybersecurity S&T to the DoD cannot be overstated. Through the establishment of standards and authoring of special publications, NIST baselines cybersecurity for the entirety of the federal government. Several of the DoD's core cybersecurity constructs tie back directly to NIST.

**70. If confirmed, how would you work with other federal agencies and the Office of Science and Technology Policy to improve coordination of research activities and harmonization of research funding decisions?**

In today's trans-disciplinary research and engineering landscape, interagency partnerships are critical to innovation. The White House Office of Science and Technology Policy's National Science and Technology Council provides a robust and highly effective framework for identifying, developing, and shaping shared federal research priorities and objectives and for fostering interagency partnerships on the full range of S&T topics that are relevant DoD. If confirmed, I will ensure the Department and its deep bench of technical subject matter experts maintain an active role in the NSTC and its subordinate entities, as well as other OSTP initiatives to foster innovation and collaboration in federal research and development. Additionally, the Department and the Military Services routinely engage federal agencies in bilateral and multilateral partnerships on research and development for shared mission objectives. If confirmed, I will engage with my interagency counterparts as well as with my colleagues within the Department to sustain existing areas of cooperation and to identify and advocate for new or expanded partnerships.

## **Technology Strategy**

### **71. What weaknesses, if any, do you perceive in the current Defense S&T strategic planning process?**

An effective S&T strategy should balance longer-term investments in basic research and scientific discovery with nearer-term opportunities to transition technology and modernize existing systems. A S&T strategy should also enable flexibility and the ability rapidly shift and adapt as new priorities, as well as new knowledge, emerges. If confirmed, I will evaluate DoD's current S&T strategic planning process focusing on improving the balance between near- and long-term technology investments.

### **72. What do you believe to be the key attributes of a good technology strategic plan and how could these attributes be carried through effectively to the DOD programming and budgeting purposes?**

A good technology strategic plan should have a clear vision of the future, well-defined long-term goals and near-term objectives, defined key performance indicators with which to measure progress over time, and milestones to assess technology progress and options. If confirmed, I will ensure that USD(R&E) leverages these attributes to translate its technologic strategic plans into programs and budgets.

### **73. If confirmed, how would you ensure reliance on technology strategic plans as foundational elements of the budget, planning, and programming process?**

USD(R&E) currently has principal directors for each of its 11 modernization priorities, who are responsible for ensuring that science, technology, engineering, prototyping, and demonstration investments are effectively leveraged and fully aligned with DoD's priorities. If confirmed, I will assess if the modernization priorities are well aligned with the new Defense strategy or if modifications are needed. I will ensure that principal directors, as well as other staff within USD(R&E), collaborate closely with OSD CAPE, Comptroller, and military services to ensure that technology strategic plans are foundational elements of the budget, planning, and programming process.

## **Technology Transition**

### **74. How would you assess the effectiveness of current transition processes and systems?**

The Advanced Capabilities directorate within USD(R&E), which oversees prototyping and experimentation activities, transitions ~80% of its prototypes to the military services or the warfighter. While this is an impressive metric, I believe that we can and should do more to increase not only the rate of transition, but also the volume of capabilities transitioned. If

confirmed, I will support efforts to enable more technologies to bridge the “valley of death” by expanding prototyping and joint experimentation initiatives.

**75. In your view, what challenges exist in technology transition in DOD?**

A number of things can cause technology to not transition: innovative technologies may not be mature enough for program managers to take the risk in incorporating them into a program of record. The technology may be demonstrated in a laboratory environment but not in a relevant operational environment. Or, the technology may be mature but there doesn't fulfill a requirement identified by a Service. This is where the “valley of death” usually occurs.

**76. What would you do, if confirmed, to address each of these challenges?**

Funding to further mature and demonstrate a promising technology in a relevant environment should be made available to bridge the valley of death. If confirmed, I will seek out promising technologies and increase prototyping and experimentation to reduce technical risks in order to improve technology transition into programs

**77. As compared to other technologies, do you believe that a different methodology is needed to transition software capabilities from research to operational use?**

Yes. Modern software development uses DevSecOps methodology. Namely, continuous development and continuous testing. This is contrary to legacy software practices which follow a very linear process of development then testing. In order to rapidly transition the latest software, we need to have an open architecture that isolates the software from the hardware then allows rapid user testing.

**78. What is your understanding of the role of the USD(R&E) in facilitating communication between technical communities, acquisition personnel, and end users to support or speed technology transition?**

USD(R&E) should play a critical role in bridging the technical communities to the acquisition community and the end users. The technical community informs the acquisition community and the end users the art-of-possible based on the emerging technologies. USD(R&E) should also inform them on the maturity of the technology and the associated risks. Lastly, USD(R&E) should also inform the acquisition community & the end users on trade space opportunities, and experiments needed to mature the technology.

**79. What are your views as to whether DOD’s approach to and processes for funding technology transition must be changed? What sort of changes, if any, would you recommend, if confirmed?**

DoD has several authorities that help accelerate technology transition, including “year of execution” prototyping programs and Other Transaction Authorities for more agile contracting. If confirmed, I will assess these authorities, as well as related policies and programs, to identify opportunities to increase technology transition. For example, one opportunity might be to create a flexible, robust, and non-specific 6.4 funding line that could be used to as a bridge to help mature technologies so that they can transition to a programs of record.

**Commercial Technologies**

**80. What steps would you take to make appropriate use of commercial technologies for the benefit of DOD institutions and the warfighter?**

The DoD should leverage the commercial sector’s tremendous amount of investments in research and development and accelerate DoD’s ability to incorporate innovative commercial technologies. If confirmed, I will promote and enhance communication and collaboration between DoD and commercial industry

**81. If confirmed, what steps would you take to transition appropriate commercial technologies to acquisition programs or capabilities that are fielded at scale with one or more Military Services?**

The commercial sector is a proven source of remarkable rapid innovation. If confirmed, I will strengthen the dialog with innovative companies in the private sector and eek to understand impediments that they have to work with the DoD, then work to remove these impediments.

**82. What do you believe to be the most significant barriers to Program Executive Offices or prime contractor adoption and transition of new technologies, including but not limited to commercial technologies, into acquisition programs? What should be done to address such barriers, in your view?**

I believe the biggest barrier to PEOs and prime contractors in adopting new technologies is the perceived risk associated with something new. PEOs and typical defense contractors are risk-adverse since they do not want to be delayed on a program or increase the cost of the program due to unforeseen technical risks. Often, careers depend on how well they execute on cost, schedule and performance of a program that they manage.

**83. What steps does the Department need to take to ensure that sustainment and life cycle costs for commercial technologies are understood and controlled as early in the decision cycle as is feasible?**

USD(R&E) has important responsibilities to ensure that sustainment and life cycle costs for commercial technologies are understood and controlled as early in the decision cycle as feasible. Technologies have a natural life cycle and becomes obsolete at the end of their life cycle. The Department needs to understand this natural life cycle of every technology and incorporate this information into the program plan and plan for upgrades to avoid obsolescence in sustainment.

**84. What are the downsides, if any, to the use of commercial technologies and services by the Department of Defense?**

Commercial technologies will become obsolete much faster than the typical defense system life cycle. As a result, the DoD must incorporate a modular open system that isolates the hardware from the software to enable rapid insertion of the latest technology to avoid obsolescence.

Commercial components are not tested at the same level as MILSTD components. This could potentially create failures when operating at extreme conditions.

**85. In your view, would there be benefit to the Department's establishment of a comparative testing program for domestic commercial technologies—perhaps a program modeled on the successful Foreign Comparative Testing program?**

While there are a number of programs within the Department that search for innovative domestic technologies and when appropriate, seek to develop them further, none of these programs is explicitly designed to fund or conduct comparative testing activities. I believe it would be beneficial to have an equivalent testing program for domestic commercial technologies, assuming it is funded sufficiently to attract hundreds or thousands of U.S. commercial innovations and at the same time to effectively evaluate them. Modeling such a program on the existing Foreign Comparative Test (FCT) process would be a natural choice, since the FCT program has been a tremendous success story, benefiting both the DoD and the U.S. industrial base for 40 years since its inception.

**Systems Engineering and Prototyping**

**86. Does the Department of Defense have sufficient systems engineering expertise in its current workforce and contractor base?**



It typically takes a decade to train a system engineer, so experienced system engineers are both essential and hard to obtain. In my experience, the lack of quality experienced system engineers can result in poor architecture, poor program planning and it does result in poor program execution. The DoD does not have sufficient in-house systems engineering expertise and relies upon contractors, including FFRDCs, as a supplement.

**87. What do you predict would be the impact of further reductions in DOD personnel allocations to the ability of the USD(R&E) to execute assigned systems engineering missions?**

I understand that USD(R&E) is experiencing a shortage of expertise in certain key areas (e.g., systems engineering, software development) and that additional cuts to its existing engineering workforce could have a negative impact on USD(R&E)'s mission. If confirmed, I will assess the USD(R&E) workforce and its alignment to mission, and will identify opportunities to address any shortfalls USD(R&E)'s technical workforce.

**88. What changes, if any, do you believe should be made in the Department's systems engineering organizations and practices?**

I recognize the need to modernize systems engineering processes to leverage digital engineering and model-based systems engineering, as well as to facilitate rapid and iterative "design-test-fix" cycles. I also recognize that while DoD needs to be more flexible in its approach in systems engineering, it is also critical to retain fundamental engineering rigor. If confirmed, I will identify opportunities to balance between engineering rigor and flexibility and to modernize DoD's approach to systems engineering.

**89. What role does prototyping play in efforts to increase the success of the Department's acquisition efforts?**

Prototyping and experimentation help drive down technical and integration risk, validate designs, obtain warfighter feedback, and inform requirements definition. Prototyping and experimentation can also help DoD explore emerging technologies early, in order to assess military utility. Prototyping and experiments allow DoD to "fail fast" before large investments are made. Ultimately, these activities help harness innovation, accelerate acquisition, and deliver capability more quickly.

**90. If confirmed, how would you work to increase the breadth and scope of systems engineering projects and prototyping efforts undertaken by the Department and its contractor base?**

Performing systems engineering up front reduces the risk of programs failing to meet its performance objectives. If confirmed, I will seek solid systems engineering analysis and trade-space be performed prior to a program start. Prototyping critical technologies early on reduces program risk in engineering design and manufacturing. I will assess and encourage prototyping activities to reduce program risks.

## **Venture Capital**

### **91. In your view, what role should venture capital firms play in the Department's investments in developing technologies, including in the Small Business Innovation Research program?**

Venture capital must remain free to pursue leads and interest as the market dictates, not to address DoD prerogatives. That said, venture capital firms motivate early-stage companies to continue innovating and by provide them with resources to grow their products and services and this, when coincident with DoD interests, has the indirect benefit, from a DoD angle, of helping to develop and sustain a healthy industrial base. DoD can even signal areas of interest that might spur the coincidence of interest. Venture capital can help the Department accelerate product development and efficiently deliver breakthrough, war-winning capabilities.

### **92. What advantages and disadvantages do you see in the use of venture capital strategies?**

#### **Advantages:**

- Venture capital strategies provide start-ups with resources, access to connections and valuable business networks, and guidance as the companies' grow.
- The use of venture capital can help the Department accelerate product development and efficiently deliver breakthrough, war-winning capabilities.
- Venture capital protects small and new companies from predatory investments by reducing industry's need to accept foreign investment when they need capital to continue growing.

#### **Disadvantages:**

- Venture capitalists may need strong demand signals from the government in order to accept the investment risk.
- There is a potential to lose some company autonomy, since investors may want to participate in company decision processes or to control some aspects of company business.

**93. Should the Department decide to use venture capital strategies, what steps do you believe should be taken to ensure that Department funds are invested in technologies and companies that properly reflect national defense priorities, avoid the potential for conflicts of interest by industry partners, and to ensure that the Department's investments are not diluted?**

The Department can play a liaison role in bridging venture capital firms to promising small businesses.

**94. What other strategies do you intend to employ, if confirmed, to ensure that the nation's most innovative companies work on the Department's research and engineering programs?**

If confirmed, I will work with the services and Small Business Innovation Research (SBIR) program to identify the most innovative companies and engage with them to understand their challenges in working with the DoD. I will work with the Services to resolve the impediments to their problems and garner support to help them to transition their technologies to the Services.

#### **Beneficial Ownership Concerns**

**95. What concerns do you have regarding foreign beneficial ownership of DOD contractors and subcontractors, especially those with venture capital funding?**

If confirmed, I will work with DCSA to ensure that companies with foreign ownership have a proper Special Security Agreement (SSA) structure in place to prevent sensitive information be released to foreign owners.

**96. If confirmed, what steps would you take to ensure continuous monitoring and assessment of the beneficial ownership of DOD contractors and subcontractors?**

If confirmed, I will work closely with USD(A&S) to ensure appropriate reporting of DoD contractor ownership, in accordance with Section 223 of FY21 NDAA, "Disclosure of Funding Sources in Applications for Federal Research and Development Awards."

#### **Operational Energy and Energy Resilience**

**The Department defines operational energy as the energy required for training, moving, and sustaining military forces and weapons platforms for military operations, including the energy used by tactical power systems, generators, and weapons platforms. Today, DOD**

**energy requirements are projected to increase exponentially due to technological advances in weapons systems and distributed operations over longer operating distances.**

**97. If confirmed, how would you lead the Department in harnessing innovations in operational energy in order to reduce contested logistics vulnerabilities for warfighters?**

If confirmed, I will work closely with the USD(A&S), the Joint Staff, Services, Combatant Commands, the S&T community, and industry to identify opportunities to reduce the military's logistics footprint by developing advanced materials to dramatically reduce size and weight and increase fuel efficiency. I will also explore resilient, secure, and cost effective energy solutions, to include sustainable and renewable sources, that can reduce DoD's reliance on legacy energy sources while still meeting the warfighters needs.

**98. In what specific domains, if any, do you believe the Department needs to improve the incorporation of energy considerations and alternative energy resources?**

I believe that the Department should incorporate energy considerations and alternative energy sources in the formal weapon system requirements process. If confirmed, I will work with the Joint Staff and USD(A&S) to ensure that requirements address the energy efficiency of weapon system platforms, especially throughout their life cycle.

**99. How can the Department's acquisition systems better address requirements related to the use of energy in military platforms to decrease risks to warfighters?**

Through the requirements process, the Department can specify requirements for both the energy efficiency and operational risk of military platforms. Performing tradeoffs through rigorous systems engineering early in the acquisition life cycle, the Department can determine the optimal means for meeting requirements for both operational energy and decreasing risk to our warfighters.

**100. In your view, what steps should be taken to render "energy supportability that reduces contested logistics vulnerabilities" a key performance parameter in the requirements process, as compared to the "check the box" consideration it is today?**

If confirmed, I will work closely with the Joint Staff and across the logistics enterprise to assess the contested logistics vulnerabilities and develop technical solutions to reduce the risks.

**Readiness and Resource Impacts from Extreme Weather**

**Over the last few years, damage from extreme weather events have resulted in billions worth of damage to DOD installations, ranging from three hurricanes in 2017 with over \$1.3 billion in damage to 2018 with roughly \$9 billion in damage at Tyndall Air Force Base, Camp Lejeune, and Offutt Air Force Base.**

**101. Based on these readiness and resource impacts, do you believe it necessary to use more resilient designs in DOD infrastructure? If so, and if confirmed, how would you recommend that DOD better incorporate extreme weather resilience into engineering and designs?**

Yes. If confirmed, I will work with USD(A&S), who is the lead for DoD installations, to identify areas in which USD(R&E) can support the engineering and design of more robust DoD infrastructure.

**102. How can the Department better use existing authorities on extreme weather mitigation granted by Congress in recent NDAA's?**

I understand that Congress, through recent NDAA's, has been supportive of DoD's climate resilience efforts. For example, NDAA requirements incorporate climate considerations into building codes and mandate installation resilience planning. If confirmed, I will ensure that DoD continues to invest in innovative research and engineering to develop new tools and capabilities which can enhance DoD's efforts to leverage these new authorities.

### **International Research Cooperation**

**103. In your view, how should increased globalization of defense technology affect the Department of Defense's research and technology development and investment strategy?**

DoD needs to strike a careful balance across the goals of promoting US innovation base health, strengthening alliances, and controlling the spread of cutting-edge technology for military superiority. For critical technologies and programs, for example, DoD can apply appropriate protections that prevent technologies from falling into the wrong hands. DoD can also establish procedures to reinforce the integrity of our research enterprise. DoD can engage with the broader S&T community and its stakeholders to provide improved threat awareness, inform necessary controls, and develop best practices that can be institutionalized across the DoD S&T enterprise. DoD can also support the free exchange of ideas that is critical to U.S. research institutions and can support those institutions by expanding opportunities for international S&T partnerships. If confirmed, I will take these and other steps in order to development and investment strategy that strikes the proper balance between promoting and protecting critical technologies.

**104. What do you perceive to be the most significant obstacles to effective international research and development cooperation, and, if confirmed, how would you address those obstacles?**

Currently, I am not aware of any substantive issues facing USD(R&E)'s ability to pursue international partnerships in S&T and I understand that USD(R&E) recently released a "DoD International S&T Engagement Strategy." If confirmed, I will review this strategy, assess obstacles that may impede its implementation, and work to expand international collaboration in S&T.

**105. How would increased international technology cooperation and procurement of foreign goods and services affect our domestic defense industrial base, in your opinion?**

DoD's international partners have similar defense and security objectives and are investing their own R&D dollars to increase their capabilities. By increasing technology cooperation, DoD can pool its investments and leverage expertise and ideas that increase the U.S.'s industrial base capabilities. Additionally, international partners garner a greater understanding and appreciation of U.S. industry through participation in international armaments cooperation programs. If confirmed, I would continue the close collaboration between USD(R&E) and USD(A&S) on these and other international efforts.

**106. What best practices should govern Departmental monitoring and assessment of the research capabilities of our global partners and competitors, and of the global commercial sector?**

DoD could conduct a data-driven assessment of global research capabilities by leveraging the enormous amount of open-source data, engaging with international and private sector partners, and working with the intelligence community to identify promising research trends and developments.

**Test and Evaluation**

**107. What are your views on the adequacy and effectiveness of the Department of Defense's development and operational test and evaluation activities?**

Thorough testing of a system in an operationally realistic environment is critical for informing acquisition decision making, identifying programmatic opportunities to apply additional engineering and risk mitigation resources, and ensuring operational readiness. I believe that DoD still has work to do to align its test activities with the new Adaptive Acquisition Framework and to ensure that test and evaluation processes are properly structured to assess software-intensive systems, new capabilities such as artificial

intelligence-enabled autonomous systems, and to leverage new systems engineering approaches such as digital engineering.

**108. What modifications would you recommend to the test and evaluation processes in the Department to more efficiently and quickly develop and deliver operationally effective and suitable technologies to the warfighter?**

I believe that the test community should be engaged earlier and continuously in programs as it undergoes design and development. If confirmed, I will work closely with USD(A&S) and DOT&E to adopt more modern testing methodologies. .

**109. What role do you believe OSD should play in developmental test and what type of organizational structure and staffing is required to effectuate this role?**

I believe that DoD needs to execute enough testing to ensure that warfighters are equipped with affordable, effective, suitable, and survivable systems. Such testing must be commensurate with the urgency of deploying a capability. I also believe that test and evaluation should be thought of as a continuum – breaking down the stovepipes that have traditionally constituted contractor testing, developmental testing, and operational testing. Early successful mission-based evaluation will be a critical enabler to assessing operational effectiveness earlier in the testing lifecycle and will provide more confidence that operational testing has completed successfully. If confirmed, I will review and implement an appropriate organizational structure to ensure that developmental test and evaluation is properly staffed and resourced and has the necessary authorities to achieve these and other objectives.

**The Department continues to streamline its acquisition processes to increase the speed of policy and oversight decision-making and to enhance organizational alignment, yet three test organizations remain separate within OSD. Industry generally maintains only a single organization for all of its test & evaluation—a model of agility for the assessment of weapon systems.**

**110. What are your views on the proposal to realign OSD Developmental Test and DOT&E organizations, together with the Test Resource Management Center, under the auspices of a single leader? Please explain your answer.**

If confirmed, I will review previous proposals to improve test and evaluation, including organizational restructuring, and will advance strategies that accelerate delivering high-quality, suitably-tested, technologically-superior capabilities to our warfighters.

**Small Business Issues**

**111. If confirmed, how would you work to ensure that the Small Business Innovation Research (SBIR) program is an integral part of DOD modernization strategies and activities?**

If confirmed, I would continue to leverage the nearly \$2B annual investment in America's innovative small businesses via the SBIR/STTR programs to help achieve DoD's modernization goals. Through the DoD SBIR/STTR program, small businesses are already contributing to important areas of modernization. If confirmed, I would seek to understand the impediments to transitioning from Phase 1 to Phase 2 and the difficulties in making Phases 2 contract awards by engaging with small companies and then working with the Services address the situation.

**112. If confirmed, how might you modify the SBIR program to improve the transition of S&T capabilities into acquisition programs?**

I understand that the DoD SBIR/STTR program is piloting the OSD Transition SBIR/STTR Technology (OTST) Program to incentivize SBIR/STTR technology transition into programs of record. I also understand that efforts may be underway to modify SBIR/STTR authorities to allow additional Phase II awards and to provide DoD more flexibility in funding levels. These steps could enable further maturation of technologies so they can be inserted and integrated into a program of record or fielded systems. If confirmed, I will review these and other initiatives and promote opportunities to leverage the innovation inherent in small businesses.

**113. If confirmed, how might you modify the SBIR program to improve its ability to attract non-traditional defense contractors, such as small startup companies, as participants?**

Non-traditional defense contractors may require more assistance understanding proposal submission requirements, completing pre-contracting activities, enhancing cybersecurity, and understanding foreign disclosure requirements. If confirmed, I would increase opportunities to educate non-traditional contractors and provide assistance to them to do business with DoD.

**114. If confirmed, what steps would you take to improve DOD's consideration of intellectual property rights as an incentive for small business to engage with the Department?**

Retention of intellectual property (IP) rights is an important consideration for small businesses when engaging with DoD. If confirmed, I would explore steps to improve DoD's treatment of IP rights.

**115. What emphasis would you place, if confirmed, on participation by the acquisition community in setting research priorities for the SBIR program and**



**in incorporating new technologies and methods into existing programs of record?**

If confirmed, I would explore opportunities to help SBIR/STTR technologies bridge the “valley of death” into existing programs. An example of prior transition successes: the prime contractor worked closely with the SBIR program offices and established an Industry Day with small companies. The prime contractor then stated the technical challenges that they have and requested ideas from small companies. The prime then worked closely with the small companies on creating the SBIR phase 1 contract and then the phase 2 contract. Subsequently, the technology was successfully transitioned into a program of record.

**Defense Laboratories**

**116. What is your overall assessment of the technical capabilities and quality of Defense laboratories relative to their peers at the Department of Energy, and in Federally Funded Research and Development Centers (FFRDCs), industry, and academia—both foreign and domestic?**

If confirmed, I will perform an assessment of the technical capabilities and quality of the Defense laboratories.

**117. What do you believe to be the most effective management and human resources approaches for personnel at these Defense laboratory facilities?**

If confirmed, I will take a look at the effectiveness of the human resources approaches for personnel at the Defense laboratory facilities.

**118. If confirmed, would you support increased delegation of operating authority to lab directors? Please explain your answer.**

If confirmed, I would support increased delegation of operating authority. I believe that delegation of authority to the lab directors has been an effective management tool for increasing lab director flexibility, creativity, and effectiveness. Furthermore, I would encourage the lab directors to further delegate their authorities to increase flexibility and creativity.

**119. If confirmed, what specific steps, if any, would you take to improve the quality, technical capabilities, and mission performance of the Defense laboratories?**

If confirmed, I will perform an assessment of the quality, technical capabilities and mission performance of the Defense laboratories.

### **Workforce Issues**

**120. What is your perception of the particular workforce challenges confronting the USD(R&E)?**

Created in February 2018, USD(R&E) is still a relatively new organization that is working to establish roles and responsibilities, define processes, and chart its course. Complicating matters, USD(R&E) has been without confirmed leadership since July 2020. If confirmed, I am committed to providing the leadership, vision, and consistency that USD(R&E)'s workforce deserves.

**121. How do personnel authorities applicable to the Office of the USD(R&E) compare to the human resources flexibilities available to the DARPA and the Defense laboratories? Should these flexibilities be expanded to apply also to the Office of the USD(R&E) and other research and engineering components of the DOD? Please explain your answer.**

I understand that the Defense laboratories and DARPA have a number of personnel flexibilities that enable these organizations to compete in a highly competitive technical market to attract and retain critical technical talent and remain at the cutting edge. I also understand that these authorities may not be applicable to USD(R&E), which operates under the Acquisition Demonstration program. That said, I believe additional authorities may benefit USD(R&E) and other technical components of DoD to attract top talent. If confirmed, I will review opportunities to improve DoD's ability recruit and retain technical talent through all means, including by potentially leveraging new human resources flexibilities.

**122. With a view to improving productivity, performance, and mission accomplishment, how would you work with the personnel policy and management communities in the Office of the Secretary of Defense and the Military Departments to enhance the human resources flexibilities available to DOD labs, test ranges, and other research and engineering components of the DOD?**

If confirmed, I will take a look at personnel policies with an eye to increasing flexibilities available to the DoD Labs, test ranges and other research & engineering components of the DoD.

**123. How would you work with the DOD lab, test range, and other research and engineering components of the DOD to maximize utilization of human resources flexibilities currently in place or newly authorized?**

If confirmed, I would work with my counterparts in USD(P&R) as well as with the Service Acquisition Executives to ensure that they maximize the utilization of flexibilities available to them. I will also coordinate with my counterparts to ensure that, where appropriate, human resources flexibilities guidance is coordinated and consistent throughout the DoD.

**124. What is your assessment of the diversity of the workforce comprising the research and engineering organizations of the Department of Defense?**

Women and minorities have been historically under-represented in both national security and in science, technology, engineering, and mathematics (STEM) fields. The diversity of professionals who work at the intersection of both national security and STEM has historically been quite poor. If confirmed, I am committed to strengthening DoD's STEM workforce by taking steps to increase its diversity.

**125. How do you think improvements in workforce diversity would improve the productivity, performance, and mission accomplishment of such organizations? Please explain your answer.**

USD(R&E)'s effectiveness is dependent on its ability to attract the most talented workforce from across this nation. USD(R&E) must provide opportunities for a diverse workforce since diversity provides different ideas that enrich our innovation. The United State of America is known for its innovation based on its ability to attract a diverse population.

**126. What steps, if any, would you take, if confirmed, to increase diversity in the research and engineering organizations of the Department of Defense?**

If confirmed, I will explore opportunities to increase diversity in the Department of Defense.

**127. Some research and engineering organizations, including DARPA and DIU, have different challenges in increasing diversity due to their need for more experienced, mid-career talent. In your view, are there meaningful steps these organizations can and should take to improve diversity notwithstanding?**

Yes. Organizations like DARPA and DIU can take steps to ensure that they consider a diverse pool of candidates for all positions. For example, these organizations could proactively recruit

diverse candidates, leverage hiring flexibilities to access diverse talent at universities, industry, and federally funded research and development laboratories (FFRDCs), and build networks of diverse, early-career candidates who might be interested in working for these organizations later.

### **Joint All-Domain Command and Control**

**The Joint Staff J6 leads a cross-functional team (CFT) for Joint All-Domain Command and Control (JADC2), which overlays and integrates similar but Service-specific multi-domain command and control and targeting initiatives. The J6 has received support from the Principal Director for Fully Networked C3 in the Office of the USD(R&E), as well as from the Director for Mission Integration. Among the major objectives of the JADC2 initiative are interoperability across platforms and systems of all the Services, in all domains, coupled with decision aids geared to vastly increasing the speed and scale of sense- and decision-making.**

- 128. What are your views as to the importance of the JADC2 CFT and the ways in which the Office of the USD(R&E) can and should assist in furthering the objectives of this initiative?**

If confirmed, I will look into the JADC2 program and assess opportunities to assist them to achieve their objective.

### **Space Issues**

**Given that one purpose underlying the creation of the U.S. Space Force was to consolidate space activities, section 956 of the Fiscal Year (FY) 2020 National Defense Authorization Act (NDAA) as clarified by section 1601 of the NDAA for FY 2021, requires transfer of the Space Development Agency (SDA) from the USD(R&E) to the Space Force, effective October 1, 2022.**

- 129. If confirmed, what steps would you take to effectuate the timely transfer of the SDA to the Space Force?**

If confirmed, I am committed to work closely with the Space Force leadership and the Director of SDA to ensure a smooth, orderly, and on time transition as called for in the FY21 NDAA.

- 130. Prior to the creation of Space Force, the Government Accountability Office commented on the functional overlap of myriad DOD space entities.**

Yes, it is my understanding that DoD has a myriad of space entities including SDA, the Space Force, Air Force Space & Missile Command, Space RCO, and the Missile Defense Agency. A review of these organizations' role and responsibilities and missions may be helpful to ensure alignment with warfighter needs, identify opportunities to reduce duplication, and to encourage inter-organizational collaboration.

**131. What is your understanding of the relationship between the Office of the USD(R&E) and the Space Force? How can the USD(R&E) best support space research and engineering, without duplicating functions properly assigned to the Space Force?**

As with USD(R&E)'s role in relation to the other services, USD(R&E)'s role with the Space Force is to support its research and engineering efforts and also serve to synchronize and de-conflict those efforts with others being conducted elsewhere in the Department.

**Missile Defense Agency**

**132. If confirmed, what steps would you take to expedite the Missile Defense Agency's shift in focus to research and development and divestiture of management responsibilities for existing weapon systems to the Military Departments?**

If confirmed, I will work with MDA director to shift its focus towards research and development and work to enable transition of its existing weapons systems to the Military Departments.

**133. What specific missile defense systems should be transferred to the Military Departments, in your view?**

If confirmed, I will work with the director of MDA to assess production missile defense systems that should be transferred to the Military Departments.

**134. Given the findings and recommendations set forth in a recent Government Accountability Office report (GAO-21-314) what are your views on the Missile Defense Agency's current developmental and operational testing function? If confirmed, which, if any, of GAO's recommendations would you implement, and why?**

If confirmed, I will work with the Director of MDA to assess the current Developmental & Operational testing functions and review GAO's recommendations before forming an opinion.

## **Defense Advanced Research Projects Agency (DARPA)**

### **135. What adjustments would you expect to make, if confirmed, in the current style of DARPA research program management and investment strategy?**

DARPA has an enduring mission to make pivotal investments in breakthrough technologies for national security. Working with innovators inside and outside government, DARPA has repeatedly delivered on that mission, recently demonstrated by early investments in mRNA research which are being applied to the COVID fight today. I believe DARPA's authorities and funding allow it the flexibility to explore new areas of discovery and to rapidly pivot to emerging threats. If confirmed, I would carefully review DARPA's approach and portfolio to see how its programs align with national defense priorities and address not only near-term threats but also those on the horizon and beyond.

### **136. What is the appropriate relationship between DARPA and the Military Service S&T programs and laboratories?**

DARPA should have a strong understanding of the Military Service S&T programs and robust working relationships with the laboratories. DARPA participates as a member of the Science and Technology (S&T) Executive Committee as well as the Reliance 21 Communities of Interest where Military Service S&T programs as well as DARPA programs are reviewed and discussed. DARPA should also keep the Services and laboratories informed of its S&T programs to prevent duplication of effort and to seek technical and programmatic assistance in the execution of and transition of technologies to the Services.

### **137. What is the appropriate relationship between DARPA and Military Department acquisition programs?**

DARPA should have strong relationships with the Military Department acquisition and requirements communities to facilitate transition of DARPA technologies to programs of record. DARPA should be aware of Service's capability gaps, acquisition programs and understand opportunities to transition.

### **138. If confirmed, what steps would you take to improve DARPA's effectiveness in transitioning successful programs and innovations to the Services?**

**If confirmed, I will work closely with DARPA and the Services to understand the impediments to transition and collaborate on a transition path.**

**139. Is there value in assessing and endeavoring to increase the diversity of the DARPA program management workforce? Please explain your answer.**

Yes, there is significant value in assessing and working to increase the diversity of the workforce across the Department. If confirmed, I will review ways to increase underrepresented community participation across the USD(R&E) ecosystem, and support DARPA in its initiatives to increase the diversity of its program management workforce.

**Defense Innovation Unit (DIU)**

**140. What is your assessment of the effectiveness of the DIU in transitioning capabilities into operational use?**

I understand that in 2020, DIU increased its technology programs transition to the Services from 35% in 2019 to 43%. This transition means that the Service procured the DIU developed systems. Part of its success is attributed to early transition planning, securing support from DoD partner organizations' leadership, and fostering acquisition and operator involvement earlier in projects. If confirmed, I will work to ensure DIU continues to increase the transition rate.

**141. What do you believe to be is the appropriate management framework for the DIU? Should DIU continue under current reporting chains or align under a new construct? Please explain your answer.**

If confirmed, I will review the DIU reporting chain to ensure maximum synergy between the multiple prototyping organizations within USD(R&E) and throughout the Services.

**142. What is your assessment of DIU's effectiveness in partnering with the Services to support development and transition of commercial technologies?**

If confirmed, I will review challenges that prevent greater commercial technology transition, which may include securing funding within a budget cycle when a project is successful and incentivizing programs to insert commercial technologies.

**Science, Technology, Engineering, and Mathematics (STEM) Education**

**143. Do you agree with the premise of some that the Department of Defense specifically, and the nation as a whole, are facing a crisis in STEM education?**

I do agree with the premise that there is a crisis in STEM education, particularly for the Department of Defense. National security requires that the U.S. have access to a substantial, high quality STEM workforce, which is adept at navigating an increasingly high-tech, digital, and connected world. At the

graduate level, there is an insufficient number of U.S. citizens being trained and receiving advanced degrees in technical and engineering areas. The work of energizing the future workforce through STEM education begins at the K-12 level, and if confirmed, I will seek to maximize the effectiveness of DoD's STEM education investments.

**144. In your view, how have deficiencies in STEM education affected the Department's ability to execute its missions?**

Deficiencies in STEM education have limited the ability of young people to discover and pursue the key fields which undergird the future technologies of the Department. The presence of fewer students and researchers entering science, technology, engineering, and mathematics fields also limits the breadth and frequency of breakthroughs in critical technology areas. The Department of Defense has to compete with commercial and defense industries for the limited pool of STEM talent. All of these deficiencies hurt the Department's ability to execute its missions.

**145. What role do you think the Department should play in supporting STEM education writ large?**

DoD is the primary funding source of engineering and math research and education programs in the U.S. and, therefore, plays a significant role supporting STEM education. I believe that DoD has a responsibility to examine its current balance between education, recruitment, and management to see if these investments address technical workforce needs. The science and engineering challenges DoD faces today are highly complex and often intersect with more than one scientific discipline. DoD should think about how to ensure that our research funding encourages an interdisciplinary approach. Engaging foreign-born STEM graduates is also an important component to addressing DoD's workforce needs, and therefore, reviewing immigration challenges and considering options to streamline accesses or statuses is prudent and may even be necessary.

**146. What role should the Department play in supporting STEM education opportunities for service members?**

The Department can encourage service members to take advantage of the educational opportunities and STEM programs available to them. If confirmed, I will work with USD(P&R) to identify possible synergies in supporting further STEM education opportunities for service members.

**147. What role should the Department play in supporting STEM education opportunities for dependents of service members?**

Military dependents could benefit from DoD's various STEM education programs. The Department is uniquely positioned to provide meaningful STEM education opportunities for dependents of service



members through formal and informal STEM activities. If confirmed, I will seek to leverage the scientists, engineers, laboratories, and engineering centers across DoD's STEM enterprise to appropriately support STEM opportunities for military children.

**148. What role should the Department play in other K-12 STEM educational activities?**

Preparation of a capable, STEM-literate workforce of the future starts with improving K-12 STEM education in the U.S. In 2016, China produced 4.7 million STEM graduates, compared to 568K in the United States at the undergraduate level. This gap is significantly amplified by the fact that the U.S. continues to lag in math and science proficiency at the secondary level. Engagement at all levels of the STEM pipeline is critical, starting with increasing interest in elementary students in sciences. STEM outreach for high school students leads to higher retention, when students do pursue STEM degrees at the college level. As the largest employer of scientists and engineers across the federal landscape, the Department is uniquely positioned and should play a significant role in supporting STEM education through formal and informal activities which leverage the USD(R&E) enterprise and support students throughout all levels of the STEM pipeline.

**JASON**

**149. If confirmed, would you support a proposal to transfer management of the JASON scientific advisory group to the Office of the USD(R&E)? Please explain your answer.**

Yes, if confirmed, I would support transferring oversight of the JASON scientific advisory group to USD(R&E). The JASON scientific advisory group was established as an eminent cadre of senior scientists, engineers, and technical experts across various disciplines who support DoD through short-term, technically based studies. These studies provide technical recommendations that help DoD formulate new research programs and review current programs. These functions align with the statutory role of the Office of USD(R&E) and would provide very valuable synergy, if managed by USD(R&E).

**Manufacturing**

**150. What role should DOD play in investing in manufacturing innovation and ensuring that the resultant innovations are adopted into defense industry and the organic industrial base?**

DoD should further its manufacturing innovation ecosystem by leveraging existing authorities under the DoD Manufacturing Technology Program to stimulate the early development of manufacturing processes and the adoption of enterprise business practices, as well as providing concurrent support for science and technology development. To increase its national impact and accelerate the adoption of technology, DoD

should also continue its close partnership with the DoD Manufacturing Innovation Institutes and use these institutes as mechanisms for unifying the DoD, Federal agency, state/local government, and private-sector communities to collaboratively tackle manufacturing technology challenges for the benefit of the Nation and the warfighter.

**151. What is your assessment of the performance and impacts of the DOD Manufacturing Technology program, including the Manufacturing Institutes?**

The DoD Manufacturing Technology Program is an ambitious program that meets cross-cutting defense manufacturing needs beyond the ability of any single service to address. If confirmed, I will assess the successes that MII has achieved and seek to continue the innovation institutes. I will review the ManTech program's long-term engagement strategy with the MIIs to help ensure maximum effectiveness.

**Microelectronics**

**152. If confirmed, specifically what steps would you take to ensure that the Department of Defense has assured access to the microelectronics it requires for defense systems?**

If confirmed, I will work with my team in USD(R&E) and DARPA, as well as with USD(A&S), our counterparts across all interested federal agencies, and industry to ensure that the Department retains continued access to state-of-the-art and radiation-hardened microelectronics, which are essential to DoD's most critical missions. Microelectronics are an essential element of much of what the Department does and I look forward to working with the team to find new opportunities to keep the Department on the cutting edge of these technologies.

**153. What is your assessment of the Department of Defense's microelectronics needs, to include both legacy, state-of-the-practice, and state-of-the-art?**

It is my understanding that the Department is currently working on a comprehensive microelectronics strategy, as directed by the FY2021 NDAA, which will capture the needs of the Department for legacy, state-of-the-practice, and state-of-the-art microelectronics. If confirmed, I will work with my colleagues, USD(A&S), DARPA to complete that strategy and ensure that it is provided to Congress in a timely fashion.

**154. If confirmed, what steps would you take to ensure that the nation has an effective microelectronics research enterprise?**

If confirmed, I will continue to seek out opportunities to advance USD(R&E) and DARPA's strong relationships with industry, academia, the Services' labs and other interested agencies. The task is difficult and reliance on DoD alone misplaced: DoD represents just over 1% of the microelectronics market. We depend on the commercial market to stay at the cutting edge.

**155. What role should the Department of Defense play in supporting the commercial microelectronics industry?**

If confirmed, I will support the administration's ongoing effort to ensure a robust domestic microelectronics industry that can support the commercial and national security needs of the nation.

**156. What role should the Department of Defense play in working with the interagency regarding domestic production of microelectronics?**

It is my understanding that the USD(R&E) is an integral part of the interagency efforts to address matters relating to microelectronics research, development, manufacturing, and policy to develop a national strategy on microelectronics research, development, manufacturing, and supply chain security. If confirmed, I will pursue opportunities to promote domestic production of microelectronics important for meeting DoD needs.

**157. Should the Department of Defense be dependent on foreign sources of microelectronics for its systems and programs?**

Due to the national security implications of microelectronics, the United States should remain a world leader in state-of-the-art microelectronics technology and manufacturing. . Military unique integrated circuits used in critical weapon systems should be designed and fabricated by from secure sources either within the United States or from our closest trusted allies.

**158. There is a shortage in strategic radiation hardened microelectronics required for the ongoing nuclear modernization?**

If confirmed, I will look into whether we have a shortage of RADHARD microelectronics required for nuclear modernization.

**159. If confirmed, what steps would you recommend to correct this unique deficiency?**

I will work with my colleagues in the Department and in industry to gain a full understanding of the current situation and identify what steps are needed.

**Section 276 of the FY NDAA requires the Secretary of Defense to submit to the President by June 1, 2021, a strategy for microelectronics that includes innovative models of public-**

**private partnerships for managing the execution of the strategy, including consideration of establishing a semiconductor manufacturing corporation. The same law requires that the strategy address the need for funding and other forms of support for the development, demonstration, prototyping, and scale up of new microelectronics technologies.**

**160. If confirmed, what steps would you take to prioritize the development and implementation of this strategy? How would you proposed to partner with the Under Secretary for Acquisition & Sustainment on this issue?**

If confirmed, I will work with my USD(A&S) counterpart to make sure the Department is on track to submit the strategy called for in the NDAA.

### **Social Science and Management Research**

**161. In your view, what benefits would defense missions derive from increases in DOD-funded research in the social, information, and management sciences?**

Increasingly, we have seen how areas important to the Department—such as cyber, AI, autonomy, insider threat behaviors, cross-domain deterrence, climate and environmental change, etc.—are complex interdisciplinary problems that need to be informed by social, information, and management science. By funding research in social, information, and management sciences, the Department can better guide cross-discipline research in areas that focus on DoD needs.

**162. What are your specific ideas for enabling engagement between the DOD science and technology community and outside academic experts in areas such as business, management, and public administration, to perform research, participate in personnel exchange programs, and provide technical expertise to support the Department's efforts to improve its management and business practices?**

A challenge to outside academic experts performing research within DoD is in facilitating access to data that may be classified and require clearances. If confirmed, I will explore options for aggregating and anonymizing data for researchers to use. I will also explore personnel exchange programs that would both facilitate opportunities for academic researchers in business, management, and public administration to hold clearances for purposes of conducting research that is informed by an appreciation of the challenges of the DoD mission space. This would also provide DoD administrators the opportunity to spend time within academic environments, generating opportunities for integrating external best practices upon their return to the Department.

### **Sexual Harassment**

**In responding to the 2018 DOD Civilian Employee Workplace and Gender Relations survey, 17.7 percent of female and 5.8 percent of male DOD employees indicated that they had experienced sexual harassment and/or gender discrimination by “someone at work” in the 12 months prior to completing the survey.**

**163. What is your assessment of the current climate regarding sexual harassment, gender discrimination, and other harassment in the Office of the USD(R&E)?**

The existence of sexual harassment, gender discrimination, and other harassment within our ranks is deeply disturbing and the conduct is unacceptable. These actions destroy good order and discipline and foster a climate that is inconsistent with the dignity and respect that our workforce deserves. The Department must continue its work to eliminate sexual harassment, gender-based discrimination, and any other form of harassment. The Department must ensure consistent incident tracking, ensure responsiveness, and provide training for the workforce to improve outcomes and strive for workforce stability.

If confirmed, I would review previous workforce assessments including climate surveys, OPM Federal employee viewpoint survey results, and any other documentation that would give me insight into the USD(R&E) organization and help me make informed decisions on next steps to mitigate, and hopefully eliminate, sexual harassment, gender discrimination, and any other harassment within the Office of USD(R&E).

**164. If confirmed, what actions would you take were you to receive or become aware of a complaint of sexual harassment, discrimination, or other harassment from an employee of the Office of the USD(R&E) or an employee of an organization over which the USD(R&E) exercises authority, direction, and control?**

If confirmed, I would immediately reiterate to the workforce of the importance of equality and diversity as well as the Department's zero tolerance for harassment. Second, I would further reiterate my expectations of professional conduct to all employees, to include contractors. More importantly, I would take the complaint seriously and immediately contact the appropriate office to initiate an investigation to gather all facts, conduct the necessary interviews, collected appropriate information, and address the complaint within the specified guidelines of DoD regulations and policies.

**Congressional Oversight**

**In order to exercise legislative and oversight responsibilities, it is important that this committee, its subcommittees, and other appropriate committees of Congress receive timely testimony, briefings, reports, records—including documents and electronic communications, and other information from the executive branch.**

**165. Do you agree, without qualification, if confirmed, and on request, to appear and testify before this committee, its subcommittees, and other appropriate committees of Congress? Please answer with a simple yes or no.**

Yes.

**166. Do you agree, without qualification, if confirmed, to provide this committee, its subcommittees, other appropriate committees of Congress, and their respective staffs such witnesses and briefers, briefings, reports, records—including documents and electronic communications, and other information, as may be requested of you, and to do so in a timely manner? Please answer with a simple yes or no.**

Yes.

**167. Do you agree, without qualification, if confirmed, to consult with this committee, its subcommittees, other appropriate committees of Congress, and their respective staffs, regarding your basis for any delay or denial in providing testimony, briefings, reports, records—including documents and electronic communications, and other information requested of you? Please answer with a simple yes or no.**

Yes.

**168. Do you agree, without qualification, if confirmed, to keep this committee, its subcommittees, other appropriate committees of Congress, and their respective staffs apprised of new information that materially impacts the accuracy of testimony, briefings, reports, records—including documents and electronic communications, and other information you or your organization previously provided? Please answer with a simple yes or no.**

Yes.

**169. Do you agree, without qualification, if confirmed, and on request, to provide this committee and its subcommittees with records and other information within**

**their oversight jurisdiction, even absent a formal Committee request? Please answer with a simple yes or no.**

Yes.

**170. Do you agree, without qualification, if confirmed, to respond timely to letters to, and/or inquiries and other requests of you or your organization from individual Senators who are members of this committee? Please answer with a simple yes or no.**

Yes.

**171. Do you agree, without qualification, if confirmed, to ensure that you and other members of your organization protect from retaliation any military member, federal employee, or contractor employee who testifies before, or communicates with this committee, its subcommittees, and any other appropriate committee of Congress? Please answer with a simple yes or no.**

Yes.