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STATEMENT OF

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NUCLEAR, CHEMICAL, AND BIOLOGICAL DEFENSE PROGRAMS

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INTRODUCTION

Chairman Gallego, Ranking Member Kelly, and distinguished Members of the Subcommittee, it is an honor and privilege to testify before you today on behalf of the Department of Defense's (DoD) diverse workforce who comprise the United States' formidable countering weapons of mass destruction (CWMD) enterprise. These dedicated Americans work tirelessly to defend our brave service members, the Nation, and our international partners and allies from the increasing threat posed by the most devastating weapons ever created.

As the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense (ASD(NCB)), I serve as the senior advisor and technical expert to the Secretary and Deputy Secretary of Defense for chemical and biological defense, along with nuclear weapons. In close coordination with the offices of my fellow witnesses, NCB coordinates with interagency and international partners to ensure the United States maintains its enduring technical advantages when countering WMDs. Our countering WMD mission has never been more important, not least because the operating environment continues to change rapidly due to science and technology advancements and disruptive actors' reduced threshold for CB weapon (CBW) use.

As we continue to see both within the Department and in our every-day lives, science and technology convergence is revolutionizing capabilities with potential dual-use applications and potentially unanticipated risks. Additionally, the Department's continued focus on peer competitors—including the People's Republic of China (PRC) and the Russian Federation— is changing our countering WMD paradigm. The President, Secretary of Defense Lloyd Austin, Congress, and our allies and partners are prioritizing our defensive capabilities to counter and deter the growing WMD threat, especially with regards to biodefense. This prioritization is evident from the Interim National Security Strategic Guidance, Secretary Austin's Biodefense Vision Memo, numerous provisions in recent National Defense Authorization Acts, and in joint statements and agreements with many of our allies and partners. If we do not act now, foreign science and technology advancements will have a transformative effect thereby creating the potential for disruptive capabilities that undermine our Nation's deterrent. Despite these changes, our mission remains the same: to anticipate future threats and deliver capabilities that enable the Joint Force to fight and win in WMD-contested environments.

THREAT LANDSCAPE

In recent years, our adversaries have demonstrated the potential for CBW to achieve a broad range of effects, from assassinations to population-scale psychological impact. CBW can also be useful for anti-access/area-denial objectives by disrupting operational tempo and by contaminating areas –including logistics nodes—that the Joint Force would have to traverse to reach the fight. CBW could also be used to weaken or displace defensive forces thereby allowing adversaries to seize infrastructure, territory, or achieve a strategic advantage. Furthermore, these weapons can target specific military units or systems to take them out of the fight or reduce their effectiveness.

These threats are becoming exponentially more complex due to advances in science and technology. The Intelligence Community identifies the potentially threatening nature of bio-convergence, or the application of diverse sciences and technologies such as computational and cognitive science, nanotechnology, physics, and others, to the life sciences. Among other effects, bio-convergence has the potential to create seemingly infinite new biological threats, forcing the Department away from only relying on a definite list of known threat agents against which to develop countermeasures. Engineered biological weapons may have the capability to evade medical countermeasures and physical defenses, as well as increase virulence and transmissibility, making them more appealing for potential use against the United States. Not only does the Department recognize the threat these agents pose to the United States and the warfighter, but the adversaries we face continue to see strategic and tactical advantage-gaining opportunities from developing and employing these devastating weapons.

Of particular concern, new threats could have significant and tailorable delay between application and effect, challenging our ability to forecast their impact on the Joint Force and attribute origin. Accordingly, our deterrence and defensive posture must prepare for and respond to the full spectrum of biological threats, whether naturally occurring, accidental, or deliberate. New science and technology developments are allowing adversaries to create viable CB threats without the large-scale industrial production facilities or delivery systems previously required. This both challenges U.S. detection capabilities and makes it easier for new actors to acquire these weapons. The Department must also consider how these weapons can be used in

conjunction with other emerging domains of warfare, such as information and disinformation operations, which we see our adversaries using with increasing frequency.

In addition to the challenges arising from science and technology advancements, foreign actors continue to challenge international norms and agreements that prevent the development and use of chemical and biological weapons. The Department of State's April 2021 Compliance Report voiced grave concerns about China, Iran, North Korea, and Russia's compliance with the Biological Weapons and Toxins Convention. The report assessed that both North Korea and Russia have offensive biological weapons programs. Additionally, the activities of China and Iran raise concerns about compliance. Chinese publications have described biology and biotechnology as a new domain of warfare and cite the aspiration to make China the world leader in genetic engineering, precision-medicine, and brain sciences, among other scientific disciplines. We need to think more holistically about biological threats as our adversaries can rapidly weaponize dual-use science and technology activities conducted under legitimate auspices.

Finally, instead of developing WMDs to fill immediate tactical or operational gaps, foreign actors see chemical and biological weapons as an asymmetric advantage and relish their potential deterrent effect. These unique strategic effects, coupled with challenges to global norms regarding chemical and biological weapons, present a growing threat to the United States. We must be sure our adversaries understand the strength of our defensive capabilities and the severe price they will pay for using chemical or biological weapons.

MEETING THE NEW THREAT LANDSCAPE

To achieve our mission, the Department is responding to the emerging threat landscape in how we deter and defend against WMD threats. I want to be clear, if our Department's approach doesn't adapt to the emerging threat landscape, we will be accepting irreversible risk to the Nation and our Joint Force.

Therefore, the Department must strengthen its science and technology (S&T) advantage through bolder acquisition approaches. For instance, incremental cycles of research and development must be replaced by investments designed to drive groundbreaking innovations. In turn, S&T

must shape and inform the Department's operating concepts. Recently, the Department has combined off-the-shelf wearable technologies with artificial intelligence machine-learning (AI/ML) tools to better assess physiological impacts and changes to the warfighter, thereby providing both early warning and on-the-spot, real-time diagnostics.

We also need to drive innovation by championing research, science, technology, and engineering. This includes nurturing early research and investing in potential scientific breakthroughs to prevent technological surprise. Our investments must introduce new elements that complicate our adversaries' offensive investments, approaches, and decision-making calculus. The Department must also expand its chemical and biological defense industrial base by seeking out partnerships with small businesses, new entrants, and international partners. Furthermore, the Department needs to become a trusted partner to industry by communicating stable, long-term requirements to that take advantage of the private sector's full potential.

Inside the Department, we must also change how we think about and plan for biological threats. As Secretary Austin said in his Biodefense Vision Memorandum, biodefense is a responsibility of the entire Department. It must be a part of everything we do, similar to the Department's approach to artificial intelligence and cyber. As the Department bolsters its deterrent capabilities, nuclear weapons will continue to provide unique deterrence effects that no other element of U.S. military power can replace at this time, and the nuclear mission remains indispensable to our national security. At the same time, improved chemical and biological defense capabilities will contribute to our Nation's integrated deterrence by denying the adversary any advantage of using these weapons. Speaking broadly, our programs are focused in three main areas: understanding the threat, protecting the Joint Force, and mitigating any effect of CBW. The interaction between understand, protect, and mitigate enhances our ability to deter and defeat WMD usage by providing an integrated layered defense approach. This layered approach helps us guard against being defeated by single points of failure. For instance, with better PPE or preventive medical countermeasures, we are better positioned to overcome a failure in early warning. Similarly, early diagnosis and effective therapeutics can help us bridge the gap until a vaccine is ready.

Along with these overarching capabilities, we are focused more specifically in a number of key areas to stay ahead of the rapidly changing threat landscape.

The first key area is integrated early warning systems. We continue to see how biological threats can circumvent traditional concepts of biological detection systems. We need to change the paradigm by integrating all available sensors and data collection as a network of networks to identify changes within an environment rather than waiting for the onset of symptoms after a warfighter has already been exposed to an agent. Surveillance will also be enhanced by using assets such as thermal imaging to identify environmental changes that signal possible chemical and biological contamination.

We are also focused on deploying more CB sensors and detection systems while reducing the Joint Force's logistical burden. We may be able to accomplish this objective through wearable technology, placing CB sensors on existing weapon systems and unmanned systems, satellite imagery, and fixed-point intelligence collection nodes. In order to warn the Joint Force of a possible contamination, the Department is developing systems that will harness artificial intelligence and machine learning tools to automatically fuse data into centralized command and control systems that provide near real-time information to the Joint Force.

Although we are making significant progress, the complex, ever-changing nature of CBW threatens our ability to rely on early warning and physical protection capabilities. A second key area we are exploring is the concept of defending from within through preventive and post-exposure medical countermeasures. We must think differently about how we protect the warfighter from within and prevent the negative effects of agents. The Department is looking at how the body responds to agents, and further how we can then train our immune systems to protect the body instead of the traditional reliance of creating physical barriers. Another concept the Department has begun implementing is repurposing medications that have already been produced and proven effective against one threat to potentially serve as medical countermeasures for other threats that share similar attributes. Before the pandemic, the Chemical and Biological Defense Program validated this approach by investing in *remdesivir* as a medical countermeasure against filo virus biological threats. Within three months of the first known case of SARS-CoV-2, the CBDP partnered with the Department of Health and Human Services to repurpose *remdesivir* as a medical countermeasure against SARS-CoV-2. This is yet another example of

how the CBDP is able to apply its transformative research and development efforts to solve national and even international biological threats by developing medical countermeasures with potential repurposing opportunities.

Even if we achieve the concept of defending from within, a third key area is protecting our infrastructure, vehicles, and warfighter against CB agents. For the foreseeable future, physical protection will continue to be a key part of our defense against CB threats, and we are working to enhance protection while reducing the burden to the warfighter. For instance, we are replacing heavy, bulky, and extremely hot individual protective equipment with smaller, lighter, and form-fitting PPE that will not reduce the warfighter's effectiveness or the Joint Force's operational tempo. The CBDP is also researching novel types of materials and responsive technologies to create protective ensembles that can adapt to unknown threats and contaminated environments. Ultimately, we want protective equipment that provides protection against a broad array of chemical and biological threats without impacting mission performance. Similarly, we are moving away from traditional decontamination methods that rely on abundant water supplies. For instance, one novel approach the Department is developing decontaminates the interior of an aircraft by filling it with extremely hot air to disinfect any lingering pathogens or agents.

A WHOLE OF DEPARTMENT APPROACH

For the first time, Secretary Austin has ordered a Department-wide Biodefense Posture Review (BPR), which is co-chaired by the Assistant Secretaries from the offices of the Under Secretaries from Acquisition & Sustainment and Policy. To meet Secretary Austin's objectives, we are assessing roles, responsibilities and authorities for biodefense, identifying gaps, and making recommendations to strengthen DOD's biodefense posture against the entire spectrum of biological threats, whether natural, accidental, or deliberate.

Although this review is ongoing, it is being guided by three principles. First, unify efforts through an empowered, collaborative, and integrated approach to biodefense across the Department. Second, modernize DOD operations to optimize capabilities, capacity, resilience, and readiness. Third, synchronize biodefense planning with the new National Defense Strategy, the interagency, and allies and partners to support biodefense efforts in alignment with national

goals and strategy. Therefore, the BPR is examining how the Department can, and should, support other U.S. departments and agencies to deter deliberate biological attacks and respond to natural and accidental incidents. The review will inform biodefense-related operations, activities, and investments to support force protection, research and development, capability acquisition, and required Departmental expertise.

EXPANDING PARTNERSHIPS

As President Biden and Secretary Austin have underscored, we cannot achieve our mission without closely collaborating with other departments and agencies, as well as our like-minded allies and partners. Put simply, countering WMDs is a whole-of-government and global effort. The Department can leverage investments and capabilities from other partners, but the Department can also reinforce the efforts of others. Our chemical demilitarization program is an excellent example of this partnership. I'm proud to report we have destroyed 98% chemical agents from the U.S. chemical weapon stockpile and are on track to complete the destruction of the entire United States' legacy chemical weapons stockpile by the planned completion date of September 2023. Our progress in turn supports the United States' commitment to arms control.

Most importantly, the United States' network of allies and partners are essential in everything we do, from addressing chemical and biological threats to preventing the proliferation of WMDs. As the Department continues to develop advanced chemical and biological defense capabilities, we must develop a common understanding with our allies and partners on the concepts and capabilities needed for CBD. cannot outpace our allies and partners' concepts and capabilities. The Department of Defense Cooperative Threat Reduction (CTR) Program's Biological Threat Reduction Program provides layered, networked defense capabilities by strengthening our partners' capacity to detect and diagnose diseases and report outbreaks to appropriate international health agencies. Furthermore, the Department's Chemical and Biological Defense Program works especially closely with allies and partners. Through jointly funded research and development or information sharing agreements, our allies and partners are essential collaborators for early warning, detection, physical protection, and medical countermeasure development programs.

CONCLUSION

In conclusion, I'm extremely grateful for the sustained and growing interest among the committee and across the legislative branch. The threat we face as a Nation cannot be understated. In order for the Department to best serve the Joint Force, we must invest now in transformative research and development programs to get the best possible capabilities into the field to protect the warfighter. The Department must also remain an active partner to industry, our allies and partners, and to all branches of the U.S. government. Within the first year of my tenure as the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense, I have seen the tremendous contributions our workforce has made to our shared mission. I pledge to the Committee and to our incredible defense enterprise, we will support the warfighter and the Nation to defend against any weapon of mass destruction threat we face. Furthermore, as these threats evolve, I will work closely with the committee to ensure our partners in Congress are well informed on the capability development programs we seek to pursue. On behalf of the entire nuclear, chemical, and biological defense enterprise, I thank each of you for your continued and strong support to our goal of preparing for, deterring, and mitigating current and future weapons of mass destruction threats. Thank you for your time today, I look forward to your questions.