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SENATE ARMED SERVICES COMMITTEE

STATEMENT OF
CHARLES A. RICHARD
COMMANDER
UNITED STATES STRATEGIC COMMAND
BEFORE THE
SENATE ARMED SERVICES COMMITTEE
8 MARCH 2022

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INTRODUCTION

United States Strategic Command (USSTRATCOM) is the global combatant command (CCMD) responsible for Strategic Deterrence, Nuclear Operations, Global Strike, Joint Electromagnetic Spectrum Operations, Analysis and Targeting, and Missile Threat Assessment. In addition, the January 2021 Unified Campaign Plan (UCP) designated the Commander, USSTRATCOM (CDRUSSTRATCOM) as the Nuclear Command, Control, and Communications (NC3) Enterprise Operations lead. It takes a team of dedicated individuals to execute our mission set, and I am honored and privileged to lead the 150,000 Soldiers, Sailors, Airmen, Marines, Guardians, and Civilians dedicated to the DoD's highest priority mission.

I want to thank Secretary Austin and Chairman Milley for their leadership and continued support to the strategic defense of this Nation. USSTRATCOM is committed to Secretary Austin's integrated deterrence initiative and remains dedicated to his priorities of defending the Nation, taking care of our people, and succeeding through teamwork. I also want to thank Congress for your continued support to ensure USSTRATCOM is equipped with the resources necessary to maintain strategic deterrence on behalf of the Nation, our Allies, and our partners.

Since my last testimony, there should be no doubt we are contending with a rapidly changing and dynamic strategic security environment where potential adversary actions challenge us in ways we have not experienced in over 30 years. ***In September 2021, I formally declared the strategic breakout of the People's Republic of China (PRC) to the Secretary of Defense. A strategic breakout denotes the rapid qualitative and quantitative expansion of military capabilities that enables a shift in strategy and requires the DoD to make immediate and significant planning and/or capability shifts.*** The PRC continues the breathtaking expansion of its strategic and nuclear forces with opaque intentions as to their use. The recent test of an intercontinental ballistic missile (ICBM)-launched hypersonic glide vehicle (HGV)

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with fractional orbital bombardment (FOB) is just one example of these growing capabilities. Meanwhile, Russia conducted the invasion of Ukraine backing its actions with the coercive potential of the world's largest nuclear arsenal. *The strategic security environment is now a three-party nuclear-peer reality, where the PRC and Russia are stressing and undermining international law, rules-based order, and norms in every domain. Never before has this Nation simultaneously faced two nuclear-capable near-peers, who must be deterred differently.*

I applaud Secretary Austin for his vision of integrated deterrence across the Joint Force, our Allies and partners as the foundation of the National Defense Strategy. *Every operational plan in the DoD, and every other capability we have, rests on the assumption that strategic deterrence, and in particular nuclear deterrence, will hold. If strategic or nuclear deterrence fails, integrated deterrence and no other plan or capability in the DoD will work as designed. The Nation's nuclear forces underpin integrated deterrence and enable the U.S., our Allies and partners to prevent and, if necessary, confront aggression around the globe using all instruments of national power.*

Our operational requirements exist to execute Presidential directives and decisions we make today will have lasting strategic impacts on our ability to do so. Maintaining and strengthening deterrence for the long-term requires a modern infrastructure and industrial base able to develop credible capabilities necessary for a more challenging security environment. While the command is ready to execute its mission today, we must make threat-informed decisions regarding our nuclear capabilities to provide strategic deterrence well into the future.

STRATEGIC THREAT ENVIRONMENT

Chairman Milley rightly stated that we are experiencing one of the largest shifts in global geostrategic power the world has ever witnessed. *Today, both the PRC and Russia have the*

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capability to unilaterally escalate a conflict to any level of violence, in any domain, worldwide, with any instrument of national power, and at any time. USSTRATCOM measures the risk of strategic deterrence failure every day considering this reality. The DoD can no longer have the luxury of assuming the risk is always low, particularly during a crisis. Potential adversaries, as they have for years, have the capability to threaten to inflict catastrophic effects on the U.S. homeland, and on our Allies and partners to achieve their national objectives.

Our potential adversaries continue to rapidly advance the capability to conduct these attacks. Their growing capabilities will pose a danger to U.S. They will continue to expand and diversify their nuclear forces over the next decade and the PRC, in particular, will increase the role of nuclear weapons in its defense strategies. The range of their new systems complement growing nuclear stockpiles, and includes the development and modernization of survivable nuclear triads, counter-intervention, and power projection capabilities intended to deter and deny our regional influence.

The Nation faces significant risk as our potential adversaries develop and deploy emerging technologies, such as anti-satellite, hypersonic, and FOB capabilities. They are also pursuing leadership in key technologies with significant military potential including, artificial intelligence (AI), autonomous systems, advanced computing, quantum information sciences, biotechnology, and advanced materials and manufacturing. USSTRATCOM supports Secretary Austin's call for measures to protect critical U.S. capabilities, technologies, and operations as the Nation also faces risks from the threat of foreign theft of U.S. technology, penetration of U.S. information and weapons systems, supply chain disruptions, and cyberespionage campaigns designed to erase U.S. advantages. Cyber threats from the PRC, Russia, and the Democratic People's Republic of Korea (DPRK) are determined and unrelenting. Even now, Russia threatens cyberattacks against the U.S. as tensions over Ukraine increase. To that end,

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USSTRATCOM implemented a new construct to operationally harden NC3 systems against cyber threats to improve force readiness during competition and crisis. We must mitigate these threats for future programs to field new uncompromised capabilities.

People's Republic of China

We should carefully consider the PRC's actions rather than their rhetoric. The breathtaking expansion of land-, sea-, and air-based nuclear delivery platforms, command and control survivability, novel and asymmetric weapons, and supporting infrastructure is inconsistent with a minimum deterrent posture. When I testified last year, I warned that the PRC was capable of executing any plausible nuclear strategy. *I am fully convinced the recent strategic breakout points towards an emboldened PRC that possesses the capability to employ any coercive nuclear strategy today.*

Just three months after my April 2021 testimony, commercial satellite imagery revealed three new nuclear missile fields in western China, each with approximately 120 missile silos. With this discovery, it is clear the People's Liberation Army Rocket Force (PLARF) will soon achieve a robust ICBM capability. The new silos can be equipped with the solid-fueled, road-mobile CSS-10 Mod 2 capable of reaching the continental United States (CONUS). This is in addition to the fixed ICBM arsenal of CSS-4 Mod 2 and multiple independently targetable reentry vehicle (MIRV) equipped CSS-4 Mod 3 ICBMs. While only a developmental concept in 2019, the PRC has already fielded the road-mobile, MIRV-capable, CSS-20 with launch options including silo or rail-mobile basing. Counting both conventional and nuclear-armed missiles, the PLARF employs over 900 theater-range intermediate and medium-range ballistic missiles (IRBM / MRBM), some of which are capable of doing catastrophic damage to United States, Allied, and partner forces in the region. Combined, this formidable arsenal is cause for concern.

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Further advancements in the last year include ground-based, large phased array radars and at least one geostationary satellite capable of detecting ballistic missile launches. These capabilities, plus a rapidly expanding silo-based ICBM force, indicate the PRC increased the peacetime readiness of its nuclear forces and seeking a Launch-on-Warning posture, all while the PLARF now rotates its nuclear and conventional brigades to “high alert duty” posture for unspecified periods. Enhancing the survivability of its sea-based deterrent, the third generation JL-3 submarine launched ballistic missiles (SLBM) allows the People’s Liberation Army Navy’s (PLAN) now six JIN-class ballistic missile submarines (SSBN) to target CONUS from a protected bastion within the South China Sea.

The PRC’s pursuit of an ICBM delivered HGV with FOB capability is a technological achievement with serious implications for strategic stability. On 27 July 2021, the PRC’s first HGV FOB test resulted in 40,000 kilometers distance flown and over 100 minutes of flight time—the greatest distance and longest flight time of any land attack weapon system of any nation to date. The PRC is investing heavily in HGV and directed energy weapons technology for global strike and defeat of missile-defense systems, anti-satellite, anti-missile, and anti-unmanned aircraft system capabilities.

The PRC is increasing its capacity to produce and enrich plutonium by constructing fast breeder reactors and reprocessing facilities, which may be used to support a growth in China's nuclear weapons stockpile. While the PRC may use a portion of this infrastructure for civilian nuclear technology programs, it is highly likely some infrastructure will support their expanding nuclear weapons program. This accelerated nuclear expansion may enable the People’s Liberation Army (PLA) to field over 700 nuclear warheads by 2027. The PRC likely intends to have at least 1,000 warheads by 2030, greatly exceeding previous DoD estimates. Unlike the U.S., The growth of the PRC’s nuclear arsenal is not constrained by any treaty limits.

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Finally, the PLA continues to develop and field precision strike nuclear delivery systems. The dual-capable DF-26 IRBM can range critically important ports, airfields and bases in the western Pacific with conventional and nuclear payloads. Survivable road-mobile transporter erector launchers can deliver the DF-31A ICBM at ranges in excess of 11,000 kilometers. The PLA's H-6N air-to-air refueling-capable bomber, which can carry the nuclear air-launched ballistic missile (ALBM), is entering its second year of operational service. The 2020 Annual Report to Congress, released in November 2021, surmises that the PRC may be building a new conventional- and nuclear-capable stealth strategic bomber with global reach in addition to medium and long-range stealth bombers. These nuclear-related advancements are additive to the PRC's ongoing conventional modernization and expansion efforts, where they already have a substantive overmatch in regional- and theater-class weapons and capabilities.

Russia

Russia is in its second decade of investing substantial resources to expand their strategic and non-strategic nuclear capabilities. In a recent statement, President Vladimir Putin recounted that in 2000 Russian nuclear deterrent forces were only 12% modernized. By late 2020, President Putin stated that 86% of Russia's nuclear forces had been modernized, including components from all legs of their strategic nuclear triad, and promised to increase modernization to 89% by the end of 2021. Nuclear weapons are an integral part of Russia's national security strategy and Moscow appears to utilize them to demonstrate political stake, deter outside actors, and support resolutions acceptable to Russia. In June 2020, Russia publicly revealed its official nuclear deterrence strategy for the first time, describing threats and conditions for the use of nuclear weapons. Within this strategy, Russia acknowledges it could use nuclear weapons first, including in response to conventional attacks that threaten the "existence of the state."

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Russia made extensive efforts to update their ICBM force with single and multiple warhead missiles, including the developmental silo-based SS-X-29 Sarmat heavy ICBM with the capacity to carry ten or more warheads on each missile; the deployed, more capable silo-based variant of the SS-27; and the silo-based or road-mobile "KEDR" ICBM to be fielded by 2030. To support the expansion and modernization of the sea-leg of its triad, Russia plans to complete the production of ten DOLGORUKIY-class SSBNs and deploy them equally across the Northern and Pacific Fleets by 2028. These SSBNs will carry the new SS-N-32 Bulava SLBM, enhancing Russia's strategic reach while retiring the older Delta IV SSBNs.

Russia also continues to invest in strategic air capabilities, fitting its heavy bombers with a new advanced nuclear cruise missile. On 12 January 2021, Russia accepted delivery of the first of ten brand-new Tu-160M strategic bombers with updated NV-70M radar and NK-32-02 engines. An accomplishment not seen since the Cold War, restarting the Tu-160M production line required cooperative efforts between the Kremlin and the Russian industrial base. The opening of new manufacturing and production lines further illustrates Russia's ability to rapidly increase its industrial production capacity to support its strategic forces.

In my last testimony, I highlighted Russia's novel and advanced weapon delivery systems, many of which are capable of hypersonic speeds and flight path adjustments designed to avoid U.S. missile defense systems. They pursue these capabilities despite the United States clearly relying on its strategic nuclear forces to deter any large attack by Russian nuclear weapons. The Avangard HGV, Tsirkon hypersonic anti-ship and land-attack missile, and Kinzhal ALBM are operationally fielded now. Meanwhile work continues on the Skyfall nuclear-powered intercontinental cruise missile and the nuclear-armed Poseidon autonomous underwater vehicle. All provide Russia with an even more diverse and flexible nuclear force while posing a challenge for us. Defense Minister Sergei Shoigu asserted that hypersonic

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weapons will make up the core of Russia's non-nuclear deterrence capability in the future.

Russia is not limiting itself to these new systems and claims to have already completed serious research and technological groundwork on pieces of equipment that have no counterpart in the world. They continue to develop additional strategic systems with new hypersonic warheads to expand the range of threats against the U.S., our Allies and partners.

Russia's stockpile of approximately 1,000 to 2,000 non-treaty accountable nuclear weapons is anticipated to grow. These weapons fall entirely outside of the U.S.-Russia New Strategic Arms Reduction Treaty (START) and provide Russia with a diverse stockpile of theater and tactical weapons systems employable by naval, air, and ground forces. In a conventional conflict, if Russia perceives an irreparable imbalance of forces, it may escalate to non-treaty accountable nuclear weapons use.

In October 2019, Russia conducted their largest strategic nuclear exercise since the collapse of the Soviet Union. The exercise was notable for the size and scope of the nuclear forces involved and strategic messaging. President Putin participates in these exercises, indicating a high-level of readiness across Russia's strategic nuclear forces and intending to serve as a visible message to the U.S. and NATO. These major strategic exercises include command and control operations with participation of the entire nuclear triad; an ICBM combat training launch; and long-range aviation cruise missile launches. More importantly, Russia rescheduled and completed the strategic exercise to coincide with the invasion of Ukraine in February 2022.

DPRK

The DPRK remains a strategic security challenge as it continues to conduct activities that threaten regional stability and defy international norms. The DPRK previously tested ICBM-class missiles designed to reach the U.S., and they have a large arsenal of theater-class missiles.

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The recent missile launches demonstrate their ongoing desire to develop a credible missile threat. USSTRATCOM supports the Department's efforts with regional partners to reduce military tensions and encourages diplomatic efforts to pursue the DPRK's denuclearization. At the same time, USSTRATCOM will continue to contribute to the extended deterrence commitments of the Republic of Korea and Japan.

INTEGRATED DETERRENCE

While deterrence is not a new concept, the emerging security environment necessitates integrated deterrence to leverage all elements of national power, while enabling the Joint Force to synchronize actions across domains and time on an unprecedented scope and scale. *Yet, the foundation of the Nation's strategic deterrent is unchanged: a powerful and ready nuclear force, a survivable NC3 system, and a responsive nuclear weapons infrastructure. Absent this foundation, the credibility of integrated deterrence will not work.*

Sustaining and strengthening our Nation's deterrence is imperative. Our potential adversaries employ coercion or threat of force as a means to challenge U.S. security commitments and undermine the existing international order. To confront aggressive and coercive behaviors of nuclear-capable near-peers, the Nation must leverage all elements of national power with our nuclear enterprise at its foundation. Integrated deterrence orients the DoD toward stability and cooperation, and clearly communicates the folly and cost of aggression and that diplomacy is always the best option.

Alliances and partnerships remain our greatest strength and are enabled by our credible extended assurance and deterrence. Our policies and postures must enable our Allies to contribute to collective defenses even in the face of adversary nuclear coercion. We share with our Allies and partners a collective of like-minded states who believe a free and open world should be the foundation of the international order. *Our alliances are only as strong as the*

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guarantee of extended deterrence and assurance backed by credible U.S. nuclear forces, which are essential to integrated deterrence.

WHAT WE NEED TO DO OUR MISSION

Fundamentally, strategic deterrence relies on credible capabilities backed by a safe, secure, reliable, and effective nuclear enterprise. We no longer face a singular operational problem set but must consider two nuclear-capable near-peers simultaneously. The attributes provided by all three legs of the triad, forward-deployed regional capabilities, a robust NC3, and a weapons complex able to adapt to future threats offers the President flexible options and enhances the credibility of deterrence. Our strategic capability and capacity must evolve with the threat to achieve our National strategy. USSTRATCOM encourages Congress, the Department, and the Services to continue their decades-long support for these vital national security capabilities.

LAND-BASED TRIAD COMPONENT

The Minuteman III (MM III) ICBM force has stood on continuous alert every hour of every day for the past 50 years, ready to deliver a responsive and highly reliable strategic deterrent capability—and our potential adversaries know it. MM III represents half of the Nation's day-to-day available deterrent and its geographic dispersion presents an intractable targeting challenge. I previously testified that without the Nation's ICBMs the PRC becomes a strategic nuclear peer. *The discovery of three new ICBM missile fields in the last year demonstrates the value the PRC places on land-based forces. If we choose not to continue investing in the land-based leg of our triad, the PRC will soon have a superior, modernized nuclear force with elevated day-to-day readiness.*

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Requirement for MM III Sustainment

The MM III is well beyond its intended 10-year design life, yet still provides a high availability rate, testifying to its robust design, past modernization efforts, and the dedication of the Airmen of the U.S. Air Force. Exhaustive Air Force analysis decisively demonstrated that another MM III life extension is more costly than recapitalization, and the debate has moved well beyond funding. We cannot continue to rely on an aging ICBM force with end-of-life challenges and the inability to pace the threat. We must complete Ground Based Strategic Deterrent (GBSD) recapitalization on time and avoid the “sunset mentality” prevalent when replacing old systems.

Requirement for Ground Based Strategic Deterrent

GBSD is the program of record to recapitalize the ICBM force and is critical for maintaining a strong deterrent posture. GBSD will be able to pace the threat and is integral to our strategy to navigate the three-party nuclear-capable peer reality. Its development, procurement, and deployment are the best approach to ensure the land-based leg of the triad remains effective and affordable. GBSD preserves the MM III’s key attributes while improving operational effectiveness against a rapidly developing threat. USSTRATCOM encourages continued Congressional support for the Air Force’s ongoing GBSD strategy – pursue mature, low-risk technologies; design modularity; advanced cyber security; open system architecture; and state-of-the-art model-based systems engineering.

SEA-BASED TRIAD COMPONENT

The Navy’s OHIO-class SSBN fleet, paired with the Trident II D5 Strategic Weapon System (SWS), combines a highly effective, survivable, worldwide launch capability with continuous and virtually undetectable strategic deterrent patrols. Since their first deployment,

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early in the Cold War, we have relied on our SSBN fleet for a resilient, reliable, and survivable deterrent.

Requirement for Trident Sustainment and Modernization

No single Navy submarine has served longer than 37 years, yet the entire OHIO-class SSBN fleet has been life extended to an unprecedented 42 years. USSTRATCOM requires OHIO-class sustainment and modernization until completely replaced in 2042 by the COLUMBIA-class SSBN. OHIO-class sustainment is critical to ensure operational availability of the submarine force to minimize significant transition risk throughout the COLUMBIA-class deployment timeline. The COLUMBIA-class SSBN remains a high priority strategic deterrent program for USSTRATCOM. The program of record delivers twelve SSBNs, the absolute minimum required to meet at-sea requirements, especially during triad recapitalization and future intensive fleet maintenance periods. Continued Congressional support for the COLUMBIA program is vital to strategic deterrence. It must deliver on time to avoid a triad capability gap.

To guarantee uninterrupted SSBN capability, we must continue investing in our SSBN SWS programs. The Navy previously life extended the Trident II D5 weapon system (D5LE) to outfit the OHIO-class through retirement and deployment of the first eight COLUMBIA-class SSBNs. A second D5 life extension (D5LE2) is required to ensure a viable SSBN deterrent through the 2080s. D5LE2 will continue reliable, high performing D5LE design elements and components in order to mitigate cost and technical risk. Additionally, D5LE2 meets current D5 demonstrated performance while offering added flexibility to support future missions and payloads in response to advancing threat environments.

Anti-Submarine Warfare

Anti-submarine warfare threats continue to evolve rapidly as potential adversaries continuously look for new and innovative ways to gain an advantage in the undersea domain.

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The Navy's Integrated Undersea Surveillance System (IUSS) provides vital information concerning submarine and surface ship operations, and acoustic characteristics of interest. It allows U.S. forces to maintain favorable tactical and strategic positions while supporting deterrent patrol operations. Surveillance performed by IUSS directly contributes to the theater anti-submarine warfare commander's maritime defense of the homeland. Advances in Russian submarine stealth and detectability makes IUSS recapitalization a national imperative.

While our submarines are formidable weapon systems, we must address potential adversary's undersea security advances to ensure our current and future SSBN fleet remains effective and viable well into the future. Evolving submarine quieting, acoustic arrays, and processing capabilities challenge our acoustic superiority and subsequently, SSBN survivability. Advanced modifications of large vertical arrays, advanced materials science and coatings, and other efforts within the Acoustic Superiority Program are vital. Funding for these emerging passive long-range detection/wide area search programs secure our SSBN fleet advantages through the OHIO to COLUMBIA transition.

AIR-BASED TRIAD COMPONENT

The bomber fleet is our most flexible and visible leg of the triad. We are the only nation with the capability to provide bombers in support of our Allies and partners, enabling the U.S. to signal our resolve while providing a flexible option to de-escalate a conflict or crisis. Bombers support both strategic deterrent and conventional employment options, and execute global strike, nuclear, and conventional deterrent mission sets around the globe to achieve National objectives. USSTRATCOM executed 127 Bomber Task Force (BTF) missions over the past year. BTFs remain the iconic example of dynamic force employment across the entire Joint Force and potential adversaries watch these missions closely. We strongly encourage continued Congressional support for full funding of the bomber fleet.

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B-52H Sustainment

The B-52H is a 60-year-old platform with plans to remain in service for another 30 years. Achieving this unparalleled milestone carries maintenance and operational challenges, which require dedicated technical and funding resources. Critical B-52 modernization upgrades include the Commercial Engine Replacement Program (CERP), Radar Modernization Plan (RMP), and survivable NC3. These improvements are necessary to keep the B-52 flying and able to pace the evolving threat. The Air Force recently selected Rolls-Royce to execute CERP to replace the B-52's 1960s-era TF-33 engines, enabling longer unrefueled range with lower emissions while solving supply chain issues afflicting the current engines. The B-52's very low frequency (VLF) and extremely high frequency (EHF) modernization programs will provide mission critical, beyond-line-of-sight strategic connectivity, and must field on time to meet USSTRATCOM's operational requirements.

B-2 Sustainment

The B-2 fleet remains the world's only low-observable bomber, able to penetrate denied environments while employing a wide variety of munitions against high-value strategic targets. The DoD must protect this unique operational advantage as the Air Force transitions from the B-2 to the B-21. The Air Force can only achieve a successful transition with full funding for the B-2 sustainment and modernization programs until the B-21 completes development and certification, both conventional and nuclear missions. A carefully synchronized transition is necessary to mitigate operational risk associated with executing the triad-wide multi-platform recapitalization.

Requirement for B-21

The B-21 Raider will support the nuclear triad with a visible deterrent capability and provide strategic and operational flexibility across a wide range of military objectives. The

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program is on track to meet USSTRATCOM operational requirements, with five test aircraft currently in development and the first operational aircraft scheduled for delivery in the mid-2020s. USSTRATCOM supports fully funding the Air Force's B-21 strategy to prevent operational shortfalls in the bomber force.

Air-Delivered Weapons / Long Range Standoff

The air-delivered weapons portfolio consists of the Air Launched Cruise Missile (ALCM), the B83 gravity bomb, and the B61 family of weapons providing the right mix of standoff and direct attack munitions to meet near-term operational requirements. The long range standoff (LRSO) weapon will replace the ALCM as our Nation's only air-delivered standoff nuclear capability. It will provide the President with flexible and scalable options, and is capable of penetrating and surviving against advanced air defenses – a key attribute and critical component in all USSTRATCOM operational plans. Without LRSO, B-2 and B-21 bombers will have no option but to fly directly over targets to drop gravity-delivered weapons unnecessarily increasing risk to the mission and the lives of Air Force bomber aircrews.

The LRSO complements the ICBM and SSBN programs as they transition from legacy to modernized weapon systems. The LRSO on-time delivery is important to sustaining strategic stability, as potential adversaries will exploit gaps resulting from technical problems or production delays. Finally, fielding LRSO is cost-effective. Using gravity weapons to deliver similar effects would require ten-times the current bomber allocation and four times the current tanker allocation, with more gravity weapons, or employment of additional triad elements. LRSO full funding is absolutely imperative to reduce operational risks we face during triad recapitalization.

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Tanker Support

A robust tanker fleet is essential to sustaining global reach for all USSTRATCOM mission sets. While the KC-135 and KC-10 force has done the yeoman's work for decades, the Air Force's effort to revitalize the tanker fleet is timely. The likelihood of future concurrent mission sets between strategic, theater, and homeland defense is high, requiring continued tanker modernization and expansion efforts. USSTRATCOM fully endorses and supports the Air Force's effort to modernize and sustain the tanker fleet.

NUCLEAR COMMAND, CONTROL, AND COMMUNICATIONS

NC3 provides the critical assured communications link between the President and our nuclear forces. On-going NC3 Enterprise Center (NEC) modernization efforts bridge the gap between legacy and future systems to ensure this critical link does not fail. While aging capabilities provide the nuclear triad with sufficient viable assured strategic communications; today, sustainment issues increasingly compromise the reliability of these stalwart systems. Modernizing our NC3 systems is key to ensuring the nuclear capability of the Nation remains fully positioned to provide an assured response if called upon. Our NEC Next Generation capabilities must pace adversary emerging and future technological developments.

NC3 Next Generation / Modernization

Potential adversaries continue to rapidly research, develop, and field emerging technologies and weapon systems. We are at a point where end-of-life limitations and the cumulative effects of underinvestment in our nuclear deterrent and supporting infrastructure leave us with no operational margin. The Nation simply cannot attempt to indefinitely life-extend leftover Cold War weapon systems and successfully support our National strategy. Pacing the threat requires dedicated and sustained funding for the entire nuclear enterprise and NC3 Next Generation modernization must be a priority.

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The DoD operates, maintains, and defends the current NC3 enterprise every single day from cyber threats. In coordination with the Services, USSTRATCOM led an enterprise-wide approach to harden the current architecture until complete fielding of the NC3 Next Generation. As an example, the Air Force is leading the effort to modernize the NC3 data pathways for the Strategic Automated Command and Control System (SACCS), replacing legacy telephony to sustainable and secure modern technology with upgraded at-risk cryptographic devices.

The NEC and DoD stakeholders fielded the NC3 Next Generation Increment 1 capabilities, including the Family of Advanced Beyond Line of Sight Terminals (FAB-T) to replace antiquated survivable satellite communications equipment. The NEC, the National Security Agency (NSA), and the Services also began replacing outdated encryption equipment with newer, upgraded capabilities. The NC3 Enterprise continues segment upgrades to legacy telecommunications capability from analog to digital working closely with the Defense Information Systems Agency. This conversion is the first step to standardize our enterprise-wide terrestrial communications highway. Additionally, the NEC collaborated with U.S. Cyber Command (USCYBERCOM) to execute a cybersecurity pilot program to provide real-time, persistent monitoring across various NC3 networks to detect, characterize, and mitigate adversary network actions.

The NEC, Navy, and Air Force completed the first step in a digital high frequency (HF) demonstration to enable advanced beyond line-of-sight communication between our command centers and operational forces. USSTRATCOM developed, installed, and deployed a mobile communications suite providing an alternative communications capability supporting continuity of operations and force direction. This new capability will enable USSTRATCOM to rapidly create requirements and field systems in the future.

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The NEC is undertaking several efforts to more rapidly develop and deliver NC3 enterprise capabilities. The NEC established a digital modeling and engineering environment (DMEE), a collaborative platform in the standard development of and test engineering specifications for the NC3 enterprise. The NEC and the University of Nebraska-Lincoln, through a Partnership Intermediary Agreement (PIA), established the Nebraska Defense Research Corporation (NDRC). The PIA fosters collaboration between commercial entities, defense industry, academia, Federally Funded Research and Development Centers (FFRDCs), and other government agencies. The NDRC is already prototyping of future NC3 Next Generation Incremental capabilities. All of these efforts are currently ongoing and will posture delivery of NC3 Next Generation Increments and provide increased operational margin within our NC3 Enterprise.

NC3 Cybersecurity, Technological Improvements, and AI / Machine Learning (ML)

USSTRATCOM continues to realize the benefits from the investment in our world class Command and Control Facility, the DoD's newest NC3 command center. Confidence in our ability to protect, defend, and execute the nuclear deterrent mission in the face of advanced cyber threats remain high. The relative isolation and the redundancies of the systems comprising the Nuclear Command and Control System (NCCS), combined with ongoing cybersecurity enhancements, ensure our ability to respond under adverse cyber conditions. To preserve our critical information and command and control advantages, USSTRATCOM is investing in cybersecurity protections that exceeds the DoD baseline standard while looking for opportunities to improve that posture.

Near-term efforts to enhance cybersecurity of the NC3 enterprise include: the establishment of quarterly cybersecurity reporting for all NC3 information technology (IT) systems; ongoing efforts with USSTRATCOM system program managers to correct

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cybersecurity shortfalls; piloting of a persistent cyber sensing and monitoring capability for NC3 IT systems; and the development and execution of Defensive Cyber Operations (DCO) Internal Defensive Measures (IDM) to harden and defend the NC3 cyber terrain. As the threat evolves; however, the DoD must continue to fund and rapidly implement required cybersecurity capabilities. CyberSecurity Service Provider (persistent cyber defense); persistent sensing and monitoring across the NC3 enterprise; and cryptographic modernization will ensure the confidentiality of our information and decision making capabilities. A responsive cyber Command and Control construct will enable the rapid dissemination of defensive cyber operations orders, facilitate action, and enable follow-up reporting. These efforts will ensure continued readiness of the nuclear deterrent mission and set conditions for the success of our conventional forces.

Deep learning and advanced data management concepts are also fueling new demands for infrastructure that can scale to capacity on demand. Acting on the guidance of the Deputy Secretary of Defense and recommendations from the National Security Commission on AI, USSTRATCOM implemented the Command Data and AI Center (CDAI) to solve the command's most intractable problems through the application of advanced AI/ML methods. The command is recruiting a highly skilled workforce to build and maintain a resilient and scalable cloud and on-premise infrastructure to provide the capabilities to maintain information advantage over our potential adversaries.

We will do this in ways consistent with the DoD Ethical Principles for Artificial Intelligence, while continuing to lead in developing best practices for the development and application of AI and ML technologies to ensure their use is safe, secure, reliable, and consistent with our values. In an effort to "go faster," USSTRATCOM completed a 90-day pilot to assess opportunities to leverage commercial industry and use of non-traditional unclassified data

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sources to solve some of our most challenging problems. I strongly endorse Deputy Secretary of Defense Hicks's AI and ML initiatives in this critical focus area.

USSTRATCOM continues to collaborate with USCYBERCOM, the Services, and agencies to leverage technologies in development, security, and operations (DevSecOps), code delivery, cloud computing, and data analytics to accelerate the development and delivery of new capabilities. Initiatives in these areas will jumpstart development of frameworks and governance necessary to pace the threat. Likewise, these new areas require stable, consistent, and on-time funding.

NUCLEAR WEAPONS AND SUPPORTING INFRASTRUCTURE

The Nation faces a confluence where triad delivery platforms, weapons, and infrastructure must modernize simultaneously. As with DoD programs, the Department of Energy (DoE) and the National Nuclear Security Administration (NNSA) fill a vital role providing the weapons and components required to maintain the Nation's strategic deterrent mission. The NNSA's programs of record must be prioritized and executed on schedule to ensure the DoD retains a credible and modern triad. The NNSA's ability to sustain the Nation's nuclear weapons stockpile is underpinned by a resilient and responsive production infrastructure and robust science and technology programs. All of these elements are critical to maintaining a safe, secure, and effective deterrent force. The objective is to restore the weapons complex to a resilient, responsive and modern condition; capable of sustaining the health of the Nation's stockpile and keeping pace with the evolving threat environment.

Nuclear Weapons and Stockpile Challenges

While today's stockpile is safe, secure and militarily effective, I am increasingly concerned with reliability and performance degradations in the majority of our systems. We must execute stockpile modernization programs on time to reverse this trend. In compliance

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with national policy, the NNSA has done an excellent job reducing the weapons stockpile. As we shift focus beyond life extension to modernizing our remaining weapons, we must overcome obstacles that delay program execution. Failure to do so results in accumulation of operational risk from continued deferral of necessary modernization programs and aging weapons in the stockpile decades longer than intended. For example, both the B61 life extension and W88 alteration programs were delayed 24-months and are now late-to-need. The W80-4 program is a just-in-time modernization for airborne standoff capability, and any program delay incurs operational impacts.

Stockpile modernization programs take 10-15 years to execute. Without a concerted effort to reduce these timelines, today's issues will continue to manifest as the Nation undertakes more complex ballistic missile modernization programs. Specifically, W87-1 is the "pathfinder" weapons program for modernizing our land- and sea-based ballistic missile systems and will develop the infrastructure and technology processes needed in the future. Any W87-1 program delays will cascade through each follow-on program, beginning with the W93/Mk7. W93/Mk7 must deploy on time to reduce our over-reliance on a single SSBN warhead type, avoid future simultaneous SLBM modernization and support the United Kingdom's modernization to its deterrent force.

Weapons Complex Infrastructure

The DoE, NNSA, and DoD work closely to ensure the nuclear weapons infrastructure complex is postured to ensure the stockpile remains safe, secure, and militarily effective. However, today's Manhattan Project-era infrastructure is in poor condition, challenging NNSA's ability to successfully meet basic sustainment needs. Long-term deferred infrastructure investments have significant impacts, and there are heightened concerns with every major site providing critical stockpile capabilities to include uranium, tritium, high explosives, lithium,

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radiation-hardened electronics, testing, experimentation, and weapon assembly/disassembly. Infrastructure modernization must be accomplished to prevent delays in fielding required capabilities. Prioritizing crucial NNSA infrastructure modernization programs is the best and only option to pace projected threats and sustain strategic deterrence.

In 2021, it became clear the production complex would not meet the Nation's plutonium pit production requirements, necessitating pursuit of less optimal approaches to meet stockpile modernization programs in the 2030s. Pit production shortfall is a leading indicator of how our current infrastructure is unable to execute the needed and planned stockpile modernization strategy. The atrophied condition of the infrastructure, coupled with delays in fielding necessary state of the art capabilities, significantly increases operational risk in sustaining a safe, secure, and effective nuclear deterrent.

Science, Technology, and Engineering Base

The science, technology and engineering (ST&E) base is essential for nuclear weapon and production complex modernization. Our ability to attract and retain the best and brightest scientists, engineers, program managers and technicians to work in the strategic deterrence mission set rests on ST&E efforts. In 2021, ST&E programs continued to advance our understanding of nuclear weapons. For example, the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory (LLNL) made a major technological advance, to expand the range of experiments directly relevant to stockpile modernization. This achievement will enable high fidelity testing to address challenging nuclear survivability requirements in the future.

The ability of NNSA to backstop an aging stockpile and infrastructure with advanced science and technology programs has enabled the Nation to sustain the deterrent well beyond projected lifetimes. As our potential adversaries rapidly advance their nuclear programs;

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however, this edge in science and technology is beginning to erode. The Nation must aggressively sustain and advance these critical resources to improve our understanding of nuclear weapons performance and mature technologies to allow us to confidently move forward with stockpile and production modernization programs. I have formally reported this to the Secretary of Defense.

NUCLEAR WEAPONS SECURITY / FORCE PROTECTION

Nuclear weapons security remains a top USSTRATCOM priority and I am encouraged by the Department's continuing efforts to enhance and improve our security posture and capabilities. The security systems that protect our nuclear weapons must evolve as potential adversaries seek to exploit vulnerabilities. We must remain committed to protecting the investments in and fielding of the capabilities required to maintain the high security standards this mission demands and continue to adapt as the threat evolves.

MH-139A Grey Wolf Replacement Helicopter

The Air Force continues to make progress toward replacing the aging UH-1N helicopter fleet with the MH-139A Grey Wolf. The Grey Wolf will close our UH-1N limitations in speed, range, endurance, payload and survivability, and provide a rapid lethal response to address security vulnerabilities. We look forward to the Air Force completing Grey Wolf FAA certifications and getting aircraft "on the ramp" as we move toward full operational capability across all three ICBM wings in FY28.

Countering Small Unmanned Aircraft Systems

USSTRATCOM requires an effective integrated set of Countering Small Unmanned Aircraft Systems (C-sUAS) capabilities to defend strategic locations and assets across the threat spectrum in a rapidly advancing and technically challenging environment. As technology advances, so must our access and authorization to use both kinetic and non-kinetic capabilities in

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C-sUAS engagements to protect our nuclear assets. I strongly support the Services' efforts to develop and field effective protection systems and encourage continuing Congressional support as we deploy C-sUAS capabilities to reduce the threat.

Countering Underwater Unmanned Vehicles

USSTRATCOM requires an integrated Counter-Unmanned Underwater Vehicle (C-UUV) capability for protection of strategic naval assets. The underwater environment has become an uncontested entry point for UUV systems, threatening our strategic assets. The effectiveness of traditional undersea detection and protection methods must be enhanced and new capabilities developed to ensure we retain strategic advantage in response to this emerging threat. It is imperative we seek and employ non-traditional layered protection measures to maintain the safety and security of our waterfronts and strategic assets.

Weapons Generation Facilities

The future Weapons Generation Facilities (WGF) are a DoD program priority and will consolidate weapon maintenance and storage functions to support ICBM and bomber missions. These functions reside in 1960s and 1970s era Weapons Storage Areas (WSA) that exceed their intended service lives. Emerging threats expose WSA vulnerabilities, driving the need for a cost effective approach to restore weapon security and storage; however, the uncertainty of consistent stable funding, supply chain concerns, and pandemic repercussions affect overall confidence in construction schedules.

CONVENTIONAL HYPERSONIC WEAPONS

Hypersonic weapons development remains a top USSTRATCOM priority. Hypersonic weapons will provide a highly responsive, non-nuclear global strike capability against distant, defended, and/or time-critical threats when other forces are unavailable, denied access, or not preferred. Conventional hypersonic weapons will enhance our overall strategic deterrence

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posture by providing the President additional strike options to rapidly project power and hold high-value targets at risk without crossing the nuclear threshold. USSTRATCOM will be ready to command and control hypersonic weapons the day they are fielded, as these weapons directly contributes to the Command's Strategic Deterrence and Global Strike missions. We appreciate and encourage continued Congressional funding as we quickly develop, procure, and field this enhancement to our strategic deterrence portfolio.

JOINT ELECTROMAGNETIC SPECTRUM OPERATIONS (JEMSO)

USSTRATCOM and the Joint Force are critically dependent on the EMS. Across the competition continuum, the Electromagnetic Spectrum (EMS) will be congested, contested, and constrained. Potential adversaries are pursuing technology to deny our ability to use the EMS successfully across our range of missions and operations, to include targeting critical NC3 architecture. To ensure freedom of maneuver in the EMS, we must continue to develop and integrate EMSO across the DoD and with select allies.

USSTRATCOM is implementing operational aspects of the DoD EMS Superiority Strategy (EMSSS) I-Plan Goal 5, Establishing Effective EMS Governance, in coordination with DoD Chief Information Officer (CIO), OUSD, Joint Staff, Combat Support Agencies, CCMDs, and Services. To support this goal, USSTRATCOM will establish a 2-Star Direct Report Organization called the Joint EMS Operations Center (JEC). The JEC will enable execution of proposed amended UCP responsibilities for JEMSO operational lead reporting directly to CDRUSSTRATCOM and we intend to achieve IOC this year.

USSTRATCOM is leading the development of JEMSO Cells (JEMSOC) across the Joint Force to support joint planning, coordination, and control of the EMS. The USSTRATCOM JEMSO staff in lockstep with DoD CIO, is driving the requirements for a JEMSOC Electromagnetic Battle Management (EMBM) system to achieve EMS superiority.

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USSTRATCOM's Joint Electromagnetic Warfare Center (JEWEC) established the first-ever Joint EMS Information Analysis and Fusion capability to provide spectrum-specific data for electromagnetic battle management and CCMD JEMSO cells. Our task is to raise the aggregate readiness of the Joint Force to prevail in a complex EMS that has become key terrain in nearly every military action we undertake.

MISSILE DEFENSE

Missile defense (MD) remains an essential element of our strategic deterrence approach, raising the stakes of rogue actors and regional adversaries and denying the benefit of attack against our protected assets as part of an integrated deterrence framework, both for the homeland and for the regional CCMDs. The active missile defense mission begins with launch detection, attribution, warning, and tracking, all of which face significant challenges as potential adversaries develop and deploy hypersonic systems, increase ballistic, cruise missile availability, and lethality. Technology developments continue at an unrelenting pace and employment techniques - operating at lower altitudes, higher speeds, and with greater maneuverability - continue to challenge our missile defense systems. We must develop and deploy additional missile defense systems with advanced capabilities into the existing architecture to address the rapidly changing threat environment. USSTRATCOM is engaging with CCMDs, the Services, and agencies to advocate for and deliver global integrated missile defense capabilities and capacity in an operationally relevant timeframe.

As we move beyond legacy interceptor-based "hit-to-kill" technologies, we must expand our approach to active defenses and appreciate the funding of such critical sensors as the Hypersonic and Ballistic Missile Space Tracking Sensor (HBTSS) and the Space Development Agency's Tranche 1 MD Tracking Layer. As the Department develops capabilities that complement our existing Ground-Based Interceptor (GBI) systems and regionally-focused

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systems such as, Aegis, Terminal High Altitude Area Defense (THAAD), and Patriot, we must examine novel, cost effective options to adapt and overcome emerging threats. Finally, we should consider modifications to existing systems to defend against emerging threats, while remaining fiscally responsible – for example, fully integrating existing space- and terrestrial-based sensors in an attempt to identify and track ballistic, maneuvering, hypersonic, and cruise missile threats, as well as unmanned aerial systems.

USSTRATCOM continues to work with our Allies and partners to further integrate our capabilities to meet common threats. Led by the Joint Force Component Command-Integrated Missile Defense, the 24-nation missile defense policy campaign, NIMBLE TITAN 20, culminated with a senior leader event in Amsterdam in November 2021 and was successfully completed despite the limitations of the on-going pandemic. We have begun planning our next campaign, NIMBLE TITAN 23, to deepen the exchange of MD policy views and insights and collectively explore operational concepts in this challenging environment.

OUR PEOPLE & PARTNERSHIPS

It has been thirty years since this Nation has had to seriously consider the implications of competition through crisis and possible conflict with a nuclear-armed opponent let alone two nuclear-capable near-peers. USSTRATCOM holds the bulk of the last remaining strategic and operational deterrence expertise in the DoD. Thus, our people and partnerships are a vital element to the national strategic deterrence mission. Even against the challenges of the continuing pandemic, the personnel of USSTRATCOM remain operationally resilient. Because of our people, we continued the mission during this unforeseen crisis.

People

The Command remains committed to improving our workforce and our competitive advantage. We are growing our intellectual and deterrence theory capital through industry and

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academic partnerships such as USSTRATCOM's Strategic Fellows and Deterrence Education Programs. We continue to pursue Diversity, Equity, and Inclusion in line with DoD guidance through Human Capital initiatives. The Command emphasizes and distributes Service and agency focused resources to provide greater visibility to individuals within the Command. We offer opportunities for our military and civilian workforce to pursue additional diversity leadership training and certificates, opportunities to participate in Heritage Councils to help celebrate DoD-recognized special observances, and Directorate-level diversity councils to promote healthy culture and provide direct feedback on workforce and personnel guidance and processes. Additionally, we provide and monitor active feedback mechanisms to report on health and culture within the Command and provide tools to address diversity issues.

Academic Endeavors

This Nation faces an intellectual challenge, requiring us to leverage the intellectual capacity of the U.S., our Allies and partners. USSTRATCOM is making a concerted effort to reinvigorate research in strategic deterrence. Since the establishment of the Academic Alliance in 2014, over 70 academic institutions and industry partners have focused on USSTRATCOM's challenging mission set while building the next generation of national security professionals. Although the Alliance is currently developing the deterrence-focused curricula, it is only a fraction of what is needed to reinvigorate research and analysis for deterrence concepts. In August 2021, I further challenged the Academic Alliance, FFRDCs, and think tanks to provide new ideas on strategic deterrence in the 21st century by establishing USSTRATCOM's first ever analytic agenda. The response from these institutions is so promising that I am integrating some of the concepts and ideas into USSTRATCOM plans and operations.

While this is a good start to understanding deterrence in the 21st century, good will, and the Academic Alliance will only take the Department and our Nation's capacity to think through

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deterrence challenges so far. USSTRATCOM collaborates with the National Strategic Research Institute (NSRI) and the University of Nebraska to research key topics in my analytic agenda. This initiative only scratches the surface to truly understand the implications of strategic deterrence in the 21st century and requires additional engagement with our academic partners.

Wargames

Exercises, wargames, tabletop exercises (TTX), and rehearsals of concept continue to refine how we demonstrate joint capacity, capability, and interoperability across the globe. Last year, USSSTRATCOM conducted over 360 nuclear command, control, and communications-focused exercises and wargame events focused on coordination with other CCMDs and the interagency, integrating advanced weapons, and improving processes and procedures to leverage every advantage from our nuclear enterprise.

CONCLUSION

Potential adversary actions are challenging us in ways we have not experienced in over 30 years. USSTRATCOM will continue to deter strategic attack and employ forces as directed by the President to guarantee the security of the Nation, our Allies, and our partners. We must remember deterrence is not a static concept – it evolves – and the current evolution of the world’s strategic security environment will result in three nuclear-capable near-peers. ***The PRC and Russia actively seek to change the international rules-based order, while the U.S., with our Allies and partners, seek to defend it.*** Our military can contribute to an integrated whole-of-government approach only if we make clear-eyed and threat-informed decisions regarding the capabilities needed to protect and defend the Nation. The Nation’s nuclear force is the backstop of integrated deterrence. Today, we stand ready to execute our assigned missions. Failure to pace the threat from potential adversary technological advances today may inhibit our ability to do so in the future. To execute a National strategy resistant to adversarial coercion, we need

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modern, effective, and reliable capabilities. *Above all else, USSTRATCOM will continue to provide strategic deterrence, underwriting every U.S. military operation around the world and deterring great power conflict. Peace is our Profession...*