



Document No. 1. Report on the Nuclear Employment Strategy of the United States – 2020 (Specified in Section 491(a) of Title 10 U.S.C.)

Purpose

This report on the Nuclear Employment Strategy of the United States is submitted in accordance with section 491(a) of title 10, U.S. Code, which states:

By not later than 60 days before the date on which the President implements a nuclear employment strategy of the United States that differs from the nuclear employment strategy of the United States then in force, the President shall submit to Congress a report setting forth the following:

- (1) A description of the modifications to the nuclear employment strategy, plans, and options of the United States made by the strategy so issued.
- (2) An assessment of effects of such modification for the nuclear posture of the United States.
- (3) The implication of such changes on the flexibility and resilience of the strategic forces of the United States and the ability of such forces to support the goals of the United States with respect to nuclear deterrence, extended deterrence, assurance, and defense.
- (4) The extent to which such modifications include an increased reliance on conventional or non-nuclear strike capabilities or missile defenses of the United States.

In April 2019, the President issued nuclear weapons employment guidance. This report is provided pursuant to section 491 as the Department of Defense (DoD) implements this new employment strategy by updating DoD military guidance and plans, a process that has been ongoing since 2019, and is scheduled to be completed in 2022.

Introduction

The President's April 2019 nuclear weapons employment guidance, as implemented by the Secretary of Defense's Nuclear Weapons Employment Planning and Posture Guidance, guides the planning for employment of nuclear weapons consistent with national policy. The revised Presidential and Secretary of Defense guidance reflects continuity with previous guidance, as it accounts for contemporary nuclear threats and great power competition. The guidance is intended to strengthen the security of the United States and its allies and partners through the development of tailored nuclear deterrence strategies supported by flexible capabilities.

The requirements for effective nuclear deterrence vary given the need to address different potential adversaries under very different circumstances. Deterrence rests on a perceived



ability to deny an adversary the objectives it seeks from an attack and the capability to inflict intolerable costs under any circumstances. However, the United States cannot rely on adversaries to perceive threats of large-scale nuclear responses as credible in all situations. Therefore, to strengthen the credibility of U.S. nuclear deterrence and extended deterrence, the United States will continue to field a range of nuclear and non-nuclear capabilities that provide U.S. leadership with options that can be tailored to deter potential adversaries, assure allies and partners, achieve U.S. objectives should deterrence fail, and hedge against an uncertain future.

If deterrence fails, the United States will strive to end any conflict at the lowest level of damage possible and on the best achievable terms for the United States, and its allies, and partners. One of the means of achieving this is to respond in a manner intended to restore deterrence. To this end, elements of U.S. nuclear forces are intended to provide limited, flexible, and graduated response options. Such options demonstrate the resolve, and the restraint, necessary for changing an adversary's decision calculus regarding further escalation.

2018 Nuclear Posture Review

In 2017, President Trump directed the Secretary of Defense to initiate a new Nuclear Posture Review (NPR). DoD completed the NPR in 2018 and has since been implementing it. The purpose of the 2018 NPR was to reassess U.S. security requirements in the new strategic environment that had developed since the 2010 NPR was published.

The 2018 NPR identifies four key roles that nuclear weapons play in U.S. national security strategy:

- Deterrence of nuclear and non-nuclear strategic attack;
- Assurance of allies and partners;
- Achievement of U.S. objectives if deterrence fails; and,
- Capacity to hedge against an uncertain future.

In implementing the 2018 NPR, the DoD, the Department of Energy (DOE) and the Department of State (State) are focused on ensuring that U.S. nuclear forces can fulfill these roles, both today and in the future.

Deterrence Strategy

The 2018 NPR articulated a U.S. nuclear deterrence strategy consistent with previous deterrence strategies, adjusted to account for developments in the threat environment since the 2010 NPR. These developments include increased prominence of nuclear weapons in the



military strategies of Russia, China, and rogue States to secure coercive and military advantage against the United States, and its allies, and partners.

The Strategic Environment

Changes in the strategic environment since the publication of the 2010 NPR demonstrate that nuclear-armed potential adversaries chose not to follow the U.S. lead in reducing the role of nuclear weapons in their national security strategies. They have instead chosen to emphasize the role of nuclear weapons and, for more than a decade, they have increased the size of their nuclear arsenals, modernized their existing capabilities, and created and fielded new capabilities.

The increasing prominence of nuclear weapons in the national security strategies of potential adversaries is taking place in a strategic environment that, since 2010, has become significantly more threatening and less stable. Russia, China, North Korea, and Iran all have undertaken aggressive actions to expand or reinforce their influence. Of particular concern are aggressive Russian and Chinese actions (e.g. Russian occupation of Crimea, military intervention in eastern Ukraine, and violation of the Intermediate Range Nuclear Forces (INF) Treaty; Chinese militarization of the South China Sea, renewed assertiveness vis-à-vis Taiwan, and border conflict with India).

Rather than reducing the role of nuclear weapons, Russia and China are developing, testing, and procuring nuclear weapons and delivery systems to support their efforts to upset the international order, including claiming disputed territories and forcefully occupying neighboring lands. Russia, for instance, is expected to grow the size and increase the capabilities of its nuclear arsenal significantly over the next decade. This growth is driven primarily by Russia modernizing and expanding its non-strategic nuclear weapons – providing them greater accuracy, longer ranges, and lower yields to suit their role in coercive nuclear strategies and nuclear warfighting. In addition, Russia is pursuing a number of novel nuclear delivery systems of strategic range that are not covered under the New START Treaty and have no U.S. counterpart.

China, meanwhile, continues its policy of non-transparency regarding its nuclear arsenal and doctrine, and is likely to at least double the size of its nuclear stockpile by 2030. It may not stop there. Its activities in Asia have caused considerable alarm among U.S. allies and partners. Despite a global economic downturn, China continues to increase its defense spending and one of its top priorities is modernizing and significantly expanding its nuclear forces. China will soon field a full triad of delivery systems (land-, air-, and sea-based) that can range U.S. regional allies and partners, and the U.S. homeland. The United States has significant questions and concerns regarding the evolution of Chinese nuclear doctrine, especially regarding its “No First Use” policy, as well as the rapid expansion of its nuclear



arsenal and its exploration of low-yield nuclear warheads. China's policy of opacity and consistent refusal to engage in serious dialogue concerning nuclear matters, nuclear risk reduction, and arms control increases the dangers and potential consequences of misperception and miscalculation in crisis or conflict.

The rogue states of North Korea and Iran continue to pose a security threat to the United States and its allies and partners. Although the United States still aspires to a negotiated elimination of North Korea's nuclear arsenal, North Korea continues to expand and advance its nuclear capabilities. The United States is carefully monitoring North Korea's missile development, nuclear advances, and proliferation activities. In addition, Iran is gaining valuable knowledge with its space-launch program that could be applied towards developing an intercontinental ballistic missile (ICBM). Iran's non-compliance with its nuclear non-proliferation obligations under the Joint Comprehensive Plan of Action (JCPOA) is especially troubling.

Although the United States aspires to a cooperative international order that allows for nuclear disarmament, these international security developments, when combined with the unpredictable nature of future threat developments and aging U.S. nuclear systems, demonstrate the prudence and necessity of the U.S. nuclear modernization program. Since international affairs can alter deterrence and assurance requirements faster than the U.S. defense industrial base can reasonably be expected to respond to shifting requirements, it is of paramount importance that U.S. nuclear forces; the nuclear command, control, and communication systems (NC3); and stockpile infrastructure be flexible, responsive, and resilient.

Until nuclear weapons can be prudently eliminated from the world, the United States will maintain safe, secure, and effective nuclear forces that deter potential adversaries, assure allies and partners, enable us to achieve our objectives if deterrence fails, and hedge against future uncertainties.

Nuclear weapons alone, no matter how capable, however, cannot have the necessary deterrence and assurance effects without a realistic and credible supporting strategy, tailored to potential adversaries.

Tailored Strategies and Flexible Capabilities

Through the Cold War and the years immediately thereafter, the United States was able to focus its nuclear weapons policy, strategy, and force development on the Union of Soviet Socialist Republics (USSR) and later the Russian Federation. However, the post-Cold War strategic environment became more complex as Russia began modernizing and expanding its nuclear capabilities; China declared their aspirations to "basically" complete military



modernization by 2035 and become a “world class” military by 2049 – armed with a nuclear triad and a global fighting force; and North Korea pursued and acquired a nuclear capability. As a result, tailored deterrence strategies – unique to each potential adversary – are now necessary to reduce the chance of misperception while clearly and credibly communicating U.S. intentions and capabilities.

The 2018 NPR states: “The requirements for effective deterrence vary given the need to address the unique perceptions, goals, interests, strengths, strategies, and vulnerabilities of different potential adversaries. The deterrence strategy effective against one potential adversary may not deter another. Consequently, the United States will apply a tailored approach to effectively deter across a spectrum of adversaries, threats, and contexts.” In short, U.S. strategies and capabilities need to convey the costs of aggression to the right officials, at the right time, through the right communication channels, and in a credible and convincing manner.

The nuclear forces of the United States must be sufficiently flexible to deter a large spectrum of nuclear scenarios credibly, including an adversary’s limited employment of nuclear weapons to secure advantage in a crisis or conflict. To meet these requirements, the United States will field nuclear and non-nuclear capabilities that provide U.S. leadership a range of tailored response options to deter escalation and accomplish U.S. objectives if deterrence fails. U.S. nuclear forces are designed, sized, and postured in such a way that no adversary should ever contemplate a successful disarming first strike or limited nuclear employment.

Elements of U.S. nuclear forces, currently in the field or under development, provide flexible, credible, limited, and graduated response options so U.S. leadership has choices beyond inaction or large-scale responses. Such options reduce the risk of a potential adversary’s misperception of an exploitable gap between stated U.S. objectives and its perceived capabilities.

Limited and graduated U.S. response options provide a more credible deterrent to limited attack against the United States and our allies and partners than relying primarily on the threat of large-scale nuclear responses. Flexible and graduated options that raise an adversary’s nuclear threshold have been a continuous part of U.S. deterrence strategy for decades. Such options do not increase risk and do not lower the U.S. nuclear threshold. Rather, such options, regarded as credible responses by potential adversaries, make their resort to nuclear weapons less likely, not more likely.

Capabilities designed to provide tailored, limited, and graduated response options do not work in isolation. Preserving large-scale response options further enhances deterrence by raising doubt in an adversary’s mind of its ability to predict or control the consequences of a U.S. response to a nuclear or a non-nuclear strategic attack. A flexible nuclear force therefore



strengthens deterrence and reinforces the U.S. commitment to its allies and partners by demonstrating to adversaries there is no scenario for nuclear use to which the United States cannot respond effectively, and there exists no advantage an adversary could secure that would outweigh the costs of a U.S. nuclear response.

Declaratory Policy and Posture Guidance

Declaratory Policy

The 2018 NPR did not fundamentally alter the declaratory policy articulated in the 2010 NPR, but rather clarified it. The 2018 NPR states:

The United States would only consider the employment of nuclear weapons in extreme circumstances to defend the vital interests of the United States, its allies, and partners. Extreme circumstances could include significant non-nuclear strategic attacks. Significant non-nuclear strategic attacks include, but are not limited to, attacks on the U.S., allied, or partner civilian population or infrastructure, and attacks on U.S. or allied nuclear forces, their command and control, or warning and attack assessment capabilities.

The United States will not use or threaten to use nuclear weapons against non-nuclear weapons states that are party to the NPT and in compliance with their nuclear non-proliferation obligations.

Given the potential of significant non-nuclear strategic attacks, the United States reserves the right to make any adjustment in the assurance that may be warranted by the evolution and proliferation of non-nuclear strategic attack technologies and U.S. capabilities to counter that threat.

The President of the United States is the sole authority who can authorize the employment of nuclear weapons. DoD takes numerous steps to ensure U.S. nuclear forces are always under positive control and responsive to Presidential direction. DoD has established a number of means to provide senior leadership with the necessary information to support an informed decision regarding the employment of nuclear weapons. Any U.S. decision to employ nuclear weapons would follow a deliberative process.

Alert Levels

The day-to-day posture and alert levels of U.S. nuclear forces must ensure, and must be seen to ensure, that the United States has credible and effective response options available even in the wake of a large-scale nuclear attack on the United States. Retaining portions of U.S.



nuclear forces on alert helps to deter a potential adversary from attempting a disarming nuclear first strike against the United States.

To strengthen deterrence, the United States maintains the capability to launch nuclear forces under conditions of an ongoing nuclear attack. However, owing to the mutually-supporting elements of the nuclear Triad, U.S. nuclear forces do not rely on launch-under-attack to ensure a credible response. Rather, U.S. nuclear forces are postured to withstand an initial attack and provide maximum decision-making time for a President to gather information and respond in a time, place, and manner of our choosing.

It is simply incorrect to say U.S. nuclear weapons are on “hair-trigger” alert; they are not. The U.S. alert system prioritizes surety over speed. The United States rejects launch-on-warning and has set up a system of survivable and redundant sensors to detect and characterize potential attacks confidently. These capabilities enable policies and procedures that ensure the President has sufficient time and can properly characterize, understand, and if desired, respond to an attack.

The United States has spent decades refining and practicing launch procedures to minimize ambiguity and maximize positive control, and will continue the practice of not targeting any country on a day-to-day basis. The United States will continue to rely on open-ocean targeting so that in the highly unlikely event of any accidental or unauthorized launch of a U.S. nuclear weapon, the weapon would land in the open ocean.

Further moves to reduce alert levels (e.g., “de-alerting” ICBMs) are ill-advised, in part because reciprocation of such moves by nuclear-armed potential adversaries cannot be readily verified. More importantly, de-alerting proposals, if implemented, would make U.S. ICBMs a tempting target for preemption as well as create dangerous instabilities in a crisis, such as a race to re-alert.

Targeting

U.S. nuclear planning and targeting adhere to the laws of armed conflict. The United States has for decades rejected a deterrence strategy based on purposely threatening civilian populations, and the United States will not intentionally target civilian populations. The U.S. nuclear posture and alert status are tailored to enhance stability by ensuring that the United States retains sufficient survivable nuclear forces to ensure credible response options, no matter the nature of the adversary’s attack.



Principles of U.S. Nuclear Employment

Responsive to U.S. Goals in Multiple Scenarios

The United States develops and implements its strategy for nuclear employment, and the resulting force posture decisions, based on the different types and severity of threat scenarios it faces. The U.S. leadership's deterrence goals and response options will necessarily differ depending on the scenario. In short, U.S. nuclear forces must be responsive to a number of needs and requirements across the range of scenarios that could create extreme circumstances that threaten the vital interests of the United States, and its allies, and partners.

U.S. strategy for nuclear employment informs its force sizing and posture decisions. The size and posture of the U.S. nuclear arsenal ensures the United States will retain flexible response options and can still hold at risk what potential adversaries value most – providing significant incentive for a potential adversary to refrain from attack or escalation.

After Nuclear Employment

Should deterrence fail, the United States will strive to end any conflict at the lowest level of damage possible and on the best achievable terms for the United States, allies, and partners. U.S. nuclear weapons employment guidance directs minimizing civilian damage to the extent possible consistent with achieving U.S. objectives and restoring deterrence. U.S. actions will seek to discourage adversary escalation by ensuring the adversary always concludes that the prospective costs of its aggression are much greater than any possible gain. If an adversary chooses to escalate the confrontation with the United States, it is imperative we maintain a range of flexible capabilities and options to present to the President that allow the United States to achieve its objectives.

Limited Nuclear Strikes: The United States believes currently that the most likely scenario for adversary nuclear employment is a limited nuclear strike in the context of an escalating conventional conflict. In the face of a limited nuclear attack against the United States, its allies, or its partners, U.S. nuclear forces provide a range of response options in scope and scale. A tailored and graduated nuclear response does not mean an adversary can confidently predict only a symmetrical response or that the adversary can define escalation thresholds by the manner of its initial nuclear use. What an adversary can confidently anticipate is the certainty of an effective U.S. response to nuclear attack, at any level and in any context, in ways that will impose greater costs than any expected or hoped-for gain.

The U.S. set of graduated response options is particularly valuable in situations where the adversary's threat calculus is not clear, or the level and type of threat the adversary finds



credible are uncertain. As noted, the United States will not limit itself to considering purely symmetrical responses, as these could spur open-ended, tit-for-tat exchanges. The U.S. flexible and graduated response strategy ensures there are a variety of credible options available, critical to demonstrating both U.S. resolve and restraint, and thereby deterring an adversary's attack or escalation.

As U.S. deterrence strategy makes clear, the United States maintains forces capable of delivering large-scale nuclear responses as well as limited and graduated response options that may be critical for deterrence credibility, particularly in scenarios that involve limited nuclear employment against the United States or an ally or partner. The United States continues to strengthen the credibility of its deterrent options against a limited nuclear attack on the United States and its allies, and partners.

Large-Scale Attack: No State should employ a nuclear weapon confident in its ability to control escalation. Similarly, although it is important that the United States tries to deter escalation, it cannot be certain its efforts to deter escalation will succeed. Should a crisis escalate into a large-scale nuclear attack on the United States or its allies or partners, the United States retains the option to pursue multiple objectives, from preventing further nuclear employment to inflicting intolerable costs on the adversary. The United States will sustain the diverse capabilities needed to deter large-scale attacks by ensuring that the adversary cannot anticipate significant political or military gain from its attack, and that the adversary will understand that the United States will impose intolerable costs exceeding any possible benefit gained from the adversary's decision to strike the United States, its allies, or its partners.

Planning Considerations

All nuclear plans must include the flexibility to tailor a response to the unique circumstances that would surround any nuclear crisis. To that end, the United States will also maintain a responsive and adaptive planning capability to support a flexible and tailored nuclear strategy and the ability to employ nuclear weapons in a conflict. Adaptive planning is regularly exercised, contributing to the credibility of U.S. deterrence strategies.

No First Use and Sole Purpose

To deter adversary aggression and assure allies and partners, the United States has never adopted a "no first use" policy and, given the contemporary and anticipated future threat environments, such a policy would be imprudent. Rather, the policy of the United States and the desire of its allies and partners is for the United States to retain calculated ambiguity regarding the precise extreme circumstances that might lead to a U.S. nuclear response. Those who argue that a U.S. "no first use" policy would be stabilizing should consider that



the United States and its allies and partners always remained skeptical of the veracity of the Soviet Union's public "no first use" policy during the Cold War (correctly, as it turned out), and today we harbor significant doubts concerning China's current "no first use" policy. The United States does not consider it prudent to assume states will adhere to their "no first use" pledges, even under the most stressful conditions of major conflict.

Similarly, the United States sees no benefit and significant risk in adopting a "sole purpose" policy in which the United States declares the sole purpose of nuclear weapons to be for deterring and responding to an adversary's nuclear use. A U.S. "sole purpose" policy, if potential adversaries believed it, would greatly simplify their decision calculus, remove doubt about the type of U.S. response to non-nuclear strategic attack, and potentially incentivize adversary employment of large-scale conventional aggression, chemical and biological weapons, or employment of other means of delivering highly destructive non-nuclear strategic attacks. In addition, a U.S. "sole purpose" declaration would dispirit allies and partners – raising doubts about U.S. defense commitments to them and increasing the chances of nuclear proliferation – while not affecting Russia or China, who would not believe such a declaration.

As stated in the 2018 NPR, the United States will "hedge against the potential rapid growth or emergence of nuclear and non-nuclear strategic threats, including chemical, biological, cyber, and large-scale conventional aggression. The capacity to hedge helps ensure our ability to sustain effective deterrence and assurance amid unexpected change."

Implications for the U.S. Nuclear Posture and Nuclear Stockpile

The United States will maintain the nuclear capabilities needed to deter adversaries, assure allies and partners, achieve objectives if deterrence fails, and hedge against unexpected challenges. DoD believes that these four missions are best accomplished with a strategic nuclear Triad and forward-based non-strategic nuclear weapons in Europe – a position consistent with updated guidance, the 2018 Nuclear Posture Review, and reflecting continuity with numerous internal reviews over multiple administrations.

The overall strength and adaptability of the U.S. nuclear Triad is evident in the fact that the 2018 Nuclear Posture Review recommended only supplemental modifications to the U.S. nuclear force, despite significant changes in the security environment. The first supplemental capability, the W76-2 warhead, modifies a small number of submarine-launched ballistic missile warheads to provide a low-yield option that is both prompt and can penetrate adversary air defenses in the near term. The W76-2 is meant to counter an adversary's perception of a gap in U.S. capabilities that can be exploited in a regional scenario. The other supplemental capability, the nuclear sea-launched cruise missile (SLCM-N), will provide a highly mobile and assured response option for added deterrence value



against adversaries, while also assuring allies and partners. Together, the W76-2 warhead and SLCM-N, which do not require or rely on host nation support, will provide additional diversity in platforms, range, and survivability, and a valuable hedge against future nuclear “break out” scenarios.

Given the range of possible adversary nuclear employment scenarios, it would be imprudent for the United States to reduce its nuclear forces unilaterally at this time or in the near future. Unilateral U.S. nuclear reductions would likely degrade the deterrence of attacks on the United States, its allies, and partners; undermine the assurance of allies and partners; and do nothing to halt the continuing modernization and projected substantial increases in Russian and Chinese nuclear arsenals. Instead, U.S. unilateral reductions could encourage Russian and Chinese expansion of their capabilities. In addition, unilateral U.S. nuclear reductions would undermine U.S. leverage in a future arms control negotiation.

In the face of an increasingly challenging and unpredictable threat environment, including diverse nuclear threats, the United States will continue to rely on the proven force posture of a Triad of nuclear delivery systems to deter strategic attack. To meet these ends, the United States will continue updating the Triad and stockpile to meet current and future threats.

Additional Implications

Increased Reliance on Conventional or Non-Nuclear Strike Capabilities or Missile Defenses

DoD provides U.S. senior leaders with a range of graduated response options, from conventional to nuclear, to deter aggression and intra-war escalation and accomplish U.S. objectives if deterrence fails. Although not a comparable substitute for the deterrent effects of nuclear weapons, U.S. conventional weapons contribute to U.S. deterrence and assurance efforts. To defeat an adversary strategy that includes coercive nuclear escalation and ensure the United States is prepared to respond at any point in the spectrum of conflict, DoD is pursuing the integration of conventional and nuclear planning when appropriate.

The modifications to U.S. employment strategy, plans, and options described in this report have not increased reliance on the missile defenses of the United States. The United States continues to rely on its nuclear forces to deter a Russian or Chinese nuclear and non-nuclear strategic attack on the U.S. homeland. U.S. missile defenses are not designed to, nor can they, negate Russia’s or China’s nuclear deterrent. Instead, U.S. policy is to develop and deploy missile defenses that stay ahead of the rogue State threat. U.S. missile defenses also will provide a measured level of protection against an unauthorized or accidental launch by any potential adversary.



Flexibility and Resilience of U.S. Strategic Forces

Our nuclear strategy requires maintaining a mix of flexible and resilient nuclear forces, NC3, and supporting infrastructure. The loss of any one leg of the Triad increases the risk of deterrence failure. For example, a U.S. nuclear arsenal without ICBMs would raise the relative value of each remaining U.S. nuclear asset, such as U.S. bombers and ballistic missile submarines, and thus incentivize additional adversary investments in air and missile defense and anti-submarine warfare capabilities – resulting in reduced U.S. and allied and partner security. Because deterrence and assurance requirements can change much more rapidly than the U.S. nuclear industrial base can respond, it is incumbent upon U.S. political and military leaders to preserve the inherent flexibility and resilience in the current nuclear Triad while ensuring future systems incorporate the highest levels of adaptability.

The United States cannot fully predict the development of future threats to the Nation, its allies and partners, nor can it predict the precise circumstances in which U.S. leaders may be compelled by events to contemplate nuclear employment. The ongoing U.S. nuclear modernization programs, effective intelligence, surveillance, and reconnaissance, and an adaptive planning process help to ensure that U.S. leaders will have the information and capabilities necessary to deter attacks and protect U.S. national interests.

Document No. 2. Unclassified Statement of Charles A. Richard, Commander, United States Strategic Command Before the Senate Committee on Armed Services, February 13, 2020

Introduction

USSTRATCOM is a global warfighting command, and I am privileged to lead the 150,000 Sailors, Soldiers, Airmen, Marines, and Civilians who dedicate themselves to the Department of Defense’s highest priority mission. I thank the President, Secretary of Defense, and Chairman of the Joint Chiefs for their confidence in me to lead this Command and the Department’s nuclear enterprise. I also thank Congress for their continued support, which ensures USSTRATCOM has the required resources necessary to continue providing our Nation’s strategic deterrence.

Commander, USSTRATCOM, as a key enabler and contributor to Joint Force operations, is the combatant commander responsible for Strategic Deterrence; Nuclear Operations; Global Strike; Joint Electromagnetic Spectrum Operations; Missile Defense; Analysis and Targeting; and Missile Threat Assessment. To execute our assigned responsibilities, the men and



women of this Command operate globally across all domains, to include the information environment. We work closely with the Joint Force across organizations, and with our Allies and partners to address the strategic challenges facing our Nation. Our mission: To deter strategic attack and employ forces, as directed, to guarantee the security of our Nation, our Allies, and our partners.

The Command's priorities are: 1) above all else, we will provide strategic deterrence for the Nation and assurance of the same to our Allies and partners; 2) if deterrence fails, we are prepared to deliver a decisive response, decisive in every possible way; and 3) we will do this with a resilient, equipped, and trained combat-ready force. A powerful, ready triad; a survivable nuclear command, control, and communications (NC3) system; and a responsive nuclear weapons infrastructure are the foundation that enables strategic deterrence and assurance which is fundamental to our survival as a Nation, and deters adversaries from conducting nuclear and non-nuclear strategic attacks against our Nation, our Allies, and our partners.

The dedicated professionals working for and with USSTRATCOM allow the Command to execute its operations and provide the Nation with its strategic deterrent against threats in all domains. Without the men and women of USSTRATCOM, actively performing the deterrence mission every day, we could not deter potential adversaries and guarantee the freedoms our Nation holds dear. To be clear, nuclear deterrence is the highest priority mission of the Department of Defense – our deterrent underwrites every U.S. military operation around the world and is the foundation and backstop of our national defense.

The ability of the United States to deter threats to our Nation and our Allies is at a critical point. The contemporary security environment is the most challenging since the Cold War. In the nuclear dimension, we face a range of potential adversaries, each with different interests, objectives, and capabilities. To maintain a credible deterrent in this environment requires us to modernize and recapitalize our strategic forces to ensure our Nation has the capability to deter any actor, at any level. Doing so requires we remain committed to modernizing and recapitalizing our strategic forces and supporting infrastructure, and that we continue to pursue the supplemental nuclear capabilities intended to address new challenges in the security environment.

A visible symbol of our commitment to nuclear modernization is the recently completed General Curtis LeMay Command and Control Facility (C2F) at USSTRATCOM. The C2F is one of the most advanced weapon systems ever constructed, and will be a critical element for the integration of global intelligence, nuclear planning, and operations with other combatant commands in coordination with our national leadership. Its modern infrastructure for Command and Control of strategic forces provides the flexibility for effective oversight and clear direction in a new era of global, integrated operations. We must proceed with



modernization. Sustainment and modernization of our nuclear forces has transitioned from something that we should do to something that we must do. Continuing to maintain the Nation's strategic deterrent needed to meet the challenges of the global security environment and to realize Presidential and Departmental guidance defined by the National Defense Strategy (NDS), National Military Strategy (NMS), and Nuclear Posture Review (NPR) requires continued Congressional support, budget stability, and on-time appropriations.

Global Security Environment

The NDS's prioritization of great power competition is the impetus for increasing lethality, strengthening alliances and partnerships, and reforming the Department in an increasingly complex global environment. It addresses the changing nature of threats to the United States. Competitors, such as China and Russia, are developing advanced capabilities to directly challenge our strengths across all domains. USSTRATCOM is committed to fulfilling our NDS requirements and searching out innovative ways to understand the environment and adapt to the challenges presented in the global security environment. We understand competition does not equal conflict, and war does not have to be an inevitable conclusion in an era of great power competition. However, we must be responsive to the increasing desire for state and non-state actors to reshape the world in their favor, doing so at the expense to the security of our Nation, our Allies, and our partners, and accepted international norms and rules. We must be capable of recognizing and communicating the potential for adversarial actors who use forces in any domain to coerce, undermine, or erode the current rules-based order.

China

China is advancing a comprehensive modernization program for the People's Liberation Army (PLA) and is building a robust, lethal force with capabilities spanning all domains, the electromagnetic spectrum, and the information environment. These initiatives increase China's ability to project power further from their mainland and support their aspirations to impose China's will throughout the Indo-Pacific region. Beijing's military modernization supports longstanding goals to establish regional hegemony, deny U.S. power projection operations in the Indo-Pacific, and supplant the U.S. as the security partner of choice.

China continues to expand and increase its strategic force capabilities. Despite maintaining a "No First Use" policy, China's lack of transparency regarding its modernization efforts to increase regional capabilities and to expand its overall arsenal bring its motives and intent into question. Among questions about Chinese intentions is their drive to likely double the size of their nuclear stockpile by the end of the decade. The PLA's range of new systems that complement its growing nuclear stockpile includes developing a survivable nuclear triad,



counter-intervention, and power projection capabilities to deter and deny foreign regional force projection in the Indo-Pacific. The PLA's Air Force (PLAAF) newly reassigned nuclear mission, and a deployment of a strategic bomber would provide China with its first credible nuclear triad. During the 70th Anniversary Parade in October 2019, the PLA unveiled new strategic nuclear systems, including the H-6N BADGER bomber, DF-41 intercontinental ballistic missile (ICBM), DF-17 medium-range ballistic missile, and improved submarine-launched ballistic missiles (SLBM). Other advanced systems include a range of ballistic missile defense technologies and increased anti-access/area denial operations. Finally, the PLA is developing a space-based early warning capability and more sophisticated command and control (C2) systems to safeguard the integrity of a larger, more dispersed force. Collectively, Chinese improvements to its nuclear capabilities raise troubling concerns and underscore the need to press on with modernizing our nuclear forces, including the supplemental capabilities outlined in the NPR.

Our Nation, and our Allies and partners, should not accept Chinese policies or actions that threaten the international rules-based order or undermine regional and global stability. We must remain postured to counter Chinese coercion and subversion, assure our regional Allies and partners, and protect our national security interests as international law allows.

Russia

Russia seeks to regain its role as a world power and erode U.S. leadership in world affairs. Russia continues to pursue a sphere of influence over the states on its periphery and attempts to dictate the parameters of those states' sovereignty, especially regarding matters of security or economics. Russian military doctrine emphasizes the potential coercive and military uses of nuclear weapons and Russia fields advanced capabilities to achieve these objectives. Moreover, Russian doctrine and rhetoric highlights a willingness to use nuclear weapons first, perhaps in an attempt to terminate a conventional conflict on terms acceptable to Russia.

Russia's aggressive and robust military and nuclear modernization campaign across its strategic triad and dual-use systems is close to completion. To date, Russia has recapitalized 76 percent of its strategic nuclear forces with modern weapons and equipment, strengthening its overall combat potential. It is easier to list the nuclear weapons and equipment Russia has not modernized, than it is to describe their all new equipment and capabilities. Upgrades to existing strategic forces include updating the Tu- 95MS BEAR strategic bomber and Kh-101/102 long-range, air-launched cruise missiles; building and deploying the DOLGORUKIY-class SSBN platform for the BULAVA SS-N-32 SLBM; replacing silobased and mobile ICBMs with newer systems and increased warhead upload capacity; and fielding the Avangard Hypersonic Glide Vehicle. In addition to modernization efforts, Russia is embracing new and novel technologies such as the TSIRKON hypersonic anti-ship



missile, Belgorod submarine, nuclear capable Poseidon unmanned underwater vehicle, Kalibr land-attack cruise missile, Kinzhal air-launched ballistic missile, and Skyfall nuclear powered intercontinental cruise missile. These advanced dualcapable systems are specifically designed to challenge U.S. and Allied deterrent structures and target our capabilities.

Over the past decade, Moscow has not only emphasized strategic forces preparedness, but also endeavored to enhance Russia's civil defense readiness for strategic conflict, and has conducted exercises geared towards increasing interoperability between civil and military organizations in a time of war. Additionally, both Russia and China appear to be expanding their strategic partnership in the Asia/Pacific Region. Last summer, this partnership went on display through a combined out-of-area (OOA) flight. Their joint efforts continue to erode transparency and predictability, use force to achieve their goals, undermine rules-based international order, and violate the sovereignty and territorial integrity of their neighbors.

Russia's nuclear forces include a range of strategic weapons, some not captured by existing arms control structures, and theater and tactical nuclear weapons entirely outside the arms control framework. Due to Russia's refusal to submit these theater (or non-strategic) systems to arms control limits or transparency initiatives, a considerable level of uncertainty clouds judgements on the scope and disposition of Russia's stockpile. However, Russia's overall nuclear stockpile is likely to grow significantly over the next decade – growth driven primarily by a projected increase in Russia's non-strategic nuclear weapons. Russia's determined pursuit of "non-strategic" nuclear weapons, together with their recent theory of nuclear rhetoric, indicates a troubling readiness to resort to nuclear weapons early in a crisis. Accordingly, our nuclear forces must include a sufficient range of capabilities such that Russia never mistakenly perceives any advantage from using nuclear weapons, at any threshold of violence.

North Korea and Iran

North Korea continues to defy international norms and conducts malign activities to foster regional instability. North Korea has tested ICBM-class missiles designed to reach the United States and has increased the number of short and medium-range ballistic missiles in its inventory. USSTRATCOM is committed to supporting the Department's efforts to work with like-minded regional partners to reduce military tensions and support our diplomats in achieving the final, fully verified denuclearization of North Korea.

Iran remains the world's leading sponsor of terror. By arming and utilizing proxy forces with advanced conventional weapons, Iran threatens our Nation and our partners in the region. Iran relies on its missile forces as a tool for signaling, propaganda, and retaliation, as observed through violation of the 2015 Joint Comprehensive Plan of Action (JCPOA), and



further illustrated by last month's ballistic missile launches against airbases in Iraq. Additionally, Iran continues to retain the technological capability and capacity to develop a nuclear weapon within one year of a decision to do so. Iran continues to ready and develop long-range ballistic missile capabilities, coupled with an aggressive strategy to destabilize the Middle East; calling into question Iran's commitment to foregoing nuclear weapons. Iran's actions introduce greater risk to an already volatile environment and threatens global commerce, security, and stability.

We remain vigilant to the threats both North Korea and Iran pose to the United States, our Allies and partners, and support on-going international and whole-of-government approaches to reduce these threats.

Integrated Strategic Deterrence

The 21st century global security environment presents challenges to deterrence. Competitors are conducting subversive actions below the levels of traditional conflict across all domains. Additionally, our adversaries are integrating nuclear, conventional, space, electromagnetic spectrum, and cyber capabilities to form an unprecedented range of threats; this includes the exploitation of the potential threat of nuclear employment to shape our response to their actions.

In a new era of warfighting, traditional Cold War deterrence concepts may be insufficient to deter the full range of threats in the modern security environment. The United States must apply tailored deterrent strategies to specific adversaries, while integrating the full spectrum of our military capabilities, both nuclear and conventional, with all elements of U.S. national power. An integrated strategic deterrence concept must leverage and exploit information advantage to seek long-term gains and capabilities in response to advancing threats; and fully assess the risks associated with deterrence failure. To address 21st century challenges, integration cannot stop within our government. Building and maintaining our relationships are critical to preserving shared interests and responding to mutual threats. The Command continues to engage with Allies and partners to strengthen relationships, build trust, and set conditions across the globe.

USSTRATCOM supported seventeen senior-level international engagements in 2019, including visits to the United Kingdom, Denmark, and Canada as well as visits from the United Kingdom, Denmark, Japan, Australia, the Republic of Korea, and 32 Defense Attachés through the International Visitor Leadership Program (IVLP). Our daily interactions with our Allies and partners coupled with Bomber Task Force (BTF) deployments, submarine port-calls and visits, and cooperative missile defense activities provide unique opportunities to strengthen relationships, build trust between our senior leaders, and increase the interoperability of our forces. The Command also hosted an annual Deterrence Symposium



to exchange viewpoints on security challenges; senior political, military, and academic leaders from over 13 nations attended this event.

To facilitate these interactions, Headquarters USSTRATCOM hosts permanently assigned liaison officers from Australia, Canada, Denmark, the Republic of Korea, and the United Kingdom; and our Joint Functional Component Command for Integrated Missile Defense hosts a liaison officer from Germany. These Foreign Liaison Officers serve as a conduit between the Command and their nations' militaries. To the extent possible, liaison officers and their superiors participate in our Tier 1 globally integrated exercises, offering mutual benefits to our Allies and the United States. These peacetime engagements develop relationships before a crisis. This past year's successes have included funding secure communication infrastructure compatibility, defining operational relationships, enhancing our military interoperability, improving combined capabilities across our Allies and partners, and integrating critical defense missions to assure Allies and partners of our Nation's extended deterrence commitments and nonproliferation objectives.

Globally Integrated Operations

Globally integrated operations remain essential to achieving defense objectives in this era of great power competition. The worldwide dispersal of friendly and adversarial forces create both opportunities and challenges. As a Joint Force, we must continue to work with our Allies and partners across geographic and warfighting boundaries to create security advantages. Additionally, the Joint Force must increase proficiency in employing global capabilities - space, cyber, and special operations forces - hand-in-hand with traditional air, land, and sea warfighting capabilities. The essence of globally integrated operations is the alignment of the Joint Force in purpose, time, and tempo regardless of which commander is responsible for execution; this is particularly important for execution of the strategic deterrence mission where the operations and activities of combatant commanders significantly affect deterrence success. Investments in cross-combatant command coordination are vital. There is also a temporal aspect to global integration; the ability of operational commanders to gain warfighting advantages depends on enacting decisions faster than our adversaries. In the last year, the Joint Force has made enormous strides in implementing the Secretary's vision for global integration, but we must continue on the path to defend the Nation's interests in the 21st century.

Nuclear Operations

USSTRATCOM bears the responsibility for operating our Nation's nuclear triad. The Nation's nuclear triad is safe, secure, and effective; and is foundational to our survival. It remains the greatest contributor to deterring adversaries from conducting nuclear and non-nuclear strategic attacks against our Nation, and our Allies and partners. However, the Nation is at a



critical juncture regarding the future of our nuclear forces. Since the end of the Cold War, we led the world in reducing our nuclear stockpile while increasing transparency. While we reduced the number and types of nuclear weapons in our arsenal, our adversaries went in the other direction and continued to modernize and expand their strategic capabilities. We now find ourselves fielding a reduced Cold War era arsenal against a larger, more modern, and more varied Russian force and a continually improving and growing Chinese force. If we do not address 2018 NPR recommendations, this will create the potential for insufficient flexibility in the triad to impose costs and deter all potential conventional and nuclear threats in the early-2030s. For the last three decades, we have anticipated reaching a tipping point in the nuclear weapons complex. That point is almost here. Our weapons, NC3, and triad delivery systems will soon reach retirement or require refurbishment. If we do not invest smartly and consistently in our nuclear enterprise now, we will need to rebuild from scratch the talent and infrastructure required to design the deterrent forces for our Nation's future needs. As the foundation for deterrence for our Nation, Allies, and partners, we must continue to sustain, modernize, and recapitalize our Nation's strategic nuclear capabilities. Previous de-emphasis on our nuclear deterrent and the infrastructure that supports it, coupled with a changing security environment, coupled with adversaries that are modernizing and creating increasingly capable forces, has led us to the point where we must modernize now to continue to maintain a viable deterrent in the future. We appreciate that Congress has recognized the importance of modernizing U.S. nuclear forces after decades of deferred recapitalization and has funded these programs. We request your continued support to modernize and sustain our Nation's nuclear deterrent.

Land-Based Strategic Deterrent

USSTRATCOM's geographically dispersed ICBM force is the most responsive leg of the triad, continuing to deliver a highly reliable, secure deterrent capability and an overwhelming challenge to defeat. While the Minuteman has served as the backbone of our Nation's ICBM force since 1962, its aging infrastructure, and asset attrition require a comprehensive weapon system replacement beginning in 2028. The Air Force remains focused on sustaining our ICBM force at the lowest reasonable cost. The Ground Based Strategic Deterrent (GBSD) Analysis of Alternatives provided decisive analysis that continued life extension of the Minuteman III (MM III) would be more costly than a replacement system and would not address future challenges and threats to our current ICBM force. GBSD is the lowest risk, highest value decision to meet current and future military requirements.

USSTRATCOM supports the ongoing MM III sustainment programs needed to keep the weapon system viable and effective until GBSD reaches full operational capability in 2036. Smart, consistent sustainment of our current missile systems, while we modernize the ICBM force, will ensure an effective deterrent remains for many decades. GBSD is a just-in-time



replacement program, and we cannot afford to have the MM III weapon system deteriorate prematurely.

The GBSD program completes the Technology Maturation and Risk Reduction (TMRR) phase in FY2020 and transitions to Engineering and Manufacturing Development (EMD) following a successful Milestone B decision this year. USSTRATCOM remains firmly committed to GBSD as the Air Force pursues mature, low-risk technologies, modularity, and open system standards to enable affordable technology insertion. On-time GBSD deployment remains a USSTRATCOM imperative; we must keep requirements stable and protect existing schedule margin or where possible, expand these schedule margins.

GBSD, when fielded, will be an affordable, modern weapon system, deployed in updated infrastructure and fully integrated into a modernized NC3 system. Our ICBMs, and prospectively the GBSD, raise the threshold of an adversary's attack on the homeland by presenting an intractable targeting problem. Eliminating our ICBM capability, and specifically the GBSD, would be dangerously provocative, present a less credible strategic threat, and grant adversaries a vastly reduced target set – raising the risk to our Nation of a disabling first strike. Thus, USSTRATCOM strongly supports the Air Force in providing GBSD to ensure our deterrent remains effective and lethal in an ever-changing and increasingly threatening strategic environment.

Air-Based Strategic Deterrent

The bomber leg of the nuclear triad is the most flexible and visible aspect of our Nation's nuclear forces. Through their discernable adaptability, bombers continue to provide a wide variety of deterrence options to the President and unambiguously signal unwavering resolve to our adversaries. Additionally, their persistence and reliability of our bomber force reassures our Allies and partners. Nevertheless, current bombers and associated weapon systems are beyond or quickly approaching their intended end of service life and require sustainment to remain operational and modernization to address evolving and emerging threats.

The B-52 remains the backbone of the bomber force and will remain in service for an additional 30 years. It serves as an important hedge against delays in our future bomber programs and is a key component of the Nation's triad. To remain effective, the B-52 must receive several critical upgrades. First, the B-52's Commercial Engine Replacement Program will replace the existing TF-33 engines (1960s era) that are becoming increasingly unsupportable, and will also yield increased fuel efficiency resulting in greater range, longer flight times, and reduced tanker requirements. In addition to new engines, modernization plans are underway to upgrade the B-52's radar, avionics, and NC3 systems, which must remain on schedule to meet the operational requirements of our airborne deterrent



requirement. The B-2 is the only long-range, penetrating stealth bomber in the world. It is imperative we maintain the B-2's unique deterrent and combat capability, until replaced by the B-21. Decisions on the future bomber force structure and key enablers must be based upon strategic imperatives and combat effectiveness, ensuring no capability gaps for critical tasking across the family of operational plans (nuclear and conventional).

The future of the bomber force is the B-21 Raider. Designed to meet NDS objectives and based on firm requirements leveraging existing and mature technology, the B-21 will deliver unrivaled combat capability. It is an Air Force "Top 3" acquisition program with a planned procurement of at least 100 aircraft and is currently executing in the EMD acquisition phase. The B-21 will utilize both direct attack and standoff weapons, providing a multitude of options to the warfighter to meet national objectives. It is critical the Air Force delivers the B-21 on time and on budget to meet the Nation's deterrence objectives and global security requirements. In addition to the bombers, the air delivered weapon stockpile modernization is also occurring through just-in-time Life Extension Programs (LEPs). Notably, the Long Range Standoff (LRSO) weapon coupled with the W80-4 warhead will replace the Air Launched Cruise Missile (ALCM) and its W80-1 warhead as that system faces reliability and sustainability challenges. Likewise, the B61-12 will replace aging B61 nuclear gravity bombs deployed on strategic long-range bombers and on our Nation's and Allies' Dual Capable Aircraft (DCA). The B61-12 life extension includes a guided tail kit assembly to improve weapon accuracy, enabling a more accurate, single gravity nuclear weapon capability that will enhance our Nation's nuclear deterrent and the extended deterrence provided to our Allies and partners.

The success of all bomber missions depends on adequate tanker support to achieve the necessary global reach to hold strategic targets at risk. The KC-46, currently in the Initial Operational Testing and Evaluation (IOT&E) acquisition phase, will partially replace the aging KC-135 fleet. Air Force leadership continues to engage with Boeing to ensure the new tanker will meet operational objectives.

Sea-Based Strategic Deterrent

The OHIO-class SSBN with the highly capable Trident II D5 ballistic missile constitutes the most survivable leg of our nuclear triad and provides a reliable deterrent to our adversaries around the world. The SSBN's ability to operate continuously and clandestinely sends a very clear message that our adversaries cannot benefit from a strategic attack against the U.S. or our Allies.

The OHIO-class SSBN is a marvel of technology and its robust design, along with a comprehensive maintenance program, has allowed it to be life extended from 30 to 42 years – longer than any previous submarine class in U.S. history. The Navy has never kept a single



submarine in service longer than 37-years, let alone an entire class. There is no margin to extend the OHIO-class further; therefore, the COLUMBIA-class SSBN must field on time to avoid a capability gap in the triad. It is essential we maintain our technological advantage in this critical mission, and to this end, the Navy has designated COLUMBIA as the top shipbuilding priority in order to ensure its first strategic deterrent patrol in FY2031. As production begins, we must support our industrial partners' expansion of both infrastructure and training programs to minimize risk.

Furthermore, to remain survivable, we must address anticipated security threats that could undermine our own future capabilities. Advancements in Russian submarine stealth and detection requires us to remain committed to the recapitalization of our Integrated Undersea Surveillance System (IUSS) to preserve our advantage in the undersea domain.

Following the decision to extend the OHIO-class SSBN, the Navy determined the need to life-extend the Trident II D5 ballistic missile, both to address obsolescence issues and to ensure the required quantity of deployable ballistic missiles into the early 2040s. The life extension program, known as D5LE, will ultimately serve as the transition missile from OHIO to COLUMBIA. Additionally, efforts are underway to further extend the D5 missile through the life of the COLUMBIA with the D5LE2 program. D5LE2 will recapitalize the D5, using highly reliable components still in production, pull forward previously unused system margin, and provide a more cost effective design with sufficient flexibility to account for evolving threats. In order to realize these capabilities, we must revive an atrophied industrial base required to produce critical non-nuclear components employed on the D5LE2. To enhance the flexibility and responsiveness of our nuclear forces as directed in the 2018 NPR, we will pursue two supplemental capabilities to existing U.S. nuclear forces: a low-yield SLBM warhead (W76-2) capability and a modern nuclear sea launched cruise missile (SLCM-N) to address regional deterrence challenges that have resulted from increasing Russian and Chinese nuclear capabilities. These supplemental capabilities are necessary to correct any misperception an adversary can escalate their way to victory, and ensure our ability to provide a strategic deterrent. Russia's increased reliance on non-treaty accountable strategic and theater nuclear weapons and evolving doctrine of limited first-use in a regional conflict, give evidence of the increased possibility of Russia's employment of nuclear weapons. We must counter these dangerous perceptions with the supplemental capabilities the LYBM and SLCM-N will provide. An analysis of alternatives is under way for SLCM-N.

Nuclear Weapons and Supporting Infrastructure

Today's nuclear stockpile meets current operational and policy requirements. While the stockpile and its supporting infrastructure are safe, secure, reliable, and effective, both remain fragile. Many of our weapons have remained in service well beyond their original design lives, owing to the robustness of original designs and the Department of



Energy/National Nuclear Security Administration's (DOE/NNSA) continuing stockpile stewardship efforts. However, the accumulation of concurrent risks and capacity margins limit the ability to mitigate adverse impacts to the deterrent. Insufficient resourcing over the past 30+ years postponed much-needed weapon and infrastructure modernization programs, which typically require 10-15 years to execute. Directive policy changes affecting priorities and inefficient program execution across administrations have directly contributed to the related erosion in the critical capabilities and capacity of our strategic deterrent forces. As a result, many of the modernization and sustainment efforts necessary to ensure the deterrent's viability have zero schedule margin and are late-to-need. I firmly support the Secretary's and Chairman's public statements identifying nuclear deterrence as the highest priority mission of the Department of Defense. Our nuclear deterrent underwrites every U.S. military operation around the world and is the foundation and backstop of our national defense. I cannot overemphasize the need to modernize our nuclear forces and recapitalize the supporting infrastructure to ensure we can maintain this deterrent in the future. I am concerned that the oft-repeated message of the need to modernize and recapitalize has lost its impact, and that collectively we have underestimated the risks associated with such a complex and time-constrained modernization and recapitalization effort. Even seemingly small issues can have a disproportionate impact on the force. We cannot afford more delays and uncertainty in delivering capabilities, and must maintain a focus on revitalizing our nuclear forces and the associated infrastructure.

The 2018 NPR described a hedging strategy to meet future risks and unexpected challenges. The atrophy in our nuclear weapons supporting infrastructure is consuming our hedge for avoidable programmatic risk. We no longer have hedge capacity to fully account for geopolitical risk, technological risk, or operational risk. Continued modernization and sustainment work deferral will only further exacerbate an already untenable situation as we repeatedly extend weapon lifetimes and do not invest in the diagnostic capabilities needed to ensure confidence in the viability of these systems. To maintain military effectiveness in the future, we must execute the program of record (POR) immediately, and invest in advanced diagnostic, research, and development activities to mature emerging technologies to certify and field a modern deterrent for the 21st century. The next generation of deterrent forces must encompass responsive weapon systems, world-class personnel, resilient infrastructure, and intelligence informed decisions. We must address emerging 21st century threats that may reduce the effectiveness of our nuclear deterrent force.

The NNSA took efforts in 2019 to address a gap identified in the 2018 NPR by converting a small number of W76-1s into the W76-2 low-yield variant. W76-2 deliveries to the Navy and remaining production are continuing as scheduled in FY2020. In 2019, our weapon modernization programs saw a setback when reliability issues emerged with commercial off-the-shelf non-nuclear components intended for the W88 Alteration 370 program and the B61-12 LEP. NNSA has worked closely with DoD to mitigate impacts, but correcting these



issues will delay initial fielding of both systems. Finally, another just-in-time program is the W80-4 LEP, which remains in synchronized development with the LRSO delivery system. It is critical for this standoff attack capability program to remain on track.

While air-delivered weapon modernization is proceeding in the B61-12 and W80-4, we must begin efforts now to modernize ballistic missile warheads for our ICBM and SLBM force in the 2030s and 2040s. After the 2018 NPR, re-evaluation of our stockpile strategy shifted to pursue separate NEP designs for the Air Force and Navy. However, the ballistic missile end-state remains the same: address known and projected aging and performance concerns; preserve triad attributes; balance warhead types across the force; and improve inter- and intra-leg hedge capability. The Air Force is developing the MK21A/W87-1 to replace the W78 ICBM warhead that will be over 50 years old when finally retired. When deployed, the W87-1 will provide enhanced safety and security compared to all other ballistic missile warheads.

The Nuclear Weapons Council has established a requirement for the W93/Mk7 warhead. This warhead will provide USSTRATCOM and the Navy a means to address evolving ballistic missile warhead modernization requirements, improve operational effectiveness, and mitigate technical, operational, and programmatic risk in the sea-leg of the triad. This effort will also support a parallel Replacement Warhead Program in the United Kingdom whose nuclear deterrent plays an absolutely vital role in NATO's overall defense posture. Without a coordinated, joint effort to develop and field the W93/MK7 as a system, the bulk of our day-to-day deterrent force will be at increased risk in the early 2040s due to aging legacy systems. Given the potential severity of impacts on overall deterrence from late delivery of the W93/MK7, it is imperative the complex work to identify opportunities to accelerate the development timeline and invest in technologies to reduce schedule risk. Research and development efforts for critical national capabilities, such as fuzes and aero shells, must begin immediately to deliver a capability in the 2030s that maintains a credible at-sea deterrent through the 2050s and beyond. Our present Nuclear Security Enterprise (NSE) infrastructure, which we count on to sustain our strategic deterrent, continues to atrophy and requires timely recapitalization. NNSA planned facility improvements to critical capabilities will not materialize in the near-term, yet facility age and capacities currently limit our ability to timely respond to unforeseen technical, geopolitical, programmatic, or operational developments. The non-nuclear component issue affecting the B61-12 LEP and W88 Alteration 370 program is a symptom of a fragile enterprise – a single component failure caused a disruption across multiple programs for a period of years. USSTRATCOM is able to mitigate the operational impacts today, but proposed steps to reduce accumulating further operational impacts provide a partial capability at best. The Nuclear Weapons Council Strategic Plan, NNSA Stockpile Stewardship and Management Plan, and 2020 Requirements and Planning Document describe a path forward to enable an effective, responsive, and resilient NSE, but successful navigation of the path will only be possible through continued on-time investments.



USSTRATCOM supports NNSA's highest infrastructure priority to reconstitute plutonium pit production. Since the closure of the Rocky Flats facility 30 years ago, no significant quantities of new pits have been added to the stockpile. The Nation must be able to produce no fewer than 30 pits per year in 2026 and produce at least 80 pits per year during 2030 to maintain stockpile effectiveness. This capacity is the minimum required to execute the POR; anything less will force difficult decisions on which modernization programs to defer, which could result in a less-capable nuclear deterrent, and accept unprecedented pit ages. The NNSA's two-site plan to achieve plutonium pit production at Los Alamos National Lab and the Savannah River Site is prudent and necessary to achieve pit production requirements rather than accept pit lifetimes that threaten the confidence in our weapons' capabilities.

Failure to accomplish these goals will place all future stockpile modernization programs at risk. In addition to plutonium pit production, the NSE must continue to recapitalize capabilities to process uranium and lithium, produce tritium, manufacture and procure trusted radiation-hardened microelectronics, and manufacture non-nuclear components in sufficient quantities to sustain and modernize the force. Production of nuclear weapon components and the materials needed to construct them effectively stopped during the 1990s when we began to life-extend legacy systems. This includes recruiting and developing the specialized workforce and experts required to produce and maintain these systems. Maintaining a safe, secure, reliable, and effective strategic deterrent into the future requires restoring or increasing the capacity of these material, component, and workforce capabilities.

Congressional legislation has recognized and supported the need for an effective, responsive, and resilient NSE by directing the NNSA to continually exercise all capabilities required to conceptualize, develop, engineer, certify, and deploy nuclear weapons. The Stockpile Responsiveness Program (SRP), combined with the POR and its supporting science program, enables a process to exercise the development of nuclear weapons. I remain supportive of the program, especially activities like the rapid design-to-test experiment, which cuts time from clean-sheet design to hydrodynamic test by two-thirds. Maintaining a safe, secure, reliable, and effective stockpile that continues to meet its intended deterrence and assurance roles into the future will require consistent, predictable funding for weapons modernization and the supporting infrastructure over the next two decades. Failure to make this investment presents an existential risk to the Nation. Success hinges on continued coordination between DoD and NNSA as well as the consistent cooperation among all stakeholders.

Nuclear Weapons Safety and Security

Our nuclear security standard is complete denial of unauthorized access to nuclear weapons. We have worked closely with our Navy and Air Force partners to assess nuclear security requirements and adjust our force posture, training, and equipment to address current and



evolving threats. While we continue to advance our security capabilities, there are areas where additional investments are necessary to maintain the high standards this mission demands.

The proliferation, ease of use, and sophisticated capabilities of small, unmanned aircraft systems (sUAS) pose a threat to our operations. The Department continues to field counter sUAS capabilities and are refining tactics, techniques, and procedures to address the developing threat. Focused leadership, vigilance, and dedicated investment are necessary to remain ahead of this challenge. With intense advocacy from our Command and strong support from Congress, we achieved a significant ICBM security milestone with the Air Force awarding a contract to replace our Vietnam-era UH-1N helicopter fleet with the new MH-139 “Grey Wolf.” The Air Force expects delivery of the first two aircraft to Eglin AFB in 2020 for developmental testing. Delivery of subsequent aircraft to each missile wing will provide full operational capability by FY2027. With this program moving forward, we can now focus our efforts on replacing aging armored security vehicles with Joint Light Tactical Vehicles, equipped with advanced weapons and communications systems that will provide security personnel uninterrupted situational awareness anywhere they operate.

Finally, we encourage Congress to continue supporting our ICBM Transportation and Handling equipment. The Payload Transporter Replacement and Transporter Erector Replacement Programs will provide safe, secure MM III solid rocket motor (SRM) transport, removal, and emplacement, and over the coming years, these heavily tasked force enablers will facilitate the transition from MM III to GBSD. We continue to support fully funding the weapons security programs for on-time delivery, enhancing the security of our strategic weapons and our vast ICBM complex.

Nuclear Command, Control, & Communications

Our layered approach to providing NC3 capabilities remains reliable and effective in our current strategic environment; however, we have identified challenges in the near-term to address maintaining deterrence in the coming decades. Our posture and capabilities were adequate for the Cold War needs, especially against the Soviet-era ballistic missile and bomber threats. Now, we face improved adversarial capabilities in air- and sea-launched cruise missiles and evolving space and cyber threats. We must look beyond traditional ballistic missile profiles and understand the full spectrum of threats to NC3. We must innovate and outpace those threats to maintain our deterrent capabilities. Our continued focus is to maintain positive command and control of U.S. nuclear forces at all times, before, during, and after a nuclear attack. As we modernize our triad, we must maintain current capabilities while we address future NC3 requirements. This is one of my top priorities.



In October 2018, the Secretary of Defense designated the Commander, USSTRATCOM, as the NC3 Enterprise Lead responsible for NC3 enterprise operations, requirements, and systems engineering and integration. Last year, USSTRATCOM established the NC3 Enterprise Center (NEC) and started building relationships with the Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)) as the NC3 Capability Portfolio Manager (CPM). In the effort to consolidate authorities and responsibilities for the NC3 portfolio, we jointly presented the status of the NC3 Enterprise to the Deputy Secretary of Defense and the Chairman of the Joint Chiefs of Staff; this will reoccur on a continual basis as directed by the Secretary of Defense.

USD(A&S) and the Commander, USSTRATCOM, coordinated and recommended adjustments for our most pressing NC3 shortfalls. We support fully funding our approach to quantitatively assessing the NC3 enterprise. While an understandably complex and ambitious undertaking, we want to be able to model and monitor the entire enterprise. Data science is quickly proving its value to industry and we need to leverage this capability and implement it into our approach to assess the NC3 Enterprise's mutually supportive, interdependent architecture. Additionally, in order to move forward, we must provide the necessary manpower to build enterprise level capabilities.

Last year we saw success in validating the mission need statement for the next generation NC3 architecture. We are continuing to build out processes and supporting capabilities that will be foundational to establishing an architecture that is mutually supportive and resilient to the entire spectrum of attacks. While we develop the next generation NC3 to conduct nuclear command and control (NC2) over assured communication paths, we must consider how NC2 infrastructure will align and interoperate with the future Joint All-Domain Command and Control (JADC2) structure. Future NC3 architecture will retain elements specific to NC2 while leveraging JADC2 to maintain resilient and redundant C2 and facilitate quick decision cycles.

In order to provide continuous communications and control of nuclear forces between the President, senior advisors, and Joint Forces, we must maintain our Advanced Extremely High Frequency (AEHF) satellites, paired with ground and airborne Family of Advanced Beyond Line of Sight Terminals (FAB-T). We continue to develop the plan for the next generation of airborne command and control aircraft, replacing the legacy E-4B National Airborne Operations Center (NAOC), E-6B Airborne Command Post (ABNCP) and Take Charge and Move-Out (TACAMO), and C-32 Executive Transport fleets. Existing capabilities will need to retain their current roles and may need to accept new ones as our next generation of NC3 takes shape. As we build on our airborne communication capabilities, we are evaluating the relay capabilities of ground forces to augment and enhance the survivability and endurance of our airborne layer. The Air Force's Global Aircrew Strategic Network Terminal (G-ASNT) gives our ground forces a multi-band communications system to maintain situational awareness and relay direction to nuclear forces not in direct contact with decision makers.



Cutting across all of these capabilities is the cyber defense of the systems themselves. Our NC2 hardware infrastructure fails if the NC3 fails due to a cyber-attack. We must continue to invest in active, persistent cyber defense of our NC3 systems, both current and future. We have collaborated with USCYBERCOM, USD(A&S), and the Services to ensure our existing NC3 systems remain free of adversary influence in real time and to protect our future NC3 acquisitions and sustainment from cyber threats. Cyber defense is not a “trade space” discussion; it is an additive necessity in today’s technologycentric world.

USSTRATCOM, as the NC3 Enterprise lead, will continue to develop the Enterprise’s future requirements and ensure a safe, secure, and reliable architecture for the future. As we move towards the next generation of NC3, we must work with industry to rapidly prototype new technologies and experiment with them to determine their effectiveness. In addition, we will continue cooperation on NATO NC3 systems that require modernization to enable appropriate consultations and effective nuclear operations, improve survivability, resilience, and flexibility. We need to move rapidly and if a new technology appears promising, acquire and field it quickly – and if our experiment shows it is not feasible, to “fail fast,” and move on. We rely on the necessary resources for sustainment and modernization of NC3 systems. We must also attract the right experience and talent needed to fulfill enterprise manpower requirements to develop the innovative NC3 solutions described in the NC3 Enterprise Center Mission Needs Statement. A combined effort between the Services and Agencies, National Labs, industry, and academia are necessary to generate innovative ideas, establish working relationships with key stakeholders, and maintain deterrence during this transition. I am confident in the forming relationships and the direction the Department is taking to prioritize NC3 modernization.

Global Strike

Strategic competitors continue to invest in and rapidly develop anti-access/area denial capabilities to counter U.S. military advantages in power projection and freedom of movement. Additionally, competitors are developing hypersonic weapons as part of this counter-intervention strategy. The Department requires flexible, prompt, survivable response options for global strike. Continued investment and a commitment to fielding advanced capabilities are crucial to offset these threats and ensure our deterrence and conventional power remains strong into the future.

Offensive hypersonic strike weapons will provide conventional capabilities to ensure the Joint Force can deter aggression in contested environments short of nuclear use. They provide a highly responsive, long-range, conventional strike capability for distant, defended, or time-critical threats when other forces are unavailable or not preferred. Fielding advanced hypersonic capabilities will allow us to tailor our strategies and plans with an



expanded range of conventional options. While not a replacement for nuclear weapons, new classes of hypersonic weapons will complement and enhance strategic deterrence and can deliver surgical strikes to provide effects or be integrated into larger campaigns, increasing the effectiveness of our warfighting advantages.

For more than a decade, the U.S. matured its hypersonic strike technologies and successfully demonstrated their significance to future warfighters. FY2020 represents a pivotal year for hypersonic weapon development and fielding as the Department begins aggressively flight testing capabilities across multiple domains and posturing the industrial base to produce these systems at scale to allow the Services to field operational capabilities in the near-term. A flexible mix of capabilities launched from land, sea, and air will provide a constant, visible, and global presence designed to influence adversary behavior in all stages of conflict without crossing the nuclear threshold, and will provide an effective deterrent and strike capability in the near-term to address current and future threats.

Missile Defense

As a global warfighting command, Commander, USSTRATCOM is the coordinating authority and is responsible for global missile defense planning in coordination with other combatant commands, Services, and agencies that employ our Nation's missile defense capabilities. USSTRATCOM's Joint Functional Component Command for Integrated Missile Defense (JFCC-IMD) supports missile defense operations worldwide: this means helping to identify and minimize gaps and seams in regional planning, conducting missile defense operations support, and advocating for capabilities on behalf of all other combatant commanders.

While current missile defense capabilities ensure defense of the homeland against a rogue ballistic missile threat, a concerted U.S. effort is required to expand and improve existing capabilities for both homeland and regional missile defense. Potential adversaries are improving existing missile system capabilities and capacities, blurring missile defense operations across traditional regional boundaries. Solving the trans-regional threat, increased range, and lethality requires more than just active missile defense; we must address the problem of decreased warning and adjust defensive postures appropriately. Navigating this environment requires a comprehensive approach that establishes a renewed emphasis on leveraging opportunities to negate missile threats prior to launch, during all phases of flight, and after impact, drawing on effects generated from capabilities throughout all domains.

As the warfighter advocate for missile defense, USSTRATCOM must focus developers on examining, developing, and exploiting advanced concepts and technologies. Research and development across all domains is key to ensuring we keep pace with evolving adversary threats, such as hypersonic weapons and cruise missiles. Future space-based sensors may



be able to provide birth-to-death detection, tracking, and discrimination of hypersonic glide vehicle, cruise missile, and ballistic missile threats globally. These abilities cannot be fully achieved with the current or future terrestrial-based radar architecture due to the constraints of geography and characteristics of future missile threats.

Our regional missile defenses protect against missile attacks on deployed U.S. forces, Allies, and partners; assist Allies and partners in better defending themselves; preserve freedom of action; and counter adversary anti-access/area denial tactics. However, challenges remain to the Department's efforts to fully integrate and optimize limited defense resources and architectures through Allied and partner integration and interoperability. USSTRATCOM's NIMBLE TITAN exercise series, with participants from 24 countries and four international organizations, advances multinational collaboration through the experimentation of operational integration concepts to enhance deterrence and defense against missile attacks.

The Ground Based Interceptors (GBI) currently emplaced have the capability of defending the homeland from today's rogue threat. Although we are pursuing development of the Next Generation Interceptor (NGI) to complement our GBI capability, we need to examine new approaches to defeat ICBMs in ways that repurpose existing options and are cost effective. As we address future threats, we must account for the air and missile defense assets required to defend the homeland, while simultaneously improving our regional security architectures. We continue to embrace new and developing technologies and find innovative ways to use, as well as repurposing existing technologies to strengthen and expand current capabilities. Examples include developing an underlay for homeland defense to account for ballistic missiles and using existing sensors for tracking ballistic, hypersonic, and cruise missile threats.

The 2019 Missile Defense Review (MDR) provided an opportunity to conduct focused reviews clarifying and optimizing missile defense roles and responsibilities across the Department. In accordance with the MDR, the Department is reviewing policy, responsibilities, and procedures for missile defense research, development, test and evaluation, procurement, operations, and sustainment. Revised improvements to the Warfighter Involvement Process (WIP) will meet 2019 MDR guidance, align with Department budget process and maximize warfighter input in capability development and acquisition, and seeks to deliver missile defense capabilities in a timely manner. USSTRATCOM is working with the community of interest to update the WIP and incorporate findings established in the MDR. As Commander, I will continue to advocate for missile defense requirements through continued capability and utility assessments and by ensuring operational tests and evaluations meet warfighter demands. Missile defense endures as a critical component of comprehensive U.S. strategic and tailored regional deterrence strategies and is a key element of any integrated response options.



Joint Electromagnetic Spectrum Operations (JEMSO)

The Electromagnetic Spectrum (EMS) is the one physical maneuver space depended upon by forces across all warfighting domains. If we cannot achieve EMS superiority and assure access to the EMS, the joint force cannot prevail. Our adversaries have observed our use and dependence on the EMS, and have developed and organized their forces to achieve EMS superiority; it is essential we develop capabilities and appropriately organize to counter this threat. Achieving and maintaining EMS superiority is the critical enabler for successful Joint Force operations.

To address warfighter requirements, USSTRATCOM collaborates with the Secretary of Defense Electromagnetic Spectrum Operations (EMSO) Cross Functional Team, the Electronic Warfare Executive Committee (EW EXCOM), the Services, the DoD Chief Information Officer (CIO), the joint staff, and Under Secretary of Defense offices to advocate for essential warfighter EMSO capabilities. Additionally, we engage with Australia and North Atlantic Treaty Organization partners to ensure compatible JEMSO doctrine, capabilities, and concepts of operation.

USSTRATCOM led the effort to create the first Joint Publication for JEMSO. Working with DoD CIO and Defense Information Systems Agency (DISA), USSTRATCOM provided the initial warfighter requirements for an Electromagnetic Battle Management (EMBM) system to achieve EMS superiority. In coordination with the DISA Defense Spectrum Organization, USSTRATCOM is establishing the initial Joint Electromagnetic Spectrum Information Analysis and Fusion capability that will provide spectrum specific data for battle management and combatant command operational cells.

Our Command also led a combatant command JEMSO cell manpower requirement validation study through the joint manpower validation process for the FY2022 Program Objective Memorandum budget. All of these warfighter requirement initiatives will require sustained investments.

Conclusion

USSTRATCOM is a global warfighting command, actively and successfully deterring strategic attack against our Nation and our Allies. The men and women of our Command are committed to maintaining a safe, secure, reliable, and effective deterrent for our Nation. If deterrence fails, our combat-ready force is prepared now to deliver a decisive response anywhere on the globe, across all domains, in coordination with geographic and global warfighting combatant commanders and our Allies and partners.



The Command is focused on integrating strategic deterrence in the 21st century, expanding the intellectual capital to educate the joint force on deterrence and nuclear policy, and ensuring our forces are prepared to meet challenges in the global security environment.

Our strategic forces provide the foundation and credibility that backstops all U.S. military operations and diplomacy around the world. Our triad remains the most effective way to deter adversaries from conducting strategic attacks against our Nation and our Allies and partners. Our Nation's strength has helped deter great power war and we must continue to prioritize the capabilities that underpin our strength.

Our Nation is at a critical point in maintaining our strategic advantages and must remain committed to modernization and recapitalization programs in place. Our strategic forces are a prudent investment in the current and future security of our Nation, with some systems scheduled to operate effectively well into the 2070s and 2080s. With continued Congressional support and budget stability, we can continue to pace the threat and develop the future force necessary to guarantee the continued execution of the Department's highest priority mission, to keep our Nation and our Allies safe.

Document No. 3. The Importance of the Nuclear Triad (Office of the Secretary of Defense, Nuclear and Missile Defense Policy, November 2020).

"The nuclear Triad has kept the peace since nuclear weapons were introduced and has sustained the test of time."

-- General Mark A. Milley
Chairman of the Joint Chiefs of Staff

The Triad Has Stood the Test of Time

For more than six decades, the United States has emphasized the need for a nuclear force that credibly deters adversaries, assures allies and partners, achieves U.S. objectives should deterrence fail, and hedges against uncertain threats. Since the 1960s, these objectives have been met by the U.S. nuclear Triad through forces operating at sea, on land, and in the air.

Today's nuclear Triad consists of:

- 14 ballistic missile submarines (SSBNs) armed with 240 submarine-launched ballistic missiles



- 400 land-based intercontinental ballistic missiles (ICBMs)
- 60 nuclear-capable heavy bomber aircraft capable of delivering gravity bombs and cruise missiles

These strategic forces are enabled by a secure nuclear command and control system and supplemented by a small number of non-strategic nuclear forces that provide an ability to forward-deploy.

Complementary Attributes for Robust Deterrence

Each leg of the Triad provides unique and complementary attributes. Collectively, the Triad is intended to ensure that no adversary believes it could launch a strategic attack under any circumstances that eliminates the U.S. ability to respond and inflict unacceptable damage.

SSBNS ARE SURVIVABLE	ICBMS ARE RESPONSIVE	BOMBERS ARE FLEXIBLE
A portion of the SSBN fleet is always on patrol, making it very difficult for potential adversaries to track all of them, contributing to their survivability.	ICBMs are deployed in hundreds of silos and can be launched and reach targets within minutes, creating a nearly insurmountable targeting problem for adversaries.	Bombers are a clear and visible signal of U.S. intent and resolve during a crisis and provide a variety of deployment and yield options when placed on alert.

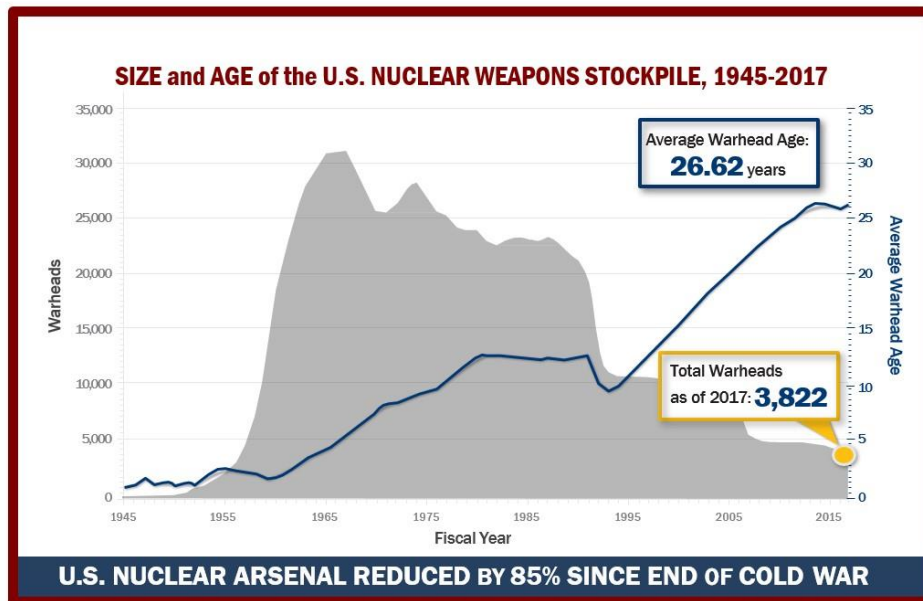
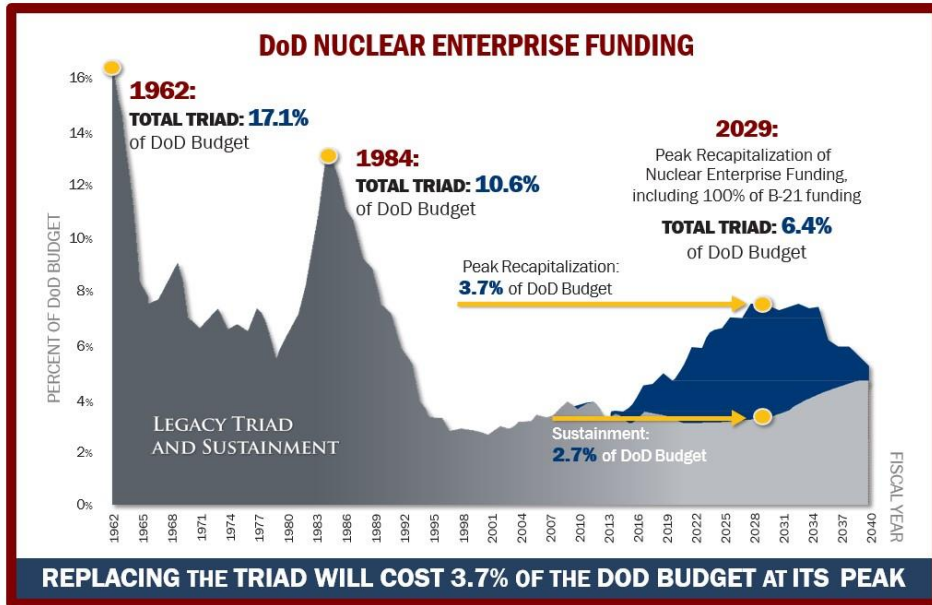
Eliminating a leg of the Triad would weaken the combined strength of the force and simplify adversary attack planning. For example, without ICBMs, a conventional-only attack on the limited number of submarine and bomber bases could significantly degrade the U.S. nuclear arsenal without rising to the level of nuclear use. This significantly lowers the threshold for an attack against the U.S. homeland. Also, the Triad’s diversity enables mitigation of risk if a particular leg of the Triad is degraded or unavailable.

Most of the systems that compose the Triad are operating well beyond their original design lives—they must be modernized or they will be lost. With foreign nuclear threats growing, the importance of the Triad endures.

“The Department will modernize the nuclear triad – including nuclear command, control, and communications, and supporting infrastructure. Modernization of the nuclear force includes developing options to counter competitors’ coercive strategies, predicated on the threatened use of nuclear or strategic non-nuclear attacks.”

-- 2018 National Defense Strategy





*Latest publicly-available figures

First deployed in 1970, with an expected 10 year service life, Minuteman III (MM III) intercontinental ballistic missiles (ICBMs) have been operating for 50 years from bases deep in the American heartland. Having undergone multiple life extensions, the Minuteman III will



be replaced by a new, more survivable, and more cost-effective weapon system: the Ground Based Strategic Deterrent (GBSD).

Modernizing U.S. ICBMs

- After conducting an analysis of alternatives, the Air Force determined that a replacement ICBM would be similar in cost to a Minuteman III life extension program over FY2016-2075, would meet future requirements, and lower sustainment costs over its lifecycle.
- For the MM III to be usefully life extended, the United States would need to replace a number of major components – which, even if accomplished at cost and on time, would still fall short of the Department’s requirements – including accommodating modern safety and security features and technologies.
- GBSD will incorporate low risk, technically mature components; feature a modular architecture that can incorporate emerging technology to adapt to rapidly evolving threat environments; and will be easier to maintain than the MM III – all of which will save on costs and provide great value as GBSD operates well into the 2070s.
- Finally, the GBSD program will not only replace the MM III missile, but also modernize the launch facilities, improve command and control, and increase safety and security.

The Importance of U.S. ICBMs

- U.S. ICBMs are the most responsive leg of the Triad, on day-to-day alert 24/7/365, and controlled by iron-clad nuclear command, control, and communications (NC3).
- U.S. ICBMs are spread out in 400 hardened, underground silos – with another 50 silos kept in “warm” status – assigned to three separate military bases, presenting an intractable targeting problem for any potential adversary.
- The hardened and dispersed nature of U.S. ICBMs requires a potential adversary to commit to a massive attack on the U.S. homeland to even have a chance of disabling all U.S. ICBMs – thus enhancing deterrence of an attack.
 - A massive first strike – when confirmed by multiple ground and space-based sensors – would send an unambiguous signal of the adversary’s unlimited aims and virtually ensure massive U.S response.
 - U.S. nuclear planners have specifically built in options to either absorb an initial first strike and respond effectively later, or to launch ICBMs while under a confirmed attack to preclude being disabled in a massive first strike.
 - While it is not U.S. policy to rely on launch under attack tactics, retaining this option forces the adversary to consider the likelihood its first strike could potentially result in 900 or more warheads being used on empty silos.
- Should the United States need to respond quickly to an emerging attack, U.S. ICBMs provide the most rapid response option with assured connectivity to the President through national command authorities.



- Although the MM III can carry up to three nuclear warheads, each is currently loaded with only one – providing the United States targeting flexibility, especially for some scenarios of an adversary’s limited use.
- ICBMs also provide the ability to upload additional warheads which can hedge against technical failure in one of the other legs of the Triad or respond to adverse geopolitical developments.
- Finally, the day-to-day alert of ICBMs takes the burden of a daily alert posture off the bomber force – freeing up many bombers from continuous nuclear alert to concentrate on potential conventional missions.
 - Without U.S. ICBMs, more bombers would likely need to be purchased, beyond the number already planned, to maintain a secure nuclear strike capability while maintaining conventional roles.
 - At least some portion of the bomber force would then have to be placed on day-to-day alert to ensure survivability, which would reduce the serviceable lifetime of the airframe and add greater cost.

Answering Questions

Are U.S. ICBMs on “hair trigger” alert? Isn’t this dangerous?

- No, the term “hair trigger” is misleading, meant to evoke an image of ICBMs dangerously close to being launched at the first sign of attack, without safeguards or oversight.
- In reality, ICBM operators are incapable of launching an ICBM without first receiving and confirming a number of criteria to verify and process a valid launch order from the President. Furthermore, to prevent unauthorized or accidental launches, ICBMs are locked day-to-day and cannot be enabled for launch without a code received in the valid launch order. In addition, a missile squadron is interconnected, meaning the five launch control centers (LCCs) monitor the status of all 50 ICBMs in that squadron and each other, and any one LCC will initiate “inhibit launch” commands in the event of unauthorized launch indications.
- Although the President can order the launch of ICBMs quickly during an adversary’s confirmed strike, the dispersed and survivable nature of the overall nuclear Triad, along with the redundant and secure nature of U.S. missile warning sensors, offers the President viable options to not rely on launch-under-attack tactics.

Does the United States have a launch-on-warning policy? What about false warnings of attack?

- No, the United States rejects launch-on-warning policies and postures and will not launch its ICBMs based only on one sensor’s data.



- The United States maintains and is modernizing an overlapping network of space- and ground-based sensors that jointly validate the indications, and determine the severity, of a missile launch against the United States.
- The United States takes every precaution to ensure it does not rely on only one sensor's data for missile warning and assessment. Before a notification is sent to U.S. senior leadership, data concerning a potential missile attack are confirmed using dual-phenomenology – matching the data from both ground- and space-based sensors.
- The Department of Defense also considers the broader political-military context in which it receives the data concerning a possible missile launch. Data that indicate a massive missile attack against the United States, when received in peacetime, will be given an extra level of scrutiny and confirmation to prevent mischaracterization.

Why can't we rely on submarines and bombers by themselves?

- A dyad of submarines and bombers alone would not provide sufficient deterrence and assurance effect.
- Without ICBMs, a conventional-only attack on the limited number of submarine and bomber bases could significantly degrade the U.S. nuclear arsenal without rising to the level of nuclear use. This significantly lowers the threshold for an attack against the U.S. homeland.
- Adversaries would have enormous incentives to invest even more in anti-submarine warfare capabilities while reinforcing their already substantial air and missile defenses.

Will the GBSD cause an arms race?

- No, Russia and China are already increasing the capability and number of their ICBMs respectively, while the United States is transparently replacing ICBMs on a one-for-one basis.
- Eliminating U.S. ICBMs unilaterally would in fact remove leverage from diplomats seeking to avoid an arms race and reduce the leverage needed to persuade other nations to decrease their nuclear arsenals.

Would eliminating ICBMs save a lot of money in the defense budget?

- No, even assuming a vastly reduced future defense budget, according to the Congressional Budget Office (CBO), eliminating ICBMs would account for less than one percent of the defense dollars spent over the next 30 years.
- Additionally, calls for eliminating ICBMs rarely account for the increased costs that would result.
- Eliminating ICBMs would only transfer the responsibility of nuclear deterrence and assurance missions onto the other legs of the nuclear Triad – bombers and submarines – which would require force posture and capability changes.



- These changes could potentially include procurement of additional submarines and bombers, and then placing bombers on strategic day-to-day alert to maintain current capabilities and effectiveness – both of which would increase costs.

The current Ohio-class ballistic missile submarines (SSBNs) began patrolling the world's oceans in 1982 and, although originally designed for a 30-year service life, have been life extended for a 42-year service life

- with the newest SSBN having entered service in 1997. Ohio-class SSBNs currently carry 20 Trident II D5 submarine-launched ballistic missiles (SLBMs). The Trident II D5 SLBM can carry multiple nuclear warheads and is used on both U.S. and U.K. nuclear-powered SSBNs. As the 14 Ohio-class SSBNs reach the end of their service lives, the U.S. Navy will replace them with the Columbia-class SSBNs, with the first patrol scheduled for 2030.

Modernizing Sea-Based Weapons

- Ohio-class SSBNs will serve longer than any other U.S. nuclear submarine.
- The United States will replace the 14 Ohio-class SSBNs with at least 12 Columbia-class SSBNs.
- The Columbia-class SSBNs will be able to carry 16 Trident II D5 SLBMs and feature a nuclear reactor that does not need to be refueled midlife – reducing operational and program costs while still meeting operational requirements.
- The Columbia-class SSBNs are designed to be survivable and operate well into the 2080s.
- The Trident II D5 SLBM fleet will operate into the 2040s.
- The United States has supplemented its sea-based nuclear capability with the W76-2 by modifying a small number of Trident II D5 nuclear warheads to provide a responsive and survivable low-yield capability to enhance deterrence.
- The Department of Defense plans to develop a nuclear-armed sea-launched cruise missile (SLCM-N) – providing a mobile, survivable, and dispersed capability for deterrence and assurance missions.
- The United States is also pursuing the W93 warhead to improve operational effectiveness and mitigate risk.

The Value of Sea-Based Weapons

Ballistic Missile Submarines

- SSBNs are the most survivable leg of the nuclear Triad because they are extremely difficult to detect while on deterrent patrol – with no foreseeable threats to their survivability in the near- to mid-term.
- Given their carrying capacity, SSBNs provide a range of nuclear response options that are available for a significant period of time while at sea.



- SSBNs are highly mobile, allowing them to move to a variety of launch points to avoid SLBM overflight concerns, increase operational flexibility, and provide assurance to allies.
- U.S. SSBNs maintain a continuous presence while at sea, with each SSBN often on patrol for months at a time, providing a reliable and responsive asset during an evolving crisis or conflict.
- U.S. SSBNs have reliable and redundant connectivity with the President through national command authorities.

Submarine-Launched Ballistic Missiles

- U.S. SLBM warheads are very accurate and reliable, and when combined with the Trident II D5's approximate +7,000 km range, allow the United States to hold at risk any adversary's hardened and valued assets.
- The Trident II D5's low-yield W76-2 warhead provides a prompt and survivable capability – a deterrent against any adversary's potential misperception regarding the possible gains from a limited or regional nuclear strike.

Nuclear-Armed Sea-Launched Cruise Missiles

- SLCM-Ns will be dispersed across a highly mobile force, posing an intractable targeting problem for adversaries, providing assurance to allies, and allowing the United States to surge forces during a crisis if needed.
- The maneuverability of the cruise missile launching platforms forces the adversary to plan against multiple azimuths of attack, stressing defensive planning.

Answering Questions

If SSBNs are very difficult to detect, why does the United States need 12? Can it reduce to eight?

- The primary mission of SSBNs is to deter strategic attack on the United States, its allies, and partners. To meet operational requirements and provide credible deterrence, U.S. SSBNs must maintain a high level of availability, survivability, and responsiveness that is only achievable with 12 SSBNs.
- Fewer than 12 SSBNs would limit our ability to meet operational requirements and conduct at-sea training, exercises, maintenance, and certification – including the operating of nuclear weapons, the nuclear reactor, and the submarine – all eroding U.S. credibility.
- Although SSBNs are indeed the most survivable leg of the nuclear Triad, the United States cannot assume that the current balance of technology will remain in the U.S. favor indefinitely.



- Reducing SSBNs to eight in number, for example, would greatly increase the strategic value of each individual submarine – increasing the incentives for adversaries to invest in anti-submarine warfare capabilities.
- A notional force posture of eight submarines, assuming the current level of nuclear warheads, would restrict targeting flexibility, reduce the size of the patrol area, and increase the predictability of submarine deployments and transit – reducing survivability.

Does the low-yield W76-2 warhead increase the risk of nuclear war by making it appear more usable?

- No, a nuclear weapon’s yield is not determinative of its “usability” – any decision to employ nuclear weapons, even of the lowest yield, would be one of the most important decisions a President could make.
- The W76-2 is a limited and prudent modification of existing weapons – such adjustments do not increase the risk of nuclear war and, in fact, enhance deterrence by addressing a perceived gap in U.S. capabilities.
- A potential adversary must not perceive a gap between stated U.S. national interests, U.S. political will to defend those interests, and the appropriate U.S. capabilities needed and available to defend those interests.
- The W76-2’s primary purpose is to deter, not fight, a nuclear war. Since the United States already has air-launched cruise missiles, what would SLCM-N add?
- The SLCM-N will provide a regional-based nuclear capability to deter strategic attacks, including an adversary’s limited nuclear strikes – thus increasing the credibility of U.S. deterrence and assurance efforts.
- While air-launched cruise missiles stress an adversary’s air defenses, U.S. sea-launched cruise missiles will stress the adversary’s air defenses and naval forces that seek out the U.S. naval launch platform.

Is the United States trying to match Russia’s non-strategic nuclear force, system by system?

- No, the United States does not see a need to match Russia’s approximately 2,000 non-strategic nuclear weapons.
- Although the United States followed through on its commitments after the Cold War to retire sea-based nuclear cruise missiles from its forces, Russia did not follow suit and not only retained them, but modernized them.
- The Russian non-strategic nuclear force contains a number of systems that have no U.S. equivalent, including nuclear torpedoes, anti-ship missiles, depth charges, short-range ballistic missiles, and anti-aircraft missiles.
- Given this threat, the SLCM-N can fill a number of deterrence and assurance roles by broadening response options across a mobile and dispersed force, an important capability especially in regional crisis scenarios involving allies.



Why does the United States need the W93/Mk7? It already has two warheads for naval use.

- USSTRATCOM identified operational requirements for the W93/Mk7 to ensure the survivable, sea-based leg of the Triad can deter and survive against evolving threats in 2040 and beyond.
- The United States has not delivered an integrated nuclear reentry body system since the 1980s—required skills and industrial base have atrophied.
- The W93 warhead will not require nuclear testing or increase the size of the U.S. stockpile.
- The W93/Mk7 effort will also support our Ally, the United Kingdom, in their Replacement Warhead program.

The United States has a diverse set of air-based nuclear delivery systems – the B-52H heavy bomber, B-2 bomber, and the F-15E dual capable aircraft (DCA); as well as weapon systems—the air-launched cruise missile (ALCM), the B83-1, and the B61 family of gravity bombs. In the future the United States will deploy the B-21 Raider beginning in the mid-2020s; the nuclear-certified version of F-35 in 2024; the B61-12 in the 2020s; and the Long-Range Standoff Weapon (LRSO) in the early 2030s.

Modernizing Air-Based Nuclear Weapons

- The B-52H Stratofortress, originally deployed in 1961, has undergone a number of life extensions and upgrades, with the latest potential upgrade being an assessment of engine options and cybersecurity enhancements.
- The B-2 Spirit has been the Nation’s only low-observable bomber since it was first deployed in 1997, and has received numerous software and hardware upgrades to remain capable in the most challenging environments.
- The B-21 Raider is a next generation low-observable bomber, scheduled to replace the B-2 beginning in the late 2020s, with a planned minimum inventory of 100 aircraft.
- The AGM-86B ALCM, which was first deployed in 1982, and designed to defeat Soviet threats, will be replaced by the LRSO – a low-observable, long-range, and survivable cruise missile.
- The B61-12 nuclear gravity bomb replaces four previous variants (Mods 3, 4, 7, and 10) – resulting in a single variant that balances greater accuracy and controlled yield—while meeting military requirements.
- The nuclear-certified F-35 DCA will gradually replace F-15E fighter aircraft as the primary dual-capable platform.



The Value of Air-Based Nuclear Weapons

- U.S. bombers are the most flexible leg of the Triad, allowing the United States to signal adversaries through force posturing – tangible reminders of U.S. commitments to its security and the security of its allies and partners.
- U.S. bombers have nearly unlimited range given their mid-air refueling capability, and, when combined with the range of their air-launched cruise missiles, can threaten a large percentage of targets in an adversary’s territory.
- U.S. bombers can carry a number of nuclear and conventional weapons, tailored to the mission. These weapons can also be loaded or unloaded under condensed timelines, providing more flexibility than ICBMs or SLBMs.
- U.S. bombers and DCA can be forward deployed in allied or partner nations during peacetime, a crisis, or a conflict.
- Bombers can also be uploaded with additional weapons and/or placed on alert during a crisis as a deterrent signal.
- B61-12 and LRSO will have improved capabilities, accuracy, and reliability that will maintain their military effectiveness and reduce the probability of unintended consequences.
- The availability of low-yield options on the B61-12 and LRSO provides U.S. leadership better-tailored deterrence effects, flexibility in targeting, and less possibility of collateral damage.
- U.S. bombers and DCA are able to be recalled once airborne, unlike other components of the nuclear Triad, providing U.S. leadership more time for decision-making during an unfolding crisis.
- Air-launched cruise missiles greatly expand the capability of each individual bomber. For example, a single B-52 can carry 20 ALCMs, allowing one bomber to threaten 20 geographically separated targets.
- Advanced standoff weapons like the LRSO can impose significant costs on adversaries’ air defenses, requiring large investments and advances in detection, tracking, C2, and area defenses to challenge a single LRSO.
 - Adversaries would have to detect both a low-observable bomber, if a B-21, and each low-observable LRSO.
 - Adversary investments in air and missile defense limit the amount of money they can invest in offensive forces.
- Without the LRSO, U.S. air-based nuclear deterrence capabilities would be significantly restricted, as delivery platforms would be forced to overfly each individual target – decreasing the probability of mission success and increasing the risk to aircrew safety.
- A significantly reduced U.S. bomber force could not credibly deter aggression nor assure allies and partners.



Answering Questions

With advances in potential adversaries' air defenses, are new bombers a worthwhile investment?

- Yes, the B-21 is designed to overcome even an advanced adversary's air defenses – but it is important to note that not all bomber missions will require direct penetration through the most concentrated air defense forces.
- Many of the B-21 bomber's prospective weapons will be able to launch at a standoff distance, allowing the bomber to either continue forward towards other targets or return safely for other missions.
- The B-21 will impose significant costs on potential adversaries, requiring significant investment in their integrated air and missile defense capabilities.

Why is the low-observable LRSO needed when the low-observable B-21 can carry gravity bombs?

- The LRSO's unique characteristics will augment the capabilities of nuclear gravity bombs, providing U.S. leadership with a broader range of options.
- While the B-21 will provide a significant capability improvement over other low-observable aircraft, the LRSO extends the range at which the United States can hold targets at risk within an adversary's territory – even when defended by modern integrated air defense systems.
- LRSO allows the B-21 to penetrate and launch the missile to fly the remainder of the mission, thereby denying an adversary geographic sanctuaries.
- If only carrying nuclear gravity bombs, a B-21 bomber would have to fly near or directly over each target. Whereas by employing LRSOs the B-21 could release multiple munitions at optimal points in the flight plan, allowing each cruise missile to maneuver and avoid air defenses. This enables one bomber to strike multiple targets while reducing time in or near an adversary's contested airspace.
- The deterrent effect of holding at risk what the adversary values both from standoff distance with cruise missiles or directly with gravity bombs is significantly greater than the deterrent effect of having only gravity bombs available.

Why can't conventional long-range cruise missiles substitute for the LRSO?

- While the operational effectiveness of LRSO in comparison to conventional cruise missiles is important, it is of secondary importance to the LRSO's primary purpose – deterrence – a purpose conventional cruise missiles can only supplement, not replace.
- The LRSO's greater range, low-observable signature, and nuclear yield will outpace any similar capabilities provided by conventional cruise missiles.
- In addition, if employed against hardened or mobile targets, the United States would need to launch far more conventional cruise missiles on more missions to – if possible – achieve the same likelihood of effectiveness.



If potential adversaries cannot determine whether a cruise missile is conventional or nuclear, will the LRSO increase the risk of nuclear war?

- No, the United States has deployed nuclear and conventional air-launched cruise missiles for decades.
- The United States has launched more than 350 conventional cruise missiles in combat since 1987, and none have been mischaracterized by potential adversaries as nuclear strikes.
- U.S. planning accounts for many possible adversary perceptions across a number of scenarios and seeks to minimize the chance of mischaracterization – including what weapons it employs, when, and for what targets.

Are bombers major contributors to the cost of the Department of Defense’s nuclear modernization budget?

- No, the latest CBO projections estimate the total costs of bombers at around \$40 billion over the next 10 years, averaging about four billion a year, or less than one percent of the entire annual defense budget.
- Of the four billion per year, however, CBO attributes only a quarter of the total cost to the nuclear mission.
- Even if U.S. bombers did not have a nuclear mission, the United States would still need to purchase the same number of bombers to accomplish conventional missions.

