

AMERICA'S STRATEGIC POSTURE

The Final Report of the Congressional Commission
on the Strategic Posture of the United States

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PREFACE OF THE CHAIR AND VICE CHAIR

October 2023

The militarily troubling and increasingly aggressive behaviors of Russia and China over the past decade led Congress to direct a review of the strategic posture of the United States, including nuclear weapons policy, strategy, and force structure.¹ We have the privilege to serve as the chair and vice chair of this second Strategic Posture Commission (SPC).

Much has happened since the first SPC released its report in 2009.² China's rapid military build-up, including the unprecedented growth of its nuclear forces, Russia's diversification and expansion of its theater-based nuclear systems, the invasion of Ukraine in 2014 and subsequent full-scale invasion in February 2022, have all fundamentally altered the geopolitical landscape. As a result of China's and Russia's growing competition with the United States and its Allies and partners, and the increasing risk of military conflict with one or both, as well as concerns about whether the United States would be prepared to deter two nuclear peers, Congress determined it was time for a new look at U.S. strategic policy, strategy, and force structure.

The first SPC had a charge like ours: "to conduct a review of the strategic posture of the United States and to make a recommendation on how to move forward."³ The vision of a world without nuclear weapons, aspirational even in 2009, is more improbable now than ever. The new global environment is fundamentally different than anything experienced in the past, even in the darkest days of the Cold War. Today the United States is on the cusp of having not one, but two nuclear peer adversaries, each with ambitions to change the international status quo, by force, if necessary: a situation which the United States did not anticipate and for which it is not prepared. While the risk of a major nuclear conflict remains low, the risk of military conflict with either or both Russia and China, while not inevitable, has grown, and with it the risk of nuclear use, possibly against the U.S. homeland.

We started our work with extensive intelligence briefings to understand this new, rapidly changing security environment. These briefings underpin our conclusion that as a nation we need to urgently prepare for the new reality, and that measures need to be taken now to deal with these new threats. We believe that prompt actions are needed to provide future decision-makers viable options to credibly deter conflict. Being unprepared for the reality of two nuclear peers, who are dedicated to and focused on undermining the post-Cold War international order that has served the United States and its Allies and partners so well, is, in our view, not an option.

We had extensive discussions and briefings on the problems we face as a nation, including workforce shortages, supply chain limitations, and inadequate physical, scientific, technical, and experimental infrastructure at the Department of Defense (DOD) and Department of Energy/National Nuclear Security Administration (DOE/NNSA). These shortcomings resulted from years of inattention and if not addressed promptly, will continue to limit the U.S. ability to prepare and respond to the new challenges.

As we discussed this new normal, we also concluded that the United States does not truly have, but must commit to, a "whole-of-government" approach to be more efficient and effective.

Keeping up with technology is also a challenge. Whereas in the past, when U.S. government research was uniformly on the cutting edge, that role has shifted to the private sector in many areas. As a result, the DOD and DOE/NNSA will have to change traditional procurement practices to work effectively with the private sector to rapidly develop and deploy new cutting-edge technology.

America's Strategic Posture

Allies and partners are important as together we are stronger. Greater cooperation, coordination and integration with our Allies and partners is essential to deter conflict and prosper economically. National leaders must communicate to U.S. citizens the benefits and importance of U.S. global leadership, Allies and partners and extended deterrence, if they are to gain the support of the American people for the associated policy and costs.

Our review sought to address and respond to this new, more dangerous, and more competitive environment, while looking for ways to improve strategic stability and reduce the risk of conflict. We know that this will be difficult on many levels, but we believe that our recommendations can help shape needed future strategy and posture decisions.

For the most part the Commission deliberately avoided making specific force structure recommendations; instead, we identified capabilities beyond the existing program of record (POR) that will be needed. We believe it is appropriate to leave specific material solution decisions to the Executive Branch and Congress. We were clear, however, that the nuclear force modernization POR is absolutely essential, although not sufficient to meet the new threats posed by Russia and China, and that the elements of the POR should be completed on time, expedited wherever possible, and expanded as needed.

We also found that adopting new technologies faster, and working with smaller innovative companies will be necessary to support a modern, flexible, force structure and infrastructure in the future.

While we did not conduct a cost analysis of our recommendations, it is obvious they will cost money. We do recognize budget realities, but we also believe the nation must make these new investments and U.S. leaders must communicate to U.S. citizens both the need and urgency to rebuild the nuclear infrastructure and modernize the nuclear forces. These investments in the nuclear enterprise are a relatively small portion of the overall defense budget but provide the backbone and foundation of deterrence and are the nation's highest defense priority. The investments the Commission recommends in both nuclear and conventional capabilities will provide a safe, secure, reliable, effective, and credible deterrent, which is essential to reduce the risk of conflict, most importantly nuclear conflict.

From the outset the Commissioners understood that our most valuable contribution to U.S. national security would be a consensus report. There were certainly differences of opinion and a multitude of views expressed amongst our members during our many robust debates and discussions. No doubt some commissioners might have stated some things differently. For example, a number of commissioners believe it is inevitable that the size of the U.S. nuclear stockpile and the number of delivery systems should increase. We all agreed, however, on the findings and recommendations in this report and the need for actions now to better position the United States for the future and ensure a safe, secure, reliable, and credible deterrent.

We believe that sustained bipartisan consensus is possible and necessary to secure a strong future and credible deterrent for the United States. Moreover, we hope this report illustrates to policy- and decision-makers that even with different opinions, people of good faith can work together for the common good on fundamentally important matters.

This report would not have been possible without the excellent work of the Institute for Defense Analyses (IDA) leadership and staff. We extend a sincere thank you to our Executive Director, Maj. Gen. William Chambers (USAF retired) and the IDA staff.

Madelyn Creedon
Chair

Jon Kyl
Vice Chair

EXECUTIVE SUMMARY

The United States faces a strategic challenge requiring urgent action. Given current threat trajectories, our nation will soon encounter a fundamentally different global setting than it has ever experienced: we will face a world where two nations possess nuclear arsenals on par with our own. In addition, the risk of conflict with these two nuclear peers is increasing. It is an existential challenge for which the United States is ill-prepared, unless its leaders make decisions now to adjust the U.S. strategic posture.

The Congressional Commission on the Strategic Posture of the United States was established by the Fiscal Year (FY) 2022 National Defense Authorization Act (NDAA), and concludes that America's defense strategy and strategic posture must change in order to properly defend its vital interests and improve strategic stability with China and Russia. Decisions need to be made now in order for the nation to be prepared to address the threats from these two nuclear-armed adversaries arising during the 2027-2035 timeframe. Moreover, these threats are such that the United States and its Allies and partners must be ready to deter and defeat both adversaries simultaneously.

We arrive at these conclusions following a comprehensive year-long review of the threats America faces and its strategy and planned capabilities to address those threats. The evidence demonstrates that the U.S.-led international order and the values it upholds are at risk from the Chinese and Russian authoritarian regimes. The risk of military conflict with those major powers has grown and carries the potential for nuclear war. Therefore, the Commission reached the unanimous, non-partisan conclusion that today's strategic outlook requires an urgent national focus and a series of concerted actions not currently planned. In sum, we find that the United States lacks a comprehensive strategy to address the looming two-nuclear-peer threat environment and lacks the force structure such a strategy will require.

In reaching that overall conclusion, we make clear that the fundamentals of America's deterrence strategy remain sound, but the application of that strategy must change to address the 2027-2035 threat environment. Those changes drive necessary adjustments to the posture of U.S. nuclear capabilities – in size and/or composition. A full spectrum of non-nuclear capabilities is also essential to the nation's strategic posture. Such adjustments, in turn, drive the need to strengthen and expand the capacity of the infrastructure required to sustain and enhance U.S. strategic capabilities. In addition, Allies and partners are central to our findings regarding strategy and posture. We also emphasize the need for robust risk reduction efforts as fundamental to the U.S. approach in the new threat environment.

Adhering to the stipulations of our mandate, the report that follows delineates 131 findings and makes 81 recommendations. Those findings and recommendations are found at the beginning and end, respectively, of each chapter that follows; a complete list is also included following the report's conclusion. Our most important recommendations are summarized here:

STRATEGY

- To achieve the most effective strategy for stability in light of the 2027-2035 threat environment, the Commission identifies three necessary changes:
 - ▶ The United States must develop and effectively implement a truly integrated, whole-of-government strategy to address the 2027-2035 threat environment.

- ▶ The objectives of U.S. strategy must include effective deterrence and defeat of simultaneous Russian and Chinese aggression in Europe and Asia using conventional forces. If the United States and its Allies and partners do not field sufficient conventional forces to achieve this objective, U.S. strategy would need to be altered to increase reliance on nuclear weapons to deter or counter opportunistic or collaborative aggression in the other theater.
- ▶ The size and composition of the nuclear force must account for the possibility of combined aggression from Russia and China. U.S. strategy should no longer treat China's nuclear forces as a "lesser included" threat. The United States needs a nuclear posture capable of simultaneously deterring both countries.
- The Commission recommends the United States maintain a nuclear strategy consistent with the Law of Armed Conflict (LOAC), based on six fundamental tenets—assured second strike, flexible response, tailored deterrence, extended deterrence and assurance, calculated ambiguity in declaratory policy, hedge against risk—and apply these tenets to address the 2027-2035 threat.

STRATEGIC POSTURE

In the context of a strategic posture deploying both conventional and nuclear capability, the Commission believes the traditional role of nuclear weapons in U.S. defense strategy remains valid and of continuing importance: deterrence of adversaries; assurance of Allies; achieving U.S. objectives should deterrence fail; and hedging against adverse events.

- The Commission recommends fully and urgently executing the U.S. nuclear modernization Program of Record (POR), which includes replacement of all U.S. nuclear delivery systems, modernization of their warheads, comprehensive modernization of U.S. nuclear command, control, and communications (NC3), and recapitalizing the nuclear enterprise infrastructure at the DOD and DOE/NNSA.
- The current modernization program should be supplemented to ensure U.S. nuclear strategy remains effective in a two-nuclear-peer environment.
- Comprehensive risk-mitigating actions across U.S. nuclear forces must be executed to ensure that delays in modernization programs or early age-out of currently deployed systems do not result in militarily significant shortfalls in deployed nuclear capability.
- The U.S. strategic nuclear force posture should be modified to:
 - ▶ Address the larger number of targets due to the growing Chinese nuclear threat.
 - ▶ Address the possibility that China will field large-scale, counterforce-capable missile forces that pose a threat to U.S. strategic nuclear forces on par with the threat Russia poses to those forces today.
 - ▶ Assure the United States continues to avoid reliance on executing Intercontinental Ballistic Missile (ICBM) launch under attack to retain an effective deterrent.
 - ▶ Account for advances in Russian and Chinese integrated air and missile defenses (IAMD).
- The U.S. theater nuclear force posture should be urgently modified to:
 - ▶ Provide the President a range of militarily effective nuclear response options to deter or counter Russian or Chinese limited nuclear use in theater.
 - ▶ Address the need for U.S. theater nuclear forces deployed or based in the Asia-Pacific theater.
 - ▶ Compensate for any shortfall in U.S. and allied non-nuclear capabilities in a sequential or simultaneous two-theater conflict against Russia and China.
 - ▶ Address advances in Russian and Chinese IAMD.

NUCLEAR SECURITY ENTERPRISE INFRASTRUCTURE AND ORGANIZATION

- The Commission recommends the DOD and DOE/NNSA strategic infrastructure be expanded to have sufficient capacity to:
 - ▶ Meet the capability and schedule requirements of the current nuclear modernization POR and the requirements of the force posture modifications recommended by the Commission in time to address the two-peer threat.
 - ▶ Provide an effective hedge against four forms of risk: technical failure of a warhead or delivery system, programmatic delays, operational loss of delivery systems, and further deterioration of the geopolitical environment.
 - ▶ Flex to respond to emerging requirements in a timely fashion.
- To support the proposed strategy, the Commission recommends Congress fund an overhaul and expansion of the capacity of the U.S. nuclear weapons defense industrial base and the DOE/NNSA nuclear security enterprise, including weapons science, design, and production infrastructure. Specifically:
 - ▶ Congress should fund the full range of NNSA's recapitalization efforts, such as pit production and all operations related to critical materials.
 - ▶ Congress should forge and sustain bipartisan consensus and year-to-year funding stability to enable the defense industry to respond to innovative DOD contracting approaches and invest with more certainty.
 - ▶ Congress should enact annual DOD and DOE authorization and appropriation bills before the beginning of each fiscal year.
 - ▶ Congress should place the purview of all "050" programs (President's Budget line item for "national security") that are in NNSA under Defense appropriations subcommittees (House Appropriations Committee-Defense (HAC-D), Senate Appropriations Committee-Defense (SAC-D).
 - ▶ Cabinet Secretaries, working with states and union leaders, should establish and increase the technical education and vocational training programs required to create the nation's necessary skilled-trades workforce for the nuclear enterprise.
- The Commission recommends a number of specific actions to expand the capacity and effectiveness of the nation's infrastructure and supply chain for its strategic capabilities.

NON-NUCLEAR CAPABILITIES

The Commission recommends:

- The United States urgently deploy a more resilient space architecture and adopt a strategy that includes both offensive and defensive elements to ensure U.S. access to and operations in space.
- The United States and its Allies take steps to ensure they are at the cutting edge of emerging technologies – such as big data analytics, quantum computing, and artificial intelligence (AI) – to avoid strategic surprise and potentially enhance the U.S. strategic posture.
- The United States prioritize funding and accelerate long-range non-nuclear precision strike programs to meet the operational need and in greater quantities than currently planned.

- The United States develop and field homeland IAMD that can deter and defeat coercive attacks by Russia and China, and determine the capabilities needed to stay ahead of the North Korean threat.⁴
- The Secretary of Defense direct research, development, test and evaluation into advanced IAMD capabilities leveraging all domains, including land, sea, air, and space. These activities should focus on sensor architectures, integrated command and control, interceptors, cruise and hypersonic missile defenses, and area or point defenses. The DOD should urgently pursue deployment of any capabilities that prove feasible.
- The Secretary of Defense and the Military Departments transfer operations and sustainment responsibility for missile defense to the appropriate Military Departments by 1 October 2024. This will allow the Missile Defense Agency (MDA) to focus on research, development, prototyping and testing.

ALLIES AND PARTNERS

The Commission believes it is in the U.S. national interest to maintain, strengthen, and when appropriate, expand its network of alliances and partnerships. These relationships strengthen American security by deterring aggression regionally, before it can reach the U.S. homeland, while also enabling U.S. economic prosperity through access to international markets. Withdrawing from U.S. alliances and partnerships would directly benefit adversaries, invite aggression that the United States might later have to reverse, and ultimately decrease American, allied, and partner security and economic prosperity. Further, the Commission believes that our defense and the defense of the current international order is strengthened when Allies can directly contribute to the broader strategic posture, and the United States should seek to incorporate those contributions as much as possible.

- The Executive branch should recognize that any major change to U.S. strategic posture, policies, or capabilities will have great effect on Allies' perceptions and their deterrence and assurance requirements. As a result, any changes should be predicated on meaningful consultations.

RISK REDUCTION

The Commission believes it is of paramount importance for the United States to work to reduce strategic risks. This involves activities and programs across the U.S. government, including in nonproliferation and arms control, as well as maintaining strong, viable, and resilient military forces.

- The Commission recommends that a strategy to address the two-nuclear-peer threat environment be a prerequisite for developing U.S. nuclear arms control limits for the 2027-2035 timeframe. The Commission recommends that once a strategy and its related force requirements are established, the U.S. government determine whether and how nuclear arms control limits continue to enhance U.S. security.
- The Commission recommends that the United States continue to explore nuclear arms control opportunities and conduct research into potential verification technologies in order to support or enable future negotiations in the U.S. national interest that seek to limit all nuclear weapon types, should the geopolitical environment change.
- Where formal nuclear arms control agreements are not possible, the Commission recommends pursuing nuclear risk reduction measures to increase predictability and reduce uncertainty and the chances for misperception and miscalculation.

The 2009 Congressional Commission on the Strategic Posture of the United States reported that the United States was at “a moment of opportunity, . . .but also a moment of urgency” – because the security environment had improved and the threat of nuclear proliferation was the principal concern. Since 2009, the security environment has dramatically worsened and new existential threats have emerged. This Commission concludes that the United States now faces a high-stakes challenge that requires urgent action. Nevertheless, the Commission has not seen the U.S. government demonstrate the urgency and creativity required to meet the challenge. Nothing other than synchronized steps taken by the Executive and Legislative Branches will craft the strategy and build the posture the nation requires.

The challenges are unmistakable; the problems are urgent; the steps are needed now.

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INTRODUCTION

Section 1687 of the FY2022 NDAA established a Congressional Commission on the Strategic Posture of the United States to “examine and make recommendations to the President and Congress with respect to the long-term strategic posture of the United States.”⁵ The Commission was directed to:⁶

1. “Conduct a review of the strategic posture of the United States, including a strategic threat assessment and a detailed review of nuclear weapons policy, strategy, and force structure”;
2. Assess the “benefits and risks associated with the current strategic posture and nuclear weapons policies of the United States; factors affecting strategic stability that relate to strategic posture; and lessons learned” from previous Commissions and Nuclear Posture Reviews (NPR); and
3. Make recommendations with respect to “the most appropriate strategic posture; the extent to which capabilities other than nuclear weapons can contribute to or detract from strategic stability; and the most effective nuclear weapons strategy for strategic posture and stability.”

The FY2022 NDAA language did not provide definitions of “strategy,” “strategic posture,” or “strategic stability,” all of which are terms of art. For this Commission, *strategy* is understood as a method by which the United States develops and employs the instruments of national power to achieve national objectives. The Commission defines *strategic posture* as the manner in which the United States is positioned to defend itself and its Allies and advance American interests. Strategic posture draws on the capacity, capability, flexibility, and resolve that the United States has developed across its tools of national power, and encompasses the forces and their supporting infrastructure and industrial base. The Commission considers *strategic stability* broadly, as a condition in which the political relations and military balance between states that pose an existential threat to each other is such that they perceive neither a compelling need nor a viable opportunity to use military force to advance their interests at the expense of the other state.⁷

The FY2022 NDAA was signed into law on December 27, 2021. By June 2022, all Commissioners were appointed and the Institute for Defense Analyses (IDA) was selected to provide analytic and logistical support. The Commission began its work in earnest in July 2022, and the deadline for reporting was later adjusted by the FY2023 NDAA to July 31, 2023.⁸

APPROACH

From the outset, the Commission emphasized the importance of consensus. Members committed to providing objective, non-partisan assessments and recommendations. At the start, the Commission reviewed the lessons learned from the results of the 2008-2009 Strategic Posture Commission, other commissions, and previous Nuclear Posture Reviews. To ensure that Commission members had access to all information pertinent to their mandate, the members met as a group at least once per month between July 2022 and June 2023, receiving more than 128 presentations at all classification levels from subject matter experts and government officials, including 70 DOD and DOE/NNSA experts, and 7 Combatant Commands. They held discussions with and reviewed materials from many non-government experts and analysts (for a full list of engagements, see Appendix D). Members of the Commission also traveled to Los Alamos National Laboratory, the headquarters of U.S. Strategic Command, and the headquarters of Air Force Global Strike Command. The Commission completed information gathering and substantive research in May 2023.

America's Strategic Posture

The Commission analyzed and discussed the information it received during its plenary sessions and leveraged the Commissioners' collective experience and judgment to produce consensus findings and recommendations for each of the areas specified in their Congressional mandate. This report's findings and recommendations, shown at the beginning and end, respectively, of each chapter, summarize the Commission's assessments of the threat, the strategy, and the strategic posture of the United States as well as the specific actions that should be taken as a result. In general, the Commission's recommendations describe the core substance of actions required of the government; by and large, the recommendations deliberately avoid specifying the detailed means of how to complete such actions.

REPORT ORGANIZATION

The Commission is presenting its review, assessments, and recommendations regarding the U.S. strategic posture in the following chapters:

- The Stakes
- The Threat Through 2027-2035
- Strategy
- Strategic Posture
- Nuclear Security Enterprise Infrastructure and Organization
- Non-Nuclear Capabilities
- Allies and Partners
- Risk Reduction

Each chapter outlines the challenges and opportunities that the nation faces and how U.S. strategic posture can enhance strategic stability and provide security for the American people as well as U.S. Allies and partners.

THE STAKES

FINDINGS

Today, the U.S.-led international order is under threat from the Chinese and Russian authoritarian regimes, which seek to disrupt and displace this order and create a new version conducive to their authoritarian regimes, premised on values antithetical to those held by the United States and like-minded Allies and partners worldwide.

Though the U.S.-led order is threatened, it currently holds. The Commission concludes, however, that unless the United States adjusts its strategic posture, U.S. vital interests and international stability are at risk during the 2027–2035 period.

U.S. Allies and partners give the United States a clear strategic advantage. If the United States were to adopt a defense strategy and associated strategic posture no longer based on existing alliance systems in Asia and Europe, U.S. vital interests would be at risk, U.S. global influence diminished, and Americans' liberties threatened.

A central thrust of China's and Russia's adversarial approach toward the United States is their building of military capabilities, including major expansion and modernization of nuclear capabilities, which could lead to a situation where both powers pose an existential threat to the United States.

There is a growing risk of confrontation with China, Russia, or both. This includes the risk of military conflict.

Unlike World Wars I and II, a major power conflict in the 21st century has the potential to escalate into a large-scale nuclear war.

While it is challenging to maintain a strategic posture sufficient to prevent major power war, it would be far more expensive to fight such a war.

The urgent imperative to tackle the strategic challenge the United States faces must be consistently conveyed in a bipartisan manner by national leaders and broadly understood by the American people.

U.S. LEADERSHIP

In the aftermath of World War II, the United States and its Allies and partners⁹ built a geopolitical framework that fostered new levels of peace, prosperity, and freedom across the globe, while allowing the United States to benefit from and ensure the success of this order. U.S. and allied political, economic, and military leadership underpinned that system, with U.S. military strength complementing political partnerships, economic relationships, and multilateral arrangements. U.S. strategic capabilities, including its nuclear deterrent force, are a key element of its military strength. In Asia and Europe, U.S. military capabilities continue to be central to assuring and protecting Allies and partners and deterring adversaries. The United States now extends nuclear deterrence to more than thirty formal treaty Allies, which combined generate approximately one-third of annual global Gross Domestic Product (GDP).¹⁰ In so doing, U.S. nuclear deterrence assures U.S. non-nuclear Allies that they do not need their own nuclear weapons, thereby supporting global nonproliferation goals.

Today the longstanding U.S.-led international order is threatened by the Chinese and Russian authoritarian regimes.¹¹ These regimes seek to disrupt and displace this system, and to create a new version that is premised on values antithetical to those held by the United States and like-minded Allies and partners. Though U.S. policy does not seek to constrain any nation's peaceful growth, China and Russia are pursuing strategies to dominate their neighbors and replace the status quo with an autocratic model. As a result, in their pursuit of global power, they coerce, threaten, and provoke the United States and its Allies and partners. China and Russia continue to act aggressively across diplomatic, informational, military, and economic fronts to undermine the actions of the United States and its Allies and partners and the international order. These actions threaten U.S. vital interests.¹²

China and Russia are building their military capabilities and using other tools and mechanisms to expand their influence both regionally and globally, while attempting to diminish the role and influence of the United States and its Allies and partners. If this aggressive expansion succeeds, the foundational principles of the international order that the United States and its Allies have painstakingly built over the past 75 years – self-determination, territorial integrity, political sovereignty, individual freedoms, human rights, free markets, access to the global commons and information – will be lost.

Though the international order faces new threats, it is strong. U.S. leadership and strategic posture impact the broader global community, which has reaped great benefits from the post-World War II order. The Commission concludes that the United States must maintain its leadership on the global stage in order to revitalize and defend this system. Unless the United States adjusts its strategic posture soon, international stability and U.S. vital interests will be at risk during the 2027-2035 period. The United States must respond quickly to the deteriorating strategic setting.

ALLIES AND PARTNERS

U.S. alliances and partnerships give the United States a clear advantage over its adversaries. The bonds the United States has with Allies and partners across the globe are critical to its strategic posture and to our collective strength. Chinese and Russian leaders know this, and are seeking to fracture those bonds. The Commission heard from European and Asian Allies, with whom the United States has security guarantees and commitments, who are increasingly worried about Chinese, Russian, and North Korean aggression in their respective regions. This dramatic change in the overall strategic setting shines a bright light on the importance of U.S. extended deterrence and resultant assurance of Allies, via conventional and nuclear capabilities, and U.S. credibility and resolve.

U.S.-led alliance systems in Europe and Asia protect U.S. sovereignty and further U.S. vital interests by helping to deter and, if necessary, defeat armed aggression and catastrophic escalation that would threaten the existence of the United States and its Allies. Alliances also help protect the lives of U.S. citizens; preserve access to critical resources, markets and the global commons; and prevent the spread of authoritarian rule by force or coercion. Therefore, leading alliances and supporting Allies and partners are acts of friendship that also advance vital economic and security interests of all U.S. citizens. U.S. Allies and partners enable and strengthen U.S. engagement on the international stage, which serves to achieve U.S. objectives. Allies also can and do directly contribute to military and strategic balances, and these contributions are important both materially and politically. Consequently, if the United States were to adopt a national security strategy and associated strategic posture no longer based on existing alliance systems in Europe and Asia, the safeguards necessary to protect U.S. vital interests would be severely threatened.

Continuing to expand the U.S. system of partnerships and alliances around the globe will further U.S. national security. As the United States learned twice in the 20th century, an isolationist or disengaged United States would likely need to intervene in large-scale conflicts with authoritarian major powers from a position of temporal, military, and geographic disadvantage. Unlike World Wars I and II, however, a major power conflict in the 21st century has the potential to escalate into a nuclear war with two nuclear-armed peer adversaries. The United States must take the opportunity now to lower this risk and strengthen its posture to deter future conflict.

COMPETITION AND CONFRONTATION

For both China and Russia, a central thrust of competition is to improve and leverage their military capabilities to expand their influence, and challenge:

- Their neighbors, and ultimately the territorial and political sovereignty of the United States, its Allies and partners;
- Open access to the global commons (including space and cyberspace); and
- The preservation and support of democracy and human rights.

The very real prospect of regional aggression by nuclear-armed adversaries against the United States and its Allies and partners now threatens U.S. vital interests and strategic stability.¹³ Directed from top leadership in both nations, China and Russia are pursuing advantage across a range of fronts. Russia remains a nuclear peer. China is advancing toward peer status across the full range of military capabilities, including modern nuclear weapons. The aggressive policies of Xi Jinping and Vladimir Putin are increasing the risk of military confrontation or conflict with China, Russia, or possibly both.

Chinese and Russian demonstrations of military power include major expansion and modernization of their nuclear capabilities and could lead to a situation whereby acting alone or together, both pose an existential threat to the United States. In addition, China and Russia have incorporated hybrid tools to undermine U.S. and allied objectives well before a regional military conflict and to complicate U.S. and allied capability to respond.

While it requires significant investment to maintain a strategic posture sufficient to prevent war with a major power, it will be far more expensive, in lives and resources, to fight such a war. Losing such a war would have existential consequences. The Commission is sensitive to budget concerns, but required adjustments to U.S. strategic posture are necessary and should be prioritized. The stakes are too high to do otherwise. As a result, the Commission is concerned that artificial congressional caps placed on spending for national security will undermine the actions the Commission recommends.

The United States faces a fundamentally different strategic setting than it has experienced during the past 70 years. Indeed, the Commission perceives the coming years as a “decisive decade”¹⁴ during which the United States must simultaneously deter two nuclear-armed adversaries and assure its many concerned Allies, all while undertaking a significant modernization of its conventional and nuclear capabilities. Given these stakes, the challenge is to build a strategic posture that has the highest probability to secure and further U.S. vital interests into the future as well as prevent a major power war or nuclear employment of any kind.

COMMUNICATING THE STAKES

Such a posture requires U.S. resolve, which, in turn, is only possible with the understanding and support of the American people. No U.S. defense strategy can be successful without the sustained support of the American people, and that support is largely a function of their understanding of the nature of the U.S. vital interests, the threats to those interests, and what is required to counter those threats, including increased spending. Such a national-level understanding requires that elected U.S. leaders proactively develop a bipartisan consensus on what constitutes U.S. vital interests in the face of the authoritarian challenges posed by China and Russia, and other authoritarian states. This is a prerequisite to formulating an effective and sustainable defense strategy and the strategic posture necessary to enable it. Similarly, elected U.S. leaders could achieve a broad-based understanding of America's strategic challenges by actively developing a bipartisan consensus on what constitutes the primary threats to those agreed U.S. vital interests. A basic shared threat perception is also a prerequisite for formulating an effective and sustainable defense strategy and strategic posture.

In sum, the urgent imperative to tackle America's strategic challenges—and the threat environment described in the chapter that follows—must be clearly and consistently conveyed by national leaders. The Commission believes American political leadership, from members of Congress to the President, must now individually and collectively explain to the American people what this challenge means for our national security and that of our Allies and partners – what changes in U.S. strategic posture are required and why, what it will cost and, most importantly, why it matters to them.

RECOMMENDATION

The Commission recommends America's elected leaders communicate strategic realities—U.S. vital interests, threats to those vital interests, and necessary changes to the U.S. strategic posture—to the American people clearly, forthrightly, and regularly.

- ▶ This entails communicating that U.S. national security requires the United States to remain engaged in international affairs to maintain and further its national interests, prevent armed aggression and escalation if possible, and prevail in armed conflict if necessary.
- ▶ It also requires communicating that U.S. and allied commitments to come to the defense of one another protect and advance U.S. vital interests, including our shared democratic values, freedoms, and prosperity. The U.S. alliance security commitments, therefore, are acts of friendship that also advance vital economic and security interests of all U.S. citizens. More fundamentally, Allies and partners make the United States stronger and enable it to better pursue and protect U.S. national and shared interests.

THE THREAT THROUGH 2027-2035

FINDINGS

The United States will face two nuclear peer adversaries for the first time. The Commission concludes that China's rapid expansion of its nuclear forces and Russia's increasing reliance on nuclear weapons and potentially expanded nuclear arsenal are an unprecedented and growing threat to U.S. national security and potentially the U.S. homeland. In addition, unlike previous conflicts in the 20th century, a future potential conflict with China or Russia would likely involve new kinetic and non-kinetic attacks on the U.S. homeland and assets in space and cyber domains – further underscoring the importance of deterring and defeating such attacks.

The new partnership between Russian and Chinese leaders poses qualitatively new threats of potential opportunistic aggression and/or the risk of future cooperative two-theater aggression. Neither the 2018 nor the 2022 National Defense Strategy (NDS) adequately address this rapidly emerging threat. As noted by the 2018 Commission on the NDS, regarding the 2018 NDS: "The Department has largely abandoned the longstanding 'two war' construct for a 'one major war' sizing and shaping construct. In the event of large-scale conflict with China or Russia, the United States may not have sufficient remaining resources to deter other adversaries in one—let alone two—other theaters by denying them the ability to accomplish their objectives without relying on nuclear weapons."

The 2022 NDS also adopts a "one major war" sizing construct, while both the 2022 NDS and the 2022 Nuclear Posture Review (NPR) hint at increased reliance on U.S. nuclear forces to deter opportunistic aggression. But neither addresses the nature of the U.S. conventional force, including space and non-kinetic capabilities, or nuclear force that will be required to do so when facing two peers. As noted in the 2022 NPR: "In a potential conflict with a competitor, the United States would need to be able to deter opportunistic aggression by another competitor. We will rely in part on nuclear weapons to help mitigate this risk, recognizing that a near-simultaneous conflict with two nuclear-armed states would constitute an extreme circumstance."

Due to China's nuclear build-up, the United States will no longer be able to treat the Chinese nuclear threat as a "lesser included case" of the Russian nuclear threat. As a result, the United States must re-evaluate the size and composition of the U.S. nuclear force that would be adequate to fulfill longstanding roles of that force. These roles include deterrence, assurance, achieving objectives should deterrence fail, and hedging against adverse events.

U.S. defense strategy to address the two-nuclear-peer threat requires a U.S. nuclear force that is either larger in size, different in composition, or both; therefore, decisions must be made now to meet evolving deterrence requirements.

- ▶ The current and planned capacity of the U.S. nuclear weapons enterprise, in both DOD and DOE/NNSA, limits the nation's ability to meet and build on the existing POR in order to address the threat.

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The Commission concludes the U.S. and allied conventional military advantages in Asia are decreasing at the same time the potential for two simultaneous theater conflicts is increasing.

- ▶ Moreover, the U.S. conventional forces needed to fight a theater conflict in Europe differ from those required for Asia. The currently planned force is not structured to be able to fully reinforce both theaters simultaneously – especially given the growing adversary non-nuclear capability to hinder U.S. ability to flow additional forces to Asia or Europe. This shortfall, combined with increases in China's nuclear capabilities, has the potential to undermine deterrence, especially deterrence of opportunistic aggression.

The Commission concludes that dismissing the possibility of opportunistic or simultaneous two-peer aggression because it may seem improbable, and not addressing it in U.S. strategy and strategic posture, could have the perverse effect of making such aggression more likely.

- ▶ China, Russia, or both simultaneously, may believe that the United States and its Allies are unlikely to oppose their regional aggression with sufficient forces to guarantee victory, since doing so may leave the United States and its Allies vulnerable in another theater. These states may gamble that their perceived greater stake in a conflict's outcome, combined with perceived U.S. limitations, may offer a unique opportunity for their successful aggression.
- ▶ The speed and scale of success of U.S. forces in meeting that aggression in one theater may greatly influence the chances of conflict, or success in conflict, in the other theater.

China is pursuing a nuclear force build-up on a scale and pace unseen since the U.S.–Soviet nuclear arms race that ended in the late 1980s.

The Commission further concludes that at China's current pace, it will reach rough quantitative parity with the United States in deployed nuclear warheads by the mid-2030s.

- ▶ As it acquires sufficient fissile material, China will retain the capacity to continue growing its nuclear forces quickly past that point.

China's capacity for rapid change, and opacity concerning its intentions, presents great challenges for U.S. defense and nuclear strategy.

China appears to have decided to change the role of nuclear weapons in its national security strategy (e.g., adopting an expanded theater nuclear war-fighting role), in anticipation of a conflict over Taiwan and perhaps in pursuit of its broader national objectives.

Neither a new Chinese strategy nor the far larger and more diverse Chinese nuclear force required to implement it were envisioned when the current U.S. nuclear modernization program was developed.

The Commission also assesses that the rapid pace of potential change in Chinese strategy and capabilities will place additional demands on the ability of the United States and its Allies to adapt their own strategies and capabilities.

The Commission has concluded that China now has, for the first time, a nascent triad of strategic nuclear delivery systems, and potentially a launch-on-warning posture. China also is developing and testing potentially destabilizing, new intercontinental range systems that include hypersonic as well as fractional or multiple orbital bombardment systems (FOBS or MOBS) that could potentially threaten an unwarned preemptive attack on the United States.

China will also for the first time have survivable (mobile) theater nuclear forces capable of conducting low-yield precision strikes on U.S. and allied forces and infrastructure across East Asia, in contrast to its historic practice of fielding only larger yield weapons. Theater-range low-yield weapons may reduce China's threshold for using nuclear weapons.

The Commission finds that China is rapidly fielding new non-nuclear capabilities in space and cyberspace and electronic warfare (EW) capabilities that create both strategic and theater effects. These capabilities, in addition to China's conventional forces, can deny, disrupt, or diminish U.S. conventional forces' ability to project power effectively, and can threaten both U.S. NC3 and the critical national infrastructure that supports it.

The Commission concludes that China continues to engage in biological and chemical activities with dual-use applications, which raises concerns regarding its compliance with the Biological and Chemical Weapons Conventions (BWC and CWC).

The Commission concludes that China is rapidly expanding and modernizing its conventional forces—to include ballistic missile systems—posing an increasing threat to U.S. forces and Allies in Asia. By the 2030s China's conventional military build-up could turn the conventional military balance in Asia against the United States and its Allies.

- ▶ This potential conventional imbalance, particularly in long-range and intermediate-range systems, increases the risk of deterrence failure should China contemplate aggression, especially if there were to be a theater conflict already underway between Russia and the North Atlantic Treaty Organization (NATO).
- ▶ China is also strengthening and expanding its air and missile defense network, primarily aimed at defeating the full range of U.S. advanced strike capabilities.

The Commission finds that even before any potential change in the conventional military balance, China may perceive that the cost of inaction against Taiwan is higher than the cost of conflict with the United States over Taiwan – even at the risk of nuclear war.

The Commission concludes that Russia today has the largest nuclear force of any state. This is likely to remain true through 2035.

Russia is projected to continue to expand and enhance its nuclear forces, with most of the growth concentrated in theater nuclear forces, thus increasing its decided numerical advantage over U.S. and allied nuclear forces.

Russian strategy and doctrine as written envisions limited first use of theater nuclear weapons to, inter alia, coerce war termination on terms acceptable to Russia, and larger scale use of theater nuclear forces to defeat NATO conventional forces if Russia is decisively losing a war with NATO. Russian strategy and doctrine rely on strategic nuclear forces to deter a large-scale U.S. nuclear response against the Russian homeland while Russia can escalate to limited nuclear war in theater if it chooses.

The Commission concludes that Russia's active nuclear warhead and missile production lines provide the capability, should Russia decide to discard the limits of New START (Strategic Arms Reduction Treaty), to expand its strategic nuclear forces.

- ▶ Russia's current modernization program added substantial warhead upload capacity to its ICBMs and Submarine Launched Ballistic Missiles (SLBMs).
- ▶ Russia's modernized nuclear warhead design and production infrastructure have significant surplus capacity to implement a decision to upload.

America's Strategic Posture

- ▶ Russia has nearly completed a multi-year modernization program of its strategic nuclear forces, with notable improvements to its triad of forces, including the new Sarmat heavy ICBM and cruise-missile equipped Severodvinsk class submarines.
- ▶ Russia's future long-range nuclear forces include new forms of nuclear delivery systems (e.g., Avangard, Poseidon, nuclear-powered Skyfall Ground Launched Cruise Missile (GLCM), Kinzhal air-launched ballistic missile).

The Commission concludes that Russia is continuing to expand its space, cyber, and electronic warfare capabilities in an effort to deny U.S. and NATO forces critical enabling capabilities, and to derive coercive political leverage from threats to critical infrastructure.

The Commission concludes that Russia continues to pursue biological and chemical weapons capabilities in violation of the BWC and CWC.

The Commission has concluded that Russian conventional forces, while inferior to fully mobilized NATO forces, will continue to have a space/time advantage against NATO states on Russia's periphery, potentially enabling them to occupy such states' territory in a *fait accompli* before NATO forces can fully mobilize in their defense, thus presenting an existential threat to territorial sovereignty of Allies and partners.

Russian modernization and expansion of its air and missile defense capabilities beyond the Moscow region will pose a growing threat not only to the efficacy of U.S. nuclear forces but to conventional forces as well.

The Commission has found that Russia's use of large-scale conventional military force against Ukraine demonstrates a propensity to take risk and tolerate significant loss. The outcome of the war in Ukraine could influence future calculations – and indeed miscalculations – about the risks and benefits of aggression.

The Commission concludes that North Korea continues to expand and diversify its nuclear forces, increasing the threat to U.S. Allies and forces in theater and posing a greater threat to the United States and its Allies.

North Korea is on pace to deploy nuclear-armed intercontinental range missiles in sufficient numbers that could potentially challenge U.S. homeland ground-based ballistic missile defenses.

The Commission concludes that North Korea's chemical and biological weapons programs continue to be of great concern.

The Commission also found that North Korea's cyber forces have matured and are fully capable of achieving a range of strategic objectives against diverse targets, including a wider target set in the United States.

The Commission concludes the Iranian regime will maintain a nuclear program as part of its strategic goals for enhancing security, prestige, and regional influence. This includes pursuit of nuclear energy and the capability to build missile-deliverable nuclear weapons.

If Iran decides to do so, it could field advanced longer-range missile systems in the 2027-2035 timeframe. Iran will also pose a credible theater missile threat as a key non-nuclear capability.

METHODOLOGY

During the Commission's investigations and deliberations, the Commission received briefings on the threat at all classification levels from numerous subject matter experts from the Intelligence Community, as well as other U.S. government and allied officials and non-government experts in the research and academic communities. They each provided a range of insights drawing on multiple sources. This chapter provides a summary of the Commission's consensus view on the major threat trends the United States must address. Unclassified sources are used to illustrate as much as possible the Commission's important observations of the main features of the evolving security environment, but they are not the sole source of information upon which the Commission's findings are based. In-depth analysis on the nature of the threat is provided in a classified Threat Annex to this report.

THE TWO-PEER THREAT

The Commission's timeframe of focus, 2027-2035, will present the United States with a fundamentally new and pernicious set of challenges. The central feature of this environment is that the United States will face two major nuclear-armed adversaries, China and Russia. Their projected capabilities magnify how complex this competition could become, and combine to pose an existential threat to the United States and its Allies and partners. Geopolitical competition over the global rules and norms that will guide the future world will make the next few years critical in determining who and what will shape the strategic landscape.

China is pursuing its revisionist aims while reorienting its nuclear posture for strategic rivalry with the United States because its leaders view their current capabilities as insufficient. In its rhetoric, the People's Republic of China (PRC) leadership often employs strategic ambiguity to obfuscate both planning and decision-making. China currently indicates no interest in negotiated risk reduction, strategic stability dialogue or arms control agreements that restrict its plans and will not agree to negotiations that diminish it or lock in U.S. or Russian advantages. Heightened confidence in PRC nuclear forces is likely to bolster China's resolve, intensify conventional conflicts, and increase the risks of miscalculation.¹⁵

Russia continues to maintain the largest nuclear weapons stockpile in the world, and is expanding and modernizing its nuclear weapons capabilities. During its war with Ukraine, Russia has leveraged its doctrine that nuclear capabilities are necessary for coercion and achieving its goals in a potential conflict against the United States and NATO, and it sees its nuclear weapons arsenal as the ultimate guarantor of the Russian Federation.¹⁶ Russia made nuclear threats from the start of its 2014 invasion of Ukraine and escalated those threats during its second invasion in 2022.¹⁷

China and Russia are seeking to reshape the international order to be more reflective of their aims and perceived interests and tolerant of their governing systems, advocating for the absence of Western norms. They are likely to remain aligned as long as President Xi Jinping and President Vladimir Putin remain in power. Both countries are likely to maintain a cooperative relationship; however, a formal alliance is unlikely. China and Russia will sustain and likely expand military cooperation through equipment transfers, training, and joint exercises.^{18,19}

THE THREAT FROM CHINA, 2027 – 2035

National Goals. The Chinese Communist Party (CCP) seeks to make China the world's preeminent power by 2049, the 100th anniversary of the PRC. The CCP perceives the rules-based international order built by the United States and its Allies since World War II as a barrier to China's rise,

and thus seeks to undermine that order, replacing it with one more conducive to the continued increase of Chinese power and influence. In pursuit of this goal the PRC seeks hegemony over its neighbors, illegally presses its claims to the South China Sea, commits large-scale human rights abuses in its Xinjiang Province, and threatens to seize the Republic of China (henceforth referred to as Taiwan) by force. China's accelerating conventional and nuclear military build-up indicates that China's leaders see an increased role for military power in achieving their goals.

Strategy and Doctrine. The People's Liberation Army Rocket Force (PLARF) is a critical component of China's deterrence strategy and its efforts to counter third-party intervention in a regional conflict, including conflicts started by China. China cites its "no first use" (NFU) policy²⁰ in claiming it will not use or threaten to use nuclear weapons against any non-nuclear-weapon state or in nuclear-weapon-free zones.²¹ However, China's NFU policy likely includes contemplation of a nuclear strike in response to a non-nuclear attack threatening the viability of China's nuclear forces or command and control, or that approximates the strategic effects of a nuclear strike.²² Beijing probably would also consider nuclear use if a conventional military defeat gravely threatened the PRC's survival.²³

- China's approach to using nuclear forces is based on "deterrence" of an enemy first strike and "counterstrike" when deterrence fails. China's nuclear strategy prioritizes the maintenance of a nuclear force able to survive a first strike and respond with sufficient strength to conduct multiple rounds of counterstrike. The People's Liberation Army (PLA) probably selects its nuclear strike targets to achieve conflict de-escalation and a return to a conventional conflict to avoid a protracted series of nuclear exchanges.²⁴
- Beijing has shown no interest in agreements that restrict its plans and will not agree to negotiations that lock in perceived U.S. or Russian advantages.²⁵ Beijing has not declared an end goal nor acknowledged the scale of its nuclear expansion and has declined to engage in military-to-military communications or substantive arms control discussions, maintaining opacity.
- The PRC's long-term nuclear requirements and the relationship between the PRC's nuclear requirements and its national strategy and goals to field a world class military by 2050 remain unclear.

The PLA has begun implementing a launch-on-warning (LOW) posture called "early warning counterstrike," where warning of a missile strike leads to a counterstrike before an enemy's first strike can detonate. The PRC probably seeks to keep at least a portion of its force, especially its new silo-based units, on a LOW posture. The PLARF has conducted exercises since 2017 involving early warning of a nuclear strike and LOW responses.²⁶

Nuclear Capabilities. Beijing will continue the largest nuclear force expansion and arsenal diversification in its history. Current estimates are that the PRC's operational nuclear warhead stockpile surpassed 400 warheads in 2021, and that the PLA will field over 700 nuclear warheads by 2027, over 1,000 warheads by 2030, and, if it continues its current pace, at least 1,500 deployed warheads by 2035.^{27,28} China is building a larger and increasingly capable nuclear missile and bomber force that is more survivable, more diverse, and on higher alert than in the past, including nuclear missile systems designed to manage regional escalation and ensure an intercontinental strike capability in any scenario.²⁹ Additionally, China's activities at its Lop Nur nuclear weapons test site raise concerns regarding China's adherence to its pledge to a moratorium on nuclear testing and to the U.S. "zero-yield" standard.^{30,31,32,33}

China's nuclear build-up includes both strategic and theater nuclear forces.

- As of 2020, the People's Liberation Army Air Force (PLAAF) had operationally fielded the nuclear-capable H-6N bomber, providing a platform for the air component of the PRC's nascent nuclear triad. China will continue to invest in and expand its land-, sea-, and air-based nuclear delivery platforms and construct the necessary infrastructure to support its expansion of nuclear forces.³⁴
- The PRC seeks lower-yield nuclear warhead capabilities to provide response options that its high-yield warheads cannot deliver. China may intend to use these low-yield nuclear weapons against tactical targets. Moreover, China is developing and testing potentially destabilizing, new intercontinental range systems such as FOBS or MOBS³⁵ that could potentially threaten an unwarned preemptive attack on the United States. On July 27, 2021, the PRC conducted a test of an ICBM-range hypersonic glide vehicle that travelled 40,000 km. The test likely demonstrated the PRC's technical ability to field a FOBS that, if fielded, could be intended for a decapitation strike and therefore will be highly destabilizing.³⁶

Space and Counterspace. China is steadily progressing toward its goal of becoming a world-class leader in space with the intent to match or surpass the United States by 2045. China's space activities are designed to advance its global standing and strengthen its attempts to erode U.S. influence across military, technological, economic, and diplomatic spheres.³⁷ The PLA posits that space is already a new domain of military competition and it is a critical factor for deciding military transformation. It views space superiority, the ability to control the space-enabled information sphere and to deny adversaries their own spaced based information gathering and communication capabilities, as a critical component to conduct modern "informatized" warfare and has enacted reforms to better integrate space into joint military operations.^{38,39}

The PLA will continue to integrate space services that include reconnaissance, communications and navigation into its weapons and command and control systems in an effort to erode U.S. information advantage.⁴⁰ It plans to launch a range of satellites that substantially enhance its intelligence, surveillance, reconnaissance (ISR) capabilities,⁴¹ field advanced communications satellites able to transmit large amounts of data and increase positioning, navigation, and timing (PNT) capabilities.⁴²

- Between 2019 and 2021, China doubled the number of satellites in orbit to 500. As of January 2022, China's ISR satellite fleet contained more than 250 systems – a quantity second only to the United States. The PLA owns and operates about half of the world's ISR systems, most of which could support monitoring, tracking, and targeting of U.S. and allied forces worldwide and especially in the Indo-Pacific region.
- China's satellite navigation system, known as BeiDou, is an independently constructed, developed, and exclusively China-operated PNT service. BeiDou priorities are to support national security and economic and social development.^{43,44,45}

Counterspace operations will be integral to potential PLA military campaigns, and China has counterspace-weapon capabilities intended to target U.S. and allied satellites. The PLA will continue to acquire and develop a range of counterspace capabilities, including kinetic-kill missiles, ground-based lasers/directed-energy weapons, orbiting space robots, and ground-based anti-satellite (ASAT) missiles capable of destroying satellites up to Geosynchronous Earth Orbit (GEO), as well as space surveillance capabilities to enable counterspace actions.⁴⁶ China also has conducted orbital technology demonstrations, which while not counterspace weapons tests, prove China's ability to operate future space-based counterspace weapons.

America's Strategic Posture

- During the past two decades, Chinese defense research has proposed the development of several reversible and nonreversible counterspace Directed Energy Weapons for reversible dazzling of electro-optical sensors and even potentially destroying satellite components.
- PLA's operational ground-based ASAT missile system is intended to target low earth-orbiting satellites and military units continue training with ASAT missiles. China likely intends to pursue additional ASAT weapons that are able to destroy satellites up to GEO.

PLA continues to rely on overt and covert acquisition of foreign space and counterspace technologies to build Chinese knowledge and advance technological modernization as a supplement to its domestic research. Acquisition of foreign technology is being used to circumvent the costs of research and facilitate “leapfrog” developments.^{47,48}

China has steadily improved human space flight missions and operations to include its fully operational space station. The Chang'e series is part of China's continued exploration of the moon. The primary technical objectives are to develop and launch China's first lunar orbiter, validate the technology necessary to fly lunar missions, and build a basic engineering system for lunar exploration. Lunar landings are planned for 2024 and 2026. Crewed landings and lunar basing are planned for the latter part of the decade.^{49,50}

The Chinese commercial space sector is on track to be a major global competitor by 2030 with state-owned enterprises operating as the primary players. Commercial enterprises are also expected to continue attempts to undercut the price of Western firms in more competitive markets. China also emphasizes “military-civil fusion” – a phrase used, in part, to refer to the use of dual-use technologies, policies, and organizations for military benefit.^{51,52}

Cyber. China presents the broadest, most active, and persistent cyber espionage threat to U.S. government and private sector networks. China almost certainly is capable of launching cyber-attacks that would disrupt critical infrastructure services within the United States, including against oil and gas pipelines, electrical grid, and rail systems.⁵³ The PRC seeks to create disruptive and destructive effects to shape decision making and disrupt military operations in the initial stages of and throughout a conflict.⁵⁴ The PLA also considers cyberspace capabilities to be a critical component in its overall integrated strategic deterrence posture, alongside space and nuclear deterrence.⁵⁵

Electronic Warfare (EW). The PLA considers EW to be an integral component of modern warfare and seeks to achieve information dominance in a conflict through the coordinated use of cyberspace and EW to protect its own information networks and deny the enemy the use of the electromagnetic spectrum. China is developing jammers dedicated to targeting U.S. and allied Synthetic Aperture Radars (SAR) and Satellite Communications (SATCOM) over a range of frequency bands.⁵⁶

Chemical and Biological Weapons. The PRC continues to engage in biological and chemical activities with dual-use applications, which raises concerns regarding its compliance with the BWC and CWC.⁵⁷ China has the technical expertise to weaponize chemical/biological weapons (CBW) agents, the chemical biotechnology infrastructure to research, develop, and produce chemical and biological agents on a large scale, and a robust armaments industry to produce delivery vehicles for CBW agents.⁵⁸

The United States does not have sufficient information to determine whether China has eliminated its assessed historical biological warfare program (1950s-1980s) since its accession to the BWC in 1984. As part of its historical biological weapons program, the PRC had researched weaponized ricin, botulinum toxins and the causative agents of anthrax, cholera, plague, and tularemia.⁵⁹

The United States cannot make a determination that China has met its obligations under the CWC due to China's research of pharmaceutical-based agents and toxins with potential dual-use applications.⁶⁰ China likely has the technical expertise to weaponize chemical warfare agents even though China has maintained that its chemical warfare program has been dismantled and all agents and munitions were disposed of before China's ratification of the CWC in 1997.⁶¹

Conventional Force Trends. China's conventional forces also are rapidly expanding and modernizing, posing a growing threat to U.S. forces and Allies in Asia, including their ability to deny U.S. forces' access, freedom of maneuver, and operational reach. By 2035, China aims to have “basically” completed its military modernization and by 2050 aims to have a “world-class” military capable of fighting and winning wars against any adversary.⁶²

Sometime between 2015 and 2020, the PLA Navy (PLAN) surpassed the U.S. Navy in numbers of battle force ships, making the PLAN numerically the largest in the world. Meanwhile, “Xi and PLA officials have called on the PLAN to become a ‘world-class navy,’ able to operate globally and to achieve ‘command of the seas.’”⁶³ Furthermore, DOD states that “the PLAN's overall battle force is expected to grow to 400 ships by 2025 and 440 ships by 2030. Much of this growth will be in major surface combatants.”⁶⁴ China's naval modernization, to include modern and advanced platforms such as submarines, aircraft carriers, and large multi-mission surface vessels, is designed to increase its anti-access/area-denial (A2/AD) capabilities.⁶⁵

Readiness for Taiwan Contingencies. Beijing will continue to pressure and possibly offer inducements for Taiwan to move toward unification. The PRC will react to what it views as increased U.S.-Taiwan engagement.⁶⁶ Friction will grow as China continues to increase military activity around Taiwan's waters and 168 islands, and Taiwan's leaders resist Beijing's coercive pressure for progress toward unification.⁶⁷ As a recent example, in April of this year, the PLA completed three days of large-scale combat exercises around Taiwan that rehearsed blockading the island. Although the PRC publicly advocates for peaceful unification with Taiwan, the PRC has left open the option for and never renounced the use of military force. The PLA is aiming to achieve its 2027 modernization goals of *mechanization*, *informatization*, and *intelligentization*, which if achieved, will provide the PLA the capabilities to be a more credible military tool for the CCP to use to unify forcefully with Taiwan.⁶⁸

The circumstances under which China has historically indicated it would consider the use of force have evolved over time but include:

- Formal declaration of Taiwan independence;
- Undefined moves toward Taiwan independence;
- Internal unrest in Taiwan;
- Taiwan's acquisition of nuclear weapons;
- Indefinite delays in the resumption of cross-Strait dialogue on unification; and/or
- Foreign military intervention in Taiwan's internal affairs.⁶⁹

The PRC could conduct a range of options for military campaigns against Taiwan that can be executed individually or in combination, with varying degrees of feasibility, readiness, and associated risks, such as:

- An air and/or maritime blockade;
- Limited force or coercive options;

- Air and missile campaign; and/or
- A full-scale amphibious invasion to seize and occupy some of its offshore islands or all of Taiwan.⁷⁰

Integrated Air Defense System (IADS). The PRC has a robust and redundant IADS architecture over its land areas and within 300nm of its coast, as one aspect of its A2/AD capability.⁷¹ Its IADS architecture is composed of an extensive early warning radar network, fighter aircraft, and a variety of surface-to-air missile (SAM) systems, including S-300 and S-400 systems purchased from Russia. The PRC has also placed radars and air defense weapons on outposts in the South China Sea, further extending the range of its IADS.⁷²

- The PLA is increasing development and production of advanced long-range SAMs that have the capability to engage against aircraft and low-flying cruise missiles. China also manufactures a variety of long-range air surveillance radars that claim to support ballistic missile defense and the ability to detect stealth aircraft.⁷³
- China is also developing and testing a kinetic-kill mid-course interceptor as the upper tier for its missile defense system.⁷⁴

THE THREAT FROM RUSSIA, 2027 – 2035

National Goals. Russia is pursuing an imperialist foreign policy and actively seeks to upset the international order. Over the last 30 years, Russian behavior makes clear that Russia selectively complies with the international rules it views as in its interest and routinely violates those rules it sees as hindering Russia's return to great power status. This includes its violations of almost every arms control agreement it has ratified.^{75/76} Russia seeks a sphere of influence over the post-Soviet space that would provide Moscow perceived defense in depth and a veto over the political sovereignty of other independent nations. Russia has repeatedly used military force illegally against its neighbors. Russia's invasions of Ukraine in 2014 and 2022, backed by the repeated threats of nuclear use, demonstrates its propensity to take risks to achieve its political aims and diminish the influence of the United States.⁷⁷

Strategy and Doctrine. Russia's 2022 invasion of Ukraine is a global inflection point that has potential to reshape the global order.⁷⁸ The war has cast relations between Russia and the West downward to the point of risking direct military confrontation. Russia has threatened to employ nuclear weapons in its invasion; such use would constitute nuclear use for the first time in 75 years. In sum, the war's threat to future peace and prosperity is a new international reality.

There are broader strategic implications for the United States as well, as Russia's actions foreshadow future warfare and national security challenges.⁷⁹ The Commander of United States Strategic Command (CDRUSSTRATCOM) has characterized the war as Russia's attempt to undermine the international order using conventional forces backed with nuclear threats.⁸⁰ Russia's intimidation tactics may serve as a harbinger of future attempts to threaten U.S. global leadership.

Moscow has shown throughout the war that it views its nuclear capabilities as necessary to maintain deterrence, enable coercion, and achieve its goals in a potential conflict against NATO, viewing its nuclear weapons arsenal as the ultimate guarantor of the Russian Federation.⁸¹ Moreover, Russian military losses in Ukraine's counteroffensive by late summer 2022 led Putin to warn the West that he was ready to use nuclear weapons to defend Russia.⁸² Though Russia has greatly miscalculated in reaching its aims,⁸³ the further degradation of its conventional capability in that conflict likely increases its reliance on its nuclear arsenal.⁸⁴ Of note, according to media reporting, Russia deployed tactical nuclear weapons to Belarus in June 2023.⁸⁵

Amidst the disruption of the global system precipitated by Russia's war, and amidst its persistent threats to use nuclear weapons and its myriad setbacks in Ukraine, Russia appears resolved to continue prosecuting the war. It is assessed that Russia will continue to maintain its global military, intelligence, security, commercial, and energy footprint, only in a marginally reduced role, and will continue to seek out partnerships aimed at undermining U.S. influence and boosting its own.⁸⁶

Nuclear Capabilities. Russia's rhetoric is underpinned by its nuclear arsenal, which is the largest and most diverse in the world.⁸⁷ It continues to expand and modernize those nuclear capabilities, with potentially destabilizing effects.⁸⁸ In addition, Russia is expanding and modernizing its large and diverse set of nonstrategic nuclear systems, which are capable of delivering nuclear or conventional warheads. Moscow believes such systems offer options to deter adversaries, control the escalation of potential hostilities, and counter U.S. and allied conventional forces.⁸⁹

Russia's nuclear modernization efforts include:

- The continuation of flight tests and plans to soon begin fielding its new heavy ICBM, the SS-X-29 Sarmat, replacing legacy versions. The Sarmat has displayed at least partial orbital trajectory capabilities.⁹⁰
- Fielding the new Dolgorukiy-class Ballistic Missile Submarines (SSBNs), armed with the new SS-N-32 Bulava SLBM, and Severodvinsk-class nuclear-powered cruise missile submarines (SSGN).⁹¹
- Fielding nuclear-capable hypersonic systems such as the Avangard hypersonic glide vehicle, the Tsirkon land-attack cruise missile, and the Kinzhal air-launched ballistic missile, the last of which Russia has employed in Ukraine with conventional warheads.⁹²
- The continued development of long-range nuclear-capable nuclear-powered missile and underwater delivery systems, such as Status 6 (also known as Poseidon), that are meant to penetrate or bypass U.S. defenses.^{93,94}

Russia's significant investment in launch platforms and systems not subject to New START provides it with increasingly diverse and flexible nuclear deterrence options; for example, its stockpile of approximately 2,000 theater nuclear weapons does not fall under the limits established by New START.^{95,96} Additionally, the United States has been and continues to be concerned about the nature of Russia's adherence to their moratorium on nuclear testing and obligations under the Threshold Test Ban Treaty.⁹⁷

Space and Counterspace. Russia perceives space as a warfighting domain and believes that achieving space supremacy will be a decisive factor for victory in future conflicts.⁹⁸ According to the Commander of U.S. Space Command (CDRUSSPACECOM), Russia views U.S. space-based capabilities as a soft underbelly that Russia is seeking to exploit,⁹⁹ and in 2022, Russia warned at the United Nations that commercial infrastructure in outer space used for military purposes “can become a legitimate target for retaliation.”¹⁰⁰

For these reasons, Russia is currently developing an arsenal of space and counterspace capabilities to challenge U.S. space dominance. These efforts include fielding new antisatellite weapons to disrupt and degrade U.S. and allied space capabilities; developing, testing, and fielding an array of nondestructive and destructive counterspace weapons for targeting U.S. and allied satellites;¹⁰¹ and fielding capabilities to limit U.S. access to space during crisis and conflict.¹⁰²

Russia continues to develop a range of capabilities to ensure that it could credibly inflict unacceptable damage on the West, including long-range nuclear-armed missiles, underwater delivery systems,^{103,104} and increasingly spaced-based weapon systems, operating in a domain in which Russia views supremacy as integral to future military victories.¹⁰⁵ For example, Russia is developing a counterspace capability that is publicly also touted as a ballistic missile defense system and capable of destroying Low Earth Orbit (LEO) satellites.¹⁰⁶ Moscow believes that by fielding counterspace capabilities, it will deter aggression from adversaries reliant on space.¹⁰⁷ Russia further believes that if deterrence fails, its counterspace capabilities would then offer its military leaders the ability to control escalation of a conflict through selective targeting of adversary space systems.¹⁰⁸

Russia's advanced space capabilities include:

- Global Navigation Satellite System (GLONASS), a Russian worldwide satellite navigation service that supports Russia's economic development and national security interests.¹⁰⁹
 - ▶ Russia now launches satellites as needed to maintain the constellation while developing next-generation GLONASS satellites. Russia's military also uses GLONASS to enable military system deployments, force movement, and precision-guided munitions delivery.¹¹⁰
- A redundant and survivable command and control system to control its forces and that serves as a force enabler.¹¹¹
- A Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) complex that uses multiple capabilities, ranging from technologically advanced systems to mechanically simple, legacy Soviet devices intended to centralize control of the military while providing intelligence support to speed up decision-making cycles and carry out joint operations.¹¹²
- Space assets providing electro-optical imagery, a new radar observation platform, missile warning, and electronic and signals intelligence.
 - ▶ Space-based sensors provide Russia strategic warning of ballistic missile launches and support targeting of Russian anti-ship cruise missiles.
- The use of its civil satellites to supplement military-dedicated capabilities that reduce the U.S. ability to perform sensitive military activities undetected.¹¹³
- An anti-satellite program characterized as a "Russian nesting doll" satellite that can send a projectile to another satellite.¹¹⁴

Russia's advanced future capabilities based on areas of investment, development and testing include:

- ASAT missile systems that can destroy U.S. and allied space systems in LEO, threatening ISR and communications satellites.
- A mobile missile defense complex referred to as Nudol, which Russia described as capable of destroying ballistic missiles and low-orbiting satellites.
 - ▶ Although Nudol is publicly described as a ballistic missile defense system, it has an inherent counterspace capability.¹¹⁵
- EW and directed energy weapons to counter Western on-orbit assets. These systems work by disrupting or disabling adversary C4ISR capabilities and by disrupting GPS, tactical and satellite communications, and radars.
- Ground-based ASAT missiles capable of destroying space targets in LEO.¹¹⁶
- Greater support to human spaceflight and deep space missions.¹¹⁷

Russia will remain a space competitor and threat to U.S. assets. Despite the difficulties it is facing to achieve its long-term space and counterspace goals, due to international sanctions and domestic resource constraints,¹¹⁸ Russia has shown an ability to design and employ some of the world's most capable individual ISR satellites.¹¹⁹

Cyber. Russia will remain a top cyber threat as it refines and employs its espionage, influence, and attack capabilities. Russia views cyber disruptions as a foreign policy lever to shape other countries' decisions.¹²⁰

Russia is particularly focused on improving its ability to target critical infrastructure, including underwater cables and industrial control systems in the United States as well as in allied and partner countries. Improving its ability to compromise such infrastructure demonstrates its ability to inflict damage during a crisis.¹²¹

Electronic Warfare. The Russian military views EW as an essential tool for gaining and maintaining information superiority over its adversaries. In a conflict, Russia seeks to seize the operational initiative by disrupting adversary command, control, communications, and intelligence capabilities. As a result, Russia has developed and fielded a full spectrum of EW capabilities with mobility, automation, and performance improvements able to counter Western space-enabled C4ISR and weapon guidance systems.¹²²

Chemical and Biological Weapons. The United States assesses that Russia maintains an offensive BW program and is in violation of its obligation under Articles I and II of the BWC. Russia's noncompliance with the BWC has been a concern of the West for many years.¹²³

- Confidence-building Measures (CBMs) submitted by the Russian Federation have consistently reported “nothing new to declare” with respect to its biodefense research and development programs. Yet, since 2011, Russia has revised plans and funding to its national chemical and biological facilities that fall under the Russian Ministry of Defense without providing relevant details in their annual CBM reports.¹²⁴
- Russian government entities remain engaged in dual-use activities, potentially for purposes incompatible with the BWC.¹²⁵
- In congressionally mandated annual reports to Congress, the State Department has said that Russia is in noncompliance with the CWC.¹²⁶ Russia's violations of the CWC include the 2018 “Salisbury” attack in the United Kingdom, where Russian agents used a military-grade nerve agent in an attempt to assassinate a former spy Sergei Skripal, and the attempted assassination of Alexei Navalny in 2020 with the same nerve agent.¹²⁷ Since these incidents, Russia continues to threaten global stability by bringing CWC-banned substances across international borders for illegal activity.
- Russia has triggered U.S. sanctions under the Chemical and Biological Weapons Control and Warfare Elimination Act of 1991.

Conventional Force Trends. The Russian military has faced and will continue to face issues of attrition, personnel shortages, and morale challenges that have left its forces vulnerable to Ukrainian counterattacks. Its losses during the Ukraine conflict will require years of rebuilding and leave Russia less capable of posing a conventional military threat to European security, and less able to operate as assertively in Eurasia and on the global stage.¹²⁸ Russia, however, is still expanding and modernizing its large, diverse, and modern set of nonstrategic systems capable of delivering nuclear or conventional warheads, because Moscow believes such systems offer options to deter adversaries, control the escalation of potential hostilities, and counter U.S. and allied conventional forces.¹²⁹

- The heavy losses to its ground forces and the large-scale expenditures of precision-guided munitions during the war have degraded Moscow's ground and air-based conventional capabilities and increased its reliance on nuclear weapons.¹³⁰
- Moscow will become even more reliant on nuclear, cyber, and space capabilities as it continues to deal with the extensive damage to Russia's ground forces.¹³¹
- Moscow retains the ability to deploy naval, long-range bomber, and small general-purpose air and ground forces globally, increasingly via the security company Wagner or other such companies.¹³²
- Also, Russia's traditional focus on air defense now includes advanced surface-to-air systems that reportedly engage short- and intermediate-range ballistic missiles, cruise missiles, precision-guided weapons, and strategic and tactical aircraft. For example, Russia is continuing to develop, deploy and export S-400 and S-500 missile defense systems that Russia claims to have demonstrated significant capabilities against aircraft and ballistic missiles.^{133,134}
- Russia is adding offensive capabilities, as well as advanced strike capabilities via cyber and space that can "deny, damage, and defeat U.S. space-based systems in order to reduce U.S. military effectiveness and control conflict escalation if deterrence fails."¹³⁵

BEYOND GREAT POWER COMPETITION

The Threat from North Korea, 2027 – 2035

Strategy and Doctrine. North Korea's national security strategy's two main objectives are to ensure the Kim regime's long-term security and retain the capability to exercise dominant influence over the Korean Peninsula. Since the mid-2000s, the North's strategy to achieve these goals has been to prioritize the development of nuclear weapons and ballistic missiles to deliver nuclear weapons to increasingly distant ranges while maintaining a conventional military capable of inflicting enormous damage on South Korea.¹³⁶

North Korean defense planning seeks to deter direct U.S. military intervention by signaling that the cost of such intervention would be unacceptably high to the United States even if North Korea ultimately lost the engagement. In the last few years, North Korea's effort to shape U.S. deterrence calculations has centered on developing a survivable long-range nuclear-armed ballistic missile force and publicly calling attention to it.¹³⁷

North Korea poses a variety of threats directly to the United States as well as to U.S. regional Allies and partners. Its unconstrained nuclear weapons program has accelerated over the years, threatening regional and global security, and undermining U.S. vital interests in the Indo-Pacific region.

Nuclear Capabilities. For the foreseeable future, Kim Jong Un will remain strongly committed to expanding the country's nuclear weapons arsenal and maintaining nuclear weapons as a centerpiece of his national security structure. By enacting a law affirming its self-proclaimed status as a nuclear power, North Korea has established command and control and open-ended conditions for nuclear use. Kim, as the supreme commander, is the sole release authority for nuclear weapons under the "firepower strike plan" designed primarily for use against the United States.^{138,139}

North Korea has demonstrated the capability to produce sufficient quantities of plutonium for its nuclear weapons program and has claimed to possess the ability to produce highly enriched uranium. It is probably preparing to test a nuclear device to facilitate tactical nuclear operations. It may maintain a stockpile of a few dozen nuclear warheads.^{140,141,142}

Ballistic Missiles. North Korea maintains a Strategic Force and has described this organization as a nuclear-armed ballistic missile force and part of the backbone of its national defense. The Strategic Force includes units operating short-range ballistic missiles (SRBMs), medium-range ballistic missiles (MRBMs), intermediate-range ballistic missiles (IRBMs), and ICBMs, each of which North Korea has stated represents a nuclear-capable system. The country has implemented a rapid, ambitious missile development and flight-testing program to refine capabilities that include intercontinental reach and improved reliability. In 2022, North Korea tested multiple ICBMs in an effort to improve its ability to strike the United States.^{143,144}

Cyber. North Korea's cyber program poses a sophisticated and agile espionage, cybercrime, and attack capability. North Korea views its offensive cyber capabilities as a cost-effective and deniable tool that it can employ with little risk of reprisal. North Korea's cyber capabilities support military operations and national security goals by providing the Kim regime a way to influence and intimidate its adversaries and collect information on them.^{145,146}

Chemical and Biological Weapons. North Korea has a chemical warfare program that could comprise up to several thousand metric tons of chemical warfare agents, and the capability to produce nerve, blister, blood, and choking agents. North Korea probably could employ CW agents by modifying a variety of conventional munitions, including artillery and ballistic missiles, along with unconventional, targeted methods. North Korea is not a party to the CWC.¹⁴⁷

North Korea has a longstanding biological warfare capability and can redirect its biotechnology infrastructure to support a BW program. It may consider the use of biological weapons during wartime or as a clandestine attack option. The North is a signatory to the BWC but has yet to declare any relevant developments.^{148,149,150,151}

The Threat from Iran, 2027 – 2035

Strategy and Doctrine. The Islamic Republic of Iran's national security strategy aims to ensure continuity of clerical rule, maintain stability against internal and external threats, secure Iran's position as a dominant regional power, and achieve economic prosperity. While Tehran recognizes it cannot conventionally compete with the United States, it is pursuing multiple avenues to compensate. These include accelerating its nuclear program, expanding its conventional, proxy and partner forces, emphasizing asymmetric tactics, and leveraging relations with Russia and China. Tehran has gone so far as to provide materiel support for Russia's invasion of Ukraine. Iran continues to act aggressively and threaten U.S. interests, U.S. forces, and U.S. Allies and partners in the region.^{152,153}

Iran views the United States as its greatest enduring threat and believes the United States is engaged in a covert and “soft war” to subvert the regime, undermining what Iran perceives as its rightful place as a regional power. Many regime elites view regional dynamics through the lens of perceived U.S. aggression.

Nuclear Capabilities. The Commission's assessment is that the United States must consider the possibility that Iran will become a nuclear state during the 2027-2035 timeframe. Iran is likely not currently undertaking the key nuclear weapons design and development activities that would be necessary to produce a testable nuclear device; however, the time estimated for Iran to achieve sufficient fissile material continues to shorten, as Iran is accelerating the expansion of its nuclear program. The International Atomic Energy Agency (IAEA) has verified that Iran conducted research into uranium metal production and has produced small quantities of uranium metal enriched up to 20 percent. Iran continues to increase the size and enrichment

level of its uranium stockpile beyond what were the Joint Comprehensive Plan of Action (JCPOA) limits and continues to exceed restrictions on advanced centrifuge research and development and is continuing uranium enrichment operations at its Fordow Fuel Enrichment Plant. In March 2023, the IAEA revealed that it had found traces of enriched uranium that was just shy of weapons-grade level at a facility in Iran.¹⁵⁴ Iran also has been enriching and accumulating uranium hexafluoride (UF6) enriched up to 60 percent U-235 and continues to accumulate UF6 enriched to 20 percent.¹⁵⁵

Ballistic Missiles. Iran's ballistic missiles constitute a primary component of its strategic deterrent. Lacking a modern air force, Iran has embraced ballistic missiles as a long-range strike capability to dissuade its adversaries. Iran's ballistic missile programs, which already include the largest inventory of ballistic missiles in the region, continue to pose a threat to countries across the Middle East. Its missiles can range U.S. forces and bases and population centers of U.S. partners in the region. They can also reach to parts of Southern Europe. Iran has emphasized improving accuracy, lethality, and reliability of its missiles. It lacks ICBMs, but Tehran's desire to have a strategic counter to the United States could drive it to develop and eventually field an ICBM. Iran's work on space launch vehicles shortens its timeline to have an ICBM if it decides to develop one.^{156,157}

Cyber. Iran's growing expertise and willingness to conduct aggressive cyber operations make it a major threat to the security of U.S./allied networks and data. Tehran views cyber operations as a safe, low-cost method for retaliation and believes it must demonstrate it can push back against the United States in other domains. It has shown a willingness to target countries such as Israel that have stronger capabilities.¹⁵⁸

Chemical and Biological Weapons. Iran is a party to both the Chemical Weapons Convention (CWC) and the Biological and Toxin Weapons Convention (BWC). Iran is in noncompliance with the CWC, and there are concerns that Iran may be pursuing central nervous system-acting chemicals and pharmaceutical-based agents for offensive purposes.^{159,160,161,162}

OTHER STRATEGIC THREATS & CHALLENGES, 2027 - 2035

Through 2035, the international security situation will be increasingly muddled at the strategic level. For example, the power structure of authoritarian rulers and the domestic stability of the U.S. nuclear-armed adversaries are not guaranteed, and such instability could lead to rapid, unpredictable, and dramatic changes in the strategic environment. States and non-state actors will probably attempt to veil strategies, plans, and activities, particularly China as it attempts to navigate towards a dominant role in the ordering of the international environment.¹⁶³

Technology. The pace and reach of technological developments will increase, transforming human experiences and capabilities while creating new tensions and disruptions for all states and actors. Global cooperation as well as competition for the core elements of technology supremacy will increase. Technological development timelines have already shortened significantly in the last three decades and are likely to decrease even faster during the next decade. The time period to develop, deploy, and mature technologies is moving from decades to years and sometimes faster. New and novel spin-off technologies are advancing in often unpredictable ways and applications are increasingly accessible, enabling rapid adoption around the globe. Technological advances may also increase strategic and even existential threats in unforeseen ways such as advancements in generative AI, quantum computing, genetic engineering, nanotechnology, and hypersonic flight technologies. The potential of AI or biotechnology developing without ethical norms, for example, must be considered – though difficult to forecast, it could manifest as a high-impact strategic scenario. The global pandemic

of 2020-2022, which spurred unprecedented research and collection of genetic and health data worldwide, along with technological advances in genetic engineering, genome sequencing, and DNA modification, are driving new lines of effort in biotech research. Several countries, universities, and private companies have created or are creating centralized genetic or genomic databases to collect, store, process, and analyze genetic data, albeit at the risk of potentially compromising health and genetic data privacy, and are ripe targets for cyber-attack and theft.^{164,165}

Proliferation. The expansion of collective global nuclear stockpiles and their delivery systems, coupled with increased competition, crisis, and conflict involving nuclear weapon states, as well as the potential for internal instability in nuclear-armed powers, pose a significant challenge through the next decade and beyond. The potential for crisis in Russia for example, with its very large stock of nuclear weapons, is a challenge commensurate with that faced at the time of the break-up of the Soviet Union and its nuclear arsenal in 1991-1992. Counterproliferation and arms control policies, plans, and measures will likely change in scope, scale, and complexity along with the increasing number of strategic technologies and the states that acquire them.

North Korea, in particular, will remain a grave proliferation concern considering its willingness to spread nuclear technology over the last 15 years. And Iran will continue attempts to acquire knowledge, technology, and materiel to improve the accuracy and lethality of its strategic programs and systems, and will pursue the development of new systems, despite continued international counterproliferation efforts.^{166,167,168}

The Homeland. Over the next decade, the United States will face escalating challenges to defending the homeland given the evolution of adversarial capabilities that can impact the nation and its people. Advances in critical technologies such as autonomous technology, hypersonic weapons, AI, quantum computing, and biotechnology offer China, Russia, Iran, and North Korea an expanding range of strategic capabilities that emanate from all domains. U.S. critical infrastructure is increasingly the target of cyberattacks launched by transnational criminal organizations and hostile nation states, including China, Russia, Iran, and North Korea. The United States continues to face threats from foreign and domestic terrorists within its borders. Individuals and cells adhering to ideologies espoused by ISIS, al-Qa'ida, or other extremist groups pose a significant terrorist threat to U.S. persons, facilities, and interests.^{169,170,171,172}

Warning and Strategic Surprise. The United States has not always been able to accurately predict threats to the country. Strategic surprises at Pearl Harbor, the collapse of the Soviet Union, and 9/11 greatly affected the security environment and national security priorities of the country. It is possible, if not likely, that there will be other strategic surprises. Now and through 2035, China and Russia will engage in activities often below the level of crisis to undermine the U.S. strategic position and attempt to reshape the international order. The U.S. ability to anticipate and deal with strategic surprise will become increasingly constrained within this time horizon due to the complexity and volatility of this emerging security environment. Simultaneously deterring two nuclear-armed adversaries, assuring a multitude of concerned Allies, and coping with other strategic issues will strain attempts to maintain situational awareness in order to warn of strategic crisis or conflict, ultimately stressing U.S. efforts to maintain an effective strategic posture. The rapid escalation of conflicts, for example in Ukraine, could have cascading effects that may increasingly reach global proportions. U.S. conventional and diplomatic posture will be stretched further, exacerbating existing shortfalls and constraining the ability to meet commitments around the world. The chance for strategic surprise, including one that involves a nuclear-armed state, cannot be discarded given the socio-economic, technological, and military dynamics that are challenging the international order.

As an example, the 2008 Strategic Posture Commission report stated that “deterrence of China does not require large numbers.” However, the United States now recognizes China's rapid emergence as a nuclear peer adversary. This drives home the need for the United States to be vigilant in assessing potentially emerging threats and adversaries and develop and maintain the infrastructure needed to rapidly adapt and modify its capabilities and capacities, and align its forces and infrastructure as necessary to address future uncertainties.

The Commission received a robust array of threat assessments from the Intelligence Community and Defense Intelligence Enterprise as it pertains to strategic posture, vital interests, and strategy, and concludes that the United States has entered into a volatile world replete with threats and challenges, including two nuclear peer adversaries, for which it is ill-prepared in the coming decade and beyond.

RECOMMENDATIONS

The Commission has identified several key areas where more concise and predictive intelligence support is necessary to sharpen how the United States plans for and achieves deterrence, particularly in light of the potential need to deter China and Russia simultaneously. These areas focus on better decision-making informed by concise and timely intelligence about the threat. Our recommended changes to strategy and posture as a result of the threat are described in chapters that follow.

- ▶ The Director of National Intelligence (DNI) should immediately direct increased collection, processing, exploitation, and analysis on Chinese nuclear strategy, planning, and employment doctrine. It is essential that the United States better understand, *inter alia*, whether and how China's thinking about the role of nuclear weapons is changing, where the Chinese are investing time and effort in military equipment and strategy development, and what goals CCP leadership wants to achieve with its newly expanded nuclear arsenal.
- ▶ The DNI should immediately direct development of dynamic assessments of the decision calculus of all nuclear-armed adversaries regarding the use of nuclear weapons for coercion or in conflict. The Intelligence Community must ensure these assessments identify specific adversary perceptions of the potential benefits and costs of employing nuclear weapons in conflict, the potential benefits and costs of restraint from doing so, and possibilities for misunderstanding and miscalculation that could facilitate escalation of crises. Such assessments are critical prerequisites for the development of effective deterrence strategies and campaigns, and the plans that flow from them.
- ▶ The DNI should immediately direct an analysis of other potential adversaries that may develop strategic military capabilities during the 2027-2035 timeframe that could threaten U.S. and allied interests.
- ▶ The Secretary of Defense should immediately direct an analysis of the policy and posture effects of the threats posed by emerging and disruptive technologies, to include AI, quantum, and genetically engineered or other novel biological weapons on the future military balance and strategic stability. Based on the results of that analysis, develop a strategy and identify associated strategic posture changes, including defenses, sufficient to address these potential threats.

STRATEGY

FINDINGS

The six core tenets of U.S. nuclear strategy—assured second strike, flexible response, tailored deterrence, extended deterrence and assurance, calculated ambiguity, and hedge against risk—remain sound and continue to provide an effective foundation for deterrence and defense.

Adversary kinetic and non-kinetic capabilities are a growing threat to the U.S. homeland.

Space, cyber, and other non-kinetic capabilities are not adequately reflected in a coherent U.S. strategy to address the 2027-2035 threat.

The risk of failing to deter potential opportunistic or collaborative two-theater aggression in the 2027-2035 timeframe will not be mitigated unless the United States modifies its defense strategy and the strategic posture that enables it.

Among other elements of national power, current U.S. defense strategy seeks to protect U.S. vital interests by deterring war, deterring escalation in war, and prevailing in conflict if deterrence fails. U.S. deterrence strategy is designed to convince potential adversaries that if they choose war, the United States will deny their objectives, and they will incur costs that far exceed any benefits they can achieve through aggression or escalation. Since the end of the Cold War, this strategy has been enabled by U.S. and allied conventional superiority, and by a U.S. nuclear posture designed to deter nuclear employment of any kind. This construct remains sound, and key elements of it should be preserved in future U.S. strategy.

As the previous chapter makes clear, however, the threats the United States is likely to face in the 2027-2035 timeframe will be greater in magnitude and different in character than they are today. The Commission assesses that current U.S. defense strategy will not adequately address this future threat environment, and therefore must change. To that end, it is essential that the United States develop a coherent defense strategy that identifies the desired end-state in the 2027-2035 timeframe, and establishes the ways and means necessary to achieve that end-state.

U.S. defense strategy must clearly establish an effective approach to defending U.S. vital interests at home and around the world against two nuclear peer adversaries. Critically, it cannot be designed to address major power adversaries in sequence. This new defense strategy must integrate the application of all instruments of national power, implementing a long-awaited but difficult to achieve whole-of-government approach. It must fully embrace the security needs and capabilities of U.S. Allies and partners, who contribute to U.S. security by helping to deter and if necessary defeat adversaries. A critical enabler of that defense strategy will be the strategic posture of the United States, which will have to be significantly modified to counter the new threats the United States will face.¹⁷³



*USS Maine (SSBN 741)*¹⁷⁴

U.S. NUCLEAR STRATEGY

U.S. nuclear forces play a fundamental role in U.S. defense strategy. They deter an adversary's large-scale nuclear attack, the only military existential threat to the United States; assure Allies and partners; and provide the means to achieve national objectives should deterrence fail.¹⁷⁵ They also enable the projection of decisive conventional military force against nuclear-armed adversaries in defense of the vital interests of the United States and its Allies and partners by deterring or countering limited nuclear escalation and other forms of strategic attack. The nuclear element of current U.S. defense strategy is based on six foundational tenets: assured second strike, flexible response, tailored deterrence, extended deterrence and assurance, calculated ambiguity, and hedging against risk.

Assured second strike. The basis for U.S. nuclear strategy is assured second strike. The United States postures its nuclear forces and command and control capabilities such that no adversary can hope to degrade U.S. nuclear forces in a first strike sufficiently to avoid a devastating response that imposes costs unacceptable to the adversary. Assured second strike is enabled by survivable nuclear forces of sufficient size and capability to inflict unacceptable damage on an attacker under any circumstances.¹⁷⁶

Flexible response. The flexible response tenet of U.S. nuclear strategy ensures that the President has a sufficient range of response options following adversary escalation to terminate a conflict on terms acceptable to the United States and its Allies and partners at the lowest level of damage possible. Flexible response options are required to deter adversary limited nuclear escalation when a large-scale U.S. nuclear response might not be credible. Flexible response is enabled by

survivable strategic and theater nuclear forces with a range of delivery modes, explosive yields, and delivery timelines. All U.S. nuclear employment planning is and should remain compliant with the LOAC, thereby strengthening the credibility of U.S. deterrence.¹⁷⁷

Tailored deterrence. The principle of tailored deterrence ensures that U.S. nuclear strategy accounts for the unique aspects of each potential adversary's decision calculus. At its most fundamental level, tailored deterrence holds at risk what each adversary values most. During the Cold War, for example, the United States assessed that the Soviet leadership prioritized its own survival, its ability to exercise political control of the Soviet state postwar, its military forces (including nuclear forces), and its war supporting industry.¹⁷⁸ U.S. nuclear forces held all four of these target categories at risk. Tailored deterrence is not limited to cost imposition alone, however. It seeks to influence the full range of an adversary's perceived benefits and costs of taking actions the United States seeks to deter, and of an adversary's restraint from such actions.



Launch of a TRIDENT II D5 Missile

Extended deterrence and assurance. The extended deterrence and assurance tenet underlies U.S. alliance architectures in both Europe and Asia. Those alliance architectures have been described by multiple Chairmen of the Joint Chiefs of Staff as America's military center of gravity.¹⁷⁹ Confidence in U.S. extended nuclear deterrence enables U.S. Allies to stand with the United States in opposing threats to mutual vital interests posed by nuclear-armed adversaries. In Europe, U.S. nuclear forces—to include those deployed within and beyond the region—comprise the centerpiece of NATO's nuclear deterrent, with the nuclear capabilities of the United Kingdom and France also contributing to deterrence. In Asia, U.S. nuclear forces based at sea and in the continental United States provide the nuclear deterrent to attacks on Australia, Japan, and the Republic of Korea (ROK). Credible extended deterrence and assurance, from the perspective of U.S. Allies, requires U.S. nuclear forces capable of providing the President a range of flexible response options to deter adversary limited nuclear escalation and restore deterrence. Extended deterrence and assurance also play a critical role in convincing non-nuclear Allies to refrain from pursuing nuclear weapons, thus helping to prevent proliferation cascades.

Calculated ambiguity. U.S. nuclear strategy has long retained a degree of calculated ambiguity regarding the precise circumstances in which the United States might employ nuclear weapons. This contributes to deterrence by creating uncertainty in the mind of potential adversaries and by assuring U.S. Allies that the United States reserves the right to employ nuclear weapons first in their defense if necessary.

Hedging against risk. The final core tenet of U.S. nuclear strategy is to hedge against risk. This includes geopolitical, technical, operational, and programmatic risks that could render U.S. nuclear forces insufficient to effectively enable U.S. strategy.

In addition to these six foundational tenets, U.S. nuclear strategy has also long recognized the potential for arms control and risk reduction measures to enhance the strategy's effectiveness.

Similarly, U.S. strategy has recognized the benefits of nonproliferation on strategic stability, as preventing further proliferation of nuclear weapons is an important U.S. policy goal. More countries acquiring nuclear weapons would destabilize important geopolitical regions, constrain U.S. freedom of action, and increase the risk of nuclear weapons being used in a conflict, whether deliberately or by accidental or unauthorized use. The Nuclear Non-Proliferation Treaty (NPT) and other multilateral agreements play a critical role in preventing the spread of nuclear weapons.

Arms control and risk reduction, discussed in a subsequent chapter of this report, contribute to the goals of U.S. nuclear strategy by shaping adversary perceptions and capabilities, decreasing uncertainty, and reducing the risk of miscalculation. That said, for the first time in decades there will likely soon exist an international environment without any nuclear arms control agreements constraining the nuclear arsenal of any nuclear power. This situation further exacerbates the challenges facing the United States and its Allies and partners.

THE ROLE OF CAPABILITIES OTHER THAN NUCLEAR WEAPONS IN U.S. DEFENSE STRATEGY¹⁸⁰

U.S. defense strategy seeks to deter and, if necessary, defeat adversary aggression through a combination of forward-deployed conventional forces and their reinforcement, enabled by capabilities in space and cyberspace. U.S. forward-deployed and reinforcing conventional forces are integrated with the conventional forces of U.S. Allies and partners to present adversaries a combined force capable of denying them their objectives, imposing costs that far exceed any benefits they might be able to achieve through armed aggression, and prevailing in conflict.

In concert with U.S. nuclear strategy, this defense strategy has succeeded in deterring major powers from armed aggression against the United States and its Allies and partners. But current U.S. strategy, based on the 2022 NDS and consistent with the 2018 Commission on the NDS, reflects a “one major war” sizing construct for the conventional force.¹⁸¹ The Commission believes this strategy is sufficient to deter opportunistic or collaborative two-theater aggression today, but will fall short in the 2027-2035 timeframe. Adversary nuclear and non-nuclear capabilities will greatly increase the risk that the current strategy will fail to deter such aggression, without either a change in U.S. defense posture or significant changes in adversary forces and strategies. The threat of conflicts with China and Russia requires significantly increased U.S., allied, and partner investments in fielding and optimization of conventional forces; without these necessary enhancements to the conventional force, an increased reliance on the nuclear deterrent is likely. Furthermore, such conventional capabilities must be fully integrated with U.S. nuclear capabilities to be properly prepared for the potential of deterrence failure.

In addition, the role of conventional forces in U.S. defense strategy is critically dependent on the ability of the United States to rapidly and decisively reinforce forward-based U.S., allied, and partner conventional forces with forces based in the United States. Both China and Russia have identified this dependence on reinforcement as a potential vulnerability in U.S. strategy, have incorporated disruption or denial of such reinforcement in their theories of victory, and continue to acquire a growing array of kinetic and non-kinetic means of striking the U.S. homeland, as well as U.S. lines of communication with Europe and Asia.

Russia and China are deploying missile defense systems designed to protect critical assets against U.S. offensive strikes; to date the United States has chosen to not build homeland missile defenses against major powers. U.S. homeland IAMD capabilities do not adequately protect the critical infrastructure necessary to project power and avoid coercion in light of growing Russian and Chinese nuclear and conventional strike threats.



*B-52H Stratofortress*¹⁸²

WHAT MUST CHANGE TO ADDRESS THE 2027-2035 THREAT ENVIRONMENT

The 2027-2035 threat environment will pose significant challenges to current U.S. defense strategy. While the fundamental elements of that strategy are sound, they must be adapted (and the supporting strategic posture altered) to effectively address the threat: in the 2027-2035 timeframe the United States and its Allies and partners will face two nuclear peer adversaries, substantially increased Chinese conventional capabilities, advances in Russian and Chinese strategic capabilities to degrade critical U.S. non-nuclear enablers, and the likely reconstitution of Russian conventional forces. Moreover, the potential for simultaneous conflicts with China and Russia in Asia and Europe, whether those conflicts result from opportunistic or collaborative aggression, must be addressed. Dismissing the possibility of opportunistic or simultaneous two-peer aggression because it seems improbable, and thus not addressing it in U.S. defense strategy and strategic posture, is likely to have the perverse effect of making such aggression more likely.

Since U.S. defense strategy to address the two-nuclear-peer threat will require a U.S. nuclear force that is larger in size, different in composition, postured differently, or all three, decisions must be made now to meet deterrence requirements by the mid-2030s. The Commission recommends a number of such decisions in the chapters that follow.

RECOMMENDATIONS

U.S. nuclear strategy is the foundational element of its broader strategy for addressing the two–nuclear–peer threat environment.¹⁸³ The Commission recommends the United States maintain a nuclear strategy based on six fundamental tenets:

- ▶ Assured second strike;
- ▶ Flexible response to achieve national objectives;
- ▶ Tailored deterrence;
- ▶ Extended deterrence and assurance;
- ▶ Calculated ambiguity in declaratory policy; and
- ▶ Hedge against risk.

These foundational strategy tenets should be applied to address the 2027–2035 threat in the following ways:

- ▶ Deter large–scale strategic attack on the United States and its Allies and partners through maintaining an assured second–strike capability sufficient to impose unacceptable costs as an adversary or adversaries perceive it under any conditions.
- ▶ Continue the practice and policy of not directly targeting civilian populations, and adhere to the LOAC in nuclear planning and operations.
- ▶ Tailor U.S. deterrence strategy and practice to decisively influence the unique decision calculus of each nuclear–armed adversary. As a general rule, the most effective deterrent is to hold at risk what adversaries value most.¹⁸⁴ As long as the Chinese and Russian regimes maintain their current autocratic structure and dangerous policies, this means holding at risk key elements of their leadership, the security structure maintaining the leadership in power, their nuclear and conventional forces, and their war supporting industry.
- ▶ Deter limited strategic attacks, including limited nuclear escalation, through a flexible response strategy enabled by U.S. and allied nuclear and conventional forces and partner conventional forces that are capable of:
 - » Continuing to operate effectively to achieve U.S. and allied and partner objectives in a limited nuclear use environment; and
 - » Providing a credible range of resilient response options to restore nuclear deterrence and promote conflict termination by convincing an adversary's leadership it has seriously miscalculated, that further use of nuclear weapons will not achieve its objectives, and that it will incur costs that far exceed any benefits it can achieve should it escalate further.
- ▶ Enhance deterrence of armed aggression against U.S. Allies and partners and reduce the risk of escalation in a conflict if deterrence fails. U.S. extended nuclear deterrence requires that U.S. flexible response options be credible, especially in a simultaneous conflict with two peer nuclear adversaries.

- ▶ Maintain a declaratory policy of calculated ambiguity about the conditions in which the United States may employ nuclear weapons to preserve options for the President under all circumstances, complicate adversary decision-making regarding going to war with the United States, and deter an adversary from escalating a conflict with the United States.
- ▶ Develop the means to hedge against geopolitical, technical, operational, and programmatic risk that ensures such risks cannot result in U.S. deployed nuclear forces being insufficient to support U.S. nuclear strategy.

The Commission believes that U.S. national security strategy should strengthen deterrence by incorporating resilient offensive and defensive capabilities necessary to deny adversaries' theories of military victory. This recommendation is driven by Russian and Chinese advances in kinetic and non-kinetic offensive weapons, including dual-capable strike systems that can range the U.S. homeland. These weapons pose threats to the U.S. ability to project power in support of its Allies and partners in Europe and Asia, and to elements of the nuclear command, control, and communications system, strategic nuclear forces, and military space capabilities. The Commission recommends significant attention to these new kinetic and non-kinetic threats, including changes to U.S. IAMD in order to address the 2027–2035 security environment. U.S. strategy should increase the role of homeland IAMD capabilities capable of deterring and defending against coercive attacks by Russia and China.¹⁶⁵ The Commission believes that protecting against such kinetic and non-kinetic attacks will complicate adversary attack planning and force them to contemplate larger-scale attacks to achieve similar objectives, thus strengthening deterrence.

The Commission believes U.S. military strategy requires active and passive defense of U.S. and allied and partner assets, as well as credible threats of punishment, to enable the military operations necessary to deter and counter Russian and/or Chinese theater aggression. For example, because Russian and Chinese advances in offensive counterspace capabilities pose an increasingly serious threat to U.S. and allied and partner space capabilities that enable U.S. power projection, missile attack warning, and nuclear command and control, the United States should urgently deploy a more resilient space architecture and adopt a strategy that includes both offensive and defensive elements to ensure U.S. access to and operations in space.

To achieve the most effective strategy for stability in light of the 2027–2035 threat environment, the Commission recommends three necessary changes:

1. The United States must develop and effectively implement a truly integrated, whole-of-government strategy to address the 2027–2035 threat environment, and must be able to bring all elements of American power to bear against these impending threats. The Department of Defense's Integrated Deterrence concept is a good start in this direction, but the Commission sees little evidence of its implementation across the interagency.
2. The objectives of U.S. strategy must include effective deterrence and defeat of simultaneous Russian and Chinese aggression in Europe and Asia using conventional forces.¹⁶⁶ If the United States and its Allies and partners do not field sufficient conventional forces to achieve this objective, U.S. strategy would need to be altered to increase reliance on nuclear weapons to deter or counter opportunistic or collaborative aggression in the other theater.¹⁶⁷

America's Strategic Posture

3. This strategy must be reflected in U.S. nuclear force structure.¹⁸⁸ U.S. strategy should no longer treat China's nuclear forces as a "lesser included" threat. Therefore, nuclear force structure constructs can no longer assume that the nuclear forces necessary to deter or counter the Russian nuclear threat will be sufficient to deter or counter the Chinese nuclear threat simultaneously. Nuclear force sizing and composition must account for the possibility of combined aggression from Russia and China. Therefore, the United States needs a nuclear posture capable of simultaneously deterring both.

STRATEGIC POSTURE

FINDINGS

In the context of a strategic posture deploying both conventional and nuclear capability, the traditional role of nuclear weapons in U.S. defense strategy remains valid and of continuing importance: deterrence of adversaries; assurance of Allies; achieving U.S. objectives should deterrence fail; and hedging against adverse events.

The U.S. triad of strategic delivery systems (intercontinental ballistic missiles, ballistic missile submarines, and bombers) has great value in presenting an intractable targeting problem for adversaries. Each system has unique strengths, such as responsiveness, survivability, and flexibility, that complement the others and vastly complicate adversary planning – thus contributing to deterrence. The triad will remain the key foundation for the U.S. strategic posture for the foreseeable future.

The triad provides the President with a range of options to protect U.S. national interests in any crisis or against any challenge. For example, the responsiveness and alert status of the ICBM force provides the President with options to:

- ▶ Launch under Attack – ICBMs are launched before they are destroyed by an adversary's preemptive counterforce attack; or
- ▶ Ride-Out – The U.S. absorbs an adversary first strike on its ICBM force and responds with forces at a time and place of its choosing.

The President is never compelled to launch ICBMs under attack.

The strategic setting in 2010, which informed the current POR, led to these assumptions:

- ▶ New START force levels were a sufficient deterrent capability against Russia;
- ▶ The PRC was a lesser-included case; and
- ▶ The aggressive foreign policies of China and Russia, the extent of their nuclear modernization, and the possibility of conflict with China and Russia were not foreseen.

U.S. strategic force requirements were set more than a decade ago and anticipated a significantly more benign threat environment than the one the United States now faces. Therefore, the United States requires an updated strategic posture to address the projected security environment. This is an urgent task that has yet to be acknowledged.

U.S. deterrence requirements must be tailored to each adversary in light of characteristics specific to their regime (e.g., goals, values, capabilities, vulnerabilities).

Chinese and Russian force modernization and expansion confronts the United States with a two-peer threat environment. In the emerging environment, the United States must maintain a resilient nuclear force that can absorb a first strike and respond effectively with enough forces to cause unacceptable damage to the aggressor while still posing a credible threat to the other nuclear power.

If China and Russia continue on their current trajectories with respect to force modernization and expansion, the rate at which U.S. nuclear force modernization is proceeding will likely add unacceptable risk.

America's Strategic Posture

Deployed strategic nuclear force requirements will increase for the United States in such a threat environment.

The current multi-program, multi-decade U.S. nuclear modernization program is necessary, but not sufficient to enable the nuclear strategy recommended by the Commission to address an unprecedented two-nuclear-peer threat environment. To avoid additional risk and meet emerging challenges, the United States must act now to pursue additional measures and programs. Additional measures beyond the planned modernization of strategic delivery vehicles and warheads may include either or both qualitative and quantitative adjustments in the U.S. strategic posture.

Current U.S. nuclear capabilities are safe, secure, reliable, and effective, and all operate on a daily basis, however, they have been extended past their original design lives.

Modernizing the U.S. nuclear command and control system is urgently required to ensure it remains survivable, adaptable, resilient, and effective against future threats.

The nuclear deterrent modernization POR, for DOD and DOE/NNSA combined, began in 2011. Its principal traits are as follows:

- ▶ Continued adherence to the strategic triad structure and theater dual-capable aircraft structure;
- ▶ Each leg of the triad and its NC3 systems are being modernized and replaced, which presents a challenge to DOD for the next 25 years;
- ▶ The new delivery systems will begin to be fielded in the late 2020s, but currently planned modernization will require several decades;
- ▶ Unlike previous platforms, the new systems are generally being designed to operate longer, and to more easily adapt to emerging threats, such as adversary air and missile defenses; and
- ▶ DOE/NNSA will be significantly challenged to deliver on time the nuclear weapons required by DOD.

The U.S. POR calls for "just-in-time" delivery. The new systems will enter service at the same time the legacy systems must be retired. Although the POR is underway in both DOD and DOE/NNSA, significant risks to the schedule are apparent as most margin has been used. DOD and DOE/NNSA, while candid about challenges, express "can-do" confidence, notwithstanding multiple factors that are already driving delays of programs.

This just-in-time situation means that delays in elements of the POR, or any early aging out of an existing system, will create shortfalls in U.S. nuclear capabilities.

There are several ways to mitigate the impact of shortfalls created by problems in the execution of the POR, but none are optimal or completely meet the requirements of the modernization program. Some require significant additional investment and/or near-term decisions to hedge against the problem. Others may require potential near-term decisions to be able to field different warhead loads. For example, sustaining the legacy force until its modernized replacement arrives will require additional investment in order to prevent a loss of capability and sustain the U.S. vital nuclear deterrent.

Additional U.S. theater nuclear capabilities will be necessary in both Europe and the Indo-Pacific regions to deter adversary nuclear use and offset local conventional superiority. These additional theater capabilities will need to be deployable, survivable, and variable in their available yield options.

Modernizing nuclear command and control capabilities is necessary if U.S. systems are to remain resilient and effective against future threats. NC3 modernization must also address the need for cross-Combatant Command interaction in planning and executing combat operations in a regional context.

Advancements in emerging technologies could pose new risks, but also new opportunities to defend, survive, and prevail. If the United States effectively adapts and employs these technologies, they could contribute to the survivability and effectiveness of U.S. nuclear forces. Of particular note are hypersonic delivery vehicles, quantum computing, generative AI, and autonomous vehicles.

From the Commission's perspective, optimizing U.S. defense strategy for the 2027-2035 threat environment will require modification. The primary aims of the recommended strategy, however, remain consistent with past U.S. policies: to deter adversary aggression and if deterrence fails, to defeat adversary forces in a way that defends the U.S. vital national interests and those of its Allies and partners. When it comes to U.S. strategic posture, however, the Commission's assessment of and recommendations for what is most appropriate are urgent and reflect a significant shift.

In summary, the Commission finds that the current U.S. strategic posture¹⁸⁹ will be insufficient to achieve the objectives of U.S. defense strategy in the future due to the rapid advancement of the threat, particularly the nuclear threat of two peer adversaries. Urgent, significant change is required in the U.S. overall strategic posture, particularly with respect to U.S. nuclear posture.

To address the emerging security environment, the United States must first fully execute the nuclear modernization POR underway, including both delivery platforms and warheads. Furthermore, the United States should accelerate the timing and completion of that program where possible, while determining what additional requirements are needed to meet the threats which have emerged since 2010. In addition, the current modernization program needs to be accompanied by risk-mitigating actions across the triad to ensure that delays in modernization programs or early age-out of currently deployed systems do not result in militarily significant shortfalls in deployed nuclear capability. Finally, the U.S. theater nuclear force posture should be modified in order to provide the President a range of militarily effective response options to deter or counter Russian or Chinese limited nuclear use in theater.



The B-21 Raider⁹⁰

THE ROLE OF THE U.S. STRATEGIC POSTURE

In a broad sense, the U.S. “strategic posture” refers to the manner in which the United States is positioned to defend itself and its Allies and advance American interests. It draws on the capacity, capability, flexibility, and resolve that the United States has developed across its tools of national power. The United States wields these tools to shape, adapt to, and hedge against changes in the international environment. It seeks to maintain an international order favorable to U.S. values and interests in a competitive and adversarial world with uncertain and complex challenges.

The central component of the U.S. strategic posture is the U.S. military posture—the way the United States develops, positions, and uses military instruments to favorably shape the international environment. Strategic military instruments are generally defined as those that are most threatening and consequential in the mind of the adversary, relevant to high-end conflict scenarios, and/or critical to the defense of the U.S. homeland. For more than 75 years, an array of U.S. strategic military capabilities—both conventional and nuclear—has been committed to securing the shared policy goals of the United States and its Allies.

The U.S. nuclear posture consists of a triad of strategic nuclear delivery systems and platforms: ICBMs, SLBMs and SSBNs, and bombers; their associated nuclear warheads and weapons; and the enterprise that sustains those forces, including its highly skilled personnel. The U.S. nuclear posture comprises the foundation of U.S. military strength, and therefore the foundation of the U.S. strategic posture. These capabilities underpin deterrence of major aggression, deterrence of nuclear employment by adversaries, assurance of Allies in peacetime, crisis, and conflict, and the ability to achieve objectives should deterrence fail.

While the triad's capabilities are foundational, the overall U.S. strategic posture extends to programs, activities, and capabilities beyond nuclear forces. It includes U.S. space forces, cyber forces, and homeland air and missile defenses. It includes ground forces based and deployed in Europe and Asia; surface combatants, submarines, and naval airpower to protect vital sea-lanes

and communication around the globe; and airpower assets based in the United States and deployed forward in every region; and the command and control systems that integrate them all.

The U.S. strategic posture depends on the essential activities of the Military Services, such as the organization, training, and equipping of forces, the education and cultivation of leadership, the development of doctrine and concepts, and the establishment of appropriate facilities and capabilities for force development and maintenance. Together with the plans and exercises of the Combatant Commands, these activities help ensure the operational readiness of the force and sustain an effective strategic posture.

The U.S. strategic posture also requires a sizable industrial base to design and produce appropriate systems and capabilities. Throughout the Cold War, the size, diversity, and production capacity of the U.S. industrial base served to ensure that the U.S. strategic posture was “second to none.”¹⁹¹ Together with declaratory policy, doctrine, organization, training, exercises, leadership, and facilities, the U.S. strategic posture continues to rely heavily on the capacity and strength of a much smaller U.S. industrial base—including the DOE/NNSA nuclear weapons design and production complex—to defend U.S. and allied interests around the globe. This industrial base, on balance, is not able to support the forces needed in the future.

Finally, the U.S. strategic posture is a material manifestation of the U.S. extended deterrence commitment to protect the shared interests of the United States and its Allies. These security commitments have been honored by successive administrations and supported by Congress as being in the long-term vital interest of the United States. Over many decades, the convergence of U.S. and allied security interests has remained a relative constant, even as new challenges and threats emerged. As such, whenever circumstances demand, the United States and its Allies may opt to field new capabilities or adjust the size and composition of their forces to meet the challenge and serve their common security interests.¹⁹²

THE ROLE OF THE U.S. NUCLEAR POSTURE

Through a triad of capabilities, U.S. nuclear forces reinforce conventional deterrence by making clear to adversaries that they do not have attractive escalation options should a conflict occur. Each leg has unique attributes that complement one another and complicate adversary planning. Taken together, the triad serves to deter any adversary from attacking the United States and its Allies. Its attributes include:

- **Survivability.** Ballistic missile submarines comprise the most survivable leg of the triad. A portion of the SSBN fleet is continuously on patrol in broad ocean areas and difficult to target when underway. The SSBNs' survivability, coupled with the SLBMs' intercontinental range, provide for assured second-strike deterrent capability.
- **Responsiveness.** The key attribute of the land-based leg of the triad is the responsiveness of the ICBM force. ICBMs are on continuous alert; they can be launched within minutes on Presidential authority and can reach most targets within 30 minutes of launch. U.S. ICBMs are deployed in nuclear-hardened silos across five Western states, creating a large, complex targeting problem for any adversary contemplating a first strike on the United States. An effective attack would require a major share of the adversary's long-range systems.
- **Flexibility.** The air leg's principal attribute is flexibility. Bombers can be deployed as a show of force to deter or dissuade an adversary, and to demonstrate U.S. resolve and commitment to assure Allies and partners. The bombers' ability to deploy gravity bombs and cruise missiles is key to the U.S. deterrent and to the U.S. hedging strategy against operational and geopolitical risk.¹⁹³ And, unlike ICBMs and SLBMs, bombers can be recalled.

- **Coupling.** In addition to the strategic triad, the U.S. maintains dual-capable aircraft (DCA) forward-deployed in Europe, along with tactical air-delivered nuclear gravity bombs. The DCA mission is shared with certain NATO allies. DCA assets are capable of delivering either conventional munitions or non-strategic nuclear gravity bombs in support of NATO's deterrence mission.
- **Positive Control.** The U.S. strategic posture includes appropriate NC3 capabilities that enable the President to exercise authority over U.S. nuclear weapons. NC3 capabilities include personnel, procedures, processes, facilities, equipment, and communication systems.

UPDATING THE BASIS FOR U.S. NUCLEAR FORCE REQUIREMENTS

Current U.S. nuclear modernization plans were developed in the relatively more benign and optimistic strategic setting of 2000-2010. According to the 2010 NPR, the threat of nuclear war had grown remote with the end of the Cold War and the collapse of the Soviet Union.¹⁹⁴ In the immediate post-9/11 era, policy-makers viewed the most pressing threats to the United States as terrorism and nuclear proliferation. While Russia continued to modernize its nuclear forces, it was generally seen more as a potential partner than as an adversary. The prospect of direct military confrontation was considered extremely unlikely. In 2010, China was not a driving factor in determining U.S. nuclear force size and requirements; instead, China remained a "lesser-included case" for U.S. planning purposes.

This view of the strategic context shaped U.S. strategic priorities, and those priorities consequently shaped the direction of U.S. nuclear force planning. The top priority for U.S. national security was to prevent nuclear proliferation and nuclear terrorism; reducing the role of nuclear weapons was next, and maintaining strategic deterrence and stability was third. To pursue these priorities, the 2010 NPR stated that the United States would take the following actions regarding nuclear delivery systems, warheads, and NC3:

- Maintain the triad, but reduce the number of U.S. strategic delivery vehicles and warheads;
- Retire the Tomahawk Land Attack Missile-Nuclear (TLAM-N);
- Decide as a matter of policy to not develop new nuclear warheads or Life Extension Programs (LEPs) that would support new military missions or capabilities; and
- Strengthen the U.S. command and control system to maximize Presidential decision time in a crisis.

Additionally, when New START entered into force in 2011 it imposed the following limits on U.S. strategic offensive arms to be achieved by 2018:

- 700 deployed ICBMs, SLBMs, and heavy bombers equipped for nuclear armaments;
- 1,550 nuclear warheads operationally deployed on ICBMs, SLBMs, and heavy bombers (where each bomber counts as one warhead); and
- 800 deployed and non-deployed ICBM launchers, SLBM launchers, and heavy bombers equipped for nuclear armaments.¹⁹⁵

In 2010, the United States was clearly not anticipating that Russia and China would adopt aggressive foreign policies aimed at disrupting and displacing the international order established by the United States and its Allies. The United States did not anticipate that China would ignore international norms such as freedom of navigation; take disputed territory in the South China Sea through military coercion; renege on its international commitments to maintain a "one country-two systems" framework by violently repressing peaceful protesters in Hong Kong; and directly threaten the use of military force against Taiwan.

China's military modernization and lack of transparency were concerning, but China and the United States were seen as economically interdependent with increasingly shared responsibilities for addressing terrorism and proliferation. But by 2021, however, it became clear that China was expanding its nuclear force in what has been described as a "breakout" by former Commander, U.S. Strategic Command (CDRUSSTRATCOM), Admiral Charles A. Richard.¹⁹⁶ Indeed, by 2022 China had displaced Russia as the pacing threat for conventional force planning.¹⁹⁷

Similarly, in 2010, the United States did not anticipate that Moscow would ignore the commitments made in the 1994 Budapest Memorandum and violate the territorial integrity and sovereignty of Ukraine by seizing Crimea and portions of the Donbas in 2014, and invading the rest of Ukraine in 2022. Nor did the United States expect Russia to violate its commitments under the Intermediate-Range Nuclear Forces (INF) Treaty and the Presidential Nuclear Initiatives (PNIs) by developing and deploying short- and medium-range nuclear weapons. The United States did not anticipate that Moscow would threaten nuclear use against Baltic States and other NATO members for aiding Ukraine, suspend its compliance activities for New START, or decide to move nuclear weapons to Belarus.

An array of events, some of which have been noted above, now call into question the underlying assumptions, expectations, and planning factors that existed between 2000 and 2010. At this point, the U.S. nuclear modernization programs underway are critical and necessary, but no longer adequate to deter the increased challenges from Beijing, Moscow, and the possibility of engaging both simultaneously.



A B-2 Spirit⁹⁸

CURRENT U.S. NUCLEAR FORCES

It is U.S. policy to ensure U.S. nuclear capabilities¹⁹⁹ are safe, secure, reliable, and effective.²⁰⁰

As a result, the Services continually track related metrics for nuclear weapons delivery platforms and the NC3 system. An assessment of these metrics is provided to the Secretary of Defense on a recurring basis, with the *Biennial Assessment and Report on the Delivery Platforms for Nuclear Weapons and the Nuclear Command and Control System* transmitted by the CDRUSSTRATCOM; Director of the Strategic Systems Programs of the Navy; Commander, Air Force Global Strike Command; and Commander, U.S. Air Forces in Europe.²⁰¹

In parallel, the heads of the three DOE/NNSA national security laboratories and CDRUSSTRATCOM annually prepare and submit the *Report on Stockpile Assessments* to the Secretary of Energy, Secretary of Defense, and the Under Secretary of Defense for Acquisition and Sustainment. The report assesses the safety, reliability, performance, and military effectiveness of each nuclear weapon type.²⁰² DOE/NNSA also uses several strategies to maintain nuclear weapons, including: assessing the stockpile annually through Science-based Stockpile Stewardship (SBSS); extending the life of the deterrent through modernizations; and assuring support capabilities such as production, manufacturing, and research.²⁰³

Tremendous care is applied to preserve the integrity of U.S. nuclear capabilities through the use of successive updates and life extensions.²⁰⁴ However, across the enterprise there are indications that substantial investment is needed. As illustrated by Table 1, the vast majority of nuclear delivery systems are well past their original design lives. Similarly, many NC3 systems entered service in the 1970s and are also long overdue for upgrades.²⁰⁵ As for the weapons themselves,

most entered the stockpile in the 1970s and 1980s and have been sustained through the DOE/NNSA Stockpile Stewardship Program and/or LEPs to ensure they remain safe, secure, reliable, and effective as they age.²⁰⁶ Table 2 shows deployment dates and notional replacement dates for each warhead type. However, as will be described in a subsequent chapter of this report, DOE/NNSA's physical infrastructure is also aging. As the 2018 NPR noted, "over half of NNSA's infrastructure is over 40 years old, and a quarter dates back to the Manhattan Project era."²⁰⁷

Table 1. First deployment of nuclear delivery systems and the end of original design lives²⁰⁸

Current System	Year First Deployed	End of Original Design Life
MMIII ICBM	1970	1980
B-2A Bomber	1997	None
B-52H Bomber	1961	1981
AGM-86B ALCM	1982	1992
Ohio-class SSBN	1981	2011
Trident II D5	1990	2015
Trident D5LE	2017	2042
F-15E DCA	1988	None

Sources:

Government Accountability Office, *Nuclear triad: DoD and DoE Face Challenges Mitigating Risks to U.S. Deterrence Efforts*, May 2021, <https://www.gao.gov/assets/gao-21-210.pdf>.

"Trident II (D5) Missile," *U.S. Navy Office of Information*, last updated September 22, 2021, <https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/Article/2169285/trident-ii-d5-missile/>.

"The Long View: Fleet Ballistic Missiles," *Lockheed Martin*, last updated October 1, 2020, <https://www.lockheedmartin.com/en-us/news/features/history/fbm.html>.

"F-15E Strike Eagle," *Air Force*, last updated April 2019, <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/104499/f-15e-strike-eagle/>.

Table 2. First deployment of warheads and replacement dates

Warhead Type	Date of Entry into Stockpile	Planned LEP ¹	First Prod. LEP	Planned Repl. ²	Projected FPU ⁵ for Replacement	Plutonium Component ⁷ Age at Initial Replacement ⁶
B61-3/4*	1979	B61-12 LEP	2020	FAW ³	~2040-2050	~60-70 yrs
B61-7/10**	1985/1997	B61-12 LEP	2020	FAW	~2040-2050	~60-70 yrs
B83-1**	1983	Retired by 2025	n/a	n/a	n/a	n/a
Cruise Missile W80-1	1982	W80-4 LEP	2025	FAW	~2040-2055	~60-75 yrs
SLBM W76	1978	W76-1 LEP	2008	SLW ⁴	~2045-2047	~65-70 yrs
		W76-2 MOD	2020	SLW ⁴	~2045-2047	~65-70 yrs
ICBM W78	1979	n/a	n/a	W87-1	~2030	~50 yrs
ICBM W87	1986	Partial LEP	1999	FSLW ⁴	~2035-2040	~50-55 yrs
SLBM W88	1989	Alt 370 Refresh	2022	FSSW ⁴	~2035-2040	~45-50 yrs

* Non-strategic bomb ** Strategic Bomb

1 Life extension programs (LEP) reuse nuclear components.

2 Replacement requires nuclear component production.

3 Future Air-Delivered Warhead (FAW) timeframe identified; characteristics to be determined.

4 Submarine-Launched Warhead (SLW), Future Strategic Sea-Based Warhead (FSSW), and Future Strategic Land-Based Warhead (FSLW) initial studies planned; diversity and characteristics to be determined.

5 First Production Unit

6 Replacement dates are notional.

7 Nuclear Component: "Major subassembly of a nuclear explosive that contains SNM [Special Nuclear Material] in quantities sufficient to fuel a nuclear explosion (e.g., pit or canned subassembly)." [https://www.directives.doe.gov/terms_definitions/nuclear-component]

Sources:

Department of Defense, Nuclear Matters Handbook, (Washington, DC: ASD Nuclear Matters, 2020). Figure 4.3, 34.

"Warhead Modernization," Department of Energy (National Nuclear Security Administration), last updated January 2022, <https://www.energy.gov/nnsa/articles/warhead-activities-fact-sheet>.

National Nuclear Security Administration, FY 2023 Stockpile Stewardship and Management Plan - Biennial Plan Summary, (Washington, DC: Department of Energy (National Nuclear Security Administration), April 2023), https://www.energy.gov/sites/default/files/2023-04/FY23%20SSMP_FINAL.pdf.

The age of nuclear delivery systems, nuclear weapons, and NC3 systems makes maintaining their safety, security, reliability, and effectiveness more difficult and expensive. To address aging-related issues and ensure an effective long-term deterrent, modernization POR are underway for every aspect of the deterrent force. The 2022 NPR affirms “full-scope triad replacement and other nuclear modernization programs, including NC3” to “ensure a safe, secure, and effective deterrent while taking responsible steps to advance the goal of reducing the role of nuclear weapons in U.S. strategy.”²⁰⁹

MODERNIZATION PROGRAMS

The POR was developed with the 2010 strategic setting in view. Its principal trait is that each legacy delivery system and weapon is being replaced with a similar, modernized version of itself.²¹⁰ This like-for-like transition is depicted in Figure 1. The POR, then, does not markedly change or grow the force structure. For example, though new warheads like the W93 are adding new military capabilities, the number of *Columbia*-class SSBNs is fewer than the *Ohio*-class, and the number of missiles that the *Columbia*-class can carry is significantly fewer.²¹¹ As such, the current POR is not a like-for-like transition in capacity, and may demand more SSBNs if the United States chooses to deploy additional missiles and nuclear warheads.

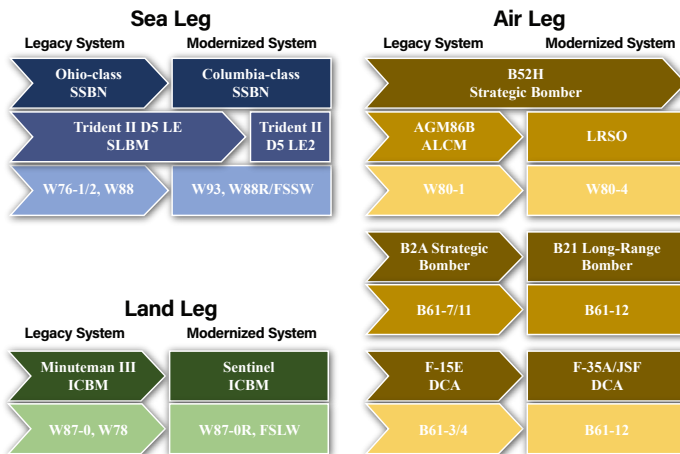


Figure 1. Illustration of the like-for-like transition from legacy to modernized systems.²¹²

Finally, almost all of the transitions from legacy to modernized systems will happen simultaneously in the next two to three decades. Under best-case scenarios, modernized systems will arrive just in time to replace legacy systems as they age out. The just-in-time nature of the transition poses significant risk and additional cost. Sustained focus will be required from DOD, DOE/NNSA, and senior leaders throughout the transition period to ensure the programs are delivered on time.

As described above, additional measures necessary to ensure effective deterrence in a two-nuclear-peer environment require the current modernization program be supplemented. Planning and programming for such capabilities must begin now, in order to enable the industrial base and production infrastructure to respond in time to address the challenges of the 2027-2035 timeframe.

THE TRANSITION FROM LEGACY TRIAD TO A MODERN TRIAD

Modernization programs across the triad call for just-in-time delivery via transition plans notionally illustrated in Figure 2. The Air Force and Navy expect to sustain legacy delivery systems until replacement systems are deployed, and the legacy systems are predicted to age out just before the arrival of the new systems. Similarly, DOE/NNSA's modernized weapons and infrastructure are expected to arrive just in time. Making the task especially complicated is the added layer of synchronization that DOD and DOE/NNSA must achieve to align related delivery systems and weapons programs through a concurrent acquisition process coordinated through the Nuclear Weapons Council (NWC).²¹³ For example, W80-4 and Long-Range Standoff (LRSO) weapon production schedules must be synchronized for the integrated system to be fielded as expected.²¹⁴

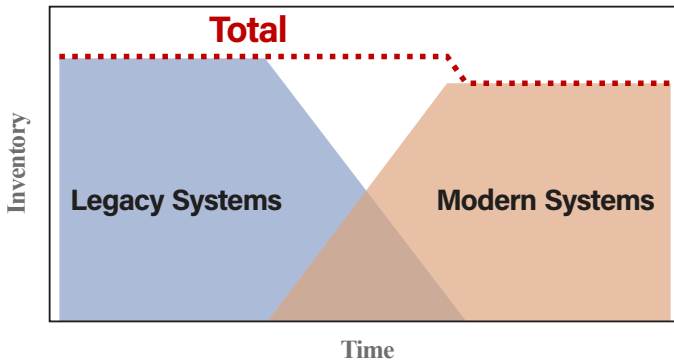


Figure 2. Notional depiction of the transition from a nuclear triad based on legacy systems to nuclear triad based on modern systems. The total inventory, illustrated by the red dashed line, decreases in the early 2030s due to the (currently planned) downward shift in SSBN capacity.

Despite DOD and DOE/NNSA generally expressing confidence that the modernization POR can be delivered on time, both displayed a general lack of urgency to meet these goals. Notwithstanding the measured confidence of managers of major acquisition programs, the Commission is aware of multiple factors that put the triad's modernization at risk.²¹⁵ All three of the major platform programs—B-21, *Columbia*, and Sentinel—are already experiencing delays.

- The B-21's first flight has been delayed multiple times, although Northrop Grumman stated that the program is still within the baseline schedule and cost.²¹⁶
- *Columbia* construction is behind schedule. The Navy is addressing the delay by leveraging (and thereby driving delays in) the *Virginia*-class program.²¹⁷
- According to OUSD(A&S), the Sentinel schedule is “aggressive and compressed compared to prior ICBM programs.”²¹⁸ Risks include dependency on immature technologies, available schedule margin for issues that may arise during testing, and scope of launch facilities' restoration. The Sentinel Program was originally slated to reach IOC in FY2029.²¹⁹ Now GAO estimates that Sentinel will not achieve IOC until 2030, a slip of a full year.²²⁰

The Commission found that most schedule margin has been consumed by the modernization POR. Further delays in delivering modernized systems, or early aging out of legacy systems, could create shortfalls in U.S. nuclear capabilities if adequate mitigation measures are not developed and implemented. Figure 3 notionally illustrates how such a gap could manifest during the timeframe focused on by this Commission in the event of a POR delay or combination of delays.²²¹

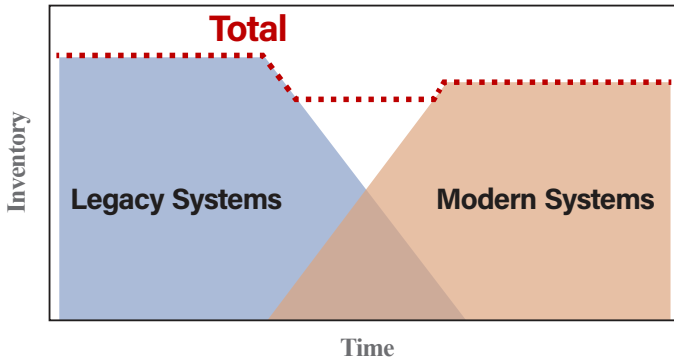


Figure 3: Notional depiction of the transition from a nuclear triad based on legacy systems to triad based on modern systems in the event of a POR delay (or combination of delays). In this case, the total inventory, illustrated by the red dashed line, would experience a shortfall in the late 2020s through early 2030s.

The 2022 NPR recognized the just-in-time nature of the transition and stated that proactively managing risk across the transition is imperative. The Nuclear Deputy’s Management Action Group, a decision forum that supports the Secretary of Defense, was created to integrate risks and opportunities across the full nuclear enterprise, provide senior leaders a comprehensive and strategic view of the state of the enterprise, and recommend actions for executive decision.²²² Leadership reviews are being held and department-level initiatives have been put in place to identify issues early and manage risk.²²³

In addition to senior-level oversight, funding is also necessary to ensure programs are delivered on time. According to the Office of the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs, all programs are fully funded to successfully meet Initial Operating Capability (IOC) dates.²²⁴ In contrast, the Office of Management and Budget (OMB) states that DOE/NNSA Weapons Activities budget requirements are growing faster than funding levels.²²⁵

But increased oversight and full funding—and the Services’ and DOE/NNSA’s dedication to sustainment and on-time modernization—are not enough. More substantial risk-mitigation strategies will be required to ensure DOD and DOE/NNSA can meet USSTRATCOM requirements throughout the transition. The Commission specifically recommends implementing three strategies to mitigate legacy-to-modern transition risk. Decisions to implement these strategies must be made very soon, years in advance of execution.

First, the Commission recommends that the Air Force and Navy exercise uploading ICBM and SLBM warheads. Uploading warheads allows the same number of warheads, to an extent, to be fielded if the number of available delivery systems is reduced. For example, if Sentinel experiences a delay while a fraction of the Minuteman III force ages out, warheads from the aged-out Minuteman III could be uploaded onto the remaining Minuteman III to keep the number of fielded, land-based warheads constant. Exercising upload capabilities will ensure Air Force and Navy preparedness should uploading become necessary. Notwithstanding Russian “suspension” of its obligations, these exercises should respect treaty limits until the United States determines that it is no longer bound by New START or the treaty expires.

Second, the Commission recommends the Air Force and Navy develop plans and procedures to “re-convert” SLBM launchers and B-52 bombers that were rendered incapable of launching a nuclear weapon under New START. To meet New START limits on delivery systems, the Air Force modified some of the B-52 bombers to a conventional-only role, and the Navy modified a fraction of Trident-II SLBM launchers to be incapable of carrying missiles. Re-converting these delivery systems to nuclear-capable status could be a viable option to hedge against legacy-to-modern transition risk.

Third, the Commission recommends providing sufficient funding to ensure existing deployed systems can operate past their currently planned retirement dates, as technically feasible. For example, the Navy is considering extending the service life of up to five *Ohio*-class SSBNs by three years to provide more active SSBNs in the 2030s.²²⁶ These SSBNs would require an 18-month overhaul called a Pre-Inactivation Restricted Availability (PIRA). A decision on whether or not to carry out this plan will need to be made during the build of the FY25 Program Objective Memoranda (POM) to prepare for the first PIRA in 2029.

THEATER-FOCUSED NUCLEAR CAPABILITIES

In addition to strategic challenges, the United States and its Allies face regional risks from China, Russia, North Korea, and Iran. Moscow's use of force to address its illegal claim to Ukraine, and its repeated threats of nuclear use and escalation against NATO, raise the prospect of further conflict in Eastern Europe. The enormous asymmetry that Moscow enjoys in nuclear weapons which can be deployed on dual use shorter- and medium-range systems, and its proximity to NATO territory, are destabilizing and must be countered.

The United States and its Allies in the Asia-Pacific region remain uncertain about the future course of China's nuclear expansion. Although the United States seeks arms control opportunities that advance our security and strategic stability, China's lack of transparency and refusal to engage in any meaningful dialogue regarding its nuclear force structure and programs leaves little opportunity for near-term arms control or CBM, and now threatens stability. In addition, North Korea has matured its operational capabilities, and can now strike all of the continental United States, as well as targets on the Korean Peninsula, Japan, and elsewhere in the region. Finally, Iran has advanced its uranium enrichment and ballistic missile programs. With these developments in mind, the risks of adversary nuclear use in both regional and global contexts have increased.



A Minuteman III ICBM test launch²²⁷

RECOMMENDATIONS

The Commission recommends fully and urgently executing the U.S. nuclear modernization POR, which includes replacement of all U.S. nuclear delivery systems, modernization of their warheads, comprehensive modernization of U.S. nuclear command, control, and communications, and recapitalizing the nuclear enterprise infrastructure at the DOD and DOE/NNSA.

At the same time, the current modernization program should be supplemented to ensure U.S. nuclear strategy remains effective in a two-nuclear-peer environment. Modifications to both strategic nuclear forces and theater nuclear forces are urgently necessary.

The U.S. strategic nuclear force posture should be modified in order to:

- ▶ Address the larger number of targets. The Chinese nuclear threat is no longer a “lesser included case” of the Russian nuclear threat, resulting in the need to deter and achieve objectives against China and Russia simultaneously should deterrence fail.
- ▶ Address the possibility that China will field large scale counterforce-capable missile forces that pose a threat to U.S. strategic nuclear forces on par with the threat Russia poses to those forces today.
- ▶ Assure the United States continues to avoid reliance on executing ICBM launch under attack to retain an effective deterrent; and
- ▶ Account for advances in Russian and Chinese IAMD.

America's Strategic Posture

The following strategic nuclear force posture modifications should be pursued with urgency:

- ▶ Prepare to upload some or all of the nation's hedge warheads;
- ▶ Plan to deploy the Sentinel ICBM in a MIRVed²²⁸ configuration;
- ▶ Increase the planned number of deployed Long-Range Standoff Weapons;
- ▶ Increase the planned number of B-21 bombers and the tankers an expanded force would require;
- ▶ Increase the planned production of Columbia SSBNs and their Trident ballistic missile systems, and accelerate development and deployment of D5LE2;
- ▶ Pursue the feasibility of fielding some portion of the future ICBM force in a road mobile configuration;
- ▶ Accelerate efforts to develop advanced countermeasures to adversary IAMD; and
- ▶ Initiate planning and preparations for a portion of the future bomber fleet to be on continuous alert status, in time for the B-21 Full Operational Capability (FOC) date.

A comprehensive set of risk-mitigating actions across U.S. nuclear forces must also be executed to ensure that delays in modernization programs or early age-out of currently deployed systems do not result in militarily significant shortfalls in deployed nuclear capability. The Commission recommends that set of urgent actions include, at a minimum:

- ▶ Exercise upload of ICBM and SLBM warheads on existing deployed systems;
- ▶ Develop plans and procedures to "re-convert" SLBM launchers and B-52 bombers that were rendered incapable of launching a nuclear weapon under New START; and
- ▶ Provide sufficient funding to ensure existing deployed systems, such as NC3 and Ohio-class SSBNs, can operate past their currently planned retirement dates, as technically feasible.

U.S. theater nuclear force posture should be urgently modified in order to:

- ▶ Provide the President a range of militarily effective nuclear response options to deter or counter Chinese or Russian limited nuclear use in theater;
- ▶ Address the need for U.S. theater nuclear forces deployed or based in the Asia-Pacific theater;
- ▶ Compensate for any shortfall in U.S. and allied non-nuclear capabilities in a sequential or simultaneous two-theater conflict against China and Russia;
- ▶ Address advances in Chinese and Russian IAMD; and
- ▶ Address allied concerns regarding extended deterrence.

The Commission recommends the following U.S. theater nuclear force posture modifications:

- ▶ Develop and deploy theater nuclear delivery systems that have some or all of the following attributes:
 - » Forward-deployed or deployable in the European and Asia-Pacific theaters;
 - » Survivable against preemptive attack without force generation day-to-day;
 - » A range of explosive yield options, including low yield;
 - » Capable of penetrating advanced IAMD with high confidence; and
 - » Operationally relevant weapon delivery timeline (promptness).
- ▶ Ensure that USEUCOM and USINDOPACOM are capable of planning integrated nuclear-conventional operations in their respective areas of responsibility (AORs).

NUCLEAR SECURITY ENTERPRISE INFRASTRUCTURE AND ORGANIZATION

FINDINGS

A critical element of U.S. strategic posture is the nation's ability to develop, produce, and maintain the nuclear weapon systems necessary to enable U.S. strategy.

Expanding the infrastructure and supply chain for the nation's nuclear complex and its strategic capabilities is part of an overall national need to broaden and deepen the American defense industrial base. This includes the ability to accelerate the incorporation of emerging and innovative weapon and production technologies.

The Commission believes that due to previous years of neglect and a dangerous threat environment, the infrastructure (facilities and workforce) that enables development and fielding of strategic capabilities needs to be overhauled. This will require nothing short of a government-wide focus akin to the U.S. moonshot of the 1960s.

Unlike Russia, China, and even North Korea, the United States does not currently have the production capacity to deliver new nuclear warheads with newly manufactured pits.

Sustainment of the legacy deterrent force and execution of the nuclear modernization POR—maintaining required capability during the complex legacy-to-modern transition in both warheads and delivery platforms—is now stressing and will continue to stress the capacity of the infrastructure and industrial base supporting both DOD and DOE/NNSA.

DOE/NNSA's infrastructure recapitalization in the nuclear weapons complex—the replacement or modernization of 1940s-era Manhattan Project and other facilities—is underway. The infrastructure modernization POR is necessary but not sufficient to meet the future threat. When the DOE/NNSA production infrastructure modernization was planned it was sized to support the stockpile the United States believed it needed in 2010 to support a New START size force. As a result, the planned DOE/NNSA production infrastructure will not have sufficient capacity to support the force needed to address the future threat.

In the Strategic Posture chapter, the Commission has recommended immediate actions to mitigate risks in the nuclear modernization POR and has recommended responses to the new threat environment, including additional capabilities to the POR. These steps will drive extraordinary demands on the already-constrained DOD and DOE/NNSA infrastructure.

DOE/NNSA's infrastructure recapitalization faces many cost and schedule issues, some of which are outside DOE/NNSA's control. Nevertheless, this recapitalization is absolutely essential to build the capacity of the complex's production capability.

Infrastructure recapitalization for both DOD and DOE/NNSA is also hindered by unpredictable incrementally funded budget levels each fiscal year, exacerbated by the continued practice of Continuing Resolutions to fund the government.

Component organizations responsible for strategic infrastructure must conduct extraordinary advocacy for budget share inside their parent organizations in order to successfully garner necessary resources in the midst of their organization's many competing demands. This advocacy is required despite public statements by senior leaders that nuclear deterrence is their highest-priority national security mission.

America's Strategic Posture

The challenge of hiring and retaining a skilled workforce, for both DOD and DOE/NNSA, has also grown substantially.

Diminishing manufacturing sources, lack of skilled trades in the workforce, and supply chain fragility, among other things, inhibit both sustainment and modernization of the strategic deterrent force (platforms and warheads). Both DOD and DOE/NNSA are attempting to tackle these challenges, but it remains to be seen if these shortfalls can be overcome in time to prevent a gap in required capability. These are national-level challenges that require focused Executive and Legislative Branch leadership.

Regarding organizational issues related to the DOE/NNSA nuclear weapons complex, multiple administrations have taken steps to address the findings and recommendations made by the many previous assessments of DOE/NNSA's organizational effectiveness. Continued focus is critical, especially in light of the new demands placed on the weapons complex.

The fundamental enabler of the nation's strategic posture is the infrastructure that sustains and modernizes the strategic force, and the organizations that oversee that infrastructure. Historical context is required to understand the adequacy of the Nuclear Security Enterprise's²²⁹ infrastructure and organization for the emerging strategic setting. During the Cold War, new U.S. nuclear delivery systems were introduced approximately every 10 years, and with each new delivery system there was usually a new warhead designed to address recent developments in the adversary target base or technological advances. This steady rate of modernization allowed the United States to pace adversary developments by responding to new operational challenges and demands with new capabilities. This steady rate of modernization also kept the industrial base—including the DOE/NNSA nuclear weapons laboratories and production complex—at a very high level of engagement and performance throughout the Cold War.²³⁰

Unprecedented changes in the international security environment came with the fall of the Berlin Wall in November 1989, the collapse of the Warsaw Pact in February 1991, and the dissolution of the Soviet Union later that same year. Together, these events had a dramatic effect on the U.S. strategic posture and force structure. Negotiated reductions in strategic delivery systems and their accompanying warheads resulted in significantly smaller nuclear stockpiles.²³¹ Without the immediate and ominous Cold War threat that Soviet capabilities had long represented, modernization of the U.S. triad, DCA, the nuclear stockpile, and associated NC3 capabilities was deferred.

Beginning in 1987, successive U.S.-Soviet and U.S.-Russia arms control agreements and unilateral initiatives greatly reduced the overall size of both sides' nuclear arsenals and delivery systems from their earlier levels at the height of the Cold War. The INF Treaty of 1987 eliminated an entire class of nuclear systems (i.e., ground-based Long-Range Theater Nuclear Forces such as the Soviet SS-20, the U.S. Pershing II IRBM, and the U.S. Ground-launched Cruise Missile). In 1991, the Strategic Arms Reduction Treaty (START) reduced the size of U.S. and Soviet strategic forces and introduced intrusive verification procedures. After the end of the Cold War, the Presidential Nuclear Initiatives of 1991-1992 resulted in other U.S. nuclear systems being withdrawn from deployment (e.g., Artillery-fired Atomic Projectiles and Sea-Launched Cruise Missiles, or TLAM-N).²³²

As these nuclear force eliminations, reductions and withdrawals took place, other modern nuclear programs were cancelled (i.e., the U.S. Peacekeeper and Small ICBM, SRAM II, and Follow-on-to-Lance). As a result, the United States continued to rely on the remaining deterrent force structure, and the general composition of the triad remained relatively constant. The operational readiness of the force remained high due to the array of essential Service and Combatant Command activities noted in the last chapter. The signing of the Comprehensive Nuclear Test-Ban Treaty (CTBT) in 1992 resulted in a change in policy from designing and fielding new weapons to maintaining the existing systems through SBSS.

As a result of post-Cold War policy decisions, modernization of nuclear delivery systems, platforms and warheads, as well as the industrial base, was largely deferred or cancelled. The one exception was the scientific and experimental facilities developed at NNSA as part of SBSS. With the moratorium on underground nuclear explosive testing in place and “no new military capabilities” being developed as a matter of policy, LEPs became the primary means of sustaining legacy warhead capabilities and ensuring their safety, security, and reliability. Some Air Force and Navy platforms and delivery systems also underwent life extension programs. For example:

- SBSS was developed to assess, maintain, and certify the legacy warheads retained in the U.S. nuclear stockpile—without testing;
- Warhead life extension and other modification programs were started to maintain and extend the life of the older B61 variants, as well as the W76, W80, W78, W87, and W88;
- Minuteman III received a new guidance set and propulsion replacement in the 1990s and 2000s; and
- Trident D5 underwent life extension in the early 2000s.

With no additional new delivery systems being designed and built,²³³ the size of the industrial base for production capabilities – such as for large solid-rocket motors – shrank in the post-Cold War era and considerable consolidation of the defense industrial base occurred.²³⁴ Moreover, without a steady rate of modernization underway, ensuring the effectiveness of U.S. nuclear systems against developments in the threat grew more difficult, particularly as the adversary target base became increasingly mobile, hardened and deeply buried, and legacy systems were generally not given “new military capabilities” to hold these adversary targets at risk.

Although there has been some modernization and sustainment of the NNSA production infrastructure, most of the focus over the past two decades was on the scientific, experimental, and computational infrastructure. As a result, the DOE/NNSA production infrastructure is in dire need of modernization or replacement.

The United States is presently engaged in a multi-year, multi-program effort to modernize the entire U.S. nuclear force and its NC3: replacing the Minuteman III with the Sentinel ICBM; replacing the *Ohio*-class SSBN with the *Columbia*-class; replacing the Trident D5LE with the D5LE2 SLBM; replacing the B-2 Bomber with the B-21; life-extending or replacing the existing stockpile of U.S. nuclear weapons; and updating the capabilities and expanding the capacities of the DOE/NNSA nuclear weapons scientific, experimental, computational and production complex. The modernization programs currently underway were developed in the late 2000s and early 2010s.

The assumptions, expectations, and planning factors that guided the decisions on current U.S. force structure and modernization requirements and production capacities were formed in a strategic setting that is fundamentally different than the one confronting the United States today. As described in preceding chapters, the need to mitigate risk in executing the current POR and the need to simultaneously deter two nuclear-armed peer adversaries now combine to produce a different demand signal than that on which the current POR is based. Responding to that demand signal by increasing production capacity and developing a flexible infrastructure is essential to the U.S. strategic posture; indeed, the response itself sends an important signal of capability and resolve to the U.S. adversaries as well as its Allies.

While the POR themselves pose significant challenges, those risks are exacerbated by issues with the DOD and DOE/NNSA Industrial Base. The DOD is approaching the crucial transition years from legacy to modern weapons platforms and DOE/NNSA will continue its shift to a production

focus by developing and expanding its production capabilities and capacity to support the planned nuclear stockpile requirements. Consequently, decrements to the underlying infrastructure; disruptions in supply chain, manufacturing and maintenance capacity; and workforce challenges will limit both enterprises in their abilities to deliver flexibly and on time.

The following sections outline challenges within both the DOD and DOE/NNSA industrial base in three areas: infrastructure, manufacturing/supply chain, and workforce. The Commission's subsequent findings and recommendations in these areas urge policy, budgetary, and organizational solutions on an accelerated schedule to execute the current POR and expand U.S. capability due to the growing need.

INFRASTRUCTURE

Within the DOD, weapons platforms, support components, and the underlying infrastructure to sustain weapons systems in the U.S. POR are aging out. This could impact the reliability of these systems, straining the ability to sustain legacy systems to account for delays in modernization programs. For example, the current below-ground engineering and support equipment for the Minuteman III comprises the same infrastructure that was fielded with the Minuteman I in the early 1960s. This support equipment must be sustained and operational until the transition to the Sentinel weapon system. The Air Force has reported that these facilities are experiencing degradation due to their age, including "corrosion, water intrusion, collapsed conduits, misaligned doors, and bulging walls."²³⁵

Another challenge to the DOD weapon system support infrastructure is having the appropriate resources and facilities to sustain legacy platforms while simultaneously producing a modernized weapon system. In the sea leg, the Navy is scheduled to construct one *Columbia*-class submarine per year and sustain the *Ohio*-class in parallel relying on the same infrastructure for both (manufacturing facilities, dry docks, etc.). Additionally, this same workforce and industrial base also support *Virginia*-class submarine production.²³⁶ As a result, the Navy must consider schedule tradeoffs between the two classes of submarines. The OMB as well as the Commission are skeptical that the current infrastructure can simultaneously support conventional and nuclear sustainment, modernization, and construction as scheduled.²³⁷ The AUKUS agreement may place further stress on this capacity.

Additional elements of the infrastructure within the U.S. defense industrial base are also impacted by parallel efforts both inside and outside of the nuclear enterprise. For instance, the DOD test infrastructure needed to support delivery platform modernization competes with both the test infrastructure for sustainment as well as with the increasing demand for other forms of systems testing (i.e., missile defense, hypersonics, and space systems).

A DOE/NNSA infrastructure evaluation study concluded that the current state of the facilities may pose a risk to "availability, capacity, and reliability of Weapons Activities capabilities."²³⁸ The current NNSA production complex is fragile, with limited ability to provide flexibility or additional capacity or capability. As demonstrated by Figure 4, DOE/NNSA has assessed half of their facilities as in poor or very poor condition, thus putting the ability to carry out the mission at risk. The one-third of facilities deemed in 'fair' condition must be maintained and monitored so they do not continue to degrade.²³⁹

The current workload is significantly greater than at any period since during the Cold War. As a result, NNSA's ability to simultaneously innovate and meet the currently planned POR has been limited. There is no current plan to accelerate the POR schedule and little attention has been given to much needed innovations in manufacturing and design.

Asset Condition by Replacement Plant Value %

Building Condition Index for operating buildings and trailers and Laboratory Operating Board scores for other structures and facilities

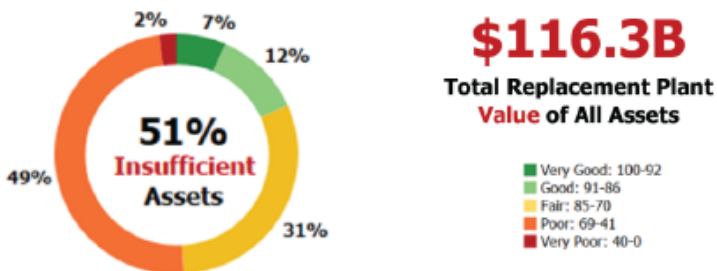


Figure 4. NNSA Asset condition by replacement plant value percentage²⁴⁰

Many of the new facilities will not be available for 20-30 years, and some of the large, sophisticated, high-security, and high-hazard facilities can take 20 or more years from start of design to full operational capability. While this timeline is dependent on a number of factors, it is too long, should be shortened, and belies the urgency needed to address the future threat environment. Major facilities are projected to cost anywhere between \$500M to \$10B each to design, build, and commission. DOE/NNSA should begin developing plans to accelerate the design and construction of these complex facilities using modern tools and analyses with streamlined approvals.

The Commission notes that although a number of NNSA experimental and test facilities are currently under construction, such as the Enhanced Capabilities for Subcritical Experiments at the Nevada National Security Site, and others have recently been upgraded, capability and capacity shortfalls exist throughout the weapons production complex. Thus, the currently planned programs, as well as any future warhead programs, will most likely be late.

Correcting the infrastructure problems is further complicated by factors outside of DOE/NNSA's control, including delayed and uncertain funding, the additional burdensome, often unnecessary oversight from DOE, the nation's limited capacity and capability for highly specialized construction and fabrication, and the limited number of program management and technically skilled employees throughout the nuclear security enterprise. Due largely to manpower funding shortfalls and historical caps on the federal workforce, DOE/NNSA is not sufficiently staffed to effectively execute all the necessary infrastructure projects even if industry could support the needed construction and funds were unlimited. As a result, DOE/NNSA can execute only a few of these projects at once; therefore, these complex and expensive efforts must be carefully planned, prioritized, and spread out over time.²⁴¹

To address these capacity challenges, NNSA has developed a comprehensive plan for modernization. The first priority is to replace facilities identified as beyond repair and to maintain the rest until they can be replaced or refurbished. NNSA has a separate, smaller non-line item infrastructure recapitalization program designed to improve overall infrastructure and safety. These minor construction projects aim to extend the life of maintainable facilities, expand existing capacity and generate specific new capability, and improve worker safety while reducing risk.²⁴² Overall, these projects support improvements to lower operating costs and can provide flexible, rapid response to emerging issues. This program can also respond in the short term to changing stockpile requirements and infrastructure priorities.²⁴³

To ensure a continuous and responsive strategic deterrent, the DOE/NNSA infrastructure must be in a constant state of recapitalization, with an assured and uninterrupted funding stream to develop the long-sought flexible and responsive nuclear security enterprise. Even then, without additional incentives and new approaches or options to address the limitations described above, DOE/NNSA will not be able to go fast enough to meet the threat as it is projected to evolve into the future.

Future investments must span all parts of the enterprise, which includes production facilities as well as scientific, computational, and experimental facilities, to allow for innovative design, manufacturing, certification, and surveillance, to support future requirements. New scientific and testing facilities not only support the nuclear weapons programs but also support nonproliferation and a variety of other basic and applied sciences in the broader national interest.

MANUFACTURING AND SUPPLY CHAIN

The DOD manufacturing capacity is constrained by available weapon system support during program transition years, as the legacy systems must be sustained during the time that the modernized systems come online. For example, in the land leg, the conversion of the existing Minuteman III silos to be compatible for fielding Sentinel is a complex balance of schedules in the enterprise. Launch facilities are planned to be converted at a rate of 50 per year, which is an aggressive timeline for the DOD industrial base to support.

From a manufacturing perspective, the level of effort required from the Air Force to convert Minuteman III facilities to Sentinel facilities is unclear. This is crucial to the maintenance of the Sentinel fielding schedule, as the planned conversion rate depends on the suitability of current launch facilities. The Air Force is mitigating risk by scheduling programmed depot maintenance of each Minuteman III silo one year prior to conversion for the Sentinel platform to address issues with the facilities (e.g., structural deficiencies).²⁴⁴

The DOD and DOE/NNSA currently consider the integration of their planning efforts for weapons and weapon system manufacturing and acquisition as crucial for effective transition to the modernized force. Continuing this synchronization is critical to maintaining the enterprise POR schedule. For example, the W87-1 must remain integrated with the Sentinel program's other components, such as the Mk21A re-entry vehicle. Currently, the Air Force plans to convert legacy aeroshells (used for the W87-0 warhead) to be compatible with the W87-1. This program is set to align with the W87-1 program in 2030; however, depending on phase-out of the Minuteman III platform and potential need for W87-0 warheads, conversion could prove challenging.²⁴⁵

DOE/NNSA has significant manufacturing capacity challenges, such as available and suitable square footage.²⁴⁶ Consider the Kansas City National Security Campus (KCNSC). Though one of the newer DOE facilities, it was sized to handle 1.5 LEPs; meeting the demands of the enterprise for production of non-nuclear components will therefore require "hundreds of thousands of additional square feet."²⁴⁷ NNSA has started to expand the KCNSC by leasing suitable additional buildings and is reviewing a longer-term plan that could include new construction.

The current inability to produce pits and other manufacturing capability shortfalls stem partially from post-Cold War policy decisions to life extend warheads in the stockpile rather than design new warheads, as well as overall policy guidance and funding decisions regarding nuclear modernization.²⁴⁸ Much of the NNSA's manufacturing capacity is dependent on its ability to restart or recreate various production methods that went dormant or have disappeared. Program delays have occurred in instances where DOE/NNSA needed to restart or recreate historic capabilities. For example, the W76-1 program experienced delays when there were barriers to restarting

production on a key material called Fogbank. Recovering the knowledge to produce Fogbank took an unanticipated length of time, causing delays to the program with no risk mitigation.²⁴⁹

Ongoing and future weapons programs will, for example, require “newly produced explosives,” some types of which have not been produced at scale since the 1990s. Recreating these production capabilities, or finding new solutions will be a challenge for a workforce already stretched thin by increased demands in production tempo.

Much of the sustainment of legacy weapons platforms and components hinges on the supply chain capacity within the DOD industrial base. The constraints on obtaining critical delivery system components will limit the sustainment and modernization POR going forward. In the sea leg, the *Ohio*-class was originally planned to retire after 30 years of service, but will be serviced longer in anticipation of the *Columbia*-class submarines that replace them. The Navy has identified parts obsolescence as a significant problem. As the industrial base to manufacture these parts no longer exists, there is no supply chain to restart.²⁵⁰ Specific examples are the many electrical and mechanical components for the Trident D5 systems that were designed in the 1980s. Similarly, sustainment of Air Force legacy platforms, like the B-2 Spirit, also suffers from the problem of vanishing vendors.

Within the DOD, NC3 is currently facing similar challenges to the legacy weapons systems, as some sub-system technology is nearing or at end of life. Sustaining and replacing this technology is becoming less supportable due to both obsolescence and supply chain challenges. A programmatic risk area in the NC3 supply chain stems from the over-consolidation of components with the vendor; disruptions in the supply chain may complicate keeping some capabilities fully operational. Sustainment experts seek a better understanding of the scope of this problem as well as effective mitigating steps. Currently, the NC3 Enterprise Capability Portfolio Manager is focused on the modernization of NC3 systems and acceleration of the transition to new capabilities.²⁵¹

DOE/NNSA's production capacity also depends on the availability of parts, including those supplied by external vendors. With the anticipated doubling of post-Cold War production rates to support the B61-12 LEP and W88 modification, the need for nuclear and non-nuclear components has increased. DOE/NNSA's KCNSC, which manufactures and procures the majority of the non-nuclear parts, procures approximately 65 percent of parts from an external supply chain. When there are disruptions in the vendor supply chain, production delays permeate through the enterprise.²⁵²

WORKFORCE

Recruiting, training, and retaining the workforce needed to both sustain the current nuclear force and transition to modern weapon systems is a growing challenge. Within the DOD industrial base parallel programs for recapitalization and sustainment of systems and components will stress the enterprise's workforce and therefore, the POR's schedule at large. Currently, recruitment in STEM fields and technical areas is highly competitive throughout industry. A major recruiting challenge for the technical workforce, as well as for civil service and military personnel, is security clearance requirements. The Air Force, for example, has a clearance backlog for missile crew members and maintenance personnel of up to two years. Interim clearances can sometimes mitigate this, but Personnel Reliability Program requirements make it difficult to interact with the weapon systems before clearances come through. This challenge is often exacerbated for civilian positions.²⁵³

Retention challenges also plague both DOD and DOE/NNSA sides of the enterprise, as many experienced personnel leave the DOD and DOE/NNSA industrial bases for higher paying, or otherwise more attractive non-defense industries. Specifically, in the DOD, there is a significant portion of the skilled labor and technical workforce retiring without a sufficient replenishment of expertise from the younger generations. For the workforce with mid-level experience or senior experience, this loss of knowledge and personnel increases the pressure on the remaining workforce to accomplish the mission and train the incoming workforce. For example, the DSLE missile went through assessment last in the 1980s and currently there is very little practice and experience that help “develop the judgment” of new scientists working on these assessments.²⁵⁴ In the case of DOE/NNSA, the lack of new and innovative scientific and engineering opportunities, such as allowing experts to begin studying new nuclear weapon design from “a blank sheet of paper,” limited the possible hiring and retention of the technical workforce.



“Radiological Control Technicians simulate work processes in a glove box training facility.” © Copyright Triad National Security, LLC²⁵⁵

There is also a crucial knowledge management and knowledge transfer capacity that is not often addressed in both the DOD and DOE/NNSA industrial bases. For example, the methodology for tritium extraction was developed in the 1990s, and only a select few experts remain in the enterprise. Similar workforce challenges exist across the entire DOD and DOE/NNSA enterprise. Within the DOD, the enterprise must address a way to transition the current workforce to new subject matter expertise as weapon systems age out and manufacturing and testing practices evolve. The retirement of platforms like the B-2 will require the repositioning and retraining of experts (e.g., maintainers) in the industrial base.

The DOE/NNSA has similar issues with workforce capacity; pit production is a prime example of this challenge. In a 2019 independent study, the following were cited as some of the issues challenging the pit production workforce.²⁵⁶

- **Hiring and Onboarding:** The long pipeline of recruiting, training, and the security clearance process puts strain on planned the pit production timelines.
- **Attrition:** Due to the lengthy recruitment and training timelines, the NNSA must consider projected retention challenges and anticipate a need for surge in the workforce up to five years in advance.
- **Knowledge Transfer:** The effects of attrition and the need to ramp up the workforce to meet the production needs of the near future increases the need to preserve and transfer knowledge of the weapons production enterprise so manufacturing can occur at scale.

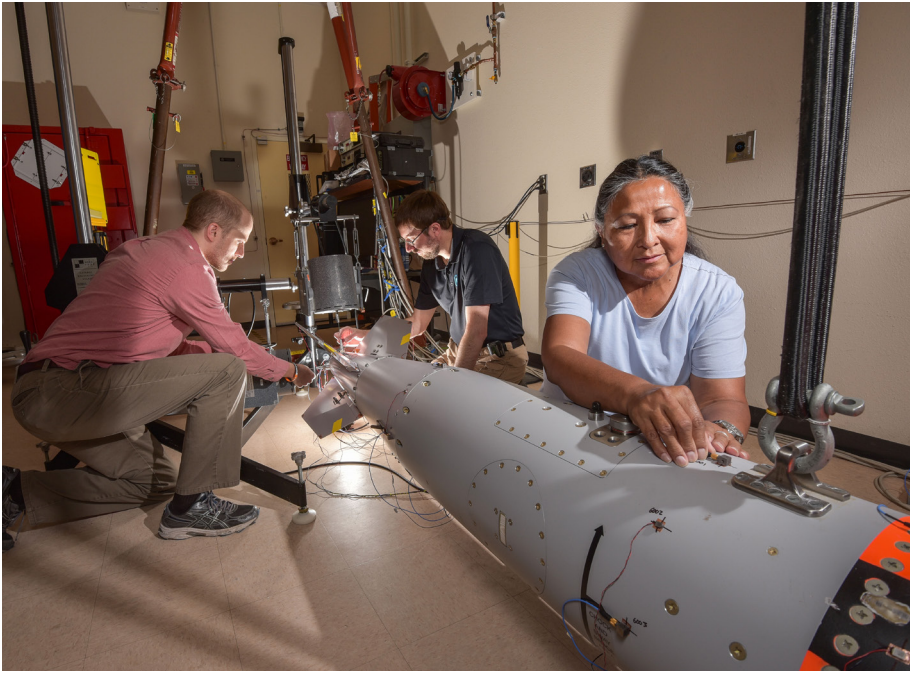
Similar workforce challenges exist across the DOE/NNSA weapons production complex and require significant advance planning to develop the expertise needed in the future. DOE/NNSA's national security laboratories and production plants have begun to mitigate some of these challenges by collaborating with local technical schools and universities to develop specialty educational programs in these fields as a way to interest and recruit students.

MITIGATIONS ACROSS THE ENTERPRISE

Challenges across the DOD and DOE/NNSA industrial base introduce risk to the POR schedules as well as any needed expansion beyond the POR to address the two-nuclear-peer threat.

In an effort to mitigate this, DOD is focusing on “process improvements, new tools/technology, and manpower” in order to position the Nuclear Enterprise for success. Both DOD and DOE/NNSA are committed to developing the workforce and knowledge preservation.²⁵⁷ DOE/NNSA also believes that sufficient resources for the Stockpile Responsiveness Program and Stockpile Research, Technology, and Engineering as well as for infrastructure modernization—needed for a responsive and flexible weapons complex—are required to recruit and retain the future workforce. In DOD, specific tools like the Nuclear Mission Assessment effort uses data analysis to understand challenges in the Air Force enterprise such as maintenance issues. The Air Force has also implemented the Nuclear Weapon System Enterprise Review to understand and provide an assessment of overall performance.²⁵⁸

Leaders in the enterprise argue that many of these capacity challenges need an “enterprise-level, multi-faceted approach” to support the industrial base needed for the POR and future capabilities. DOD’s Nuclear Deputy Secretary’s Management Action Group process has been designed to increase collaboration between the two departments. In addition, key leadership, organizational, and process actions in DOD, DOE, and Congress are needed to increase focus and elevate the visibility of critical enterprise-wide challenges. The most recent initiative to address DOE/NNSA organization and management challenges is DOE/NNSA’s Enhanced Mission Delivery Initiative, an effort that will require continued follow-through. Moreover, leadership focus – starting at the Cabinet Secretary-level down to the leaders of each component organization – will be required to ensure priority is given to the resources and competencies required to build and sustain the capacity that meets the needs of the nation’s new strategic posture.



"Workers at Sandia National Laboratories (SNL) prepare the B61-12 nuclear bomb for a vibration test." © 2023 National Technology and Engineering Solutions of Sandia, LLC²⁵⁹

RECOMMENDATIONS

The Commission recommends the DOD and DOE/NNSA urgently expand strategic infrastructure to ensure sufficient capacity to:

- ▶ Meet the capability and schedule requirements of the current nuclear modernization POR and the requirements of the force posture modifications recommended by the Commission in time to address the two-peer threat;
- ▶ Provide an effective hedge against four forms of risk: technical failure of a warhead or delivery system, programmatic delays, operational loss of delivery systems, and further worsening of the geopolitical environment; and
- ▶ Communicate to U.S. adversaries that the United States has the technical capabilities and political will—paired with all other instruments of national power—necessary to ensure they cannot gain a geopolitical or military advantage through nuclear arms racing.

The Commission recommends this urgent expansion of the capacity of the U.S. nuclear weapons defense industrial base and the DOE/NNSA nuclear security enterprise include the flexibility to respond to emerging requirements in a timely fashion.

In order to support the Commission's recommended strategy, with respect to resourcing, the Commission recommends Congress:

- ▶ Fund an overhaul and expansion of the capacity of the U.S. nuclear weapons defense industrial base and the DOE/NNSA nuclear security enterprise;

- ▶ Fund NNSA's recapitalization efforts, including weapons science, design and production infrastructure.²⁶⁰ In order to support these appropriations, NNSA should deliver to Congress a long-term prioritized recapitalization plan that highlights the roles played by each facility, the highest risk factors at each facility, actions already taken to mitigate those risks, and opportunities for additional risk mitigation;
- ▶ Forge and sustain bipartisan consensus and year-to-year funding stability to enable defense industry to respond to innovative DOD contracting approaches and invest with more certainty;
- ▶ Pass annual DOD and DOE authorization and appropriation bills on time. No continuing resolutions;
- ▶ Avoid placing artificial caps on defense spending; necessary expansion of DOE/NNSA and DOD infrastructure for strategic capabilities require increases in funding for these fundamental national security priorities;
- ▶ Place purview of all 050 programs (President's Budget line item for "national security") that are in NNSA under Defense appropriations subcommittees (HAC-D, SAC-D); and
- ▶ Work with state governments and private industry to expand the manufacturing and supply base for strategic weapons.

With respect to capacity and effectiveness of the nation's infrastructure and supply chain for its strategic capabilities, the Commission recommends:²⁶¹

- ▶ DOE/NNSA plan to increase production capacity beyond current POR, in accord with earlier Recommendations, to meet the needs of the two-peer threat;
- ▶ DOD incentivize private industry bidding on government Request for Proposals (RFPs) by offering multi-year contracts that send a steady demand signal, especially for smaller sustainment-related requirements;
- ▶ DOE/NNSA incentivize private industry bidding on government RFPs for equipment and supplies by offering multi-year contracts that send a steady demand signal;
- ▶ DOD and DOE/NNSA continue to reform acquisition and project management processes to better reward on-time product delivery; and
- ▶ DOD increase shipbuilding capacity, by working with industry to establish or renovate a third shipyard dedicated to production of nuclear-powered vessels, with particular emphasis on nuclear-powered submarines.

With respect to workforce, the Commission recommends:

- ▶ Cabinet Secretaries, working with states and union leaders, establish and increase the technical education and vocational training programs required to create the nation's necessary skilled-trades workforce for the nuclear enterprise;
- ▶ Leaders in DOD and DOE/NNSA establish a workplace culture in the nuclear security enterprise that reinforces the strategic importance of such work; grows effective leaders, including mid-tier leaders; adjusts to new workplace expectations; rewards experimentation; recognizes failure as part of the development process; and delegates responsibility to those program experts at the lowest level who are most knowledgeable of that program's characteristics; and
- ▶ DOD and DOE/NNSA expand use of innovative contracting methods, including offering higher pay scales for high-priority projects in order to better attract and retain skilled personnel.

America's Strategic Posture

With respect to organization and governance, the Commission recommends:

- ▶ Secretary of Defense and Secretary of Energy establish the nuclear deterrence mission as the #1 priority in their Departments' processes, to help eliminate the gap between statements of priority and actual results;
- ▶ Secretary of Energy protect and reinforce NNSA's independent role as steward of the nuclear warhead stockpile and its semi-autonomous operating model;
- ▶ Congress elevate the Under Secretary for Nuclear Security/NNSA Administrator position in DOE to Deputy Secretary for Nuclear Security;
- ▶ The Senate Armed Services Committee invite the nominee for Secretary of Energy to appear before the committee in advance of confirmation; and
- ▶ The NWC expand its enterprise-wide approach in order to effectively synchronize the plans and programs of DOD and DOE/NNSA in the midst of multi-faceted challenges.

NON-NUCLEAR CAPABILITIES

FINDINGS

China, Russia, North Korea, and Iran continue to increase their regional and intercontinental missile capabilities. Missile threats to the U.S. homeland, U.S. Allies and partners, and U.S. forces overseas are growing both quantitatively and qualitatively.

Homeland and regional missile defense systems constitute a critical component of U.S. efforts to deter, and if necessary, defeat missile attacks by states such as North Korea and Iran, while enhancing U.S. freedom of action to conduct regional military operations. IAMD can limit or prevent damage from an adversary's offensive missile strikes, and thus contribute to the U.S. ability to deter, respond to, and stabilize crisis or conflict.

IAMD capabilities play an important role in U.S. strategy by serving as a “deterrence by denial” component of the broader deterrence framework. IAMD adds resilience to U.S. defense strategy; complicates adversary decision-making by creating uncertainty about the success of offensive missile use; reduces incentives to conduct coercive²⁶² attacks by increasing the size of the attack required to, potentially, be effective; assures Allies and partners that the United States will not be deterred from fulfilling its global security commitments; and in crisis or conflict, offers a military option that may be less escalatory than offensive strikes.²⁶³

Given Russia's and China's technical capabilities and financial resources, the United States has not built an impenetrable missile defense “shield” over the entire U.S. homeland. However, it does not need to for U.S. missile defenses to provide critical defense capabilities that contribute to deterrence.

Given the threat picture for 2027–2035, the currently planned U.S. homeland IAMD capability does not adequately defend against coercive attacks from China and Russia. Such attacks are potentially designed to dissuade and deter the United States from defending or supporting its Allies and partners in a regional conflict; keep the United States from participating in any confrontation; and divide U.S. alliances. To defend against a coercive attack from China or Russia, while staying ahead of the North Korean threat, the United States will require additional IAMD capabilities beyond the current POR.

U.S. Northern Command (USNORTHCOM) needs improved warning and defensive capabilities to protect critical U.S. infrastructure from conventional or nuclear attack from air- and sea-launched cruise missiles—systems that ground-based interceptors (GBIs) are not designed to counter. In addition, Commander of U.S. Northern Command (CDRUSNORTHCOM) has limited authority to detect and defeat such missiles inside U.S. airspace.²⁶⁴

Strategic investments in research, development, test and engineering of advanced sensor architectures, interceptors, cruise and hypersonic missile defenses, and area or point defenses are urgently needed. If proven feasible,²⁶⁵ these capabilities would enhance deterrence and provide a significant measure of protection for the homeland to help address coercive nuclear or conventional strikes.

The space domain provides critical capabilities for strategic posture such as protected, resilient communications; positioning, navigation, and timing; ISR; and global, persistent missile warning and attack assessment.

America's Strategic Posture

Space situational awareness (SSA) is and will continue to be indispensable to U.S. and allied space and terrestrial missions. SSA enables both defensive and offensive counterspace operations necessary to conduct effective terrestrial military operations.

Space is now a fully contested domain; Russia and China have fielded counterspace capabilities that make it a warfighting domain. An integrated approach to deterring adversary aggression in space is essential to protect U.S. and allied space capabilities, especially for adversaries who believe they can achieve asymmetric benefits from denying or eliminating space assets.

Survivability and durability of essential U.S. and allied space capabilities must be ensured through active defense, passive defense, and U.S. terrestrial strike and offensive counterspace capabilities. Essential U.S. space capabilities constitute critical infrastructure that merits an explicit threat of response to enhance deterrence of adversary strategic attack.

Of note, U.S. missile defense benefits greatly from space-based sensors; its mission and other national security missions stand to gain even more from increasingly capable space-based networks, including the growing cost-effective commercial capabilities.

Existing U.S. and allied general purpose forces' long-range non-nuclear precision strike capabilities are inadequate. Current programs are not pacing the threat.

Current plans to modernize and expand the nation's global mobility capabilities, especially its fleet of air refueling tankers, are inadequate for a simultaneous two-war construct.

Effective cyber defense requires a whole-of-government approach, as the Department of Defense has neither the mission nor the necessary authorities to defend civilian critical infrastructure.

It is essential to incorporate cyber capabilities into strategic and theater campaign plans and the deliberate planning process of the Combatant Commands.

Securing U.S. sensitive data will require working collaboratively with the defense industrial base.

Cyber security programs for, and active cyber defense of, the nation's strategic systems play a major role in ensuring the reliability and effectiveness of the U.S. nuclear deterrent force.

Despite frequent use of economic sanctions, the U.S. government does not have a well-understood concept nor a synchronized playbook for employing financial and economic measures to bolster U.S. efforts to deter adversary aggression. Such measures include the imposition of sanctions, trade and investment restrictions, and export controls, and depend on coordinated action within the interagency.

An important national goal is avoiding strategic surprise. The Commission is concerned that emerging technologies could result in military capabilities that would rapidly and surprisingly shift the military balance between the United States and its Allies and potential adversaries. In addition, these technologies increase the number of pathways by which new threats as well as misperceptions and miscalculations can emerge.

Emerging technologies may significantly benefit U.S. security and strengthen U.S. defense capabilities. Some applications, for instance, could improve information flow and crisis management and potentially reduce the risk of miscalculation.

U.S. advances in AI, quantum computing, additive manufacturing, ubiquitous sensing, big data analytics, and directed energy offer potential benefits to U.S. strategic posture, especially if streamlined, rapid acquisition methods are employed.

Current procurement processes are generally slow and ill-suited to adequately integrate new capabilities. Funding and bureaucratic obstacles remain impediments to rapidly using commercial capabilities. Effectively leveraging U.S. and allied innovation requires a cultural and bureaucratic shift.

ROLE OF NON-NUCLEAR CAPABILITIES

In accord with its remit, the Commission's examination and assessment focused on America's strategic capabilities—its nuclear deterrent, and its non-nuclear capabilities that produce or enable strategic effect. As introduced in the Strategic Posture chapter, the Commission concluded that the nation's most appropriate strategic posture for the 2027-2035 threat landscape must include an integrated blend of non-nuclear capabilities. Beginning with conventional forces, this chapter briefly outlines the U.S. non-nuclear capabilities essential to strategic stability in a two-peer threat environment for which the United States must now plan.

CONVENTIONAL FORCES

As recommended in the Strategy chapter, the U.S. strategy necessary to address the two-peer threat must have as a fundamental objective the need to effectively deter and defeat simultaneous Chinese and Russian aggression in Asia and Europe using conventional forces. The Commission heard significant concerns from regional Combatant Commanders regarding the capabilities and positioning of their conventional forces. In short, shifting to a necessary two-war construct requires increases in the size, type, and posture of U.S. and allied conventional forces. In the absence of such increases, the United States will likely have to increase its reliance on its nuclear deterrent.

Moreover, the different capabilities of China and Russia and the very different operating environments of the Asian and European theaters drive the need for different sets of conventional capabilities. On the one hand, effective operations in the European theater require a conventional force capable of operating in a well-understood NATO construct characterized by a land- and air-centric environment; on the other hand, effective operations in the Indo-Pacific theater require a force capable of operating in a less-standardized allied and partner construct and a distinctly maritime- and air-centric environment. Relatedly, the two theaters possess inherent challenges related to operational reach, basing, infrastructure, host nation support, logistics, and command and control that are dramatically different.

Though increasing the size, type, and posture of U.S. and allied conventional forces in two different theaters is costly and complex, it is fundamental to preventing regional conflict that may escalate to nuclear use.

INTEGRATED AIR AND MISSILE DEFENSE (IAMD)

As stated in the 2022 Missile Defense Review (MDR), “missile-related threats have rapidly expanded in quantity, diversity and sophistication. U.S. national security interests are increasingly at risk from wide-ranging missile arsenals that include offensive ballistic, cruise, and hypersonic weapons.”²⁶⁶ The global proliferation and advancement of missile technology have lowered the technical and financial barriers for adversaries to strike the United States and its Allies and partners.²⁶⁷ “Adversaries are developing, fielding, and integrating more advanced air

and missile capabilities into their strategies in order to favorably shape the course of a potential crisis or conflict. These air and missile capabilities pose an expanding and accelerating risk to the U.S. homeland, U.S. forces abroad, and U.S. Allies and partners.²⁶⁸

North Korea is aggressively expanding its missile program, conducting multiple ballistic missile test launches in 2022.²⁶⁹ Staying ahead of the North Korean missile threat to the homeland is a longstanding policy goal, to be pursued through “a comprehensive missile defeat approach.” As stated in the MDR, “for states like North Korea, missile defenses and the U.S. nuclear arsenal are complementary and mutually reinforcing, as both capabilities contribute to deterring an attack against the United States and our Allies and partners.”²⁷⁰ The MDR goes on to state, “the United States will leverage and improve its full spectrum of missile defeat capacity, complemented by the credible threat of direct cost imposition through nuclear and non-nuclear means to counter North Korean threats to the homeland.”²⁷¹

Chinese and Russian investments in nuclear and non-nuclear strike capabilities provide these adversaries the ability to threaten critical U.S. assets and deter or disrupt U.S. power projection from the homeland, as well as threaten U.S. Allies and partners in the Indo-Pacific and European regions. China's and Russia's strike systems will give them capabilities that will allow them to successfully threaten the U.S. homeland below the nuclear threshold. Such a perception on their part, unless directly addressed, raises the risk of deterrence failure.

The Commission believes that the role of missile defenses in the U.S. deterrence framework is to reduce the adversary's perception that an offensive missile strike will be effective. In particular, this effect must be achieved in order to deter and, if necessary, defend against coercive strikes from an adversary. A “coercive” attack consists of limited conventional or nuclear strikes intended to convince U.S. leadership that the costs of intervening or persevering in a conflict involving the attacker are too high. If an adversary perceives that the United States would not or could not continue to fight after executing such a strike, that strike is incentivized. Such coercive attacks are bounded in scale to avoid eliciting a severe U.S. response. The coercive effect of the attack is based on the threat that additional attacks will follow if the United States refuses to be coerced. As will be discussed, the Commission believes this analysis applies to China and Russia as well as rogue states.

In the event missile defenses do not deter states such as North Korea, the United States reserves the right to rely upon its strategic forces to deter all forms of strategic conflict, as indicated in the 2022 MDR. As described earlier, China and Russia have also been advancing their missile technologies. U.S. missile defense policy has precluded defenses designed to counter strategic missile attacks from China and Russia, based on technical feasibility, cost, and strategic stability grounds.

Instead, the United States relies on its nuclear arsenal to deter such an attack, while reserving the “right to defend itself against attacks from any source.”²⁷² As stated in the 2022 MDR, “the United States will continue to rely on strategic deterrence . . . to address and deter large intercontinental range, nuclear missile threats to the homeland.” The Commission notes that U.S. missile defense policy provides for defense capabilities to be used against an unauthorized or accidental missile launch from either Russia or China.

China and Russia continue to develop systems capable of defeating or evading not only existing U.S. missile defense capabilities but also planned future missile defense systems. These adversary systems are precisely the kinds of capabilities that are desirable for coercive strikes.

Current U.S. missile defenses include GBIs in Alaska and California for national missile defense, as well as several theater, area, and point defense systems, such as Terminal High Altitude Area Defense (THAAD), Patriot, Aegis (sea-based) and Aegis Ashore.²⁷³ The 2022 MDR states that new interceptors, designated the NGIs, will augment and possibly replace GBIs.

Further, Section 1654 of the FY23 NDAA calls for the Director of the MDA to submit a report to Congress outlining the funding profile necessary, by fiscal year, to acquire no fewer than 64 operational NGIs. The NGIs are designed to improve the effectiveness and efficiency of the Ground-based Mid-course intercept system. The MDA operates and sustains a variety of missile defense capabilities, functions typically performed by a Service component. The Commission notes that, in light of the need to advance missile defense capabilities, the MDA is more appropriately equipped to focus on research and development of missile defense technologies than on operations and sustainment of existing systems.

Homeland defense traditionally focused on the intercontinental ballistic missile threat. However, U.S. adversaries' naval and aerospace capabilities are increasing, and modern missile ranges mean adversaries do not need to navigate near U.S. shores to pose a direct threat to the homeland. CDRUSNORTHCOM has stated that detecting and defending against cruise missile and other adversary standoff capabilities represents a major gap for the command, in addition to lacking required situational awareness tools.²⁷⁴

In sum, in order to defend critical homeland infrastructure, deployed forces, and allied states against future threats, significant improvements to U.S. IAMD defense will be required. As missile threats continue to grow and become more sophisticated, the United States must leverage its technical capabilities, including new technologies and potential commercial applications, to stay ahead of the threat. The Commission believes the DOD must look at new approaches to achieving U.S. missile defense goals, including the use of space-based and directed energy capabilities, as simply scaling up current programs is not likely to be effective.

ENSURING U.S. ACCESS TO SPACE IN CONFLICT²⁷⁵

In the words of Commander of U.S. Space Command (CDRUSSPACECOM), "Space is fundamental to all joint military operations as outlined in the National Defense Strategy. It is also critical to our way of life enabling modern banking transactions, navigation, communication and so many other capabilities vital to our society and economy. Space touches our lives every day."²⁷⁶ In addition, "the Joint Force relies on space-based capabilities to project and employ power."²⁷⁷ U.S. Space Command operates critical U.S. sensors²⁷⁸ that enable national warning, support decision-making, and provide essential information to facilitate employment of defensive and offensive strategic capabilities.

So great is the opportunity the space domain provides, that the nations of the world once came together to declare that space would belong to no nation. Rather, it would be the "province of all mankind."²⁷⁹ Unfortunately, as CDRUSSPACECOM has pointed out, "China and Russia consider [our] dependency [on space to be] a soft underbelly and seek to exploit it. They intend to limit our access to space during crisis and conflict, and they are fielding capabilities to that effect."²⁸⁰ China views space as an opportunity to advance its own global standing, and has launched many space-based ISR assets. China is also developing and deploying counterspace capabilities, including ground-based anti-satellite missiles, lasers, and orbiting space robots. Russia is also adding to its considerable space-based ISR infrastructure and is developing similar counterspace capabilities.

NON-NUCLEAR LONG-RANGE PRECISION STRIKE

Advances in conventional long-range strike capabilities are changing the nature of modern warfare. According to Michael Griffin, former Under Secretary of Defense for Research and Engineering, the “growing gap between U.S. and Chinese hypersonic weapons can create instability, because without its own hypersonic weapons, the only response the United States would have if ‘the Chinese started throwing hypersonic missiles at American bases in the Pacific and sinking carrier strike groups’ would be ‘to let them have their way or go nuclear.’”²⁸¹

In testimony before Congress in 2021, Griffin noted, “we, today, do not have systems which can hold them [China] at risk in a corresponding manner, and we don’t have defenses against those systems.”²⁸² A prompt global strike capability would obviate the type of deterrent scenario described above by Mr. Griffin, and potentially thereby reduce the role of nuclear weapons. Both the DOD and Congress have acknowledged the need for a prompt global strike capability and efforts are underway in DOD, for offensive and defensive purposes, but the pace of those efforts lags the need.²⁸³

Both Russian and Chinese theories of victory rely in part on the use of long-range non-nuclear precision strike capabilities to deter, disrupt, and delay U.S. force projection forward into the European and the Indo-Pacific theaters, and to destroy critical infrastructure and force elements on the territory of U.S. Allies and partners. These Russian and Chinese A2/AD capabilities are dependent on a network of sensors, data fusion centers, and weapons platforms located on their national territories. Therefore, long-range strike capabilities are critical for regional conflict, particularly with China, and must be integrated alongside other capabilities to deter regional aggression and, in the event deterrence fails, prevail in conflict.²⁸⁴ This was emphasized by both the Secretary of the Navy and the Chief of Naval Operations in testimony before the House Armed Services Committee, where they characterized the conventional missile gap between the United States and China with grave concern.²⁸⁵



A KC-135R Stratotanker²⁸⁶

GLOBAL MOBILITY

As outlined in previous chapters, the realities of a new strategic setting consisting of two nuclear peer adversaries drive significant demands on the U.S. strategic posture. In particular, the need to simultaneously deter aggression by two peers in two different AORs places a premium on the U.S. ability to deploy and sustain forward forces over long distances. This challenge is made more severe as a result of China's and Russia's A2/AD capabilities. Credible conventional and nuclear capabilities to deter and, if necessary defeat aggression in two theaters simultaneously, rely heavily on air and sealift capabilities.

The ability to flow conventional forces and their logistical support forward to two far-flung areas of operations must now be complemented by the ability to deploy and air refuel nuclear-capable forces to deter adversary temptation to escalate a regional conflict. Although the United States is unsurpassed in global mobility, its airlift, sealift, and air refueling capabilities are insufficient for such a scenario within the 2027-2035 timeframe. For example, the ability to rapidly project airpower in two theaters with conventional long-range strike assets and flexible dual-capable bombers will depend on a substantial number of tanker aircraft, which could impose operational constraints.

STRATEGIC CYBER OPERATIONS

Chinese and Russian cyber operations pose strategic threats to the United States and its Allies and partners in peacetime and in war.^{287,288} China has exfiltrated sensitive information from both public and private institutions, while Russia has used information campaigns to challenge the democratic process.²⁸⁹ In 2018, U.S. adversaries were actively using "cyber-enabled campaigns to erode U.S. military advantages, threaten our infrastructure, and reduce our economic prosperity."²⁹⁰ Today, according to the 2023 National Cybersecurity Strategy, "every day, cyber defenders foil state-backed attacks and prevent criminal plots around the world."²⁹¹ The Threat chapter and the classified Threat Annex describe the seriousness of these threats.

The Commission supports the multiple efforts outlined in the 2023 Cybersecurity Strategy to integrate whole-of-government mission centers in the name of civil defense. For example, the creation of the DOD's Defense Industrial Base Collaborative Information Sharing Environment "provide[s] opportunities to enable timely, actionable, and relevant information sharing directly with private sector partners in their respective sectors."²⁹²

In addition, the Commission fully supports the efforts to "clarify how U.S. Cyber Command and other DOD components will integrate cyberspace operations into their efforts to defend against state and non-state actors capable of posing strategic-level threats to U.S. interests, while continuing to strengthen their integration and coordination of operations with civilian law enforcement and intelligence partners to disrupt malicious activity at scale."²⁹³

An immediate corollary to the criticality of cyber defense across the civil, defense, and defense industrial base spaces is the absolute necessity for a robust cyber defense of the nation's strategic systems.

ELECTROMAGNETIC SPECTRUM OPERATIONS

In light of the potential for conflict with adversaries who have sophisticated EW capabilities in their conventional, nuclear, and dual-use forces, U.S. management of the electromagnetic spectrum (EMS) is critical to enabling U.S. and allied forces to properly employ nuclear deterrence operations, prosecute conventional warfighting, and protect the homeland. In 2020, the White House and DOD announced the America's Mid-Band Initiative Team to make spectrum from 3450-3550 MHz available for sharing.²⁹⁴ This agreement promised the spectrum would continue to be available for defense missions as well as available for use by the private sector in the continental United States.

It is essential that this partnership continue to mature through effective sharing methods including modified concepts of operations. Other proposals under consideration could allow U.S. commercial entities access to a larger portion of the EMS, such as the 3.1-3.45 MHz band, where the impacts have not been fully assessed. This creates the potential of undermining the efficacy of U.S. defensive and offensive capabilities.²⁹⁵ In particular, auctioning the 3.1-3.45GHz band risks impacting "various types of shipborne, land-based, and aeronautical mobile radar systems [used] for national defense purposes."^{296,297} As highlighted by the DOD Chief Information Officer, "We have many radars [in the 3.1-3.45 GHz segment] . . . that are critical for our service members to train on before they deploy into harm's way overseas, and also to protect our homeland . . . it would take us two decades and hundreds of billions of dollars to be able to refactor and move those radars out of there."²⁹⁸

As discussed in the Threat chapter, China and Russia have developed advanced EW capabilities that threaten the effectiveness of U.S. and allied deterrent and warfighting capabilities. Moreover, "adversaries have perceived that the department's reliance on the [electromagnetic spectrum] makes its operations vulnerable."²⁹⁹ The United States has recently rejuvenated emphasis on its own EW capabilities, as demonstrated by Secretary Austin signing the Electromagnetic Spectrum Superiority Strategy's Implementation Plan (EMSSS I-Plan).³⁰⁰ However, current DOD efforts to advance Electromagnetic Spectrum Operations (EMSO), including execution of the EMSSS I-Plan, may lag the need in the 2027-2035 timeframe.³⁰¹ Every aspect of Command and Control and the Find-Fix-Track-Target-Engage-Assess kill chain requires U.S. forces to be prepared with both defensive and offensive EMSO capabilities, which make them an essential part of the U.S. strategic posture.

FINANCIAL AND ECONOMIC STATECRAFT

All instruments of national power must be included in the U.S. strategic posture and its strategic deterrence capabilities, including economic and financial tools. The United States possesses the world's largest economy and the dollar remains the dominant reserve currency for Central Banks around the globe. Vis-à-vis adversarial nations, U.S. financial strength provides leverage to deter or to induce a change in behavior. Integrating economic and financial tools, such as sanctions, investment restrictions, and export controls, with the other tools of national power is essential in order to bolster the U.S. strategic posture and its deterrent capability to address the two-peer threat environment.

EMERGING TECHNOLOGIES AND INNOVATION

U.S. success on the strategic landscape depends upon success in effectively transitioning new applied technologies to the warfighter. Such success depends on an efficient cycle of conducting basic research, testing, prototyping, and fielding. The Commission believes there is no substitute for U.S. technological leadership. Moreover, the United States is uniquely positioned to leverage emerging technologies as a key tool to enhance strategic deterrence. Losing the race to employ emerging technologies will erode the U.S. strategic posture, threaten U.S. national interests, and incur unknowable but serious risks to strategic stability. Furthermore, failing to apply emerging technologies increases the risk of strategic surprise, where an adversary could gain a military capability that the United States cannot match or counter or that may have negative strategic effects well before military conflict. An example of an adversary leveraging technology advances for strategic advantage is the harvesting of DNA information during the COVID-19 pandemic.³⁰²

As documented in the Threat chapter and the classified Threat Annex, U.S. adversaries are exploiting emerging technologies. China and Russia are using their considerable intellectual and technical capacity to incorporate new technologies into their militaries and other instruments of national power and using these new technologies to pursue their objective to establish a new international order. For the United States to maintain global technological leadership, it will require extraordinary national focus and unprecedented partnerships between government, academia, and private industry, as well as nimble acquisition processes in order to close the current gap between technology development and fielded strategic capability.

Specifically, the Commission cites advances in AI, quantum computing, additive manufacturing, ubiquitous sensing, big data analytics, and directed energy as being particularly ripe for transition into crucial capabilities with potential benefits to enhance U.S. strategic posture. For example, technologies that enable change detection and pattern recognition could provide decision-makers higher-fidelity information quickly, and reduce the risk of surprise or miscalculation. Another example is to leverage advanced manufacturing to launch small satellites that, when in orbit, could complement existing capabilities and provide a more agile, resilient space architecture at potentially lower cost. Exploring and applying these and other technologies, such as AI, for strategic purposes must be carefully managed within ethical and operational boundaries and include deliberate incorporation of human decision-making.

In order to prevent strategic surprise and fully leverage emerging technologies, the United States must foster a culture and economy of innovation both at home and among Allies and partners. To wit, the National Security Commission on AI stated that, "The principles we establish, the federal investments we make, the national security applications we field, the organizations we redesign, the partnerships we forge, the coalitions we build, and the talent we cultivate will set America's strategic course. The United States should invest what it takes to maintain its innovation leadership."³⁰³ Creating a culture and economy of innovation means creating an environment where the integration of new technologies and ideas is encouraged and financed.

Many promising technology development initiatives are created, developed, and applied outside of government. To facilitate technology development and transition, DOD initiatives to better partner and contract with innovative emerging technology companies will need to be significantly expanded and accelerated for use in time to have impact on the 2027-2035 strategic landscape. Indeed, the National Security Commission on AI found that “bureaucracy is thwarting better partnerships with the AI leaders in the private sector that could help. The government must become a better customer and a better partner.” The Commission supports the work of the Planning, Programming, Budgeting and Execution Commission to reform budget processes and identify alternate pathways to effectively and more rapidly leverage commercial innovation for defense. Beyond military applications, the incorporation of some of these technologies across the diplomatic, informational, and economic tools also carry potential strategic benefits.

The Commission notes the DOD has established initiatives to more rapidly develop and deploy new systems, and to overcome the funding and acquisition challenges that comprise the “valley of death,” where many promising technologies are not scaled up and effectively applied to national security missions. Examples of models for rapid acquisition and leveraging commercial technologies include the Defense Innovation Unit, the Space Development Agency, AFWERX and SpaceWERX.

Nevertheless, effectively leveraging U.S. and allied innovation requires both a cultural and bureaucratic shift in order to overcome legacy approaches not suited to leveraging new technologies. As Eric Schmidt warns, “The United States must innovate in peacetime, faster than ever before. By failing to do so, it is eroding its ability to deter and, if necessary, to fight and win the next war.”³⁰⁴

RECOMMENDATIONS

The Commission recommends DOD develop, acquire, and deploy the Next Generation Interceptors as soon as possible.

The Commission recommends the Director of MDA, in conjunction with CDRUSNORTHCOM and CDRUSSTRATCOM, determine the required effectiveness criteria and number of additional GBIs/NGIs that will be needed overall to stay ahead of the North Korean threat. In addition, they should assess the feasibility to counter coercive attacks from cruise, hypersonic, and ballistic missiles from any adversary.

The United States should develop and field homeland IAMD capabilities that can deter and defeat coercive attacks by Russia and China. To this end, the Commission recommends the Chairman of the Joint Chiefs of Staff, in conjunction with the CDRUSNORTHCOM, identify existing or new sensor and interceptor capabilities necessary to defend critical infrastructure assets. The Secretary of Defense should ensure adequate funding is incorporated in the Service and Agency budgets to fulfill these requirements. Congress should appropriate the funds necessary for the sensors and interceptors necessary to defend these assets.

The Commission recommends the Secretary of Defense and the Chairman of the Joint Chiefs of Staff, in conjunction with relevant Combatant Commanders, review and determine what additional IAMD requirements exist in geographic areas of responsibility and identify existing or new capabilities, including capabilities that could be provided by Allies and partners, that could provide this necessary defense. The Secretary of Defense should ensure adequate funding is incorporated in the Service and Agency budgets to fulfill these requirements.

The Secretary of Defense should direct research, development, test and evaluation into advanced IAMD capabilities, leveraging all domains, including land, sea, air, and space. These activities should focus on sensor architectures,³⁰⁵ integrated command and control, interceptors, cruise and hypersonic missile defenses, and area or point defenses. If any of these capabilities prove feasible, the Department should pursue deployment with urgency.³⁰⁶

In order to achieve advanced, potentially game-changing missile defense/defeat capabilities, the Commission recommends Congress promptly and consistently fund significant additional new investments in the defense industrial base, cooperation with the private sector, and expansion of the technical talent pipeline in order to conduct foundational research and development, explore the application of emerging technologies, and develop advanced IAMD systems.

The Commission recommends that the Secretary of Defense and the Military Departments transfer operations and sustainment responsibility for missile defense to the appropriate Military Departments by 1 October 2024. This will allow the MDA to focus on research, development, prototyping and testing.

Funding needs to be prioritized and long-range non-nuclear precision strike programs must be accelerated to meet the operational need and in greater quantities than currently planned.

Funding needs to be prioritized and air refueling tanker programs must be accelerated to meet the operational needs of a two-theater conflict.

Department of Defense leaders should increase the focus on and continue to prioritize adaptive cyber defense of strategic delivery platforms, warheads, and NC3 systems.

Congress should not auction for commercial use those portions of the electromagnetic spectrum critical for national security and homeland defense without proper cost-benefit analysis and due diligence by DOD and other federal agencies.

DOD should accelerate and direct further development of advanced EMSO capabilities and the integration of robust EMSO into CCMD deliberate planning.

The Commission recommends the President direct a whole-of-government approach to financial and economic statecraft that analyzes what adversaries value in the economic and financial domain; plans the tailored employment of financial and economic tools in concert with planning for other tools of national power; executes a synchronized use of financial and economic levers as part of the nation's broader deterrence campaign; assesses the effects of financial tools on adversaries; and continues this analysis-planning-execution-assessment cycle until a deterrent effect is achieved.

DOD routinely conducts this type of planning for application of military forces. Therefore, DOD is well positioned to advise and assist the Treasury, State, and Commerce Departments, and others, with the planning processes for the application of financial and economic tools.

The Executive Branch should initiate and Congress should authorize and appropriate a whole-of-government focus—including a strong partnership among academia, industry, and government—to ensure the United States and its Allies remain at the cutting edge of basic and applied research of emerging technologies, such as big data analytics, quantum computing, and AI, in order to avoid strategic surprise and leverage important new tools for national security.

America's Strategic Posture

The Departments of Defense and Energy should further expand processes for streamlined requirements development and rapid and more agile acquisition. This would enable insertion of innovative technologies to accelerate applications of new capabilities and have an impact on the 2027-2035 strategic landscape and beyond. To this end, the Departments of Defense and Energy should establish agile acquisition pathways and set aside specific budget lines and funding to rapidly acquire and leverage innovative commercial technologies for applications to strategic deterrence. The Departments should work with Congress to allow the budget flexibility necessary, while providing transparency and ensuring accountability, to enable rapid acquisition for use of new technologies and concepts.

ALLIES AND PARTNERS

FINDINGS

It is in the U.S. national interest to maintain, strengthen, and when appropriate expand its network of alliances and partnerships. These relationships strengthen American security by deterring aggression regionally before it can reach the U.S. homeland, while also enabling U.S. economic prosperity through access to international markets. Withdrawing from U.S. alliances and partnerships would directly benefit U.S. adversaries, invite aggression that the United States might later have to reverse, and ultimately decrease American security and economic prosperity.

Just as the U.S. benefits from its alliances, Allies rely on the U.S. strategic posture because it forms an integral part of their defense strategy. In some cases, Allies are jointly developing capabilities that benefit mutual defense. The United States uses its strategic posture to support Allies by extending to them deterrence, including nuclear deterrence, against adversaries. The U.S. strategic posture also serves to assure Allies that the United States is a credible security partner. As a result, many Allies perceive no need to develop their own nuclear weapon capabilities, which is in the U.S. national security interest. Any major changes to U.S. strategic posture, policies, or capabilities will, therefore, have great effect on Allies' perceptions and their deterrence and assurance requirements.

Given the geographic distance between the U.S. homeland and its Allies overseas and the long lead time for force projection from the U.S. homeland, Allies stressed the importance of U.S. military forces being available in theater for deterrence and assurance purposes.

Allies perceive that the risk of Russian and Chinese aggression and potential nuclear employment has increased; and thus, U.S. nuclear and conventional capabilities are increasingly important for credible extended deterrence. Allies expressed an aversion to any major change in the current U.S. nuclear declaratory policy of calculated ambiguity.

Additionally, a strong and credible U.S. nuclear arsenal is one of the greatest nonproliferation tools the United States possesses for assuring Allies they do not need to pursue nuclear weapons of their own.

The relationship that exists between NATO, its member states, and the United States is strong, and deserves continuous care. The Commission supports the initiative by NATO leadership to revitalize the Nuclear Planning Group (NPG), increase the operational effectiveness of NATO DCA, and conduct additional exercises with broader participation by Allies.

The United Kingdom and France provide important nuclear forces that contribute to the NATO Alliance. The United Kingdom, in particular, contributes to deterrence and complicates adversary planning with its independent nuclear arsenal.

The Commission supports NATO Allies' commitment to increased investments in their defense capabilities in order to enhance deterrence of Russian aggression.

The special relationship that exists between the United Kingdom and the United States is strong and deserves continuous care.

America's Strategic Posture

As America's oldest ally, France contributes to security in Europe and Asia and remains an important contributor to NATO.

The Australia, United Kingdom, United States (AUKUS) agreement strengthens U.S.-allied bonds by expanding areas of cooperation and enhancing deterrent capability in the Indo-Pacific region.

The Commission supports the Washington Declaration and all ongoing efforts with Japan and South Korea to strengthen extended deterrence consultations.

Allies are increasingly concerned by the actions of Russia and China. Other Allies are equally concerned with the actions of North Korea and Iran. European Allies communicated to the Commission how the security environment has fundamentally changed due to Russia's further invasion of Ukraine, and its use of overt nuclear coercion. Likewise, Allies in Asia communicated to the Commission their increasing concern over China's aggressive foreign policies, economic coercion, and rapidly growing nuclear arsenal.

Some Allies in both Europe and Asia have thus begun to invest more heavily in their own conventional military forces, and seek opportunities to jointly develop capabilities with the United States. Allies repeatedly stressed that the worsening threat environment requires closer and stronger cooperation with the United States because the consequences of deterrence failure are so severe, and for some Allies, existential.

For over two centuries the United States has cultivated and enjoyed a wide range of mutually beneficial and multifaceted alliances and strategic partnerships designed to strengthen U.S. security, advance U.S. national interests, and sustain the international order built with the U.S. Allies and partners.³⁰⁷ After World War II, NATO emerged as the leading political and military alliance. Since 1949, the cooperation and interoperability between NATO nations, their sharing of military hardware and expertise, and their ironclad commitment to Article V³⁰⁸ on collective defense, have enabled a collaborative defense of European security and eased the burden on U.S. forces. Alliances advance U.S. interests both materially – by contributing troops and providing host nation support for U.S. logistics hubs or forward-basing – as well as diplomatically. They further the ability of the free nations of the world to speak and act together in a united front against threats.



F-35A Lightning II³⁰⁹

In the Indo-Pacific, a deepening set of alliances has proven increasingly critical to defending U.S. interests in the region. Australia, Japan, the ROK, the Philippines, and Thailand facilitate, enable, and aid U.S. forces in guaranteeing freedom of the seas, maintaining free and open access to markets, and defending the interests and sovereignty of the United States, its Allies and partners. They do this by providing safe harbor for U.S. ships, by hosting U.S. ground, air, maritime and space forces, and by participating in military exercises to improve interoperability and demonstrate their commitment to the Alliance and security in the region.^{310,311,312} Both European and Asian Allies further benefit from joint development programs such as the F-35 Lightning II, wherein eight nations have cost-sharing agreements with the United States.³¹³

The depth of Indo-Pacific alliances was epitomized in September 2021, when Australia, the United Kingdom and the United States announced AUKUS – “a new security partnership that will promote a free and open Indo-Pacific that is secure and stable.”³¹⁴ Australia is an ally that shares democratic values and has “fought side-by-side [with the U.S.] for more than one hundred years, in every major conflict since World War I, beginning with the Battle of Hamel in 1918.”³¹⁵ The value of such an ally in the Pacific region cannot be overstated. Specifically, the central AUKUS initiative – technical exchange and acquisition of conventionally-armed, nuclear-powered submarines (SSNs) – will give Australia the ability to augment allied regional posture and reach. The agreement also bolsters information sharing and other areas for technological cooperation among the three Allies; the integration born from combining resources and talents will be a key to ensuring the Indo-Pacific remains at peace.

In tandem with military cooperation, allied contributions to U.S. economic statecraft are central to countering adversary belligerence. In response to Russia’s invasion of Ukraine, the United States imposed sanctions in February 2022 that severed connections to Russian financial institutions and sanctioned high-ranking individuals amongst other measures. Simultaneously, the European Union, Australia, Japan, Canada, New Zealand and the United Kingdom levied similar wide-ranging and coordinated sanctions. This multilateral maneuver “served as a force multiplier in restricting more than \$50 billion in key inputs to Russia – impacting far more than

that in Russia's production."³¹⁶ Moreover, on April 6, 2022, the United States, the G7, and the European Union imposed more severe economic measures, including sanctions on Russia's largest financial institution. Such activities demonstrate how U.S. alliances and partnerships can impose excruciating costs and confront regional aggression.

More broadly, commercial ties with U.S. Allies and partners continue to positively impact U.S. economic prosperity and security at home. In 2020, trade in goods and services between the United States and Japan totaled an estimated \$252.2 billion; between the United States and South Korea, \$154.9 billion.³¹⁷ In 2021, the United States exported products and services worth \$75 billion to Japan.³¹⁸ In 2021, U.S. exports to the European Union totaled \$271.6 billion, a 17.5 percent increase from the previous year.³¹⁹ These numbers point to the vitality and dynamism of U.S. economic links with Allies and partners, which has helped to raise living standards for U.S. citizens and those around the world.

In addition, as noted in the 2023 National Security Strategy, "No region impacts the United States more directly than the Western Hemisphere. With \$1.9 trillion in annual trade, shared values and democratic traditions, and familial bonds, nations of the Western Hemisphere, especially in North America, are key contributors to U.S. prosperity and resilience."³²⁰ Ensuring economic and democratic stability in this region will benefit the United States in the long term. With emphasis on the long-term economic partnerships with Canada and Mexico, the United States must also focus on supporting democracies and countering the growing influence of China and Russia in the region through increased attention and cooperation. Similarly, such an effort is needed to focus on the many nations of Africa and the Middle East now being courted by China and Russia.

For U.S. Allies and partners, and the United States itself, deterrence remains the most cost-effective approach to maintain stability. Allies rely on U.S. strategic forces to deter nuclear-armed adversaries. Forward-deployed U.S. forces, coupled with a credible nuclear deterrent, demonstrate that the United States is ready, willing, and able to come to their defense. These assurances and capabilities impact the policies and priorities of those nations who receive U.S. extended deterrence guarantees. For example, many nations have foregone indigenous nuclear weapons programs because of U.S. assurances, underpinned by credible capabilities. These actions demonstrate the confidence Allies and partners place in the United States.

The Commission's engagement with multiple allied representatives featured a clear and consistent message: U.S. presence and commitment are indispensable. Each conversation highlighted the critical importance of U.S. forward-positioning and extended deterrence on allied security planning. Therefore, U.S. extended deterrence must be viewed as credible and the United States perceived as a reliable security partner. In regional defense, because Allies' survival can be at stake, Washington must continue to closely consult with U.S. Allies, as they remain acutely attuned to any indication Washington may adjust its declaratory policy or posture.

Russia's unprovoked invasions of Ukraine, against a backdrop of nuclear threats, has been a watershed moment for U.S. Allies and partners. European officials stressed to the Commission that Russia's nuclear saber-rattling is unacceptable and that nuclear coercion must be resisted. Russia's irresponsible nuclear threats call into question Putin's commitment to the principle that "a nuclear war cannot be won and must never be fought."³²¹ In light of Russian aggression against Ukraine, many Allies have bolstered their defense spending, often purchasing U.S. or other Allies' equipment, and thereby promoting NATO's military integration and interoperability.³²² Allies and partners have provided hardware and materiel to Ukraine when it mattered the most, even though it had a deleterious impact on their own ability to defend themselves.³²³ Still, the Commission notes that NATO Allies can do more. According to the Secretary General's Annual Report 2022, only seven Allies met the defense spending guidance of two percent of GDP.³²⁴

Critically, the NATO Alliance has taken steps to reinforce its deterrent message. Its new Strategic Concept in 2022 recommitting NATO to “three core tasks: deterrence and defense; crisis prevention and management; and cooperative security.”³²⁵ NATO’s steadfast commitment to the defense of its members includes advances in support to the DCA mission, and new direction to the NPG. Purchases of the F-35 by several NATO nations, as well as the U.S. delivery of the B61-12, have also enabled the Alliance to update its nuclear sharing mechanics. In addition, more battle groups will be stationed on NATO’s eastern front. The Madrid Summit highlights the fact that NATO is a highly adaptable alliance capable of making difficult decisions in accordance with emerging threats.³²⁶

Additionally, from NATO’s viewpoint:

“The strategic forces of the Alliance, and particularly those of the United States, are the supreme guarantee of the security of the Alliance. The independent strategic nuclear forces of the United Kingdom and France have a deterrent role of their own and contribute significantly to the overall security of the Alliance. These Allies’ separate centers of decision-making contribute to deterrence by complicating the calculations of any potential adversaries. In other words, should an adversary decide to attack NATO, they must not only contend with NATO’s decision-making, but also make a judgment about decision-making from the leaders of the United States, the United Kingdom and France.”³²⁷

The Commission’s conversations with NATO Allies further confirmed these views are widely and deeply held.

In the words of Prime Minister Winston Churchill, since “the New World, with all its power and might, step[ped] forth to the rescue and liberation of the old,” the United Kingdom and the United States have enjoyed a unique relationship unprecedented in modern times.³²⁸ This relationship has helped underwrite European and global security for over 60 years, and special care should be taken to ensure its continued strength. The Commission notes that the United Kingdom shares Allies with the United States in both Europe and the Indo-Pacific – demonstrating further the importance of the U.S.-UK special relationship.

France, the oldest U.S. Ally, offers unique capabilities and assets in Europe and the Indo-Pacific. French contributions to NATO are significant: it is the third-largest contributor to NATO’s military and civil budgets, only behind the United States and Germany.³²⁹ There appear to be numerous opportunities to further strengthen the U.S.-French relationship via improved commercial ties, scientific cooperation, and diplomatic engagements.

U.S. Allies and partners in the Indo-Pacific view China as a grave threat to their security and have taken steps to mitigate this threat.³³⁰ This view is driven by, among other factors, China’s aggressive behavior in the maritime domain and use of grey-zone tactics to infringe on the territory of other claimants, like Brunei, Indonesia, Malaysia, the Philippines, Taiwan, and Vietnam.³³¹ Japan’s release of its National Security Strategy, National Defense Strategy, and the Defense Build-up Program in December 2022 marks an important shift in its strategic thinking. The documents commit Japan to increase its defense spending to 2 percent of its GDP during the next 5 years, signaling a break from its Cold War era defense spending of 1 percent. The new budget will be spread among many categories, including standoff capabilities, IAMD, and unmanned systems, some of which are being jointly developed with the United States. Additionally, Japan is moving quickly to develop and mass produce long-range missiles, which could significantly increase security for both the United States and Japan.³³²

Similarly, the Washington Declaration, signed by President Biden and President Yoon in April 2023, affirmed the ironclad alliance between the ROK and the United States. The two countries established “a new Nuclear Consultative Group (NCG) to strengthen extended deterrence, discuss nuclear and strategic planning, and manage the threat to the nonproliferation regime posed by the Democratic People's Republic of Korea.”³³³ Furthermore, “the Alliance has established a new bilateral, interagency table-top simulation to strengthen our joint approach to planning for nuclear contingencies.” These developments point to the fact that U.S. Allies are fully aware of the dangerous and deteriorating global situation and the need to address it in close coordination with the United States.

Since the establishment of diplomatic relations between the United States and PRC in 1979, and in accordance with the Taiwan Relations Act of 1979, the United States maintains the “expectation that the future of Taiwan will be determined by peaceful means” and considers “any effort to determine the future of Taiwan by other than peaceful means [...] a threat to the peace and security of the Western Pacific area and of grave concern to the United States.”³³⁴ Russian aggression against Ukraine highlights the need for Taiwan to strengthen and reinforce its asymmetric defense strategy to deter aggression and maintain peace in the region. In accordance with the Taiwan Relations Act, the United States provides defensive equipment and services “in such quantity as may be necessary to enable Taiwan to maintain a sufficient self-defense capacity.”³³⁵

Pyongyang's missile tests, growing nuclear arsenal, and aggressive rhetoric have negatively affected the security of U.S. Allies in Asia. In 2022, North Korean dictator Kim Jong-Un conducted nearly 100 missile tests, marking a record year for the isolated regime and raising concerns in Japan and South Korea. To compound the military threat, North Korea's state-sponsored cyber criminals have wreaked havoc on global financial institutions. According to some reports, North Korean hackers stole \$1.7 billion in 2022 alone, highlighting the scale and reach of the operations.³³⁶

Additionally, Iran continues to undermine regional and global security. In March 2023, the IAEA revealed that it had found traces of enriched uranium at a facility in Iran that were “just shy” of weapons-grade level.³³⁷ At the same time, the Iranian regime has supplied Russia with armed drones that target Ukrainian civilian populations and infrastructure.³³⁸ In the Middle East and around the world, Iran continues supporting terrorist groups and military proxies and employing paramilitary forces all designed to stoke and prolong conflicts and undermine stability.³³⁹

These developments all point to a fundamentally different and dangerous security environment for the United States, its Allies, and partners. These threats are growing and expanding across domains and regions and create existential risks to some Allies. The elevated role of nuclear weapons in adversaries' strategies and tactics has created the need for a closer cooperation and coordination among Allies to strengthen strategic deterrence and reduce the risk of nuclear war – recognizing the approaches and processes might vary in different regions.

RECOMMENDATIONS

The Commission recommends the Executive branch recognize that any major change to U.S. strategic posture, policies, or capabilities will have great effect on Allies' perceptions and their deterrence and assurance requirements; as a result, any changes should be predicated on meaningful consultations.

The Commission recommends the Department of Defense continue increasing interoperability between U.S. and allied systems in order to maximize regional deterrent effects, by balancing the need for classification and export controls with the critical need to increase technological cooperation and combined capabilities.

RISK REDUCTION

FINDINGS

The Commission believes it is of paramount importance for the United States to work to reduce strategic risks. This involves activities and programs across the U.S. government, including in nonproliferation and arms control, as well as the maintenance of strong, viable, and resilient military forces.

U.S. vital interests and international security are served by robust diplomatic engagements that reduce uncertainty and reduce the risk of deterrence failure and unnecessary arms competition. It is in the U.S. national interest to lead, and be recognized as leading, diplomatic efforts to reduce such risks.

Although the potential for a return to a more cooperative relationship with Russia and China now seems remote, we cannot rule out the possibility of change in the 2027–2035 timeframe.

Risk reduction measures can increase predictability, reduce uncertainty and the risk of misperception and miscalculation.

U.S. nonproliferation efforts and the nonproliferation regime have slowed the spread of nuclear weapons, thereby making the world safer. It is in the U.S. interest to prevent the spread of nuclear weapons to additional states.

The U.S. nuclear umbrella has protected Allies, thereby removing the need for them to develop their own nuclear weapons.

U.S. threat reduction measures have successfully constrained the availability of nuclear materials, technology, and expertise to potential proliferators.

The Commission is concerned that new developments in genetically engineered and novel biological agents pose a significant threat to U.S. and allied security, and the Commission assesses that the BWC will not effectively prevent the development and deployment of new biological weapons.

Effectively verifiable arms control measures with parties who comply with their obligations can improve international security and stability. Such measures can provide predictability and reduce the threats to U.S. vital interests and those of its Allies.

Arms control agreements in the U.S. national interest are potentially important tools to support U.S. policy goals, but given Russia's history of noncompliance and illegal treaty suspensions, and China's continued intransigence on arms control dialogue, the United States cannot develop its strategic posture based on the assumption that arms control agreements are imminent or will always be in force. In short, the United States must be prepared for a future with and without arms control agreements.

The current policy of the Chinese leadership is not to engage in substantive dialogue on nuclear arms control or risk reduction measures.

The United States cannot set its arms control limits without first determining the requirements for its overall strategic posture, and the strategy that those requirements will support.

America's Strategic Posture

While there is no prospect of a meaningful arms control treaty being negotiated with Russia in the foreseeable future, any future nuclear arms control treaty must, as the U.S. Senate stated in its resolution of ratification for New START, address all Russian nuclear weapons.

Emerging technologies have the potential to support U.S. efforts in arms control, verification, and risk reduction.

Certain weapon technologies deserve urgent attention, as incipient threats and potential subjects for future arms control negotiations. An example is China's development of ICBM-launched FOBS or MOBS.

U.S. nuclear strategy has long recognized the potential for risk reduction measures to enhance its effectiveness by shaping adversary perceptions and capabilities and decreasing uncertainty. The Commission believes "risk reduction" encompasses a number of military and non-military efforts that can cover a range of purposes, including reducing the risk of misperception, inadvertent escalation, accidents, and deterrence failure. Additionally, risk reduction efforts can aid in establishing or improving open channels of communication between states; promoting transparency; improving weapon safety and surety; and reducing unnecessary arms competition.

These risk reduction efforts can take a number of forms, such as formal bilateral or multilateral treaties (e.g., New START, the NPT), military-to-military discussions, confidence-building measures, data exchanges, political agreements, and Track 1.5 and Track 2 dialogue among government and non-government experts. The United States uses numerous military and non-military channels for risk reduction between Washington and Moscow, and to a lesser extent, between Washington and Beijing. China and Russia, however, are increasingly spurning the use of these means in favor of militaristic threats and behavior. Despite U.S. efforts, China continues to rebuff requests for greater transparency and substantive dialogue on nuclear issues, while Russia has proven itself to be a serial arms control agreement violator.³⁴⁰

Despite these negative trends, U.S. leadership and diplomacy will increase in value and importance as the United States seeks to strengthen Alliances and form new partnerships against aggression. The United States will continue to reduce risk with China and Russia when and where possible to enhance U.S. security, but it will also need to prepare for a future in the 2027-2035 timeframe when formal arms control treaties are difficult to achieve or absent.

UTILITY OF DIPLOMACY AND RISK REDUCTION

The durability of the U.S. role in the international security environment is rooted in U.S. prowess in the mutually supporting areas of diplomacy and military affairs. U.S. diplomats advance American interests by communicating deterrence messages to adversaries and assuring Allies in ways military capabilities alone cannot, and military capabilities provide credibility and power to backstop U.S. diplomacy.

Additionally, given the immensely destructive nature of nuclear weapons if they were to be employed, the United States has developed a range of policies, procedures, and technologies designed to reduce the risks of misperceptions, inadvertent escalation, accidents, and deterrence failure. At times, the United States has made progress in these areas with the cooperation of the Soviet Union, and later, the Russian Federation. These risk reduction measures involve both formal treaties as well as independent initiatives and informal political agreements.

Formal nuclear arms control treaties have played a significant role in U.S. strategy from the Cold War to today. Agreements that verifiably limited nuclear warhead and delivery system numbers have improved transparency, provided a measure of predictability, and established

a helpful forum for additional dialogue. The United States also uses a number of independent risk reduction measures such as improving weapon safety features, modernizing warning capabilities, and other national technical means for verification.

Risk reduction efforts benefit not only those states that are directly involved, but also those that could be harmed by the consequences of misperceptions, inadvertent escalation, accidents, or deterrence failure. U.S. Allies and partners especially are valuable in this regard for their contributions of technical expertise, situational awareness, regional connections, and intelligence sharing.

Moreover, increasing the resiliency and redundancy of U.S. systems, notably early warning and NC3, can also reduce these risks by providing increased understanding of the situation and ensuring that the United States can operate through an attack on these systems. Historically, there was a notion that an adversary attack on early warning and NC3 systems was a signal or precursor to a nuclear attack. Increasing the ability of these systems to survive and reliably detect, identify, and attribute a launch could help provide enhanced situational awareness.

Formal arms control agreements are unlikely in the near future. Therefore, the United States should concentrate its efforts on reducing risk in other ways, both on its own, and when achievable, in cooperation with Russia or China. For instance, the United States can continue investing in the research and development of technology that might enable new verification techniques or provide higher confidence assessments. The United States can work with its Allies and partners to jointly share data for improved situational awareness. Moreover, the United States can continue its research and development of advanced technologies that may help improve weapon safety features, reduce the risks of accidents, strengthen nonproliferation safeguards, and expand situational awareness to reduce the risk of misperception and inadvertent escalation.

The Chinese and Russian rejection of traditional diplomatic norms, plus a growing array of advanced technologies in every domain, make U.S. risk reduction efforts all the more important. The United States needs willing partners to significantly reduce the bilateral and trilateral risk inherent in this developing dynamic; until Beijing and Moscow change their policies, the United States must press on with its Allies and partners to reduce risks when and where possible.

The work of risk reduction is never fully finished and the timeline may be long before there is significant progress. Although the prospect of achieving formal arms control treaties is bleak, the United States should invest in the expertise and technologies necessary to support risk reduction whenever and wherever possible. Track 1.5 and Track 2 discussions on security issues, for example, could maintain active channels of communication and provide a useful basis for future engagement.

CHARTING THE PATH FORWARD FOR NONPROLIFERATION

The United States remains committed to the NPT as one of the cornerstones of its national policy, and continues to serve as the global leader on a range of nonproliferation efforts aimed at halting the potential spread of nuclear weapons to other states. U.S. nonproliferation policy has three key facets. First, the United States seeks to prevent the proliferation of nuclear weapons or nuclear weapon technology to or by non-nuclear states or non-state actors. Second, the United States maintains the military capabilities and diplomatic relations necessary to assure Allies and partners that they do not need to seek their own independent nuclear weapon programs. Third, the United States partners with non-nuclear weapons states on the peaceful uses of the nuclear energy.

Wherever possible, the United States has sought to work with Allies, partners, and even adversaries to prevent nuclear proliferation. These cooperative efforts have constrained the amount of nuclear material potentially available to proliferators and channeled scientists into new areas of study outside of weapon programs. Ongoing U.S. nonproliferation efforts in these areas include accounting for and reducing unsecured radioactive material; “downblending” highly enriched uranium to low enriched uranium; working with Allies and partners to detect and interdict illicit nuclear-related transfers; supporting export control regimes; and providing technical and other support to the IAEA. Where necessary, these efforts may also leverage multilateral and bilateral forms of coercive diplomacy, such as economic sanctions.

Significant challenges to the NPT will persist through the 2027-2035 timeframe. North Korea, for example, having declared its intention to leave the NPT, continues to increase its nuclear weapons program – and associated delivery systems – in violation of numerous United Nations Security Council resolutions. A combination of economic sanctions and multilateral diplomacy have failed to convince North Korea's leaders to stop their nuclear weapons program. Iran, which has colluded with North Korea previously on missile proliferation, continues to be a significant nuclear proliferation risk. Tehran's decision to enrich uranium to near weapons-grade levels is extremely concerning, as are its coercive threats to leave the NPT.³⁴¹

With respect to Iran, the Commission affirms the U.S. objective to prevent Tehran from obtaining a nuclear weapon. For North Korea, the Commission affirms the longstanding U.S. policy objective of working towards complete, verifiable, and irreversible nuclear disarmament, and emphasizes that if there are opportunities for interim dismantlement steps, they should be pursued in conjunction with the U.S. Allies, consistent with nonproliferation considerations.

The proliferation risks of North Korea and Iran are well known now, but the risks of emerging technology enabling new – and potentially more destabilizing – threats in the future are less discernable. The State Department has noted with concern Chinese and Russian efforts in the area of biotechnology, for instance, which could have enormous implications for novel biological weapons.³⁴² The often inherently dual-use nature of biological research prevents easy arms control solutions, but there may be opportunities for the United States to work in cooperation with its Allies and partners to reduce risks and prevent proliferation.

THE UNCERTAIN FUTURE OF NUCLEAR ARMS CONTROL

Historically, impactful risk reduction measures have included formal nuclear arms control agreements or treaties between the United States and the Soviet Union, and then the Russian Federation. These measures have provided the United States with important insights on Russian nuclear forces and often produced a forum for additional diplomatic engagement. When all states comply with their obligations, the agreements are in the respective parties' national interests. When the agreements are effectively verifiable, arms control can provide stability and security, especially when the broader political relationship is strained.

Formal arms control can serve as an effective instrument for U.S. interests, but its value hinges on the degree to which each party adheres to the provisions in the treaty and on the parties' ability to verify those provisions. In light of Russia's noncompliance and China's nuclear build-up, there may soon exist an international environment without any nuclear arms control agreements constraining the nuclear arsenal of any nuclear power.

Over the past 20 years, Russia has either violated or has failed to comply with nearly every major arms control treaty or agreement to which the United States is or was a party. These include the Conventional Armed Forces in Europe Treaty, the Presidential Nuclear Initiatives, the Budapest

Memorandum, the Helsinki Accords, the Open Skies Treaty, the INF, and most recently, the New START. Russian actions clearly demonstrate that its goal is not strategic stability as the United States understands it, especially given its apparent willingness to undermine nuclear arms control with the United States for the sake of its ongoing conflict against Ukraine.

China, for its part, has generally refused to engage substantively with the United States in discussions on its nuclear forces, doctrine, or policies. There are some existing mechanisms for dialogue with Chinese officials that the United States has sought to build on – including the P5, Joint Staff talks, and the Military Maritime Consultative Agreement – but China's degree of participation has kept their impact very limited. China's refusal to engage bilaterally with the United States on nuclear issues raises the risks of misperception and even deterrence failure as it continues the rapid expansion of its nuclear arsenal.

When evaluating the prospects for nuclear arms control in the 2027-2035 timeframe, the United States must determine the forces it needs before it can develop negotiating positions. That is, the United States must first determine the size and composition of the nuclear forces it needs to meet its deterrence requirements; based on those requirements, it can judge how an arms control proposal can enhance vital U.S. interests.

China's emergence as a nuclear-armed peer of the United States and Russia's continued arms control violations will place great pressure on the United States, as the responsible nuclear power, to develop negotiated agreements among the United States, Russia, and China. The ideal scenario for the United States would be a trilateral agreement that could effectively verify and limit all Russian, Chinese, and U.S. nuclear warheads and delivery systems, while retaining sufficient U.S. nuclear forces to meet security objectives and hedge against potential violations of the agreement. Such an agreement, however, does not appear likely in the foreseeable future.

The United States can thus focus on steps that may help to create the conditions for future nuclear arms control, or to enhance U.S. preparedness should the prospects for nuclear arms control improve. The United States should explore emerging technologies and their potential to either help, or be used by an adversary to interfere with, verification and monitoring missions. Accordingly, the United States could make effective investments in technologies that would support verifiable arms control. Operating at the forefront of this technology development will best posture the United States to understand the implications for arms control, reap the technologies' benefits, and mitigate the technologies' risks. More broadly, the United States must continue developing the expertise, policies, procedures, and technologies that underpin U.S. diplomacy to both advance U.S. interests and counter adversary efforts.

The 2027-2035 timeframe will likely feature its share of surprises for arms control, whether through development of new technology or new application of old technology. An example of the latter is China's development of a nuclear-armed FOBS or, potentially, a MOBS. As this system would further reduce the amount of warning time prior to a strike, it could conceivably enable leadership decapitation, making it highly destabilizing in a crisis or conflict.

The prospects for agreements on nuclear arms control with Russia or China appear bleak, but this is no reason to stop pursuing broader risk reduction efforts when achievable and in the U.S. national interest.

RECOMMENDATIONS

The Commission recommends that a strategy to address the two-nuclear-peer threat environment be a prerequisite for developing U.S. nuclear arms control limits for the 2027-2035 timeframe. The Commission recommends that once a strategy and its related force

America's Strategic Posture

requirements are established, the U.S. government determine whether and how nuclear arms control limits continue to enhance U.S. security. The United States cannot properly evaluate a future nuclear arms control proposal that will serve the U.S. interest, by reducing risk and avoiding the costs of an unconstrained nuclear arms competition, without knowing what the U.S. nuclear force requirements will be. Any future arms control proposal must be consistent with U.S. nuclear force requirements.

The Commission recommends that the United States continue to explore nuclear arms control opportunities and conduct research into potential verification technologies in order to support or enable future negotiations in the U.S. national interest that seek to limit all nuclear weapon types, should the geopolitical environment change.

Where formal nuclear arms control agreements are not possible, the Commission recommends pursuing nuclear risk reduction measures to increase predictability and reduce uncertainty and the chances for misperception and miscalculation.

The Commission recommends continued pursuit of such measures, to include: ballistic missile launch notification agreements; open ocean targeting of ballistic missiles; hotline or leadership communications agreements (crisis communications); Agreement on the Prevention of Incidents On and Over the High Seas; strategic stability talks; peacetime norms regarding activities in space and cyber space in peacetime; and military exercise notifications and transparency.

The Commission recommends that the United States use all its instruments of national power, including its strong economic, political and defense capabilities, to turn Russia and China away from their nuclear arms build-ups and toward negotiation of effectively verifiable arms control measures.

▶ The Commission condemns the unwarranted and illegal Russian suspension of New START.

The Commission recommends the Departments of Defense, Energy, and State in a coordinated fashion assess the potential impacts of new and emerging technologies on the U.S. strategic posture, with the goal of identifying potentially destabilizing or threatening capabilities the United States may want to address, whether through arms control negotiations or other means.

▶ The Commission believes China's development of FOBS/MOBS is a compelling example of this phenomenon. The Commission recommends the United States, as an urgent matter, propose an immediate global ban on further testing and deployment of missiles in a FOB/MOB mode.

The Commission recommends that the United States develop measures to prevent the proliferation of threatening emerging military technologies to hostile states.

Given the importance of preventing the further proliferation of nuclear weapons, the Commission recommends the United States continue to support the current nonproliferation regime centered on the NPT.

The Commission recommends the U.S. evaluate diplomatic measures, whether in the BWC context or beyond, to address the threat of novel biological weapons. It may be necessary to strengthen the development of multilateral transparency and enforcement mechanisms related to the handling of dangerous pathogens as well as BWC violations.

CONCLUSION

The Commission's recommended steps to improve U.S. strategic posture are urgently needed to respond to a deteriorating global security environment. The present-day outlook on the threat environment, characterized by Chinese and Russian aggressive policies and actions, stands in stark contrast to the hopeful landscape that guided the previous Strategic Posture Commission and the current modernization of America's conventional and nuclear forces. China and Russia seek to upend U.S. leadership and further their authoritarian agendas.

Their continuing bellicose behavior and the expansion of their strategic arsenals compelled the Commission to conclude that while the current posture of the United States remains strong, it is ill-prepared for the potentially existential challenges of 2027-2035 and beyond. The Commission concluded that to meet these new threats, the United States must change course urgently and resolutely.

After the Cold War, the United States sought to build cooperative relationships with China and Russia and to reduce the role of nuclear weapons. Despite the U.S. best efforts to create the conditions for a just and prosperous world, both Russia and China chose a different path, one of military build-ups, aggression, and extortion. Russia's criminal and unjust war against Ukraine, backed by nuclear threats, is the most potent demonstration of its belligerency. Russia brought trenches and tanks back to Europe, making it an epicenter of conflict once more. At the same time, China is violating its neighbors' territorial sovereignty and by its aggressive behavior is making Asia a military flashpoint. The Commission is clear that its recommendations aim to prevent war with two nuclear peer adversaries—to deter aggression against the United States and its Allies and partners—and to ensure victory if deterrence fails.

In order to position the United States to meet these challenges, the Commission believes its recommended changes can and must be made on a bipartisan basis. During the Cold War, the Soviet threat generated a national consensus that enabled U.S. success in a long-term competition with the Kremlin. The nation again needs a framework for bipartisanship to protect American interests and values at home and abroad. Absent a strong bipartisan consensus, it will be impossible to implement the Commission's recommendations.

Congress and the President play an essential role in communicating U.S. interests, and threats to those interests, to the American people and enacting legislation in a timely fashion. The public needs to know that American vital interests and their individual freedoms and livelihoods are at risk, and that it will take a whole-of-government response to mitigate the risk.

Success will be contingent not only on fielding strong deterrent capabilities but on the U.S. ability to bolster its industrial base and to harness American ingenuity and innovation. Congress and the President must guarantee appropriate, consistent, and timely funding for the foundational pieces of America's strategic posture so crucial to protecting the U.S. national interests. Such commitment will ensure that the American experiment continues to succeed.

COMPILATION OF FINDINGS AND RECOMMENDATIONS

THE STAKES

Findings

Today, the U.S.-led international order is under threat from the Chinese and Russian authoritarian regimes, which seek to disrupt and displace this order and create a new version conducive to their authoritarian regimes, premised on values antithetical to those held by the United States and like-minded Allies and partners worldwide.

Though the U.S.-led order is threatened, it currently holds. The Commission concludes, however, that unless the United States adjusts its strategic posture, U.S. vital interests and international stability are at risk during the 2027-2035 period.

U.S. Allies and partners give the United States a clear strategic advantage. If the United States were to adopt a defense strategy and associated strategic posture no longer based on existing alliance systems in Asia and Europe, U.S. vital interests would be at risk, U.S. global influence diminished, and Americans' liberties threatened.

A central thrust of China's and Russia's adversarial approach toward the United States is their building of military capabilities, including major expansion and modernization of nuclear capabilities, which could lead to a situation where both powers pose an existential threat to the United States.

There is a growing risk of confrontation with China, Russia, or both. This includes the risk of military conflict.

Unlike World Wars I and II, a major power conflict in the 21st century has the potential to escalate into a large-scale nuclear war.

While it is challenging to maintain a strategic posture sufficient to prevent major power war, it would be far more expensive to fight such a war.

The urgent imperative to tackle the strategic challenge the United States faces must be consistently conveyed in a bipartisan manner by national leaders and broadly understood by the American people.

Recommendations

The Commission recommends America's elected leaders communicate strategic realities—U.S. vital interests, threats to those vital interests, and necessary changes to the U.S. strategic posture—to the American people clearly, forthrightly, and regularly:

- This entails communicating that U.S. national security requires the United States to remain engaged in international affairs to maintain and further its national interests, prevent armed aggression and escalation if possible, and prevail in armed conflict if necessary.
- It also requires communicating that U.S. and allied commitments to come to the defense of one another protect and advance U.S. vital interests, including our shared democratic values,

freedoms, and prosperity. The U.S. alliance security commitments, therefore, are acts of friendship that also advance vital economic and security interests of all U.S. citizens. More fundamentally, Allies and partners make the United States stronger and enable it to better pursue and protect U.S. national and shared interests.

THE THREAT THROUGH 2027-2035

Findings

The United States will face two nuclear peer adversaries for the first time. The Commission concludes that China's rapid expansion of its nuclear forces and Russia's increasing reliance on nuclear weapons and potentially expanded nuclear arsenal are an unprecedented and growing threat to U.S. national security and potentially the U.S. homeland. In addition, unlike previous conflicts in the 20th century, a future potential conflict with China or Russia would likely involve new kinetic and non-kinetic attacks on the U.S. homeland and assets in space and cyber domains – further underscoring the importance of deterring and defeating such attacks.

The new partnership between Russian and Chinese leaders poses qualitatively new threats of potential opportunistic aggression and/or the risk of future cooperative two-theater aggression. Neither the 2018 nor the 2022 National Defense Strategy (NDS) adequately address this rapidly emerging threat. As noted by the 2018 Commission on the NDS, regarding the 2018 NDS: "The Department has largely abandoned the longstanding 'two war' construct for a 'one major war' sizing and shaping construct. In the event of large-scale conflict with China or Russia, the United States may not have sufficient remaining resources to deter other adversaries in one—let alone two—other theaters by denying them the ability to accomplish their objectives without relying on nuclear weapons."

The 2022 NDS also adopts a "one major war" sizing construct, while both the 2022 NDS and the 2022 Nuclear Posture Review (NPR) hint at increased reliance on U.S. nuclear forces to deter opportunistic aggression. But neither addresses the nature of the U.S. conventional force, including space and non-kinetic capabilities, or nuclear force that will be required to do so when facing two peers. As noted in the 2022 NPR: "In a potential conflict with a competitor, the United States would need to be able to deter opportunistic aggression by another competitor. We will rely in part on nuclear weapons to help mitigate this risk, recognizing that a near-simultaneous conflict with two nuclear-armed states would constitute an extreme circumstance."

Due to China's nuclear build-up, the United States will no longer be able to treat the Chinese nuclear threat as a "lesser included case" of the Russian nuclear threat. As a result, the United States must re-evaluate the size and composition of the U.S. nuclear force that would be adequate to fulfill longstanding roles of that force. These roles include deterrence, assurance, achieving objectives should deterrence fail, and hedging against adverse events.

U.S. defense strategy to address the two-nuclear-peer threat requires a U.S. nuclear force that is either larger in size, different in composition, or both; therefore, decisions must be made now to meet evolving deterrence requirements.

- The current and planned capacity of the U.S. nuclear weapons enterprise, in both DOD and DOE/NNSA, limits the nation's ability to meet and build on the existing POR in order to address the threat.

The Commission concludes the U.S. and allied conventional military advantages in Asia are decreasing at the same time the potential for two simultaneous theater conflicts is increasing.

- Moreover, the U.S. conventional forces needed to fight a theater conflict in Europe differ from those required for Asia. The currently planned force is not structured to be able to fully reinforce both theaters simultaneously – especially given the growing adversary non-nuclear capability to hinder U.S. ability to flow additional forces to Asia or Europe. This shortfall, combined with increases in China’s nuclear capabilities, has the potential to undermine deterrence, especially deterrence of opportunistic aggression.

The Commission concludes that dismissing the possibility of opportunistic or simultaneous two-peer aggression because it may seem improbable, and not addressing it in U.S. strategy and strategic posture, could have the perverse effect of making such aggression more likely.

- China, Russia, or both simultaneously, may believe that the United States and its Allies are unlikely to oppose their regional aggression with sufficient forces to guarantee victory, since doing so may leave the United States and its Allies vulnerable in another theater. These states may gamble that their perceived greater stake in a conflict’s outcome, combined with perceived U.S. limitations, may offer a unique opportunity for their successful aggression.
- The speed and scale of success of U.S. forces in meeting that aggression in one theater may greatly influence the chances of conflict, or success in conflict, in the other theater.

China is pursuing a nuclear force build-up on a scale and pace unseen since the U.S.–Soviet nuclear arms race that ended in the late 1980s.

The Commission further concludes that at China’s current pace, it will reach rough quantitative parity with the United States in deployed nuclear warheads by the mid-2030s.

- As it acquires sufficient fissile material, China will retain the capacity to continue growing its nuclear forces quickly past that point.

China’s capacity for rapid change, and opacity concerning its intentions, presents great challenges for U.S. defense and nuclear strategy.

China appears to have decided to change the role of nuclear weapons in its national security strategy (e.g., adopting an expanded theater nuclear war-fighting role), in anticipation of a conflict over Taiwan and perhaps in pursuit of its broader national objectives.

Neither a new Chinese strategy nor the far larger and more diverse Chinese nuclear force required to implement it were envisioned when the current U.S. nuclear modernization program was developed.

The Commission also assesses that the rapid pace of potential change in Chinese strategy and capabilities will place additional demands on the ability of the United States and its Allies to adapt their own strategies and capabilities.

The Commission has concluded that China now has, for the first time, a nascent triad of strategic nuclear delivery systems, and potentially a launch-on-warning posture. China also is developing and testing potentially destabilizing, new intercontinental range systems that include hypersonic as well as fractional or multiple orbital bombardment systems (FOBS or MOBS) that could potentially threaten an unwarned preemptive attack on the United States.

China will also for the first time have survivable (mobile) theater nuclear forces capable of conducting low-yield precision strikes on U.S. and allied forces and infrastructure across East Asia, in contrast to its historic practice of fielding only larger yield weapons. Theater-range low-yield weapons may reduce China’s threshold for using nuclear weapons.

America's Strategic Posture

The Commission finds that China is rapidly fielding new non-nuclear capabilities in space and cyberspace and electronic warfare (EW) capabilities that create both strategic and theater effects. These capabilities, in addition to China's conventional forces, can deny, disrupt, or diminish U.S. conventional forces' ability to project power effectively, and can threaten both U.S. NC3 and the critical national infrastructure that supports it.

The Commission concludes that China continues to engage in biological and chemical activities with dual-use applications, which raises concerns regarding its compliance with the Biological and Chemical Weapons Conventions (BWC and CWC).

The Commission concludes that China is rapidly expanding and modernizing its conventional forces—to include ballistic missile systems—posing an increasing threat to U.S. forces and Allies in Asia. By the 2030s China's conventional military build-up could turn the conventional military balance in Asia against the U.S. and its Allies.

- This potential conventional imbalance, particularly in long-range and intermediate-range systems, increases the risk of deterrence failure should China contemplate aggression, especially if there were to be a theater conflict already underway between Russia and North Atlantic Treaty Organization (NATO).
- China is also strengthening and expanding its air and missile defense network, primarily aimed at defeating the full range of U.S. advanced strike capabilities.

The Commission finds that even before any potential change in the conventional military balance, China may perceive that the cost of inaction against Taiwan is higher than the cost of conflict with the United States over Taiwan – even at the risk of nuclear war.

The Commission concludes that Russia today has the largest nuclear force of any state. This is likely to remain true through 2035.

Russia is projected to continue to expand and enhance its nuclear forces, with most of the growth concentrated in theater nuclear forces, thus increasing its decided numerical advantage over U.S. and allied nuclear forces.

Russian strategy and doctrine as written envisions limited first use of theater nuclear weapons to, inter alia, coerce war termination on terms acceptable to Russia, and larger scale use of theater nuclear forces to defeat NATO conventional forces if Russia is decisively losing a war with NATO. Russian strategy and doctrine rely on strategic nuclear forces to deter a large-scale U.S. nuclear response against the Russian homeland while Russia can escalate to limited nuclear war in theater if it chooses.

The Commission concludes that Russia's active nuclear warhead and missile production lines provide the capability, should Russia decide to discard the limits of New START (Strategic Arms Reduction Treaty), to expand its strategic nuclear forces.

- Russia's current modernization program added substantial warhead upload capacity to its ICBMs and Submarine Launched Ballistic Missiles (SLBMs).
- Russia's modernized nuclear warhead design and production infrastructure has significant surplus capacity to implement a decision to upload.
- Russia has nearly completed a multi-year modernization program of its strategic nuclear forces, with notable improvements to its triad of forces, including the new Sarmat heavy ICBM and cruise-missile equipped Severodvinsk class submarines.

- Russia's future long-range nuclear forces include new forms of nuclear delivery systems (e.g., Avangard, Poseidon, nuclear-powered Skyfall Ground Launched Cruise Missile (GLCM), Kinzhal air-launched ballistic missile).

The Commission concludes that Russia is continuing to expand its space, cyber, and electronic warfare capabilities in an effort to deny U.S. and NATO forces critical enabling capabilities, and to derive coercive political leverage from threats to critical infrastructure.

The Commission concludes that Russia continues to pursue biological and chemical weapons capabilities in violation of the BWC and CWC.

The Commission has concluded that Russian conventional forces, while inferior to fully mobilized NATO forces, will continue to have a space/time advantage against NATO states on Russia's periphery, potentially enabling them to occupy such states' territory in a *fait accompli* before NATO forces can fully mobilize in their defense, thus presenting an existential threat to territorial sovereignty of Allies and partners.

Russian modernization and expansion of its air and missile defense capabilities beyond the Moscow region will pose a growing threat not only to the efficacy of U.S. nuclear forces but to conventional forces as well.

The Commission has found that Russia's use of large-scale conventional military force against Ukraine demonstrates a propensity to take risk and tolerate significant loss. The outcome of the war in Ukraine could influence future calculations – and indeed miscalculations – about the risks and benefits of aggression.

The Commission concludes that North Korea continues to expand and diversify its nuclear forces, increasing the threat to U.S. Allies and forces in theater, and posing a greater threat to the U.S. and its Allies.

North Korea is on pace to deploy nuclear-armed intercontinental range missiles in sufficient numbers that could potentially challenge U.S. homeland ground-based ballistic missile defenses.

The Commission concludes that North Korea's chemical and biological weapons programs continue to be of great concern.

The Commission also found that North Korea's cyber forces have matured and are fully capable of achieving a range of strategic objectives against diverse targets, including a wider target set in the United States.

The Commission concludes the Iranian regime will maintain a nuclear program as part of its strategic goals for enhancing security, prestige, and regional influence. This includes pursuit of nuclear energy and the capability to build missile-deliverable nuclear weapons.

If Iran decides to do so, it could field advanced longer-range missile systems in the 2027-2035 timeframe. Iran will also pose a credible theater missile threat as a key non-nuclear capability.

Recommendations

The Commission recommends the following:

- The Director of National Intelligence (DNI) should immediately direct increased collection, processing, exploitation, and analysis on Chinese nuclear strategy, planning, and employment

doctrine. It is essential that the United States better understand, inter alia, whether and how China's thinking about the role of nuclear weapons is changing, where the Chinese are investing time and effort in military equipment and strategy development, and what goals CCP leadership wants to achieve with its newly expanded nuclear arsenal.

- The DNI should immediately direct development of dynamic assessments of the decision calculus of all nuclear-armed adversaries regarding the use of nuclear weapons for coercion or in conflict. The Intelligence Community must ensure these assessments identify specific adversary perceptions of the potential benefits and costs of employing nuclear weapons in conflict, the potential benefits and costs of restraint from doing so, and possibilities for misunderstanding and miscalculation that could facilitate escalation of crises. Such assessments are critical prerequisites for the development of effective deterrence strategies and campaigns, and the plans that flow from them.
- The DNI should immediately direct an analysis of other potential adversaries that may develop strategic military capabilities during the 2027-2035 timeframe that could threaten U.S. and allied interests.
- The Secretary of Defense should immediately direct an analysis of the policy and posture effects of the threats posed by emerging and disruptive technologies, to include AI, quantum, and genetically engineered or other novel biological weapons on the future military balance and strategic stability. Based on the results of that analysis, develop a strategy and identify associated strategic posture changes, including defenses, sufficient to address these potential threats.

STRATEGY

Findings

The six core tenets of U.S. nuclear strategy—assured second strike, flexible response, tailored deterrence, extended deterrence and assurance, calculated ambiguity, and hedge against risk—remain sound and continue to provide an effective foundation for deterrence and defense.

Adversary kinetic and non-kinetic capabilities are a growing threat to the U.S. homeland.

Space, cyber, and other non-kinetic capabilities are not adequately reflected in a coherent U.S. strategy to address the 2027-2035 threat.

The risk of failing to deter potential opportunistic or collaborative two-theater aggression in the 2027-2035 timeframe will not be mitigated unless the United States modifies its defense strategy and the strategic posture that enables it.

Recommendations

U.S. nuclear strategy is the foundational element of its broader strategy for addressing the two-nuclear-peer threat environment. The Commission recommends the United States maintain a nuclear strategy based on six fundamental tenets:

- Assured second strike;
- Flexible response to achieve national objectives;
- Tailored deterrence;
- Extended deterrence and assurance;

- Calculated ambiguity in declaratory policy; and
- Hedge against risk.

These foundational strategy tenets should be applied to address the 2027-2035 threat in the following ways:

- Deter large-scale strategic attack on the United States and its Allies and partners through maintaining an assured second-strike capability sufficient to impose unacceptable costs as an adversary or adversaries perceive it under any conditions.
- Continue the practice and policy of not directly targeting civilian populations, and adhere to the LOAC in nuclear planning and operations.
- Tailor U.S. deterrence strategy and practice to decisively influence the unique decision calculus of each nuclear-armed adversary. As a general rule, the most effective deterrent is to hold at risk what adversaries value most. As long as the Chinese and Russian regimes maintain their current autocratic structure and dangerous policies, this means holding at risk key elements of their leadership, the security structure maintaining the leadership in power, their nuclear and conventional forces, and their war supporting industry.
- Deter limited strategic attacks, including limited nuclear escalation, through a flexible response strategy enabled by U.S. and allied nuclear and conventional forces and partner conventional forces that are capable of:
 - ▶ Continuing to operate effectively to achieve U.S. and allied and partner objectives in a limited nuclear use environment; and
 - ▶ Providing a credible range of resilient response options to restore nuclear deterrence and promote conflict termination by convincing an adversary's leadership it has seriously miscalculated, that further use of nuclear weapons will not achieve its objectives, and that it will incur costs that far exceed any benefits it can achieve should it escalate further.
- Enhance deterrence of armed aggression against U.S. Allies and partners and reduce the risk of escalation in a conflict if deterrence fails. U.S. extended nuclear deterrence requires that U.S. flexible response options be credible, especially in a simultaneous conflict with two peer nuclear adversaries.
- Maintain a declaratory policy of calculated ambiguity about the conditions in which the United States may employ nuclear weapons to preserve options for the President under all circumstances, complicate adversary decision-making regarding going to war with the United States, and deter an adversary from escalating a conflict with the United States.
- Develop the means to hedge against geopolitical, technical, operational, and programmatic risk that ensures such risks cannot result in U.S. deployed nuclear forces being insufficient to support U.S. nuclear strategy.

The Commission believes that U.S. national security strategy should strengthen deterrence by incorporating resilient offensive and defensive capabilities necessary to deny adversaries' theories of military victory. This recommendation is driven by Russian and Chinese advances in kinetic and non-kinetic offensive weapons, including dual-capable strike systems that can range the U.S. homeland. These weapons pose threats to the U.S. ability to project power in support of its Allies and partners in Europe and Asia, and to elements of the nuclear command, control, and communications system, strategic nuclear forces, and military space capabilities. The Commission recommends significant attention to these new kinetic and non-kinetic threats, including changes to U.S. IAMD in order to address the 2027-2035 security environment. U.S. strategy should increase the role of homeland IAMD capabilities capable of deterring

and defending against coercive attacks by Russia and China. The Commission believes that protecting against such kinetic and non-kinetic attacks will complicate adversary attack planning and force them to contemplate larger-scale attacks to achieve similar objectives, thus strengthening deterrence.

The Commission believes U.S. military strategy requires active and passive defense of U.S. and allied and partner assets, as well as credible threats of punishment, to enable the military operations necessary to deter and counter Russian and/or Chinese theater aggression. For example, because Russian and Chinese advances in offensive counterspace capabilities pose an increasingly serious threat to U.S. and allied and partner space capabilities that enable U.S. power projection, missile attack warning, and nuclear command and control, the United States should urgently deploy a more resilient space architecture and adopt a strategy that includes both offensive and defensive elements to ensure U.S. access to and operations in space.

To achieve the most effective strategy for stability in light of the 2027-2035 threat environment, the Commission recommends three necessary changes:

1. The United States must develop and effectively implement a truly integrated, whole-of-government strategy to address the 2027-2035 threat environment, and must be able to bring all elements of American power to bear against these impending threats. The Department of Defense's Integrated Deterrence concept is a good start in this direction, but the Commission sees little evidence of its implementation across the interagency.
2. The objectives of U.S. strategy must include effective deterrence and defeat of simultaneous Russian and Chinese aggression in Europe and Asia using conventional forces. If the United States and its Allies and partners do not field sufficient conventional forces to achieve this objective, U.S. strategy would need to be altered to increase reliance on nuclear weapons to deter or counter opportunistic or collaborative aggression in the other theater.
3. This strategy must be reflected in U.S. nuclear force structure. U.S. strategy should no longer treat China's nuclear forces as a "lesser included" threat. Therefore, nuclear force structure constructs can no longer assume that the nuclear forces necessary to deter or counter the Russian nuclear threat will be sufficient to deter or counter the Chinese nuclear threat simultaneously. Nuclear force sizing and composition must account for the possibility of combined aggression from Russia and China. Therefore, the United States needs a nuclear posture capable of simultaneously deterring both.

STRATEGIC POSTURE

Findings

In the context of a strategic posture deploying both conventional and nuclear capability, the traditional role of nuclear weapons in U.S. defense strategy remains valid and of continuing importance: deterrence of adversaries; assurance of Allies; achieving U.S. objectives should deterrence fail; and hedging against adverse events.

The U.S. triad of strategic delivery systems (intercontinental ballistic missiles, ballistic missile submarines, and bombers) has great value in presenting an intractable targeting problem for adversaries. Each system has unique strengths, such as responsiveness, survivability, and flexibility, that complement the others and vastly complicate adversary planning – thus contributing to deterrence. The triad will remain the key foundation for the U.S. strategic posture for the foreseeable future.

The triad provides the President with a range of options to protect U.S. national interests in any crisis or against any challenge. For example, the responsiveness and alert status of the ICBM force provides the President with options to:

- **Launch under Attack** – ICBMs are launched before they are destroyed by an adversary's preemptive counterforce attack; or
- **Ride-Out** – The U.S. absorbs an adversary first strike on its ICBM force and responds with forces at a time and place of its choosing.

The President is never compelled to launch ICBMs under attack.

The strategic setting in 2010, which informed the current POR, led to these assumptions:

- New START force levels were a sufficient deterrent capability against Russia;
- The PRC was a lesser-included case; and
- The aggressive foreign policies of China and Russia, the extent of their nuclear modernization, and the possibility of conflict with China and Russia were not foreseen.

U.S. strategic force requirements were set more than a decade ago and anticipated a significantly more benign threat environment than the one the United States now faces. Therefore, the United States requires an updated strategic posture to address the projected security environment. This is an urgent task that has yet to be acknowledged.

U.S. deterrence requirements must be tailored to each adversary in light of characteristics specific to their regime (e.g., goals, values, capabilities, vulnerabilities).

Chinese and Russian force modernization and expansion confronts the United States with a two-peer threat environment. In the emerging environment, the United States must maintain a resilient nuclear force that can absorb a first strike and respond effectively with enough forces to cause unacceptable damage to the aggressor while still posing a credible threat to the other nuclear power.

If China and Russia continue on their current trajectories with respect to force modernization and expansion, the rate at which U.S. nuclear force modernization is proceeding will likely add unacceptable risk.

Deployed strategic nuclear force requirements will increase for the United States in such a threat environment.

The current multi-program, multi-decade U.S. nuclear modernization program is necessary, but not sufficient to enable the nuclear strategy recommended by the Commission to address an unprecedented two-nuclear-peer threat environment. To avoid additional risk and meet emerging challenges, the United States must act now to pursue additional measures and programs. Additional measures beyond the planned modernization of strategic delivery vehicles and warheads may include either or both qualitative and quantitative adjustments in the U.S. strategic posture.

Current U.S. nuclear capabilities are safe, secure, reliable, and effective, and all operate on a daily basis, however, they have been extended past their original design lives.

Modernizing the U.S. nuclear command and control system is urgently required to ensure it remains survivable, adaptable, resilient, and effective against future threats.

America's Strategic Posture

The nuclear deterrent modernization POR, for DOD and DOE/NNSA combined, began in 2011. Its principal traits are as follows:

- Continued adherence to the strategic triad structure and theater dual-capable aircraft structure;
- Each leg of the triad and its NC3 systems are being modernized and replaced, which presents a challenge to DOD for the next 25 years;
- The new delivery systems will begin to be fielded in the late 2020s, but currently planned modernization will require several decades;
- Unlike previous platforms, the new systems are generally being designed to operate longer, and to more easily adapt to emerging threats, such as adversary air and missile defenses; and
- DOE/NNSA will be significantly challenged to deliver on time the nuclear weapons required by DOD.

The U.S. POR calls for “just-in-time” delivery. The new systems will enter service at the same time the legacy systems must be retired. Although the POR is underway in both DOD and DOE/NNSA, significant risks to the schedule are apparent as most margin has been used. DOD and DOE/NNSA, while candid about challenges, express “can-do” confidence, notwithstanding multiple factors that are already driving delays of programs.

This just-in-time situation means that delays in elements of the POR, or any early aging out of an existing system, will create shortfalls in U.S. nuclear capabilities.

There are several ways to mitigate the impact of shortfalls created by problems in the execution of the POR, but none are optimal or completely meet the requirements of the modernization program. Some require significant additional investment and/or near-term decisions to hedge against the problem. Others may require potential near-term decisions to be able to field different warhead loads. For example, sustaining the legacy force until its modernized replacement arrives will require additional investment in order to prevent a loss of capability and sustain the U.S. vital nuclear deterrent.

Additional U.S. theater nuclear capabilities will be necessary in both Europe and the Indo-Pacific regions to deter adversary nuclear use and offset local conventional superiority. These additional theater capabilities will need to be deployable, survivable, and variable in their available yield options.

Modernizing nuclear command and control capabilities is necessary if U.S. systems are to remain resilient and effective against future threats. NC3 modernization must also address the need for cross-Combatant Command interaction in planning and executing combat operations in a regional context.

Advancements in emerging technologies could pose new risks, but also new opportunities to defend, survive, and prevail. If the United States effectively adapts and employs these technologies, they could contribute to the survivability and effectiveness of U.S. nuclear forces. Of particular note are hypersonic delivery vehicles, quantum computing, generative AI, and autonomous vehicles.

Recommendations

The Commission recommends fully and urgently executing the U.S. nuclear modernization POR, which includes replacement of all U.S. nuclear delivery systems, modernization of their warheads,

comprehensive modernization of U.S. nuclear command, control, and communications, and recapitalizing the nuclear enterprise infrastructure at the DOD and DOE/NNSA.

At the same time, the current modernization program should be supplemented to ensure U.S. nuclear strategy remains effective in a two-nuclear-peer environment. Modifications to both strategic nuclear forces and theater nuclear forces are urgently necessary.

The U.S. strategic nuclear force posture should be modified in order to:

- Address the larger number of targets. The Chinese nuclear threat is no longer a “lesser included case” of the Russian nuclear threat, resulting in the need to deter and achieve objectives against China and Russia simultaneously should deterrence fail;
- Address the possibility that China will field large scale counterforce-capable missile forces that pose a threat to U.S. strategic nuclear forces on par with the threat Russia poses to those forces today;
- Assure the United States continues to avoid reliance on executing ICBM launch under attack to retain an effective deterrent; and
- Account for advances in Russian and Chinese IAMD.

The following strategic nuclear force posture modifications should be pursued with urgency:

- Prepare to upload some or all of the nation's hedge warheads;
- Plan to deploy the Sentinel ICBM in a MIRVed configuration;
- Increase the planned number of deployed Long-Range Standoff Weapons;
- Increase the planned number of B-21 bombers and the tankers an expanded force would require;
- Increase the planned production of Columbia SSBNs and their Trident ballistic missile systems, and accelerate development and deployment of D5 LE2;
- Pursue the feasibility of fielding some portion of the future ICBM force in a road mobile configuration;
- Accelerate efforts to develop advanced countermeasures to adversary IAMD; and
- Initiate planning and preparations for a portion of the future bomber fleet to be on continuous alert status, in time for the B-21 Full Operational Capability (FOC) date.

A comprehensive set of risk-mitigating actions across U.S. nuclear forces must also be executed to ensure that delays in modernization programs or early age-out of currently deployed systems do not result in militarily significant shortfalls in deployed nuclear capability. The Commission recommends that set of urgent actions include, at a minimum:

- Exercise upload of ICBM and SLBM warheads on existing deployed systems;
- Develop plans and procedures to “re-convert” SLBM launchers and B-52 bombers that were rendered incapable of launching a nuclear weapon under New START; and
- Provide sufficient funding to ensure existing deployed systems, such as NC3 and Ohio-class SSBNs, can operate past their currently planned retirement dates, as technically feasible.

U.S. theater nuclear force posture should be urgently modified in order to:

- Provide the President a range of militarily effective nuclear response options to deter or counter Chinese or Russian limited nuclear use in theater;
- Address the need for U.S. theater nuclear forces deployed or based in the Asia-Pacific theater;
- Compensate for any shortfall in U.S. and allied non-nuclear capabilities in a sequential or simultaneous two-theater conflict against China and Russia.
- Address advances in Chinese and Russian IAMD; and
- Address allied concerns regarding extended deterrence.

The Commission recommends the following U.S. theater nuclear force posture modifications:

- Develop and deploy theater nuclear delivery systems that have some or all of the following attributes:
 - ▶ Forward-deployed or deployable in the European and Asia-Pacific theaters;
 - ▶ Survivable against preemptive attack without force generation day-to-day;
 - ▶ A range of explosive yield options, including low yield;
 - ▶ Capable of penetrating advanced IAMD with high confidence; and
 - ▶ Operationally relevant weapon delivery timeline (promptness);
- Ensure that USEUCOM and USINDOPACOM are capable of planning integrated nuclear-conventional operations in their respective areas of responsibility (AORs).

NUCLEAR SECURITY ENTERPRISE

Findings

A critical element of U.S. strategic posture is the nation's ability to develop, produce, and maintain the nuclear weapon systems necessary to enable U.S. strategy.

Expanding the infrastructure and supply chain for the nation's nuclear complex and its strategic capabilities is part of an overall national need to broaden and deepen the American defense industrial base. This includes the ability to accelerate the incorporation of emerging and innovative weapon and production technologies.

The Commission believes that due to previous years of neglect and a dangerous threat environment, the infrastructure (facilities and workforce) that enables development and fielding of strategic capabilities needs to be overhauled. This will require nothing short of a government-wide focus akin to the U.S. moonshot of the 1960s.

Unlike Russia, China, and even the North Korea, the United States does not currently have the production capacity to deliver new nuclear warheads with newly manufactured pits.

Sustainment of the legacy deterrent force and execution of the nuclear modernization POR—maintaining required capability during the complex legacy-to-modern transition in both warheads and delivery platforms—is now stressing and will continue to stress the capacity of the infrastructure and industrial base supporting both DOD and DOE/NNSA.

DOE/NNSA's infrastructure recapitalization in the nuclear weapons complex—the replacement or modernization of 1940s-era Manhattan Project and other facilities—is underway. The infrastructure modernization POR is necessary but not sufficient to meet the future threat. When the DOE/NNSA production infrastructure modernization was planned it was sized to support the stockpile the United States believed it needed in 2010 to support a New START size force. As a result, the planned DOE/NNSA production infrastructure will not have sufficient capacity to support the force needed to address the future threat.

In the Strategic Posture chapter, the Commission has recommended immediate actions to mitigate risks in the nuclear modernization POR and has recommended responses to the new threat environment, including additional capabilities to the POR. These steps will drive extraordinary demands on the already-constrained DOD and DOE/NNSA infrastructure.

DOE/NNSA's infrastructure recapitalization faces many cost and schedule issues, some of which are outside DOE/NNSA's control. Nevertheless, this recapitalization is absolutely essential to build the capacity of the complex's production capability.

Infrastructure recapitalization for both DOD and DOE/NNSA is also hindered by unpredictable incrementally funded budget levels each fiscal year, exacerbated by the continued practice of Continuing Resolutions to fund the government.

Component organizations responsible for strategic infrastructure must conduct extraordinary advocacy for budget share inside their parent organizations in order to successfully garner necessary resources in the midst of their organization's many competing demands. This advocacy is required despite public statements by senior leaders that nuclear deterrence is their highest-priority national security mission.

The challenge of hiring and retaining a skilled workforce, for both DOD and DOE/NNSA, has also grown substantially.

Diminishing manufacturing sources, lack of skilled trades in the workforce, and supply chain fragility, among other things, inhibit both sustainment and modernization of the strategic deterrent force (platforms and warheads). Both DOD and DOE/NNSA are attempting to tackle these challenges, but it remains to be seen if these shortfalls can be overcome in time to prevent a gap in required capability. These are national-level challenges that require focused Executive and Legislative Branch leadership.

Regarding organizational issues related to the DOE/NNSA nuclear weapons complex, multiple administrations have taken steps to address the findings and recommendations made by the many previous assessments of DOE/NNSA's organizational effectiveness. Continued focus is critical, especially in light of the new demands placed on the weapons complex.

Recommendations

The Commission recommends the DOD and DOE/NNSA urgently expand strategic infrastructure to ensure sufficient capacity to:

- Meet the capability and schedule requirements of the current nuclear modernization POR and the requirements of the force posture modifications recommended by the Commission in time to address the two-peer threat;
- Provide an effective hedge against four forms of risk: technical failure of a warhead or delivery system, programmatic delays, operational loss of delivery systems, and further worsening of the geopolitical environment; and

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- Communicate to U.S. adversaries that the United States has the technical capabilities and political will—paired with all other instruments of national power—necessary to ensure they cannot gain a geopolitical or military advantage through nuclear arms racing.

The Commission recommends this urgent expansion of the capacity of the U.S. nuclear weapons defense industrial base and the DOE/NNSA nuclear security enterprise include the flexibility to respond to emerging requirements in a timely fashion.

In order to support the Commission's recommended strategy, with respect to resourcing, the Commission recommends Congress:

- Fund an overhaul and expansion of the capacity of the U.S. nuclear weapons defense industrial base and the DOE/NNSA nuclear security enterprise;
- Fund NNSA's recapitalization efforts, including weapons science, design and production infrastructure. In order to support these appropriations, NNSA should deliver to Congress a long-term prioritized recapitalization plan that highlights the roles played by each facility, the highest risk factors at each facility, actions already taken to mitigate those risks, and opportunities for additional risk mitigation;
- Forge and sustain bipartisan consensus and year-to-year funding stability to enable defense industry to respond to innovative DOD contracting approaches and invest with more certainty;
- Pass annual DOD and DOE authorization and appropriation bills on time. No continuing resolutions;
- Avoid placing artificial caps on defense spending; necessary expansion of DOE/NNSA and DOD infrastructure for strategic capabilities require increases in funding for these fundamental national security priorities;
- Place purview of all 050 programs (President's Budget line item for "national security") that are in NNSA under Defense appropriations subcommittees (HAC-D, SAC-D); and
- Work with state governments and private industry to expand the manufacturing and supply base for strategic weapons.

With respect to capacity and effectiveness of the nation's infrastructure and supply chain for its strategic capabilities, the Commission recommends:

- DOE/NNSA plan to increase production capacity beyond current POR, in accord with earlier Recommendations, to meet the needs of the two-peer threat;
- DOD incentivize private industry bidding on government Request for Proposals (RFPs) by offering multi-year contracts that send a steady demand signal, especially for smaller sustainment-related requirements;
- DOE/NNSA incentivize private industry bidding on government RFPs for equipment and supplies by offering multi-year contracts that send a steady demand signal;
- DOD and DOE/NNSA continue to reform acquisition and project management processes to better reward on-time product delivery;
- DOD increase shipbuilding capacity, by working with industry to establish or renovate a third shipyard dedicated to production of nuclear-powered vessels, with particular emphasis on nuclear-powered submarines.

With respect to workforce, the Commission recommends:

- Cabinet Secretaries, working with states and union leaders, establish and increase the technical education and vocational training programs required to create the nation's necessary skilled-trades workforce for the nuclear enterprise;
 - Leaders in DOD and DOE/NNSA establish a workplace culture in the nuclear security enterprise that reinforces the strategic importance of such work; grows effective leaders, including mid-tier leaders; adjusts to new workplace expectations; rewards experimentation; recognizes failure as part of the development process; and delegates responsibility to those program experts at the lowest level who are most knowledgeable of that program's characteristics; and
 - DOD and DOE/NNSA expand use of innovative contracting methods, including offering higher pay scales for high-priority projects in order to better attract and retain skilled personnel.
- With respect to organization and governance, the Commission recommends:
- Secretary of Defense and Secretary of Energy establish the nuclear deterrence mission as the #1 priority in their Departments' processes, to help eliminate the gap between statements of priority and actual results;
 - Secretary of Energy protect and reinforce NNSA's independent role as steward of the nuclear warhead stockpile and its semi-autonomous operating model;
 - Congress elevate the Under Secretary for Nuclear Security/NNSA Administrator position in DOE to Deputy Secretary for Nuclear Security;
 - The Senate Armed Services Committee invite the nominee for Secretary of Energy to appear before the committee in advance of confirmation; and
 - The NWC expand its enterprise-wide approach in order to effectively synchronize the plans and programs of DOD and DOE/NNSA in the midst of multi-faceted challenges.

U.S. NON-NUCLEAR CAPABILITIES

Findings

China, Russia, North Korea, and Iran continue to increase their regional and intercontinental missile capabilities. Missile threats to the U.S. homeland, to U.S. Allies and partners, and U.S. forces overseas are growing both quantitatively and qualitatively.

Homeland and regional missile defense systems constitute a critical component of U.S. efforts to deter, and if necessary, defeat missile attacks by states such as North Korea and Iran, while enhancing U.S. freedom of action to conduct regional military operations. IAMD can limit or prevent damage from an adversary's offensive missile strikes, and thus contribute to the U.S. ability to deter, respond to, and stabilize crisis or conflict.

IAMD capabilities play an important role in U.S. strategy by serving as a "deterrence by denial" component of the broader deterrence framework. IAMD adds resilience to U.S. defense strategy; complicates adversary decision-making by creating uncertainty about the success of offensive missile use; reduces incentives to conduct coercive attacks by increasing the size of the attack required to, potentially, be effective; assures Allies and partners that the United States will not be deterred from fulfilling its global security commitments; and in crisis or conflict, offers a military option that may be less escalatory than offensive strikes.

America's Strategic Posture

Given Russia's and China's technical capabilities and financial resources, the United States has not built an impenetrable missile defense "shield" over the entire U.S. homeland. However, it does not need to for U.S. missile defenses to provide critical defense capabilities that contribute to deterrence.

Given the threat picture for 2027-2035, the currently planned U.S. homeland IAMD capability does not adequately defend against coercive attacks from China and Russia. Such attacks are potentially designed to dissuade and deter the United States from defending or supporting its Allies and partners in a regional conflict; keep the United States from participating in any confrontation; and divide U.S. alliances. To defend against a coercive attack from China or Russia, while staying ahead of the North Korean threat, the United States will require additional IAMD capabilities beyond the current POR.

U.S. Northern Command (USNORTHCOM) needs improved warning and defensive capabilities to protect critical U.S. infrastructure from conventional or nuclear attack from air- and sea-launched cruise missiles—systems that ground-based interceptors (GBIs) are not designed to counter. In addition, CDRUSNORTHCOM has limited authority to detect and defeat such missiles inside U.S. airspace.

Strategic investments in research, development, test and engineering of advanced sensor architectures, interceptors, cruise and hypersonic missile defenses, and area or point defenses are urgently needed. If proven feasible, these capabilities would enhance deterrence and provide a significant measure of protection for the homeland to help address coercive nuclear or conventional strikes.

The space domain provides critical capabilities for strategic posture such as protected, resilient communications; positioning, navigation, and timing; ISR; and global, persistent missile warning and attack assessment.

Space situational awareness (SSA) is and will continue to be indispensable to U.S. and allied space and terrestrial missions. SSA enables both defensive and offensive counterspace operations necessary to conduct effective terrestrial military operations.

Space is now a fully contested domain; Russia and China have fielded counterspace capabilities that make it a warfighting domain. An integrated approach to deterring adversary aggression in space is essential to protect U.S. and allied space capabilities, especially for adversaries who believe they can achieve asymmetric benefits from denying or eliminating space assets.

Survivability and durability of essential U.S. and allied space capabilities must be ensured through active defense, passive defense, and U.S. terrestrial strike and offensive counterspace capabilities. Essential U.S. space capabilities constitute critical infrastructure that merits an explicit threat of response to enhance deterrence of adversary strategic attack.

Of note, U.S. missile defense benefits greatly from space-based sensors; its mission and other national security missions stand to gain even more from increasingly capable space-based networks, including the growing cost-effective commercial capabilities.

Existing U.S. and allied general purpose forces' long-range non-nuclear precision strike capabilities are inadequate. Current programs are not pacing the threat.

Current plans to modernize and expand the nation's global mobility capabilities, especially its fleet of air refueling tankers, are inadequate for a simultaneous two-war construct.

Effective cyber defense requires a whole-of-government approach, as the Department of Defense has neither the mission nor the necessary authorities to defend civilian critical infrastructure.

It is essential to incorporate cyber capabilities into strategic and theater campaign plans and the deliberate planning process of the Combatant Commands.

Securing U.S. sensitive data will require working collaboratively with the defense industrial base.

Cyber security programs for, and active cyber defense of, the nation's strategic systems play a major role in ensuring the reliability and effectiveness of the U.S. nuclear deterrent force.

Despite frequent use of economic sanctions, the U.S. government does not have a well-understood concept nor a synchronized playbook for employing financial and economic measures to bolster U.S. efforts to deter adversary aggression. Such measures include the imposition of sanctions, trade and investment restrictions, and export controls, and depend on coordinated action within the interagency.

An important national goal is avoiding strategic surprise. The Commission is concerned that emerging technologies could result in military capabilities that would rapidly and surprisingly shift the military balance between the United States and its Allies and potential adversaries. In addition, these technologies increase the number of pathways by which new threats as well as misperceptions and miscalculations can emerge.

Emerging technologies may significantly benefit U.S. security and strengthen U.S. defense capabilities. Some applications, for instance, could improve information flow and crisis management and potentially reduce the risk of miscalculation.

U.S. advances in AI, quantum computing, additive manufacturing, ubiquitous sensing, big data analytics, and directed energy offer potential benefits to U.S. strategic posture, especially if streamlined, rapid acquisition methods are employed.

Current procurement processes are generally slow and ill-suited to adequately integrate new capabilities. Funding and bureaucratic obstacles remain impediments to rapidly using commercial capabilities. Effectively leveraging U.S. and allied innovation requires a cultural and bureaucratic shift.

Recommendations

The Commission recommends DOD develop, acquire, and deploy the Next Generation Interceptors as soon as possible.

The Commission recommends the Director of MDA, in conjunction with CDRUSNORTHCOM and CDRUSSTRATCOM, determine the required effectiveness criteria and number of additional GBIs/NGIs that will be needed overall to stay ahead of the North Korean threat. In addition, they should assess the feasibility to counter coercive attacks from cruise, hypersonic, and ballistic missiles from any adversary.

The United States should develop and field homeland IAMD capabilities that can deter and defeat coercive attacks by Russia and China. To this end, the Commission recommends the Chairman of the Joint Chiefs of Staff, in conjunction with the CDRUSNORTHCOM, identify existing or new sensor and interceptor capabilities necessary to defend critical infrastructure assets. The Secretary of Defense should ensure adequate funding is incorporated in the Service and Agency budgets to fulfill these requirements. Congress should appropriate the funds necessary for the sensors and interceptors necessary to defend these assets.

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The Commission recommends the Secretary of Defense and the Chairman of the Joint Chiefs of Staff, in conjunction with relevant Combatant Commanders, review and determine what additional IAMD requirements exist in geographic areas of responsibility and identify existing or new capabilities, including capabilities that could be provided by Allies and partners, that could provide this necessary defense. The Secretary of Defense should ensure adequate funding is incorporated in the Service and Agency budgets to fulfill these requirements.

The Secretary of Defense should direct research, development, test and evaluation into advanced IAMD capabilities, leveraging all domains, including land, sea, air, and space. These activities should focus on sensor architectures, integrated command and control, interceptors, cruise and hypersonic missile defenses, and area or point defenses. If any of these capabilities prove feasible, the Department should pursue deployment with urgency.

In order to achieve advanced, potentially game-changing missile defense/defeat capabilities, the Commission recommends Congress promptly and consistently fund significant additional new investments in the defense industrial base, cooperation with the private sector, and expansion of the technical talent pipeline in order to conduct foundational research and development, explore the application of emerging technologies, and develop advanced IAMD systems.

The Commission recommends that the Secretary of Defense and the Military Departments transfer operations and sustainment responsibility for missile defense to the appropriate Military Departments by 1 October 2024. This will allow the MDA to focus on research, development, prototyping and testing.

Funding needs to be prioritized and long-range non-nuclear precision strike programs must be accelerated to meet the operational need and in greater quantities than currently planned.

Funding needs to be prioritized and air refueling tanker programs must be accelerated to meet the operational needs of a two-theater conflict.

Department of Defense leaders should increase the focus on and continue to prioritize adaptive cyber defense of strategic delivery platforms, warheads, and NC3 systems.

Congress should not auction for commercial use those portions of the electromagnetic spectrum critical for national security and homeland defense without proper cost-benefit analysis and due diligence by DOD and other federal agencies.

DOD should accelerate and direct further development of advanced EMSO capabilities and the integration of robust EMSO into CCMD deliberate planning.

The Commission recommends the President direct a whole-of-government approach to financial and economic statecraft that analyzes what adversaries value in the economic and financial domain; plans the tailored employment of financial and economic tools in concert with planning for other tools of national power; executes a synchronized use of financial and economic levers as part of the nation's broader deterrence campaign; assesses the effects of financial tools on adversaries; and continues this analysis-planning-execution-assessment cycle until a deterrent effect is achieved.

DOD routinely conducts this type of planning for application of military forces. Therefore, DOD is well positioned to advise and assist the Treasury, State, and Commerce Departments, and others, with the planning processes for the application of financial and economic tools.

The Executive Branch should initiate and Congress should authorize and appropriate a whole-of-government focus—including a strong partnership among academia, industry, and government—to ensure the United States and its Allies remain at the cutting edge of basic and applied research of emerging technologies, such as big data analytics, quantum computing, and AI, in order to avoid strategic surprise and leverage important new tools for national security.

The Departments of Defense and Energy should further expand processes for streamlined requirements development and rapid and more agile acquisition. This would enable insertion of innovative technologies to accelerate applications of new capabilities and have an impact on the 2027-2035 strategic landscape and beyond. To this end, the Departments of Defense and Energy should establish agile acquisition pathways and set aside specific budget lines and funding to rapidly acquire and leverage innovative commercial technologies for applications to strategic deterrence. The Departments should work with Congress to allow the budget flexibility necessary, while providing transparency and ensuring accountability, to enable rapid acquisition for use of new technologies and concepts.

ALLIES AND PARTNERS

Findings

It is in the U.S. national interest to maintain, strengthen, and when appropriate expand its network of alliances and partnerships. These relationships strengthen American security by deterring aggression regionally before it can reach the U.S. homeland, while also enabling U.S. economic prosperity through access to international markets. Withdrawing from U.S. alliances and partnerships would directly benefit U.S. adversaries, invite aggression that the United States might later have to reverse, and ultimately decrease American security and economic prosperity.

Just as the U.S. benefits from its alliances, Allies rely on the U.S. strategic posture because it forms an integral part of their defense strategy. In some cases, Allies are jointly developing capabilities that benefit mutual defense. The United States uses its strategic posture to support Allies by extending to them deterrence, including nuclear deterrence, against adversaries. The U.S. strategic posture also serves to assure Allies that the United States is a credible security partner. As a result, many Allies perceive no need to develop their own nuclear weapon capabilities, which is in the U.S. national security interest. Any major changes to U.S. strategic posture, policies, or capabilities will, therefore, have great effect on Allies' perceptions and their deterrence and assurance requirements.

Given the geographic distance between the U.S. homeland and its Allies overseas, and the long lead time for force projection from the U.S. homeland, Allies stressed the importance of U.S. military forces being available in theater for deterrence and assurance purposes.

Allies perceive that the risk of Russian and Chinese aggression and potential nuclear employment has increased; and thus, U.S. nuclear and conventional capabilities are increasingly important for credible extended deterrence. Allies expressed an aversion to any major change in the current U.S. nuclear declaratory policy of calculated ambiguity.

Additionally, a strong and credible U.S. nuclear arsenal is one of the greatest nonproliferation tools the United States possesses for assuring Allies they do not need to pursue nuclear weapons of their own.

America's Strategic Posture

The relationship that exists between NATO, its member states, and the United States is strong, and deserves continuous care. The Commission supports the initiative by NATO leadership to revitalize the Nuclear Planning Group (NPG), increase the operational effectiveness of NATO DCA, and conduct additional exercises with broader participation by Allies.

The United Kingdom and France provide important nuclear forces that contribute to the NATO Alliance. The United Kingdom, in particular, contributes to deterrence and complicates adversary planning with its independent nuclear arsenal.

The Commission supports NATO Allies' commitment to increased investments in their defense capabilities in order to enhance deterrence of Russian aggression.

The special relationship that exists between the United Kingdom and the United States is strong, and deserves continuous care.

As America's oldest ally, France contributes to security in Europe and Asia, and remains an important contributor to NATO.

The Australia, United Kingdom, United States (AUKUS) agreement strengthens U.S.-allied bonds by expanding areas of cooperation and enhancing deterrent capability in the Indo-Pacific region.

The Commission supports the Washington Declaration and all ongoing efforts with Japan and South Korea to strengthen extended deterrence consultations.

Allies are increasingly concerned by the actions of Russia and China. Other Allies are equally concerned with the actions of North Korea and Iran. European Allies communicated to the Commission how the security environment has fundamentally changed due to Russia's further invasion of Ukraine, and its use of overt nuclear coercion. Likewise, Allies in Asia communicated to the Commission their increasing concern over China's aggressive foreign policies, economic coercion, and rapidly growing nuclear arsenal.

Some Allies in both Europe and Asia have thus begun to invest more heavily in their own conventional military forces, and seek opportunities to jointly develop capabilities with the United States. Allies repeatedly stressed that the worsening threat environment requires closer and stronger cooperation with the United States because the consequences of deterrence failure are so severe, and for some Allies, existential.

Recommendations

The Commission recommends the Executive branch recognize that any major change to U.S. strategic posture, policies, or capabilities will have great effect on Allies' perceptions and their deterrence and assurance requirements; as a result, any changes should be predicated on meaningful consultations.

The Commission recommends the Department of Defense continue increasing interoperability between U.S. and allied systems in order to maximize regional deterrent effects, by balancing the need for classification and export controls with the critical need to increase technological cooperation and combined capabilities.

RISK REDUCTION

Findings

The Commission believes it is of paramount importance for the United States to work to reduce strategic risks. This involves activities and programs across the U.S. government, including in nonproliferation and arms control, as well as the maintenance of strong, viable, and resilient military forces.

U.S. vital interests and international security are served by robust diplomatic engagements that reduce uncertainty and reduce the risk of deterrence failure and unnecessary arms competition. It is in the U.S. national interest to lead, and be recognized as leading, diplomatic efforts to reduce such risks.

Although the potential for a return to a more cooperative relationship with Russia and China now seems remote, we cannot rule out the possibility of change in the 2027-2035 timeframe.

Risk reduction measures can increase predictability, reduce uncertainty and the risk of misperception and miscalculation.

U.S. nonproliferation efforts and the nonproliferation regime have slowed the spread of nuclear weapons, thereby making the world safer. It is in the U.S. interest to prevent the spread of nuclear weapons to additional states.

The U.S. nuclear umbrella has protected Allies, thereby removing the need for them to develop their own nuclear weapons.

U.S. threat reduction measures have successfully constrained the availability of nuclear materials, technology, and expertise to potential proliferators.

The Commission is concerned that new developments in genetically engineered and novel biological agents pose a significant threat to U.S. and allied security, and the Commission assesses that the BWC will not effectively prevent the development and deployment of new biological weapons.

Effectively verifiable arms control measures with parties who comply with their obligations can improve international security and stability. Such measures can provide predictability and reduce the threats to U.S. vital interests and those of its Allies.

Arms control agreements in the U.S. national interest are potentially important tools to support U.S. policy goals, but given Russia's history of noncompliance and illegal treaty suspensions, and China's continued intransigence on arms control dialogue, the United States cannot develop its strategic posture based on the assumption that arms control agreements are imminent or will always be in force. In short, the United States must be prepared for a future with and without arms control agreements.

The current policy of the Chinese leadership is not to engage in substantive dialogue on nuclear arms control or risk reduction measures.

The United States cannot set its arms control limits without first determining the requirements for its overall strategic posture, and the strategy that those requirements will support.

While there is no prospect of a meaningful arms control treaty being negotiated with Russia in the foreseeable future, any future nuclear arms control treaty must, as the U.S. Senate stated in its resolution of ratification for New START, address all Russian nuclear weapons.

Emerging technologies have the potential to support U.S. efforts in arms control, verification, and risk reduction.

Certain weapon technologies deserve urgent attention, as incipient threats and potential subjects for future arms control negotiations. An example is China's development of ICBM-launched FOBS or MOBS.

Recommendations

The Commission recommends that a strategy to address the two-nuclear-peer threat environment be a prerequisite for developing U.S. nuclear arms control limits for the 2027-2035 timeframe. The Commission recommends that once a strategy and its related force requirements are established, the U.S. government determine whether and how nuclear arms control limits continue to enhance U.S. security. The United States cannot properly evaluate a future nuclear arms control proposal that will serve the U.S. interest, by reducing risk and avoiding the costs of an unconstrained nuclear arms competition, without knowing what the U.S. nuclear force requirements will be. Any future arms control proposal must be consistent with U.S. nuclear force requirements.

The Commission recommends that the United States continue to explore nuclear arms control opportunities and conduct research into potential verification technologies in order to support or enable future negotiations in the U.S. national interest that seek to limit all nuclear weapon types, should the geopolitical environment change.

Where formal nuclear arms control agreements are not possible, the Commission recommends pursuing nuclear risk reduction measures to increase predictability and reduce uncertainty and the chances for misperception and miscalculation.

The Commission recommends continued pursuit of such measures, to include: ballistic missile launch notification agreements; open ocean targeting of ballistic missiles; hotline or leadership communications agreements (crisis communications); Agreement on the Prevention of Incidents On and Over the High Seas; strategic stability talks; peacetime norms regarding activities in space and cyber space in peacetime; and military exercise notifications and transparency.

The Commission recommends that the United States use all its instruments of national power, including its strong economic, political and defense capabilities, to turn Russia and China away from their nuclear arms build-ups and toward negotiation of effectively verifiable arms control measures.

- The Commission condemns the unwarranted and illegal Russian suspension of New START.

The Commission recommends the Departments of Defense, Energy, and State in a coordinated fashion assess the potential impacts of new and emerging technologies on the U.S. strategic posture, with the goal of identifying potentially destabilizing or threatening capabilities the United States may want to address, whether through arms control negotiations or other means.

- The Commission believes China's development of FOBS/MOBS is a compelling example of this phenomenon. The Commission recommends the United States, as an urgent matter, propose an immediate global ban on further testing and deployment of missiles in a FOB/MOB mode.

The Commission recommends that the United States develop measures to prevent the proliferation of threatening emerging military technologies to hostile states.

Given the importance of preventing the further proliferation of nuclear weapons, the Commission recommends the United States continue to support the current nonproliferation regime centered on the NPT.

The Commission recommends the U.S. evaluate diplomatic measures, whether in the BWC context or beyond, to address the threat of novel biological weapons. It may be necessary to strengthen the development of multilateral transparency and enforcement mechanisms related to the handling of dangerous pathogens as well as BWC violations.

APPENDIX A: ENDNOTES

- 1 Congress established the parameters of the review and a Strategic Posture Commission to carry it out in the National Defense Authorization Act for Fiscal Year 2022, Pub. L. 117-81, 135 Stat. 2126, 117th Cong.
- 2 William J. Perry and James R. Schlesinger, *America's Strategic Posture: The Final Report of Congressional Commission on the Strategic Posture of the United States*, (United States Institute of Peace, 2009).
- 3 *Ibid*, Chairman's Preface.
- 4 A "coercive" attack consists of limited conventional or nuclear strikes intended to convince U.S. leadership that the costs of intervening or persevering in a conflict involving the attacker are too high.
- 5 National Defense Authorization Act for Fiscal Year 2022, Pub. L. 117-81, 135 Stat. 2126, 117th Cong.
- 6 *Ibid*.
- 7 For a list of definitions, see Appendix G.
- 8 James M. Inhofe, National Defense Authorization Act for Fiscal Year 2023, Pub L. 117-263, 136 Stat. 2779, 117th Cong. (2022).
- 9 Allies are states to which the United States has made security guarantees as a result of a ratified Treaty. Partners are states who share regional economic and security interests with the United States. Many partner nations are also designated as Major Non-NATO Allies (MNNA), per 22 USC § 2403. MNNA status is a designation that provides foreign partners with certain benefits in defense trade and security cooperation. While MNNA status provides military and economic privileges, it does not entail any security commitments to the designated country.
- 10 In 2022, the total GDP for U.S. Allies combined was approximately \$28 trillion, accounting for roughly 34% of global GDP. Source: The World Bank DataBank, [https://data.worldbank.org/\(object name NY.GDP.MKTP.CD; accessed June 30, 2023\)](https://data.worldbank.org/(object name NY.GDP.MKTP.CD; accessed June 30, 2023).).
- 11 Two successive U.S. Administrations, President Trump's and President Biden's, have formally recognized the Chinese and Russian threats to the international order in their respective national strategy documents.
- 12 Vital interests represent values the United States holds dear. Protecting vital interests may be cause to employ U.S. national power, including military force. While the Commission is mindful that an array of geopolitical and domestic factors are considered as part of such a decision, the Commission agrees those U.S. vital interests, *inter alia*, include:
 - » Protecting the political integrity and individual liberties enshrined in the U.S. Constitution;
 - » Ensuring territorial integrity, political sovereignty and security of the U.S. and its Allies and partners;
 - » Maintaining and furthering a stable international system that strengthens democracy, supports human rights and ensures open access to: markets and critical resources; global commons (including space and cyberspace); and free and open circulation of people, goods, ideas, and information; and
 - » Protecting the American people and their ability to engage around the world.
- 13 The Commission agrees the primary threats posed to U.S. vital interests include:
 - » Attack on the U.S. or its Allies and partners by state or non-state actors;
 - » Replacement of the post-Cold War U.S.-led international order that has enabled fair and free trade and respect for the sovereignty of nations—and that has benefitted the freedom, prosperity, and security of the American people and its Allies and partners—with a chaotic world order dominated by China and/or Russia according to the objectives of these revisionist powers;
 - » Illegitimate use of force to resolve political and territorial disputes, with the potential for conflict escalation;
 - » Disruption/distortion of international trade and access to critical resources;
 - » Interference with, or denied access to, the global commons;
 - » Spread of authoritarian rule and the associated denial of fundamental human rights and national self-determination;
 - » Creating instability that leads to failed states, thereby creating the flow of large numbers of displaced persons – predominantly to western states;
 - » Undermining relationships between the U.S. and its Allies and partners; and
 - » Misuse of information to sow discord, undermine legitimate political processes, and instigate or exacerbate societal divisions.
- 14 Joseph Biden, *National Security Strategy*, (The White House, October 12, 2022).
- 15 Office of the Director of National Intelligence (ODNI), *Annual Threat Assessment of the U.S. Intelligence Community*, (February 6, 2023).
- 16 *Ibid*.
- 17 "Has Putin threatened to use nuclear weapons?," *Reuters*, October 27, 2022.
- 18 National Intelligence Council (NIC), *Global Trends 2040 Assessment: A More Contested World*, (March, 2021).
- 19 Department of Defense (DOD), *Military and Security Developments Involving the People's Republic of China 2022: Annual Report to Congress*, (Office of the Secretary of Defense, 2022).
- 20 A "no first use" declaratory policy states that a nation will never use nuclear weapons first at any time nor under any circumstance.
- 21 *DOD, Military and Security Developments Involving the People's Republic of China 2022*.

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- 23 Ibid.
- 24 Ibid.
- 25 ODNI, *Annual Threat Assessment*, 2023.
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- 27 Admiral Charles A. Richard, Commander, *United States Strategic Command (USSTRATCOM), Fiscal Year 2023 Strategic Forces Posture*, Statement Before the House Armed Services Committee, Strategic Forces Subcommittee, March 1, 2022, 117th Cong.
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- 32 United Nations Press Release, *China's Nuclear Testing will cease with Enactment of Test Ban First Committee Told*, (October 17, 1995).
- 33 Department of State (DOS), *Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments*, (Bureau of Arms Control, Verification, and Compliance, April 2021).
- 34 DOD, *Military and Security Developments Involving the People's Republic of China 2022*.
- 35 A Fractional Orbital Bombardment System (FOBS) or Multiple Orbital Bombardment System (MOBS) achieves a low orbit at very high velocities. The weapon has no range limit and can leave orbit and engage a target at any time.
- 36 DOD, *Military and Security Developments Involving the People's Republic of China 2022*.
- 37 ODNI, *Annual Threat Assessment*, 2023.
- 38 Ibid.
- 39 Defense Intelligence Agency (DIA), *Challenges to Security in Space*, (March 2022).
- 40 ODNI, *Annual Threat Assessment*, 2023.
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- 43 ODNI, *Annual Threat Assessment*, 2023.
- 44 DOD, *Military and Security Developments Involving the People's Republic of China 2022*.
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- 48 DIA, *Challenges to Security in Space*, 2022.
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- 50 National Aeronautics and Space Administration, NASA Space Science Data Coordinated Archive, <https://nssdc.gsfc.nasa.gov/nmc/SpacecraftQuery.jsp/> (object name NSSDCA/COSPAR ID: 2020-087A; accessed June 23, 2023).
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- 52 DIA, *Challenges to Security in Space*, 2022.
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- 56 Ibid.
- 57 Ibid.
- 58 Ibid.
- 59 Ibid.
- 60 Ibid.
- 61 DIA, *China Military Power: Modernizing a Force to Fight and Win*, (2019).
- 62 DOD, *Military and Security Developments Involving the People's Republic of China 2022*.
- 63 Caitlin Campbell, *China's Military: The People's Liberation Army (PLA)*, R46808, (Congressional Research Service, June 4, 2021).
- 64 DOD, *Military and Security Developments Involving the People's Republic of China 2022*.
- 65 *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, RL33153, (Congressional Research Service, May 15, 2023).
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- 67 Ibid.
- 68 DOD, *Military and Security Developments Involving the People's Republic of China 2022*.
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- 75 ODNI, "Director of National Intelligence Daniel Coats on Russia's Intermediate-Range Nuclear Forces [INF] Treaty Violation," November 30, 2018.
- 76 North Atlantic Treaty Organization (NATO), "Statement by the North Atlantic Council on the Treaty on Open Skies," June 18, 2021, https://www.nato.int/cps/en/natohq/news_184840.htm; DOS, "Russian Noncompliance with and Invalid Suspension of New START," June 1, 2023, <https://www.state.gov/russian-noncompliance-with-and-invalid-suspension-of-the-new-start-treaty/>.
- 77 Because the Commission's substantive research ended in May 2023, the Commission did not receive a briefing on the events of June 24, 2023 in Russia; therefore, the Commission did not account for those events and their aftermath in its findings. The Commission notes continuing uncertainty about regime stability in Russia and the possibility of rapid change in its status.
- 78 ODNI, *Annual Threat Assessment*, 2023.
- 79 General James H. Dickinson, Commander, United States Space Command, *Fiscal Year 2024 Strategic Forces Posture*, Opening Statement to the House Armed Services Committee Strategic Forces Subcommittee, March, 8 2023, 118th Cong.
- 80 General Anthony Cotton, Commander, United States Strategic Command, *Fiscal Year 2024 Strategic Forces Posture*, Opening Statement to the House Armed Services Committee Strategic Forces Subcommittee, March 8, 2023, 118th Cong.
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- 82 Ibid.
- 83 Ibid.
- 84 General Anthony Cotton, Commander, United States Strategic Command, *Fiscal Year 2024 Strategic Forces Posture*, Opening Statement to the House Armed Services Committee Strategic Forces Subcommittee, March 8, 2023, 118th Cong.
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- 94 Mary Beth D. Nikitin, *Russia's Nuclear Weapons: Doctrine, Forces, and Modernization*, R45861, (Congressional Research Service, April 21, 2022).
- 95 General Anthony Cotton, Commander, United States Strategic Command, *Fiscal Year 2024 Strategic Forces Posture*, Opening Statement to the House Armed Services Committee Strategic Forces Subcommittee, March 8, 2023, 118th Cong.
- 96 Ibid.
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- 98 DIA, *Challenges to Security in Space*, 2022.
- 99 General James H. Dickinson, Commander, United States Space Command, *Fiscal Year 2024 Strategic Forces Posture*, Opening Statement to the House Armed Services Committee Strategic Forces Subcommittee, March, 8 2023, 118th Cong.
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- 102 General James H. Dickinson, Commander, United States Space Command, *Fiscal Year 2024 Strategic Forces Posture*, Opening Statement to the House Armed Services Committee Strategic Forces Subcommittee, March, 8 2023, 118th Cong.
- 103 Lieutenant General Scott Berrier, Director of the Defense Intelligence Agency, *Worldwide Threats*, Opening Statement to the Senate Armed Services Committee, April 29, 2021, 117th Cong.
- 104 ODNI, *Annual Threat Assessment*, 2023.
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- 106 Ibid.
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- 109 Ibid.
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- 111 DIA, *Russia Military Power: Building a Military to Support Great Power Aspirations*, (2017).
- 112 Ibid.

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- 114 David Hambling, "U.S. And U.K. Accuse Russia Of In-Orbit Test Of Nesting Doll Anti-Satellite Weapon", *Forbes*, July 24, 2020.
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- 117 Ibid.
- 118 Ibid.
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- 120 ODNI, *Annual Threat Assessment*, 2023.
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- 122 DIA, *Challenges to Security in Space*, 2022.
- 123 DOS, *Adherence To And Compliance With Arms Control, Nonproliferation, and Disarmament Agreements and Commitments*, 2021.
- 124 Ibid.
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- 126 Paul K. Kerr, and Mary Beth D. Nikitin, *Arms Control and Nonproliferation: A Catalog of Treaties and Agreements*, RL33865, (Congressional Research Service, April 25, 2022).
- 127 Mary Beth D. Nikitin, *Resurgence of Chemical Weapons Use: Issues for Congress*, IN10936, (Congressional Research Service, March 11, 2022).
- 128 DNI, *Annual Threat Assessment*, 2023.
- 129 Ibid.
- 130 Ibid.
- 131 Ibid.
- 132 Ibid.
- 133 "Russia Releases Footage of New S-500 Air Defence System in Action," *Reuters*, July 20, 2021.
- 134 Lieutenant General Scott Berrier, Director of the Defense Intelligence Agency, *Worldwide Threats*, Opening Statement to the Senate Armed Services Committee, April 29, 2021, 117th Cong.
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- 136 DIA, *North Korea Military Power: A Growing Regional and Global Threat*, (2017).
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- 142 Mary Beth D. Nikitin, *North Korea's Nuclear Weapons and Missile Programs*, IF10472, (Congressional Research Service, April 14, 2023).
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- 171 General Anthony Cotton, Commander, United States Strategic Command, *Fiscal Year 2024 Strategic Forces Posture*, Opening Statement to the House Armed Services Committee Strategic Forces Subcommittee, March 8, 2023, 118th Cong.
- 172 Alejandro Mayorkas, Secretary of Homeland Security, *Fiscal Year 2024 Budget Request for the Department of Homeland Security*, Committee on Homeland Security, U.S. House of Representatives, April 19, 2023.
- 173 Commission recommendations for modifications to the U.S. strategic posture—both nuclear and non-nuclear elements—are detailed in separate chapters.
- 174 LCPL Emily Weiss, *III MEF Resupplies SSBN in Philippine Sea [Image 3 of 5]*, Photograph, May 9, 2023.
- 175 DOD, *2022 Nuclear Posture Review*, (Office of the Secretary of Defense, October 2022).
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- 177 DOD, *Department of Defense Law of War Manual*, (Office of the General Counsel, 2016).
- 178 DOD, *Report of Secretary of Defense Harold Brown to the Congress on the FY1982 Budget, FY1983 Authorization Request and FY1982-1986 Defense Programs*, (1981).
- 179 For example, see General Joseph F. Dunford, Jr., “From the Chairman: Allies and Partners Are Our Strategic Center of Gravity,” *Joint Forces Quarterly* 87, no. 4 (October 2017).
- 180 The Commission does not intend to convey separate nuclear and conventional strategies; indeed, central to the Commission’s recommendations is the need to fully integrate conventional and nuclear capabilities and planning.
- 181 Eric Edelman and Gary Roughead, *Providing for the Common Defense: The Assessment and Recommendations of the National Defense Strategy Commission*, (United States Institute of Peace: 2018).
- 182 Sr. Airman Celeste Zuniga, *ACE: KC-135 fuels a B-52 [Image 1 of 5]*, Photograph, June 26, 2023.
- 183 U.S. nuclear strategy is nested within U.S. defense strategy, which is further aligned with U.S. national security strategy.
- 184 This general rule comports with a definition of deterrence articulated by the Scowcroft Commission some 50 years ago: “Deterrence is the set of beliefs in the minds of the Soviet leaders, given their own values and attitudes, about our capabilities and our will. It requires us to determine, as best we can, what would deter them from considering aggression, even in a crisis – not to determine what would deter us.” Brent Scowcroft, *Report of the President’s Commission on Strategic Forces*, (April 1983).
- 185 The capabilities required to implement this strategy recommendation are characterized in the Non-Nuclear Capabilities chapter.
- 186 Such conventional capabilities must be fully integrated with U.S. nuclear capabilities to be properly prepared for the potential of deterrence failure.
- 187 The Commission prefers to address the threat of simultaneous conflicts with Russia and China without increasing the role of nuclear weapons in U.S. defense strategy; however, this could only be achieved through increased U.S., allied, and partner investments in and optimization of conventional forces.
- 188 The Commission considers this usage of “nuclear force structure” to include numbers, composition, and methods of employment.
- 189 Here the Commission refers to the forces, resources, and structure available to execute the Commission’s recommended strategy, all of which are described in the text that follows.
- 190 U.S. Air Force, *B-21 Raider Unveiling*, Photograph, March 7, 2023.
- 191 See the remarks prepared for President Kennedy to deliver on November 22, 1963: “Remarks intended for delivery to the Texas Democratic State Committee in the Municipal Auditorium in Austin, November 22, 1963 [Undelivered]”, Papers of John F. Kennedy, Presidential Papers, President’s Office Files, Speech Files, John F. Kennedy Presidential Library, <https://www.jfklibrary.org/archives/other-resources/john-f-kennedy-speeches/austin-tx-undelivered-19631122>.
- 192 A recent example of the continuing U.S. commitment to extended deterrence is embodied in the Washington Declaration made by the U.S. and the ROK on the 70th anniversary of their alliance. See The White House, “Washington Declaration,” April 26, 2023, <https://www.whitehouse.gov/briefing-room/statements-releases/2023/04/26/washington-declaration-2/>.

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- 193 This hedging strategy was articulated in the first Nuclear Posture Review in the Clinton Administration.
- 194 DOD, *Nuclear Posture Review Report*, (Office of the Secretary of Defense, 2010).
- 195 Department of State, "New START," <https://www.state.gov/new-start/>.
- 196 David Vergun, "China, Russia Pose Strategic Challenges for U.S., Allies, Admiral Says," *Department of Defense News*, August 12, 2021.
- 197 DOD, *2022 National Defense Strategy of the United States of America*, (Office of the Secretary of Defense, October 2022).
- 198 Mauricio Campino, *170826-F-DA916-1326 [Image 18 of 20]*, Photograph, August 26, 2017.
- 199 The current U.S. strategic nuclear deterrent force consists of a sea leg, a ground leg, and an air leg that comprise a triad of complementary capabilities. Each leg includes delivery platforms, weapon systems, and warheads, and is supported by nuclear command and control capabilities. The current U.S. theater nuclear deterrent force consists of dual-capable fighter aircraft and nuclear gravity weapons that represent the U.S. contribution to NATO's deterrent capability postured in Europe.
- 200 50 U.S. Code § 2538(a), "Advice to President and Congress regarding safety, security, and reliability of United States nuclear weapons stockpile."
- 201 10 U.S. Code § 492, "Biennial assessment and report on the delivery platforms for nuclear weapons and the nuclear command and control system."
- 202 50 U.S. Code § 2525, "Annual assessments and reports to the President and Congress regarding the condition of the United States nuclear weapons stockpile."
- 203 National Nuclear Security Administration (NNSA), *Fiscal Year 2022 Stockpile Stewardship and Management Plan: Report to Congress*, (March 2022).
- 204 SBSS and LEPs are sustaining and extending the lives of existing warheads, and the triad's nuclear delivery systems, platforms and NC3 systems have received upgrades to sustain and extend the performance of the systems and increase reliability.
- 205 John R. Hoehn, *Nuclear Command, Control, and Communications (NC3) Modernization*, IF11697, (Congressional Research Service, December 8, 2020).
- 206 For a discussion of LEPs and upgrades, see Congressional Research Service Report series RL33640, *U.S. Strategic Nuclear Forces: Background, Developments, and Issues*.
- 207 DOD, *Nuclear Posture Review 2018*, (Office of the Secretary of Defense, February 2018).
- 208 The "Nuclear Security Enterprise" chapter of the report highlights the means by which the United States has sought to extend the service lives of these systems, while ensuring their safety, security, and reliability.
- 209 DOD, *2022 Nuclear Posture Review*.
- 210 The W76-2, which provides a new low-yield capability, is an exception.
- 211 According to 50 USC §2529(d)(2): "The term 'new nuclear weapon' means a nuclear weapon that contains a pit or canned subassembly, either of which is neither—(A) in the nuclear weapons stockpile on December 2, 2002; nor (B) in production as of that date."
- 212 Image adapted from the presentation by the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs to the Strategic Posture Commission.
- 213 NNSA, *Fiscal Year 2022 Stockpile Stewardship and Management Plan*, 2022..
- 214 Neither platform nor warhead is cross-compatible with the legacy systems (e.g., W80-4 cannot be used with ALCM, and LRSO cannot be used with W80-1).
- 215 Details about the many sustainment and modernization challenges that DOD and DOE/NNSA face can be found in the following reports by the United States Government Accountability Office (GAO): *Defense Nuclear Enterprise: Systems Face Sustainment Challenges, and Actions Are Needed to Effectively Monitor Efforts to Improve the Enterprise*, GAO-20-296, (March 26, 2020); *Nuclear Triad: DOD and DOE Face Challenges Mitigating Risks to U.S. Deterrence Efforts*, GAO-21-210, (May 6, 2021); *Weapon Systems Annual Assessment: Challenges to Fielding Capabilities Faster Persist*, GAO-22-105230, (June 8, 2022); *Columbia Class Submarine: Program Lacks Essential Schedule Insight amid Continuing Construction Challenges*, GAO-23-106292, (January 24, 2023).
- 216 For details, see John A. Tirpak, "Second B-21 Under Construction as Bomber Moves Toward First Flight," *Air and Space Forces Magazine*, January 15, 2021, and Stephen Losey, "B-21 first flight running 'a few months' behind," *Defense News*, March 16, 2023.
- 217 GAO, *Columbia Class Submarine*, 2023.
- 218 GAO, *Nuclear Triad*, 2021.
- 219 Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs, Presentation to the Strategic Posture Commission.
- 220 GAO, *Weapon Systems Annual Assessment*, 2023.
- 221 GAO, *DoD and NNSA Could Further Enhance How They Manage Risk and Prioritize Efforts*, GAO-22-104061, (January 20, 2022).
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- 223 Ibid.
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- 225 Office of Management and Budget, Presentation to the Strategic Posture Commission.

- 226 For details about PIRA, see Sam LaGrone, “Navy Could Extend Life of Five Ohio-class Ballistic Missile Boats to Hedge Against Columbia Program Delays,” USNI, November 1, 2022, and Caitlin Kenney, “A Handful of Ohio Subs Could Get Yet Another Service Life Extension,” *Defense One*, November 1, 2022.
- 227 Sr. Airman Clayton Wear, *Air Force Global Strike Tests Minuteman III missile with Launch from Vandenberg [Image 1 of 5]*, Photograph, February 5, 2020.
- 228 MIRVs refer to Multiple-Independently-targetable Re-Entry Vehicles.
- 229 In 50 USC, Congress has defined the term “Nuclear Security Enterprise” as the system of national laboratories and plants managed by DOE/NNSA. That term is explicitly used in the Commission's statute. The Commission acknowledges this statutory definition, but chooses to address nuclear infrastructure holistically by including infrastructure issues in both DOD and DOE/NNSA.
- 230 For example, the Titan ICBM was developed against the risk that the Atlas rocket program might be delayed. The Titan I ICBM went operational in the early 1960s and was replaced by the Titan II with a single 9MT warhead (W-53) by mid-decade. A total of 54 Titan II ICBMs were operationally deployed, and these were augmented by deployment of the Minuteman I in the mid-1960s. In turn, the Minuteman was replaced by the Minuteman II and, ultimately, by the Minuteman III ICBM each with three Multiple-Independently-targetable Re-Entry Vehicles. The Titans were eventually converted to space-launch vehicles, and briefly replaced by 50 Peacekeeper ICBMs in 1987 – each with 10 warheads. Throughout the Cold War a similar evolution of the Navy's SSBN fleet took place – from the George Washington Class SSBN, to Poseidon, to the Ohio-class – including appropriately designed weapon delivery systems and warheads for each.
- 231 For example, the overall size of the U.S. Bomber force was reduced between 1993 and 2014 largely as a result of six major DOD reviews. See Mark Gunzinger, “The Case for the B-21 Raider,” *Air and Space Forces* 106, no. 4 (April 2023).
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- 241 Facilities requiring construction, expansion, refurbishment, replacement, and/or recapitalization include but are not limited to the following infrastructure projects and their respective specializations:
- » (Plutonium Research and Pit Production) LANL's Technical Area (TA) 55 – which includes Plutonium Facility 4 (PF-4) – and the Savannah River Plutonium Processing Facility (SRPPF);
 - » (High Explosive Research and Production) The High Explosives Science and Engineering (HESE) and High Explosive Synthesis, Formulation, and Production (HESFP) facilities at Pantex;
 - » (Lithium Processing) The Lithium Processing Facility (LPF), at the Y-12 site in Oak Ridge, TN;
 - » (Uranium Processing) The Uranium Processing Facility (UPF), also at Y-12;
 - » (Non-Nuclear Components) Expansion of Kansas City National Security Complex through the Kansas City Non-Nuclear Component Expansion Transformation (KC NEXt) project; and
 - » (Tritium) Re-establishment of the Tritium Finishing Facility at Savannah River.
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- 246 David Hunter et al., *Independent Assessment of the Two-Site Pit Production Decision*, IDA Paper P-10632 (Alexandria, VA: Institute for Defense Analyses, May 2019), FOUO.
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APPENDIX B: ENABLING LEGISLATION

Sec. 1687 of the National Defense Authorization Act for Fiscal Year 2022 (Public Law 117–81—Dec. 27, 2021)

SEC. 1687. CONGRESSIONAL COMMISSION ON THE STRATEGIC POSTURE OF THE UNITED STATES.

(a) ESTABLISHMENT.—There is established in the legislative branch a commission to be known as the “Congressional Commission on the Strategic Posture of the United States” (in this section referred to as the “Commission”). The purpose of the Commission is to examine and make recommendations to the President and Congress with respect to the long-term strategic posture of the United States.

(b) COMPOSITION.—

(1) MEMBERSHIP.—The Commission shall be composed of 12 members appointed as follows:

- (A) One by the Speaker of the House of Representatives.
- (B) One by the minority leader of the House of Representatives.
- (C) One by the majority leader of the Senate.
- (D) One by the minority leader of the Senate.
- (E) Two by the chairperson of the Committee on Armed Services of the House of Representatives.
- (F) Two by the ranking minority member of the Committee on Armed Services of the House of Representatives.
- (G) Two by the chairperson of the Committee on Armed Services of the Senate.
- (H) Two by the ranking minority member of the Committee on Armed Services of the Senate.

(2) QUALIFICATIONS.—

(A) IN GENERAL.—The members appointed under paragraph

(1) shall be from among individuals who—

- (i) are United States citizens;
- (ii) are not officers or employees of the Federal Government or any State or local government; and
- (iii) have received national recognition and have significant depth of experience in such professions as governmental service, law enforcement, the Armed Forces, law, public administration, intelligence gathering, commerce (including aviation matters), or foreign affairs.

(B) POLITICAL PARTY AFFILIATION.—Not more than six members of the Commission may be appointed from the same political party.

(3) DEADLINE FOR APPOINTMENT.—

(A) IN GENERAL.—All members of the Commission shall be appointed under paragraph (1) not later than 45 days after the date of the enactment of this Act.

- (B) EFFECT OF LACK OF APPOINTMENTS BY APPOINTMENT DATE.—If one or more appointments under paragraph (1) is not made by the date specified in subparagraph (A)—
- (i) the authority to make such appointment or appointments shall expire; and
 - (ii) the number of members of the Commission shall be reduced by the number of appointments not made by that date.
- (4) CHAIRPERSON; VICE CHAIRPERSON.—
- (A) CHAIRPERSON.—The chairpersons of the Committees on Armed Services of the Senate and the House of Representatives shall jointly designate one member of the Commission to serve as chairperson of the Commission.
- (B) VICE CHAIRPERSON.—The ranking minority members of the Committees on Armed Services of the Senate and the House of Representatives shall jointly designate one member of the Commission to serve as vice chairperson of the Commission.
- (5) ACTIVATION.—
- (A) IN GENERAL.—The Commission—
- (i) may begin operations under this section on the date on which not less than 2/3 of the members of the Commission have been appointed under paragraph (1); and
 - (ii) shall meet and begin the operations of the Commission as soon as practicable after the date described in clause (i).
- (B) SUBSEQUENT MEETINGS.—After its initial meeting, the Commission shall meet upon the call of the chairperson or a majority of its members.
- (6) QUORUM.—Eight members of the Commission shall constitute a quorum.
- (7) PERIOD OF APPOINTMENT; VACANCIES.—Members of the Commission shall be appointed for the life of the Commission. A vacancy in the Commission does not affect the powers of the Commission and shall (except as provided by paragraph (3)(B)) be filled in the same manner in which the original appointment was made.
- (8) REMOVAL OF MEMBERS.—
- (A) IN GENERAL.—A member of the Commission may be removed from the Commission for cause by the individual serving in the position responsible for the original appointment of the member under paragraph (1), provided that notice is first provided to that official of the cause for removal, and removal is voted and agreed upon by 3/4 of the members of the Commission.
- (B) VACANCIES.—A vacancy created by the removal of a member of the Commission under subparagraph (A) does not affect the powers of the Commission and shall be filled in the same manner in which the original appointment was made.

(c) DUTIES.—

(1) REVIEW.—The Commission shall conduct a review of the strategic posture of the United States, including a strategic threat assessment and a detailed review of nuclear weapons policy, strategy, and force structure and factors affecting the strategic stability of near-peer competitors of the United States.

(2) ASSESSMENT AND RECOMMENDATIONS.—

(A) ASSESSMENT.—The Commission shall assess—

- (i) the benefits and risks associated with the current strategic posture and nuclear weapons policies of the United States;
- (ii) factors affecting strategic stability that relate to the strategic posture; and
- (iii) lessons learned from the findings and conclusions of the Congressional Commission on the Strategic Posture of the United States established by section 1062 of the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110–181; 122 Stat. 319) and other previous commissions and previous Nuclear Posture Reviews.

(B) RECOMMENDATIONS.—The Commission shall make recommendations with respect to—

- (i) the most appropriate strategic posture;
- (ii) the extent to which capabilities other than nuclear weapons can contribute to or detract from strategic stability; and
- (iii) the most effective nuclear weapons strategy for strategic posture and stability.

(d) REPORT AND BRIEFING REQUIRED.—

(1) IN GENERAL.—Not later than December 31, 2022, the Commission shall submit to the President and the Committees on Armed Services of the Senate and the House of Representatives a report on the Commission's findings, conclusions, and recommendations.

(2) ELEMENTS.—The report required by paragraph (1) shall include—

- (A) the recommendations required by subsection (c)(2)(B);
- (B) a description of the military capabilities and force structure necessary to support the nuclear weapons strategy recommended under that subsection, including nuclear, nonnuclear kinetic, and nonkinetic capabilities that might support the strategy, and other factors that might affect strategic stability;
- (C) a description of the nuclear infrastructure (that is, the size of the nuclear complex) required to support the strategy and the appropriate organizational structure for the nuclear security enterprise;
- (D) an assessment of the role of missile defenses in the strategy;

- (E) an assessment of the role of cyber defense capabilities in the strategy;
- (F) an assessment of the role of space systems in the strategy;
- (G) an assessment of the role of nonproliferation programs in the strategy;
- (H) an assessment of the role of nuclear arms control in the strategy;
- (I) an assessment of the political and military implications of the strategy for the United States and its allies; and
- (J) any other information or recommendations relating to the strategy (or to the strategic posture) that the Commission considers appropriate.

(3) INTERIM BRIEFING.—Not later than 180 days after the deadline for appointment of members of the Commission specified in subsection (b)(3)(A), the Commission shall provide to the Committees on Armed Services of the Senate and the House of Representatives a briefing on the status of the review, assessments, and recommendations required by subsection (c), including a discussion of any interim recommendations.

(e) INFORMATION FROM FEDERAL AGENCIES.—

(1) IN GENERAL.—The Commission may secure directly from the Department of Defense, the National Nuclear Security Administration, the Department of State, or the Office of the Director of National Intelligence information, suggestions, estimates, and statistics for the purposes of this section. Each of such agency shall, to the extent authorized by law, furnish such information, suggestions, estimates, and statistics directly to the Commission, upon receiving a request made by—

- (A) the chairperson of the Commission;
- (B) the chairperson of any subcommittee of the Commission created by a majority of members of the Commission; or
- (C) any member of the Commission designated by a majority of the Commission for purposes of making requests under this paragraph.

(2) RECEIPT, HANDLING, STORAGE, AND DISSEMINATION.—Information, suggestions, estimates, and statistics provided to the Commission under paragraph (1) may be received, handled, stored, and disseminated only by members of the Commission and its staff consistent with all applicable statutes, regulations, and Executive orders.

(f) ASSISTANCE FROM FEDERAL AGENCIES.—In addition to information, suggestions, estimates, and statistics provided under subsection (e), departments and agencies of the United States may provide to the Commission such services, funds, facilities, staff, and other support services as those departments and agencies may determine advisable and as may be authorized by law.

(g) COMPENSATION AND TRAVEL EXPENSES.—

(1) STATUS AS FEDERAL EMPLOYEES.—Notwithstanding the requirements of section 2105 of title 5, United States Code,

including the requirements relating to supervision under subsection (a)(3) of such section, the members of the Commission shall be deemed to be Federal employees.

(2) COMPENSATION.—Each member of the Commission may be compensated at not to exceed the daily equivalent of the annual rate of basic pay in effect for a position at level IV of the Executive Schedule under section 5315 of title 5, United States Code, for each day during which that member is engaged in the actual performance of the duties of the Commission.

(3) TRAVEL EXPENSES.—While away from their homes or regular places of business in the performance of services for the Commission, members of the Commission shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in the Government service are allowed expenses under section 5703 of title 5, United States Code.

(h) STAFF.—

(1) EXECUTIVE DIRECTOR.—The Commission shall appoint and fix the rate of basic pay for an Executive Director in accordance with section 3161(d) of title 5, United States Code.

(2) PAY.—The Executive Director appointed under paragraph (1) may, with the approval of the Commission, appoint and fix the rate of basic pay for additional personnel as staff of the Commission in accordance with section 3161(d) of title 5, United States Code.

(i) PERSONAL SERVICES.—

(1) AUTHORITY TO PROCURE.—The Commission may—
 (A) procure the services of experts or consultants (or of organizations of experts or consultants) in accordance with the provisions of section 3109 of title 5, United States Code; and
 (B) pay in connection with such services travel expenses of individuals, including transportation and per diem in lieu of subsistence, while such individuals are traveling from their homes or places of business to duty stations.

(2) MAXIMUM DAILY PAY RATES.—The daily rate paid an expert or consultant procured pursuant to paragraph (1) may not exceed the daily equivalent of the annual rate of basic pay in effect for a position at level IV of the Executive Schedule under section 5315 of title 5, United States Code.

(j) CONTRACTING AUTHORITY.—The Commission may acquire administrative supplies and equipment for Commission use to the extent funds are available.

(k) AUTHORITY TO ACCEPT GIFTS.—

(1) IN GENERAL.—The Commission may accept, use, and dispose of gifts or donations of services, goods, and property from non-Federal entities for the purposes of aiding and facilitating the work of the Commission. The authority under this paragraph does not extend to gifts of money.

(2) DOCUMENTATION; CONFLICTS OF INTEREST.—The Commission shall document gifts accepted under the authority provided by paragraph (1) and shall avoid conflicts of interest or the appearance of conflicts of interest.

(3) COMPLIANCE WITH CONGRESSIONAL ETHICS RULES.—Except as specifically provided in this section, a member of the Commission shall comply with rules set forth by the Select Committee on Ethics of the Senate and the Committee on Ethics of the House of Representatives governing employees of the Senate and the House of Representatives, respectively.

(l) POSTAL SERVICES.—The Commission may use the United States mails in the same manner and under the same conditions as departments and agencies of the United States.

(m) COMMISSION SUPPORT.—Not later than 60 days after the date of the enactment of this Act, the Secretary of Defense shall seek to enter into a contract with a federally funded research and development center to provide appropriate staff and administrative support for the activities of the Commission.

(n) EXPEDITION OF SECURITY CLEARANCES.—The Office of Senate Security and the Office of House Security shall ensure the expedited processing of appropriate security clearances for personnel appointed to the Commission by offices of the Senate and the House of Representatives, respectively, under processes developed for the clearance of legislative branch employees.

(o) LEGISLATIVE ADVISORY COMMITTEE.—The Commission shall operate as a legislative advisory committee and shall not be subject to the provisions of the Federal Advisory Committee Act (5 U.S.C. App) or section 552b, United States Code (commonly known as the “Government in the Sunshine Act”).

(p) FUNDING.—Of the amounts authorized to be appropriated by this Act for fiscal year 2022 for the Department of Defense, up to \$7,000,000 shall be made available to the Commission to carry out its duties under this section. Funds made available to the Commission under the preceding sentence shall remain available until expended.

(q) TERMINATION.—

(1) IN GENERAL.—The Commission, and all authorities under this section, shall terminate on the date that is 90 days after the Commission submits the final report required by subsection (d).

(2) ADMINISTRATIVE ACTIONS BEFORE TERMINATION.—The Commission may use the 90-day period described in paragraph (1) for the purpose of concluding its activities, including providing testimony to committees of Congress with respect to and disseminating the report required by subsection (d).

Sec. 8151 of the Consolidated Appropriations Act, 2022
(Public Law 117-103—Mar. 15, 2022)

(c) Congressional Commission on the Strategic Posture of the United States.—Section 1687 of the National Defense Authorization Act for Fiscal Year 2022 (Public Law 117-81; 135 Stat. 2126) is amended—

(1) in subsection (b)—

(A) in paragraph (2)(A)(ii), by inserting “(other than experts or consultants the services of which are procured under section 3109 of title 5, United States Code)” after “Federal Government”; and

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(B) in paragraph (3)(A), by striking “45 days after the date of the enactment of this Act” and inserting “April 11, 2022”; and

(2) <<NOTE: 135 Stat. 2128.>> in subsection (d)(1), by striking “December 31, 2022” and inserting “February 28, 2023”.

This division may be cited as the “Department of Defense Appropriations Act, 2022”.

Sec. 1057 of the National Defense Authorization Act for Fiscal Year 2023
(Public Law 117-263—Dec. 23, 2023)

(d) Congressional Commission on the Strategic Posture of the United States.—Section 1687(d) of the National Defense Authorization Act for Fiscal Year 2022 (Public Law 117-81; 135 Stat. 2128) is amended—

(1) in paragraph (1), by striking “December 31, 2022” and inserting “July 31, 2023”; and

(2) in paragraph (3), by striking “180 days after” and inserting “one year after”.

APPENDIX C: ACRONYMS

A2/AD	Anti-Access/Aerial Denial
AI	Artificial Intelligence
ALCM	Air-Launched Cruise Missile
AOR	Area of Responsibility
ASAT	Anti-Satellite
ATA	Annual Threat Assessment
AUKUS	Australia – United Kingdom – United States Partnership
BWC	Biological and Toxin Weapons Convention
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CBM	Confidence-Building Measures
CCMD	Combatant Command
CBW	Chemical/Biological Weapons
CCP	Chinese Communist Party
CDRUSNORTHCOM	Commander, United States Northern Command
CDRUSSPACECOM	Commander, United States Space Command
CDRUSSTRATCOM	Commander, United States Strategic Command
CRS	Congressional Research Service
CTBT	Comprehensive Nuclear Test Ban Treaty
CWC	Chemical Weapons Convention
DCA	Dual-Capable Aircraft
DHS	Department of Homeland Security
DIA	Defense Intelligence Agency
DNI	Director of National Intelligence
DOD	Department of Defense
DOE	Department of Energy
EMSO	Electromagnetic Spectrum Operations
EW	Electronic Warfare
FAW	Future Air-Delivered Warhead
FOBS	Fractional Orbital Bombardment System
FOC	Full Operational Capability
GAO	Government Accountability Office
GBI	Ground-Based Interceptor
GDP	Gross Domestic Product
GEO	Geosynchronous Earth Orbit
GLCM	Ground Launched Cruise Missile
GLONASS	Global Navigation Satellite System
GPS	Global Positioning System

America's Strategic Posture

HAC-D	House Appropriations Committee-Defense
IADS	Integrated Air Defense Systems
IAEA	International Atomic Energy Agency
IAMD	Integrated Air and Missile Defense
IC	Intelligence Community
ICBM	Intercontinental Ballistic Missile
IDA	Institute for Defense Analyses
INF	Intermediate-Range Nuclear Forces Treaty
IOC	Initial Operating Capability
IRBM	Intermediate-Range Ballistic Missile
ISR	Intelligence, Surveillance, and Reconnaissance
JCPOA	Joint Comprehensive Plan of Action
KCNSC	Kansas City National Security Campus
LANL	Los Alamos National Laboratory
LEO	Low-Earth Orbit
LEP	Life-Extension Programs
LOW	Launch-on-Warning
LOAC	Law of Armed Conflict
LRSO	Long Range Standoff Weapon
MDA	Missile Defense Agency
MDR	Missile Defense Review
MNNA	Major Non-NATO Ally
MOBS	Multiple Orbital Bombardment System
MRBM	Medium-Range Ballistic Missile
NATO	North Atlantic Treaty Organization
NC3	Nuclear Command, Control, and Communications
NCG	Nuclear Consultative Group
NDAA	National Defense Authorization Act
NDS	National Defense Strategy
NFU	No First Use
NGI	Next Generation Interceptor
NPG	Nuclear Planning Group
NPR	Nuclear Posture Review
NPT	Nuclear Non-Proliferation Treaty
New START	New Strategic Arms Reduction Treaty
NSS	National Security Strategy
NWC	Nuclear Weapons Council
ODNI	Office of the Director of National Intelligence
OMB	Office of Management and Budget
OUSD(A&S)	Office of the Under Secretary of Defense for Acquisition & Sustainment

PIRA	Pre-Inactivation Restricted Availability
PLA	People's Liberation Army
PLAAF	People's Liberation Army Air Force
PLARF	People's Liberation Army Rocket Force
PNI	Presidential Nuclear Initiative
PNT	Position, Navigation, and Timing
POM	Program Objective Memorandum
POR	Program(s) of Record
PRC	People's Republic of China
RFP	Request for Proposals
ROK	Republic of Korea
RV	Re-Entry Vehicle
SAC-D	Senate Appropriations Committee-Defense
SAM	Surface-to-Air Missiles
SAR	Synthetic Aperture Radar
SATCOM	Satellite Communications
SBSS	Science-Based Stockpile Stewardship
SLBM	Submarine Launched Ballistic Missile
SRAM	Short-Range Attack Missile
SRBM	Short-Range Ballistic Missile
SSA	Space Situational Awareness
SSBN	Nuclear Ballistic Missile Submarine
SSGN	Nuclear Guided Missile Submarine
STEM	Science, Technology, Engineering, and Mathematics
THAAD	Terminal High Altitude Area Defense
TLAM-N	Tomahawk Land Attack Missile-Nuclear
UF6	Uranium Hexafluoride
USAF	United States Air Force
USCYBERCOM	United States Cyber Command
USEUCOM	United States European Command
USINDOPACOM	United States Indo-Pacific Command
USSPACECOM	United States Space Command
USSTRATCOM	United States Strategic Command

APPENDIX D: ORGANIZATIONS ENGAGED

2018 National Defense Strategy Commission
2022-2023 Commission on Planning, Programming, Budgeting, and Execution Reform
Air Force Global Strike Command
Air Force Nuclear Weapons Center
Arms Control Association
Atlantic Council
Australian Department of Defence
B-21 Systems Program Office
Brookings Institution
Bureau of Arms Control, Verification, and Compliance, Department of State
Carnegie Endowment for International Peace
Central Intelligence Agency
Defense Security Cooperation Agency
Defense Intelligence Agency
Directorate for Strategy, Plans and Policy, Joint Chiefs of Staff
Embassy of Estonia
Embassy of France
Embassy of Japan
Embassy of Latvia
Embassy of Lithuania
Embassy of the United Kingdom
Independent Consultants
Institute for Defense Analyses
Lawrence Livermore National Laboratory
Los Alamos National Laboratory
Missile Defense Agency
National Defense University
National Institute for Public Policy
National Nuclear Security Administration
National Security Council
North American Aerospace Defense Command
Nuclear Policy Directorate, NATO International Staff
Office of the Assistant Secretary of Defense for Industrial Base Policy
Office of the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs
Office of the Assistant Secretary of Defense for Space Policy
Office of the Deputy Assistant Secretary of Defense for Nuclear and
Countering Weapons of Mass Destruction Policy
Office of the Deputy Assistant Secretary of Defense for Nuclear Matters

America's Strategic Posture

Office of the Deputy Assistant Secretary of Defense for Strategic, Space, and Intelligence Portfolio Management

Office of the Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration, U.S. Air Force

Office of the Director of National Intelligence

Office of Management and Budget

Office of Net Assessment

Office of the Under Secretary of Defense for Acquisition and Sustainment

Office of the Under Secretary of Defense for Research and Engineering

Permanent Delegation of Belgium to NATO

Permanent Delegation of Canada to NATO

Permanent Delegation of the Czech Republic to NATO

Permanent Delegation of Denmark to NATO

Permanent Delegation of Latvia to NATO

Permanent Delegation of Lithuania to NATO

Permanent Delegation of the Netherlands to NATO

Permanent Delegation of Norway to NATO

Permanent Delegation of Romania to NATO

Permanent Delegation of Slovakia to NATO

Princeton University, School of Public and International Affairs

Program Executive Office, Strategic Submarines, U.S. Department of the Navy

Sandia National Laboratories

Savannah River Site, U.S. Department of Energy

Special Competitive Studies Project

Stanford University, Department of Political Science

Strategic Systems Programs, U.S. Department of the Navy

University of Pennsylvania, Department of Political Science

U.S. Air Forces in Europe & U.S. Air Forces Africa

U.S. Cyber Command

U.S. European Command

U.S. Indo-Pacific Command

U.S. Institute of Peace

U.S. Northern Command

U.S. Space Command

U.S. Space Force

U.S. Special Operations Command

U.S. Strategic Command

APPENDIX E: COMMISSIONER BIOGRAPHIES

MADELYN R. CREEDON – CHAIR

The Honorable Madelyn Creedon had a long career in federal service; she served most recently as Principal Deputy Administrator of the National Nuclear Security Administration (NNSA) within the Department of Energy, a position she held from 2014 to 2017. She also served in the Pentagon as Assistant Secretary of Defense for Global Strategic Affairs from 2011 to 2014, overseeing policy development in the areas of missile defense, nuclear security, combatting WMD, cybersecurity, and space.

Creedon served as counsel for the U.S. Senate Committee on Armed Services for many years, beginning in 1990; assignments and focus areas included the Subcommittee on Strategic Forces as well as threat reduction and nuclear nonproliferation. During that time, she also served as Deputy Administrator for Defense Programs at the NNSA, Associate Deputy Secretary of Energy, and General Counsel for the Defense Base Closure and Realignment Commission. She started her career as a trial attorney at the Department of Energy.

Following retirement from Federal Service in 2017, Creedon established Green Marble Group, LLC, a consulting company, and currently serves on several advisory and other boards related to national security. She is also a non-resident senior fellow at The Brookings Institution and a research professor at the George Washington University Elliott School of International Affairs. She holds a J.D. from St. Louis University School of Law, and a B.A. from the University of Evansville.

JON L. KYL – VICE CHAIR

Senator Jon Kyl served 18 years in the U.S. Senate, and before that, eight years in the U.S. House of Representatives. He was elected unanimously by his colleagues in 2008 to serve as Republican Whip, a position he held until his retirement in 2013. Kyl served on the Intelligence, Judiciary, Finance and Armed Services committees among others. He was active in the Senate consideration of the Comprehensive Nuclear Test Ban Treaty, New START, and other arms limitation proposals, as well as strategic deterrence issues in numerous National Defense Authorization Acts. After retiring from the Senate, Kyl served as a member of the Board of Directors of Sandia Laboratory for three years. In 2018, he was a member of the National Defense Strategy Commission. On September 5, 2018, Kyl was appointed by Arizona Governor Doug Ducey to fill the seat of the late Senator John McCain through the end of 2018.

MARSHALL S. BILLINGSLEA – COMMISSIONER

The Honorable Marshall S. Billingslea is a senior fellow at the Hudson Institute, focusing on illicit finance and arms control. Prior to joining Hudson, Billingslea was the Special Presidential Envoy for Arms Control at the U.S. Department of State, holding the personal rank of Ambassador. In this capacity, he led arms control negotiations and worked with partners and Allies in Europe and Asia on the development and deployment of defensive capabilities. Before joining the State Department, Billingslea served as the Assistant Secretary for Terrorist Financing at the U.S. Department of the Treasury, where he built international coalitions and led U.S. efforts to counter illicit financial activities around the globe. He also served as President of the Financial Action Task Force, the global anti-money laundering watchdog. Between 2001 and 2009, Billingslea served in several senior roles within the Department of Defense and at NATO, including as Deputy Under Secretary of The Navy and Assistant Secretary General for Defense Investment at NATO. He has been decorated with the Cross of Terra Mariana by the President of Estonia; the Knight's Cross by the President of Poland; and the Cross of the Order of Merit of the Czech Republic.

GLORIA C. DUFFY – COMMISSIONER

Dr. Gloria Duffy has been president and CEO of The Commonwealth Club since 1996. She oversees the organizational strategy, programming, publications, outreach, membership and fundraising for the nation's largest and oldest public affairs forum. Prior to becoming president and CEO of the Club, Duffy was U.S. Deputy Assistant Secretary of Defense and Special Coordinator for Cooperative Threat Reduction, where she led Nunn-Lugar program negotiations and oversaw U.S. assistance for the dismantling of nuclear warheads and delivery systems in the former Soviet countries, as well as the disposal of chemical weapons and reemployment of WMD scientists on civilian research.

Prior to Duffy's service at DoD, she founded and headed Global Outlook, a Palo Alto-based research institute on international security issues; worked for the MacArthur Foundation on the creation of its international security funding program; was the start-up CEO of Ploughshares Fund; was a fellow at Stanford's Center for International Security and Arms Control; was communications director for the Arms Control Association and editor of *Arms Control Today*; and worked at the RAND Corporation for the U.S. Department of Energy on the International Nuclear Fuel Cycle Evaluation.

Duffy is the author of a RAND report on Soviet nuclear export practices, co-author and co-editor of a textbook on arms control and of a book on arms control treaty compliance. She has testified before Congress on arms control treaty compliance and cooperative threat reduction. She has served on or chaired the boards of several organizations in the international security field, including chairing the board of CRDF Global.

Duffy received her A.B. magna cum laude in 1975 from Occidental College and her M.A. (1977), M.Phil. (1980), and Ph.D. (1991), all in political science, from Columbia University in New York, where she studied at the Harriman Institute. She also holds a Doctor of Humane Letters (honoris causa), awarded by the University of San Francisco in 2006.

LISA E. GORDON-HAGERTY – COMMISSIONER

The Honorable Lisa Gordon-Hagerty served as the Administrator of the National Nuclear Security Administration and Under Secretary for Nuclear Security at the U.S. Department of Energy, where she was responsible for the management and operations of NNSA, including the safety, security, and effectiveness of the U.S. nuclear weapons stockpile; reduction in global dangers from weapons of mass destruction; the safe and effective nuclear propulsion to the U.S. Navy; and responses to nuclear and radiological emergencies in the U.S. and abroad from 2018 to 2020. Prior to this position, Gordon-Hagerty served in various federal positions within the National Security Council staff, Department of Energy, U.S. House of Representatives, and Lawrence Livermore National Laboratory, and held senior leadership positions across a number of national security-focused companies. Gordon-Hagerty holds a Master of Public Health in Health Physics and a Bachelor of Science, both from the University of Michigan. She is a member of the Council on Foreign Relations and the Health Physics Society.

ROSE E. GOTTEMOELLER – COMMISSIONER

The Honorable Rose Gottemoeller is a lecturer at Stanford University's Freeman Spogli Institute for International Studies and its Center for International Security and Cooperation. Before joining Stanford, Gottemoeller was the Deputy Secretary General of NATO from 2016 to 2019. Prior to NATO, she served for nearly five years as the Under Secretary for Arms Control and International Security at the U.S. Department of State, advising the Secretary of State on arms control, nonproliferation and political-military affairs. While Assistant Secretary of State for Arms

Control, Verification and Compliance in 2009 and 2010, Gottomoeller was the chief U.S. negotiator of the New Strategic Arms Reduction Treaty with the Russian Federation. Prior to government service, Gottomoeller was a senior associate with the Carnegie Endowment for International Peace, with joint appointments to the Nonproliferation and Russia programs.

REBECCA L. HEINRICHS – COMMISSIONER

Ms. Rebecca L. Heinrichs is a senior fellow at Hudson Institute and the director of its Keystone Defense Initiative, where she specializes in U.S. national defense policy with a focus on strategic deterrence. Heinrichs currently serves on the U.S. Strategic Command Strategic Advisory Group. She is also an adjunct professor at the Institute of World Politics and is a staff member of the Defense and Strategic Studies Program at Missouri State University. Heinrichs served on the National Independent Panel on Military Service and Readiness. She previously worked in the U.S. House of Representatives as an adviser to Members of Congress, where she focused on matters related to the Strategic Forces Subcommittee of the Armed Services Committee and was instrumental in starting the Bipartisan Missile Defense Caucus. Heinrichs holds a B.A. in history and political science from Ashland University in Ohio and was an Ashbrook Scholar. She represents the Ashbrook Center on the university's Board of Trustees. Ms. Heinrichs holds an M.A. in national security and strategic studies from the U.S. Naval War College.

JOHN E. HYTEN – COMMISSIONER

General (Ret.) John E. Hyten, USAF, served as the 11th Vice Chairman of the Joint Chiefs of Staff. In this capacity, he was the nation's second highest-ranking military officer and a member of the Joint Chiefs of Staff. Hyten attended Harvard University on an Air Force Reserve Officer Training Corps scholarship, graduated in 1981 with a bachelor's degree in engineering and applied sciences, and was commissioned a second lieutenant. His career began in engineering and acquisition before transitioning to space operations. Hyten has commanded at the squadron, group, wing and major command levels. In 2006, he deployed to Southwest Asia as Director of Space Forces for operations Enduring Freedom and Iraqi Freedom. Hyten commanded Air Force Space Command, and prior to his final assignment, was the Commander of U.S. Strategic Command, one of 11 Combatant Commands under the Department of Defense.

MATTHEW H. KROENIG – COMMISSIONER

Dr. Matthew Kroenig is Vice President and Senior Director of the Atlantic Council's Scowcroft Center for Strategy and Security and the Council's Director of Studies. In these roles, he manages the Scowcroft Center's bipartisan team of more than thirty resident staff and oversees the Council's extensive network of nonresident fellows. His own research focuses on U.S. national security strategy, strategic competition with China and Russia, and strategic deterrence and weapons nonproliferation.

Kroenig previously served in the Department of Defense and the intelligence community during the Bush, Obama, and Trump administrations. He received the Office of the Secretary of Defense's Award for Outstanding Achievement. Kroenig is also a tenured professor of government and foreign service at Georgetown University. He is the author or editor of seven books, including *The Return of Great Power Rivalry: Democracy versus Autocracy from the Ancient World to the US and China* (Oxford University Press, 2020) and *The Logic of American Nuclear Strategy: Why Strategic Superiority Matters* (Oxford University Press, 2018). His articles and commentary regularly appear in major media outlets, including: the *New York Times*, the *Wall Street Journal*, the *Washington Post*, Politico, CBS, BBC, CNN, Fox News, and NPR.

FRANKLIN C. MILLER – COMMISSIONER

The Honorable Franklin Miller is a principal at the Scowcroft Group in Washington, DC. He dealt extensively with nuclear policy and nuclear arms control issues during his 31-year government career, which included senior positions in the Defense Department and on the NSC staff. He was directly in charge of U.S. nuclear deterrence and targeting policy from 1985 to 2001 and also chaired NATO's senior nuclear policy committee, the High-Level Group, from 1997 to 2001. Miller is a member of the U.S. Strategic Command Strategic Advisory Group. He served on the Defense Policy Board from 2008-2020, on the 2008 Secretary of Defense Task Force on DOD Nuclear Weapons Management (Schlesinger Task Force), and on the 2013-2014 Congressional Advisory Panel on the Nuclear Security Enterprise (Mies-Augustine Panel). Miller is Chairman of the Board Emeritus of the Charles S. Draper Laboratory and also served twice on the Board of Directors of Sandia National Laboratory. He publishes frequently on deterrence and arms control issues.

ROBERT M. SCHER – COMMISSIONER

The Honorable Robert Scher is currently Vice President and Head of International Affairs for BP America and in this role looks at the nexus between international affairs and the energy sector globally. He is a recognized expert on national security strategy, U.S. foreign policy, and geopolitical risk. Before joining BP, Scher served as the Assistant Secretary of Defense for Strategy, Plans, and Capabilities from 2014 to January of 2017. In this role he was responsible for advising the Secretary of Defense and the Under Secretary of Defense for Policy on national security and defense strategy; the forces and contingency plans necessary to implement defense strategy; nuclear deterrence and missile defense policy; and security cooperation plans and policies. Scher previously served as the Deputy Assistant Secretary of Defense for Plans and the Deputy Assistant Secretary for South and Southeast Asia within the Office of the Assistant Secretary of Defense for Asian and Pacific Security Affairs. Prior to his roles in the Obama Administration, Scher worked at Booz Allen Hamilton, and served as a career civil servant in the Departments of Defense and State. He is a Visiting Fellow at the University of Pennsylvania's Perry World House, and serves on the Advisory Board of dcode, an emerging tech and innovation advisory firm.

LEONOR A. TOMERO – COMMISSIONER

Ms. Leonor Tomero is an expert on nuclear deterrence, national security space, and missile defense, and has been a leader in applying innovative technologies and concepts in the context of strategic stability and deterrence. She served as Deputy Assistant Secretary of Defense for Nuclear and Missile Defense Policy, where she was responsible for U.S. nuclear deterrence policy. Prior to this role, Tomero served for over a decade on the House Armed Services Committee as Counsel and Strategic Forces Subcommittee Staff Lead, where she was responsible for supporting Chairman Adam Smith in oversight and policy of a portfolio that included national security space and establishment of the U.S. Space Force, nuclear weapons, nuclear non-proliferation, nuclear clean-up, arms control, and missile defense. Before joining the Committee staff, Tomero served as Director of Nuclear Non-Proliferation at the Center for Arms Control and Non-Proliferation and as President of the Lawyers Alliance for World Security.

APPENDIX F: COMMISSION SUPPORT STAFF

Core Support Staff

William Chambers – Executive Director
Caroline Milne – Lead, Results Line of Effort
Rhiannon Hutton – Lead, Analytic Line of Effort
Allyson Buytendyk – Lead, Operations Line of Effort
Greg Weaver – Senior Advisor
Matthew Costlow – Advisor to the Vice-Chairperson
Nigel Mease – Researcher
Andrew Roberts – Researcher
Oleksandr Shykov – Researcher
Peter Solazzo – Researcher
Kelsey Stanley – Researcher
Dana Barbee – Administrator

Analytic Support

Mark Dubbs	Ralph Blackburn
Emily Parrish	James Blackwell
Jaclyn Schmitt	Michael Wheeler
David Stein	Jay Shah
John Warden	Angelo Signoracci
Theodore Wu	Jerome Burke
Neil Mithal	Eric Kiss
Matthew Reed	Chad Sbragia
Miranda Swinnen	Jeremy Teichman

Logistical/Administrative/ Communications Support

Aida Muzo	Florestine Purnell
Ana Medina	Herman Phillips
Ike Rivers	Anthony Shukosky
Patricia Sadiq	

Reviewers

David Graham
Glenn Spears
Larry Welch

APPENDIX G: DEFINITIONS

Strategic Stability: A condition in which the political relations and military balance between states that pose an existential threat to each other is such that they perceive neither a compelling need nor a viable opportunity to use military force to advance their interests at the expense of the other state.

Strategy: A method by which the United States develops and employs the instruments of national power to achieve national objectives.

Strategic Posture: The manner in which the United States is positioned to defend itself and its Allies and advance American interests. Strategic posture draws on the capacity, capability, flexibility, and resolve that the United States has developed across its tools of national power, and encompasses the forces and their supporting infrastructure and industrial base.

APPENDIX H: COMMISSION PLENARY SESSIONS SCHEDULE

Session #1	July 5, 2022
Session #2	July 28-29, 2022
Session #3	September 13-15, 2022
Session #4	October 12-14, 2022
Session #5 (Trip to Los Alamos National Laboratory)	November 8-10, 2022
Session #6 (Trip to U.S. Strategic Command)	November 29-December 2, 2022
Session #7	December 14-16, 2022
Session #8	January 10-12, 2023
Session #9	February 13-15, 2023
Session #10	March 7-9, 2023
Session #11 (Trip to Air Force Global Strike Command)	April 7, 2023
Session #12	April 11-13, 2023
Session #13	May 9-11, 2023
Session #14	June 29, 2023
Session #15	August 16, 2023

The Congressional Commission on the Strategic Posture of the United States was established by the Fiscal Year (FY) 2022 National Defense Authorization Act (NDAA), and concludes that America's defense strategy and strategic posture must change in order to properly defend its vital interests and improve strategic stability with China and Russia. Decisions need to be made now in order for the nation to be prepared to address the threats from these two nuclear-armed adversaries arising during the 2027-2035 timeframe. Moreover, these threats are such that the United States and its Allies and partners must be ready to deter and defeat both adversaries simultaneously.

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