

CHINA'S EMERGENCE AS A SECOND NUCLEAR PEER

Implications for U.S. Nuclear Deterrence Strategy



A Report of a Study Group Convened by
The Center for Global Security Research at
Lawrence Livermore National Laboratory

SPRING 2023

Production Editor/Technical Editor: *Kristine Wong*
Graphics and Cover Design Production: *Catherine Lee*

This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory in part under Contract W-7405-Eng-48 and in part under Contract DE-AC52-07NA27344. The views and opinions of the author expressed herein do not necessarily state or reflect those of the United States government or Lawrence Livermore National Security, LLC.
LLNL-MI-849567

Table of Contents

INTRODUCTION	04
EXECUTIVE SUMMARY	06
DEFINING THE PROBLEM	10
IMPLICATIONS FOR THE FUNDAMENTALS OF NUCLEAR DETERRENCE	25
IMPLICATIONS FOR U.S. STRATEGIC NUCLEAR FORCES	34
IMPLICATIONS FOR HEDGING	43
IMPLICATIONS FOR EXTENDED DETERRENCE	47
IMPLICATIONS FOR FORCE SURVIVABILITY	52
IMPLICATIONS FOR ARMS CONTROL STRATEGY	56
IMPLICATIONS FOR STRATEGIC COMMUNICATIONS	62
CONCLUSIONS	64
FINDINGS AND RECOMMENDATIONS	65
APPENDIX A: STUDY GROUP MEMBERS	74

Introduction

For the first time in its nuclear history, the United States faces two major power adversaries armed with large and diverse nuclear forces, capable of challenging the United States and its allies in a limited regional war fought with conventional forces, and bound together by a hostility to U.S.-led global and regional orders and the resolve to bring about their end. Both are armed with many new weapons, nuclear and otherwise, as well as new ideas about how to utilize them to break U.S. alliances and the U.S. will to defend its interests and thereby defeat the United States. Although not formally allied, they have defined a strategic partnership “without limits.”¹ This novel problem has been described variously as the two-near-peer problem, the two-peer problem, the three-body problem, and the tripolar problem.² For shorthand, we prefer the two-peer (2P) formulation. As we will argue further below, this is both an emerged and emerging problem, as it has implications both long-term and immediate.

For the last five decades, the United States has sought to avoid this circumstance. It has tried to move the political and military relationships with Russia and China in positive directions. It has sought to move nuclear weapons away from the center of the relationship with Russia and to keep them away from the center of the relationship with China. Towards these ends, it has tried to work with Moscow and Beijing to seize opportunities for cooperative action to reduce shared dangers, in the nuclear domain and elsewhere. The United States has also worked to create risk-reduction opportunities where they have not existed. But it has little to show for this effort. The disappointments and dead ends have taken their toll on American expectations. Compared with a decade or two ago, Americans are far more worried about the global security environment

and nuclear dangers, and U.S. policymakers face a dynamic and rapidly eroding security environment with diminished means to influence the direction of events.

Having now arrived at this point, what is to be done? Are changes to U.S. nuclear deterrence strategy required to ensure that deterrence remains effective in light of the emerged and emerging two-peer problem? Are changes to the U.S. practice of nuclear deterrence required?³ If not, why not? If so, what and how?

In an effort to answer these questions, the Center for Global Security Research (CGSR) at Lawrence Livermore National Laboratory (LLNL) convened a small study group. We met regularly through the first half of 2022. This is our report. We hope that it is useful in encouraging and informing the needed new thinking on the two-peer problem and its implications.

A list of study group members is included at Appendix A. The views expressed here are our personal views and should not be attributed to any institutions with which we are or have been affiliated. Nor should these views be attributed to the sponsors of the study group—CGSR and Lawrence Livermore National Laboratory. In associating ourselves with this report, we affirm our agreement with its general thrust and main lines of argument. This does not mean that each member supports each and every aspect of the report. We aspired to find agreement on every point but sometimes fell short. In a few cases we chose to map out our debate without resolving it, with the hope that others will benefit from the analytical framework.

-
- 1 Tony Monroe, “China, Russia partner up against West at Olympics summit,” Reuters (February 4, 2022).
 - 2 Michele Flournoy, “The Three-Body Problem; The U.S., China, and Russia,” Institute for National Security Studies Speaker Series, National Defense University (July 14, 2021). <https://inss.ndu.edu/Events/Event-View/Article/2869997/the-three-body-problem-the-us-china-and-russia>. Accessed December 14, 2022. See also Andrew Krepinovich, “The New Nuclear Age,” *Foreign Affairs* online (April 19, 2022).
 - 3 These questions were posed publicly by Admiral Charles Richard, commander of U.S. Strategic Command, as part of an effort to motivate new strategic thought about emerging challenges to deterrence, assurance, and strategic stability. See Adm. Charles Richard, “Speech to the 2021 Space and Missile Defense Symposium,” U.S. Strategic Command (August 12, 2021). <https://www.stratcom.mil/Media/Speeches/Article/2742875/2021-space-and-missile-defense-symposium/>. Accessed December 14, 2022.

The report begins with a description and analysis of the geopolitical and nuclear dimensions of the 2P problem. It then characterizes the particular military risks for the United States and its allies of the “friendship without limits.” It then explores the following key questions:

- Is change to the fundamental concepts of deterrence warranted by the emergence of a second nuclear peer?
 - Are existing and planned U.S. strategic nuclear force fit for the purpose of deterring and, if necessary, defeating two near peers simultaneously or sequentially? Does the United States have sufficient weapons of the right types? If not, what changes are needed?
 - Is the existing U.S. theater nuclear force fit for its extended deterrence purpose? If not, what changes are needed?
 - Is the United States adequately hedged? That is, does it have the capabilities and capacities in place to be able to respond in a timely and effective manner to new nuclear requirements a future president may set?
 - Is U.S. arms control strategy well aligned with the new strategic environment?
 - Are U.S. strategic communications well tailored to the challenges and opportunities of the new strategic environment?
-

Executive Summary

The evident erosion of the security environment over the last decade or two has brought with it a daunting collection of new nuclear deterrence challenges.⁴ Three stand out.

First, Russia's shift under President Vladimir Putin from partner to rival to aggressor raises basic questions about the stability of deterrence. His willingness to make heavy use of nuclear threats in a war of aggression against Ukraine and his flirtation with nuclear employment there call into question his stated conviction that nuclear wars cannot be won and thus must not be fought. Assuming President Putin continues to lead Russia after the Ukraine war, we can expect a period of nuclear provocations and nuclear-backed probing while he rebuilds.

Second, China is now a decade into what Chairman Xi Jinping has described as "significant increase in China's strategic potential" aimed at "a strong system of strategic deterrence." The then-commander of U.S. Strategic Command, speaking in 2021, coined the term "strategic breakout" to characterize China's ongoing modernization, diversification, and build-up of its nuclear forces. China has already fielded an impressive new force of land- and sea-based long-range nuclear-tipped missiles as well as a large force of missiles capable of delivering both conventional and nuclear warheads in the Northeast Asian theater. These deployments have strengthened its deterrence posture and war-fighting capabilities. These developments are more troubling when considered alongside China's growing conventional military power. With these developments, China has already emerged as a near nuclear peer of the United States. Over the next decade or so, it is likely to emerge as a full peer in both qualitative and quantitative terms.

Third, North Korea's success in creating and deploying an operational nuclear force also raises questions about the stability of deterrence. It now poses an existential threat to U.S. allies in East Asia and the risk of severe damage to the United States. Iran's status at the nuclear brink adds further

uncertainty and complexity to this picture. We can expect in one or both regions nuclear-backed provocations aimed at breaking "hostile American policies."

Thus, a key additional new factor in the deterrence landscape is the two-peer (2P) problem. China will come to equal Russia if not surpass it as a nuclear weapon state. Moreover, the two are not just peers by quantitative or qualitative metrics—they are adversaries of the U.S.-led regional and global orders who have made common cause to re-make those orders in a "friendship without limits." This is a qualitatively new and different problem. Thus, we should think of China's emergence as a nuclear peer of the United States as both additive and transformative from the perspective of U.S. nuclear deterrence. Its transformative aspects derive from the need to deter two major power adversaries simultaneously and, potentially, to wage simultaneous nuclear war against both. This need follows from the likelihood of strategic cooperation between two "friends without limits." It follows also from the potential for opportunistic aggression by one in the circumstance when the other is at war with the United States.

This new problem is both an emerged and an emerging problem. It has emerged in the sense that Russia and China already cooperate to U.S. strategic disadvantage and that China is engaged in strategic breakout. But the challenges will intensify as their nuclear and broader military modernization efforts proceed, as China achieves a greater ability to project military power in the Indo-Pacific, and as Russia proceeds with its efforts to redress the conditions in the European security order it deems unacceptable.

This new problem compels a broad re-thinking of the assumptions of U.S. nuclear policy and of the deterrence practices of the United States. This report is our effort to stimulate and inform that re-thinking. In developing the course of action recommended below, our thinking has been guided by two first principles.

4 Note that citations for information in the Executive Summary are provided later in the text when the information is introduced there.

A balanced approach is needed—that is, one combining military steps to ensure the stability and effectiveness of deterrence with a political strategy to reduce the dangers for which nuclear deterrence is relevant. This is the traditional approach to U.S. nuclear strategy and it is relevant to this new circumstance.

The proper measure of urgency is needed. There is much that the United States can and should do in the near term to adapt to the new circumstances described above. The generally laissez-faire approach of the United States until now has not served us well. But the United States should not now plan for and act upon the potential future worst case. Instead, it should act now to ensure it has the needed capacity to react in a timely manner to future erosion of the security environment.

The body of the report contains approximately 60 recommendations. The course of action we recommend encompasses the following main points:

On nuclear deterrence strategy: The emergence of a second nuclear peer is certain to drive renewed debate about the continued necessity, values, and risks of maintaining a requirement to be able to strike an enemy's nuclear forces. The growth in China's nuclear force raises a new question about just how much the United States might be able to accomplish with such counterforce strikes. It also raises a question about whether and to what extent to prepare to wage simultaneous nuclear war at the regional and/or strategic level against both peers. In our judgment, the new strategic landscape does not call into question the fundamentals of nuclear deterrence strategy as long defined in U.S. policy; preservation of a counterforce role in strategy is helpful for deterrence and assurance and also for restoring deterrence if it fails in a limited way. Also in our judgment, the United States should not ignore the requirement to prosecute two simultaneous conflicts.

On strategic nuclear forces: Today's nuclear force is, in our judgment, only marginally sufficient to meet today's requirements. For tomorrow's requirements, the deficiencies are even more striking. The United States should plan and prepare

to deploy additional warheads and bombs from the reserve it has maintained for such a possibility. Many of these warheads were down-loaded from their delivery systems to comply with the New START Treaty (NST) and can be re-loaded (although not quickly and at some expense). We recommend that the United States should upload weapons once it is no longer bound by the constraints of the New START Treaty (NST), presumably in February 2026. We cannot provide a specific number of weapons to upload to maintain the ability to deter strategic attack, assure allies, and achieve objectives if deterrence fails because that must be derived from classified guidance and threat analysis. Between now and 2026, the United States should exercise and demonstrate the ability to up-load bombers, ICBMs, and SLBMs as a signal of its ability and intent to meet its deterrence and assurance requirements. It should also act to strengthen deterrence of theater nuclear employment (see the discussion of extended deterrence below). Looking to the longer term, the United States should maintain the triad of strategic delivery systems while strengthening its hedge posture, as below.

On hedging: Hedging involves taking steps now to prepare for a future in which new factors generate different requirements. We cannot now know the future choices leaders in Moscow, Beijing, and elsewhere might make about what additional or different strategic capabilities to seek. Future U.S. leaders may also come to see more or different capabilities as necessary, especially if Russia and/or China continue to grow their forces beyond the levels predicted in 2026. If those future U.S. leaders deem a larger nuclear force necessary, or decide to seek supplemental capabilities, the capabilities and capacities to enable timely implementation must be in place—something that requires decisions and investments now. Assuming the United States proceeds as recommended above to up-load warheads beginning in 2026, it should be planning now to re-set the hedge so that it is not left without a response to future geopolitical and technical developments. Such a re-set should involve more than simply replenishing the supply of reserve warheads. Instead, the United States should develop the agile nuclear infrastructure long espoused by political and military leadership but never implemented. This requires that senior leaders bring a sense of importance and urgency

to the nuclear weapons enterprise and enable more innovative approaches by relaxing the constraints of a highly risk-averse oversight culture.

On extended deterrence: The emerging two-peer problem compels significant adaptations to both the hardware and software of extended nuclear deterrence—that is, to capabilities and force posture and to planning, exercises, consultation measures, nuclear deterrence campaigning, and risk reduction measures. On hardware, the United States should ensure the prompt availability of the F-35 Joint Strike Fighter and the B-21 bomber for the nuclear mission, demonstrate the global availability and survivability of U.S. nuclear-capable fighter-bombers and bombers, and develop supplemental forward deployable assets. In this regard, the majority of the study group recommends development and deployment of the sea-launched cruise missile (SLCM/N). On software, the United States should work with NATO allies to fully implement previously agreed steps to strengthen NATO's nuclear deterrence while working with allies in the Indo-Pacific to strengthen nuclear consultation processes. The United States should also work with allies in both regions to define a new division of deterrence labor, given that allies in both theaters will be affected by the impacts of Russian or Chinese aggression. A new division of labor is required by the challenges of deterring aggression in the second theater if the United States finds itself at war with a major power rival in the other theater.

On force survivability: The need to monitor two nuclear peers simultaneously adds significantly to the challenges of ensuring timely warning of strategic attack. Accordingly, the ability of U.S. strategic forces to survive attack is of rising concern. One response could be to increase their numbers. A better response is to improve their ability to survive preemptive attack (prelaunch survivability) and adversary defenses (post-launch survivability). In the near term, the United States should improve pre-launch survivability by exercising measures to enhance bomber survivability. In the longer term, it should ensure increased resilience of nuclear command, control, and communications (NC3) systems; field defenses against limited missile attacks (ballistic, cruise, or hypersonic) on select critical assets; and explore additional ways to further enhance survivability of nuclear forces, such as deployment of a submarine-launched nuclear-tipped cruise missile (SLCM/N). The United States should also seriously explore making a portion of the ICBM force road-mobile (but garrison-based), and take steps to ensure that the Sentinel ICBM can be made

mobile in the future if necessary. This enhances the survivability of the ICBM force without increasing the need to consider launch under attack and hedges against a breakthrough in anti-submarine warfare. Adversary defenses do not yet pose a significant post-launch survivability threat to U.S. nuclear forces, but they may do so in the future. In the longer term, the United States should take the steps necessary to ensure future defense penetration, including development of advanced countermeasures and maneuvering reentry vehicles.

On arms control strategy: The United States must prepare simultaneously for a world with and without arms control. In pursuit of a world with arms control, the U.S. should prepare concrete proposals that serve its interests as well as those of Russia and China. The United States should consider a deal that creates a common ceiling of total nuclear weapons for the U.S., Russia, and China that provides the freedom to determine the needed mix of strategic and theater weapons so long as such a ceiling ensures that the United States can implement its nuclear deterrence and employment strategies effectively now and in the future. At the same time, the U.S. should prepare for an unconstrained environment. Failing to prepare for an unconstrained environment will result in the United States having no negotiating leverage that it can use to try to prevent such an environment. How it might choose to compete is an open question. But the next nuclear arms race is already taking shape. Whether Russia and/or China are sprinting to try to seize and hold some new nuclear advantage is debatable. But the United States is not ready to keep pace even at the current rate of Russian and Chinese force expansion; it cannot even adapt “at the speed of relevance.”

On strategic communications: U.S. nuclear declaratory policy must be refined to reflect the new context. The United States should send a clear message of confidence in its deterrent even in a new strategic context. But strategic messaging involves more than declaratory policy. Recognizing that deeds are likely to speak louder than words to President Putin and Chairman Xi, and their inner circles, the United States should take the many actions recommended by this report and explain them publicly to signal that it grasps the new context and is acting to defend its interests and allies. The United States must also recognize that the information ecosystem is congested, competitive, and adversarial. The United States should compose and conduct national deterrence campaigns that include a significant information component. U.S. allies should have

complementary campaigns. That component should do more than counter disinformation; it should set out and daily reinforce a narrative that advances U.S. national interests.

On the domestic political context: The course of action recommended by this study is controversial. But the controversies are unavoidable. This study's recommendations for increased and improved U.S. strategic and regional nuclear forces will be anathema to those in Congress and elsewhere predisposed to minimal nuclear deterrence capabilities, or wary of the costs, regardless of the expanding threat. Likewise, there are those in Congress and elsewhere who believe the time is well past to take forceful corrective action, even if it means tearing up the New START treaty. Tension over these matters could put bipartisan support for the Obama-Trump-Biden nuclear modernization program and for nuclear arms control (under the right conditions) under new strain. The recommendations in this report suggest several national level decisions that lie ahead. In the near-term, Congress must continue to support

funding for the Obama-Trump-Biden nuclear modernization program. Cost increases and delays are likely—as they are in every major defense acquisition program—yet Congress must continue to sustain full funding for this important replacement program. The administration must also develop and put into place over the next two years a plan for the expeditious uploading of reserve warheads onto existing missiles and aircraft starting in 2026; Congress must approve the funding to support this effort. Agreement must also be reached on proceeding with options to improve U.S. posture and capabilities for deterring theater nuclear employment. Finally, the administration must work with Congress to develop an arms control framework to replace the New START treaty scheduled to expire in 2026. Additional decisions recommended by this report will have to be made toward the end of this decade as we see how the threat develops. The problem presented by two nuclear-armed major power adversaries is more than the sum of its parts. But we must understand the parts before we can understand the whole.

Defining the Problem

The Geopolitical Context

The two near-peer problem is a manifestation at the nuclear level of a much deeper phenomenon: the interweaving of five main factors in a dynamic and eroding security environment.

CHINA'S AMBITION

Chairman Xi Jinping has the ambition to dramatically re-make the economic and security order in East Asia, as well as the global order, by the 2049 centennial of the founding of the People's Republic. This is manifest in his stated desire to put China "at the center of the world stage, in the dominant position."⁵ This political drive is very strong. As Lee Kwan Yew, the long-time leader of Singapore, argued in 2013, China's "reawakened sense of destiny is an overpowering force...China wants to be China and accepted as such, not as an honorary member of the West."⁶ This ambition comes with a particular view of the United States and the order it has led. As one Chinese Communist Party leader put it in 2016, "The Western centered world order dominated by the U.S. has made great contributions to human progress and economic growth. But those contributions lie in the past."⁷ One of China's chief America watchers has argued more pointedly that the United States is "spiritually exhausted,

physically weak, and no longer capable of carrying the world."⁸

To fulfill this geopolitical ambition, China pursues a comprehensive strategy. Politically, it seeks a more multipolar world order to allow "greater freedom of maneuver,"⁹ a "new type of international relations toward a community of common human destiny,"¹⁰ and "the great rejuvenation of the Chinese nation."¹¹ It seeks an Asia free of the influence of outside powers: "It is for the people of Asia to run the affairs of Asia."¹² Economically, it seeks to build an alternative development model that allows developing nations "greater independence from interference" while ensuring that China enjoys "superordinate influence" and "partial hegemony."¹³ Militarily, Xi has determined that "China will become a global leader in terms of composite national strength and international influence" with a "world class army" prepared to fight and win "informatized local wars."¹⁴ Surveying in 2018 China's progress in implementing this strategy, Xi concluded that China has "fundamentally strengthened strategic self-confidence" as a result of its successes.

RUSSIA'S GRIEVANCE

Justifying his military-backed annexation of Crimea in 2014, President Putin spoke under a banner

-
- 5 Office of the Secretary of State, *The Elements of the China Challenge*, report prepared by the Policy Planning Staff (2020). See also Daniel Tobin, "How Xi Jinping's 'New Era' Should Have Ended U.S. Debate on Beijing's Ambitions," Center for Strategic and International Studies (May 8, 2020). <https://www.csis.org/analysis/how-xi-jinpings-new-era-should-have-ended-us-debate-beijings-ambitions>. Accessed December 14, 2022.
 - 6 Graham Allison, Robert D. Blackwill, and Ali Wyne, "Lee Kuan Yew: The Grand Master's Insights on China, the United States, and the World," book excerpts, Belfer Center for Science and International Affairs, Harvard Kennedy School (February 1, 2013). <https://www.belfercenter.org/publication/lee-kuan-yew-grand-masters-insights-china-united-states-and-world#excerpts>. Accessed December 14, 2022.
 - 7 Fu Ying, "The US world order is a suit that no longer fits," *Financial Times* (January 6, 2016). <https://www.ft.com/content/c09c6cb6-b3cb-11e5-b147-e5e5bba42e51>. Accessed December 14, 2022.
 - 8 See Rush Doshi, "Beijing Believes Trump Is Accelerating American Decline," *Foreign Policy* (October 12, 2020). <https://foreignpolicy.com/2020/10/12/china-trump-accelerating-american-decline/>. Accessed December 14, 2022. Original reference: 武心波, "百年未有之大变局, 中日关系有"明"暗". <https://www.jfdaily.com/staticsg/res/html/journal/detail.html?date=2019-01-15&id=264728&page=08>. Accessed December 14, 2022.
 - 9 Hu Jintao, quoted in Rush Doshi, *The Long Game: China's Grand Strategy to Displace American Order* (Oxford: Oxford University Press, 2021), p163.
 - 10 Xi Jinping, remarks to the Opening Ceremony of the 19th Communist Party of China National Congress, "Opening ceremony of the 19th CPC National Congress," China.org, timestamp 10:07 (October 17, 2017). <http://live.china.org.cn/2017/10/17/opening-ceremony-of-the-19th-cpc-national-congress/>. Accessed December 14, 2022.
 - 11 As discussed in Doshi, *The Long Game*.
 - 12 Xi Jinping, "New Asian Security Concept for New Progress in Security Cooperation," remarks at the Fourth Summit of the Conference on Interaction and Confidence Building Measures in Asia (May 21, 2014). https://www.fmprc.gov.cn/mfa_eng/wjdt_665385/zjyh_665391/201405/t20140527_678163.html. Accessed December 14, 2022.
 - 13 Doshi, *The Long Game*, p264.
 - 14 "China Focus: CPC speeds up modernization drive toward 'great' socialist China," Xinhua News Agency (October 18, 2017). http://www.xinhuanet.com/english/2017-10/18/c_136689475.htm. Accessed December 14, 2022.

proclaiming “new rules or no rules.”¹⁵ His way of thinking was evidently taking shape much earlier. As his speech to the Munich Security Conference in 2007 attests, he had become strongly critical of what he deemed to be the failure of the West to seize the opportunity he had presented for improved relations.¹⁶ In 2014, he expressed strong opposition to a European security order that he deemed designed for the purpose of encircling and containing Russia and preventing its recovery from the post-Soviet decay.¹⁷ He took particular offense at President Obama’s statement in 2013 that Russia was nothing more than a regional power. Since then, he has demonstrated repeatedly what life without rules acceptable to Russia will mean to others. While the West talked cooperation, Putin decided to engage in aggressive nuclear saber rattling, violate the INF treaty, interfere in the domestic politics of Western countries, invade Georgia (and risk direct blows with NATO), annex Crimea, poison his critics overseas with chemical agents banned by the Chemical Weapons Convention, and support a criminal regime in Syria, while killing his political opponents and violently repressing domestic dissent. This is President Putin living by the “no rules” code.

President Putin’s grievance clearly came through in his March 2018 explanation of Russia’s evolving strategic posture: “No one listened to us then. So listen to us now.”¹⁸ His aggression against Ukraine attests to his revisionist agenda.¹⁹ After all, as Russian diplomats well explained in the preceding weeks, aggression was part of a campaign of continued military activity aimed at pressuring the West into reversing conditions in the European security order that Putin deems unacceptable.²⁰

THE FRIENDSHIP WITHOUT LIMITS

The commitment of President Putin and Xi to strategic cooperation is most clearly reflected in the statement issued after a meeting at the start of the Winter Olympics in Beijing in February 2022 that immediately preceded the invasion of Ukraine:

The sides believe that certain States, military and political alliances and coalitions seek to obtain, directly or indirectly, unilateral military advantages to the detriment of the security of others, including by employing unfair competition practices, intensify geopolitical rivalry, fuel antagonism and confrontation, and seriously undermine the international security order and global strategic stability. The sides oppose further enlargement of NATO and call on the North Atlantic Alliance to abandon its ideologized cold war approaches, to respect the sovereignty, security and interests of other countries, the diversity of their civilizational, cultural and historical backgrounds, and to exercise a fair and objective attitude towards the peaceful development of other States. The sides stand against the formation of closed bloc structures and opposing camps in the Asia-Pacific region and remain highly vigilant about the negative impact of the United States’ Indo-Pacific strategy on peace and stability in the region.²¹

Russian and Chinese cooperation could take many forms along the continuum of conflict. In a time of militarized crisis, they could openly conspire or privately collude to compel the United States to split its attention and resources between two theaters. In time of war, they could coordinate

15 President of Russia, “Meeting of the Valdai International Discussion Club, Transcript” (October 24, 2014). <http://en.kremlin.ru/events/president/news/46860>. Accessed December 14, 2022.

16 President of Russia, “Speech and the Following Discussion at the Munich Conference on Security Policy,” Transcript (2007). <http://en.kremlin.ru/events/president/transcripts/copy/24034>. Accessed December 14, 2022.

17 Address by President of the Russian Federation (March 18, 2014). <http://en.kremlin.ru/events/president/news/20603>. Accessed December 14, 2022.

18 Tony Wesolowski, “‘Listen To Us Now’: Putin Unveils Weapons, Vows to Raise Living Standards In Fiery Annual Address” (March 1, 2018). <https://www.rferl.org/a/putin-set-give-annual-address-amid-presidential-election-campaign/29069948.html>. Accessed December 14, 2022.

19 Alexey Arbatov, “The vicissitudes of Russian missile defense,” *Bulletin of Atomic Scientists* (June 28, 2018). <https://www.tandfonline.com/doi/abs/10.1080/00963402.2018.1486595>. Accessed December 14, 2022.

20 The Ministry of Foreign Affairs of the Russian Federation, “Agreement on measures to ensure the security of The Russian Federation and member States of the North Atlantic Treaty Organization. Draft” (December 17, 2021). https://mid.ru/ru/foreign_policy/rso/nato/1790803/?lang=en. Accessed December 14, 2022. The Ministry of Foreign Affairs of the Russian Federation, “Treaty between The United States of America and the Russian Federation on security guarantees. Draft” (December 17, 2021). https://mid.ru/ru/foreign_policy/rso/nato/1790818/?lang=en. Accessed December 14, 2022.

21 President of Russia, Joint Statement of the Russian Federation and the People’s Republic of China on the International Relations Entering a New Era and the Global Sustainable Development (February 4, 2022). <http://en.kremlin.ru/supplement/5770>. Accessed December 14, 2022.

actions to divide the United States from its allies, to slow U.S. power projection, and to pose risks of escalation, both horizontal and vertical. In conflict below the lethal threshold, Russia and China can and do cooperate to shape the information ecosystem to their advantage and to press their case that the existing rules of international order are unjust and unworkable. For example, in 2019 Russia and China began joint bomber patrols that have become routine, on the argument that they help maintain global strategic stability.²² These are all facets of the problem of concerted nuclear-backed aggression.

Moreover, to disadvantage the United States and its allies, they need not cooperate at all. One may simply seize the opportunity to try to gain and hold some new strategic interest when the United States is heavily engaged in a crisis or war with the other. This is the problem of opportunistic nuclear-backed aggression.

THE WILDCARDS

There are at least three wildcards. First, the risk of opportunistic or coordinated third-party aggression by a nuclear-armed adversary is not, unfortunately, limited to major power rivals. North Korea may also try to seize such an opportunity, potentially in cooperation with its ally, China. North Korea's continued progress in developing and deploying long-range missiles and lightweight nuclear weapons is alarming for many reasons—including its past provocations at the military level and a nuclear strategy that Kim Jong Un describes as including a "hidden role" beyond deterrence related to redressing the "unacceptable" political stalemate on the Korean peninsula.²³ This wildcard will only become more prominent if Iran pursues capabilities similar to North Korea's.

The second wildcard is U.S. allies and partners. Although the assurance of U.S. allies and partners about the credibility of U.S. security guarantees has been a U.S. policy priority for decades, anxieties run high in some allied capitals. This is especially so in Northeast Asia, where the lengthening nuclear shadows cast by North Korea and China

are generating new debates within allied publics and governments about whether and when to seek national nuclear deterrents of their own.²⁴ A decision by one or more U.S. allies or partners to enter the nuclear club would deliver a huge shock to U.S. alliances globally and to the international order generally. Such a decision could also engender an aggressive response from our potential adversaries, risking war.

The third wildcard is the United States itself. Although American public support for an international leadership role, for U.S. alliances, and for military spending remains strong, it has wavered at the leadership level.²⁵ Americans might elect leaders who seek to lead the nation in different directions. U.S. allies and partners must account for the possibility that the American public will elect a president determined to withdraw the United States from its international commitments and to leave allies to fend for themselves. Leaders in Moscow and Beijing will survey this landscape and conclude that their predictions of American decline and retreat will prove true. They see waning confidence as their own increases. Do they also conclude that America may decide not to defend traditional American interests if they are attacked?

The sum of these geopolitical parts is troubling to us but the whole is potentially catastrophic. From the geopolitical perspective, the risk of major power war is real and appears to be rising.

The Nuclear Context

The nuclear context is also dynamic and eroding. Here there are two main factors.

CHINA'S STRATEGIC BREAKOUT

For 30 years, China's military has been focused on the challenge of local wars under informatized conditions.²⁶ The People's Liberation Army (PLA) has developed a theory of victory in crisis and war—that is, a way of war built around ideas about how to deter and defeat the United States and its allies in circumstances short of "unrestrained war."²⁷ This way of war is built around multi-dimensional,

22 Nobuhiro Kubo et al., "Russian and Chinese jets deliver pointed send-off on last day of Biden Asia trip," Reuters (May 24, 2022).

23 "North Korea's Kim vows to 'strengthen' nuclear arsenal at military parade," France 24 (April 26, 2022).

24 Jennifer Ahn, "The Evolution of South Korea's Nuclear Weapons Policy Debate," Council on Foreign Relations (August 16, 2022). <https://www.cfr.org/blog/evolution-south-koreas-nuclear-weapons-policy-debate>. Accessed December 14, 2022.

25 Karl Friedhoff, "Democrats, Republicans Support Alliances, Disagree on International Organizations," Chicago Council on Global Affairs (January 26, 2021). <https://www.thechicagocouncil.org/research/public-opinion-survey/democrats-republicans-support-alliances-disagree-international>. Accessed December 14, 2022.

26 M. Taylor Fravel, *Active Defense* (Princeton, NJ: Princeton University Press, 2019).

27 Brad Roberts, *Theories of Victory, Red and Blue*, Livermore Paper No. 7 (Livermore, CA: Center for Global Security Research, 2020).

multi-domain, and trans-regional operations and the conviction that China can best the United States in a confrontation over Taiwan by taking advantage of mass and geography and winning a competition of risk-taking because of an asymmetry of stake that favors China. These developments have reinforced in the United States both the expectation of war and of unwelcome and destabilizing escalation in war if it occurs.

Then in 2021 came the revelations about the size and scale of China's nuclear ambitions. The expansion of China's nuclear forces must be described as massive and rapid. In fact, this expansion has repeatedly exceeded the scope, scale, and schedule estimates of the U.S. intelligence community.²⁸ For example, as recently as 2020, the U.S. Department of Defense (DOD) assessed that China would double the size of its nuclear stockpile, then estimated in the low 200s, within the decade.²⁹ Since then, China has accelerated its efforts and may possess up to 700 deliverable warheads by 2027 and will likely have about 1,000 deliverable warheads by 2030.³⁰ Nothing suggests that China's leaders intend to stop there.

China's future nuclear ambitions have become a topic of profound concern. Chairman Xi Jinping has made it clear that those ambitions are significant and long term, and linked directly to China's ambitions of world leadership, as the following sequence of statements attests. Shortly after assuming the presidency in 2012, Xi publicly embraced China's nuclear force as "a strategic pillar of China's great power status"—a role articulated by no previous Chinese leader.³¹ Speaking to the CCP Central Committee in 2013, he stated that:

We must concentrate our efforts on bettering our own affairs, continually broaden our comprehensive national power, improving the lives of our people, building a socialism that is superior to capitalism, and laying the foundation for a future where we will win the initiative and have the dominant position.³²

In 2016 Xi promised "a great rise in strategic capabilities" and in 2017 "breakthroughs...in strategic deterrence capability." And as already noted, in 2020 he promised that by 2049 China would become "a leader in composite national strength and national influence...at the center of the world stage." In 2021, he directed that China "accelerate the construction of advanced strategic deterrent" capabilities.³³

The ongoing rapid expansion of China's nuclear forces indicates that Beijing has made one of two decisions. Either it has decided that the current role of nuclear weapons in its strategy requires a far larger and more diverse force, or it has decided that the role of nuclear weapons in its strategy needs to change in ways that require a force that is far larger and more diverse. We don't know which of these is true. Neither is reassuring. But the likelihood of significant change to China's nuclear strategy is underscored by particular features of the modernization program.

First, China is building a ballistic missile attack assessment capability and a command-and-control system that will enable it to adopt a Launch Under Attack posture similar to that of the United States and Russia.³⁴ This will make China's silo-based ICBM force survivable for the first time, just as its size is being massively increased. It is troubling that, unlike the United States and Russia, China has no experience operating such a warning system tied directly to the ability to launch ICBMs under attack.

Second, China is fielding a very large theater force of dual-capable missiles with precision guidance capabilities that will enable the effective use of low-yield weapons.³⁵ This force will give China an array of limited theater nuclear options it has not had before—options that are arguably inconsistent with China's stated policy of no-first-use. Of note, these options would be consistent with a coercive limited use strategy akin to Russia's. Whether this is a case of "technology push" or "strategy pull," the fact is that China will have a force capable of supporting a very different nuclear strategy

28 *Military and Security Developments Involving the People's Republic of China, 2021*, Annual Report to Congress, Office of the Secretary of Defense (2021).

29 *Military and Security Developments Involving the People's Republic of China, 2020*, Annual Report to Congress, Office of the Secretary of Defense (2020).

30 Admiral Charles Richard, commander, United States Strategic Command, remarks to the 2022 Space and Missile Defense Symposium (August 11, 2022).

31 Cited in Tong Zhao, "What is Driving China's Nuclear Buildup?" Carnegie Endowment Commentary (August 5, 2021).

32 Xi Jinping, "Uphold and Develop Socialism with Chinese Characteristics," speech to the Central Committee of the Chinese Communist Party (January 5, 2013).

33 As cited in Tong Zhao, "Why is China Building Up its Nuclear Arsenal?" *New York Times* (November 15, 2021).

34 *Military and Security Developments Involving the People's Republic of China, 2021*.

35 *Ibid.*

than the one it has long proclaimed—and which contributed to the ability of U.S. strategy and force posture to treat China's nuclear capability as a lesser included case.

Third, China flight tested a fractional orbital bombardment capability in 2021 that could also be utilized as an orbital bombardment system.³⁶ In the Cold War, both the United States and the Soviet Union abandoned such systems in part due to the destabilizing effects they could have in a crisis or conflict. Such a system poses a potential decapitating threat to the U.S. nuclear command and control system. China's disregard of the strategic instabilities generated by such weapons is especially troubling. China's pursuit of such a novel weapon system also reinforces concern that China may be seeking something other than parity with the United States. An arms race in this category of weapons, which would dramatically reduce the warning that all major nuclear powers can now expect, would make all three nuclear peers less secure.

These developments are troubling indicators of China's intent. They strongly suggest that China is moving away from its legacy strategy and toward something more ambitious and troubling. While its long-term nuclear ambitions remain unclear to outsiders, it is clear that China is aggressively improving its nuclear capabilities as part of its strategy to "continuously broaden national power" and attain "the dominant position" in the international system.

China's strategic breakout raises fundamental questions about the needed responses and policies of the United States. The evolving China-U.S. nuclear relationship has reached a point analogous to the point reached by the Soviet Union and the United States in the late 1950s, as the Soviet build-up of long-range nuclear delivery systems stripped away the superiority that the United States had enjoyed for a decade. In the 1960s, this development raised new, basic questions about how to stabilize strategic competition and credibly extend nuclear deterrence to allies in Europe and Asia. Today, China cannot simply be treated as a lesser-included case in U.S. nuclear deterrence strategy.

RUSSIA'S FULL NUCLEAR EMBRACE

Like China, Russia has been focused for three decades on "the challenge of deterring and defeating a conventionally-superior nuclear-armed major power and its allies." Like China, it believes that an underlying asymmetry of stake in conflicts on its periphery favors its interests and lends credibility to its threats to escalate. Like China, it is building up, diversifying, and adapting its nuclear forces. Unlike China, there is no doubt about the associated nuclear strategy—which puts nuclear weapons at the center of Russian military and political strategy and envisions their limited use as a means of political coercion in war.

Russia has a three-part nuclear strategy.³⁷ The first is to threaten an adversary with unacceptable damage in order to deter existential threats to Russia, particularly large-scale nuclear threats. The second is to initiate limited first use of nuclear weapons to coerce termination of an ongoing conventional war on terms acceptable to Russia (it is unclear whether acceptable equates with victory). The third is to conduct large-scale nuclear operations against an adversary's conventional forces that pose a threat to the very existence of the Russian state. The first and third parts are clearly stated in Russia's 2020 doctrinal decree; it leaves room for the second part but does not clearly state it.³⁸

Russia's ambiguity on this point is at the center of the nuclear danger today. And that ambiguity is a source of potential for miscalculation and possibly uncontrolled escalation. Attacks on U.S. allies that put in jeopardy their integrity, sovereignty, and survival threaten U.S. vital interests because the entire U.S. global security architecture is based on the credibility of U.S. extended deterrence, and U.S. willingness to come to allies' defense if deterrence fails. This means that Russian limited nuclear escalation is likely to increase substantially the U.S. stake in the outcome of the conflict, obviating a Russian perception of an asymmetry of stake in their favor. The United States would also have a significant stake in ensuring that the war does not teach the wrong lessons about the consequences of nuclear aggression to other potential adversaries, including China. Our concern about the potential for a Russian miscalculation of U.S. resolve has grown significantly with President Putin's catastrophic miscalculation of the resolve and capability of the people of Ukraine to resist Russian aggression, of

36 Theresa Hitchens, "It's a FOBS, Space Force's Saltzman confirms Chinese weapons test confusion," *Breaking Defense* (November 29, 2021).

37 Dave Johnson, "Russia's Deceptive Nuclear Policy," *Survival* 63, no. 3 (2021), pp123-142.

38 *Ibid.*

Table 1

Projected PRC Strategic Nuclear Forces—2036

	<i>Launchers</i>	<i>Warheads</i>
Intercontinental Ballistic Missiles (ICBMs)	522	1,140
Silo-based	390	840
Road-mobile	132	300
Submarine Launched Ballistic Missiles (SLBMs)	84	252
Strategic Nuclear Bombers	18	18+
Other systems		
Fractional Orbital Bombardment Systems	Several	
TOTAL	624+	1,338+

SOURCING AND ASSUMPTIONS

- Projections based the Defense Department's 2022 report, *Military and Security Developments Involving the People's Republic of China* (hereafter CMPR) and extrapolations from the 2022 estimates in the International Institute for Strategic Studies 2022 *Military Balance* report, based on past trends and order of battle projections
- Strategic warhead numbers reflect Defense Department estimates that the PRC will likely field a stockpile of "about 1500 warheads" by 2035. We assume that the majority of these warheads are fielded on strategic/intercontinental-range systems, and that a smaller fraction of the 1,500 are reserved for theater-range forces, estimates for which are presented on Table 2.
- Assume complete replacement of five-warhead DF-5B with a DF-5C version that can carry more warheads, and that China stops new silo construction for the DF-5 class at 30 silos. (Warhead loading of the DF-5B is mentioned on p. 65 of CMPR.)
- Assume five of the nine current DF-31AG brigades transition to the three-warhead DF-41. (CMPR p. 94 assesses that the DF-41 will carry no more than three warheads.) The remaining brigades are equipped with a new single-warhead DF-31B variant, development of which is mentioned in CMPR (p. 65).
- Assume full completion of the three silo fields discovered in 2021 (of 120 silos each). Assume 1/3 are now equipped with the three-warhead DF-41. The other two silo fields have the assumed single-RV DF-31B missile.
- Assume Type 096 SSBN begins construction in the mid-2020s. We assume it will take the PLA Navy roughly seven years to produce a first production unit (FPU) of the Type 096-class. If so, the first Type 096 will be put to sea about 2032. We then assume serial production only takes China approximately two years per boat. As a result, we assess the PLAN will have about three Type 096 SSBNs by 2036. We then assume one-for-one retirement of Type 094 beginning with the second boat, which results in three Type 096 and four Type 094-class submarines. We assume one of each class is non-deployed, for a total five deployed SSBNs.
- Assume the H-6N fleet quadruples (to 16 planes) and China fields two aircrafts of a new class of stealth bomber.

Table 2

Projected PRC Theater-Range Nuclear Forces

	2022	2036	
DF-21A/E	80	0	1,500+ km (930+ mi)
DF-26	110	200	3,000+ km (1,900+ mi)
DF-27	0	100	5,000-8,000 km (3,100-4,970 mi)
DF-17	24	150	Unknown/theater range
DF-4	10	0	5,000+ km (3,100+ mi)
TOTAL	224	450	

SOURCING AND ASSUMPTIONS

- System designations reflect PRC terminology. Estimated ranges are drawn from the 2022 CMPR report and the 2020 *Ballistic and Cruise Missile Threat* report. Estimated force numbers are extrapolations from the 2022 estimates in the International Institute for Strategic Studies 2022 *Military Balance* report and order of battle projections.
- The projections assume a 25% increase in the nuclear-capable DF-26 force, retirement of DF-21 in a nuclear role, and replacement with DF-17 or another IRBM-class HGV. Based on the 2022 CMPR, we also assume China fields a shorter-range single-warhead ICBM class DF-27 weapon, in numbers of about half the DF-26 force. We treat this system as a theater-range system here.

NATO's resilience in face of Russian coercion, of the West's resolve to provide substantial military assistance to Ukraine in the face of Russian threats to escalate, and of the Swedish and Finnish response to Russian aggression.

Russia's modernization, diversification, and build-up of its nuclear forces reflects the view of President Putin that Russia's status as a global power depends heavily on its nuclear potential. It also reflects the judgment of his military leadership that nuclear weapons have particular value in shaping conflict and securing outcomes favorable to Russia's interests.³⁹ Key elements of Russia's nuclear modernization program include:⁴⁰

- The core strategic forces in Russia's nuclear triad—all being replaced and upgraded in a way that enhances their ability to be rapidly expanded

- Theater and tactical nuclear weapons—being replaced, upgraded, diversified in ways that enhance their potential warfighting roles (with longer range, improved accuracy, greater mobility)
- Command and control systems—being replaced and upgraded
- Novel strategic weapons systems (including a long-range nuclear-armed nuclear-powered torpedo, an intercontinental range nuclear-powered cruise missile, and an air-launched ballistic missile) selectively poised for testing and future deployment
- Nuclear weapons complex and infrastructure—major modernization, upgrade, and expansion of capacity completed (with a 30% budget increase 2010-2018)
- Strategy and doctrine—apparent continuity at

39 Dave Johnson, *Russia's Conventional Precision Strike Capabilities, Regional Crises, and Nuclear Thresholds*, Livermore Paper No.3 (Livermore, CA: Center for Global Security Research, 2018).

40 LTG Robert Ashley Jr., "Russian and Chinese Nuclear Modernization Trends," remarks to the Hudson Institute (May 29, 2019). See also *Russia Military Power: Building a Military to Support Great Power Aspirations*, Defense Intelligence Agency (2017).

the strategic level of war with Soviet-era concepts paired with significant adjustment at regional level of war, with modernized concepts for escalation, de-escalation, and war termination.⁴¹

Russian military modernization has emphasized the production of weapon systems capable of delivering both conventional and nuclear warheads. Many new general-purpose air, land, and sea-based systems are dual-capable. Russian military doctrine has also been modernized to integrate conventional and nuclear operations.⁴²

In general, Russia's nuclear modernization has not proceeded with the secrecy of China's; on the contrary, Russian leaders speak openly and repeatedly about the program. Since modernization began over two decades ago, the program has encountered technical difficulties and financial constraints, falling short in some respects.⁴³ But overall, the Kremlin's nuclear modernization effort has succeeded: the capacities of Russia's nuclear forces have been not just renewed but enhanced, with the prospect for further significant quantitative and qualitative improvements in the decade ahead.

From the perspective of new nuclear risk, the Russian modernization program is troubling in many respects. The Russian triad continues to concentrate a significantly higher percentage of deployed warheads on silo-based MIRVed ICBMs than does the U.S. triad. The surplus upload capacity in Russia's new mobile ICBM and SLBM forces combined with Russia's large warhead production capacity, and Russia's circumvention of New START by developing novel intercontinental range systems not covered by the treaty, create a breakout potential the United States might have difficulty matching.

The modernization of theater and tactical nuclear systems has significantly enhanced Russia's nuclear war-fighting potential in Europe, providing more options for fighting and potentially winning a limited/regional nuclear war. Dozens of such systems have been deployed or are in development across Russia's ground, air, air/missile defense, and

naval forces.⁴⁴ With many capabilities having greater accuracy, longer ranges, and lower yields, this arsenal may be seen by Russian military planners as offering advantageous options to fight NATO over important but not existential stakes while managing escalation. The proximity of these weapons to the Russian operational units that might engage NATO forces is particularly troubling. So too is the capacity to rapidly arm a sizeable theater nuclear force.

The modernization of command-and-control capabilities proceeds without any apparent clarity about whether it will end Russia's practice of relying on "dead hand" systems for pre-delegated nuclear attack if positive control is lost.⁴⁵ Dead hand systems are especially troubling because their thresholds for use and other characteristics are not confidently known and may not be fully reliable.

Russia's possible deployment of one or more novel strategic systems would bring additional worrisome capabilities. The increasingly asymmetric structure of Russian and U.S. forces calls into question whether the United States can uphold its traditional commitment to having a posture that is "second to none" and "essentially equivalent" to Russia's.

The modernization of Russia's nuclear weapons complex brings with it a significantly enhanced capacity for a major and protracted expansion of Russian nuclear forces, including possibly with weapons designed to provide new military capabilities. The Defense Intelligence Agency assesses that the Russian nuclear complex has the capacity "to process thousands of warheads per year."⁴⁶ This capacity for quantitative and qualitative "breakout" is especially troubling in light of the greater warhead delivery capacity being created in the Russian program to modernize strategic delivery systems.

Developments in Russian nuclear doctrine, combined with capabilities being deployed and exercised, suggest a more prominent role of nuclear weapons, including the possibility

41 The rewriting of strategy doctrine can be traced back to the early 1990s. In 1993, Yevgeny Primakov, then head of the FSB, argued as followed: "If this [NATO expansion] happens, the need would arise for a fundamental reappraisal of all defense concepts on our side." Cited in Steven Erlanger, "Russia Warns NATO on Expanding East," *New York Times* (November 26, 1993).

42 Johnson, *Russia's Conventional Precision Strike Capabilities, Regional Crises, and Nuclear Thresholds*.

43 Jill Hruby, *Russia's New Nuclear Delivery Systems: An Open-Source Technical Review* (Washington, DC: Nuclear Threat Initiative, 2019).

44 Ashley, "Russian and Chinese Modernization Trends."

45 *Russia Military Power*; Anthony M. Barrett, *False Alarms, True Dangers? Current and Future Risks of Inadvertent U.S.-Russian Nuclear War* (Santa Monica, CA: RAND, 2016); and Michael Peck, "Russia's 'Dead Hand' Nuclear Doomsday Weapon is Back," *The National Interest* (December 12, 2018).

46 Ashley, "Russian and Chinese Nuclear Modernization Trends."

of early nuclear use in war and other acts that could exacerbate escalatory pressures. Worst-case analysis of the strategic intentions and capabilities of the United States and its allies has also played a significant, and likely ascendant, role in Russian strategy and force development. This may make Russia more likely to use nuclear weapons earlier in a conflict if it does erupt because of exaggerated fears of what the United States is able and willing to do.

Looking forward, three broad alternative trajectories for Russia's nuclear posture can be envisioned. First, Russian nuclear modernization and upgrading may taper off once the standing strategic force has been replaced. This would validate the idea that Moscow is trying to sustain the status quo ante. It would also leave a sizeable latent upload capability in the force and a huge production complex at the ready.

Second, Russian nuclear forces might come into play as bargaining chips for missile defense and conventional strike in a new round of arms control. This would require the Kremlin to shift to a peace-through-strength strategy and set aside the stated role of strong nuclear forces in pushing back against a supposed Western strategy of encirclement and containment.

Third, Russian forces might be rapidly expanded in a bid to gain increased leverage and to force NATO's hand in a political-military crisis set in motion or exploited by Moscow. Obviously this third course would be the most dangerous for the United States and its allies. The performance of Russian conventional forces in Ukraine is likely to increase Russian reliance on nuclear weapons and resort to early use in a conflict.

The Particular Risks Associated with Sino-Russian Nuclear Concert

Sino-Russian cooperation in challenging the interests of the United States and its allies brings with it important new problems for U.S. deterrence and employment strategies. These are evident across the continuum of conflict—in peacetime, crisis, and war. Let's consider these in reverse order.

In war against one, the United States would have to account for the possibility of war with the other, whether simultaneously or in close succession. In a war that has escalated to strategic nuclear attacks, the third party would have a strong disincentive

to engage militarily under the expectation that emerging unscathed from the war would best serve its long-term interests. For example, such thinking was expressed by Putin who, referring to a Chinese proverb, quipped that: "when tigers fight in the valley, the smart monkey sits aside and waits to see who wins."⁴⁷ But the third party might also see a need or opportunity to act against U.S. interests in a limited way, under the nuclear threshold, or in a much more ambitious way, by crossing the nuclear threshold in order to strike a decisive blow to defeat a hated enemy and gain a dominant position. From the perspective of U.S. nuclear strategy and force posture, this implies the need to be capable of credibly threatening to respond with effective strategic nuclear attacks against both Russia and China even after either or both engages in a preemptive attack on U.S. forces. But what kind of attacks would be effective? Must the United States be capable of executing all potential strike options against both adversaries simultaneously? Can it prioritize one over the other? Or can it plan to do less damage against one than the other but count on the lesser damage to be seen as unacceptable by the threatened country? The United States and its allies would also need to anticipate the consequences of nuclear strikes in one theater on the deterrence and escalation dynamics in the other theater. Would the third party conclude that, having endured the horrors of a nuclear war, the United States would be willing to run additional risk to bring about a stable peace? Or would they conclude instead that the United States would compromise on its interests in hope of avoiding further pain?

In time of crisis, the United States and its allies would have to strengthen deterrence simultaneously in two theaters under two possible conditions. The first would be the crisis in one theater with the potential for opportunistic aggression in the other. The second condition would be a crisis in two theaters simultaneously. In the former case, U.S. military and political assets would flow primarily to the mounting crisis. In the latter case, the United States might have to make a decision about which theater to emphasize first. These are not new problems for U.S. military strategy, which for decades has struggled with defense strategy questions about how to fulfill multi-regional U.S. security obligations. But the 2P problem puts a rising premium on both U.S. nuclear forces and the capability and capacity of U.S. allies and partners to contribute to alliance deterrence postures in new ways, given that U.S. conventional forces alone are likely to be incapable of winning in two theaters simultaneously.

47 Vladimir Putin, speech at the plenary session of the St Petersburg International Economic Forum (June 7, 2019). <http://en.kremlin.ru/events/president/news/60707>. Accessed December 14, 2022.

In peacetime (or, more precisely in that phase of the continuum of conflict below the lethal threshold), the United States and its allies must compete in new ways to restore strategic balances. Those balances have been unsettled by changes in the geopolitical and nuclear contexts and by the slow pace of adaptation by the United States and its allies. The United States and its allies must be well prepared to respond in a timely and effective manner to potential future developments in the strategic postures of China and Russia, whether qualitative or quantitative. Uncertainty about their future ambitions is at an all-time high. They have put themselves in the position to accomplish significant further changes to their postures in the decade ahead. The United States must be postured in a manner that persuades them that there is no new strategic advantage that can be seized and held through intensified nuclear competition. This raises the possibility that the United States might have to rely more heavily on nuclear weapons to compensate for conventional inferiority in the second theater.

This uncertainty in the peacetime environment is magnified by the apparent demise of arms control. The web of agreements and other measures that was in place when the Cold War ended has nearly entirely disappeared. All that remains is the New START Treaty, which will expire in February 2026. Although leaders in Washington and Moscow voice continued commitment to arms control, the conditions do not appear ripe for a convergence of views on a successor regime. Moreover, China remains deeply reluctant to join the arms control process, as it continues to argue that the United States and Russia must make far deeper reductions before China can agree to participate, even while it engages in a major build-up.

Peers versus Near Peers

The problem presented by China's strategic breakout and the friendship without limits is both an emerged and emerging problem. It has emerged in the sense that China now has the means to escalate to any level of violence and to do nuclear damage to the United States and its allies and partners that would be existential for those allies and partners and nearly so for the United States. It has also emerged in the sense that the United States and its allies must now worry about

deterrence stability in East Asia while they manage the crisis in Ukraine. Moreover, China has the conventional forces in the Indo-Pacific challenge American military power and even aspire to regional dominance. Moreover, China's near-term nuclear trajectory is clear: to complete the three new missile silo fields.

The problem is an emerging problem in the sense that China's arsenal of nuclear weapons will not become roughly comparable in size to the United States for another decade or more. It may also be emerging in the sense that Russia is likely to require a decade or more to recover militarily from its war against Ukraine and many failures there. See Table 3 for more information.

Both the emerged and the emerging problems require responses from the United States. To help ensure the necessary focus on both problems, we have opted to label them separately. For the emerged problem, we have followed Admiral Charles Richard, then commander of U.S. Strategic Command, who in spring 2022 argued that:

Today, we face two nuclear capable near peers who have the capability to unilaterally escalate to any level of violence in any domain worldwide with any instrument of national power at any time. And we have never faced a situation before like that in our history.⁴⁸

If the *emerged* problem is the two near-peer (2NP) problem, the emerging problem is the two-peer problem (2P). As argued further below, both demand decisions and action by the United States without delay.

The U.S. Response

The wake-up call to the new risks of major power conflict came with Russia's military-backed annexation of Crimea in 2014 and subsequent continued aggression in Eastern Ukraine.⁴⁹ Not unsurprisingly, the thinking of U.S. policymakers about how best to respond has been strongly informed by legacy approaches.

During the Cold War, China was essentially a footnote in U.S. nuclear strategy. This had something to do with the U.S.-China political relationship, which leaned toward anti-Soviet

48 Admiral Charles Richard, commander, United States Strategic Command, to the Committee on Armed Services of the United States Senate, testimony to the Subcommittee on Strategic Forces (May 1, 2022).

49 Jacek Durkalec, *Nuclear-Backed "Little Green Men": Nuclear Messaging in the Ukraine Crisis*, PISM Report (July 2015). <https://pism.pl/upload/images/artykuly/legacy/files/20165.pdf>. Accessed December 14, 2022.

Table 3

Notional 2026 Tripolar Balance of New START-Accountable Strategic Forces

	UNITED STATES	RUSSIA	CHINA
Deployed ICBMs, SLBMs, and Heavy Bombers	675	510	458
Warheads on Deployed ICBMs, SLBMs, and Heavy Bombers*	1,457	1,447	780
Deployed and Non-Deployed ICBMs and SLBMs Launchers and Heavy Bombers	800	764	478

* Under NST rules, each heavy bomber counts as one warhead.

SOURCING AND ASSUMPTIONS

- Russian and U.S. figures come from 2021 *Annual New START Report*.
- China estimates are based on a projection of the 2022 IISS *Military Balance* report and information contained in the Defense Department's 2022 report, *Military and Security Developments Involving the People's Republic of China* (hereafter CMPR).
- Based on the 2022 figures, the above China estimates reflects the following assumptions:
 - Complete replacement of the single warhead DF-5A with the MIRVed DF-5B system, expansion in DF-5 capable silos, and initial deployment of a DF-5C variant. According to CMPR, the DF-5B will carry no more than four reentry vehicles (p. 65). China is also developing a DF-5C variant. Media reports speculate that this will carry additional RVs. We assume the DF-5C will carry up to eight RVs—slightly fewer than the estimated warhead capacity of analogous Russian systems. The 2022 CMPR report also notes that China is increasing the numbers of DF-5 silos. We assume that 10 additional DF-5 class silos are constructed.
 - Full conversion of DF-31A to AG variant, which IISS assesses to be a DF-31A with an improved transporter. Per CMPR claims that China is doubling the number of launchers in some brigades, we assume 50% of DF-31 brigades double their assigned missiles from six to 12.
 - Two-thirds of the 360 projected silos are completed and equipped with a DF-31 variant single warhead ICBM.
 - Doubling of the DF-41 force from 2022 IISS estimates. The 2022 CMPR assesses that the DF-41 will carry no more than three warheads (p. 95).
 - All Type 094 SSBNS convert to the longer-range MIRV-capable JL-3 SLBM. In the absence of additional information, we assume the JL-3 carries three RVs.
 - Assume doubling in the size of the H-6N bomber force from the IISS 2022 baseline.

cooperation in the latter part of the Cold War. It also had something to do with the fact that China deployed its first nuclear-tipped ICBM long after the Soviet Union did (in 1981) and placed only approximately 20 nuclear-armed ICBMs in silos over the next 15 years.⁵⁰ This was a posture consistent with its commitment to "the minimum means of reprisal."⁵¹

But over the last two decades, China has become slowly but steadily more prominent in U.S. nuclear policy. China's nuclear modernization program emerged as a source of concern for the George W. Bush administration, which determined strategic force requirements in part on a logic of how much was enough to dissuade China from a "sprint to

50 John Lewis and Xue Litae, "Making China's Nuclear War Plan," *Bulletin of the Atomic Scientists* 65, no. 5 (2012).

51 Jeffrey Lewis, *The Minimum Means of Reprisal: China's Search for Security in the Nuclear Age* (Cambridge, MA: MIT Press, 2007).

THE EMERGED AND EMERGING PROBLEMS		
	EmergEd Two Near-Peer Problem	Emerging Two-Peer Problem
Force Developments	<p>The ongoing dramatic expansion of China’s nuclear force and the significant new threshold it will reach with completion of the three new fields of ICBMs</p> <p>The ability of both Russia and China to impose any level of damage on an adversary in any domain and at a time and place of their choosing</p>	<p>The possibility that China will continue to modernize, diversify, and build up its nuclear forces after the new missile fields are completed</p> <p>The possibility that Russia will continue to produce nuclear weapons and delivery systems once its current modernization cycle is completed</p> <p>Post New START expiration, a substantial risk of new nuclear competition</p>
Sino-Russian Cooperation	<p>The “friendship without limits” and the commitments of Chairman Xi and President Putin to cooperate to confront and dismantle U.S.-led regional security orders</p>	<p>The possibility that friendship will turn to alliance and more coordinated measures to roll back U.S.-led alliances in both Europe and Asia</p>
Risks	<p>That China will choose war over Taiwan sooner rather than later and that Russia will seize that opportunity to test NATO’s resolve</p>	<p>That the two will perceive a window of opportunity to act before U.S. efforts to gain new strategic advantages pay off</p>

parity.”⁵² The Obama administration emphasized shared interests with China in strategic stability but also expressed concerns about China’s nuclear modernization as well as its lack of nuclear transparency.⁵³ The Trump administration’s Nuclear Posture Review (NPR) spelled out the requirements of a tailored deterrence strategy toward China and defended its proposals for supplemental nuclear capabilities in part by arguing that such systems were needed to strengthen deterrence of China.⁵⁴ Early in this period, limited U.S. concerns about China’s nuclear modernization translated into a generally *laissez faire* attitude toward developments in China’s nuclear posture. That attitude was informed by several judgments, including that: (1) a strong and prosperous China would be a welcome stakeholder in a stable international order, (2) armed hostilities over Taiwan were a remote possibility given the gross imbalance of military power favoring the United

States, and (3) China would object to U.S. missile defenses but would not upend the strategic relationship in so doing. Later in this period, confidence in these judgments began to erode. China’s growing military power has raised questions about whether the United States and its allies can today and will in the future be able to resist a forceful attempt by China to conquer Taiwan. With the possibility of war and escalation raised, both the United States and China have become more concerned about the nuclear balance.

The *laissez faire* era is clearly at an end. The United States must now decide what adaptations to its own strategic policy and posture are warranted in light of what we know and do not know (and are unlikely to know) about China’s nuclear posture and the other military actions China might see as necessary to fulfill the “China dream.”

52 U.S. Secretary of Defense Donald H. Rumsfeld, testimony before the Senate Armed Services Committee on Ratification of the Moscow Treaty (July 25, 2002).

53 Department of Defense, *Nuclear Posture Review Report*, 2010.

54 Department of Defense, *Nuclear Posture Review Report*, 2018.

Compared to China, for 25 years after the collapse of the Soviet Union, Russia was more than a footnote in U.S. nuclear deterrence policy—but not much more.⁵⁵ In 1990, the U.S. focus shifted to “pariah” or “rogue” states armed or arming themselves with weapons of mass destruction and long-range delivery systems. Deterrence of Russia disappeared as an American policy priority, and Clinton administration nuclear policy focused instead on partnering with a democratic Russia to reduce the vestiges of Cold War nuclear rivalry while hedging against a possible future requirement to deter a malign Russia. The George W. Bush administration sought “to move nuclear weapons out of the foreground and into the background” of the bilateral relationship.⁵⁶ The Obama administration famously rolled out the “reset” button and hoped to use arms control as a tool for strengthening strategic cooperation. The United States and Russia agreed to the New START Treaty limiting the strategic range systems of both sides, but when the Obama Administration sought a follow-on agreement that would cover all nuclear weapons (including theater systems) and reduce both sides to even lower nuclear force levels, Russia refused to enter such a negotiation. Then, in 2014, Russia engaged in the military-backed annexation of Crimea. With this came the recognition that President Putin had gone quite far in distancing himself from an earlier period of cooperation with the West.

Until 2014, Russia’s own nuclear modernization was also met with a *laissez faire* attitude from the United States. Although U.S. concerns about Russia’s nuclear modernization began to emerge as Putin’s turn away from the West began to become evident in 2007, U.S. reactions were muted by the prevailing cautious optimism about the bilateral relationship, the fact that the point of departure for Russia’s modernization programs was the low point of the 1990s, and Russia’s apparent focus on recapitalization (that is, the replacement of aging systems with modern ones) as opposed to qualitative or quantitative improvements.

U.S. concern became more focused during the Obama administration, particularly after Russia’s violation of the INF treaty, its military-backed annexation of Crimea, the intervention in Ukraine, Putin’s stated affinity for “new rules or no rules,”⁵⁷ and revelations about the scale and scope of the ongoing improvements to Russian nuclear forces. As the bilateral political relationship continued to erode, the Trump administration committed to supplemental nuclear capabilities based on the need to more robustly deter Russian aggression and limited nuclear escalation in Europe. A *laissez faire* attitude to Russian nuclear modernization is also no longer viable. Each element of the modernization program raises some concern for the United States bearing on nuclear risk.

In the period from 1991 to 2014, there is no evidence to suggest that U.S. policymakers were concerned about an emerging two peer adversary problem. But U.S. nuclear strategy did account for the fact that the United States faced multiple nuclear-armed adversaries and thus needed to tailor deterrence to varied decision-makers with varied interests.⁵⁸ The *laissez faire* approach began to give way with then-Secretary of Defense Ash Carter’s call for “a new playbook” on Russia.⁵⁹ It accelerated with his successor. Secretary James Mattis’s National Defense Strategy of 2018 re-centered U.S. defense strategy on China’s rise and on the challenges of re-balancing U.S. global commitments to enable an effective strategy *vis-à-vis* China. The Biden administration’s strategy explicitly adopts China as “the pacing threat.”⁶⁰

The legacy of America’s late start on a new approach to deterrence of China and Russia was amply demonstrated in the findings of the bipartisan 2018 National Defense Strategy Commission, which concluded that the United States “could lose” a regional war against a nuclear-armed rival. Among other factors, it faulted the failure to understand the escalation strategies of those rivals and to develop counter-escalation strategies that could be effective in achieving the political objectives of the United States and its allies.⁶¹

55 This section of the report draws heavily on a discussion paper prepared by Elbridge Colby and Brad Roberts for a project on strategic stability of the United States Institute for Peace. Publication pending.

56 President George W. Bush, remarks at National Defense University, Washington, DC (May 1, 2001).

57 President Vladimir Putin, remarks to the Valdai Discussion Club (October 25, 2014).

58 Elaine Bunn, *Can Deterrence be Tailored?* Strategic Forum No. 225 (Washington, DC: National Defense University, 2007).

59 Ashton Carter, “A Strong and Balanced Approach to Russia,” *Survival* 58, no. 6 (2016).

60 See the unclassified summaries of the 2018 and 2022 National Defense Strategies.

61 *Providing for the Common Defense: the Assessment and Recommendations of the National Defense Strategy Commission* (2018).

In retrospect, it is clear that the military balance in key regions has shifted against the interests of the United States and its allies over the last two decades.⁶² While the United States fought the war on terror and innovated for counter-insurgency warfare, China and Russia studied the American way of war to develop the capabilities and concepts to prevail against the United States and its allies in wars along their peripheries. Although the United States is the most capable militarily of the three major powers, its conventional dominance at the regional level has eroded badly. Moreover, it must project power over long distances, which takes time and creates vulnerability.

The United States has also been slow to adapt its military posture to the requirements of multi-domain and trans-regional warfare. Much of the U.S. strategic posture remains tailored for the “rogue state” regional problem. Its capabilities to conduct nuclear operations in support of its allies with forward-deployed weapons remain tailored to a more peaceful era that has now passed. The United States has refrained from fielding new theater-range prompt strike systems while Russia and China have deployed hundreds of such systems—which they have also designed to be dual-capable and thus suited for casting a large nuclear shadow over regional wars. The impact of the shifting military balance on the thinking of leaders in Beijing and Moscow cannot be known, but it likely does not reinforce U.S. deterrence objectives.

Admiral Richard highlighted his concerns about a deterrence and assurance gap flowing from China’s strategic breakout and the 2P problem.⁶³ We share that concern. The U.S. position has eroded relative to the improving positions of China and Russia. Although Russia’s setbacks in Ukraine temper this judgment in the short term, Moscow can expect to rebuild in the years ahead and to further adapt its military strategy and posture in light of lessons learned from Ukraine. The deterrence postures of the United States and its allies in both Europe and Asia remain potent but relatively less so than before—and the trajectories and uncertainties are more troubling

than before. Those allies most vulnerable to coercion and attack know this. They are eager to contribute to strengthening deterrence, but also look to the United States for enduring leadership.

In our view, these gaps have had a negative impact on strategic stability. Leaders in Beijing and Moscow are more confident than before and more willing to accept military risk (the impact of Russia’s experience of war in Ukraine on Putin’s risk acceptance is profoundly uncertain at this time). They are probing and testing the resolve of the United States and its allies to defend their interests. The volatility in this circumstance is magnified by the potential that allies and partners of the United States could begin to lose faith in the reliability of its security guarantees and thereby either accommodate our potential adversaries’ objective of overturning the rules-based international order or turn to nuclear weapons of their own. A decision by any ally to move in either direction could have a cascading effect on others, with impacts far beyond their immediate regions. All of this underscores the necessity and urgency of getting the U.S. and allied response to the 2P problem right.

Conclusion

As the new problems have rapidly come into focus over the last couple of years, they should play a key role in the further development of U.S. strategy. The Biden administration has taken a first cut (although there were important antecedents in the Trump administration). Its National Security Strategy states that “the PRC and Russia are increasingly aligned” but does not elaborate on the challenges of deterring two near-peers simultaneously.⁶⁴ Its National Defense Strategy establishes that China is “the pacing threat” while Russia is the “acute threat” and observes that “the PRC and Russia relationship continues to increase in breadth” and that “either state could seek to create dilemmas globally for the Joint Force in the event of U.S. engagement in a crisis or a conflict with the other.”⁶⁵ Its Nuclear Posture Review states that “by the 2030s the United States will, for the first time in its history, face two major nuclear powers as strategic

62 Brad Roberts, ed., *Fit for Purpose? The U.S. Strategic Posture in 2030 and Beyond*, Occasional Paper (Livermore, CA: Center for Global Security Research, 2020).

63 Richard, remarks to the 2022 Space and Missile Defense Symposium.

64 *National Security Strategy, 2022*, Part 1.

65 *National Defense Strategy summary, 2022*, p5.

competitors and potential adversaries.”⁶⁶ It also highlights the risk of opportunistic aggression, concluding that the United States “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.”⁶⁷

These are the right starting points. But much more needs to be done. A broad and deep official review should be conducted of these matters, in active consultation with allies and the legislative branch, and the results reflected in the next iteration of these national strategy documents.

⁶⁶ *Nuclear Posture Review*, 2022, p4.

⁶⁷ *Ibid.*, pp6, 12.

Implications for the Fundamentals of Nuclear Deterrence

In considering the implications of this new problem, our starting point must be strategy. Is there anything in this new problem that calls into question the fundamentals of strategy as long practiced by the United States? We see three main elements of strategy:

- General deterrence theory
- Nuclear deterrence strategy
- Nuclear employment strategy

General Deterrence Theory

Deterrence theory is probably as old as human conflict and the desire to prevent aggression and inhibit escalation. Deterrence is an influence operation in the cognitive domain that uses threats to influence perceptions, decisions, and thus behaviors.⁶⁸ Deterrence targets three key adversary perceptions: the benefits of an action or set of actions; the costs of taking the action; and the consequences of not acting (i.e., demonstrating restraint). To cite the defense department's Deterrence Operations Joint Operating Concept (DO JOC):

The central idea of the DO JOC is to decisively influence the adversary's decision-making calculus in order to prevent hostile actions against U.S. vital interests. This is the "end" or objective of joint operations designed to achieve deterrence. An adversary's deterrence decision calculus focuses on their perception of three primary elements: the benefits of a course of action, the costs and risks of a course of action, and the consequences of restraint (i.e., costs and benefits of not taking the course of action we seek to deter). Joint military operations and activities contribute to the "end" of deterrence by affecting the adversary's decision calculus elements in three "ways": deny benefits, impose costs and risks, and encourage adversary restraint.⁶⁹

For the threatened imposition of cost and risk, deterrence requires holding at risk what an adversary most values. This varies by circumstance and adversary. Deterrence is enabled by the policies we establish, the words we speak, the capabilities we demonstrate, and the actions we take. It is best thought of as a campaign that requires the words and deeds be well aligned and, again, tailored to individual actors.

Deterrence exists and is executed along a continuum of time and action that encompasses general, immediate, and intra-war deterrence. Along this continuum, the principal tasks are to deter the emergence of crises, deter initial aggression, restore deterrence, and deter further escalation in conflict and, in all circumstances, deter the most extreme threats.⁷⁰ Effective deterrence requires constant shaping of adversary perceptions.

In our judgment, there is no aspect of the new problem set that calls into question any of these elements of deterrence theory. Although the practice of deterrence must be tailored to individual actors and specific contexts, the basic theory of deterrence is not called into question by a second nuclear peer.

Nuclear Deterrence Strategy

U.S. nuclear deterrence strategy is aimed at two particular objectives: to deter initial nuclear use (and other strategic attacks on the United States and/or its allies and partners by non-nuclear means) and, should that fail, to restore deterrence and to manage escalation in a manner that convinces an enemy to de-escalate and terminate the conflict on best available terms. It is important to be explicit about what the objective is not: it is not to disarm the adversary at the outset or to "win" nuclear war. The United States seeks to create the perception in the mind of each adversary decision maker, at all times, that (1) the United States has both the

68 Alexander George and Richard Smoke, *Deterrence in American Foreign Policy: Theory and Practice* (New York: Columbia University Press, 1974).

69 Deterrence Operations Joint Operating Concept, Version 2.0 (December 2006), p5. <https://apps.dtic.mil/sti/pdfs/ADA490279.pdf>. Accessed December 14, 2022.

70 Paul Bernstein and Austin Long, "Multi-Domain Deterrence: Some Framing Considerations," in Brad Roberts, ed., *Getting the Multi-Domain Challenge Right* (Livermore, CA: Center for Global Security Research, December 2021), pp6-15. https://cgssr.llnl.gov/content/assets/docs/CGSR_Getting-the-Multi-Domain-Challenge-Right.pdf. Accessed December 14, 2022.

will and the capability to employ nuclear weapons even in the extreme circumstances created by that adversary and thus that (2) the costs and risks of aggression will outweigh any potential benefits at the military-operational or political-strategic level.⁷¹

Nuclear deterrence strategy is rooted in the incomparable destructiveness of nuclear weapons. They necessarily invoke the specter of sudden, catastrophic, and even existential damage that is independent of the broader course of a conflict. Moreover, if both sides are nuclear armed, the losing side can ensure the other side “loses” as well. When both sides are capable of threatening assured destruction on the other, Mutual Assured Destruction (MAD) exists. Some believe that MAD is, in fact, U.S. nuclear deterrence strategy. This is not so. MAD is a condition, not a strategy. But that very real and persistent condition obviously sets the context in which U.S. nuclear deterrence strategy is formulated and practiced. MAD shapes U.S. nuclear deterrence strategy, but it does not constitute it.

U.S. nuclear deterrence strategy is instead best described as flexible response. This is a term from NATO's nuclear history that had a different meaning in a different time and context.⁷² But it captures precisely the nature of contemporary nuclear deterrence strategy and the solution it embodies to the need to make credible the threat of nuclear employment when presented with the risk of a potential nuclear response. Flexible response presents the adversary contemplating nuclear aggression and escalation with a broad range of potential U.S. nuclear responses. Some of these are designed primarily to deny the adversary the benefits it seeks, especially at the military-operational level of war. Others are designed to impose costs by damaging and destroying what that adversary most values at a scale sufficient to outweigh any gains that the adversary might hope to win and secure with nuclear attack. Some may do both.

U.S. threats to respond by nuclear means to nuclear attack may be dismissed by adversary leaders as not credible for various reasons. Those leaders may believe that MAD at the strategic level of war gives them protection against escalation, freeing them to engage in nuclear risk-taking in regional war. Or they may judge the United States, and democracies generally, as politically weak, easily divided and thus paralyzed, and fearful of escalation and

thus conclude that their nuclear threats can be ignored. The leaders of Nazi Germany and Imperial Japan made similar miscalculation in the late 1930s when they judged that the democracies would not effectively defend their interests if attacked. Flexible nuclear response helps to address this problem of deterrence credibility in two ways. First, it provides U.S. leaders with a range of limited strike options that can be utilized in an effort to signal both resolve and restraint. Second, it compels the adversary to contemplate continued U.S. nuclear strikes and escalation if the initial U.S. attack fails to alter that adversary's calculus of benefits, costs, and risks. In this respect, flexible response builds on what Thomas Schelling called “the threat that leaves something to chance.”⁷³ It makes clear that while escalation to a large-scale, existential level nuclear exchange would be suicidal and thus is irrational, uncontrolled escalation to such an exchange could result from the initial crossing of the nuclear threshold, whatever the original intent of both combatants.

The benefit of restraint contributes something significant to this strategy as well. Successful nuclear deterrence requires that the adversary has viable alternatives to nuclear escalation that make continued restraint its “least bad option.” This may require pairing the threat of a U.S. nuclear response with a promise of restraint of some kind if adversary restraint continues (e.g., not pursuing retreating Russian conventional forces into Russian territory).

Thus, U.S. nuclear deterrence strategy relies simultaneously on (1) U.S. confidence in deterrence of a large-scale nuclear attack to make limited U.S. nuclear responses to limited escalation credible and on (2) limited U.S. nuclear responses to create Schelling's “threat that leaves something to chance.”

In our judgment, there is no aspect of the two-peer problem set that requires changes to U.S. nuclear deterrence strategy. Flexible response will remain credible and effective in deterring attacks on the U.S. homeland and extending credible deterrence to U.S. allies in both Europe and Asia. The ways flexible response addresses the credibility of limited U.S. nuclear responses against a nuclear peer are as valid for two as for one. It remains unlikely that Moscow or Beijing or both would decide to escalate to attacking the U.S. homeland in response to limited U.S. nuclear employment at the regional level (in response to their limited regional nuclear attacks)—as such an action would mean national suicide.

71 For descriptions of U.S. deterrence strategy, see the Nuclear Posture Reviews of recent administrations and also the reports to Congress on Nuclear Employment Strategy issued in June 2013 and April 2019.

72 J. Michael Legge, *Theater Nuclear Weapons and the NATO Strategy of Flexible Response* (Santa Monica, CA: RAND, 1983).

73 Thomas Schelling, *Strategy of Conflict* (Cambridge, MA: Harvard University Press, 1960).

Regardless of these judgments, alternatives to flexible response are being discussed. One is escalation dominance.⁷⁴ The other is minimum deterrence.⁷⁵ Both are deeply flawed.

Escalation dominance is simply beyond American reach when dealing with a nuclear peer or even a near-peer capable of assured destruction. Technically, the United States may have many means to impose cost and risk on its adversaries at elevated degrees of intensity. But it cannot hope to have the means to eliminate its own vulnerabilities. U.S. leaders decided long ago (and rightly so) that pursuing an escalation dominance strategy against a determined peer nuclear adversary was neither viable nor desirable because it would only result in a continuous and competitive process of trying to maintain extended nuclear deterrence under the condition of MAD at much higher force levels and at much higher cost. If the pursuit of escalation dominance against one adversary is not viable or desirable, then it is not more viable or desirable against two.

Minimum deterrence is not seen as credible either by those whom we seek to deter or those whom we seek to assure. Minimum deterrence is a theory of deterrence built on the premises that (1) the simple existence of an assured nuclear retaliatory capability is sufficient to deter nuclear aggression and that (2) there is much more deterrence leverage to be had from conventional than nuclear weapons, as the threat to employ them is more credible than the threat to employ nuclear weapons.

The weakness of this approach is that it does not adequately account for the motivation of the leaders contemplating nuclear attack against the United States or its allies. Such leaders have already increased their reliance on nuclear means to compensate for their military weaknesses vis-à-vis the United States at the conventional level of war. A U.S. choice to further increase its reliance on non-nuclear means of strategic deterrence would only intensify their concern. Nuclear escalation is their answer to the possibility that they will fail at the conventional level of war. And against a nuclear peer adversary that is either superior to the United States and allied conventional capabilities in theater, or superior conventionally only in the early stages of a theater conflict, how would greater reliance on conventional capabilities deter them from escalating

to theater nuclear use to defeat our in theater conventional forces? The problem with reducing reliance on nuclear weapons in deterrence strategy is that deterrence of a nuclear peer requires the ability to credibly engage in a competition in risk taking that involves threats of limited nuclear escalation.

Three key supporting concepts and practices also merit review in this discussion of nuclear deterrence strategy. The first is tailoring. Tailored deterrence approaches to specific potential adversaries have been a core feature of U.S. nuclear strategy for most of the post-Cold War period and remain the organizing principle for U.S. nuclear employment planning. The United States has long had tailored deterrence strategies toward Russia and China. As discussed below, further adapting these strategies is warranted by changing circumstances—China's emergence as a more capable and risk-acceptant competitor, and Russia's demonstration of risk-taking behavior and conventional force weakness in Ukraine. The United States must ensure that it is assiduously assessing the unique factors that influence Russian and Chinese leaders' decision calculus to ensure we are addressing those factors effectively.⁷⁶

Tailoring for two nuclear peers will not require changing the methodology for tailoring strategies and plans. However, it will add significant complexity given a number of uncertainties, including the end point of China's nuclear expansion (in particular the size and disposition of its forces), the variety of potential future conflict scenarios in which deterrence must function effectively, and the various ways in which China and Russia could cooperate to U.S. disadvantage in peacetime, crisis, and war. In a competitive three-party dynamic, it is necessary to consider deterrence requirements and strategic messaging for one antagonist while thinking through the potential impact on the other. We should assume that policies and actions largely intended to influence one of these actors could shape the views of the other, as well.

The second key concept and practice is strategic stability, defined here as a balance of military forces that ensures no major power sees military aggression and escalation as a viable means of advancing its interests.⁷⁷ It is longstanding U.S. practice to adopt policies and acquire capabilities

74 Matthew Kroenig, *The Logic of American Nuclear Strategy: Why Strategic Superiority Matters* (New York: Oxford University Press, 2018).

75 Keith Payne, *Minimum Deterrence: Examining the Evidence* (Fairfax, VA: National Institute for Public Policy, 2014).

76 Bunn, *Can Deterrence be Tailored?*

77 Elbridge Colby and Michael Gerson, *Strategic Stability: Contending Interpretations* (Carlisle, PA: U.S. Army War College, 2013).

with the goals of strategic stability—in particular, crisis stability—in mind. This was true in the bipolar nuclear system of the Cold War and will remain the case in the emerging trilateral context. The task will be more challenging in this new context for two reasons. First, there are competing (and possibly multiplying) conceptions of strategic stability and the practices required to sustain or strengthen it. Second, the changing technology environment is creating new challenges to strategic stability. One challenge is the possibility of new escalation pathways resulting from cross-domain dynamics that are unfamiliar to us; increasingly, these dynamics will be trilateral in nature. Another challenge is the possibility that breakthrough applications of emerging technologies (e.g., artificial intelligence) could call into question deeply ingrained assumptions on all sides about the survivability of nuclear retaliatory forces, whether Russian and Chinese mobile ICBMs or U.S. SSBNs.⁷⁸ Stability will remain a cornerstone of nuclear practice rooted in early conceptions of the nuclear problem, but the requirements to preserve it are almost certain to change.

The third key concept and practice is integration. The aspiration for a greater degree of integration in the practice of strategic deterrence dates back many years, to include Cold War precedents. The post-Cold War era has been more openly focused on broadening the strategic forces toolkit beyond nuclear forces to leverage the perceived strategic benefits of non-nuclear kinetic systems, active defenses and, more recently, non-kinetic capabilities. The 2001 NPR formally introduced this aspiration, which has carried forward through subsequent policy reviews. In its 2013 report to Congress on employment strategy, the Obama administration referred to “deliberate planning for non-nuclear strike options” and increased reliance on non-nuclear capabilities to strengthen regional security architectures.⁷⁹ In its 2020 report on the same topic, the Trump administration referred to the contribution of conventional weapons to deterrence and assurance objectives and the integration of conventional and nuclear planning to support deterrence of limited nuclear use in regional war.⁸⁰ The Biden administration’s 2022 Nuclear Posture Review (NPR) affirms the importance of integrating conventional and nuclear

planning to strengthen deterrence.⁸¹

The 2022 NPR further outlines an approach to the role of nuclear weapons within the broader concept of integrated deterrence outlined in the 2022 National Defense Strategy (NDS). This approach recognizes the unique attributes of nuclear weapons in achieving deterrence effects and the potential payoffs of identifying ways to leverage non-nuclear strategic capabilities to complement nuclear weapons in developing tailored deterrence strategies under specific circumstances. Such an approach has the potential to shape U.S. responses in policy, posture, plans, and capabilities to the two-peer problem, but to what degree obviously depends on how the threat evolves, how non-nuclear strategic capabilities mature, and our assessment of the strategic risks and benefits associated with this type of integration. It is worth noting that both China and Russia already believe that the United States has made great progress toward integrating nuclear, advanced conventional, and missile defense capabilities in pursuit of strategic superiority.

Employment Strategy

The essentials of employment strategy have been set out in unclassified summaries of classified presidential nuclear employment guidance provided by the White House to the Congress, as previously cited. To draw illustratively on the most recent summary of 2020, that guidance states as follows:

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

78 Rose Gottemoeller, “The Standstill Conundrum: The Advent of Second-Strike Vulnerability and Options to Address it,” *Texas National Security Review* 4, no. 4 (2021). <https://tnsr.org/2021/10/the-standstill-conundrum-the-advent-of-second-strike-vulnerability-and-options-to-address-it/>. Accessed December 14, 2022.

79 “Report on the Nuclear Employment Strategy of the United States Specified in Section 491 of 10 U.S.C.” (June 12, 2013), p9. <https://apps.dtic.mil/sti/pdfs/ADA590745.pdf>. Accessed December 14, 2022.

80 “Report on the Nuclear Employment Strategy of the United States – 2020.”

81 *Nuclear Posture Review, 2022* (U.S. Department of Defense).

Elements of U.S. nuclear forces, currently in the field or under development, provide flexible, credible, limited, and graduated response options so U.S. leadership has choices beyond inaction or large-scale responses. Such options reduce the risk of a potential adversary's misperception of an exploitable gap between stated U.S. objectives and its perceived capabilities. Limited and graduated U.S. response options provide a more credible deterrent to limited attack against the United States and our allies and partners than relying primarily on the threat of large-scale nuclear responses. Flexible and graduated options that raise an adversary's nuclear threshold have been a continuous part of U.S. deterrence strategy for decades. Such options do not increase risk and do not lower the U.S. nuclear threshold. Rather, such options, regarded as credible responses by potential adversaries, make their resort to nuclear weapons less likely, not more likely.

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

Should a crisis escalate into a large-scale nuclear attack on the United States or its allies or partners, the United States retains the option to pursue multiple objectives, from preventing further nuclear employment to inflicting intolerable costs on the adversary. The United States will sustain the diverse capabilities needed to deter large-scale attacks by ensuring that the adversary cannot anticipate significant political or military gain from its attack, and that the adversary will understand that the United States will impose intolerable costs exceeding any possible benefit gained from the

adversary's decision to strike the United States its allies or its partners.

The U.S. set of graduated response options is particularly valuable in situations where the adversary's threat calculus is not clear, or the level and type of threat the adversary finds credible are uncertain...The United States' flexible and graduated response strategy ensures there are a variety of credible options available, critical to demonstrating both U.S. resolve and restraint, and thereby deterring an adversary's attack or escalation.⁸²

In sum, the objective of U.S. nuclear employment strategy is to restore deterrence if it has failed and to do the lowest level of damage possible and on the best achievable terms for the United States, its allies, and partners. It is concerned with responding to both large-scale and limited attacks and thus with preserving the flexibility to execute graduated responses in order to demonstrate both resolve and restraint.

Although we have cited the most recent available guidance on nuclear employment, the core concepts set out above have been enduring in U.S. nuclear deterrence. The prior unclassified summary of presidential nuclear employment guidance submitted to Congress by the Obama administration in 2013 established clearly that the United States should be prepared to employ nuclear weapons to achieve U.S. and allied objectives if deterrence fails.⁸³

Counterforce and Damage Limitation in U.S. Nuclear Employment Strategy

A key point of enduring debate about U.S. nuclear employment strategy relates to the value of planning to attack enemy nuclear forces and thereby attempt to limit the damage they might do. Counterforce versus countervalue targeting has been debated within the defense community since at least the Kennedy administration. That debate is certain to gain renewed energy with calls to reverse reductions to target China's new ICBMs. Four main lines of criticism have been launched against the counterforce component of employment strategy.

⁸² See both the 2013 and 2020 Reports to Congress on Nuclear Employment Guidance (2020), p7.

⁸³ Report on the Nuclear Employment Strategy of the United States, submitted by the Department of Defense to Congress (June 2013). For a comparison of the 2013 and 2020 reports, see Robert Soofer and Matthew R. Costlow, *An Introduction to the 2020 Report on the Nuclear Employment Strategy of the United States*, National Institute for Public Policy (Fairfax, VA, 2021).

These are the arguments:

1. Counterforce is merely a Cold War relic closely aligned with a doctrine of nuclear preemption and that lingers in U.S. nuclear deterrence strategy because of the bureaucratic capture of nuclear policymaking by a handful of experts with “deeply engrained preferences”⁸⁴
2. Counterforce strikes cannot effectively limit damage to the United States and its allies or partners
3. Counterforce incentivizes escalation rather than deters it
4. Counterforce incentivizes competition with little prospect of success and at great expense

We consider each in turn. The first has been articulated by Frank Gavin, Fred Kaplan, and Tom Collina, among others.⁸⁵ This criticism would be compelling if it accurately reflected U.S. nuclear policy, but it does not. A review of the relevant history is instructive. In the 1960s, Secretary of Defense Robert McNamara espoused a “no cities counterforce strategy,” which was designed to limit damage to the United States by striking Soviet strategic nuclear forces in the event of war.⁸⁶ But within a few years, due to the growth of Soviet strategic nuclear forces, the objective of limiting damage was understood to have its inherent limitations. Damage limitation as a primary objective could drive up nuclear force requirements if this implied the expansion of U.S. nuclear forces to target the growing adversary force, while also potentially being destabilizing during a crisis should the adversary believe that the United States would strike first in pursuit of pre-emptive damage limitation.

During the 1970s, presidential nuclear employment guidance (subsequently declassified)

specified a role for counterforce operations only to the extent practicable or feasible. The 1974 Nuclear Weapons Employment Policy, which states as one of its objectives, to “destroy or neutralize, to the *extent practicable* with available, allocated nuclear forces, the nuclear offensive capabilities of the enemy that threaten the United States and its allies in order to assist in *limiting damage* to and reduce the enemy’s forces for nuclear coercion.”⁸⁷ Likewise, a 1978 memo on the Nuclear Targeting Policy Review notes that “damage limiting to the *extent feasible* would also be retained as an objective of counterforce targeting.”⁸⁸ In 1982, Secretary Casper Weinberger went so far as to argue that “our strategy is defensive...U.S. policy excludes the possibility that the U.S. would initiate a war or launch a preemptive strike against the forces or territories of other nations.”⁸⁹ This implies that U.S. nuclear targeting plans were not specifically designed to maximize damage limitation through preemption, even though damage limitation remained a formal targeting objective.

Cold War era nuclear targeting and employment reviews evaluated alternative approaches, such as countervalue targeting (against adversary cities and population—sometimes referred to as assured destruction); these approaches were found wanting. First, U.S. nuclear strategy was based on the capability to execute a wide range of limited nuclear attacks while withholding attacks on Russia’s cities if Russia similarly refrained from attacking U.S. cities. Countervalue targeting would be incompatible with established nuclear policy because by targeting adversary cities at the outset, it would preclude the limited use of nuclear weapons in the hope of controlling escalation. According to the 1978 Nuclear Targeting Review, this approach was rejected because “such a policy would have an adverse impact on extended deterrence and thus on alliance relationships and might suggest

84 William J. Perry and Tom Z. Collina, *The Button: The New Arms Race and Presidential Power from Truman to Trump* (Dallas, TX: BenBella Books, 2020), p21.

85 Frank Gavin, “Time to Rethink America’s Nuclear Strategy,” *Foreign Affairs* online (September 5, 2022); Fred Kaplan, *The Bomb: Presidents, General, and the Secret History of Nuclear War* (New York: Simon and Schuster, 2020); and Collina, *The Button*.

86 Secretary of Defense Robert McNamara, remarks on mutual deterrence, San Francisco (September 18, 1967).

87 Secretary of Defense, Memo for General Scowcroft, “Nuclear Weapons Employment Policy”, (April 10, 1974) (declassified), p4. See also Secretary of Defense, Memo for the president, “NSDM 242 — Policy for Planning the Employment of Nuclear Weapons” (January 29, 1975) (declassified).

88 Secretary of Defense, Memorandum for the President, “Nuclear Targeting Policy Review” (November 28, 1978) (declassified).

89 Secretary of Defense, *Fiscal Year 1982 Annual Report to Congress*, “Chapter 4: Policy for Forces I: Strategic Nuclear” (Washington, D.C. 1982), pp37-45. See also the White House, National Security Decision Directive Number 13, “Nuclear Weapons Employment Policy” (October 1981) (declassified), pp2-3.

opportunities in the future for the Soviets to utilize their nuclear forces for coercion of the U.S. and our allies. It would provide the U.S. with a very narrow range of options should deterrence fail.⁹⁰

The important point to draw from this history is that for most of the Cold War, counterforce targeting did not require, imply, or depend upon targeting every last adversary nuclear missile or bomber. Damage limitation would contribute to deterrence, but its inherent limitations were understood, and the United States would attempt to minimize damage with the forces allocated and to the extent practicable or feasible. The alternative approach, countervalue targeting, was rejected because it lacked credibility and was inconsistent with U.S. extended deterrence requirements that required more controlled, limited use of nuclear weapons against adversary military forces, not its cities. This was deemed important for alliance relationships as well as deterrence of Russian nuclear attack.

The second criticism of counterforce, as Charles Glaser and Steve Fetter have asserted, is that counterforce strikes cannot effectively limit damage to the United States and its allies or partners.⁹¹ These critics rightly observe that “to the extent feasible” would likely not enable the targets of nuclear retaliation to escape very large-scale death and destruction of a scale and character that U.S. and allied leaders would deem unacceptable. This is true. It also sets aside the moral question of lives that might have been saved, even amidst catastrophe. It also discounts the role of limited counterforce in incentivizing de-escalation so that the war is terminated without further loss of life.

The third criticism of the counterforce component of strategy is that it incentivizes escalation rather than deters it. That is, it exacerbates inadvertent escalation risks by incentivizing U.S. adversaries to contemplate early nuclear escalation to avoid having their forces destroyed before they can use them. This may then give the United States an incentive to escalate to nuclear use earlier in a conflict. These arguments principally apply to the debate over whether the United States should pursue damage limitation, which is the capability to meaningfully limit the nuclear damage that adversaries could inflict by destroying their forces before they launch or land.

Some critics argue further that even the pursuit of limited damage limitation capabilities can create inadvertent escalation pressures, particularly with respect to states with smaller arsenals, such as China.⁹² That is, even if the United States knows it lacks a credible damage limitation capability vis-à-vis China, China may believe otherwise. These risks are overstated in the current context, primarily because China will soon have enough survivable forces to inflict unacceptable damage on the United States even after a preemptive counterforce campaign. Even if Beijing believed that its retaliatory capabilities were somewhat vulnerable, however, Glaser and Fetter overstate the likely risks of premature escalation.

A more serious source of inadvertent escalation risk arises from China’s adoption of a launch on warning posture. Here, U.S. counterforce capabilities may contribute some additional escalatory risk. If China assumes that a U.S. first strike were targeting its forces, it may launch on warning to ensure that U.S. weapons struck empty silos and bases. However, China would only have rational incentives to launch on warning if it possessed counterforce capabilities and discriminate options of its own. If China’s launch on warning targeted U.S. cities and major government targets, the United States would have no incentive to avoid inflicting unacceptable damage on China. China may attain a counterforce capability against U.S. ICBMs in the coming decade, making this a real possibility. On the other hand, if China’s forces targeted military targets in remote areas, China might hope to even the score while limiting additional damage. Absent a credible targeting option, the credibility of a Chinese launch on warning requires assuming that Chinese leaders would be making an emotional, irrational decision.

The fourth criticism of counterforce is that it incentivizes costly arms races with little prospect of success and at great expense. This argument has some merit. Historically, the U.S. pursuit of counterforce capabilities in the 1960s did drive countervailing efforts by the Soviet Union. However, the technology for U.S. counterforce capabilities already exists in the current generation of U.S. weapons technology while China is already developing new capabilities to counter perceived U.S. advantages. Any U.S. damage limitation advantage is already waning. Future growth in U.S.

90 Secretary of Defense, Memorandum for the President, “Nuclear Targeting Policy Review” (November 28, 1978) (declassified).

91 Charles L. Glaser and Steve Fetter, “Should the United States Reject MAD? Damage Limitation and U.S. Nuclear Strategy toward China,” *International Security* 41, no. 1 (Summer 2016), pp49-98.

92 *Ibid.*

forces would only be chasing China's expansion. Overall, the potential for intensified competition has many sources, and to the extent that counterforce contributes to some competition, the benefits of a modest counterforce capability outweigh the potential costs.

Does Counterforce Provide the United States with Strategic Advantages?

Although we judge these criticisms to be invalid, we are still left with the question about whether counterforce options add something substantial and important to U.S. employment strategy. One answer is that the only viable alternative is countervalue targeting—that is, attacks against cities. This strategy violates the Law of Armed Conflict and offers no deterrence leverage over a leader who cares little for the well-being of the populace.

A better answer derives from our judgment that limited counterforce strikes are beneficial to the effort to restore deterrence if it has failed. This judgment follows from our understanding of how to operationalize Schelling's concept of the "threat that leaves something to chance." The focus here is on limited strikes, as we judge that even large-scale counterforce strikes cannot eliminate significant damage to the United States and its allies and partners.

When two nuclear powers enter a conflict, even with purely conventional forces, they both incur the risk that the conflict could escalate, either deliberately or inadvertently. By this logic, one side can manipulate this risk through deliberate nuclear escalation, communicating to the other side that it values the stake so highly that it is willing to assume the risk of nuclear war. Escalation is thus a competition in risk taking. The risk being assumed is the possibility that the conflict could escalate to a general nuclear war.

Schelling argues that in such a competition in risk taking, the military effects of nuclear use are secondary to their strategic impacts.⁹³ The purpose of limited use is to communicate one's willingness to accept the risk of further escalation to secure a favorable outcome to the conflict. The target of a limited attack should therefore be to destroy something that the enemy leadership

values, communicating the prospect for further pain should the war continue. Counterforce, either as first use or retaliation, can in fact muddle the message sent through limited use, potentially communicating that the attacking side is attempting a disarming attack. As Schelling argues, "extra targets destroyed by additional weapons are not a local military 'bonus.' They are noise that may drown the message. They are a 'proposal' that must be responded to. And they are an added catalyst to general war."⁹⁴

With respect to threats that leave something to chance, the core issue is the impact that limited use has on the enemy's decision calculus. Limited attacks do two things: they impose direct cost, and they confront decision makers with the question of what to do next. Certainly, by targeting something the enemy values, the message being sent is that prolonging the conflict can imperil more valuable things, including the destruction of *everything* the enemy leadership values. However, any nuclear escalation invites the question of a response. Attacks on nuclear forces may present the enemy with the need to consider riskier operational practices. They may also deprive the enemy leadership of options to continue the conventional fight, forcing them to consider whether to turn to more dramatic forms of nuclear use that significantly increase the possibility of a massive U.S. response. In other words, if the response to nuclear use is further nuclear use, no matter the form, the risk of further escalation remains and may increase. It is therefore dubious that there is more precise communicating to be had in targeting so-called value targets such as oil wells or industrial centers. Any destructive nuclear use incurs the risk of further escalation.

In principle, the U.S. policy of flexible response is entirely compatible with limited strikes on targets other than enemy nuclear forces, so long as these attacks comply with the law of armed conflict. U.S. nuclear strategy also emphasizes the importance of making threats that are "tailored" to the priorities and perceptions of U.S. adversary decisionmakers. As such, limited U.S. nuclear responses could hold at risk so-called "value" targets, such as governmental facilities, if that is what the enemy values. The enemy could also value its nuclear forces, however. U.S. decision makers must account for two additional considerations. First, attacks on industrial centers may change the enemy's stake in the conflict by creating domestic pressures for retribution, prologuing the competition in risk taking further. Second, counterforce targeting may help

⁹³ Schelling, *Strategy of Conflict*.

⁹⁴ *Ibid.*

the U.S. shape the bargain being tacitly negotiated by sparing certain targets in the early phases of a limited nuclear war, creating space for leaders to negotiate a settlement.

In sum, criticisms of counterforce strategy reflect a misunderstanding about the necessity and effectiveness of counterforce, especially in the strategy to keep a limited war limited. The United States should continue to maintain a role in employment strategy for limited counterforce strikes, recognizing that a robust strategy to comprehensively attack the combined forces of Russia and China is neither feasible nor necessary.

Conclusion

The fundamentals of deterrence remain sound even in the context of a second nuclear peer. General deterrence theory is built on enduring truths about shaping human behavior. Nuclear deterrence strategy addresses in a reasonable way the particular requirements of deterring by nuclear means, including especially the credibility challenge, and flexible response is well tailored to the challenges of both large-scale and limited regional nuclear conflict. Employment strategy is built on sound principles. China's emergence as a second nuclear peer is certain to drive renewed debate about the value of counterforce strikes in employment strategy but in and of itself poses no challenge to employment strategy principles.

The Fundamentals of Nuclear Deterrence	
General deterrence theory	The deterrence calculus: influence an adversary's will to attack by shaping his calculus of the benefits, costs, and risks of different courses of action, including the course of inaction
Nuclear deterrence strategy	Flexible response: shape the adversary's calculus of nuclear employment and escalation by demonstrating the will and capability to impose nuclear costs and risks that would outweigh any gains from either limited and large-scale attacks
Employment strategy	Objectives-based planning: restore deterrence if it has failed and achieve other presidential objectives in a manner tailored to particular adversaries and circumstances

Implications for U.S. Strategic Nuclear Forces

Are existing and planned U.S. strategic nuclear force fit for the purpose of deterring and, if necessary, defeating two near peers simultaneously?

Does the United States have sufficient weapons of the right types, and will possess sufficient weapons as it modernizes? If not, what changes are needed?

The term “nuclear forces” refers here to the delivery platforms (bombers and ballistic missile submarines), weapons (warheads and bombs) mated to delivery systems (e.g., SLBMs and ICBMs), support systems (e.g., tankers), command and control assets, and associated military infrastructure necessary to conduct nuclear combat operations. The platforms and weapons can conceptually be split into two components: those that are operationally deployed and those that are not operationally deployed. The operationally-deployed component is readily available (immediately or within a few days), while the non-deployed component may take weeks to years to become operational.

An increase in the number of targetable Chinese nuclear weapons implies an increase in the number of U.S. nuclear weapons to target them. But a quantitative increase in an adversary's nuclear force might not always be matched by a quantitative response. For example, were Russia to upload its existing strategic nuclear delivery systems following the end of New START, U.S. counterforce targeting requirements would not increase because additional warheads on existing delivery systems do not create new targets.

Faced with growth in China's nuclear forces, and also with the possibility of further growth in Russia's forces, how should the United States respond in the design of its strategic nuclear forces? It has three basic options:

1. To not respond at all, on the argument that it already has more than enough weapons and flexibility
2. To anticipate the worst case and compete to regain ground lost over the last decade and to maintain parity against the forces of Russia and China combined
3. To respond now in a measured way to ongoing developments in China's force and prepare the hedge against possible future nuclear planning requirements.

Options 1 and 2 serve U.S. and allied interests poorly. Option 1 signals that the United States is prepared to accept a major erosion of its strategic position and a weakening of extended deterrence. Option 2 signals a commitment to nuclear supremacy that cannot be achieved or sustained and offers no meaningful benefit. Our recommended course of action is option 3.

Background

It is not obvious that the growth of China's targetable nuclear force translates automatically into a commensurate growth in U.S. nuclear forces. Presidential guidance is shaped by decisions about which risks to accept and which to try to reduce. Civilian leaders must tell military planners what to plan for and what not to plan for. As their guidance attests, the required size and attributes of U.S. strategic nuclear forces is determined in a complex calculus of strategic interest, policy choice, and threat assessment.⁹⁵ For its deterrence threats to be judged credible, the United States must have both the means and the will to impose costs, communicate risk, and deny benefits. While U.S. resolve is not entirely (or primarily) a product of its force posture, posture can contribute to communicating U.S. resolve. The actual logic of force sufficiency encompasses many quantitative and qualitative variables that inform decisions about the size, composition, and operational characteristics of the U.S. nuclear force. Accordingly, that logic does not lend itself to easy numerical force planning solutions. Key variables include the following:

- Assessments of the geopolitical environment
- Presidential guidance on force employment
- Operational imperatives
- Adversary-perceived deterrence gaps

⁹⁵ See previously cited reports to Congress on nuclear deterrence strategy. See also *Nuclear Matters Handbook, 2020* (Office of the Secretary of Defense, revised 2020 edition) and Charles Glaser, Austin Long, and Brian Radzinsky, eds., *Managing Nuclear Operations in the 21st Century* (Washington, DC: Brookings Institution, 2022), especially the chapters on nuclear employment planning.

- The specific requirements of assurance of allies and partners
- Risk management strategies

These variables are not fully independent of each other. Each is described briefly below. Also factoring into the logic of sufficiency are the attributes of each weapon system and the degree of execution flexibility desired by the president.

Assessments of the geopolitical environment are the foundation upon which the other dimensions are built. These assessments identify the countries and scenarios to which U.S. nuclear deterrence applies and the potential employment, in crisis and war, of the nuclear dimension of U.S. military power. Geopolitical assessments involve judgments about the likelihood of armed hostilities and of nuclear employment in such contingencies. They also involve judgments about the possibility of accidental, misinformed, or unauthorized use and adversary misperception and miscalculation.

The emerged 2NP problem should feature prominently in such assessments. They compel U.S. leaders to decide how best to direct U.S. military forces to prepare for two or more potential conflicts with capable adversaries. Should military planners prepare for the most stressing (a simultaneous conflict with Russia and China cooperating fully as allies) or less stressing (sequential and un-coordinated) scenarios, or both? It also compels U.S. leaders to decide on wartime objectives. Should the U.S. military be prepared to try to render an adversary unwilling or unable to continue to fight? Should the military aim to defeat attacks or to reduce the adversary's capacity to reconstitute a near-term threat? Does an adversary's current or likely future nuclear strategy and doctrine indicate a need for a wider array of U.S. nuclear response options to deter or counter adversary limited nuclear use? Must U.S. nuclear forces play a role in compensating for conventional inferiority in some plausible scenarios? Answers to these questions drive U.S. nuclear force requirements.

As previously noted, planning guidance on force employment comes from the President—the sole authority for nuclear weapons employment.

Employment refers to the use of a nuclear weapon against a target if deterrence fails. This guidance specifies the types of contingencies for which the President would like to have pre-planned options and the objectives those options are intended to achieve. It distinguishes between what is required in the way of immediately available options (“day to day”) and what is required after forces are generated—that is, fully deployed to the field. It also specifies how much flexibility is desired (that is, the ability to achieve objectives under different conditions and in different ways) as well as the desired role for non-nuclear capabilities, whether as complements or alternatives to nuclear means. The 2NP problem should be reflected in employment guidance as well. It compels U.S. leaders to decide whether objectives change if the targeted adversary is the first nuclear aggressor or the second.

U.S. presidents have recognized that it is not possible to be 100 percent effective in attacking an enemy's forces and eliminating the damage they might do. This is especially so in case of a war involving multiple nuclear exchanges and multiple disputants. But reducing damage has remained as a potential employment objective. Attacking an enemy's nuclear forces has also been seen as helpful for escalating in limited ways as part of an overall approach to restoring deterrence once it has failed. Thus, U.S. presidents have issued guidance to put enemy forces at risk “to the extent practicable.”⁹⁶

Operational imperatives also affect the size of the force. To draw an analogy from the U.K.: to maintain continuous at sea deterrence each must have a force of not one but four ballistic missile submarines (typically one on station, one in transit, one in port, one in long-term maintenance). A critical factor in determining force requirements is the need to generate forces in crisis or under attack and to sustain operations at different alert levels through a crisis so that the threat of a nuclear response is always credible. The 2NP problem magnifies the impact of alerting considerations on force size. In a 2NP world, the United States must be capable of simultaneously facing two near peers operating on heightened alert, potentially for a period of months or even years. China's force growth also raises the potential strategic price for “leveraging”—the process of assigning a single weapon to different targets on the assumption that

96 See for example the following declassified guidance documents: “Draft Memorandum from Secretary of Defense McNamara to President Johnson, Strategic and Offensive Forces” (January 15, 1968); “Draft Presidential Memorandum on Strategic Offensive and Defensive Forces” (January 9, 1969); “National Security Decision Memorandum 242” (January 1, 1974); “Policy Guidance for the Employment of Nuclear Weapons” (April 3, 1974); “Memorandum for the President, Nuclear Targeting Policy Review” (November 28, 1978); and “Presidential Directive NSC-59” (July 25, 1980).

it would only need to be employed against one.⁹⁷ Further, China's force growth highlights the need to plan for a dedicated, survivable reserve force.

Deterrence gaps as an adversary might perceive them are also a critical variable. Given what can be understood about an adversary's strategy, capabilities, doctrine, and decision calculus, it is possible that an adversary might perceive a window of opportunity due to a gap in the U.S. nuclear deterrence architecture. Is there any point in a plausible contingency at which an adversary might conclude that there could be substantial benefit (and acceptable risks) to the employment of nuclear weapons? The decisions to pursue and then to cancel SLCM/N reflect the different answers of the Trump and Biden administrations to this question. The 2NP problem, with its important implications for extended deterrence, brings us back to this question.

The specific requirements of assuring allies and partners are not generally separate or distinct from the requirements of deterring aggression by their neighbors. Effective extended deterrence equates, in theory, with effective assurance. But the reality isn't always that simple. NATO's nuclear sharing arrangements may not promise the most operationally effective delivery of a nuclear response to Russian aggression; but as a testament to the "transatlantic link" and the principle that an attack on one will be treated as an attack on all, these weapons have an irreplaceable deterrence value. Allied assurance also requires convincing them that the United States is willing to employ nuclear weapons in their defense, not just deter on their behalf. As noted above, the 2NP problem raises new questions for U.S. allies whose regional deterrence architectures may be weakened by the outward flow of U.S. military and political assets to respond to a crisis in another region.

Finally, risk management strategies are a critical determinant of force requirements. That is, the force must be hedged against various risks in order to ensure that deterrence requirements are always met. As discussed elsewhere in this report, the Department of Defense identifies four major categories of risk: geopolitical, technological, operational, and programmatic. Leaders are compelled to decide which risks are plausible and probable, which risks to mitigate, and how quickly

to try to do so. In general, the realization of a risk results in reduction of the size or effectiveness of the force and thus raises a question about whether the force remains sufficient to carry out its role in national security strategy.

Key Planning Questions

With this force planning framework in mind, force planners need answers to the following key questions generated by the 2NP problem.

First, what conflict scenarios associated with the 2NP problem are plausible?

The answer to this question cannot proceed in isolation from the rest of U.S. defense strategy. Conventional and nuclear force planning must be integrated. The range of potential scenarios in a two-peer world is broad, ranging from a single crisis/conflict with a single adversary to simultaneous crises/conflicts involving both Russia and China, which may be acting entirely independently, in loose coordination, or as allies. Simultaneous conflict could emerge at the same time or could come about through opportunistic aggression launched by the second nuclear peer after the initiation of the first conflict by the other. (Conflicts could also result from accidental or coincidental actions, or by actions taken by one of the two parties involved in the first conflict.) The dynamics of sequential and opportunistic initiation are likely to be highly context-specific, reflecting: which crisis/conflict begins first; when in the first crisis/conflict the second begins; how such conflicts are fought (e.g., do strategic attacks occur simultaneously or non-simultaneously in the two conflicts?); and, the duration of, and the degree of success or failure of aggression in, each conflict. An adversary may act like it is preparing to initiate a crisis or conflict, even if it has no intention to do so, in order to complicate U.S. planning and draw U.S. forces away from a surprise attack by the other adversary. The spectrum of possibilities is illustrated in Figure 1.

Second, in the scenarios of interest, what must U.S. nuclear forces be capable of doing for deterrence purposes and in case deterrence fails?

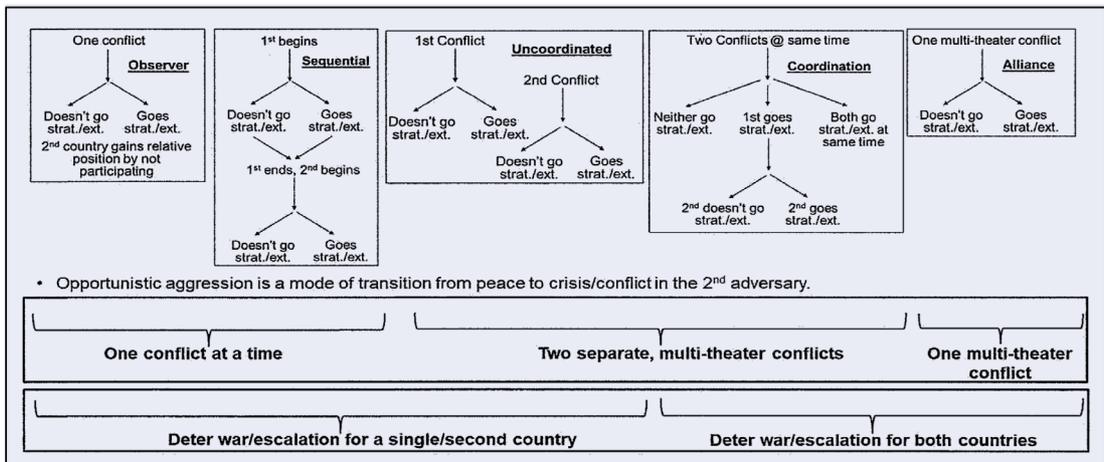
The new problem presents force planners with the question of which capabilities the United States should maintain with respect to each

97 For a discussion of how the nuclear planning process accounts for the challenge of synchronizing capabilities, plans, and operations in the current security environment, see Michael S. Elliott, "Turning Presidential Guidance into Nuclear Operational Plans," Chapter 5 in Glaser et al., *Managing U.S. Nuclear Operations in the 21st Century*.

potential adversary and theater of operations. For example, how capable should U.S. forces be of conducting counter-nuclear strikes (that is, strikes aimed at degrading or destroying an enemy's nuclear strike capabilities) across scenarios and adversaries? The United States could decide to set a high threshold with respect to counter-nuclear operations, which might reflect the aim of reducing immediate and future threats, strengthening the credibility of escalation management, and assuring allies. If so, then the force might be sized to put at risk the larger of the two adversary nuclear forces. But what about the second peer? Should the United States posture its force to achieve all its employment objectives against just one, some employment objectives against both, or all employment objectives against both? The answer to this question depends on multiple factors. How likely are the two adversaries to be allied? How likely is it that two potential conflicts will simultaneously involve large scale nuclear exchanges? How much strategic value to the United States is there in having the capacity to conduct a counter-nuclear attack against a second nuclear power after conducting and suffering a large nuclear strike by the first?

These questions point to the need for clarity about the role of U.S. nuclear forces in a second conflict. It is important to note that, as the second conflict begins, the United States will face tradeoffs and prioritization decisions beyond the nuclear dimension that can affect the nuclear dimension. This will be driven by the need to prioritize the allocation of conventional capabilities across the two theaters—especially assets that are high priority and low density, such as advanced conventional munitions. The absence or shortage of these in the lower priority conflict will complicate the U.S. way of conducting a war and possibly result in U.S. conventional inferiority in the second conflict. It is possible that the second conflict may in fact be the higher priority conflict. U.S. leaders will then have to consider the role of nuclear weapons in prosecuting both conflicts, including the possibility of relying more heavily on nuclear weapons to compensate for conventional inferiority. They may choose not to increase the nuclear role or to increase it significantly. Anticipating these choices will be necessary in designing future forces and postures.

Figure 1: Future crisis/conflict scenarios



To further frame this set of choices regarding U.S. nuclear employment strategy one can envision a range of deterrence and warfighting *Ends* against one or both peer adversaries.

Deterrence *Ends* could include:

- Contribute to deterring large scale non-nuclear aggression by a single peer adversary
- Deter opportunistic second peer non-nuclear aggression or collaborative two peer non-nuclear aggression
- Deter intrawar escalation to strategic attack by one or both peer adversaries
- Deter large scale strategic attack on the United States by one or both peer adversaries

Warfighting *Ends* could include:

- Reestablish deterrence following limited strategic attack by one or both peer adversaries
- Counter the campaign effects of intrawar escalation by one or both peer adversaries
- Limit the damage strategic attacks by one or both peer adversaries can do to the United States and our allies
- Mitigate peer adversary non-nuclear superiority in the second theater of a conflict with both peer adversaries

Given this range of deterrence and warfighting *Ends*, one can then identify a range of employment strategies that addresses those *Ends* to varying degrees. The extent to which such strategies address the *Ends* above determines their impact on future U.S. nuclear force requirements. The following four illustrative employment strategies frame this decision space in order of increasing impact on future U.S. nuclear force requirements:

1. Deter nuclear escalation by both peers, fight one peer at the theater level only.
2. Deter aggression and strategic escalation by both peers, fight one peer at the strategic and theater level.
3. Deter aggression and strategic escalation by both peers, fight both peers simultaneously at the theater level, fight one peer at the strategic level.
4. Deter aggression and strategic escalation by both peers, fight both peers simultaneously at the strategic and theater levels.

The nuclear employment strategy the United States selects will have significant impacts on the level of risk the nation takes in its efforts to deter our two peer adversaries, and on the level of risk we accept in being able to successfully defend the United States and our allies if deterrence fails in a limited or large scale way.

Third, is nuclear parity with Russia still important? Is nuclear supremacy over China still important? Can the United States accept parity with both, knowing that their combined force would be roughly double that of its own?

Through the Cold War, the United States sought to maintain approximate nuclear parity with the Soviet Union as well as a strategic posture of “essential equivalence” and, in later years, “second to none.” Both terms encapsulated a view that the United States could pursue its deterrence, allied assurance, and escalation management objectives without quantitative nuclear superiority over the Soviet Union as long as the United States maintained forces that were at least as large and technologically sophisticated as the Soviet Union’s. The Soviet Union made attaining parity with the United States a high priority of its nuclear policy, viewing parity as a prerequisite for engaging on the international stage as a co-equal superpower to the United States. The United States responded to the emergence of nuclear parity in part by taking steps to convince the Soviet leadership that its newfound confidence should not translate into aggression or coercion. The commitment to “second to none” was maintained in part as a form of assurance to allies.

After the Cold War, the United States has been clearer about strategic equivalency with Russia than about parity per se. As the 2010 NPR stated:

Because of our improved relations, the need for strict numerical parity between the two countries is no longer as compelling as it was during the Cold War. But large disparities in nuclear capabilities could raise concerns on both sides and among U.S. allies and partners, and may not be conducive to maintaining a stable, long-term strategic relationship, especially as nuclear forces are significantly reduced.⁹⁸

The United States has long enjoyed a position of nuclear superiority over China, now eroding. But it is not clear that China believes there to be strategic value in parity and thus may not stop building when it achieves parity. In contrast, it is not clear that Beijing values parity or that attaining parity with the United States would result in China feeling more secure, confident, and accepting of the international status quo.

To add further complexity, at the theater level in Europe, the United States came to accept a position of clear numerical inferiority, when it deemed the likelihood of conflict with Russia as very low. Moreover, in recent years, there has been very little evident allied interest in such matters—except in Japan, where there is a strong interest in U.S. supremacy over China.

Fourth, are there deterrence and/or assurance gaps that need to be addressed?

A central question raised by the 2NP environment is whether it creates a new gap or “widens” an existing gap (i.e., does a 2NP world increase the risk to the United States and its allies and partners of a previously existing gap)? Additionally, could the United States address a gap with respect to China or Russia with the same approach, or are different approaches and capabilities (or quantities of capabilities) needed?

STRATCOM Commander Admiral Charles Richard has clearly concluded that such a gap exists. Writing to Congress in April 2022, he argued:

The current situation in Ukraine and China’s nuclear trajectory convinces me a deterrence and assurance gap exists. To address this gap, a low-yield, non-ballistic capability to deter and respond without visible generation is necessary to provide a persistent, survivable, regional capability to deter adversaries, assure Allies, and provide flexible options, as well as complement existing capabilities. I believe a capability with these attributes should be re-examined in the near future.

The gap he perceives follows from the preparations Russia and China have made for regional wars involving nuclear coercion, blackmail, and brinkmanship. The answer to this question clearly derives from answers to the prior questions.

Answers to these four questions will likely be given in the context of updated presidential nuclear guidance, which will be written in a follow on to the Biden administration’s Nuclear Posture Review. Those answers will then inform plans for the nuclear force and posture. These deliberative, decision-making, and planning processes can be thought of in risk management terms. Administration leaders are making decisions about what kinds of risks to accept and to try to mitigate. In dealing with the 2NP problem, they will have

⁹⁸ Report of the Nuclear Posture Review, 2010.

to decide how much risk to accept in deterring the second actor and in restoring deterrence if it fails.

Key Judgments

As we have formulated our advice on this matter, we have made the following judgments.

First, the United States cannot afford to simply accept the risk of the most stressing scenario and put its focus on less stressing scenarios on the assumption that the latter are more likely or immediate. Doing so would actually make the most stressing scenario more likely to occur, obviating the assumption that it is sufficiently unlikely to make it safe to ignore it. The United States must be prepared to deter simultaneous nuclear-backed aggression by Russia in Europe and China in Asia. The Chinese-Russian partnership may be yet in early days, and the two may have good reason not to fully trust each other. But the incentive of one to seek a military advantage when the U.S. is heavily engaged against the other would be very substantial. Certainly, the second peer may see its interests best served by remaining neutral; but this is neither foreseeable nor guaranteed. The second-peer's calculus will likely be influenced by a range of factors that are difficult to discern, but their perception of U.S. and allied preparedness to counter their aggression and possible escalation will likely be the most important of those factors. We should seek to affect their perception of that factor, as we cannot yet rule out either possibility.

Consequently, in peacetime and crisis, the United States must have sufficient capabilities to simultaneously deter both Russia and China with the array of deterrence actions called for in presidential nuclear employment guidance. It must be capable of demonstrating that every adversary course of nuclear action will result in significant cost and risk imposed by the United States that outweigh any gains they would expect to achieve. In war, the United States must also have the right quantity and types of capabilities to deter escalation and achieve the military and political objectives set by the President. These potentially include restoring deterrence, preventing further escalation, countering the political and military effects of adversary conventional superiority, countering the political and military effects of adversary nuclear escalation, limiting damage to the United States and its allies, and encouraging war termination if deterrence of a second nuclear aggressor has failed.

Second, if the United States ever has to fight a war involving nuclear use, it should never be in a position where it lacks the ability to deter existential threats. That is, the United States must always be capable of inflicting intolerable costs on a peer nuclear adversary—even after a preemptive strike on its forces and a follow-on large-scale exchange. The temptation for others to exploit that vulnerability could be disastrous.

In our view, the United States must be capable of restoring deterrence of the second actor by threatening to inflict intolerable costs if it joins the ongoing conflict in a way that puts vital U.S. and/or allied and partner interests in grave danger. This does not mean that it needs to have the capability to execute all deterrence options against both actors simultaneously. It does mean the United States must have the capabilities to do damage to the adversary its leaders deem unacceptable even in the most extreme circumstances (having absorbed and responded to a large-scale preemptive strike on forces operating on a day-to-day basis rather than on alert). These criteria do not lend themselves to easy quantification.

Within our study group there are differences of view about what this means, in practical terms, for U.S. nuclear strategy and forces. On the one hand, some see it as necessary to have available the means to conduct the full range of operations envisioned in current strategy and employment guidance against two adversaries simultaneously. On the other hand, some see it as sufficient to ensure an ability to conduct a narrower range of operations against the second adversary to address the threat of limited nuclear operation, so long as the United States always retains a credible capability to impose damage on the second adversary that adversary leadership deems unacceptable. As a whole, the group recognizes that the credibility of U.S. nuclear threats is likely to be significantly impacted by the dynamics of the war with the first adversary, though we disagree on precisely how.

Despite these differences, we agree that the United States should have the capability to effectively strike at least some enemy nuclear forces under all conditions. Some will be difficult if not impossible to target with current capabilities, as they are mobile and difficult to locate and track. But targeting the rest, as practicable, offers some measure of deterrence leverage. It also holds out some promise of limiting damage to the United States and its allies from further attacks. We agree with the objective set out in declassified presidential guidance, that the United States should have the ability to “destroy or

neutralize, to the extent practicable with available, allocated nuclear forces, the nuclear offensive capabilities of the enemy that threaten the United States and its allies in order to assist in limiting damage and to reduce the enemy's forces for nuclear coercion."⁹⁹ In this formulation, "to the extent practicable" is key. The ability to target some portion of enemy nuclear forces does not negate the threat they pose and thus does not provide the United States a destabilizing preemptive strike capability. But even an imperfect capability serves other purposes.

Third, today's strategic nuclear forces are, in our judgment, only marginally sufficient to meet today's requirements. This is due primarily to insufficient limited nuclear response options to address adversary limited nuclear escalation. We also agree that today's forces are insufficient for tomorrow's requirements. Some quantitative increase will be required in response to China's build-up. And we must be ready for developments in Russian and Chinese strategic postures that require different U.S. nuclear capabilities in addition to more of them.

Recommended Course of Action

The United States should respond now in a measured way to ongoing developments in China's force and prepare the hedge against possible future nuclear planning requirements. This implies that the United States should have a two-part strategy in response to China's emergence as a nuclear peer—one near-term, the other longer term.

For the near term, it should prepare for the new strategic landscape when China's three new ICBM fields become operational. There seems to be no doubt that these will become operational—though we should not completely rule out some improvements in the international environment as leaders react to new dangers.

For the longer term, the United States should also prepare for what might come next. On this, there is a good deal more uncertainty. It is conceivable that China and Russia will slow or halt the growth of their forces when current modernization plans are completed; but this seems unlikely. But what if China and/or Russia continue over the next decade or two to build up their nuclear forces beyond current force levels? What if one or both seeks

quantitative supremacy? Here our study group is divided. Some see it as necessary for deterrence and assurance for the United States to compete to maintain a second-to-none posture. Others see nuclear supremacy as a meaningless concept so long as the United States is capable of assured retaliation in a manner that imposes unacceptable costs on an adversary. This is a judgment call for a future time. Whatever call is made, at a minimum the United States must maintain the triad and adapt it, both quantitatively and qualitatively, as circumstances change. In short, for the longer-term uncertainties, the United States must be well hedged. This is the subject of the following section. To hedge effectively, some decisions must be made now about the options that need to be put in place to meet potential future nuclear requirements, as argued further below. The immediate choice comes down to a choice by authors of updated presidential nuclear employment guidance. The United States can:

- Prioritize one peer over the other.
- Prioritize the first conflict over the possibility of a second.
- Prioritize both equally across the spectrum of conflict.

The best course of action is the third choice. This group judges that the United States should not accept more risk in its nuclear deterrence strategy; it agrees with the new National Defense Strategy that deterrence must be strengthened. Nor, it argues, should the United States change its nuclear strategy, for reasons already outlined in a preceding section. In the views of this majority, the right course of action is to take some steps now to prepare to increase the force (by exercising and demonstrating that upload capability), to increase the force when the New START constraint expires, and to prepare for additional actions that might be necessary if China and Russia grow their forces beyond 2026.

To the argument that such increases would damage the prospects for arms control, this group counters the prospects are already quite dim but also the possibility that such U.S. actions will increase the incentives for Russia and China to avoid future competition.

To prepare to increase the force when the New START constraint expires, and assuming no interim dramatic improvement of the international

99 Nuclear Weapons Employment Policy (April 10, 1974), declassified July 17, 2003.

situation, the United States must plan to upload some or all of the war-heads that it down-loaded as part of New START implementation. Preference should be given to uploading SLBMs rather than ICBMs, as this helps to preserve the advantages for stability of a single-warhead ICBM. Full restoration of the pre-NST SLBM force would require restoration of the decommissioned launch tubes (which may or not be necessary depending on targeting requirements). The United States could also increase the number of bombers available for the nuclear mission.

Assuming the United States takes these steps, it must then re-set its geopolitical hedge, as discussed further below. We are not prepared to offer a specific number of weapons to be up-loaded, as such precision requires access to classified threat and targeting information. As argued above, the United States need not match China's force deployments on a one-for-one basis—though doing so would send a powerful political message of resolve not to allow deterrence to further erode.

Some in our group call for action before 2026, on the argument that China's new ICBM fields may reach full operational capability before then. This would require U.S. withdrawal from New START (or become possible if the treaty collapses before then). It would be possible also to work within the New START limits to increase in a more limited way the operational availability of nuclear forces in crisis. Given the New START counting rule that counts every nuclear-armed bomber as a single weapon regardless of the number of loaded weapons, the United States has the options to upload bombers and also to exercise doing so. Such exercises would send a useful deterrence and assurance message.

Finally, we recommend that the United States maintain a secure reserve force to ensure that it is never without nuclear weapons, even after a nuclear exchange. Such a reserve is of increased deterrence and assurance value in the two-peer environment.

Implications for Hedging

Hedging is the means of dealing with a dangerously uncertain future. Its purpose is to ensure that U.S. nuclear deterrence strategy remains credible and effective despite changes of various kinds, both anticipated and unexpected. Hedging provides the means for a decision-maker five, 10, or 20 years hence to make different choices about deterrence in response to a changing security environment.

Is the United States adequately hedged against foreseeable developments in the two-peer environment? That is, does it have the capabilities and capacities in place to be able to respond in a timely and effective manner to new nuclear requirements a future president may set in response to geopolitical change, or to technical, operational, or programmatic risk? To be clear, the emerged problem requires a response here and now, whereas the emerging problem requires a response in the hedge (and perhaps more).

Planning for what is required to meet U.S. objectives as it pursues nuclear capabilities is inherently speculative. It takes years if not decades to field new capabilities, which are expected to remain in service for up to a half century. Decision-makers, therefore, must make informed predictions about the security environment, the evolution of military technology, and the reliability of U.S. systems over time as they determine what capabilities are needed and in what quantity. They must also, to the extent practicable, build in options to adjust over time as more information is revealed. The United States must be well hedged against four types of risk.¹⁰⁰

Risk Categories

The first is the geopolitical risk associated with changes in the number of nuclear-armed adversaries, the deployed nuclear arsenals of adversaries, or potential alignment between nuclear-armed adversaries. An existing adversary may increase the size or capability of its nuclear force, either increasing the number of targets for U.S. nuclear forces or causing concern about the survivability of U.S. forces. A new nuclear-armed adversary could emerge, adding a new set of

targets and operational requirements. Greater alignment between nuclear-armed opponents could cause concerns about the need to engage in simultaneous deterrent and employment campaigns. In each instance, the United States would face the choice of adjusting its nuclear posture to face new realities or accepting greater risk.

The second source of risk is the operational risk associated with changes in adversary military capabilities which could significantly affect the likely effectiveness of U.S. nuclear operations. Commonly cited examples of this risk include improvements in adversary air and missile defenses that could significantly reduce the probability of penetration for U.S. ballistic or cruise missiles or improvements in the ability of adversaries to locate and target U.S. submarines at sea. If adversaries fielded these capabilities, the United States might require a greater number of nuclear forces or forces more capable than those it has fielded.

The third risk is the technical risk associated with unforeseen issues with the reliability or performance of U.S. nuclear weapons or delivery systems that have a significant impact on the effectiveness of deployed capabilities. Examples could include worse-than-expected effects of plutonium aging or an issue with a component that extends to multiple weapons. These types of issues would require the United States to either replace faulty weapons within a leg of the triad with spares or increase the deployed forces in one of the functioning legs to account for shortfalls in the leg that is having issues.

The fourth risk is programmatic risk. This is the risk that procurement programs may fail to deliver required replacement capabilities before existing forces reach the end of their operational lifetimes.

The Existing U.S. Approach

The United States would, of course, prefer to minimize these risks as much as possible. It does so by, among other things, designing its capabilities

¹⁰⁰ The 2022 unclassified summary of the National Defense Strategy includes an elaboration on risks and how the Department of Defense intends to manage them.

to be effective against plausible threats that exceed anything an adversary has fielded, performing surveillance and sustainment activities to minimize technical risk, and attempting to favorably shape the international environment. It also hedges by maintaining options for adjusting nuclear posture and deploying additional nuclear forces.

Since the end of the Cold War, U.S. nuclear hedge strategy has been defined primarily by the maintenance of excess warheads that can be used to replace warheads with technical issues or uploaded onto deployed delivery systems. ICBMs and SLBMs can be equipped with additional reentry vehicles and the United States retains sufficient spare warheads to significantly upload, if necessary. In addition, nuclear cruise missiles and gravity bombs can be moved from the inactive to the active stockpile. The United States also has some limited options for increasing the number of deployed delivery vehicles. As a result, the United States retains the ability to maintain steady levels of deployed forces if technical, operational, or programmatic risks emerge and/or to increase the number of nuclear forces available for day-to-day alert or generation.

However, for at least the last 20 years, U.S. nuclear strategy documents have called for a shift to a different hedging strategy: a responsive nuclear infrastructure that can react to changes in the security environment or technical challenges with U.S. forces by quickly repairing systems that encounter technical problems or by quickly producing new capabilities.¹⁰¹ This hedging strategy has at least two advantages over one focused on upload capacity alone. First, it would reduce the number of spare warheads that would need to be preserved. Second, a truly responsive infrastructure would allow the United States to adjust to a changing security environment by making qualitative changes to its nuclear forces, not just increasing numbers. For various reasons, however, the U.S. has failed to heed these warnings and implement these recommendations.¹⁰²

Emerging Challenges

Going forward, it will be increasingly difficult for the United States to effectively hedge against risk for three reasons.

First, China's nuclear breakout, along with increased Sino-Russian alignment, is precisely the type of geopolitical risk against which the United States has been hedging. If the United States believes it must react by increasing its number of deployed nuclear forces, it will have exercised most if not all of its available hedge options, leaving little margin for further deterioration of the geopolitical situation, improvements in adversary capabilities, or a technical challenge in the U.S. arsenal or programmatic delays in nuclear modernization.

Second, the industrial capacity of the U.S. defense and nuclear enterprise is neither sufficiently responsive nor sufficient in capacity. Following the Cold War, the United States allowed its production infrastructure to atrophy and reduced its capacity to only provide for the minimum weapons required by the then current security environment. The United States is far from recapitalizing the infrastructure, and has not adjusted its planned capacity for the 2P problem. NNSA infrastructure for producing plutonium pits, tritium, and other key nuclear and non-nuclear components are a limiting factor, as is the capacity of the defense industrial base to produce, among other things, new submarines and missiles. The number of people with the necessary technical skills has declined and the experience needed to perform critical nuclear-related tasks such as certifying new systems is limited. Furthermore, many elements of the revitalized nuclear infrastructure that the United States is pursuing were designed at a time when the United States expected a more benign security environment. Even after revitalization, U.S. nuclear infrastructure thus will have limited capacity unless adjustments are made. Russia and China, by contrast, are generally able to field capabilities faster than the United States.¹⁰³

Third, U.S. nuclear forces are rapidly aging and are being replaced just as they age out. A number of U.S. delivery systems are well beyond their original design life and rapidly approaching obsolescence. The United States is undertaking a just-in-time, across-the-board modernization of its nuclear triad over the next two decades just to maintain its current force structure. This recapitalization is using most if not all of the capacity of U.S. nuclear and strategic production infrastructure and will

101 The Nuclear Posture Review of each administration from Clinton to Biden has established some such priority.

102 See testimony by Charles Verdon, acting administrator, National Nuclear Security Administration, to the Committee on Armed Services of the United States Senate (June 24, 2021).

103 These factors are discussed in Brad Roberts, ed., *Stockpile Stewardship in an Era of Renewed Strategic Competition* (Livermore, CA: Center for Global Security Research, 2022).

require increased spending on nuclear forces as a percentage of the defense budget for an extended period. Therefore, the United States has few options for preserving or extending the life of existing weapon systems as a hedge and little ability to field additional capabilities beyond the current program of record for at least the next decade.

Over at least the next decade or so, U.S. options for greater hedging will therefore be very limited unless long-discussed changes are made. Adjustments to nuclear force structure and posture that the United States may make over the next decade to counter China's nuclear buildup could consume a significant portion of the warhead reserve. The production infrastructure is already running close to full tilt just to replace existing capabilities that are at the end of their service life. There is little room over the next decade to create a new or additional hedge by making improvements to planned capabilities or increasing numbers before they age out.

The Pathway Forward

The pathway forward combines a general strengthening of hedge capacity with measures tailored to plausible future developments in the nuclear security environment.

The nuclear threat landscape was not static for the 30 years between 1992 and 2022 and at the end of this period it is much less benign than the United States hoped or expected. The next 30 years promise to be just as uncertain. Whether they will be more or less dangerous will depend in part on how the United States responds at this inflection point. From a deterrence perspective, the United States should build its nuclear capabilities, to the extent possible, with significant options for improvements or adjustments over time and planned modernization programs are doing just that. Weapons systems should be built with open architectures to allow for continuous software upgrades, which is the approach being pursued in the development of the Sentinel ICBM and the B-21 bomber. Where possible, they should also be pursued in a way that leaves open the possibility larger-than-planned buys and future capability improvements.

The United States should hedge in part by preparing for qualitative nuclear competition, not just increases in deployed force numbers. Hedging requires accounting not just for increases in the number of nuclear forces by adversaries,

but also for the potential that the adversary may further increase reliance on nuclear weapons in regional conflict and deploy more and/or better nuclear warfighting capabilities. Hedging in this way is likely to require revisiting some of the constraints related to norms and politics that have existed over the last two decades. It also requires a responsive infrastructure for weapons that is frequently exploring options and designing new systems that may or may not be produced or deployed. In the future, the United States may, for example, benefit from warhead types that in limited numbers could be used to assist penetration against air and missile defenses, destroy hard/deeply buried targets of strategic significance, or engage mobile targets. These types of options would have the additional benefit of allowing the United States to respond to adversary developments within an arms control framework that includes quantitative limits.

Accordingly, the United States must continue to prioritize the establishment and sustainment of a responsive defense industrial base and nuclear infrastructure. The United States will be in a better position to dynamically compete, and thus better hedged, when it has active production lines and the ability to produce new or modified capabilities on relatively short order. Critically, for a responsive infrastructure to serve as a hedge, it must be designed with excess capacity beyond what is required to replace and sustain the current program of record. Another key limitation that must be overcome is the time it takes to go from identifying a requirement to fielding a capability.

These measures to strengthen general hedge capacity must be combined with measures tailored to plausible future developments in the nuclear security environment. These should not be thought of as potential "surprises;" instead, they should be thought of as plausible departures from current practice for which adversaries have prepared or are preparing. One such plausible departure would be a decision by China to continue to build up its nuclear forces beyond what is currently underway. The United States need not decide now about what scale of effort is required; but it must decide now about what kinds of options it will want to have in place, as these generally require long lead times. The list of plausible developments in the nuclear security environment against which the United States should be well hedged includes:

- Continued growth and diversification of China's strategic forces upon conclusion of the three new missile fields.

- China's development and deployment of a substantial standing theater nuclear force
 - Russia's continued production of strategic nuclear weapons and delivery systems upon conclusion of its current modernization cycle
 - Russia's adaptation of its theater nuclear forces to reflect increased reliance after the Ukraine debacle
 - Fielding and further development of novel strategic weapons by one or both countries (e.g., fractional orbital bombardment systems)
 - Other novel military applications of nuclear technology that might emerge from their robust research and development activities
-

Implications for Extended Deterrence

The 2NP problem casts a harsh bright light on the assumptions that have guided the development of the U.S. practice of extended nuclear deterrence. At the end of the Cold War, the United States dramatically shrank its nuclear umbrella, bringing home most of its weapons deployed in Europe and Asia (most of which were then dismantled). In 2010, it retired the last of the Cold-War era Tomahawk nuclear sea-launched cruise missiles that had been kept in storage for possible redeployment aboard U.S. attack submarines, primarily in support of East Asia contingencies.

The United States retains a small number of nuclear weapons in Europe in support of NATO's nuclear sharing arrangements. Premised on gravity bombs designed and built in the 1960s, this deterrent depends on the ability of dual-capable aircraft (DCA) to overfly targets in enemy territory—an ability that is in growing doubt as Russian integrated air and missile defenses continue to improve. Various decisions by NATO alliance members to adapt these arrangements to the changed security environment have been made but have proven difficult to implement, such as a commitment to more realistic exercising. Since the retirement of the nuclear Tomahawk missile, U.S. Nuclear Posture Reviews have included the commitment to maintain the capability to forward-deploy dual-capable fighter-bombers and nuclear bombs anywhere in the world in support of an ally. Yet there is no evidence that this capability has been demonstrated.

Emerging Challenges

Further adaptation of U.S. extended nuclear deterrence in Europe and the Indo-Pacific should address three sets of challenges associated with the 2NP problem. The first set derives from the impact of the 2NP problem on existing regional trends that negatively impact the credibility of extended deterrence in both regions. These include: (1) negative shifts in regional nuclear balances in Europe and in the Indo-Pacific; (2) increasing uncertainty about the strategic nuclear balance between the United States and Russia, and the United States and China; and (3) a shifting conventional imbalance in the Indo-Pacific, including growing Chinese capability to inflict

non-nuclear damage on U.S. allies that can have strategic implications.

The second set of challenges flow from the continuum of conflict. U.S. extended nuclear deterrence practices must be effective not just in crisis and war but also in peacetime. After all, in peacetime, Russia and China cooperate to undermine the credibility of U.S. extended deterrence arrangements. In crisis, the United States and its allies may face a situation in which deterrence has failed in one region and there is uncertainty about the intention of another adversary. In war, they may face opportunistic aggression or coercion amidst the conflict with one aggressor or even collaborative or joint aggression.

The third set of challenges flow directly from the emerging two-peer problem. Adversaries, allies, or both may assess that the United States has insufficient forces to deal with two nuclear near peers at the same time. The U.S. strategic forces role as a “supreme guarantee” of allied security might erode if adversaries and allies begin to doubt the deterrence effectiveness of U.S. strategic forces in the most stressing scenarios, including a scenario in which the United States is engaged in a nuclear exchange with one adversary and seeks to deter an opportunistic aggression in the second region. Allies might be also concerned about regional allocation of the U.S. nuclear capabilities, for example about whether the number of U.S. bombers and dual-capable fighter-bombers is adequate for requirements of conventional and nuclear missions in both regions. Today's anxieties about the sufficiency of U.S. conventional capabilities to deal with a two regional war problem might in the coming decade spillover into a nuclear realm.

Or they may assess that the United States lacks the political resolve to bear costs and risks of nuclear competition with the two nuclear peers. Even though the United States successfully managed nuclear competition with one nuclear peer in the Cold War, dealing with two at the same time might be perceived by them as a too heavy burden in peacetime, crisis and war. Especially the allies from a region that is the secondary priority of the United States might become increasingly anxious that to decrease financial costs and strategic risks of nuclear competition with two nuclear peers, the United

States might be willing to compromise on issues that are in their core national security interest.

Or allies and adversaries may assess that the United States can be decoupled from its allies and partners in peacetime, crisis, or war. For example, they might assess that the United States would be reluctant to use strategic nuclear forces in the regional scenarios not only because of the fear about retaliation against the U.S. territory, but also because of a concern on how engagement in a strategic exchange would affect the U.S. strategic capabilities available against the second adversary. Quantitative and qualitative nuclear inferiority of the United States to the combined Russia and China's strategic nuclear forces could amplify this decoupling problem.

In this context, regional extended deterrence arrangements should be sufficient for addressing potential impact of simultaneous war with Russia and China on credibility of U.S. extended deterrence against regional challengers such as North Korea. For U.S. extended deterrence to remain credible, the United States has to convince its allies and adversaries that its allies will not be left without a credible nuclear umbrella, even in the most stressing scenarios associated with the two nuclear peers.

Adapting The "Hardware" of Extended Deterrence

An agenda for adapting the nuclear "hardware" of U.S. extended deterrence in Europe and the Indo-Pacific, alliance leaders must be mindful of both military and political requirements. Although strengthened and integrated non-nuclear deterrence architectures in Europe and the Indo-Pacific have much to offer to reducing the risks of aggression in both regions, non-nuclear means alone are insufficient to address unique peacetime, crisis, and wartime nuclear challenges posed by two nuclear peers.

From a military perspective, U.S. extended nuclear deterrence capabilities should: (1) be survivable even in an anti-access, area-denial environment; (2) provide an option for prompt response; (3) hold at risk different types of adversary's targets to maximum operational effect in a wide range of contingencies; (4) not constrain or limit the U.S. strategic second-strike capability. From a political perspective, these capabilities should: (1) provide an option for persistent in-theater presence; (2) be visible to provide an option of demonstrating

American robust resolve; (3) provide an option for allied burden sharing and signaling; and (4) be politically acceptable for allies (who will also worry about adversary reactions).

To address the emerging challenges, the United States should work with its allies and partners in both Europe and the Indo-Pacific to accelerate the process of adaptation of regional extended nuclear deterrence. There has been some adaptation over the last decade, with DCA modernization, rotational bomber displays, and improved consultations in Northeast Asia. But more is needed.

In Europe, there is an urgent need to signal to Russian leadership the resolve of the allies to defend their interests if attacked, including by nuclear means. NATO leaders have committed the alliance to multiple adaptations since 2009, including modernization and expansion of the sharing arrangements, more rigorous training and realistic exercising, new concept development, and regular exercising of the nuclear consultation process. There is very little to show for these commitments—a fact that may encourage Russian leaders to believe that the alliance is sufficiently nuclear risk-averse to be coercible with nuclear threats. Steps must be taken to finish this "old business" while considering possible additions to NATO's deterrence posture. There are encouraging signs that the June 2022 Madrid summit has imparted new momentum to these efforts.¹⁰⁴

In the Indo-Pacific, there is also an urgent need to signal that the U.S. military strategy to defend its interests, allies, and partners will not be jeopardized by China's strategic breakout. There are also strong demand signals from Tokyo and Seoul to strengthen the nuclear consultative process.

The United States and its allies and partners must also put in place medium- and long-term strategies to maintain credible nuclear deterrence amidst a build-up and diversification of the theater nuclear forces of both Russia and China.

THE CONTINUED ROLE OF FORWARD-DEPLOYABLE CAPABILITIES

Some experts in the United States argue that the requirements of extended nuclear and assurance of allies can be met adequately with strategic nuclear forces alone.¹⁰⁵ We disagree. By meeting certain requirements that are not met by strategic systems, forward deployed capabilities have an exclusive value for extended deterrence and assurance. For

104 "Summit Communique and new Strategic Concept," NATO Madrid summit (June 2022).

105 Steve Fetter and Jon Wolfsthal, "No First Use and Credible Deterrence," *Journal for Peace and Nuclear Disarmament* 1, no.1 (2018), p8.

Table 1

A Preliminary Evaluation of Technical Options

Criteria / Capabilities		Globally deployable DCA with B61-12	Globally deployable DCA with nuclear ALCM	Sea-Launched-forward deployed	GLCMs	Regionally allocated SLBMs	Regionally deployed Strategic bombers
Military Criteria	Survivability	- /+	-/+	+	+/-	+	-/+
	Promptness	-	-/+	+	+	+	-
	Targeting versatility	+/-	+	+	+	-	+
	Impact on the U.S.	+	+	+	+	-	-
Political Criteria	Persistent in-theater	+	+	+	+	+	+
	Visibility	+	+	-	+	-	+
	Option for burden	+	+	-	+	-	+/-
	Politically acceptable for allies	+/-	+/-	+	-	+	+

example, ICBMs and SLBMs do not provide an option for visible regional presence and allied burden sharing. Such a presence is possible with bombers (though with reduced benefits for burden and risk sharing).¹⁰⁶ But they may be vulnerable to attack and/or would lack the capability for a prompt strike. See Table 1.

Forward deployed capabilities could also play a role in strengthening the U.S. second strike capability. For example, in a hypothetical scenario in which the United States is already engaged in a conflict with one nuclear peer, regional capabilities could not only enhance extended deterrence in the second region but could also strengthen credibility of the U.S. second strike against the second adversary.

That said, U.S. strategic nuclear forces will continue to play a role as the ultimate guarantee of security of U.S. allies. As noted in the preceding discussion of nuclear strategy, there cannot be credible extended nuclear deterrence without credible U.S. strategic forces that give allies confidence that the United States can deter nuclear attack on the United States. All steps aimed at ensuring the

credibility of the U.S. strategic forces against the two near peers contribute to extended nuclear deterrence.

Notably, upgraded forward deployed capabilities would create additional linkage with the U.S. nuclear triad, reducing concerns about the decoupling of the United States and allies' security. Forward-deployed forces add to the risks any adversary faces and reduce the risks of an adversary's miscalculation that the United States would be unwilling to use its nuclear weapons on behalf of allies.

The United States cannot meet the changing requirements for extended deterrence with only a single and "one-size-fits-all" regional nuclear capability. For this reason, the United States, in consultation with allies, should explore options of different "mixes" of nuclear capabilities that would together meet the political and military requirements of credible extended nuclear deterrence against two nuclear peers. The future mix could include some or all of the following:

¹⁰⁶ This, however, may change if in the United States would supply its B-21 strategic bombers to some of its allies and make arrangements with these allies to use these bombers as DCA. The possibility that the United States might consider supplying B21 bombers to Australia—but without any reference to potential nuclear role—was mentioned by U.S. Air Force Secretary Frank Kendall in August 2022. Joe Saballa, "US Considering Supply of B-21 Bombers to Australia," *The Defense Post* (August 25, 2022). <https://www.thedefensepost.com/2022/08/25/us-b-21-bombers-australia/>. Accessed December 14, 2022.

- Globally-deployable F-35s with gravity bombs
- Globally-deployable F-35s with stand-off capability
- Regionally deployed F-35s (and weapons) in one or more regions
- Globally available bombers with stand-off (LRSO) and gravity bombs
- Regionally-deployed bombers (and weapons)
- SLCM/N, including potentially stored in theater
- Regionally-deployed, nuclear-armed GLCMs
- Rotationally-deployed bombers or SSBNs

For each of the regionally-deployed options, there would be a requirement to store nuclear weapons forward. For the globally-deployable options, there would be the possibility of having nuclear weapons stored forward in theater or flown in from the United States during a crisis.

Overall, the United States and its allies should have a mix of nuclear capabilities enabling attack operations in support of penetration of adversary A2/AD capabilities in the maritime, air, and ground environments. The mix should include complementary capabilities. Table 1 evaluates various technical options against relevant military and political criteria.

Within the study group there is consensus that that United States must make some adjustments to its posture and capabilities in order to shore up extended deterrence and assurance. There is not full consensus on which adjustments make the most sense. The majority favor pursuing an approach combining SLCM/N with exercising the ability to globally deploy F-35s with gravity bombs. Others prefer a different mix or are not yet ready to commit to a particular course of action without further study. A few are concerned about the potential negative impact of SLCM/N deployment aboard attack submarines on conventional deterrence, arguing as follows. U.S. nuclear strategy is predicated on seeking a conventional denial defense for allies and partners, including Taiwan. This is now in doubt vis-a-vis China, and is likely to continue to be so for the foreseeable future. U.S. attack submarines are critical to achieving an effective denial defense in several scenarios; yet there are major questions about the attack submarine

force's capacity and readiness.¹⁰⁷ Particularly in light of other existing and planned U.S. nuclear capabilities and alternate options for improving theater nuclear posture, the highest priority for the attack submarine force must be for the United States to have sufficient capacity and readiness to conduct the conventional denial mission, including in defense of Taiwan. Thus, they conclude, SLCM/N should be deployed on attack submarines only if doing so does not detract or distract from this primary goal.

Adapting the "Software" of Extended Deterrence

On the software side, the United States should do more to empower its alliances as agents of deterrence. This means asking more of its allies in terms of hardware but also participation in deterrence-related activities. It also means asking more of the geographic combatant commands, which have generally focused on deterrence at the conventional level of war and left deterrence at the strategic level to the separate nuclear, space, cyber, and homeland defense commands. Toward this end, we recommend the following steps:

- Ensure the promised availability of the F-35 for the nuclear mission in 2024.¹⁰⁸ Prolonged delay in DCA modernization has sent an unhelpful message to Moscow that an effective nuclear deterrent is not the priority NATO claims it to be and prevented the deployment of an important military capability.
- Review the state of operational planning in support of extended nuclear deterrence and ensure that roles between STRATCOM and EUCOM and INDOPACOM are properly integrated and generating needed results.
- Strengthen an adaptive nuclear planning process at NATO and effectively exercise it.
- Exercise extended deterrence capabilities in realistic scenarios involving appropriate levels of integration with conventional operations and of theater and strategic nuclear operations.
- With allies in the Indo-Pacific, develop more NATO-like consultative mechanisms and processes, beginning with agreed nuclear consultation guidelines (see below).

¹⁰⁷ *Navy Readiness: Actions Needed to Address Costly Maintenance Delays Facing the Attack Submarine Fleet*, U.S. Government Accountability Office, GAO-19-229 (November 19, 2018).

¹⁰⁸ "F-35 Dual Capable Aircraft Team Meets Goals Ahead of Schedule, Earns Prestigious Award," Defense Visual Information Distribution Service (February 17, 2022). <https://www.dvidshub.net/news/414834/f-35-dual-capable-aircraft-team-meets-goals-ahead-schedule-earns-prestigious-award>. Accessed December 14, 2022.

- Allocate a portion of the U.S. bomber forces for the deterrence needs in Europe and in the Indo-Pacific and strengthen consultative processes concerning their display and use.
- Develop regional deterrence campaign plans that align regional and functional campaigns and allied whole-of-government actions.
- Initiate annual cross-regional consultations and discussions to ensure coherence between extended deterrence postures in Europe and the Indo-Pacific.

A critical question for the United States is whether to engage allies in East Asia in the kind of operational preparations in which it is engaged with its European allies. In NATO, political decisions regarding alliance nuclear policy and posture are taken at the ministerial level in the Nuclear Planning Group of defense ministers and an annual nuclear exercise is conducted by the allies participating in the sharing arrangements, including those allies providing conventional air cover.¹⁰⁹ In East Asia, there is no specialized mechanism for nuclear decision-making at the ministerial level.

Although ministers are not prevented from taking up nuclear topics when they meet, the stand-up of a dedicated consultative mechanism would be useful as a deterrence and assurance message. Whether more can and should be done with allies in East Asia at the operational level has been debated by our group and not resolved. On the one hand, some believe that nuclear planning cells should be created within the alliances and charged with creating plans that could then be jointly exercised (plans with allies in conventional support roles). On the other hand, others believe that there is no role for joint planning of nuclear strike operations in the absence of leadership commitment to prepare for the possibility of such operations. The best pathway forward is to determine at the leadership level what concrete steps should now be taken, if any, to prepare for joint strike operations and to develop the needed supporting planning and exercising activities.

¹⁰⁹ NATO, "NATO's annual nuclear exercise gets underway" (October 14, 2022). https://www.nato.int/cps/en/natohq/news_208399.htm?selectedLocale=en. Accessed December 14, 2022.

Implications for Force Survivability

Of all the important characteristics of a nuclear force, the ability to survive an enemy's first strike and respond in a manner that inflicts unacceptable damage on the attacker is arguably the most critical. Ensuring survivability against a surprise attack was a central focus of early deterrence theorists, including Albert Wohlstetter, who called national attention to the problems associated with maintaining a secure retaliatory capability in his famous 1959 *Foreign Affairs* article.¹¹⁰ Two decades later, ensuring the survivability of U.S. retaliatory forces was the driving question addressed by the 1983 Scowcroft Commission, which noted in its report:

The objective for the United States should be to have an overall program that will so confound, complicate, and frustrate the efforts of Soviet strategic war planners that, even in moments of stress, they could not believe that they could attack our ICBM forces effectively.¹¹¹

The lesson of Pearl Harbor and the attacks of September 11th are a reminder that we should not take for granted the on-going survivability of U.S. nuclear forces. Even while we assess the full strategic implications and grapple with the uncertainty of China's nuclear expansion, the survivability of U.S. nuclear forces must be the cornerstone of our nuclear and deterrence strategy. As Secretary of Defense Robert S. McNamara cautioned in 1967, "The U.S. cannot and will not ever permit itself to get into the position in which another nation or combination of nations would possess such a first strike capability, which could be effectively used against it."¹¹²

Survivability also contributes to stability during a crisis or conflict by providing the President more time in which to decide whether and how to employ nuclear weapons. While the United States maintains the ability to launch its ICBMs before they could be struck in a preemptive attack, the survivability of the Triad as a whole allows the President to opt to ride out the attacker's initial strike, knowing that he or she will have survivable forces with which to respond.¹¹³ Adversaries, likewise, are less likely to decide to strike

first during a crisis, aware that the United States is fully prepared and capable of a devastating response that will impose costs that far exceed any benefit they might hope to gain by striking first.

The prospect of fighting two nuclear adversaries sequentially places a premium on the ability of U.S. nuclear forces and command and control systems to survive attacks by the first nuclear adversary and maintain the force generation, situational awareness, and connectivity to surviving nuclear forces necessary to deter the second challenger. Both China and Russia continue to improve their capabilities for attacking U.S. forces and the associated command, control, and communications capabilities.¹¹⁴

The United States safeguards its future second strike capabilities in various ways. It can respond by building more offensive nuclear forces, including new types of survivable systems. Or it can respond by making its current force less targetable (through enhanced mobility and concealment, higher readiness posture, etc.) and its command and control less vulnerable (through increased redundancy, improved dispersion, improved warning and attack assessment, etc.). Or it can pursue a combination of the three. But building more forces may be politically challenging and beyond the capacity of our infrastructure at this time. Thus, improvements should be sought to attain survivability. Such measures will be expensive and likely will have burdensome effects on the military services that operate nuclear forces. Examining the requirements for improved survivability for the longer term is important as we strive to replace our existing force with new systems that must meet the demands of U.S. deterrence and warfighting strategy for decades.

This study recommends further analysis and assessment of several potential measures to improve the survivability of U.S. nuclear forces and command and control. Some were investigated during the Cold War and were found wanting due to technical or political difficulties, but considering the emerging 2NP problem they are worth a second look in a new geopolitical and technological environment. Some

110 Albert Wohlstetter, "The Delicate Balance of Terror," *Foreign Affairs* (1959).

111 *Report of the President's Commission on Strategic Forces* (April 6, 1983), p15.

112 *Bulletin*, Department of State (October 9, 1967).

113 See previously cited reports to Congress on nuclear deterrence strategy.

114 See previously cited reports from the Defense Intelligence Agency and statements by its leadership.

can be done quickly; others will take several years. There will be near-term objectives, and longer-term options that will be contingent on how Russian and Chinese nuclear forces develop. Specific steps are discussed below.

ICBM Survivability in the 2NP Environment

The U.S. nuclear triad complicates Russian preemptive counterforce attack planning by presenting a synergistically difficult set of certainties and uncertainties to Russian attack planners. The ICBM force's role in that synergy has traditionally been derived from its very high readiness posture and its deployment in hundreds of hardened silos over a large geographic area of the continental United States. The ICBM force's readiness posture presents Russian planners with profound uncertainty regarding whether the U.S. President might decide to launch the ICBM force out from under an incoming preemptive counterforce attack, completely negating the effectiveness of such an attack. The deployment of the ICBM force in hundreds of hardened targets in the American heartland presents Russian planners with the certainty that to destroy the targetable portion of the U.S. strategic nuclear force, they must attack the continental United States with hundreds of high yield ground bursts, causing massive damage to heavily populated areas of the United States and making a President's decision to respond in a large-scale way highly likely.

Both ICBM force attributes will continue to have value in a two-peer threat environment. But enhancing the survivability of a significant portion of the U.S. ICBM force through mobility might significantly enhance the deterrent and warfighting value of the ICBM force in the face of two peer threats, whether those threats manifest simultaneously or sequentially. Depending on what nuclear employment strategy the United States adopts in a two-peer environment, U.S. force requirements could grow significantly beyond the currently planned strategic force. Enhanced ICBM force survivability and endurance would reduce the degree to which U.S. strategic forces would need to grow to address two peers by ensuring that those mobile ICBMs would be available to provide U.S. response options against either or both peer adversaries without relying on launch under attack. ICBM mobility would further complicate Russian and Chinese preemptive counterforce attack planning once generated and would provide a critically important hedge

against a breakthrough in antisubmarine warfare imperiling the survivability of the U.S. ballistic missile submarine force—the largest of the three legs of the triad. U.S. mobile ICBMs would impose a new technical challenge on Russian and Chinese force planners, diluting their ability to focus their investments on advances in anti-submarine warfare and air defense.

Towards these ends, an assessment is needed of the impact of alternative U.S. nuclear employment strategies on future U.S. nuclear force requirements in a two-peer threat environment. The only rational reason for either (or both) countries to contemplate an attack on U.S. forces is if they thought such a first strike could eliminate the will or capability of the United States to deny them their objectives and impose unacceptable damage on them. The assessment should therefore include the impact of such alternative U.S. nuclear employment strategies, and the force structures and postures they require, on deterrence of nuclear and non-nuclear strategic attack, assurance of U.S. allies in Europe and Asia, and our ability to achieve our objectives if deterrence fails, including deterrence of large-scale attacks on U.S. forces. The assessment should include analysis of the impact on deterrence, assurance, warfighting, and total force requirements of an all silo-based ICBM force versus an ICBM force that mixes silo-basing and road-mobile basing and the strategic and stability benefits of reducing reliance on launch under attack for ICBM survivability in a two nuclear peer crisis and conflict scenarios.

The United States has been here before. Soviet nuclear doctrine and forces during the Cold War provided a clear indication that should deterrence fail, Moscow planned for a counterforce first strike against hardened U.S. nuclear forces and critical command and control sites. The United States faced this challenge and other threats to survivability, such as from unwarned attacks from sea-launched cruise missiles off its coast, by taking compensatory measures to ensure some portion of the nuclear triad could retaliate and hold at risk what the Soviets most valued.

We assume that Russia continues to plan for such strikes, reinforcing its capability with nuclear-armed long range hypersonic missiles in addition to expanded air and sea-launched nuclear capable cruise missiles. The United States complicates Russian nuclear attack planning by maintaining a portion of the Triad on day-to-day alert and at sea. Presumably, during a crisis, a greater portion of U.S. forces will be generated to alert to enhance

their survivability and provide the President the full range of response options. But as China (and Russia) continues to grow and diversify its nuclear forces (including perhaps with hypersonic ballistic and cruise missiles), the survivability of U.S. retaliatory forces cannot be taken for granted.

NC3 Survivability

While the existing U.S. nuclear command, control, and communications (NC3) system remains sufficiently survivable and effective against current threats, its survivability and effectiveness against future threats, particularly the 2NP threat, will degrade unless we act to improve both.¹¹⁵ Given the Russian and Chinese counterspace threats that have already manifested, and those anticipated in the future, the United States should reexamine the extent to which the NC3 system relies on space-based assets. An increased reliance on ground- and air-based NC3 assets may be necessary to ensure future survivability. Similarly, if U.S. strategy to address the 2P threat environment requires increased reliance on theater-based nuclear forces, the future U.S. NC3 system will need to be adapted to support such theater-based nuclear operations in a survivable and effective manner.

Since the end of the Cold War, the U.S. NC3 system has increasingly incorporated the use of dual capable warning and command and control assets, in part due to the cost effectiveness of doing so.¹¹⁶ This is particularly true of space-based assets. However, co-mingling nuclear and conventional warning and command and control assets risks great power adversaries deciding to attack such assets during high intensity non-nuclear operations, given the non-nuclear warfighting advantages such systems provide U.S. and allied forces. Such attacks could significantly degrade the availability of such dual use assets for nuclear operations, potentially undermining deterrence. As we modernize the U.S. NC3 system for the future threat environment, we should carefully evaluate whether the strategic benefits of co-mingling associated with resiliency through redundancy and diversification of pathways exceed the risk of doing so.

Bomber Force Survivability

Current bomber pre-launch survivability is a function of force posture and attack warning. Expanding and wholly new threats to the bomber force as currently postured are likely to threaten bomber force survivability in the future. For

example, sea-launched cruise missiles could pose an unwarned preemptive strike threat against a nuclear bomber force concentrated on a few undefended locations. Improved cruise missile launch warning and nuclear-armed bomber force dispersal would likely be necessary in such a scenario. China's testing of a fractional orbital bombardment system with a hypersonic reentry vehicle poses a different—and more dire—threat to bomber survivability. Were China to field an orbital bombardment system that allowed them to place nuclear weapons in low earth orbit in crisis or conflict (in violation of the Outer Space Treaty), U.S. bomber forces might not receive sufficient warning of a Chinese preemptive attack to takeoff before being destroyed. Given the bomber force's critical role in U.S. deterrence, assurance, and employment strategy today, this pre-launch survivability problem must be urgently addressed.

Sea-Based Force Survivability

Given the heavy reliance of current and planned strategic nuclear forces on weapons delivered by SSBN-based SLBMs, it is absolutely essential that the United States continue to prioritize research and analysis regarding future anti-submarine warfare threats. Advances in unique sensors, artificial intelligence, "big data" processing, and autonomous swarm technologies all pose potential threats to future submarine survivability. We must stay ahead of those threats.

One way to increase sea-based survivability would be to restore the capability for nuclear cruise missile employment from U.S. attack submarines—resurrecting a capability that was mothballed in 1991 (when TLAM/N was removed from attack submarines and put into storage) and retired in 2010. Such a capability would significantly complicate both future peer adversaries' antisubmarine warfare (ASW) problem in multiple ways, hedging against ASW advances or breakthroughs that could suddenly threaten the most survivable leg of the strategic Triad.

First, the sheer number of additional submarines an adversary would have to locate and rapidly destroy would pose a difficult challenge. Instead of a maximum of 12 armed SSBNs at sea to find and destroy (and more likely a lower number than 12 due to operational availability rates), an adversary in the two-peer threat timeframe could face over 40 potentially nuclear-armed submarines. Second, some U.S. attack submarines are

115 The 2018 Nuclear Posture Review discusses expanding threats as they relate to NC3 (see pages 56-57).

116 Colin Demarest, "How JADC2 is improving nuclear command and control," Defense News (March 9, 2022).

continuously deployed forward in Europe and Asia, and in a conflict the number forward deployed would increase significantly. This forward deployment of many more submarines would increase the sea space an adversary would have to search to locate all U.S. nuclear-armed submarines at sea.

Third, SLCM/N deployed on attack submarines would provide a deployed hedge against a technical problem in the SSBN force or the catastrophic loss of SSBN supporting infrastructure. While there are two warhead designs deployed on U.S. SSBNs today, there are far more of one design than the other, making it difficult to hedge against the failure of the more numerous warhead in the SSBN leg. The most dire technical risk is that the Trident D5 SLBM would develop a critical and common issue, which would negate potentially the entire sea-based nuclear deterrent until fixed. SLCM/N would hedge against this risk. But it might come at some expense to the ability of the force to conduct non-nuclear missions.

Deployment of SLCM/N on attack submarines would also enhance the effectiveness of U.S. theater nuclear forces in both Europe and Asia in the two-peer threat environment. The advantages of SLCM/N in this role have been documented elsewhere in greater detail,¹¹⁷ but a list of these advantages serves as a useful reminder:

- Survivable day-to-day, even more survivable when generated
- Provides continuous theater nuclear presence in both theaters
- Enables broad, multi-azimuth target coverage, complicating adversary air defense
- Increases the range of POTUS response options to adversary limited first use
- Uses a variation of a planned warhead, limiting the challenge for the nuclear weapons complex
- Takes advantage of a large inventory of existing or planned launch platforms
- Does not require allies to deploy additional U.S. nuclear weapons on their territory

Force Posture Implications for Future Nuclear Force Survivability

Current U.S. thinking on changes to nuclear force posture in the transition from crisis and war (e.g., alert status, force generation, etc.) does not take into account a key new challenge created by the emergence of the 2NP problem: the pre- and post-counterforce strike potential of a second peer adversary. In making decisions about force alerting and generation, U.S. leaders will have to take into account both the requirements of its future strategy to deter two peers simultaneously and the impact of both peers' capabilities on the ability to meet these requirements even in the face of preemptive attack by one or both, simultaneously or sequentially. Weighing both factors will help identify the U.S. forces that must be available to implement that strategy across the spectrum of crisis and conflict, and inform decisions regarding what posture U.S. nuclear forces must be in to enable that strategy across that spectrum.

Stability Implications of Future Nuclear Force Survivability

Finally, the crisis stability and first strike stability implications of how we posture future U.S. nuclear forces to address those requirements need to be carefully evaluated in the course of this force posture analysis. For example, differences in relative pre-launch survivability among the three legs of the strategic Triad might need to be addressed differently in posturing for the two-peer threat. In the 2NP and 2P threat environments, the current (and planned) pre-launch vulnerability of the ICBM force could require both an increased reliance on Launch Under Attack and a need to make the bomber and SSBN legs of the Triad more survivable earlier in a crisis or conflict (through generation), or possibly even day-to-day (through peacetime alert). Similarly, if our future theater nuclear forces are vulnerable to preemptive attack in their day-to-day posture (as they are today), we will need to identify ways to enhance their survivability through either posture changes (if possible) and/or through the development of theater systems that are more survivable day-to-day. In both these examples, changes in planned force structure could provide critically important improvements in force survivability that could mitigate some of the crisis and first strike stability issues associated with nuclear force posture change.

117 John R. Harvey and Robert Soofer, "Strengthening deterrence with SLCM/N," Forward Defense Issue Brief, Atlantic Council of the United States (November 5, 2022).

Implications for Arms Control Strategy

Is U.S. arms control strategy well aligned with the new strategic environment? The short answer is no. To understand the needed arms control strategy for the 2NP environment, it is necessary to go back to arms control's beginnings in the 1950s.

The Demand for New Thinking on Arms Control and Strategic Stability

Over the past two decades, perceptions of arms control agreements changed from highlighting international cooperation to exemplifying international disfunction. Yet, even in times of intense geopolitical rivalry, arms control offers certain benefits that make mutually-beneficial agreements desirable and achievable. These benefits include stabilizing strategic competition, promoting transparency in strategic capabilities, and codifying reciprocity.

As arms control has been conceptualized in recent memory, the prospects for its rejuvenation as a viable national security policy tool appear dim. Russia and China are at worst untrustworthy and at best unwilling and/or unhelpful partners. For the last three decades, the United States seized every prudent opportunity to reduce the role and number of nuclear weapons in its arsenal, to persuade Russia to join in a step-by-step arms reduction process, and to bring China into the arms control regime. The United States succeeded up to a point in the first two efforts but failed in the third.

Looking ahead to the expiration of New START in 2026, it remains unclear if further progress with Russia will be possible. It seems highly likely that future progress with Russia will become hostage to the worsening bilateral relationship and possibly an increasing disparity in how the two sides see the role and utility of nuclear weapons. Competitive dynamics will frame any agreement in terms of overall leverage, asymmetric trade space, concessions, and appeasement. Meanwhile, China continues to view arms control as a Cold War trap and refuses to engage, while rapidly increasing their nuclear arsenal and introducing extremely destabilizing systems such as Fractional/Multiple Orbital Bombardment systems into the

nuclear equation. Neither Russia nor China is likely to place a concrete proposal on the table for the next agreement. Conversely, the United States lacks the leverage to incentivize further negotiated agreements beyond moral suasion. Additionally, the conversation in the United States remains highly polarized: either arms control is a vital necessity or a dangerous illusion. This polarity creates a practical impediment to successful negotiations. It is difficult to imagine a legally-binding limitation treaty that would satisfy both our erstwhile negotiating partners and the United States Senate, while politically binding agreements would lack the durability to survive a sustained environment of great power competition and political turnover. Some in the group are cautiously optimistic that these impediments will be overcome, recognizing that the numerical limits in such a treaty would have to be higher than those in the New START Treaty.

Other mechanisms to stop the erosion of formal arms control, or to replace formal arms control as a mechanism for managing strategic competition, have failed. Strategic stability (or strategic security) dialogues between the United States and Russia have served as an episodically useful means to exchange views on policy documents and perceptions/misperceptions. However, they have failed to drive a set of concrete proposals forward to the negotiating table. Track 1.5 and Track 2 dialogues likewise have had value in both the U.S.-China and U.S.-Russian context in terms of exchanging views of subject matter experts, but both remain colored by the downturn in bilateral relations and have been unsuccessful in driving ideas to the official government level. A Track 1 dialogue with the Chinese on nuclear or strategic stability issues has yet to materialize. The P5 remains divided on further progress.

The emerging tripolar rivalry significantly complicates the negotiating space for arms control and exacerbates difficulties which have emerged over the last two decades of arms control erosion. China's significant force expansion may result in a strategy driven increase in U.S. nuclear forces. Geopolitical rivals seek dominance rather than cooperation in new domains such as space and cyberspace, making asymmetric trades across capabilities and domains appear complex

and unlikely. Russia has long since ceased to be a willing partner in arms control, while it remains an open question whether any U.S.-Russian bilateral agreement—no matter how one-sided for the United States—would survive without Chinese participation.

Whereas the deterrence community is finally coming to grips with the changing security environment, the arms control expert community remains much further behind in its thinking. Arms control has been framed for decades as a cooperative enterprise signaling a lessening of tensions, yet competitive rather than cooperative dynamics dominate most areas of major military relations. Many arms control ideas are outdated, reprisals of past proposals, or based on assumptions that no longer apply. There is only one conceptual model for what competitive arms control should look like in a multipolar security environment—the Washington Naval Treaties of the interwar period (which offer some sobering lessons on the potential dysfunctions of such controls).¹¹⁸

Thus, we are left to consider the implications of the demise of major power arms control in 2026. What are the prospects for the United States in an unconstrained world with two peer nuclear adversaries? Is the United States prepared to compete? It is not. It has no capacity in place to do anything more than just-in-time delivery of replacements for delivery systems rapidly aging out.¹¹⁹ When entering New START, the United States had sufficient residual capabilities in post-Cold War force to incentivize Russia negotiations and agreement. This is no longer the case, and the United States must depend on modernizing both nuclear forces and the underlying weapons complex to make negotiated limits attractive to Russia and China.

The Logic of Returning to First Principles

The likely end of a decades-long period of arms control as a corollary of disarmament policy and focused on numerical limitations and reductions

necessitates a reminder of arms control principles articulated during the Cold War. Let's begin with some definition. Writing in 1961, Donald J. Brennan argued that:

It is useful to think generally of arms control as a cooperative or multilateral approach to armament policy—where 'armament policy' includes not only the amount and kind of weapons and forces in being, but also the development, deployment, and utilization of such forces, whether in periods of periods of relaxation, in periods of tensions, or in periods of shooting wars.¹²⁰

Thomas C. Schelling and Morton H. Halperin took a slightly more expansive definitional view of arms control in their seminal 1961 book *Strategy and Arms Control*: “we mean to include all the forms of military cooperation between potential enemies in the interest of reducing the likelihood of war, its scope and violence if it occurs, and the political and economic costs of being prepared for it.”¹²¹ In their concluding chapter, they elaborated further that arms control is: “a means of supplementing unilateral military strategy by some kind of collaboration with the countries that are potential enemies.”¹²² Hedley Bull in 1965 framed the issue in a competitive environment: “arms control in its broadest sense comprises all those acts of military policy in which antagonistic states co-operate in the pursuit of common purposes even while they are struggling in the pursuit of conflicting ones.”¹²³ These definitions highlight three basic underpinnings of arms control: (1) arms control is at its heart an armaments policy, (2) arms control is done amongst adversaries, and (3) states pursue cooperative arms control in a larger competitive environment.

The objectives of arms control were also explored in detail in the 1960s—a time when U.S. nuclear primacy ended, the contours of nuclear competition with the Soviets emerged, and the full risks of mutually assured destruction began to appear. For Schelling and Halperin, there were three major goals of arms control—avoidance of war, minimization of the costs and risks of arms competitions, and the curtailment of the scope

118 B.J.C. McKercher, ed., *Arms Limitation and Disarmament: Restraints on War, 1899-1939* (Westport, CT: Praeger, 1992).

119 Brad Roberts, ed., *Stockpile Stewardship in an Era of Renewed Strategic Competition* (Livermore, CA: Center for Global Security Research, 2022). https://cgsr.llnl.gov/content/assets/docs/CGSR_Occasional_Stockpile-Stewardship-Era-Renewed-Competition.pdf. Accessed December 14, 2022.

120 Donald G. Brennan, “Setting and Goals of Arms Control,” in *Arms Control, Disarmament, and National Security*, Donald G. Brennan, ed. (New York: George Brazillier, 1961), p30.

121 Tom C. Schelling and Morton H. Halperin, *Strategy and Arms Control* (Mansfield Centre, CT: Martino, 2014), p2.

122 Schelling and Halperin, pp141-142.

123 Hedley Bull, “Introduction to the Second Edition,” *The Control of the Arms Race* (New York: Praeger, 1965), pxiv.

and violence of war if it occurred.¹²⁴ These have been seen as canonical. Joseph S. Nye, Jr., for example, echoed in 1984 that the focus on reducing numbers was steering arms control away from its foundational goals of reducing the risk of nuclear war, reducing the damage done by nuclear war should it occur, and reducing the costs of arms races.¹²⁵ Similarly, Hedley Bull wrote in 1976 that the security objectives of arms control were to make nuclear war less likely, less catastrophic if it should occur, and less costly to implement in terms of military and economic costs.¹²⁶ Herman Kahn and Anthony Weiner focused on the need to “improve the inherent stability of the situation, decrease the occasions or approximate causes of war within the system, and decrease the destructiveness and other dis-utilities of any wars that actually occur.”¹²⁷

Given these first principles, fresh analysis needs to be done on how to structure and prioritize arms control objectives in a 2NP security environment. Should certain goals be prioritized over others? Have some of these objectives largely been accomplished by past arms control regimes, leaving us to focus on more dangerous remaining or emerging problems? Are some of these objectives impossible in a multilateral vice bilateral environment?

Determining Whether Numerical Limits Are Possible

One major question for arms control is whether stable force limits can be either determined or agreed in a new and more complex strategic environment. It is worth remembering that numerical limitations in past agreements rarely had a dramatic impact on existing or anticipated U.S. and Soviet/Russian force levels.¹²⁸ Instead they largely represented a transparent and managed transition to existing or anticipated ceilings or floors in bilateral strategic nuclear force levels. In an ideal world, such a transparent or managed transition could be expanded to include new participants such as China, new nuclear items of accountability such as warheads, or new non-nuclear systems of concern. A tripolar and multidomain world, however, makes the establishment of ceilings and floors more complicated and thus more difficult, particularly as

end points for a currently unconstrained China and a future unconstrained Russia remain unknown, as do the practical extent of their collaborative or even allied action that threatens U.S. interests. China seeks a “world class” military, which presumably includes world class nuclear forces. Russia’s conventional performance in Ukraine could result in more emphasis on its nuclear forces. A tripolar agreement with numerical limits would represent a codification of parity between the United States and its two peer nuclear competitors, who may collude or cooperate to combine their forces. It is unclear that any of the three would find this an acceptable result.

In determining limits, determinations will have to be made on two key questions: what should be included in the limit, and what should the limit be? Outside of stated positions that novel Russian systems and all Russian warheads should be “captured” in the next agreement, the United States has not articulated specifics or explained how the expansion of the Chinese nuclear arsenal impacts these goals. The answers to these questions should be grounded in the capabilities—current and projected—of the U.S. defense industry and nuclear weapons complex. The limit should be a function of what each can produce. But both are straining to keep pace with the program of record.

Some have suggested a potential deal under which the United States and Russia would largely modernize and replace their current arsenals while China would be “allowed” to build up. This might come in the form of an NST expanded to include China or a new trilateral warhead and delivery vehicle Treaty. The problem with this arms control proposal is that it codifies rough U.S. equivalence with its two potential adversaries that may collude or cooperate in a nuclear crisis. This imbalance would exist at any level, whether 1,000 warheads or 5,000 warheads. This strategic reality suggests goals for negotiated limits must be stabilizing nuclear force levels and capturing new items of accountability like warheads in storage and novel systems, which implies limits at a higher level than the current New START Treaty. That is, the goal should be reducing the prospects and costs of long-term nuclear arms racing, rather than securing further reductions.

124 As summarized in Michael Krepon, “On the Objectives of Arms Control,” *Arms Control Wonk* (May 16, 2018). <https://www.armscontrolwonk.com/archive/1205160/on-the-objectives-of-arms-control/>. Accessed November 12, 2021.

125 Joseph S. Nye, Jr., “Arms Control and the Prevention of War,” *Washington Quarterly* 7, no. 4 (1984).

126 Hedley Bull, “Arms Control and World Order,” *International Security* 1, no. 1 (Summer, 1976), pp3-16.

127 Herman Kahn and Anthony Weiner, “Technological Innovation and the Future of Strategic Warfare,” *Aeronautics and Astronautics* (December 1967), p28.

128 The INF Treaty being a notable exception.

The Concept of Arms Control without Numerical Limits

The 2NP security environment poses a complicated dilemma to an approach primarily focused on numbers: would the United States accept an agreement where parity with two other parties represents a strategic disadvantage? Using the often quoted “scorpions in bottle” or “gunfighters” nuclear analogies, there are now three players in the game, with the possibility that two of whom may cooperate or collude against the third or where one may mere sit back and let the other two fatally weaken each other while the third remains at full strength. Whatever the depth of their “strategic partnership,” Russia and China are aligned against the United States.

Other multidomain dynamics also complicate the pursuit of numerical limits. The United States focuses primarily on Russian nuclear systems, both strategic and non-strategic nuclear forces. But numerical limits do little to solve the main U.S. concern with Russian nuclear systems: Moscow’s regional aggression and perceived willingness to use nuclear weapons first in a conventional crisis. Russia, in return, is concerned with U.S. missile defenses and other weapons which can have strategic effects, such as long-range conventional strike systems. Beyond its great power aspirations, China’s dramatic nuclear force expansion is likely driven in part by concerns over U.S. non-nuclear capabilities (given the visible stasis in U.S. nuclear forces). The escalation pathways to nuclear use are complicated by emerging capabilities in cyber and counterspace which can target both conventional and nuclear command and control capabilities. Asymmetric trade space on numbers will be difficult, as all sides feel themselves to be the aggrieved party in a negotiation with an expansionist rival seeking regional or global superiority and the non-nuclear capabilities of interest are difficult to both limit and verify.

The central criticisms of the existing arms control regime for the most part has also not been about numbers. It is not a question of whether Russia has zero or 50 Sarmat ICBMs or 500 or 2,000 non-strategic nuclear warheads. Nor is it a question of the levels at which Chinese strategic forces are acceptable or unacceptable. Instead, criticisms have centered on ideas of fairness. Necessarily in arms control, some nuclear warheads are “captured” and others are not. The United States and Russia are limited by an agreement, while China is not. Some U.S. systems of concerns are captured, and others

are not. This suggests that while numbers are no longer the focus, “fairness” also provides little clarity on what future arms control should prioritize.

One area where arms control would provide great value in the 2NP security environment would be transparency. Routinized exchanges of valid information on existing and planned forces could reduce worst case assessments and unnecessary defense expenditures. The New START Treaty provides information on the relevant strategic forces of the United States and Russia, a fact which is often taken for granted. There is no guesswork; there is a daily exchange of information periodically partially verified. Outside of this area, uncertainties regarding Chinese and Russian capabilities dominate. Chinese nuclear force expansion is concerning because it is filled with unknowns regarding both what they intend to do and why they intend to do it. Russian non-strategic nuclear forces are concerning because broad estimates and ranges of numbers and capabilities dominate the analysis, and we have little insight into what is driving Russian force requirements. A similar dynamic appears to hold in worst case analyses of U.S. missile defense programs by Moscow and Beijing, despite extensive public and private American transparency regarding both programs and strategic intent.

Another arms control approach that could be pursued in the emerging 2NP security environment would be to focus on identifying narrow limits or prohibitions on specific military capability developments that are particularly destabilizing, the deployment of which are not in anyone’s interest. For example, China’s recent test of a Fractional Orbital/Multiple Orbital Bombardment system raises the prospect of a competition in fielding such systems that would result in all three of the major nuclear powers facing the prospect of very short to no warning decapitation strikes in crisis or conflict. The United States should propose to Russia and China an immediate ban on further testing of such systems, and possibly a ban on their deployment if acceptable and effective verification measures can be identified.

This suggests the possibility that the future of nuclear arms control may be one without agreed numerical limits. Complexities, uncertainties, and mistrust all fuel competition. The United States, Russia, and China all want to—or feel they need to—compete rather than cooperate. The question is how to shape this competitive landscape by applying the arms control first principles outlined above. Beyond limiting systems, how can we

meaningfully regulate capabilities to reduce the risk of war and of escalation within war? If numerical limits prove impossible to negotiate for political or military reasons, a future agreement will provide value simply through the exchange of classified information verified through onsite inspections and remote monitoring. Given a polarized United States, a pariah Russia, and a skeptical China, such an agreement may serve as a necessary framework between the formal bilateral arms control of the last 50 years and the more all-encompassing multilateral arms control of the future.

Preserving some transparency regarding nuclear forces, rather than allowing the entire arms control project to hinge on further limitations, could create space to refocus arms control endeavors on non-nuclear strategic capabilities with destabilizing nuclear spillover effects. Here the negotiating dynamics for the United States are better: it is actively "racing" in developing and deploying non-nuclear capabilities in sizeable numbers, and these quantitative and qualitative improvements are of concern to Russia and China. Arms control first principles suggest clear incentives for some degree of cooperation even in a complex competitive environment given the increased risks of conflict, and damage in conflict should it occur. The zone of agreement may be less about numbers and more about targets, timing, and transparency.

The Need to Prepare Simultaneously for a World with and without Arms Control

A key piece of information in any negotiating framework is the BATNA, or the Best Alternative to a Negotiated Agreement. One's own BATNA and the other side's impacts the zone of possible agreement as well as each side's leverage in the negotiation. If the range of potential outcomes in a negotiated settlement is preferable to the BATNA, that side should continue to engage. If not, then there is little value in continuing to negotiate until the incentives or parameters of the agreement change. Discussions of future arms control negotiations are frequently framed in simplistic terms of "Who wants it more?" A better question is what are the BATNAs for the various parties, and how can these be altered to impact desired negotiation dynamics.

At present, the United States and its allies do not necessarily "need" arms control from a strict security perspective, but they have not

adequately prepared for an alternative world without arms control. In the wake of the 2022 NPR the U.S. nuclear modernization program of record remains largely static, any proposals to strengthen U.S. nuclear capabilities are hotly debated, the nuclear weapons complex is strained after years of attention elsewhere, and political gridlock complicates and delays funding and long-term planning efforts. Extended deterrent relationships have been slow to adapt to the changing security environment, and NATO's nuclear deterrent has remained largely unchanged despite repeated calls over the last decade to "bolster" these capabilities.

In contrast, China has seen no pressing need to engage in arms control negotiations, as it has shown its willingness and ability to grow its force in an unconstrained environment. There is little penalty from the international community for its not participating in formal arms control discussions, and China continues to present itself as a responsible arms control and non-proliferation actor on the world stage. It has been given no incentives to participate and sees advantages in avoiding doing so. Until this calculus changes, China is likely to pursue its BATNA as the preferable path.

Russia's BATNA at this moment (in the midst of the ongoing war in Ukraine) is less clear than it was before the war started. Russia has a robust nuclear weapons complex, capable of producing hundreds of strategic and non-strategic warheads per year. It remains unclear whether the war in Ukraine will make Russia more or less likely to pursue nuclear arms control to replace the expiring New START Treaty. Russia may feel the need to rebalance away from nuclear weapons expenditures to focus on the heavily sanctioned civilian economy or to rebuild a shattered conventional forces capability, and thus it might welcome the transparency and strategic pause of an agreement in this area. Alternatively, Russian leadership may feel the need to more heavily invest in the nuclear space given its increasing isolation and the demonstrated poor performance of its conventional forces, with their already significant reliance on nuclear weapons in their national security strategy becoming outright dependence. Russia may or may not "need" arms control, but it at least possesses the capacity to adapt quickly to an unconstrained world.

The United States and its allies can alter these negotiating dynamics by making its BATNA look better for itself should an agreement fail to

materialize and thus look worse for its negotiating partners should they choose not to engage. We must address a political factor our potential adversaries do not have to contend with. In our democracies there is a perceived imperative among many to always be pursuing some form of the “two track approach;” seeking an arms control agreement that constrains the nuclear competition and prevents an “arms race,” while arming prudently to both provide security if negotiations fail as well as creating leverage in negotiations by presenting the potential adversary with a BATNA that is worse than an achievable agreement. This is not a hindrance to either U.S. and allied security or to arms control progress if the United States pursues a stronger nuclear capability required by its 2NP strategy that could also strengthen the negotiating position of any nuclear arms control proposal that was put on the table.

Up until this point, the United States and its allies have largely exercised self-restraint, which has gone unreciprocated by Russia and China who have seen little incentive to engage or punishment for not engaging in arms control. If alternative U.S. nuclear force postures and structures are ruled out, the United States should look for ways outside of the nuclear domain, such as in long-range conventional and non-kinetic capabilities, to create a better BATNA and thus better leverage pathways for arms control. If arms control is intended to be a corollary of armaments policy, then a concrete arms control proposal should be tied to demonstrative changes in military capabilities or postures that would encourage negotiating partners to recalculate their BATNAs against a potential agreement. Beyond pursuing transparency, it may be that only by building capability—nuclear and strategic non-nuclear—can the United States create sufficient incentives for Russia and China to engage in meaningful limitations or reductions agreements that verifiably serve our mutual security interests.

Implications for Strategic Messaging

Are U.S. strategic communications well-tailored to the challenges and opportunities of the new strategic environment?

At its simplest, this is a question about U.S. nuclear declaratory policy. That policy is carefully reviewed by each new administration. Over many administrations there has been remarkable continuity. But there have also been some important changes.

There is good reason to be skeptical that tinkering with public political statements has much impact on the strategic calculus of Chairman Xi and President Putin, who appear to have made up their minds about American strategic intentions and may question the resolve of American political leaders to defend U.S. and allied interests if attacked. With two such long-ruling leaders, it seems that actions are more useful than words in addressing any dangerous misperceptions they may have about intentions and resolve. That said, there are some clarifications to U.S. declaratory policy that would be useful (see recommendations below).

But strategic communication to enhance deterrence and assure allies cannot be reduced to declaratory policy. The rivalries with China and Russia are embedded in a complex information ecosystem—which is congested, competitive, and adversarial.¹²⁹ Both countries seek to manipulate that ecosystem to their strategic advantage and aggressively operate in many parts of that ecosystem. The United States and its allies have responded with projects to correct disinformation—a necessary but not sufficient response. U.S. use of carefully released intelligence regarding Russian military activities and strategic intent before and during Russia's invasion of Ukraine provides an example of the potential effectiveness of a more proactive approach.

The United States must also have a thoughtful communication strategy with its allies and partners. Its credentials as a security guarantor are under renewed scrutiny. Allies naturally want a seat at the American table as U.S. leaders make

plans bearing on their security. All too often, the United States falls short in its efforts to consult in meaningful ways and to share the information necessary for effective collective action. Allies in both Europe and the Indo-Pacific are anxious about the 2NP problem and about American “staying power” in light of these new challenges. Engagement with them can pay many important dividends. In return, allies must be willing to join the United States in more proactively messaging regarding the threats posed to international security by Russia and China, and about the unified resolve of our alliances to address those threats. Once again, decisive action must be an essential element of such communication.

A final constituency worthy of a sound strategic communication strategy is the American public. To the extent possible, the core strategic response to the 2NP challenge needs to be sustainably bipartisan. Success in meeting the challenge is likely to require a U.S. response spanning many decades and thus many administrations and Congresses of different stripes. The American government needs to do a much better job in explaining the threats we face in the 2NP environment, why they matter to the livelihood and lives of the American people, and what we must all do to address them effectively.

The Biden administration's NPR sends many important and useful messages to Moscow and Beijing about its commitment to deterring their aggression, negating their coercion, and assuring U.S. allies and partners. But it also sends at least two potentially unhelpful messages from the perspective of the 2NP problem:

The first is the commitment to continue to reduce the role of nuclear weapons in U.S. defense strategy; at a time when President Putin and Chairman Xi have increased the role, this U.S. commitment may be received in both capitals as confirmatory proof of what they believe: that the United States is in decline and retreat. It certainly troubles many allies.

129 For more on this subject, see the summary and annotated bibliography prepared for a workshop on “Countering Russian and Chinese ‘Information Confrontation’ Strategies” convened by CGSR in September 2022. <https://cgsr.llnl.gov/workshops>. Accessed December 14, 2022.

The second is the statement that “a policy of restraint continues to shape the role of nuclear weapons in U.S. strategy.”¹³⁰

We observe that leadership by example by this and preceding administrations has not generated much followership down the path of restraint. We are not suggesting that the United States abandon restraint; rather, we believe that Moscow and Beijing must have no doubt that the United States will do what is necessary to ensure the effectiveness of its deterrent, including potentially increasing numbers and roles.

130 *Nuclear Posture Review, 2022*, p7.

Conclusions

The emerged two near-peer problem poses many new and difficult choices for the United States and its allies. The emerging two-peer problem poses even more difficult choices about U.S. nuclear strategy, policy, and posture.

Thus, the executive branch and the Congress face some difficult decisions about policy, programming, and priorities. Whether to upload and thus to end four decades of nuclear reductions will be hotly debated. There is certain to be strong congressional interest in the Biden administration's update to the presidential nuclear employment guidance and probing questions about whether it has traded away deterrence and assurance credibility vis-à-vis the emergent problem in order to create some opportunity for arms control.

Given these controversies along the course of action we have recommended, it is appropriate to consider other courses that may generate less controversy. In our collective experience, we have heard a broad set of alternatives in discussion. These include:

- Bet on the near-term convergence of Moscow, Beijing, and Washington on shared concepts of strategic stability and agreement to mutual, reciprocal, verifiable steps to reduce the risks of nuclear crises and arms racing. In our judgment, the United States should continue to work toward this goal, but it strikes most of us as a very remote possibility.
- Proceed immediately to the worst-case planning assumptions and pursue a much larger build-up of U.S. nuclear forces, both theater and strategic. In our judgment, such a choice is neither necessary nor wise.
- End the role of counterforce in U.S. deterrence and employment strategies and stand down the ICBM force. In our judgment, this would dangerously widen the deterrence and assurance gap.
- End the practice of extended nuclear deterrence and stand down the theater nuclear power projection capabilities. In our judgment, this would unleash a dangerous wave of nuclear proliferation while emboldening challengers while stripping the United States of its alliances at a critical moment.

- Make no changes to U.S. nuclear policy and posture and hope for the best. In our judgment, this would only accelerate the erosion of the security environment, as friend and foe conclude that the United States has lost the resolve to defend its interests and allies.

These are all profoundly unattractive alternatives. U.S. leaders must accept the need to deal effectively with these new challenges.

For most of the past three decades, U.S. nuclear policy has proceeded with bipartisan support on a few key areas of agreement. This new problem set is going to push us out of these comfort zones. Rather than focus on all of the many things that might divide people across the aisle, this is a time to build new bridges so that we can find the measure of political agreement sufficient to make hard choices.

The emergent reality of two nuclear peers is destined to become a test of the U.S. national capacity to meet new dangers in a timely and effective manner. Success would go a long way toward stripping away the confidence of our two largest and most dedicated adversaries and assuring allies and partners. But failure would go a long way too. If the United States proves incapable of adjusting to these new circumstances, its ability to shape the nuclear security environment will further decline. This would only fuel the perception in Beijing and Moscow of American decline and retreat. It is in our collective interest that this not be so.

Findings & Recommendations

Defining the Problem

FINDINGS

1. China's emergence as a second nuclear peer to the United States has significant implications that are both additive and transformative for U.S. nuclear deterrence.
 - It is additive in the sense that it drives increased tailoring of policy and posture to deal with a more capable China.
 - It is transformative in the sense that the need to deter two nuclear peers simultaneously drives a fundamental rethinking of many assumptions and practices built into U.S. strategy and force posture over the last three decades.
2. The problem is both emerged and emerging.
 - The emerged problem is presented by the combination of two factors. One is the dramatic expansion of China's nuclear force that will be accomplished with completion of the three new fields of ICBMs. The other is the "friendship without limits" with Russia and the commitment of Chairman Xi and President Putin to cooperate to confront and dismantle U.S.-led regional security orders.
 - The emerging problem is presented by two possibilities. One is that China will continue the modernization, diversification, and build-up of its nuclear forces after the new missile fields are completed. The other is that Xi and Putin will support each other militarily in a direct armed confrontation with the United States—or merely engage in aggression opportunistically when the United States is engaged in crisis or war with the other.
3. The emerged problem is best thought of as the two-near-peer (2NP) problem, while the emerging problem is best thought of as the two-peer (2P) problem. They are similar but not identical problems for U.S. deterrence strategy and require separate but well aligned responses.
4. The two-peer problem is not just a longer-term problem. It requires some decisions now. For example, if larger or different U.S. nuclear

forces are deemed necessary a decade hence, decisions must be taken now to develop those forces, given the long lead times involved.

5. These two problems are coming into focus at a time when multiple changes in the security environment have combined to significantly erode strategic stability, deterrence, and assurance of U.S. allies. Steps to address the 2NP and 2P problems should not be taken in isolation from a comprehensive refresh of U.S. policies on deterrence and defense.

RECOMMENDATIONS

1. Recognize that the emerged and emerging problem warrants a broad and deep review of U.S. nuclear strategy and policy, and of the practice of deterrence. Consult with allies.
2. Given the evident and ongoing erosion of deterrence and assurance, pursue this review with a sense of urgency and take near-term steps to address that erosion.
3. Do not over-react by planning for, and acting upon, only the worst case.
4. In formulating the problem, avoid reducing these complex new problems to a simple matter of numbers. They raise a broad set of questions about the U.S. practice of deterrence and war-fighting.
5. That said, the United States should get the numbers right. China's growing nuclear force raises important questions about the size and other attributes of the U.S. nuclear force. Growth in the regional nuclear forces of Russia and China also raises an urgent question about force sufficiency.

Implications for the Fundamentals of Nuclear Deterrence

FINDINGS

1. The fundamentals of U.S. nuclear deterrence encompass general deterrence strategy, nuclear deterrence strategy, and nuclear employment strategy.
2. Each remains sound and valid in this new circumstance. The 2NP problem sharpens the debate about the value of a counterforce component in deterrence and employment strategies; we see continued value.
3. The 2P problem adds significant complexity to tailoring deterrence, given the variety of ways in which China and Russia might cooperate to U.S. disadvantage and also the variety of conflict scenarios in the 21st century environment.
4. Deterrence is a competitive process from which the U.S. has divested significantly since the 1990s. Many of the most important deterrence challenges in the new strategic environment remain under-studied. The United States and its allies must accelerate the development of the capabilities and capacities to compete in "out-thinking" our adversaries.

RECOMMENDATIONS

1. Prepare to deter both China and Russia simultaneously and sequentially across the full spectrum of conflict (peacetime, crisis, and war).
2. Prepare for the extreme circumstance in which deterrence of both is failing by maintaining the capability to credibly threaten to inflict intolerable costs on both countries under all conditions.
3. Ensure that deterrence and employment strategies hold significant portions of enemy nuclear forces at risk.
4. Invest in the human capital and analytical tools necessary to fill conceptual gaps.

Implications for U.S. Strategic Nuclear Forces

FINDINGS

1. The modernization, diversification, and build-up of China's nuclear forces, combined with changes to Russia's nuclear forces, and combined with their potential to cooperate in crisis and war, raises basic questions about whether the United States has the right number and types of nuclear forces for its strategy.
2. In war, the United States must have the means to achieve military and political objectives set by the President while also deterring armed aggression by the second potential adversary (and, failing that, deterring escalation by that aggressor). Deterrence of that second adversary in an ongoing nuclear war may require the ability to implement against that adversary all employment options envisioned in peacetime. Or it may require only the ability to credibly threaten to inflict intolerable costs on that second adversary. This is an open question on which we have failed to find agreement. Either way, the United States must always have some survivable and enduring reserve of nuclear weapons to credibly threaten those who might do further harm, even in the most extreme circumstance of having absorbed a large-scale first strike.
3. In peacetime and crisis, the United States must have sufficient capabilities to simultaneously deter both Russia and China with the array of deterrence actions called for in presidential nuclear employment guidance. It must be capable of demonstrating that every adversary course of nuclear action will result in significant cost and risk imposed by the United States. As a matter of principle, the leaders of Russia and China should not believe that they would be better off (politically, militarily) by engaging in joint nuclear attack. At a minimum, this requires that the United States maintain the capability to fully implement presidential employment guidance against one nuclear peer while also retaining enough forces to inflict intolerable costs on the second and may profoundly affect our future force requirements.
4. Today's U.S. nuclear force is, in our judgment, only marginally sufficient to meet today's requirements. Its primary deficiency is a lack of sufficient limited nuclear response options to deter and respond to adversary limited nuclear escalation in regional wars. Growth in

the regional nuclear forces of China and/or Russia will only magnify this gap.

5. For tomorrow's potential requirements, the deficiencies of the U.S. force are even more striking. When China reaches full operational capability (FOC) of its three new missile fields, the United States will have to hold at risk a large force of ICBMs in two countries with forces that it currently utilizes to hold at risk the force of only one. From the perspective of nuclear employment strategy, this may entail more risk. From the perspective of general deterrence strategy, the decision to simply accept such risk would likely be seen as a sign of unwillingness to come to terms with China as the new pacing threat and thus as a sign of weakness and retreat.
6. The United States should address the FOC shortfall by uploading weapons from its reserves (the so-called geopolitical hedge). It does not need to match China one for one. It does need to signal that it will preserve the credibility of its strategy despite China's challenge. It should plan and prepare to do so when the New START limitation expires in 2026, though it may choose to do so sooner.
7. If China and/or Russia continue over the next decade or two to build up their nuclear forces, implementation by the United States of its existing geopolitical hedge will be inadequate, in our judgment, to the requirements of U.S. deterrence and employment strategies. Thus, the United States must prepare now to re-set the hedge to address potential future requirements for more and/or different weapons.
8. The long-term U.S. approach to the two-peer problem will be shaped in the near-term by the update to presidential nuclear employment guidance promised as part of the implementation of the administration's Nuclear Posture Review. The options are to:
 - Prioritize one peer over the other.
 - Prioritize the first conflict over the possibility of a second.
 - Prioritize both equally across the spectrum of conflict.

The first two options accept more risk than the third but also preserve some flexibility for further nuclear reductions with Russia.

RECOMMENDATIONS

1. Maintain the nuclear triad. Its flexibility matters even more in the 2NP world.
2. Maintain a close eye on the transition from aging-out delivery systems to their replacements, as any possible gap in the just-in-time transition could weaken deterrence and assurance at a critical time.
3. Maintain forces in the right numbers and types to enable deterrence, assurance, and employment strategies over the long term. This requires changes to both strategic and non-strategic nuclear forces.
4. Exercise and demonstrate the ability to upload ICBMs, SLBMs, and bombers.
5. Plan and prepare to upload some warheads onto SLBMs and, if needed, ICBMs, presumably when New START no longer prevents the United States from doing so (and barring no interim dramatic improvement in the security environment).
6. Develop contingency plans to field additional warheads and delivery systems and/or improved capabilities between 2026 to 2036 and beyond.
7. Plan for a secure reserve force to ensure that the United States is never without nuclear weapons, even after a nuclear exchange.
8. In framing the guidance, do not accept more risk. Do not refrain from significant adjustments to posture and capabilities. Prioritize adaptations to the emerged and emerging challenges. If we take China as "the pacing threat," this is what is required to ensure that nuclear forces can deter, assure, and achieve national objectives if deterrence fails in the two nuclear peer environment.
9. Identify and assess options for improved survivability as part of the long-range plan to modernize U.S. nuclear forces and nuclear command, control, and communications (further details below).
10. Improve and increase U.S. theater nuclear forces (further details below).
11. Adapt the hedge strategy to new circumstances (further details below).

Implications for Hedging

FINDINGS

1. In an era marked by dramatic and sudden changes in the nuclear threat environment, and by growing unpredictability, the United States must have a strong capability and capacity for future adaptation of its force "at the speed of relevance." It does not. Nor are we on a credible path to achieve such capability and capacity.
2. The emerged 2NP problem brings hedging challenges for which the United States is adequately prepared. Some capacity to upload has been maintained and is sufficient for responding to China's three new ICBM fields.
3. But the emerging 2P problem brings challenges for which the United States is not adequately prepared. Its capacity to field additional weapons is limited to re-loading weapons that were downloaded as part of New START implementation. It does not have the capacity to rapidly field additional weapons or new weapons of different types, as the U.S. nuclear complex and associated defense industrial base is already fully absorbed with the work of replacing aging out systems.
4. Assuming the United States uploads some or all of its reserve warheads in response to China's nuclear build-up, it will have little or no capacity to respond to further geopolitical of technical surprises. It must then re-set the hedge. It should not do so by simply replenishing the stockpile of reserve warheads. It should develop the long-sought agile infrastructure. It should calibrate the needed capabilities and capacities to the particular developments in Chinese and Russian strategic forces that can be anticipated.
5. The limited technical capability of the existing infrastructure to respond to changed circumstances incentivizes U.S. adversaries to engage in arms racing. A more robust infrastructure would instead incentivize strategic cooperation and arms control by making it clear that arms racing would not result in new strategic advantage. It would also reassure U.S. allies and partners anxious about the prospects for nuclear coercion in the context of an erosion of the overall balance of strategic capabilities, making clear that despite our desire to reduce the salience of nuclear weapons in international affairs

we are postured to compete as necessary to maintain credible extended deterrence for the long term.

6. Progress in adapting the hedge will require a change to the risk-averse oversight culture of the U.S. nuclear enterprise that obstructs innovation, adds cost, and delays results and sustained national bipartisan leadership commitment to implementation.

RECOMMENDATIONS

1. Recognize the continued role of hedging and risk management in U.S. nuclear strategy and focus and invest accordingly.
1. Plan and prepare to re-load onto SLBMs (and perhaps also ICBMs, depending on the number required) some of the warheads downloaded as part of New START implementation when the New START constraint is lifted, presumably when the treaty expires in 2026.
2. Re-set the hedge. Do not simply replace the supply of up-loaded weapons. Build the long-sought agile infrastructure. Create the capacity to do more than simply replace aging systems.
3. Tailor the hedge so that it is capable of responding rapidly to the forms of nuclear "surprise" most likely from China (a build-up of theater forces) and from Russia (deployment of its novel systems).
4. Bring a sense of importance and urgency to the nuclear weapons enterprise. Enable more innovative (and cost-saving) approaches by relaxing the constraints imposed by a highly risk-averse oversight culture.

Implications for Extended Deterrence

FINDINGS

1. The new ways of war of Russia and China put U.S. allies and partners in the nuclear crosshairs. They are the objects of nuclear blackmail and brinkmanship and their political allegiance is the prize in any regional war. Their dependence on nuclear deterrence extended by the United States has risen steadily over the last two decades, as has their need for assurance that U.S. nuclear guarantees remain credible.
2. The most likely path to a large-scale nuclear exchange that would pose an existential threat to the United States is nuclear escalation in a theater conflict. This implies that deterrence of limited nuclear use has become even more central to central strategic deterrence.
3. The U.S. must convince potential adversaries and assure its allies that those allies will not be left without nuclear protection even in the most stressing scenarios in a two-peer world. But the United States' extended nuclear deterrent was designed for a different era. It reflects decisions made in the early 1990s to withdraw from Europe and Asia the vast majority of U.S. nuclear weapons. It also reflects decisions made in subsequent decades to work with allies in both regions to reduce reliance on nuclear weapons.
4. To bring U.S. extended nuclear deterrence into alignment with 21st century requirements, adaptations are needed to both hardware (i.e., capabilities and force posture) and software (i.e., planning, exercises, consultation arrangements, nuclear campaigning). A practical, step-by-step approach to strengthen and adapt deterrence is needed in both regions.
5. But incrementalism is not enough. A long-term vision is needed of the global and regional postures that are fit for purpose. A sense of urgency is also needed.
6. Adaptations should include the development of supplemental means for the forward deployment of U.S. nuclear weapons in both Europe and Asia. There is a gap which has real deterrence and assurance implications. That gap is growing in both regions. Modernization of dual-capable aircraft is an essential first step because it ensures continued credibility to NATO's nuclear

sharing arrangements but so far provides no practical benefit to allies in Asia. The future deployment of the long-range stand-off (LRSO) cruise missile will be helpful for regional deterrence; it would be useful if there were plans for it to be deployed regionally.

7. Additional steps to increase the number of globally deployable and deployed nuclear forces in Europe and Asia are needed. But symmetrical theater forces to those of Russia and China are not needed. Instead, the need is for forces sufficient in number to be seen as enabling U.S. deterrence and employment strategies.
8. In both Japan and South Korea, there are unmet demands for improved nuclear consultations and for new formal mechanisms. There are also unmet demands for joint preparations for the execution of nuclear strike operations, including joint adaptive planning and joint exercising.
9. Upgrades to the hardware and software of extended nuclear deterrence will contribute to deterrence and assurance by addressing doubts about U.S. coupling created by new adversary capabilities to put the U.S. homeland at risk. This will help to reduce the risks of an adversary miscalculation of U.S. nuclear resolve.

RECOMMENDATIONS

1. Ensure that the F35 is finally available for the nuclear mission as promised in 2024.
2. Ensure the timely availability of the B21 for the nuclear mission and plan for its early integration into USAF deterrence operations. Maintain the long-range stand-off LRSO cruise missile and ensure it is delivered on schedule.
3. Supplement these capabilities with improved means to forward deploy additional theater U.S. nuclear forces, such as by deploying SLCM/N.
4. Demonstrate by exercise the long-promised global availability of U.S. dual-capable fighter-bombers.
5. Engage with allies in Europe: implement fully the decisions taken over the last decade by NATO heads of state and government to adapt NATO's nuclear sharing arrangements to new circumstances. Modernize the planning capability. Develop deterrence concepts. Exercise realistically. Demonstrate the ability to survive attack. Strengthen the sharing

arrangements. Increase the alliance's nuclear IQ and also the nuclear IQ of its members and publics.

6. Engage with allies in the Indo-Pacific: Lead the dialogues with Japan and South Korea to a "more NATO-like" conclusion emphasizing the institutionalization of consultative decision-making. Determine at the leadership level how much to prepare for joint operations. Deepen the extended deterrence dialogue with Australia. Begin a strategic dialogue with India designed to inform it of the role of extended deterrence in U.S. security strategy and the rising threat associated with China's strategic breakout.
7. Be more ambitious. With allies in both regions, assess the deterrence requirements of the 2P world, develop deterrence campaign plans, define the requirements of an "appropriate mix" of nuclear and non-nuclear capabilities for deterrence and defense, and design a new division of deterrence labor within the regions and globally. That new division should give increased responsibility to U.S. allies for strategic deterrence in the non-nuclear realms (e.g., missile defense, deep precision strike, cyber). Improve allied conventional capabilities to ensure the United States and its allies cannot be rapidly defeated by coordinated or opportunistic aggression in the second theater of conflict.
8. Acknowledge and prepare for the reliance on nuclear weapons to compensate in time of crisis and war in one region for conventional inferiority in a second theater of conflict, and identify the theater nuclear forces necessary to do so credibly and effectively.

Implications for Survivability

FINDINGS

1. Both China and Russia are improving their capabilities to attack U.S. nuclear forces. But the survivability of those forces is essential to the credibility of U.S. nuclear threats.
1. The survivability of U.S. nuclear forces is dependent in part on the provision of warning of attack. Ensuring such warning is becoming more difficult as the challenges of monitoring the disposition of Chinese and Russia's nuclear forces grow with the growing size and diversity of those forces and their advanced efforts to deny and disrupt U.S. situational awareness.
2. Improvements are needed to the survivability of U.S. nuclear forces, associated command and control capabilities, and to their ability to endure under attack.

RECOMMENDATIONS

1. Structure and posture U.S. nuclear forces on the expectation of imperfect warning of attack.
2. Ensure redundancy in NC3 pathways across multiple physical domains.
3. Exercise measures to enhance bomber survivability.
4. Consider the deployment of SLCM/N on attack submarines.
5. Assess fielding *limited* cruise and ballistic missile defenses to protect select assets, such as critical NC3 nodes in comparison with other means of enhancing survivability and endurance.
6. Evaluate whether changes are necessary in the way in which the force responds in crisis in a 2NP threat environment.
7. Explore making a portion of the Sentinel ICBM force capable of road-mobile deployment.
8. Plan and exercise contingencies with little or no warning of nuclear attack, especially at the regional level of war.

Implications for Arms Control Strategy

FINDINGS

1. Arms control could be useful as a tool for stabilizing tripolar deterrence and managing nuclear competition if Moscow and Beijing were willing partners. They are not. This is unlikely to change any time soon. But this does not foreclose a possible longer-term renewal of arms control, albeit likely on some entirely new basis.
2. The pursuit of further reductions and the long-term goal of disarmament is untenable at this time. Arms control must return to first principles. We must begin again to explore how cooperative measures with adversaries can help to reduce the risk of conflict, reduce the risk of escalation within a conflict, and reduce damage should nuclear war occur.
3. The pursuit of further reductions and disarmament may be untenable, but there is also political requirements to try. Even with low expectations, the United States must put on the table what it considers a practical and equitable deal. Others will set the agenda if the U.S. does not.
4. Arms control based on numerical limits may also be untenable. The parity required to make a deal politically acceptable to Moscow and Beijing would likely be politically unacceptable to Washington, given the potential for the other two to cooperate to U.S. disadvantage.
5. The asymmetric force postures of the three add to the challenge. Any deal must capture all nuclear systems to avoid unduly disadvantaging the United States, given its greater emphasis and reliance on intercontinental-range systems than theater capabilities.
6. The next nuclear arms race may be taking shape. Whether Russia and China are sprinting to try to seize and hold some new advantage is debatable. But the United States is not ready to keep pace; it cannot even adapt "at the speed of relevance."
7. Negotiation requires bargaining chips. The United States has few, and Russia and China are building many.
8. Negotiation also requires demonstrating to the other side that it is better off with a deal than without. The United States has

frequently articulated the benefits it seeks from arms control, but it has not made a persuasive case to Moscow and Beijing that they too would benefit from new arms control measures or that they will pay a security price if they refuse to enter into it.

9. Strategic dialogues can help in clarifying perceptions, identifying problems, and exploring potential solutions. But the differences of view among the three are already well understood and the barriers to convergence are clear. Moscow and Beijing reject cooperation with Washington to address instabilities because they see value in increasing the American sense of vulnerability and fear of nuclear escalation.

RECOMMENDATIONS

1. Prepare simultaneously for a world both with and without new nuclear arms control. Craft proposals and place them on the negotiating table. At the same time, plan for an unconstrained environment.
2. To craft an arms control proposal, begin with the strategies and objectives set in the unclassified Nuclear Posture Review and the classified update to presidential nuclear employment guidance. With these as planning parameters, it will be possible to determine both the required size and composition of U.S. strategic nuclear forces and the force requirements that might be reduced through matching reductions by the targeted countries. From this, a numerical negotiating target can be set. The proposed deal would have to address all the nuclear forces in the three countries' postures and provide each the freedom to determine their needed mix of nuclear weapons, regardless of range. Be clear that the proposal ensures that the United States will have the deployed forces needed to fulfill the requirements of its deterrence and employment strategies despite overall parity among the three in the number of weapons in the arsenal.
3. If China refuses to participate, seek a bilateral deal with Russia that prioritizes nuclear forces transparency over numerical reductions.
4. Formulate and propose to Russia and China a ban on the further testing and possible deployment of Fractional Orbital/Multiple Orbital Bombardment systems, and seek to identify other such capabilities that make all three major nuclear powers less secure and that can be addressed through arms control.

5. Make the necessary investments in the nuclear complex and in advanced non-nuclear capabilities to incentivize Russia and China to negotiate on nuclear forces.
6. Continue to press Beijing and Moscow for strategic dialogue on crisis communications, strategy and doctrine, and transparency regarding nuclear and non-nuclear force developments. But keep expectations modest.

Implications for Strategic Messaging

FINDINGS

1. The information ecosystem is congested, competitive, and adversarial. Both Russia and China pursue "information confrontation" strategies aimed at undermining Western confidence in deterrence, determination to escalate to defend its interest if attacked, and political cohesion in crisis and war. Their disinformation campaigns appear to be well coordinated. The United States and its allies need a stronger, more strategic, and more proactive response.
2. In messaging Presidents Putin and Xi and their inner circles, at this point, deeds speak louder than words. Their judgments of U.S. strategic intent are well formed. But the words still matter and statements of presidential intent should bring home to them U.S. clarity about their strategies and determination to work with our allies to defend our interests. The unified United States and allied response to Russia's invasion of Ukraine is an example of the kind of action that can alter their perceptions of our collective will.
3. Allies and partners also require and desire regular and consistent strategic messaging from the United States about its will and capability to assist them in defending their interests as well.
4. To be effective in deterring, assuring, and protecting strategic stability, U.S. nuclear strategy must not be marked by sharp swings. This puts a premium on a measure of bipartisan agreement sufficient to this purpose. To ensure the needed dialogue and focus, we need to prioritize communication to the American public the nature of the two-peer threat, how it could affect their livelihoods and their lives, and what must be done to counter it. This requires sustained leadership by the executive branch across administrations.

RECOMMENDATIONS

1. As part of the deterrence campaigning process, compose and conduct national information campaigns. These should do more than try to correct disinformation. They should generate and competitively update narratives that advance U.S. national messages.
-

2. Use the continuing discourse about integrated deterrence to advance a national and intra-alliance discussion of the emerging two-peer problem and its implications for deterrence and assurance to campaigning. Invest leadership's political capital toward this end.
3. Clearly signal to adversaries and allies U.S. confidence in its deterrence strategies and capabilities in even the most stressing case of a close alliance between two nuclear-armed major power rivals willing to make common nuclear war on the United States.
4. Keep allies informed. Better yet, engage them as partners and enablers of U.S. strategy. This requires understanding not just their capabilities but also their interests and equities.
5. Strengthen executive-legislative discourse on these challenges with an eye to raising the level of debate and sustaining leadership focus.

Conclusions

FINDINGS

1. The emerged two near-peer problem poses some new and difficult choices for the United States and its allies. Whether to upload and thus to end four decades of nuclear reductions will be hotly debated, as will the recommendation to pursue improved theater capabilities, which opponents will attack as designed for warfighting purposes. The emerging two-peer problem poses even more difficult choices about U.S. nuclear strategy, policy, and posture. The executive branch and the Congress face some difficult decisions.
2. The alternatives to the course of action recommended here are either not viable or even less likely to generate sustained political support.
3. For most of the past three decades, U.S. nuclear policy has proceeded with bipartisan support on a few key areas of agreement. This new problem set is going to push us out of these comfort zones.
4. This new reality will be a test of our national capacity to cope with change. If the United States proves incapable of adjusting to these new circumstances, its ability to shape the nuclear security environment will further decline. The experience will be seen by others as confirmatory proof of American decline and retreat. It is in our collective interest that this not be so.

Appendix A

Study Group Members

Brad Roberts, *study group chair and director, Center for Global Security Research*

Michael Albertson, *deputy director, Center for Global Security Research*

Paul Bernstein, *senior fellow, National Defense University**

Elaine Bunn, *senior advisor, Center for Strategic and International Studies*

Brad Clark, *assistant professor, National Defense University**

Elbridge Colby, *co-founder, The Marathon Initiative*

Jacek Durkalec, *senior fellow, Center for Global Security Research*

Jeff Edmonds, *senior fellow, Center for Naval Analyses*

Kayse Jansen, *professional staff, U.S. Strategic Command**

C. Robert Kehler, *USAF retired and former commander, U.S. Strategic Command*

Pat McKenna, *senior technical advisor, U.S. Strategic Command**

Frank Miller, *principal, The Scowcroft Group*

Brian Radzinsky, *fellow, Center for Global Security Research*

Robert Soofer, *senior fellow, Scowcroft Center for Strategy and Security, Atlantic Council*

Sugio Takahashi, *director for defense policy, National Institute for Defense Studies, Tokyo*

Michael Urena, *professional staff member, Senate Armed Services Committee*

John Warden, *research staff member, Institute for Defense Analyses**

Greg Weaver, *founder and president, Strategy to Plans LLC*

Affiliations are provided for identification purposes only. Study group members participated in their private capacities. The views reflected in this report should not be attributed to any institution with which study group participants are or have been affiliated.

Participants with a star after their affiliation participated as informal governmental advisors and have recused themselves from the determination of findings and recommendations.

The Center for Global Security Research (CGSR) was established at Lawrence Livermore National Laboratory (LLNL) in 1996 to serve as a bridge between the science, technology, and national security policy communities. It focuses on emerging national security challenges in the areas of deterrence, assurance, and strategic stability, as well as global challenges such as disruptive technologies, climate change, biosecurity, and nonproliferation. The Center's work is conducted on an entirely unclassified basis. It is also multidisciplinary and entirely nonpartisan in character.



cgsr.llnl.gov

STUDY GROUP MEMBERS

Brad Roberts, study group chair and director, Center for Global Security Research

Michael Albertson, deputy director, Center for Global Security Research

Paul Bernstein, senior fellow, National Defense University*

Elaine Bunn, senior advisor, Center for Strategic and International Studies

Brad Clark, assistant professor, National Defense University*

Elbridge Colby, co-founder, The Marathon Initiative

Jacek Durkalec, senior fellow, Center for Global Security Research

Jeff Edmonds, senior fellow, Center for Naval Analyses

Kayse Jansen, professional staff, U.S. Strategic Command*

C. Robert Kehler, USAF retired and former commander, U.S. Strategic Command

Pat McKenna, senior technical advisor, U.S. Strategic Command*

Frank Miller, principal, The Scowcroft Group

Brian Radzinsky, fellow, Center for Global Security Research

Robert Soofer, senior fellow, Scowcroft Center for Strategy and Security, Atlantic Council

Sugio Takahashi, director for defense policy, National Institute for Defense Studies, Tokyo

Michael Urena, professional staff member, Senate Foreign Relations Committee

John Warden, research staff member, Institute for Defense Analyses*

Greg Weaver, founder and president, Strategy to Plans LLC

Affiliations are provided for identification purposes only. Study group members participated in their private capacities. The views reflected in this report should not be attributed to any institution with which study group participants are or have been affiliated.

Participants with a star after their affiliation participated as informal governmental advisors and have recused themselves from the determination of findings and recommendations.