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Requirements for Nuclear Deterrence and Arms Control in a Two-Nuclear-Peer Environment

A report by Greg Weaver and Amy Woolf

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Cover image: Russian President Vladimir Putin and Chinese President Xi Jinping. Credit: The Kremlin

Requirements for Nuclear Deterrence and Arms Control in a Two-Nuclear-Peer Environment

A Two-Part Series

Greg Weaver (Part I)

Amy F. Woolf (Part II)

Foreword by Dr. Robert Soofer and William Tobey

FOREWORD

After decades of seeking to reduce the role of nuclear weapons in international relations, the United States is now grappling with a global landscape marked by intense strategic competition and the growing salience of nuclear weapons—problems that will likely persist for years to come. Over the past year, Russia compounded its aggression in Ukraine with nuclear saber-rattling, modernizing and expanding its nuclear forces over the past decade. Furthermore, Russia's possession of a substantial inventory of theater nuclear weapons continues to threaten regional deterrence. Meanwhile, in Asia, Beijing is pursuing an unprecedented surge in its nuclear capabilities. If current trends persist, China is projected to possess about 1,500 nuclear warheads by 2035.[1] While China was once viewed as a secondary nuclear power, its substantial investment in its nuclear arsenal—including the launch of a third ballistic missile early-warning satellite in 2022 and advancements in land-based ballistic missiles, aircraft, submarines, and hypersonic missiles—positions China to become a near-equal nuclear power in the coming decade. These trends mark a historic shift. For the first time in its history, the United States must face two near-peer nuclear competitors simultaneously.

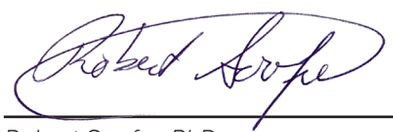
At the same time, Russia's suspension of its compliance with the New START agreement in 2023 has significantly weakened the last strategic arms control framework established in the Cold War and post-Cold War eras. This move leaves scant provisions governing the future of nuclear capabilities among the United States and its adversaries. For over half a century, Washington and Moscow negotiated to establish treaties that imposed limits on their nuclear arsenals, aiming to manage their nuclear rivalry and mitigate the risk of nuclear conflict. This process served the national security interests of both sides by curbing weapons and activities that could jeopardize deterrence, safeguarding strategic stability, offering insights into nuclear capacities, and potentially steering military competition toward less perilous avenues. However, shifts in the global security landscape have altered this calculus. The Russian Federation, much like the Soviet Union before it, has insisted that future agreements factor in the nuclear capabilities of Britain and France. On the other hand, the United States now confronts a security environment featuring two nuclear-armed adversaries—Russia and China—whose forces will potentially pose significant threats to the United States and its allies.

This evolving security landscape may prompt the United States to reevaluate its assessments of its deterrence and arms control requirements. But how should the United States approach this problem?

The papers below address the intricate challenge of maintaining nuclear deterrence through force structure and arms control requirements. They offer insights into these complex issues, each informed by two workshops attended by both technical and policy experts in the spring and summer of 2023, all supported by Los Alamos National Laboratory. The first paper, authored by Greg Weaver, examines the future of force requirements in this two-peer nuclear environment, arguing that the United States must reexamine its force structure to effectively deter China and Russia simultaneously. Weaver outlines the deterrence requirements for deterring both large-scale nuclear and conventional aggression and limited nuclear attack in a two-peer environment, and concludes that the United States may require a larger arsenal of deployed nucle-ar warheads than the 1,550 allowed by the New START Treaty, along with additional delivery systems like a nuclear-armed, sea-launched cruise missile, to effectively deter conflicts with both China and Russia simultaneously.

The second paper, authored by Amy Woolf, addresses the future of arms control by examining the future utility of stability dialogues and risk-reduction measures, instead of numerically binding treaties. Woolf finds that although stability discussions and measures for risk reduction could assist these three nations in lowering the likelihood of nuclear employment, they are unlikely to engage in negotiations for treaties or agreements that impose restrictions on the scale of their nuclear capabilities or provide insight into their plans. Together, this series will provide preliminary lessons and recommendations for the future of deterrence and arms control as the United States determines how to respond to this two-peer environment.

Whether or not one finds the specific proposals offered by each author compelling, it is clear that US and allied policy must be composed of both deterrence and arms control options. Since the 1970s, each major US nuclear modernization program has been accompanied by an arms control proposal, and each nuclear arms control treaty has been backed by tangible capabilities.



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1. *2022 Report on Military and Security Developments Involving the People's Republic of China,* US Department of Defense, 94.

PART I:
US DETERRENCE REQUIREMENTS IN THE COMING TWO-NUCLEAR-PEER THREAT ENVIRONMENT

By Greg Weaver

Introduction

A large-scale nuclear attack on the US homeland poses the only existential military threat to the United States. The nation relies on nuclear deterrence to prevent this threat. This makes nuclear deterrence the highest priority mission of the US military and the foundation of US national security strategy. If the nation fails at this mission, no other mission matters.[1]

US nuclear deterrence strategy and practice have arguably prevented nuclear war and contributed to preventing large-scale conventional war between nuclear-armed states as well. While correlation is not causation, the absence of nuclear or large-scale war between major powers since 1945 is difficult to explain without considering the role of nuclear deterrence in general, and US nuclear deterrence in particular.

However, the strategic circumstances in which US nuclear deterrence strategy and practice have operated are changing rapidly.

Throughout the nuclear age, the United States designed its nuclear deterrence strategy, and shaped and sized its nuclear forces, to address the Russian nuclear threat, treating other nuclear adversaries (i.e., from China and North Korea) as "lesser included threats." A US nuclear force structured and sized to address Russia had sufficient capability to address the lesser included threats as well, even after a nuclear war with Russia.

China, however, is deliberately and rapidly changing this equation, building up its nuclear forces on a scale and at a pace not seen since the US-Soviet arms race of the 1960s and 1970s. But, unlike during the Cold War, China is the only one racing in the US-China nuclear relationship. Declassified US intelligence assessments state that China's nuclear stockpile will reach rough quantitative parity with currently planned US-deployed nuclear warheads by the mid-2030s (e.g., approximately 1,500 weapons by 2035), if China continues on its current trajectory.[2] Should this assessment prove accurate, this means

A Chinese DF-5B ICBM following the 2015 China Victory Day parade. Credit: Wikimedia user IceUnshattered.

1. The *2022 National Defense Strategy* makes the primacy of the US nuclear deterrent abundantly clear; for example, the DOD focus on integrated deterrence is "backstopped by a safe, secure, and effective nuclear deterrent." The NDS emphasizes the importance of modernizing US nuclear forces as "the ultimate backstop to deter attacks on the homeland and our Allies and partners who rely on extended deterrence." Numerous public statements by senior US government officials reiterate the priority of the US's nuclear deterrent. See *2022 National Defense Strategy*, https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF.
2. *Military and Security Developments Regarding the People's Republic of China 2022*, Office of the Secretary of Defense, 2022, 94.

The RT-2PM2, also known as the Topol-M, is a Russian intercontinental ballistic missile that entered service in the 1990s.
Credit: Wikipedia User Stanislav Kozlovskiy

the United States will face two peer nuclear adversaries for the first time in the nuclear age in just over a decade.[3]

This paper examines how US deterrence requirements will be affected by this coming two-nuclear-peer threat environment. First, it lays out four key assumptions which undergird the analysis. Second, it examines the complex nature of the future two-peer threat. Third, it identifies the critical US deterrence objectives in that two-peer environment. Finally, it examines what will be required to achieve those objectives.

Key Assumptions

This analysis makes four assumptions regarding the two-nuclear-peer deterrence problem:

1. In the two-nuclear-peer environment, deterrence will continue to be a function of decisively influencing an adversary leadership's decision calculus by affecting its assessment of the benefits and costs of taking the action one seeks to deter, and of the benefits and costs of continued restraint from taking that action. The *way* deterrence works will not change.
2. Deterring aggression and escalation is based on affecting an adversary's assessment of the likely outcome of such military actions. Thus, while other factors contribute to deterrence, the perceived ability to fight and win a conflict below the level of large-scale nuclear exchanges is critical to deterrence success. Warfighting capability matters.[4]
3. No major power can achieve a measure of nuclear superiority sufficient to win a large-scale nuclear war without sustaining existential-level damage against technically sophisticated and well-resourced major-power adversaries. In a conflict between nuclear-armed major powers, mutually assured destruction is a condition, not a strategy.
4. While North Korea's nuclear forces will continue to grow, they will not expand sufficiently to prevent US strategy from treating North Korea as a lesser included case of the Russia-China nuclear threat.

China Is Rapidly Becoming a Nuclear Peer

China's rapid nuclear buildup is comprehensive, including both strategic and theater-range forces and the addition of an array of new capabilities. China is fielding a triad of strategic nuclear delivery systems, adopting a launch under attack (LUA) posture for its intercontinental ballistic missile (ICBM) force, and has tested potentially destabilizing new intercontinental range systems (e.g., fractional

3. Or even sooner. Recent public US intelligence estimates of China's future nuclear arsenal have repeatedly underestimated both the pace and scale of China's nuclear buildup.
4. Intrawar deterrence is important to consider should a conflict begin following a deterrence failure and critical actions must be taken to mitigate escalation toward a large-scale nuclear exchange. Intrawar deterrence considerations are distinctly different from preconflict deterrence and escalation toward conflict.

or multiple orbital bombardment systems [FOBS/MOBS] that could threaten a potentially unwarned preemptive attack on the United States). For the first time, China is developing survivable theater nuclear forces capable of conducting low-yield precision strikes on US and allied/partner forces and infrastructure across East Asia.

Whether China is pursuing nuclear parity with or superiority over the United States is unclear. It also is unclear why Chinese leadership is doing so. China may have decided to change the role of nuclear weapons in its national security strategy by adopting an expanded theater nuclear war-fighting role and/or a counterforce role against US nuclear forces backed by national missile defenses. The force that China is building is not necessary to enable its traditional minimum deterrence/"no first use" strategy.[5]

Neither a change in Chinese nuclear strategy nor the larger and more diverse Chinese nuclear force to implement it were envisioned when the US nuclear modernization program was designed.[6]

China is also rapidly modernizing and expanding its conventional forces, which pose an increasing threat to US forces and allies/partners in Asia. By the 2030s, China's conventional military buildup could flip the conventional military balance in Asia. This potential conventional imbalance could undermine deterrence of Chinese aggression by itself, but the impact would be exacerbated if China were contemplating either opportunistic aggression in the context of an already ongoing theater conflict between Russia and NATO, or collaborative Chinese-Russian aggression in both theaters.

Finally, China is rapidly fielding new nonnuclear strategic capabilities in space and cyberspace. These capabilities have the potential to deny or diminish US conventional forces' ability to project power effectively, and possibly threaten US nuclear command and control.

The Russian Threat Post-Ukraine

Even following its costly invasion of Ukraine, Russia remains a nuclear peer of the United States, one which may engage in further conventional aggression and nuclear coercion or use in the future. Russia has the largest deployed nuclear force of any state today. This is likely to remain true through 2035. Russia continues to expand its theater nuclear forces, increasing its existing advantage over NATO.

Russian strategy and doctrine envision limited first use of theater nuclear weapons to coerce war termination on terms acceptable to Russia if losing a conventional war, and larger scale use of theater nuclear forces to defeat NATO conventional forces, if coercive nuclear use fails. Russian strategy relies on strategic nuclear forces to deter a large-scale US nuclear response against the Russian homeland while Russia escalates to limited nuclear war in theater. Thus, Russian strategy indicates the Russian leadership believes that limited nuclear use is unlikely to escalate out of control.[7]

An LGM-30 Minuteman III, a US ICBM, is launched as part of a test at Vandenberg Air Force Base, California. Credit: US Air Force

Russia's invasion of Ukraine demonstrates both a propensity to take risk and to miscalculate while doing so, which makes Russian opportunistic or collaborative aggression against NATO states on its periphery a serious threat despite the dismal performance of Russian conventional forces in Ukraine. Those forces' performance is likely to increase Russian reliance on nuclear weapons, increasing the probability of Russian limited nuclear first use early in a conflict with NATO.

5. For more on the debate regarding China's "no first use" declaratory policy, see Nan Li, "China's Evolving Nuclear Strategy: Will China Drop 'No First Use?,'" China Brief, Jamestown Foundation, January 12, 2018, https://jamestown.org/program/chinas-evolving-nuclearstrategy-will-china-drop-no-first-use/. The author points out that debate over the efficacy of "no first use" among China's nuclear scholars has increased in recent years, with some calling it into question. Also see Jennifer Bradley, "China's Nuclear Modernization and Expansion: Ways Beijing Could Adapt Its Nuclear Policy," National Institute for Public Policy Occasional Paper 2, no. 7, July 2022. Bradley points out that China contends a launch-on-warning capability (that it is developing) is fully consistent with its no-first-use nuclear policy.
6. For background on the development of the current program of record during the administration of President Barack Obama, see, for example, *2010 Nuclear Posture Review; 2015 National Security Strategy*; Congressional Research Service, "U.S. Strategic Nuclear Forces: Background, Developments, and Issues," updated September 3, 2019; and for the New START debate in Congress, see, for example, "November 2010 Update to the National Defense Authorization Act of FY2010 Section 1251 Report, New START Treaty Framework and Nuclear Force Structure Plans," Los Alamos Study Group.
7. As pointed out by US experts on Russian military doctrine (e.g., Dave Johnson, Michael Kofman, Anya Fink), Russian military doctrine and strategy, particularly in the nuclear realm, cannot be reduced to the simplistic and misleading label—"escalate to deescalate." For more on the Russian approach as a strategic deterrence, counter-escalation, and war-fighting strategy, see D. Johnson, "Russia's Conventional Precision Strike Capabilities, Regional Crises, and Nuclear Thresholds," Livermore Papers on Global Security No. 3, Lawrence Livermore National Laboratory, February 2018; M. Kofman and A. Fink, "Escalation Management and Nuclear Employment in Russian Military Strategy," Center for New American Security, September 2022.

A Patriot M903 launcher station at Eielson Air Force Base in Alaska. Credit: Senior Airman Joseph P. LeVeille, US Air Force

Reconstituted Russian conventional forces, while inferior to fully reinforced NATO forces, will continue to have a space/time advantage against NATO states on Russia's periphery, potentially enabling them to occupy such states' territory in a *fait d'accompli* before NATO forces can mobilize in their defense. The Russians might then threaten limited nuclear escalation to deter or defeat a NATO counteroffensive to restore the territorial status quo ante.

Russia also continues to expand its space, cyber, and conventional deep precision strike capabilities to deny NATO forces critical enablers and to derive coercive leverage from threats to NATO critical infrastructure.

The Unique Nature of the Two-Nuclear-Peer Threat

If China's nuclear buildup continues on its current trajectory, the United States will face two nuclear-peer adversaries for the first time in the mid-2030s. Russia and China will together pose an unprecedented threat to US defense strategy. The United States has yet to even substantively grapple with the implications of this two-nuclear-peer threat, much less effectively address it.

Facing China alone as a nuclear peer will alter the strategic landscape in the Asia-Pacific region. But the Russian-Chinese "friendship without limits" will pose qualitatively new threats of opportunistic or cooperative two-theater aggression.

Neither the *2018 US National Defense Strategy* (NDS) nor the 2022 NDS adequately address this threat. As noted in the 2018 Commission on the National Defense Strategy's assessment of the 2018 NDS:

> The Department has largely abandoned the longstanding "two war" construct for a "one major war" sizing and shaping construct. In the event of large-scale conflict with Russia or China, the United States may not have sufficient remaining resources to deter other adversaries in one—let alone two—other theaters by denying them the ability to accomplish their objectives without relying on nuclear weapons.[8]

The 2022 NDS also adopts a "one major war" sizing construct. And while both the 2022 NDS and the ***2022 Nuclear Posture Review*** hint at reliance on US nuclear forces to deter opportunistic aggression by a second nuclear peer, neither document advocates for the US conventional and nuclear forces that will be required to do so when facing two nuclear peers in the mid-2030s.[9]

Failing to address this problem has the potential to undermine deterrence, especially deterrence of opportunistic aggression in a second theater or collaborative Russian and Chinese aggression in Europe and Asia simultaneously. Failing to address these threats because some deem them improbable will have the perverse effect of making them more likely.[10]

In this broader strategic context, facing a second nuclear peer poses several unique challenges to US nuclear strategy, force posture, and force structure.

A Chinese nuclear peer creates new first-strike threats that the United States must address to preserve sufficient assured second-strike

8. National Defense Strategy Commission, *Providing for the Common Defense: The Assessments and Recommendations of the National Defense Strategy Commission*, November 13, 2018, 20.
9. "In a potential conflict with a competitor, the United States would need to be able to deter opportunistic aggression by another competitor. We will rely in part on nuclear weapons to help mitigate this risk, recognizing that a near-simultaneous conflict with two nuclear-armed states would constitute an extreme circumstance." See *2022 Nuclear Posture Review*, US Department of Defense, 12.
10. Failing to address this problem also exacerbates issues around extended deterrence and assurance of allies and partners.

capability to enable US deterrence strategy. The first new threat is a China-only preemptive counterforce strike on US nuclear forces. The much larger and more capable Chinese nuclear force of the mid-2030s will almost certainly include multiple warhead ICBMs with sufficient accuracy to destroy the US ICBM force, augmented by Chinese counter-space and cyber capabilities, potentially capable of denying the launch warning necessary to enable a US LUA option to preserve ICBM survivability. Chinese nuclear forces may also include FOBS/MOBS capable of conducting a strike on US national leadership and nuclear command and control and warning systems with little to no warning. Finally, China's intense interest in artificial intelligence (AI), quantum computing, and autonomous systems research might lead to unexpected breakthroughs in antisubmarine warfare (ASW) that could pose a threat to US ballistic missile submarines (SSBNs).

A Chinese nuclear peer also creates the potential for a collaborative preemptive counterforce strike by China and Russia simultaneously. This scenario not only significantly increases the number of nuclear weapons the United States might face in a first strike on its nuclear forces, but also combines the most threatening features of future Russian and Chinese nuclear capabilities in all relevant domains. Given current capabilities, the potential increase in threat numbers alone is unlikely to increase the first-strike threat to US nuclear forces significantly, because both Russia and China will independently have sufficient forces to target everything that is currently targetable. But, should there be a breakthrough in ASW that allows small-area (but not precise) geolocation of SSBNs at sea, then barrage attacks requiring larger numbers of weapons could become a relevant threat to the most survivable portion of the US nuclear deterrent.

The growth in Chinese nuclear forces also significantly increases the number of nuclear counterforce targets for US forces to potentially hold at risk to either deter aggression and escalation and/or to achieve other US objectives if deterrence fails.[11]

These collective challenges posed by the future two-peer threat environment have important impacts on US future deterrence and assurance requirements.

Determining US Deterrence Requirements for the Two-Nuclear-Peer Environment

To determine US deterrence requirements for the two-nuclear-peer environment one must identify *whom we seek to deter from doing what under what conditions*. The United States (and its allies and partners) must be able to achieve the following deterrence objectives against China and Russia:

- Deter large-scale conventional aggression.
- Deter limited nuclear escalation.
- Deter large-scale nuclear attack.

Regarding the circumstances in which those objectives must be achieved, the United States (and its allies and partners) must be able to do so in three basic scenarios:

- Deter either adversary alone.
- Deter opportunistic aggression by one adversary while already at war against the other.
- Deter simultaneous collaborative aggression by both adversaries.

US strategy for achieving these deterrence objectives must be tailored to decisively influence the unique decision calculus of Chinese leaders and of Russian leaders. This requires a strategy and supporting force structure and posture that can credibly defeat their respective "theories of victory" by denying them their objectives and imposing costs that far exceed what benefits they can achieve through aggression or escalation.

Deterring Large-Scale Conventional Aggression

Deterring conventional aggression by Russia or China *individually* is conceptually simple but operationally complex. The United States and its allies and partners must be perceived by Moscow or Beijing as willing and capable of fighting and winning a large-scale conventional conflict. This requires conventional military superiority applied in a way that defeats the adversary's strategy.

But there is an additional element required to deter large-scale conventional aggression *by a nuclear peer adversary:* one must also convince such an adversary that it cannot escalate its way out of failed conventional aggression through nuclear means to force war termination on terms either favorable or acceptable to the adversary. Thus, the second deterrence objective of deterring limited nuclear escalation contributes directly to achieving the first deterrence objective as well.

But what about deterring opportunistic or collaborative large-scale conventional aggression? This is a much tougher challenge, requiring US, allied, and partner conventional superiority and the ability to deter limited nuclear escalation in both theaters.

Because the US forces required to achieve conventional superiority in Asia are somewhat different from those required to do so in Europe, there are potential adjustments to US and allied and partner conventional force structure and posture that could achieve superiority in both theaters.

The primary operational limitation on the ability of the United States to fight and win in both theaters simultaneously is logistics: the strategic airlift and sealift needed to get required forces where they need to be and then sustain them in combat, with sufficient stocks of advanced conventional munitions. There also are critical "low-density, high-demand" US military capabilities that would be in short supply in a two-theater conflict, including bombers; integrated air and missile defenses (IAMD); tanker aircraft; intelligence, surveillance, and reconnaissance (ISR) capabilities; and ASW capabilities.

Fixing this would require a shared understanding of the two-nuclear-peer threat among the United States and its allies and partners in Europe and Asia; significant increases in US, allied, and partner military spending; and an agreement on how to optimize the military capabilities of multiple nations in each theater.

The bottom line is that US allies and partners would have to agree to provide much more conventional capability more efficiently, with-

11. Note, however, that none of these objectives would likely require a US strategic nuclear force that matched the combined total of deployed warheads in the Russian and Chinese strategic nuclear forces.

out perceiving the US request to do so as signaling a reduced US commitment to their defense in either theater.

If the United States and its allies and partners cannot (or will not) maintain conventional superiority in a second theater conflict, deterring or defeating opportunistic or collaborative aggression will require reliance on nuclear weapons to counter adversary conventional superiority in the second theater. US nuclear forces do not currently play such a role, and the force the United States currently plans is not designed to play this role.

US ability to deter large-scale conventional aggression through increased reliance on nuclear weapons to compensate for conventional inferiority is greater against China than it is against Russia for several reasons.

First, during a possible amphibious invasion of Taiwan, China's forces would be highly vulnerable to US limited nuclear use. And while China might well use nuclear weapons in response, China's ability to seize Taiwan after sustaining a nuclear attack on its amphibious forces would be negated for years. Thus, Chinese nuclear counterescalation would not enable Beijing to achieve its original geopolitical objectives in the near term, while risking further nuclear escalation, including potentially uncontrolled escalation.[12]

Compensating for NATO conventional inferiority with nuclear weapons to deter Russian opportunistic or collaborative aggression is more problematic. Russia's growing theater nuclear force advantage would be extremely difficult to overcome in a way that would make such a US strategy credible, especially given the fact that Russian conventional operations would not be uniquely vulnerable to nuclear attack. However, given the performance of Russian conventional forces in Ukraine, it is reasonable to believe that increased, optimized conventional force contributions by European NATO allies combined with more prepositioning of US heavy ground force equipment in Europe could maintain NATO conventional superiority even if a Russia-NATO conflict began after the United States was engaged in a war against China in Asia.

So what are the key deterrence requirements for this deterrence objective?

The best military option is for the United States and its allies and partners to maintain conventional superiority over China and Russia in both theaters simultaneously. This can be done. But it is unclear whether it will be done, given the political and financial costs of doing so. A strategy that requires such conventional superiority in both theaters that is not supported by forces credibly capable of enabling it risks deterrence failure. In that event, the United States and its allies and partners would incur the much higher costs of fighting (and potentially losing) a major power war, and risk escalation to large-scale nuclear war.

If the United States and its allies and partners do not achieve two-theater conventional superiority, then the United States should increase reliance on nuclear weapons to deter large-scale opportunistic or collaborative conventional aggression in Asia while working with its NATO allies to ensure NATO conventional superiority even in the face of a two-theater war.

Chinese People's Liberation Army – Navy ship Changbaishan (LSD-989) at Nieuwe Waterweg, Rotterdam. Credit: Wikimedia user kees torn.

12. For more details on this argument, see Greg Weaver, "The Role of Nuclear Weapons in a Taiwan Crisis," Atlantic Council, November 2023.

The *Ohio*-class ballistic-missile submarine USS *Henry M. Jackson* (SSBN 730) returns from a strategic deterrent patrol. US Navy photo by Lt. Cmdr. Michael Smith

In either case, it will be essential that the United States bolsters its ability to deter limited nuclear escalation in both theaters to enhance deterrence of large-scale conventional aggression by China and/or Russia. If either Beijing or Moscow perceives a viable option to escalate its way out of failed conventional aggression, it will be more likely to risk such a conventional attack.

Deterring Limited Nuclear Escalation

When facing a peer nuclear adversary with a secure second-strike capability that poses an existential threat to the United States, deterrence of limited nuclear escalation requires the perceived ability of the United States, allies, and partners to persevere in the face of adversary limited nuclear escalation without being politically coerced into accepting war termination on the adversary's terms, and without being decisively militarily disadvantaged. That requires a set of US nuclear capabilities that are *militarily relevant* in such a conflict. Current Russian theater nuclear capabilities are designed to be just that. The ongoing evolution of Chinese theater nuclear capabilities indicates that Chinese planners may now understand this as well.

The core requirement for deterring limited nuclear escalation in a war with a nuclear peer is a flexible response strategy that credibly convinces the adversary's leadership that limited nuclear escalation:

1. Does not provide effective insurance against miscalculating about US and allied capability, resolve, and cohesion in the face of conventional aggression (as Moscow clearly concluded vis-à-vis Ukraine).
2. Will not result in war termination on its terms.
3. Runs the risk of uncontrolled escalation because the United States and its allies are visibly prepared for what nuclear scholar Thomas Schelling called a "competition in risk-taking" to defend their vital interests.

An effective flexible response strategy must be enabled by US, allied, and partner nuclear and conventional forces that are capable of three key things:

1. Providing a robust range of credible response options that can restore deterrence by convincing adversary leadership it has miscalculated in a dire way, that further use of nuclear weapons will not achieve its objectives, and that it will incur costs that far exceed any benefits it can achieve.
2. Countering the military impact of adversary theater nuclear use.
3. Continuing to operate effectively to achieve US, allied, and partner objectives in a limited nuclear use environment.

To meet these requirements the United States needs a range of continuously forward-deployed, survivable theater nuclear forces that can reliably penetrate adversary defenses with a range of explosive yields, and on operationally relevant delivery timelines. Based on these attributes, currently planned US theater nuclear capabilities are not sufficient for the two-peer threat the United States faces. Completing the modernization of NATO's dual-capable fighter aircraft capabilities is necessary but not sufficient to meet this requirement. NATO's planned theater nuclear forces are too small, insufficiently survivable, and insufficiently militarily relevant. The United States currently plans no continuously forward-deployed theater nuclear capabilities in the Asia-Pacific theater whatsoever, despite the rapid growth of Chinese theater nuclear capabilities and indications that China is changing its nuclear strategy.

US strategic nuclear forces alone cannot fill this gap because they lack the flexibility and timeliness necessary to convince the Rus-

sian or Chinese leadership that the United States and its allies are credibly prepared to counter limited nuclear first use with militarily effective nuclear responses of their own. Bombers based in the continental United States cannot deliver nuclear weapons on operationally relevant timelines in many scenarios and are vulnerable to preemptive attack if deployed forward in the theater.

The United States should supplement dual-capable fighter modernization with at least one additional survivable, continuously forward-deployed, selectable-yield delivery system with a higher probability of penetrating advanced defenses and delivering nuclear weapons to targets in the European and Asia-Pacific theaters on operationally relevant timelines. There are several candidate systems that could meet this requirement, but a US nuclear-armed sea-launched cruise missile (SLCM-N) deployed on attack submarines would provide all these attributes in a highly effective manner.

Deterring Large-Scale Nuclear Attack

US strategy for deterring large-scale nuclear attack has always been to ensure that US nuclear forces can inflict unacceptable damage on any adversary under any circumstances.

Inflicting unacceptable damage against China and Russia simultaneously requires being able to destroy what both adversaries value most under any circumstances, including following a combined Chinese-Russian preemptive counterforce strike on US nuclear forces and their command and control. This begs two key questions:

1. What do the Chinese and Russian leaderships value most?
2. How many US nuclear weapons must survive a combined future Chinese-Russian counterforce attack to be able to credibly hold at risk what both adversaries most value?

During the Cold War, the United States assessed that the Soviet leadership most valued its ability to exercise control over the Soviet state, its war-supporting industry, and its military forces, including its strategic nuclear forces. Whether this remains the correct equation to deter a Chinese and/or Russian large-scale nuclear attack on the United States is largely a question for the intelligence community.

If the intelligence community assesses the United States must hold Chinese and Russian nuclear forces at substantial risk to deter a large-scale nuclear attack, then the United States must carefully evaluate the level and nature of US nuclear counterforce capability required to deter such an attack and modify its planned nuclear force structure accordingly. Given the scale of China's nuclear force expansion our currently planned nuclear force will clearly be insufficient to address two-peer adversaries in this way.

However, two other issues regarding the need for US nuclear counterforce capabilities are questions of political-military strategy, not intelligence assessment. The first is whether holding a peer adversary's nuclear forces at risk contributes significantly to deterring limited nuclear escalation by making the US will to engage in a competition in risk-taking more credible. The second is whether holding a peer adversary's nuclear forces at risk is necessary to limit meaningfully the damage Russia and China can do to the United States and its allies if deterrence of large-scale nuclear attack fails.

Even if the United States determines it does not need to hold Chinese and Russian nuclear forces at substantial risk to deter a large-scale nuclear attack, the United States should still evaluate the level and nature of US nuclear counterforce capabilities required to achieve these other two political-military objectives and modify its planned nuclear force structure accordingly. Most analysts believe the most likely path to a large-scale nuclear war is limited nuclear escalation that results from large-scale conventional conflict between nuclear-armed adversaries. Thus, if such counterforce capability contributes to deterring limited nuclear escalation, and thus also contributes to deterring large-scale conventional aggression, it indirectly contributes to ***preventing*** large-scale nuclear attack, even if it is not necessary to ***deter*** such an attack directly.

Conclusion

The advent of the two-nuclear-peer threat means the United States must reevaluate the size and composition of the nuclear force it will need to credibly deter both China and Russia from initiating large-scale conventional aggression, escalating to limited nuclear use, and launching a large-scale nuclear attack.

China's impending nuclear-peer status means that the United States can no longer treat the Chinese nuclear threat as a "lesser included case" of the Russian nuclear threat. It is a US national security imperative that the full implications of the impending two-peer threat identified in this paper be seriously addressed *in the near term*.

Why is this an urgent imperative? Because if US strategy to address the two-peer threat requires a US nuclear force that is larger in size, different in composition, *or both,* decisions need to be made in the near term (one to three years) to supplement the planned US nuclear modernization program, or the nation will not have the required additional capabilities in time to address the threat. The current and planned capacity of the US nuclear weapons enterprise, under the purview of both the DOD and the Department of Energy, severely limits the nation's ability to supplement the planned modernization program significantly in a timely way.

To reevaluate the size and composition of the nuclear force needed to address the coming two-peer threat, the full US national security community—including those who do and those who do not normally focus on nuclear weapons issues—needs to answer three key questions about the future role of nuclear weapons in our strategy and the conventional and nuclear forces required to implement that strategy:

What is the strategic rationale for believing that the nuclear modernization program of record that was adopted in 2010, before Russian aggression against Ukraine in 2014 and 2022, and before China's ongoing and rapid nuclear force expansion, will be sufficient to address a 2030s security environment that poses the threat of conflict with two-peer nuclear adversaries simultaneously?

Are the United States and its allies and partners likely to decide to bear the sustained political and financial costs necessary to build sufficient conventional forces to deter and defeat both Russia and China simultaneously?

Why would a nuclear weapons design and production infrastructure designed to just barely be able to maintain the existing US nuclear force be sufficient to provide what the nation needs in a potentially unconstrained nuclear competition with two-peer nuclear adversaries who are technically sophisticated, well-resourced, and geostrategicaly aligned, if not allied?

PART II:
ARMS CONTROL OPPORTUNITIES IN THE EMERGING TWO-NUCLEAR-PEER ENVIRONMENT

By Amy F. Woolf

This issue brief[1] considers whether and how the emerging challenge of two near-equal nuclear-armed adversaries might affect the US nuclear posture. This changing security environment may alter US assessments of its nuclear requirements, affecting both the size and structure of the US nuclear arsenal. The presence of two near-equal nuclear adversaries might also raise new questions about whether arms control can help manage the nuclear competition with Russia and China to ease US concerns about emerging threats and mitigate the need for a more robust US nuclear force posture.

While this paper briefly addresses the prospects for arms control with Russia, the core of this inquiry is the question of whether the United States can engage China in an arms control process that restricts the scope of China's nuclear modernization program, and, therefore, the magnitude of a potential US response. In its simple form, this question asks whether China might agree to limit the size and scope of its arsenal in exchange for limits on the numbers or capabilities of US nuclear weapons. This would seem to mirror the US-Soviet and US-Russian arms control experience where the nations signed several treaties that limited and, eventually, reduced their numbers of deployed nuclear warheads.

But the United States and Soviet Union developed their arms control relationship and crafted the tools they used to manage their nuclear competition over more than fifty years of negotiations. They only agreed to reduce their numbers of deployed nuclear weapons once their political and security relationship had changed in ways that reduced their nuclear requirements. Arms control treaties that codified reductions in their numbers of nuclear weapons were the *result*, not the *cause*, of that changing political relationship.

The United States and China almost certainly will not begin their arms control relationship in the same place that the United States and Russia reached after fifty years—with formal treaties that limited their numbers of deployed weapons. Nor can the United States expect China to accept limits on its nuclear capabilities as long as it believes it needs to expand those capabilities to meet its national security requirements. Therefore, this paper looks beyond the question of whether and how to impose numerical limits on Russian or Chinese nuclear forces and considers other forms of cooperation that might ease US concerns about emerging threats and, therefore, mitigate the need for a more robust US nuclear force posture.

President Ford and Soviet Secretary Brezhnev sign a Joint Communique on the Limitation of Strategic Offensive Arms in 1974. Credit: Gerald R. Ford White House Photographs

Prospects for Arms Control with Russia

The United States and Russia are unlikely to reach an agreement on a formal treaty retaining current limits or imposing further reductions on their deployed nuclear forces before the New START agreement expires in 2026. Although the United States seems willing to move forward with negotiations, it is unclear whether that these discussions will resume before the conflict in Ukraine ends. In June 2023, Jake Sullivan, President Joseph R. Biden's national security advisor, said that "rather than waiting to resolve all our bilateral differences, the United States is ready to engage Russia now to manage nuclear risks and develop a post-2026 arms control framework."[2] Russia, however, has rejected this approach. Sergey Ryabkov, Russia's deputy foreign minister, has blamed Russia's suspension of New START participation on "the totality of circumstances related to the destructive and hostile actions of the United States." In response to Sullivan's statement, he said that "there is simply no basis for a productive discussion here, but we are ready to patiently state our approaches and explain why the US course is destructive."[3]

Differences in the US and Russian priorities for a treaty to replace New START would further complicate their ability to complete a new treaty before New START expires. The United States has suggested that the subsequent agreement "sustain limits . . . on the Russian systems covered under new START . . . limit the new kinds of nuclear systems Russia is developing; and . . . address all Russian nuclear weapons, including theater-range weapons."[4] Russia, in contrast,

1. The views expressed by Amy F. Woolf, a nonresident senior fellow in the *Forward* Defense program of the Atlantic Council's Scowcroft Center for Strategy and Security, are her own and do not reflect the views of her current or past affiliations.
2. White House, "Remarks by National Security Advisor Jake Sullivan for the Arms Control Association (ACA) Annual Forum," White House Briefing Room (website), June 2, 2023, https://www.whitehouse.gov/briefing-room/speeches-remarks/2023/06/02/remarks-by-national-security-advisor-jake-sullivan-for-the-arms-control-association-aca-annual-forum/.
3. Ministry of Foreign Affairs of the Russian Federation, "Foreign Ministry Spokeswoman Maria Zakharova's Answer to a Media Question about US National Security Adviser John Sullivan's Remarks," June 3, 2023, https://mid.ru/en/foreign_policy/news/1873993/.
4. "Keynote Address for the Commemoration of the 50th Anniversary of the Arms Control Association," delivered by Mallory Stewart, Assistant Secretary, Bureau of Arms Control, Compliance, and Verification, US Department of State, June 2, 2022, https://www.state.gov/keynote-address-for-the-commemoration-of-the-50th-anniversary-of-the-arms-control-association/.

The five Nuclear Non-Proliferation Treaty (NPT) nuclear-weapon states holding a joint press conference in 2013. Credit: Eric Bridiers, US Mission Geneva.

wants the arms control process to "cover the entire spectrum of offensive and defensive, nuclear and non-nuclear weapons with a strategic potential." This list includes offensive nuclear and conventional strategic weapons, ballistic missile defenses, space-based capabilities that could strike targets on earth, and the nuclear weapons of the United Kingdom and France.[5] It would likely take more than the short time remaining before 2026 to resolve differences and conclude a treaty.

The United States and Russia might find common ground if they seek to establish broad goals for cooperation while identifying specific measures to help manage risks and uncertainties created by their nuclear postures. Some analysts have suggested that they could maintain predictability and transparency by pledging to maintain their forces at the levels mandated in New START and to resume exchanging data on the numbers and locations of their deployed strategic weapons. They could also bolster their communication channels, like those established to ensure deconfliction in and around Syria, to reduce the risk of misunderstandings and misperceptions that could lead to inadvertent escalation.

Informal steps designed to demonstrate restraint and avoid miscalculations would, however, be less comprehensive than those mandated by formal treaties and would almost certainly lapse if either side sought additional forces to meet its national security requirements. Nevertheless, voluntary efforts at cooperation, new negotiations to reinvigorate existing communications channels, and consultations to identify new risk reduction measures could help the two sides forestall worst-case assessments and resist arms race pressures until security conditions improved and formal negotiations resumed.

Prospects for Arms Control with China

US officials have raised concerns about China's growing nuclear arsenal and the potential that a regional crisis could spark a conflict that might escalate to nuclear war. In response to these concerns, during their meeting in November 2021, President Biden invited China's President Xi Jinping to participate in a strategic stability dialogue that would establish "common-sense guardrails to ensure that competition does not veer into conflict and to keep lines of communication open."[6] According to the Biden White House, these talks would focus, at first, "on avoiding accidental conflict, then on each nation's nuclear strategy and the related instability that could come from attacks in cyberspace and outer space," before eventually providing a venue for more formal arms control negotiations.[7]

China has embraced some forms of arms control, participating in multilateral negotiations and engaging in the P5 process—which

5. Sergey Ryabkov, "Russia's Nonproliferation Policy and Global Strategic Stability," *Modern Diplomacy*, December 27, 2021, https://moderndiplomacy.eu/2021/12/27/russias-nonproliferation-policy-and-global-strategic-stability/.
6. White House, "Readout of President Biden's Virtual Meeting with President Xi Jinping of the People's Republic of China," November 16, 2021, https://www.whitehouse.gov/briefing-room/statements-releases/2021/11/16/readout-of-president-bidens-virtual-meeting-with-president-xi-jinping-of-the-peoples-republic-of-china/.
7. David E. Sanger and William J. Broad, "As China Speeds Up Nuclear Arms Race, the US Wants to Talk," *New York Times*, November 28, 2021, https://www.nytimes.com/2021/11/28/us/politics/china-nuclear-arms-race.html.

brings together the five nuclear weapon states (NWS) recognized by the Nuclear Nonproliferation Treaty (China, France, Russia, the United Kingdom, and the United States)—to address nuclear security and nonproliferation issues. In this context, Beijing has advocated for the "five nuclear-weapon States . . . to further strengthen communication on strategic stability and conduct in-depth dialogue on reducing the role of nuclear weapons in their national security doctrines and on a broad range of issues, including missile defense, outer space, cyberspace, and artificial intelligence."[8]

China has, however, been reticent about joining strategic stability talks with the United States and has expressly rejected negotiations toward an agreement that would require transparency into or limits on its nuclear forces, citing the significant disparity between the numbers of US, Russian, and Chinese nuclea r warheads. According to Ambassador Fu Cong, then-director-general of the Department of Arms Control at the PRC's Ministry of Foreign Affairs, "the countries with the largest nuclear arsenals should further conduct significant and substantive reduction in their nuclear arsenals in a verifiable, irreversible and legally binding manner. This will create conditions for other nuclear-weapon States to join the nuclear disarmament process."[9] Fu, who is now Chinese ambassador to the European Union, also argued that transparency would undermine China's strategic capability because China is "faced with a strategic competitor [with] 6000 nuclear warheads" who is also "developing missile defense, deploying all these missiles defense system around China, [and] talking about deploying the intermediate-range missiles around China."[10]

The US government has estimated that China's nuclear stockpile will grow to around 1,500 warheads by 2035.[11] Some see this as an opening for arms control because the number would be similar to the New START limit of 1,550 deployed warheads on US and Russian long-range delivery systems. But the New START agreement does not count all US and Russian weapons; their stockpiles contain around 3,700 and 4,000 warheads, respectively. Moreover, New START expires in 2026, after which the United States and Russia could expand their numbers of deployed strategic nuclear forces, leading to far more than 1,550 deployed warheads on each side by the time China's stockpile reaches 1,500 warheads in the mid-2030s. Thus, whether one counts deployed warheads on strategic delivery vehicles or total stockpiles, China's deployed forces in 2026 and its stockpile of warheads in 2035 could still fall below those of the United States and Russia.

Still, a strategic stability dialogue like the one mentioned in the statement following the Biden-Xi summit in 2021 might create a pathway for engagement if the United States remains interested and China agrees to participate. The key to progress, however, depends on the issues on the agenda and the incentives the United States provides to bring China to the table.[12] For example, China may be more willing to participate if the agenda extends beyond nuclear weapons and focuses on other capabilities, like ballistic missile defenses and conventional strategic strike systems, that China believes undermine its security. China might also be more willing to discuss the implications of its nuclear modernization program if the United States acknowledges that China's nuclear deterrent poses a credible threat to the United States and places the two nations in a "mutually vulnerable" deterrence relationship. As a matter of policy, the United States has long refused to acknowledge this reality, in part because it could undermine allies' confidence in the US extended nuclear deterrent. Still, the absence of an acknowledgment also serves to convince China that the United States is seeking "absolute security," rather than mutual deterrence, with its nuclear weapons.

US President Joseph Biden and Chinese President Xi Jinping meet on the sidelines of the G20 Summit in Indonesia in November 2021. Credit: The White House

The two nations could also seek to identify and implement crisis management, communications, and risk reduction measures to address the risk that regional crises might escalate to nuclear war. For example, a missile launch notification agreement might reduce the risk that either nation misunderstands the purpose of a missile test flight, then responds with additional military action. Measures that restrain dangerous air operations or encounters at sea could also reduce the risk of inadvertent engagements and escalation during a crisis. China has been unwilling to engage in direct government-to-government discussions on these types of issues in the past, but, in the current security environment, this type of dialogue might serve as a starting point for a more fulsome arms control relationship.

8. "Upholding the Treaty on the Non-Proliferation of Nuclear Weapons for World Peace and Development," Ambassador Fu Cong, Head of the Chinese Delegation and Director-General of the Department of Arms Control of the Ministry of Foreign Affairs of the People's Republic of China, August 2, 2022, https://reachingcriticalwill.org/images/documents/Disarmament-fora/npt/revcon2022/statements/2Aug_China.pdf.
9. "Upholding the Treaty on the Non-Proliferation of Nuclear Weapons."
10. "Upholding the Treaty on the Non-Proliferation of Nuclear Weapons."
11. *Military and Security Developments*.
12. For more details on the points summarized here, see David Santoro, "Getting Past No: Developing a Nuclear Arms Control Relationship with China," *Journal for Peace and Nuclear Disarmament,* June 13, 2023, https://doi.org/10.1080/25751654.2023.2221830.

Conclusion

The United States, Russia, and China are unlikely to accept restrictions on their numbers of deployed nuclear weapons as long as each continues to center nuclear weapons in its national security strategy, and all believe the threats in the current international security environment increase the salience of nuclear weapons. Moreover, they are unlikely to find an acceptable agenda for negotiations until each is willing to address the others' concerns about threatening activities or capabilities. Even if they clear these two hurdles, they are unlikely to succeed in talks that focus on nuclear reductions if each believes that it needs to modernize and possibly expand the size of its nuclear stockpile to achieve its security objectives.

A process focused on transparency, communication, and risk reduction measures could provide a path forward, even if it did not lead to nuclear reductions. It would not, however, be without complications. While the United States believes that steps to reduce the risk of nuclear war have value, Russia and China might believe that the risk would be worth taking in the future if it would help coerce the United States to disengage from a conflict. Nuclear weapons make this type of risk-tolerant strategy all the more dangerous. Nevertheless, an agenda focusing on communications and risk reduction might reduce the pressure to increase the number of nuclear weapons.

SERIES CONCLUSION

Nuclear weapons represent both the greatest threat to US national survival and a central tool in US defense and national security strategy. The potential for horrific destruction in even a limited nuclear attack has underlain the US doctrine of nuclear deterrence, for which the United States has sought to maintain a nuclear force posture sufficient to deny any potential adversary its objectives if it employed nuclear weapons and to ensure that the costs of a conflict that escalated to nuclear use would be unacceptably high for that adversary.

During the Cold War, the United States and the Soviet Union recognized that either side's efforts to expand its own capabilities could not only introduce new threats for the other, but also create instabilities that might add to the risk of nuclear use in a crisis or conflict. Thus, these states pursued discussions to better understand their planned nuclear force structures and to identify potential sources of instability in the nuclear balance. For the United States, this arms control process was part of its national security toolbox, as the negotiations produced agreements that restrained the size and scope of the Soviet and Russian nuclear force, offered transparency and predictability into potential future developments, and allowed the United States to plan its own nuclear programs without relying on worst-case assessments of Soviet and Russian plans.

In the years following the collapse of the Soviet Union, the size and structure of the US nuclear force, the guidance and employment plans that would direct use of nuclear weapons, and the circumstances under which the United States would consider employing them evolved to reflect positive changes in the international security environment. But the last decade has seen concerns about nuclear weapons and great power rivalry return to the scene. The United States is now engaged in a security environment where it might face conflicts with two nuclear-armed nations at the same time. As Russia and China modernize and expand their nuclear forces, the United States must again consider how to alter the size and structure of its nuclear forces and whether cooperation through arms control can mitigate the need for a more robust US nuclear posture.

The two papers in this study offer answers to both sides of this problem. The first paper concludes that the United States will likely need a greater number of deployed nuclear warheads than the 1,550 permitted under the New START Treaty and additional, more flexible delivery systems—such as a nuclear-armed sea-launched cruise missile—to ensure that it can simultaneously deter conflict with both China and Russia at the strategic and regional levels. The second paper concludes that, while stability dialogues and risk-reduction measures might help the three nations mitigate the risk of nuclear use, they are unlikely for the foreseeable future to negotiate treaties or agreements that limit the size of their nuclear forces or offer transparency into their future plans.

Because the United States, Russia, and China all see nuclear weapons as essential to their national security, they almost certainly will continue to expand their capabilities until the international security environment changes. Neither the United States and Russia, nor the United States and China, are likely to engage in bilateral arms control discussions until they believe they can strengthen their security by cooperating to manage nuclear risks. Moreover, these states are unlikely to find an acceptable agenda for negotiations until each is willing to address the others' concerns about threatening activities or capabilities. Even if these states clear these two hurdles, negotiators are unlikely to find success in talks that focus on nuclear reductions if each believes that it needs to modernize and possibly expand the size of its nuclear stockpile to achieve its security objectives.

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ACKNOWLEDGMENTS

The authors would like to thank Alyxandra Marine and Mark J. Massa for their assistance in editing this piece and Marine for writing the introduction.

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The Atlantic Council is grateful to Los Alamos National Laboratory for its support of this paper.

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