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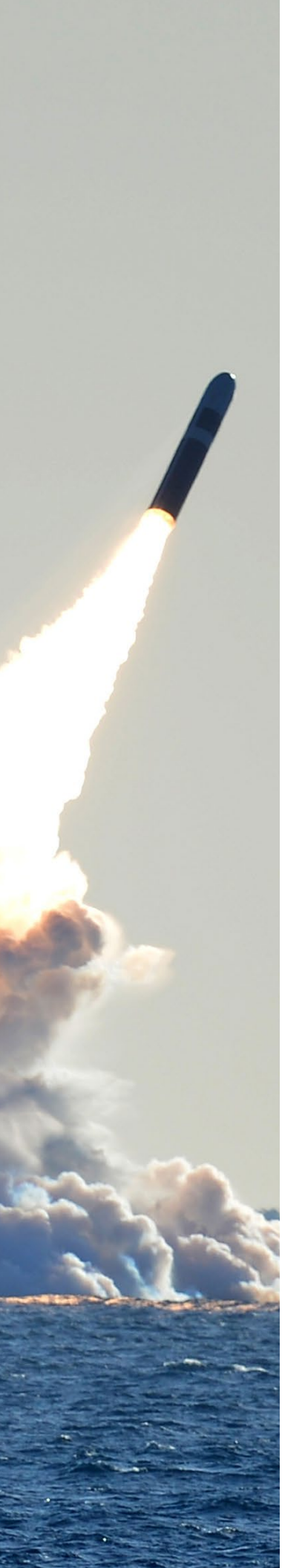
The imperative of augmenting US theater nuclear forces

An examination of alternatives

Greg Weaver



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The problem

The United States and its allies and partners face an impending change in the threats they face from nuclear-armed adversaries: a strategic environment marked by two nuclear peer major powers. Russia, long a nuclear peer of the United States, will likely emerge from the war in Ukraine—regardless of how it ends—even more reliant on its nuclear forces, which are already the largest in the world. Meanwhile, China is undertaking the largest nuclear force buildup since the Cold War. That buildup will increase the size of Beijing's nuclear forces by roughly seven and a half times since 2018, positioning China as a nuclear peer of the United States by 2035.[1]

Meanwhile, North Korea continues to expand and diversify its nuclear arsenal. Although the North Korean threat has been somewhat constrained by the quality of its ballistic missile systems—particularly its intercontinental ballistic missiles (ICBMs)—technical assistance from Russia, in exchange for Kim Jong Un's material support for the war in Ukraine, could rapidly enhance North Korean capabilities. Finally, the ongoing conflict in the Middle East could prompt Iran to choose to acquire its own nuclear arsenal, presenting a wholly new challenge.

A pair of recent analyses of the strategic impact of this two-nuclear-peer environment have sounded an alarm, making clear that this environment poses a qualitatively and quantitatively new threat of adversary aggression and the potential for nuclear war.[2] Conducted by bipartisan teams of former senior US officials and other nuclear experts, both analyses concluded—in the words of the Congressional Commission on the Strategic Posture of the United States (hereafter referred to as the Strategic Posture Commission)—that the planned US nuclear force "is *absolutely essential, although not sufficient* [emphasis added] to meet the new threats posed by Russia and China."[3] Both reports emphasized the urgent need to enhance US theater nuclear forces to address the most likely path to large-scale nuclear war: the failure to deter or counter limited adversary nuclear use in an ongoing conventional conflict. Finally, both reports laid out a set of attributes that US theater nuclear force enhancements must possess to effectively address the threat of limited nuclear escalation. However, these reports did not examine in depth the deterrence and warfighting implications of alternative new US theater nuclear systems.

This paper examines why the two-nuclear-peer threat makes the enhancement of US theater nuclear forces an urgent imperative. It explains why the planned US strategic and theater nuclear forces are insufficient to address this threat. The paper then presents a more detailed set of political-military and operational attributes that enhanced US theater nuclear forces must possess to effectively counter the threat. Using these attributes, it evaluates the relative deterrence and warfighting value of various potential alternative theater-range nuclear weapon systems. The paper concludes with a recommended future US theater nuclear force structure and posture, specifically, that the United States should field a theater nuclear force that combines an effectively dispersible dual-capable fighter aircraft (DCA) force in Europe with nuclear-armed sea-launched cruise missiles (SLCM-Ns) deployed day-to-day on attack submarines (SSNs) in Europe and Asia and ground-launched cruise missiles (GLCM-Ns) and/or ground-launched ballistic missiles (GLBM-Ns) continuously deployed in Europe and/or Asia.

1. US Department of Defense, *Military and Security Developments Involving the People's Republic of China, 2022*, Annual Report to Congress, 94–98, https://www.defense.gov/Spotlights/2022-China-Military-Power-Report/; Defense Intelligence Agency, *Nuclear Challenges: The Growing Capabilities of Strategic Competitors and Regional Rivals*, 2024, IX, https://www.dia.mil/Portals/110/Images/News/Military_Powers_Publications/Nuclear-Challenges-2024.pdf.
2. Madelyn R. Creedon et al., *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States*, Congressional Commission on the Strategic Posture of the United States, October 2023, https://www.armed-services.senate.gov/imo/media/doc/americas_strategic_posture_the_final_report_of_the_congressional_commission_on_the_strategic_posture_of_the_united_states.pdf; Brad Roberts et al., *China's Emergence as a Second Nuclear Peer: Implications for US Nuclear Deterrence Strategy*, Center for Global Security Research, Lawrence Livermore National Laboratory, Spring 2023, https://cgsr.llnl.gov/content/assets/docs/CGSR_Two_Peer_230314.pdf.
3. Creedon et al., *America's Strategic Posture*, VI.

Implications of the two-nuclear-peer threat for theater conflict

The emerging two-nuclear-peer threat environment poses a difficult challenge to the United States and its allies and partners in Europe and the Indo-Pacific: deterring or defeating simultaneous or sequential two-theater aggression by Russia and China. This two-theater war threat could manifest as a collaborative effort (i.e., Russia and China launch attacks in concert) or as an opportunistic sequence (i.e., one major-power adversary attacks first, and the other exploits the situation by launching aggression only after the United States is fully committed to the initial conflict).

Regarding the potential role of US theater nuclear forces in US, allied, and partner strategy, these scenarios pose two dire threats to the ability of the United States and its allies and partners to deter or defeat such aggression. The first is the threat of adversary limited nuclear escalation, which could either lead to war termination on the adversary's terms or escalate into a large-scale nuclear war with existential consequences if not addressed effectively. The second is the risk of US, allied, and partner conventional defeat in one or both theaters due to an inability to fight and win two major-power conventional wars simultaneously.

Adversary limited nuclear escalation

Why might an adversary resort to the limited first use of nuclear weapons in a theater conflict with the United States and its allies and partners?

Russian strategy and doctrine are rooted in the belief that limited nuclear use in a theater conflict is unlikely to result in uncontrolled escalation to a large-scale homeland-to-homeland nuclear exchange. While the extent of Russian leaders' confidence in this belief remains unclear, their strategy and doctrine explicitly call for limited nuclear escalation, if necessary, to achieve two potential objectives:

1. Coerce war termination on terms acceptable to Russia if it is losing a conventional war or
2. Defeat superior adversary conventional forces if coercion fails.

The latter objective drives Russia's perceived force requirement for a very large theater nuclear force embedded throughout Moscow's conventional forces.

Chinese strategy and doctrine regarding the role of limited nuclear escalation remain profoundly uncertain. China has not been transparent about either the need for or the purpose of its large-scale nuclear buildup. However, the nature and scale of this buildup likely indicates an ongoing change in Chinese nuclear strategy, as US nuclear force modernization plans have not significantly increased the threat to China or its existing nuclear deterrent in any significant way. It is possible that China plans to abandon its declared "no first use" policy (likely covertly) and adopt a strategy similar to Russia's, envisioning both coercive use and limited warfighting to avoid defeat or secure victory.

The nature of North Korean—and possibly Iranian—nuclear strategy remains similarly unclear. However, either could see the potential for limited nuclear first use as a means of staving off existential threats from the United States and its allies and partners during an escalating conventional war. While North Korea has issued a series of nuclear declaratory policy statements, any North Korean threat to use nuclear weapons to win a protracted conventional conflict would fly in the face of US declaratory policy, which states that the North Korean regime would not survive the US response to any level of North Korean nuclear use.

Given the potential for adversary limited nuclear use in the future, what will it take for the United States and its allies and partners to deter such escalation if possible and to defeat it if necessary?

The core requirement for deterring adversary limited nuclear escalation in a two-peer environment is a credible Flexible Response strategy. Such a strategy must convince adversary leadership that limited nuclear escalation does not provide effective insurance against misjudging US, allied, and partner resolve and cohesion. It must also demonstrate that limited nuclear use will not result in war termination on the adversary's terms and that it entails a significant risk of uncontrolled escalation. This risk arises because the United States and its allies and partners are visibly prepared for what Thomas C. Schelling described as a "competition in risk-taking" to defend their vital interests.[4]

Such a strategy must be enabled by US, allied, and partner nuclear and conventional forces that can accomplish three key objectives:

1. Provide a robust range of response options to restore deterrence by convincing adversary leadership that it has miscalculated in a dire way, that further nuclear weapon use will not achieve its objectives, and that it will incur costs that far exceed any potential benefits

4. Thomas C. Schelling, *Arms and Influence* (New Haven: Yale University Press, 1966), 94.

2. Counter the military impact of adversary limited nuclear use
3. Continue to operate effectively to achieve US, allied, and partner objectives in a limited nuclear use environment

In sum, US, allied, and partner strategy and capabilities must convince potential adversaries that nuclear escalation is always their worst option.

Deterring and countering adversary limited nuclear use must be a critical linchpin of US nuclear strategy in the impending two-peer environment. Deterring limited nuclear use contributes to deterring conventional aggression and prevents escalation to limited and unlimited nuclear war. Countering limited use has the potential to restore deterrence (thus preventing further escalation) and ensures that the United States and its allies and partners can achieve their defensive war aims despite adversary escalation.

As argued in more detail below, deterring and countering adversary limited nuclear escalation requires theater nuclear forces with a clear set of specific attributes in both theaters. However, current US theater nuclear forces do not have this set of attributes and are deployed only in Europe. There is an urgent imperative to rectify this shortcoming.

Compensating for conventional inferiority

The second key threat posed by the two-peer threat environment is the possibility that US, allied, and partner conventional forces may be unable to fight and win two major-power conflicts simultaneously. The Strategic Posture Commission noted that the current US defense strategy "reflects a 'one major war' sizing construct" that is "sufficient to deter opportunistic or collaborative two-theater aggression today, but will fall short in the 2027-2035 timeframe."[5] In perhaps one of its least noticed recommendations, the commission found that:

> "The objectives of U.S. strategy must include effective deterrence and defeat of simultaneous Russian and Chinese aggression in Europe and Asia using conventional forces. If the United States and its allies and partners do not field sufficient conventional forces to achieve this objective, U.S. strategy would need to be altered to increase reliance on nuclear weapons to deter or counter opportunistic or collaborative aggression in the other theater."[6]

Maintaining conventional superiority over both major-power adversaries simultaneously would obviously be preferable to increasing reliance on nuclear weapons. However, achieving this is likely to be very expensive, requiring the United States, its allies, and partners to significantly increase and optimize their defense spending. It is far from certain that such a decision will be made and implemented.

If the United States decides instead to increase reliance on nuclear weapons to compensate for potential conventional inferiority in a second major theater war, the resulting nuclear mission would be far more demanding than merely deterring or countering adversary limited nuclear escalation—already a formidable challenge. The United States would need to make it clear that it was willing to initiate nuclear weapons use to defeat adversary conventional aggression and would have to field the theater nuclear forces necessary to make such a threat credible. Such a force would require significantly more theater weapons and additional delivery options to hold at risk the full range of adversary conventional forces needed to ensure their defeat with confidence. This shift would represent a dramatic change, as compensating for US, allied, and partner conventional inferiority ceased to be an element of US nuclear strategy at the end of the Cold War. At that time, the United States unilaterally eliminated almost all of its theater nuclear forces.

The challenge of compensating for conventional inferiority is more difficult in Europe than in Asia, largely due to Russia's large existing advantage in theater nuclear forces. It might be possible to ensure conventional superiority in Europe if it is the second theater of war while relying on nuclear weapons to counter Chinese conventional superiority in a second theater conflict in Asia. Achieving this, however, will require a politically sensitive conversation within NATO about how to optimize the Alliance's conventional warfighting capability if the United States is initially engaged in a major conflict in Asia.

5. Creedon et al., *America's Strategic Posture*, 28.
6. Creedon et al., *America's Strategic Posture*, viii.

Why current US theater and strategic nuclear forces are insufficient

Theater forces

The current US theater-range nuclear force consists solely of DCA equipped with B61-12 gravity bombs, which are deployed in Europe but not in Asia. This US theater force is augmented by DCA flown by other NATO allies, which are also capable of delivering US B61-12 bombs under a "nuclear sharing" arrangement within the Alliance.

While nuclear-armed DCA are useful for deterring and countering Russian limited nuclear use in Europe, they lack key attributes necessary for US theater nuclear forces to perform these missions effectively in the emerging two-peer threat environment.

Survivability

US DCA currently operate from a relatively small number of fixed, known locations, making them highly vulnerable to a Russian preemptive strike. However, if NATO were to adopt and exercise an effective DCA dispersal concept, this lack of survivability could be mitigated, provided the DCA are dispersed early in a crisis or conflict.

Penetration of adversary defenses

The B61-12 is a gravity bomb that must be released in close proximity to its target. This lack of significant stand-off delivery capability reduces the survivability of the aircraft during a strike. However, the introduction of the nuclear-capable F-35 and the B61-12 represents an improvement over previous aircraft-weapon combinations in this regard.[7] Ensuring the penetration of even an F-35 DCA strike would likely require large packages of supporting aircraft, potentially limiting the scale of the theater response and affecting ongoing conventional operations.

Target coverage

DCA have a limited range compared to some other possible theater nuclear delivery options (e.g., intermediate-range cruise missiles and ballistic missiles), which restricts their target coverage and may render them incapable of holding at risk targets essential to deterrence or warfighting. This limitation would be particularly problematic if current DCA forces were deployed to Asia, as there are few bases within useful range of relevant targets, and those bases would be highly vulnerable to preemptive Chinese attack. While the range of DCA can be extended through aerial refueling, such refueling must occur outside the range of enemy air defenses. Additionally, the limited range of DCA can further reduce their penetrability by restricting their ability to avoid defenses through creative route planning.

Presence in theater

The US DCA deployed forward in Europe maintain a continuous presence in that theater of operations. That presence, along with the presence of European NATO DCA, reassures allies and enhances deterrence by clearly demonstrating to NATO allies and Russia alike that the US extended nuclear deterrence commitment is physically manifest in Europe. However, there are no US DCA forces deployed in the Indo-Pacific theater, meaning there are no US theater nuclear forces present there. While the last several US Nuclear Posture Reviews

A US F-35 fighter jet dropping an inert B61-12 gravity bomb in a test of the device, December 2021.

Credit: Los Alamos National Laboratory.

7. See acknowledgments section

have stated that the United States has the ability to deploy its Europe-based DCA and their B61-12s to the Indo-Pacific, no exercises have demonstrated this capability. Transferring US DCA and their weapons from Europe to Asia during a crisis or conflict with China or North Korea would reduce their presence in Europe, potentially undermining deterrence of Russian opportunistic aggression.

Current US theater nuclear forces are also insufficient for the mission of compensating for conventional inferiority, should the United States determine that this mission is necessary in the emerging two-peer threat environment. Compensating for conventional inferiority almost certainly requires more weapons than are currently deployed forward in support of US and NATO DCA units, as well as a wider variety of delivery systems to ensure the capability to strike a broader range of conventional force targets promptly during a rapidly evolving theater conflict. This mission also likely requires some degree of delegation of nuclear use authority from the US president to military commanders in the theater and a nuclear command, control, and communications system capable of enabling such a command concept.

Strategic forces

Opponents of augmenting US theater nuclear forces to address the two-peer threat often argue that the existing capabilities of the strategic nuclear triad—comprising ICBMs, submarine-launched ballistic missiles (SLBMs), and bomber aircraft—provide the president with sufficient nuclear response options to deter and respond to adversary limited nuclear use in theater.[8] However, due to significant limitations in the flexibility and timeliness of US strategic nuclear forces, they are insufficient to convincingly demonstrate to a major-power adversary that the United States is fully prepared to counter limited nuclear first use with militarily effective nuclear responses.

The ICBM leg

The US ICBM force has four limiting factors that make it an undesirable candidate for a limited response to an adversary's limited first use in a theater conflict.

First, ICBM warheads do not provide a low-yield option. All four hundred warheads currently deployed on the ICBM force are reported to be in the multi-hundred-kiloton range.[9] This lack of a low-yield option severely limits the utility of the ICBM force in this role.

Second, the launch of an ICBM provides adversaries that have infrared launch-detection systems in space (i.e., Russia and China) with immediate warning that the United States has launched an intercontinental-range, high-yield ballistic missile. Such a strategic ballistic missile launch signature carries some risk of being misinterpreted as the beginning of a large-scale US attack on an adversary's own strategic nuclear forces, forces which are or will soon be postured for launch under attack. While it is unlikely that an adversary would mistake a single launch for a large-scale attack, this remains a less-than-desirable attribute for limited responses.

Third, ICBMs launched at China, North Korea, or Iran would all have to overfly Russian territory to reach their targets, increasing the potential for Russia to misinterpret those ICBMs as an attack on its own forces. Although this scenario is unlikely, the overflight issue remains another undesirable attribute for limited responses.

Fourth, the use of ICBMs in limited responses reduces the number of ICBM weapons available for large-scale use if the conflict escalates. This reduction could impact the effectiveness of US large-scale strike options.

The submarine leg

The submarine leg of the strategic triad also suffers from three limiting factors that constrain its ability to render theater nuclear force augmentation unnecessary.

First, unlike the ICBM force, the SLBM force does provide a limited number of low-yield strike options due to the deployment of the W76-2 low-yield SLBM warhead. The W76-2 was deployed to provide a near-term solution to the lack of diverse theater nuclear options identified in the 2018 Nuclear Posture Review.[10] However, it was primarily seen as a bridge to an augmented theater nuclear force that would include a nuclear-armed SLCM-N based on US attack submarines. The relatively small number of W76-2 warheads produced limits this option's utility.

Second, SLBMs produce a strategic ballistic missile launch signature, just like ICBMs.

8. Daryl G. Kimball, "Does the United States Need More Nuclear Weapons?" Arms Control Association, July/August 2024, https://www.armscontrol.org/act/2024-07/features/does-united-states-need-more-nuclear-weapons; Caroline Russell, "NTI's Lynn Rusten on the Costly and Potentially Destabilizing Recommendations in the 2023 Strategic Posture Commission Report," Nuclear Threat Initiative, November 20, 2023, https://www.nti.org/atomic-pulse/ntis-lynn-rusten-on-the-costly-and-potentially-destabilizing-recommendations-in-the-2023-strategic-posture-commission-report/.
9. Hans M. Kristensen et al., "United States Nuclear Weapons, 2024," *Bulletin of the Atomic Scientists,* May 7, 2024, https://thebulletin.org/premium/2024-05/united-states-nuclear-weapons-2024/.
10. John Rood, "Statement on the Fielding of the W76-2 Low-Yield Submarine Launched Ballistic Missile Warhead," US Department of Defense, February 4, 2020, https://www.defense.gov/News/Releases/Release/Article/2073532/statement-on-the-fielding-of-the-w76-2-low-yield-submarine-launched-ballistic-m/.

Screenshot of a National Nuclear Security Administration (NNSA) video showing the casing of an older W76-1 warhead, 2019. The first W76-2 warheads were introduced in 2019.

Credit: NNSA.

Third, as with ICBMs, the use of SLBM weapons in limited responses would reduce the number of SLBM weapons available for large-scale use if the conflict escalates, potentially impacting the effectiveness of those large-scale options.

The bomber leg

The most frequently cited strategic nuclear force response option by opponents of theater nuclear force augmentation is the use of strategic bombers delivering low-yield weapons, either stand-off nuclear-armed cruise missiles or the B61-12 gravity bomb. However, the bomber leg has four limiting factors of concern.

First, the generation of elements of the bomber force is likely observable and takes significant time. Of course, these factors are not a concern if force generation is intended as a deterrent signal and if the bomber force is generated well in advance of when it might be needed. A greater operational concern, if the bomber force is based in the continental United States, is the lengthy flight times required to strike targets in Europe or Asia. These flight times might preclude responses from being conducted on operationally relevant timelines, potentially resulting in mission failure.

The bomber leg's flight time issue can be addressed by forward deploying nuclear-armed bombers into a theater during a crisis or conflict. However, forward-deployed bombers are far less survivable than bombers based in the continental United States, making them a potentially less effective deterrent. Finally, the theater employment of strategic bomber weapons reduces the number of weapons available for strategic missions. However, the fact that surviving bombers can be rapidly reloaded mitigates this limiting factor, provided there are sufficient bomber-delivered weapons in the deployed force.

Required attributes of future US theater nuclear forces

Given the limitations of current US theater and strategic nuclear forces, what are the optimal attributes of an augmented US theater nuclear force to address the problems posed by the two-peer threat? The two studies highlighted at the outset of this paper addressed this question.

The Strategic Posture Commission made the following recommendation:

- "Develop and deploy theater nuclear delivery systems that have some or all of the following attributes:
    - Forward-deployed or deployable in the European and Asia-Pacific theaters;
    - Survivable against preemptive attack without force generation day-to-day;
    - A range of explosive yield options, including low yield;
    - Capable of penetrating advanced [Integrated Air and Missile Defenses] with high confidence; and
    - Operationally relevant weapon delivery timelines (promptness)"[11]

And the two-peer study by the Center for Global Security Research made this recommendation:

> "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)."[12]

These recommendations are both sound and similar. However, for the purpose of examining a set of specific alternative theater nuclear systems to augment US theater nuclear capability, they lack sufficient operational detail. Accordingly, this paper builds on these recommendations by developing a more detailed set of attributes for the future US theater nuclear force, along with a brief explanation of the necessity of each attribute. Note that the attributes are not listed in priority order, as all are essential.

Survivable without lengthy force generation (hours, not days)

A theater nuclear force that is not survivable is not a credible deterrent to adversary limited nuclear escalation. As noted above, unless US and NATO DCA forces in Europe are able to disperse effectively, they risk inviting a preemptive attack. However, for future US theater nuclear forces to achieve survivability, they must be able to do so without lengthy force generation, as that too could invite a preemptive attack in a crisis or conflict. Continuous survivability, as provided by submerged submarines, is preferable to dependence on force generation in theater. Finally, rapid force-generation capability enables the president to calibrate force-generation signaling without incurring undue risk.

Forward deployed continuously in both Europe and Asia

Continuous theater nuclear force presence in both Europe and Asia provides several advantages over nuclear force options that deploy only during a crisis or conflict. First, continuous presence assures allies and partners in a way that deployable forces cannot. This can be seen in repeated South Korean calls for a return of US nuclear weapons to the Korean peninsula, and widespread allied support of SLCM-Ns deployed on forward-deployed attack submarines. Second, it ensures immediate force availability without requiring a deployment decision or potentially undesirable signaling. Immediate availability is particularly important if the United States compensates for conventional inferiority with theater nuclear forces, as those forces must be readily available to deter or defeat adversary aggression. Third, a force designed to maintain continuous theater nuclear presence in both theaters will drive sufficient force sizing to address the two-peer threat.

11. Creedon et al., *America's Strategic Posture*, 49.
12. Roberts et al., China's Emergence as a Second Nuclear Peer, 48.

Warheads with a range of explosive yields and multiple fusing options

Theater nuclear weapons with multiple explosive yield and fusing options expand the range of choices available to the president that are both militarily effective (e.g., striking large-area military targets or hard and deeply buried targets) and able to limit collateral damage. These options enable more effective strikes and improve the ability to limit collateral damage. Both effects enhance deterrence and ensure that US theater nuclear forces can achieve US objectives if deterrence fails.

Deliverable on operationally relevant timelines

The time it takes to deliver a US nuclear strike from the moment it is directed can determine whether that strike achieves its objective. An "operationally relevant delivery timeline" ensures that the strike occurs quickly enough to achieve the designated objective. What is "operationally relevant" depends on the nature of the objective itself. For example, if the objective of a US theater strike is to restore deterrence following an adversary's limited first use by convincing them they have miscalculated, how long will the adversary wait before concluding their initial limited nuclear use was insufficient to coerce the United States, leading them to strike again? A few hours? Ten to twelve hours? Days? The answer is that Washington does not know. However, the more rapidly the US response is delivered, the less likely the adversary is to act again. Targeting adversary mobile or relocatable forces in a dynamic theater conflict also requires more prompt delivery timelines to be operationally relevant. Additionally, more rapid response timelines provide the president with more decision time.

Highly likely to penetrate adversary defenses even in very limited strikes

Deterrent and warfighting effectiveness requires weapon systems capable of penetrating adversary air and missile defenses with high confidence. Limited strikes—the most likely option for US theater nuclear forces—set a higher bar for high-confidence penetration for two reasons. First, one means of defeating defenses is to overwhelm them with large salvos of incoming weapons. Second, limited theater nuclear responses must be highly effective to achieve their objectives, as failing to strike one or more targets in a limited response is far more consequential than in large-scale strikes.

Many factors contribute to the penetrability of nuclear strike options, but an often-overlooked attribute is the range of maneuverable delivery systems, like aircraft and cruise missiles, which can leverage long-range capability to evade adversary defenses.

Effective against the full range of likely targets necessary to enable US strategy

Deterrence requires the ability to hold at risk those things the adversary values highly and those things that will deny the adversary its objectives. Countering limited adversary nuclear use requires the capability to destroy military targets that could have a decisive impact on the outcome of an ongoing theater conflict. Thus, there is a clear overlap—a Venn diagram of what is necessary to deter and what is necessary to counter limited adversary use in theater.

The capability to hold this overlapping set of targets at risk depends on multiple factors, some of which are addressed by other attributes on this list (i.e., explosive yield and fusing, delivery on operationally relevant timelines, penetrability). US theater nuclear forces must have sufficient range to cover these targets. Additionally, these forces must create weapons effects capable of achieving US objectives, such as lethality against hard and deeply buried targets.

If the United States opts to compensate for conventional inferiority with nuclear weapons in a second theater, additional capabilities might be required—such as the ability to strike moving targets, including underway naval vessels. This mission might also necessitate some delegation of nuclear-use authority to commanders at the operational level to enable operationally relevant delivery timelines.

Ability to enhance the nation's technical hedge capability and contribute to meeting increased strategic nuclear targeting requirements

In the two-nuclear-peer threat environment, the United States will likely need to expand the size of its strategic nuclear forces to deter or achieve presidential objectives against Russia and China simultaneously. This expansion is expected to be achieved, at least in part, by uploading the ICBM and SLBM forces. However, such uploading will reduce the ability to hedge against a technical failure in a strategic warhead design or delivery system by deploying weapons initially intended as a hedge against technical failure.

Theater nuclear forces could help mitigate this problem by covering a portion of the strategic target sets with theater forces. However, a theater system can only hedge effectively against a technical problem in the strategic force if it provides an effective second-strike capability against a significant portion of strategic targets and can be readily commanded and controlled in concert with strategic nuclear strikes.

Theater nuclear forces can also help address the challenges posed by the two-nuclear-peer threat to the US strategic nuclear force. Some theater system options offer a less expensive means of increasing the number of deployed weapons needed to hold strategic targets at risk against two peer adversaries simultaneously. Consequently, a sufficiently sized US theater nuclear force can mitigate key elements of the impact on strategic nuclear force requirements driven by the need to counter two peer adversaries at once.

Examining alternative theater nuclear system options

Having identified seven key attributes needed in the future US theater nuclear force, an examination of how well alternative theater nuclear system options provide those attributes is now possible. What follows is an assessment of the following six alternative theater system options:[13]

1. DCA with the B61-12 gravity bomb
2. DCA with a nuclear-armed standoff missile
3. SLCM-Ns deployed on SSNs
4. SLCM-Ns deployed on surface ships
5. GLCM-Ns on road-mobile launchers
6. GLBM-Ns with alternative reentry vehicles

DCA with the B61-12 gravity bomb

Survivable (pre-launch)

If operated from current fixed, known locations in NATO Europe, the DCA force is vulnerable to preemptive attack and, therefore, insufficiently survivable. If and when the United States and NATO DCA nations implement an effective dispersal concept of operations, this force would become significantly more survivable. Dispersal for survivability also provides an additional deterrent signaling option. However, the requirement to disperse DCA to enhance their survivability could send a potentially undesirable signal during a crisis or conflict.

Continuous forward deployment in Europe and Asia

The current US DCA force is continuously deployed forward in Europe but not in Asia. Deploying that force from Europe to Asia during a crisis or conflict would weaken deterrence against opportunistic aggression in Europe. Thus, the current force structure and posture are inadequate to meet the requirements of a two-peer threat environment. If the United States were to field additional nuclear-armed DCA units and deploy them forward to Asia, this option would provide this attribute.

Range of explosive yields and fusing options

The B61-12 effectively provides this attribute.

Deliverable on operationally relevant timelines

The DCA force is capable of delivering on operationally relevant timelines to any target it can reach, assuming the force has achieved sufficient readiness before the order to strike is given.

Highly likely to penetrate adversary defenses

DCA armed with gravity bombs do not optimally provide this attribute. Gravity bomb delivery requires flying in close proximity to the target, reducing the probability that this system will penetrate with high confidence under all conditions. That probability depends on a wide range of factors, including how deep the target is in enemy-occupied territory, the operating condition of adversary air defenses at the time of the strike, the availability and effectiveness of air defense suppression assets accompanying the strike aircraft, and the radar cross-section of the delivering aircraft.

Effective against full range of likely targets

The limited range of DCA aircraft creates a target coverage issue that prevents this option from holding the full range of likely targets at risk in both theaters. However, DCA range limitations are more detrimental in Asia than in Europe due to a lack of survivable basing options close to the Chinese mainland. This is not an issue with providing target coverage of North Korea.

Ability to enhance technical hedge, contribute to strategic targeting requirements

Target coverage shortfalls, due to limited range and current force size, render this option ineffective as a hedge against a technical failure in the US strategic force or as an augmentation of strategic force capacity to address the two-peer threat.

Bottom line

DCA armed with the B61-12 do not fully provide five of the seven key attributes needed for the US theater nuclear force in the two-peer threat environment. Implementing an effective dispersal concept of operations and increasing the readiness of NATO DCA forces would mitigate two of the five shortfalls.

DCA with a nuclear-armed standoff missile

Survivable (pre-launch)

This option has the same pre-launch survivability as DCA with the B61-12.

Continuous forward deployment in Europe and Asia

This option has the same deployment limitations as DCA with the B61-12.

13. There are other theater nuclear systems the United States deployed during the Cold War that one could consider (e.g., nuclear artillery, torpedoes, antisubmarine rockets, etc.), but in my view, they lack too many of the attributes I've identified to merit a more detailed examination.

Range of explosive yields and fusing options

Same as DCA with the B61-12.

Deliverable on operationally relevant timelines

Same as DCA with the B61-12.

Highly likely to penetrate adversary defenses

The addition of some form of standoff missile to the DCA force would significantly enhance its ability to penetrate adversary defenses with high confidence. The extent of this improvement depends on several factors, including the range and speed of the standoff missile (the longer and faster, the better), the radar cross-section of the standoff missile (the lower, the better), and whether the missile can be carried internally by F-35 aircraft (thus reducing the radar cross-section of the F-35 itself, enabling it to fly closer, or farther into, adversary defenses before launch). Air-launched ballistic or hypersonic missiles would offer even better penetrability than air-launched cruise missiles, which are already highly effective.

Effective against full range of likely targets

DCA with standoff missiles will face the same range limitations as DCA with the B61-12 unless the missile's range significantly augments the aircraft's range. While this option can provide some improvement, shortfalls in target coverage are likely to persist.

Ability to enhance technical hedge, contribute to strategic targeting requirements

This limitation is the same as DCA with the B61-12 unless the standoff missile's range is sufficient to significantly improve target coverage of the Russian or Chinese homelands.

Bottom line

The existing US DCA force could be improved by adding a standoff missile capability and implementing an effective dispersal concept of operations. However, range limitations are still likely to prevent this option from fulfilling two of the seven attributes.

SLCM-Ns deployed on SSNs

Survivable

If routinely deployed onboard SSNs at sea, this option would provide a theater nuclear capability that is survivable day-to-day without force generation.

Continuous forward deployment in Europe and Asia

If routinely deployed onboard SSNs at sea, this option provides a theater nuclear capability that is continuously forward deployed in both theaters without force generation.

Range of explosive yields and fusing options

With the proper warhead selection, SLCM-Ns on SSNs effectively provide this attribute.

Deliverable on operationally relevant timelines

SLCM-Ns on SSNs effectively provide this attribute if forward deployed at sea.

Highly likely to penetrate adversary defenses

SLCM-Ns on SSNs effectively provide this attribute, in part due to their ability to be launched from inside the outer edges of an adversary's air defenses.

Effective against full range of likely targets

SLCM-Ns on SSNs effectively provide this attribute.

Ability to enhance technical hedge, contribute to strategic targeting requirements

SLCM-Ns on SSNs effectively provide this attribute if acquired in sufficient quantity.

Bottom line

SLCM-Ns deployed on SSNs provide all seven attributes needed for US theater nuclear forces in the two-peer threat environment, provided they are routinely deployed aboard SSNs at sea in both theaters in significant numbers.

An AGM-158 Joint Air-to-Surface nuclear capable standoff missile in flight, December 2010.

Credit: US Air Force.

SLCM-Ns deployed on surface ships

Survivable (pre-launch)

This deployment mode would be less survivable than the SLCM-N on SSN option due to the higher detectability of surface ships. However, the larger number of potential launch platforms could help mitigate this to some extent.

Continuous forward deployment in Europe and Asia

SLCM-Ns on surface ships would effectively provide this attribute.

Range of explosive yields and fusing options

With the proper warhead selection, SLCM-Ns on surface ships would effectively provide this attribute.

Deliverable on operationally relevant timelines

SLCM-Ns on surface ships would effectively provide this attribute if forward deployed at sea.

Highly likely to penetrate adversary defenses

Under certain circumstances, SLCM-Ns on surface ships could be less effective at penetrating adversary air defenses due to survivability concerns if the missile attempts to launch from inside the outer layers of adversary defenses.

Effective against full range of likely targets

SLCM-Ns on surface ships would provide less target coverage than SLCM-Ns on SSNs if unable to launch from locations close to the adversary's shoreline due to survivability concerns.

Ability to enhance technical hedge, contribute to strategic targeting requirements

This deployment option would have less capability than SLCM-Ns on SSNs in providing a technical hedge and contributing to strategic targeting requirements, primarily due to lower survivability and likely reduced strategic target coverage caused by range limitations stemming from survivability concerns.

Bottom line

The surface ship SLCM-N option would provide all seven attributes but less effectively than SLCM-Ns on SSNs for three of the seven.

GLCM-Ns on road-mobile launchers

Survivable (pre-launch)

Road-mobile GLCM-Ns would be highly survivable once effectively dispersed and concealed. Like DCA, dispersal provides an additional deterrent signaling option; however, the fact that these systems must be dispersed to enhance their survivability requires a potentially undesirable signal in a crisis or conflict. If the United States were to deploy a GLCM-N based on the conventional GLCM currently being acquired by the Army and Marine Corps, its survivability could be enhanced by embedding it within a significantly larger force.

Continuous forward deployment in Europe and Asia

Assuming US allies accept continuous deployment of GLCM-Ns on their territory, this option effectively provides this attribute. GLCM-Ns could provide a new allied nuclear sharing option.

Range of explosive yields and fusing options

With the proper warhead selection, GLCM-Ns would effectively provide this attribute.

Deliverable on operationally relevant timelines

As long as they are deployed forward continuously, GLCM-Ns would effectively provide this attribute.

Highly likely to penetrate adversary defenses

This quality is comparable to that of the SLCM-N, given the systems' ability to disperse far forward.

Effective against full range of likely targets

GLCM-Ns likely provide better target coverage in Europe than in Asia due to the relative lack of potential basing options close to the Chinese mainland.

A Tomahawk cruise missile launches from the Arleigh Burke-class guided-missile destroyer USS *Shoup* (DDG 86) for a live-fire exercise during Valiant Shield 2018 in the Philippine Sea.

Credit: William Collins III, US Navy.

A DoD flight test of a conventionally configured ground-launched cruise missile at San Nicolas Island, CA, August 2019.

Credit: Scott Howe, US DoD.

Ability to enhance technical hedge, contribute to strategic targeting requirements

GLCM-Ns would be somewhat less effective than SLCM-Ns on SSNs in providing this attribute due to the impact on its range caused by the lack of potential basing options close to the Chinese mainland.

Bottom line

GLCM-Ns would provide all seven attributes in Europe and five of seven in Asia.

GLBM-Ns with alternative reentry vehicles

Survivable (pre-launch)

A GLBM-N system would have the same positive survivability characteristics as a GLCM-N.

Continuous forward deployment in Europe and Asia

A GLBM-N system would have the same positive forward deployment characteristics as a GLCM-N.

Range of explosive yields and fusing options

A GLBM-N system would have the same positive yield characteristics as a GLCM-N.

Deliverable on operationally relevant timelines

Enhanced promptness of delivery over air-breathing systems (e.g., DCA and cruise missiles) expands the scope of adversary targets that a GLBM-N could strike on operationally relevant timelines. The range and firing locations of a GLBM-N will, of course, affect this.

Highly likely to penetrate adversary defenses

A GLBM-N, especially if equipped with maneuvering or hypersonic reentry vehicles, would provide the highest penetrability of any theater nuclear system assessed.

Effective against full range of likely targets

A GLBM-N with alternative reentry vehicles would enhance effectiveness against some targets due to promptness. A GLBM-N could suffer from the same impact on target coverage as a GLCM-N in Asia. However, the potential to develop and field a truly intermediate-range GLBM-N could mitigate this limitation to a degree.

Ability to enhance technical hedge, contribute to strategic targeting requirements

A GLBM-N system would have the same hedging and strategic targeting characteristics as a GLCM-N, with the caveat regarding improved target coverage in Asia of an intermediate-range GLBM-N noted above.

Bottom line

A GLBM-N would provide all seven attributes. The unique delivery attributes of a GLBM-N with alternative reentry vehicles make it a potentially interesting complement to SLCM-Ns on SSNs.

A graphic summary of how well alternative theater nuclear system options provide the seven attributes required for the two-peer threat environment follows:

Table 1. Assessment of Theater Nuclear System Attributes

	Survivable without lengthy generation	Continuous deployment in both theaters	Range of yields and fusing options	Operationally relevant delivery timeline	Highly likely to penetrate defenses in limited strikes	Effective against full range of likely targets	Enhance hedge and strategic targeting
DCA with B61-12	Green if effective dispersal concept and higher readiness	Red today. Yellow to Green if additional unit deployed in Asia.			Yellow due to need for aircraft fly close to target.	Yellow in Europe, Red in Asia due to range limitations	Red due to survavibility, penetrability, and range limitations
DCA with standoff	Green if effective dispersal concept and higher readiness	Red today. Yellow to Green if additional unit deployed in Asia.				Yellow in Europe, Red in Asia due to range limitations	Red due to survivability and range limitations
SLCM-N on SSNs							
SLCM-N on surface ships	Yellow due to vulnerability in A2AD environment					Yellow due to range limits due to survivability concerns	Yellow due to range limits due to survivability concerns
GLCM-N in theater	Assumes effective rapid dispersal concept					Yellow in Asia due to lack of basing options close to China	Yellow in Asia due to lack of basing options close to China
GLBM-N with alternative RVs	Assumes effective rapid dispersal concept						

A graphic summary of how well-planned US strategic forces can provide those seven attributes if used in a theater role is depicted here:

Table 2. Assessment of Strategic System Attributes for Theater Missions

	Survivable without lengthy generation	Continuous deployment in both theaters	Range of yields and fusing options	Operationally relevant delivery timeline	Highly likely to penetrate defenses in limited strikes	Effective against full range of likely targets	Enhance hedge and strategic targeting
ICBM leg							Not applicable
SLBM leg		Unclear if allies perceive SSBNs at sea as continuous presence				Limited number of low yield warheads available	Not applicable
Bomber leg		Only if deployed continuously forward, further reducing survivability		Only if deployed forward, further reducing survivability			Assumes Acquisition of Many More LRSO, Some Additional B21s

Conclusion: A recommended US theater nuclear force structure and posture

Based on an examination of how well alternative theater nuclear system options provide the seven attributes necessary to enable an effective Flexible Response strategy in the impending two-nuclear-peer threat environment, the author recommends the following future US theater nuclear force structure and posture.

The United States should field a theater nuclear force that combines an effectively dispersible DCA force in Europe with SLCM-Ns deployed day-to-day on SSNs in both theaters and GLCM-Ns and/or GLBM-Ns continuously deployed in Europe and/or Asia.

Such a force is necessary because the current US theater nuclear posture is inadequate in both theaters. DCA in Europe would provide a real operational military capability ***if*** they are made survivable through effective dispersal and concealment. SLCM-Ns on SSNs fill much of the gap in the current US posture in both theaters, providing all of the attributes needed to enhance deterrence of limited nuclear use, to counter such use if deterrence fails, and augment the technical hedge and strategic nuclear force. GLCM-Ns and/or GLBM-Ns would further complicate Russian and Chinese escalation calculations and military planning while demonstrating the resolve of the United States and its allies to take potentially politically costly action in response to the increased threats they face. However, the United States must carefully evaluate whether pursuing GLCM-N or GLBM-N deployment would ultimately enhance or undermine alliance unity in Europe or Asia.

Fielding these additional forces would likely hasten the enhanced integration of conventional and nuclear theater operations, as the Supreme Headquarters Allied Powers Europe, US European Command, US Indo-Pacific Command, and US Forces Korea would operate and plan improved theater nuclear forces of their own.

Finally, if the United States and its allies and partners choose not to maintain conventional superiority in both theaters simultaneously, additional theater nuclear capabilities are likely to be required to enable a strategy of compensating for conventional inferiority in a second theater with nuclear weapons. The importance of that choice cannot be overstated. As the Strategic Posture Commission noted:

"[D]ismissing the possibility of opportunistic or simultaneous two-peer aggression because it may seem improbable, and not addressing it in U.S. strategy and strategic posture, could have the perverse effect of making such aggression more likely."[14]

That set of potential theater nuclear force requirements and the options to meet them is the subject for further analysis.

14. Creedon et al., *America's Strategic Posture*, 29.

Author biography

Greg Weaver is the principal of Strategy to Plans LLC. Previously, he served as deputy director for strategic stability in the Joint Chiefs of Staff Directorate for Strategic Plans and Policy (J5), where he was the principal policy and strategy adviser to the chairman of the Joint Chiefs of Staff on nuclear, space, cyber, missile defense, and arms control issues. Prior to joining the Joint Staff, Weaver was principal director for nuclear and missile defense policy in the Office of the Under Secretary of Defense for Policy, and the deputy director for policy and plans at US Strategic Command. (Strategy to Plans LLC has a contractual relationship with Lawernce Livermore National Laboratory and Los Alamos National Laboratory, which design and manufacture nuclear warheads.)

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