

NUCLEAR MODERNIZATION AND THE SENTINEL ICBM

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Advocates of disarmament oppose the replacement of the Minuteman III intercontinental ballistic missile with the new Sentinel ballistic missile system. An analysis of US nuclear force structure demonstrates the necessity of modernizing not just the ground-based leg of the US nuclear triad but the submarine and bomber legs as well. In order to successfully deter attacks against US interests, assure Allies and partners, provide options in major conventional or nuclear war crisis management, and support American diplomacy and foreign policy, the United States must exceed the nuclear capabilities and modernization efforts of its adversaries, including modernizing the aging ICBM fleet.

The United States is modernizing the three legs of its nuclear triad of intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and long-range strategic bombers. While triad modernization is broadly supported in the Department of Defense, Congress, and think tanks, the nuclear disarmament community actively opposes replacement of the Minuteman III ICBM force with the new Sentinel ICBM.¹ For many advocates of disarmament, extending Minuteman III and cancelling Sentinel is premised on the idea that a new intercontinental ballistic missile is too costly and the ICBM leg of the triad is unneeded in the twenty-first century.² An examination of the role of ICBM modernization in terms of its implications for nuclear strategy, however, demonstrates that intercontinental ballistic missiles continue to prove a vital and affordable leg of the triad.

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1. See Amy F. Woolf, *U.S. Strategic Nuclear Forces: Background, Developments, and Issues*, RL33640 (Washington, DC: Congressional Research Service (CRS), December 14, 2021), 10–49; and Elisabeth Eaves, “Why Is America Getting a New \$100 Billion Nuclear Weapon?,” *Bulletin of the Atomic Scientists* (February 8, 2021), <https://thebulletin.org/>.

2. Daryl G. Kimball, “Enough Already, No New ICBM,” *Arms Control Today* (March 2021), <https://www.armscontrol.org/>.

US Strategic Nuclear Forces under New START

The New START treaty of 2010 was set to expire in 2021 unless the United States and Russia agreed to extend it for an additional five years. US President Joseph Biden and Russian President Vladimir Putin agreed to the extension in early 2021 ahead of the February expiration deadline.³ New START-compliant (American) operationally deployed strategic nuclear weapons include 400 ICBMs with one warhead each; 14 fleet ballistic missile submarines (SSBNs) each with 20 SLBM launchers that vary in the number of warheads on each missile; and 60 long-range nuclear bombers that count as one weapon each.⁴ Under the terms of the treaty, the total number of operationally deployed strategic nuclear weapons cannot exceed 1,550.

Prior to the Biden administration's extension of New START, the Trump administration was skeptical of the treaty's renewal.⁵ Some Trump administration officials wanted to demand stricter measures of compliance from Russia with various aspects of the existing agreement. Others wanted to extend the agreement to include nonstrategic nuclear forces.⁶ Russian and American conversations on nuclear arms control had deteriorated badly by 2020, partly as a result of the generally poisoned political atmosphere between the two states. The United States accused Russia of cheating on the Intermediate Nuclear Forces treaty, which led to a decision by the administration to withdraw from the treaty, leaving New START as the sole surviving nuclear arms control agreement between Washington and Moscow.⁷

Putin's agenda for modernizing Russia's strategic nuclear forces includes plans to develop and/or deploy hypersonic weapons, nuclear-powered and nuclear-armed underwater vehicles, and nuclear-powered and nuclear-armed cruise missiles, creating additional concerns about the durability of New START or a successor agreement the Biden administration may seek prior to the 2026 termination of the treaty.⁸

American plans for modernizing the strategic nuclear triad include a new generation of Columbia-class SSBNs with life-extended Trident II D5 missiles; a new, long-

3. Antony J. Blinken, "On the Extension of the New START Treaty with the Russian Federation," US Department of State, February 3, 2021, <https://www.state.gov/>.

4. Hans M. Kristensen, "First New START Data After Extension Shows Compliance," Strategic Security (blog), Federation of American Scientists (FAS), April 6, 2021, <https://fas.org/blogs/>.

5. Jack Desch and Robbie Gramer, "Trump Moves Closer to Renewing Nuclear Treaty With Russia," *Foreign Policy* (October 2020), <https://foreignpolicy.com/>.

6. Daryl G. Kimball, "Trump's Aim to Go Big on Nuclear Arms Control Should Begin by Extending New START," Just Security, December 9, 2019, <https://www.justsecurity.org/>.

7. Steven Pifer, "The Death of the INF Treaty Has Given Birth to New Missile Possibilities," *National Interest*, September 18, 2019, <https://nationalinterest.org/>.

8. See *To Receive Testimony on United States Strategic Command and United States Space Command in Review of the Defense Authorization Request for Fiscal Year 2022 and the Future Years Defense Program, Hearing before the United States Senate Committee on Armed Services*, 117th Cong. (April 20, 2021) (statement of Charles A. Richard, commander of United States Strategic Command); Vladimir Putin, Presidential Address to the Federal Assembly, March 1, 2018; and Ministry of Foreign Affairs of Russia, Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence, June 8, 2020.

range nuclear bomber (B-21); and the long-range standoff cruise missile, which will replace the current air-launched cruise missile deployed on strategic bombers.⁹ The venerable B-52 will continue to undergo upgrades as it remains in service to deliver the long-range standoff cruise missile to targets.

The ground-based strategic deterrent is regarded by the US Air Force and US Strategic Command as a necessary replacement for an aging Minuteman III force that is approaching five decades of service. Air Force analysis contends additional life extension for the Minuteman III is more expensive than recapitalization and less able to respond to emerging technical challenges and threats.

In early 2021, the commander of US Strategic Command, Admiral Charles Richard, described the issue by saying, “Let me be very clear: You cannot life-extend Minuteman III, alright? It is getting past the point of it’s not cost effective to life-extend Minuteman III. You’re quickly getting to the point [where] you can’t do it at all.” He added, “That thing is so old, in some cases, the drawings don’t exist anymore, or where we have drawings, they’re like six generations behind the industry standard.”¹⁰

Former commander of Air Force Global Strike Command, General Timothy Ray, offered a similar view. “There’s no margin left. . . . We’re just going to run out of time.” Ray went further in his discussion of threats and suggested that “the complexity of threats” makes a more capable ICBM a requirement.¹¹ Given adversary advances in conventional and nuclear ballistic missile defenses, the Minuteman III is at risk of failing to hit targets without the penetration aids that are expected with Sentinel. Scheduled for introduction in 2028 and fully operational by 2036, Sentinel will possess a number of capabilities that allow reentry vehicles to reach targets in the face of improved Russian and Chinese air defense networks and ballistic missile defense systems.¹²

Outside of government, some analysts support Minuteman upgrades, and still others argue for the elimination of the entire land-based strategic missile force.¹³ To the contrary, a modern ICBM is required to match Russian and Chinese ICBM modernization efforts (symmetry matters in deterrence); to hold adversary targets at risk in the face of improved defenses; and to ensure defeating the US nuclear arsenal requires a large-scale nuclear attack on the American homeland.

9. See Dennis Evans and Jonathan Schwalbe, *The Long-Range Standoff Cruise Missile and Its Role in Future Nuclear Forces* (Baltimore: Johns Hopkins Applied Physics Laboratory, 2017), <https://www.jhuapl.edu/>.

10. Brian W. Everstine, “STRATCOM Welcomes Nuke Review, but Says Minuteman III Life Extension Should Not Be Considered,” *Air Force Magazine* (January 5, 2021), <https://www.airforcemag.com/>.

11. John A. Tirpack, “New GBSD Will Fly in 2023; No Margin Left for Minuteman,” *Air Force Magazine* (June 14, 2021), <https://www.airforcemag.com/>.

12. Richard, *Armed Services*.

13. See Matthew Kroenig, Mark J. Massa, and Christian Trotti, “The Downsides of Downsizing: Why the United States Needs Four Hundred ICBMs,” Issue Brief (Washington, DC: Atlantic Council, March 29, 2021), <https://www.atlanticcouncil.org/>; and Matt Korda, *Alternatives to the Ground-Based Strategic Deterrent* (Washington, DC: FAS, 2021), <https://fas.org/>.

US Nuclear Strategic Postures

Broadly speaking, the United States has defined its strategic objectives for the use of nuclear forces in a variety of ways during the Cold War and afterward. For over seven decades, American presidents and congressional majorities viewed the purpose of strategic nuclear forces as focused on deterrence, which is the avoidance of war by credible threats to inflict unacceptable retaliatory punishment on any aggressor. But military planners understand that declaratory policy must also have the support of nuclear employment guidance and credible operational capability for nuclear use. Prospective attackers must believe the United States can and will respond to prospective threats if deterrence fails.

Force size is related to the objectives stated in various strategic and nuclear employment policies. Four primary employment policies were advanced by American decisionmakers over the years. First, assured retaliation or assured destruction requires forces to inflict widespread destruction on enemy populations and economic targets.¹⁴ Second, flexible targeting, escalation control, and counterforce equity seek to prevent any opponent from dominating a process of competitive bargaining if an adversary has conventional superiority or following the first use or first strike of nuclear weapons, sometimes referred to as a victory-denial strategy.¹⁵

Third, a policy of counterforce superiority, escalation dominance, and enduring nuclear command, control, and communications seeks to dominate aggressors at any rung of the escalation ladder and, if necessary, to fight a protracted, albeit limited, nuclear war.¹⁶ This option is often called a countervailing or prevailing strategy.¹⁷ (Of note: this article is less interested in nomenclature than in relative levels of military-strategic ambition and capability for deterrent effect.) Finally, a fourth posture would aim at nuclear preeminence or superiority, including all the elements of posture three plus defenses capable of defeating any enemy retaliatory strike.¹⁸

In addition to a decision about nuclear strategy and employment policy, the president, supported by senior uniformed and civilian military leaders, must also take into account the political objectives for which forces are developed and deployed. This begs the question, what are the functions for which nuclear weapons are necessary and/or useful?

14. Fiona S. Cunningham and M. Taylor Fravel, "Assuring Assured Retaliation," *International Security* 40, no. 2 (Fall 2015), <https://direct.mit.edu/>.

15. Francis J. Gavin, "The Myth of Flexible Response: United States Strategy in Europe during the 1960s," *International History Review* 23, no. 4 (December 2001), <https://www.belfercenter.org/>.

16. Keir A. Lieber and Daryl G. Press, "The New Era of Counterforce: Technological Change and the Future of Nuclear Deterrence," *International Security* 41, No. 4 (Spring 2017), <https://direct.mit.edu/>.

17. Louis René Beres, "Tilting Toward Thanatos: America's 'Countervailing' Nuclear Strategy," *World Politics* 34, no. 1 (October 1981), <https://www.jstor.org/>.

18. Matthew Kroenig, *The Logic of American Nuclear Strategy* (Oxford, UK: Oxford University Press, 2018).

First, nuclear weapons support deterrence of attacks on the American homeland, deployed forces, and American interests abroad. Intercontinental ballistic missiles are particularly useful here because they require an adversary to target nearly 450 discreet targets with nuclear weapons.¹⁹ This is no easy task and sets the bar so high for success that adversaries think twice before considering a nuclear strike against the homeland.²⁰ Related, ICBMs help to deter nuclear blackmail or high-end conventional coercion against American interests because they are on alert 24 hours a day, 365 days a year.

Second, nuclear weapons provide assurances to Allies and partners that the United States will support their own efforts to resist nuclear coercion, attack, or large-scale conventional war. The forward deployment of nuclear-capable bombers is often used to signal American resolve, but it is the ICBM force that is used daily to offer assurance to Allies and partners.

Third, nuclear weapons support American crisis management in situations with the potential to escalate into major conventional or nuclear war. Again, the difficulty of destroying the entire ICBM force in one fell swoop gives any adversary pause when it considers moving from crisis to war and nuclear war.²¹ Equally important for crisis management is the fact that ICBMs make it difficult for an adversary to see a clear first-strike advantage—given the alert status of these weapons.

Fourth, and more broadly, nuclear weapons support American diplomacy and foreign policy by conveying a sense of quiet self-confidence. No major international issue related to nuclear weapons can be decided without taking into account American perspectives and interests. It should come as no surprise that the United States regularly launches unarmed Minuteman III intercontinental ballistic missiles from Vandenberg Air Force Base as part of the Air Force's test program.²² In making the world aware of the test launches, the United States is using the ICBM for diplomatic purposes.

The significance of the last point is far from obvious to many observers. Nuclear weapons are often obscured within a small technical community that understands their physics and effects. These weapons are thus detached from their place within the larger context of deterrence and assurance required of American national security policy.

Analysis

Given the preceding discussion, how can we evaluate the prospective components of the American nuclear triad and the contrasting performance of each leg under only

19. Matthew Kroenig, "The Case for the US ICBM Force," *Strategic Studies Quarterly* 12, no. 3 (Fall 2018), <https://www.airuniversity.af.edu/>.

20. Stephen Cimbala and Adam Lowther, "Stable Nuclear Deterrence Requires a Modern Nuclear Arsenal," *Real Clear Defense*, January 7, 2021, <https://www.realcleardefense.com/>.

21. Sean M. Lynn-Jones, Steven E. Miller, and Stephen Van Evera, *Nuclear Diplomacy in Crisis Management* (Cambridge, MA: MIT Press, 1990), 256–82.

22. Glenn S. Robertson, "Mighty Ninety Missileer Participates in GT-239," 90th Missile Wing Public Affairs, F. E. Warren AFB, WY, August 12, 2021, <https://www.warren.af.mil/>.

partly foreseeable circumstances? Toward that end, we conducted an analysis of alternatives for American nuclear force structures for their relative performances in providing surviving and retaliating second-strike warheads against Russian forces—in the event of a Russian counterforce first strike.²³ The formulae used here are derived from a model developed by James Tritten.²⁴

The model calculates the results of expected nuclear force exchanges based on alternative assumptions about the performance of strategic nuclear forces under likely operational conditions. For each force component (land-based strategic forces, sea-based strategic forces, and heavy bombers), investigators assigned expected performance parameters based on publicly available data. Thus, results are based on the latest unclassified data and are admittedly an estimation of performance.

The American nuclear force structures used in this analysis are based on projections from the Congressional Budget Office's *Approaches for Managing the Costs of U.S. Nuclear Forces, 2017 to 2046*. Of course, if Russo-American relations deteriorate in the aftermath of the war in Ukraine and arms control regimes falter, these assumptions may need revision in the event of a breakout, which will most likely occur on the Russian side.

The research team ran the model with four nuclear force structures: the current nuclear triad; a dyad with submarines and bombers; a dyad with ICBMs and SLBMs; and a reduced triad with 300 ICBMs, 10 SSBNs, and 60 bombers. The results suggest every American force structure provides enough surviving and retaliating weapons to accomplish the assured retaliation and flexible targeting missions (essentially the requirements of postures one and two above).

Escalation control is uncertain because an adversary's actions can never be predicted with great certainty. The high level of uncertainty also makes escalation dominance for either state difficult to assume. Superficially, it appears that the dyad of American SLBM and bomber-delivered weapons provides for larger numbers of retaliating warheads than the triad of ICBMs, SLBMs, and bombers. This calculation reflects the expected larger second-strike survivability of SSBNs compared to ICBMs, but it is misleading unless more strategic context is provided.²⁵

Deterrence is often thought to be more effective if the success of a decapitating first strike is made more challenging through such means as assured second strikes. American ICBMs complicate the attack calculation for an adversary because of the sheer numbers of adversary nuclear weapons required to ensure a high probability of kill.²⁶

23. See *Approaches for Managing the Costs of U.S. Nuclear Forces, 2017 to 2046* (Washington, DC: Congressional Budget Office, October 2017), 33–44, <https://www.cbo.gov/>.

24. Grateful acknowledgement is made to James J. Tritten for use of a model originally designed by him and modified for its use here. See also Steven Cimballa, *War Games: The United States, Russia and Nuclear Arms Control* (Boulder, CO: Lynne Reiner, 2017), Appendix A.

25. Henry D. Sokolski, *Getting MAD: Nuclear Mutually Assured Destruction: Its Origins and Practice* (Carlisle, PA: Strategic Studies Institute, 2004), 99, <https://press.armywarcollege.edu/>.

26. Lauren Caston et al., *The Future of the U.S. Intercontinental Ballistic Missile Force* (Santa Monica, CA: RAND Corporation, 2014), 12.

With 400 operationally deployed ICBMs in hardened launched facilities and approximately 50 launch control centers, conservative plans require 900 warheads dedicated to the American ICBM force alone. Given the ICBM force's high readiness, destroying the American ICBM force is a top priority for any adversary.

Under New START central limits and peacetime deployment conditions, Russia has insufficient numbers of warheads to maintain escalation control and destroy the ICBM force. In contrast, an American dyad of submarines and bombers would require far fewer warheads for a first strike. For example, with the exception of the one ballistic missile submarine on patrol in the Atlantic and one in the Pacific—at any given time—the vast majority of the nuclear force is either in port (Bangor-Kitsap, Washington, or Kings Bay, Georgia) or in a weapons storage area (Minot or Whiteman Air Force Base) and highly susceptible to a first strike and require fewer than 100 warheads to destroy—along with key elements of the nation's nuclear infrastructure and command-control system.²⁷ In 2021, a former US Strategic Command commander suggested that if the American ICBM force were disbanded, twelve nuclear armed cruise missiles would be sufficient to disable the remaining US nuclear retaliatory force, in addition to much of the American nuclear infrastructure such as weapons laboratories.²⁸

Advocates of a strategic dyad argue silo-based ICBMs draw attack on themselves because of their acknowledged first-strike vulnerability.²⁹ From this perspective, vulnerable ICBMs create pressure for decision makers to commit to launch on warning or even preemption in the face of threatening, but still ambiguous, evidence of enemy attack. Some fear ICBMs are deployed on a "hair trigger" and prepared only for launch on warning due to survivability limitations.³⁰ Currently, the nation's ICBMs are targeted at open ocean boxes but are quickly retargeted when the order is given. To be clear, launch on warning is not the policy of the United States, contrary to the assertion of many nuclear disarmament advocates.

There is no need for ICBMs to be launched prematurely because they are only part of the nuclear triad. Their survivability depends upon the synergy of the entire triad and the complicated attack calculation it creates. Attackers must choreograph three different kinds of attacks simultaneously against American ICBMs, SLBMs, and bombers in order to escape unacceptable retaliatory destruction. This multifaceted attack scenario would be suicidal for Russian, Chinese, or other attackers even under the worst assumed conditions of enemy attack and American response.³¹

27. Matthew Costlow, "Safety in Diversity: The Strategic Value of ICBMs and the GBSD in the Nuclear Triad," Occasional Paper 1, no. 5 (Fairfax VA: National Institute Press, 2021), 33–43, <https://nipp.org>.

28. Remarks of Admiral Cecil D. Haney, USN (Ret.), at the Strategic Triad Conference, 2021.

29. David Wright, William D. Hartung, and Lisbeth Gronlund, *Rethinking Land-Based Nuclear Missiles* (Washington, DC: Union of Concerned Scientists, June 2020), 8, <https://www.ucsusa.org/>.

30. Patty-Jane Geller, "Our ICBMs Are Not on 'Hair Trigger' Alert," *The Daily Signal*, May 25, 2021, <https://www.dailysignal.com/>.

31. Warrior Maven, "Here's the American Gameplan for Nuclear War with Russia," *National Interest* (blog), January 15, 2022, <https://nationalinterest.org/>.

Although not required, deterrence stability and second-strike credibility are improved if, for example, the future Sentinel ICBM is deployed as a mobile missile. During the Cold War, various alternatives for basing ICBMs were considered but ultimately rejected for technical or policy reasons.³² But deploying mobile ICBMs, which Russia, China, and North Korea all do, increases deterrence stability by making it harder to hit a mobile target.³³ This challenge is one that perplexes US Strategic Command today.

Road or rail mobile systems are feasible.³⁴ Road-mobile systems require transporter-erector-launchers continually moving over a broad expanse of territory or remaining stationary until deployed in a “dash-on-warning” format. Rail-mobile systems make use of the large commercial rail network (with appropriate modifications) or employ purpose-built trains and lines dedicated specifically to this mission. If, for example, 100 of 400 ICBMs were mobile, the difficulty of eliminating the ICBM force in a single attack increases significantly.

Another option for increasing deterrence stability and improving second-strike credibility is the fielding of strategic defenses to protect the missile fields, dramatically increasing the number of adversary ICBMs required to ensure a high probability of kill.³⁵ This option was also considered and rejected during the Cold War, but new and old technologies make defenses affordable. It is worth noting ICBMs do not require complete protection. Raising the attack price from two warheads per silo to four or more suffices and requires more missiles than Russia and China fields combined. Even minimally successful missile defenses create targeting requirements for adversaries that dramatically increase the number of warheads needed for any given target in order to ensure a sufficiently high probability of kill.

A third alternative for improving deterrence stability and second-strike credibility is to deploy at least some proportion of the ICBM force in deep underground basing. This approach was considered for the MX or Peacekeeper ICBM during the 1980s.³⁶ In this concept, missiles and transporter launchers are buried inside mountains with sufficient protection against nuclear blast. It might take several days after a nuclear attack for these buried missiles and launchers to tunnel out from their hideaways, but that was part of their rationale.

32. Office of the Deputy Under Secretary of Defense for Research and Engineering, Strategic and Space Systems, *ICBM Basing Options: A Summary of Major Studies to Define a Survivable Basing Concept for ICBMs* (Washington, DC: Department of Defense, 1980), <https://apps.dtic.mil/>.

33. Matthew E. Dillow, “Nuclear Hell on Wheels: Examining the Need for a Mobile ICBM,” Trinity Site Papers (Maxwell AFB, AL: Center for Unconventional Weapons Studies, 2015), 2–4, <https://www.airuniversity.af.edu/>.

34. Barry R. Schneider, “The Case for Mobile ICBMs,” *Air Force Magazine* (February 1988), <https://www.airforcemag.com/>.

35. Kris Osborn, “Will the U.S. Navy Be Able to Shoot Down Incoming ICBMs?,” *National Interest* (blog), November 23, 2021, <https://nationalinterest.org/>.

36. Office of Technology Assessment, *MX Missile Basing* (Washington, DC: US Government Printing Office, 1981), <https://ota.fas.org/>.

Deeply buried missiles are not seen as first-strike weapons but are excellent for secure second strike. This option should reassure arms control advocates and adversaries who fear American ICBMs as first-strike weapons. Although President Ronald Reagan ultimately decided to base the MX in silos, interest in the deep-underground basing option remains of interest to experts.³⁷

Each of these alternatives for improving ICBM survivability (mobility, defenses, and deep basing) assumes there is some point to improving survivability for more than one arm of the nuclear triad. How much difference would any of these options really make? The following thought experiment will investigate the outcomes if the entire ICBM force were based on mobile platforms instead of silos. Strategic circumstances are different today than they were 50 years ago when the US government decided to field silo-based ICBMs. Today, for example, Russian ICBMs are believed to be accurate between 30 and 200 meters, a far cry from the half-mile-to-mile accuracy of previous generations of ICBMs.³⁸ Hypersonic and low-observable cruise missiles are also expected to dramatically change how the United States thinks about credibility and second-strike certainty.³⁹

To analyze the utility of mobile ICBMs, the research team reran the model for two of the force structures in the previous example—the current triad and a smaller triad of 300 ICBMs, 10 SSBNs, and 60 bombers—incorporating mobile ICBMs into the arsenal, changing weapon survivability. While the results show significant improvement in American ICBM survivability is achieved by substituting mobile basing for silo basing, American mobile ICBM basing does not change the fundamental character of a Russo-American strategic nuclear exchange. Neither state can escape assured retaliation. In terms of options, additional numbers of survivable American ICBMs provide support for an American strategy that includes flexible targeting and escalation control, in support of intrawar deterrence and war termination (i.e., a victory-denial strategy).

Yet neither the United States nor Russia, under New START deployment limits, has sufficient numbers of survivable weapons and launchers for a prevailing strategy that requires escalation dominance and counterforce superiority. It follows that a strategy of nuclear supremacy or nuclear superiority is even further out of reach, although improving technologies for missile defense combined with newer generations of offensive weapons can change this calculus in the years and decades ahead.

37. Ivan Oelrich, "Deep Thoughts: How Moving ICBMs far Underground Will Make the Whole World Safer," *Bulletin of the Atomic Scientists*, April 28, 2021, <https://thebulletin.org/>.

38. Amy F. Woolf, *Russia's Nuclear Weapons: Doctrine, Forces, and Modernization*, R45861 (Washington, DC: CRS, 2022), 17, 26–30, <https://sgp.fas.org/>.

39. Adam Lowther and Curtis McGiffin, "America Needs a Dead Hand," *War on the Rocks*, August 19, 2019, <https://warontherocks.com/>.

The Other Legs

Modernization of the ICBM force is not an end in itself. As noted, the American military planning assumption is that all three legs of the nuclear triad undergo significant replacement and/or upgrades in the next several decades. The sea-based SSBN force remains the most survivable leg of the triad but is expected to face increasing pressure from advanced space-based sensors, an expanding sea-based acoustic network, and a growing fleet of sea-based drones.⁴⁰ Cancelling the Sentinel ICBM replacement program would only allow Russia and China to focus their efforts on detecting and defeating ballistic missile submarines—reducing SSBN survivability significantly.

The Trump administration produced the W76-2 low-yield nuclear warhead for deployment on SSBNs in 2020, arguing this was necessary to increase American options across the spectrum of deterrence. This decision was prompted by concerns about a Russian strategy of using limited nuclear strikes to change the direction of a conventional war in Europe without escalating to strategic nuclear war.⁴¹ Whether a low-yield submarine-launched ballistic missile proves an effective deterrent is yet to be seen. It does appear the W76-2 will survive the Biden administration's effort to reduce the nuclear force.

As for the bomber leg of the triad, the B-21 Raider will replace the B-1 and B-2, which are costly to operate and maintain. Not only is the B-21 expected to reduce operations and maintenance costs, but also it will offer improved stealth capability and improved penetration of advanced air defense networks.⁴² The Air Force is also developing the long-range standoff cruise missile as a replacement for the air-launched cruise missile.⁴³ The new missile is expected to have a significantly reduced radar cross-section, improved defenses, and greater accuracy. The bomber force offers unique capabilities with respect to deterrence, including its availability for use in signaling American intent, particularly during a crisis. This is a mission that ICBMs do not perform, making the bomber force important for broader strategic stability and deescalation.

The challenge to bombers comes in the form of improved air defense networks and the vulnerability of bomber bases. Enhanced, low-observable cruise missiles and stealthy airframes are the customary responses to improved air defense systems. Vulnerable bomber bases present a more persistent challenge as adversaries develop long-range options themselves. With only three bomber bases and two weapons-storage areas, the bomber force presents a small number of targets for an adversary to destroy.

40. Sebastien Roblin, "Underwater Drones Could Be the End of Submarines," *National Interest* (blog), (September 14, 2020), <https://nationalinterest.org/>.

41. Aaron Mehta, "Trump's New Nuclear Weapon Has Been Deployed," *Defense News*, February 4, 2020, <https://www.defensenews.com/>.

42. Kris Osborn, "The B-21 Raider Is Set to Revolutionize Stealth Bombing," *National Interest* (blog), March 31, 2022, <https://nationalinterest.org/>.

43. Adam Lowther, "The Long-Range Standoff Weapon and the 2017 Nuclear Posture Review," *Strategic Studies Quarterly* 8, no. 3 (Fall 2017), <https://www.airuniversity.af.edu>.

Again, this weakness of the bomber force is a strength of the ICBM force and its approximately 450 targets.

With Putin threatening the use of nuclear weapons in Ukraine, some analysts might assume American strategic nuclear forces could be used for selective strikes against Russian forces or installations in Europe in order to compensate for the numerical inferiority and low operational readiness of NATO nuclear forces relative to Russian tactical nuclear forces.⁴⁴ But this is a dangerous game to play. The symbolism of an ICBM launched from North America against Russian military forces, even in Ukraine, would be suggestive of American escalation to strategic nuclear war. This means that no matter how much more capable the Sentinel is over the Minuteman III, it is not a fit for every possible circumstance.

The same concern is true for the strategic bomber force. With the B-52 and B-2 designated as strategic delivery systems under New START, it is challenging to send any signal other than escalation if such a platform were used in response to a Russian first use in Ukraine. Moving bombers to European bases does not challenge this calculation. Although the W76-2 was designed as a gap-filler for the United States' lack of low-yield capability in Europe, there is real concern that Russia could mistake a sea-based response for an escalation to strategic nuclear war rather than an effort to move to an off-ramp.⁴⁵

The primary purpose of this brief discussion of a current likely use scenario is simply to illustrate that no single leg of the nuclear triad is well suited for every scenario. The ICBM, bomber, and SLBM are all useful for specific purposes. Each leg's mutually reinforcing strengths is what creates deterrence stability and allows the United States to wage war at the low end of the conflict spectrum.

Conclusion

Developing and fielding the Sentinel ICBM is a necessary component of the United States' larger strategic nuclear modernization effort. In conjunction with the modernization of the bomber- and submarine-based legs of the triad, the ICBM will provide deterrence for the American homeland, extended deterrence for Allies, and reassurance to partners that the United States will never accept second-tier status for its nuclear arsenal. In a strategic area that is heavily dependent on adversary psychology, how adversaries see the United States is more important than ever before.

Future American nuclear forces, even under New START constraints, should support a strategy of assured retaliation and victory denial, as defined earlier. Current planning for the Sentinel should include a review of options for basing part of the ICBM force on mobile platforms. Just as mobile ICBMs complicate American targeting

44. Jon Jackson, "Nuclear Weapons Threat Increases as Putin Grows More Desperate," *Newsweek*, April 18, 2022, <https://www.newsweek.com/>.

45. Kyle Mizokami, "A New and Controversial U.S. Nuclear Weapon Goes to Sea," *Popular Mechanics*, January 30, 2020, <https://www.popularmechanics.com/>.

of adversary systems, they will have the same effect on adversaries considering targeting American ICBMs. The deployment of affordable and reliable ballistic missile defenses can also make the math impossible for adversaries contemplating strikes against American ICBM fields.

The analysis here and elsewhere suggests the disarmament community is incorrect in its assessment of ICBMs and their utility in nuclear deterrence. Modernizing the US ICBM force, particularly improving strategic stability and preventing nuclear conflict, is the only response to the corresponding modernization efforts of our adversaries, in which intercontinental ballistic missiles feature prominently. *Æ*

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