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LETTER FROM THE EDITORS

Welcome to the June 2026 issue of AFPC's *Defense Dossier.* For decades, American deterrence strategy rested on assumptions that seemed durable enough to take for granted: that the United States faced a single primary nuclear adversary, that its extended deterrence commitments were credible enough to prevent allied proliferation, and that the strategic environment changed slowly enough to permit deliberate adaptation. None of those assumptions holds today.

This issue examines the converging pressures that are forcing fundamental changes in American nuclear strategy. We open with the stark math of three-power deterrence — Russia, China, and North Korea simultaneously expanding their arsenals while the United States operates under force structures designed for an entirely different era. We then turn to the political consequences of deterrence under stress, as allies across Europe, the Middle East, and Asia openly debate whether Washington's guarantees remain reliable. From there, we examine what credible extended deterrence now demands, how artificial intelligence and hypersonic weapons are compressing decision timelines and eroding the cognitive foundations deterrence depends on, and finally what was until recently almost unthinkable—a nuclear detonation in low Earth orbit and the catastrophic consequences that would follow.

Taken together, these essays argue that the United States is not merely facing a more dangerous nuclear environment, but a structural transformation of the deterrence problem itself. The question is no longer whether American nuclear strategy must change. It is whether Washington will move fast enough to shape that change before its adversaries do.

All the best,

Ilan Berman
Chief Editor

Richard M. Harrison
Managing Editor

A Need for Three-Power Deterrence

Dr. Mark Schneider

Today, the United States faces three hostile nuclear-armed nations that it must deter. Russia is a nuclear peer, while China will soon become one.[1] Indeed, Assistant Secretary of State Dr. Christopher Yeaw recently observed that the U.S. believes China could achieve "parity" with the United States, in terms of its nuclear capabilities, in as little as "four or five years." [2] The third nuclear challenge, North Korea, is economically inconsequential but heavily armed and a serious threat because of its growing nuclear arsenal. [3]

Meanwhile, Russia is assisting the nuclear buildup of both countries.[4] Even the Biden administration, which came into office supporting reduced U.S. reliance on nuclear weapons, recognized that all three nations are "expanding and diversifying their nuclear arsenals at a breakneck pace—showing little or no interest in arms control."[5] By the end of its term in office, it had concluded that: "Absent a change in the nuclear trajectories of the PRC [China], Russia and North Korea, we may reach a point where a change in the size or posture of our current deployed forces is necessary."[6]

These hostile states range from authoritarian to totalitarian dictatorships. They threaten their neighbors and even the global community. None of them can be defeated at an acceptable price if they escalate to the large-scale use of nuclear weapons, which will cause unprecedented destruction. Thus, irrespective of the scope of the U.S. conventional capability, nuclear escalation must be deterred. The 2026 *National Defense Strategy* accordingly states: "We will modernize and adapt our nuclear forces accordingly with focused attention on deterrence and escalation management amidst the changing global nuclear landscape."[7]

Still, Russia and China together now have a large advantage in the number of nuclear weapons and their delivery systems. Sadly, this is as much a result of U.S. policy as it is the progress of adversary programs.

A GRIM TALLY

Earlier this year, Admiral Richard Correll, the Commander of the United States Strategic Command, provided an unclassified number for Russian nuclear weapons for the first time since 2012. The number was striking: 4,600, including 2,600 strategic and 2,000 non-strategic nuclear weapons.[8] This figure, moreover, likely counts only operational weapons. Much higher estimates exist. In 2021, noted Russian journalist Pavel Felgenhauer reported that, "…Russia may have more (maybe twice as many overall) than *all the other official or unofficial nuclear powers taken together.*"[9] (Emphasis added.)

While substantially smaller, China's nuclear arsenal is growing rapidly. The last several Pentagon annual report to Congress on Chinese military power estimated that the PRC's total nuclear weapons will increase from over 600 operational weapons in 2024 to over 1,000 in 2030, and 1,500 by 2035.[10] These numbers, too, are likely significant underestimations. Indeed, in 2025, then-STRATCOM Commander General Anthony Cotton noted that the growth of China's nuclear weapons "has outpaced every previous estimate that we've made."[11]

The North Korean nuclear stockpile is small but growing. A 2023 Rand Corporation study concluded it aims to build "at least 300 to 500" nuclear weapons.[12]

If one adds up these figures, Russia and China today have over 5,200 nuclear weapons. By 2035, this will increase to at least 6,100 just based on China's buildup. If the RAND estimate for the growth of North Korean nuclear weapons is added, these nuclear adversaries will have between 6,400 and 6,600 nuclear weapons. Russia has a large warhead upload potential, which they may have already implemented, and this will increase when the problems with its new Sarmat heavy ICBM are resolved.

By comparison, the United States is falling woefully short. In 2023, the Biden administration announced

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The three nuclear-armed dictatorships have many types of nuclear weapons the United States lacks. They can therefore launch attacks to which the United States cannot respond in-kind.

that the active and inactive U.S. nuclear stockpile was 3,748 weapons.[13] This number, moreover, is likely to decline. Meanwhile, in reality, the inactive stockpile (probably around 2,000 weapons) has little deterrence significance unless these weapons are made operational and deployed. As the Department of Energy (DOE) has laid out, "Inactive warheads are maintained at a depot in a non-operational status and have their tritium bottles removed."[14] Thus, the inactive stockpile mostly serves as an important hedge against the failure of a deployed U.S. nuclear weapon, but it won't have an impact on current deterrence.

Moreover, there are no announced plans to increase the number of U.S. strategic nuclear weapons or delivery systems. The only technology which will see growth will be U.S. non-strategic nuclear weapons; an unannounced number of nuclear land-attack cruise missiles (SLCM-N) will be brought online by 2034.[15]

FALLING BEHIND

The deterrence problem is more than just a numbers question, however. The three nuclear-armed dictatorships have many types of nuclear weapons the United States lacks. They can therefore launch attacks to which the United States cannot respond in-kind. The NATO chart on page 5 illustrates the significant disparity between NATO and Russian non-strategic nuclear weapons types.[16]

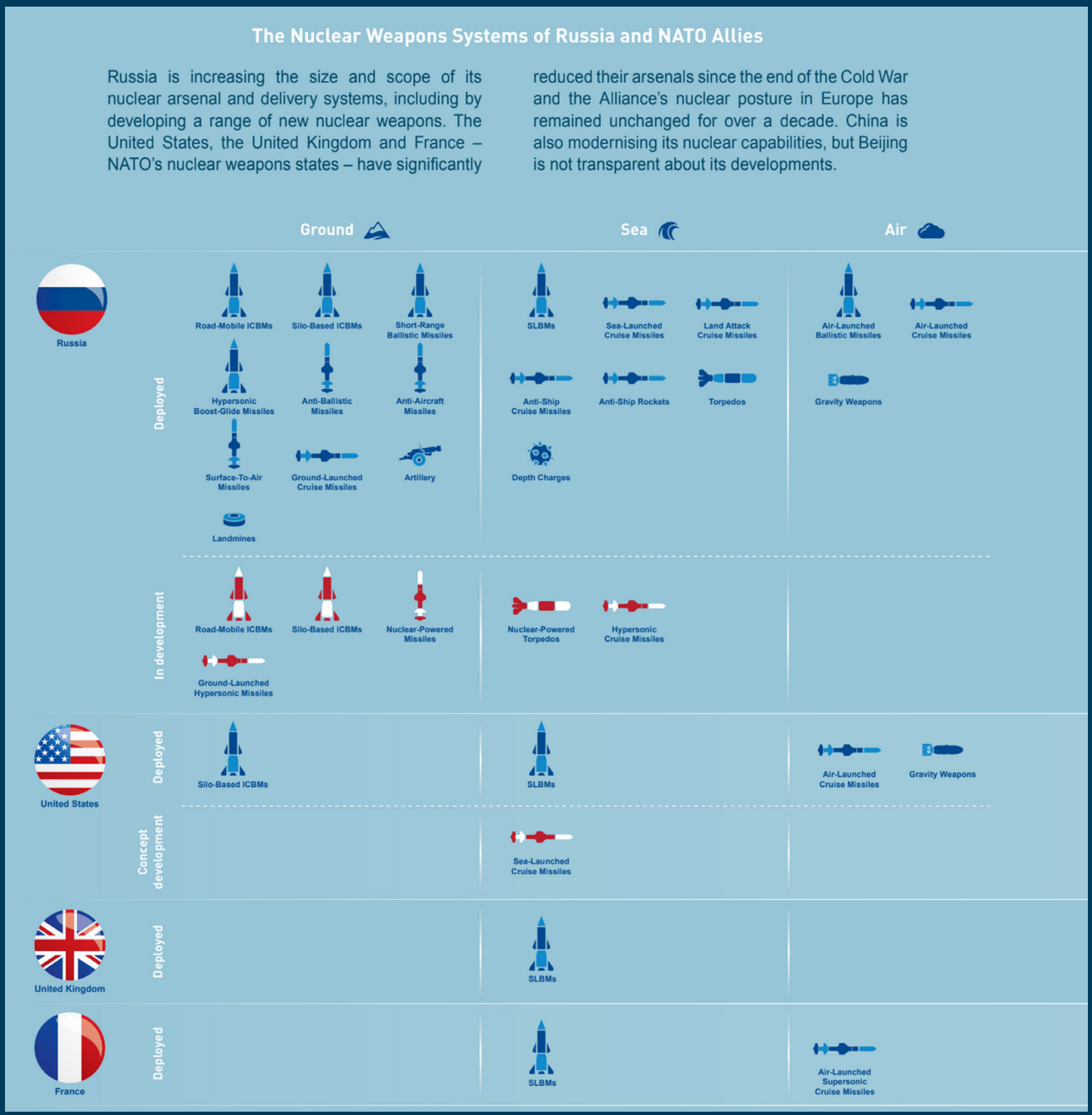
There is much more uncertainty concerning the types of Chinese non-strategic nuclear weapons. DIA lists four nuclear-capable types: hypersonic missiles, air-launched ballistic missiles, medium-range ballistic missiles and intermediate-range ballistic missiles.[17] A number of senior U.S. generals and other sources have indicated that China has nuclear-capable cruise missiles.[18]

North Korea, meanwhile, has a large force of nuclear-capable ballistic missiles. In 2021, it also announced the development of tactical nuclear weapons.[19] And in 2024, the DPRK "unveiled a purported tactical nuclear warhead and claimed it could be mounted on at least eight delivery systems, including an unmanned underwater vehicle and cruise missiles."[20]

Nuclear deterrence is linked to U.S. targeting strategy, which has not changed significantly in decades. The United States now has many fewer weapons with which to implement it, which probably results in low damage expectancy against some target sets. All U.S. administrations have rejected minimum deterrence (a small force of nuclear weapons targeted against cities). For decades, U.S. targeting strategy instead focused on "tactical and strategic nuclear forces, military command centers, conventional military forces including armies in motion, and industrial facilities supporting military operations."[21] It avoids targeting cities in order to "minimize collateral damage to civilian populations and civilian objects."[22]

Since the tenure of Ronald Reagan, American presidents have approved sensible nuclear employment policies, but allowed the nuclear deterrent to age and ordered nuclear weapons reductions that made it impossible to implement their guidance effectively. The legacy Biden administration program, even with the very useful funding increases made by the Trump administration, is inadequate. The only major change has been the earlier deployment of the B-21 bomber and the possibility of a faster production rate.

Indeed, the nation's nuclear deterrent is the product of the 2010 Nuclear Posture Review, which assumed a benign security environment. It reportedly determined a requirement for "1500 'arms control accountable' warheads—about 1850 'real' deployed warheads."[23] A 2012 Heritage Foundation study co-authored by Bak-



Source: NATO, https://www.nato.int/content/dam/nato/legacy-wcm/media_pdf/2021/3/pdf/sgar20-en.pdf

er Spring and Rebeccah Heinrichs (a member of the Congressional Strategic Posture Commission) concluded that the United States needed approximately 2,700-3,000 deployed strategic nuclear warheads in order to be able because of the requirement to threaten adversary "hardened and mobile targets with high confidence."[24] This is about twice what the U.S. reportedly currently has in its arsenal, and this assessment was formulated a decade before the scope of the current Chinese nuclear buildup (which has in turn increased the requirement for warhead numbers).

The inactive stockpile mostly serves as an important hedge against the failure of a deployed U.S. nuclear weapon, but it won't have an impact on current deterrence.

The United States has the potential to correct the deficiencies in its current strategic deterrent posture by increasing the number of its deployed strategic nuclear weapons at very low cost. The United States could about double the number of its deployed strategic nuclear warheads in a few years, much of it less than a year by uploading available warheads on existing missiles and bombers. In 2020, the Congressional Budget Office concluded that, "Increasing warhead loadings to reach the START II limits [3,500 warheads] would incur about $100 million in onetime costs for DoD."[25] Moreover, the $100 million would be spent over a period of several years. While not a substitute for the nuclear modernization program, low-cost nuclear warhead upload can more than double its effectiveness. It would allow much better targeting capability against the three adversary threat that we now face. This will clearly enhance deterrence.

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Resurgent Nuclear Proliferation: What It Will Demand

Henry Sokolski

The world is entering a new era of nuclear proliferation. As alliance loyalties wane, hostile and friendly nuclear weapons proliferation is becoming more likely. As in the 1950s and 1960s, security analysts are increasingly worried about the prospect of nuclear use. To hedge against these concerns, Washington must bolster its overseas security pledges, tighten existing nuclear controls, and transition to a new generation of warfare, in which the use of nuclear weapons is less likely.

HOW BAD CAN IT GET

China is building up its nuclear arsenal.[1] Officials in South Korea and Japan are openly discussing developing their own nuclear weapons options.[2] So, too, are officials in Poland and Germany, as well as Turkey and Saudi Arabia.[3] Welcome to the latest era of nuclear proliferation, in which not just our enemies, but also our friends, lust for the bomb and where our alliance system is not nearly as great a brake on those impulses as it once was.

Early in the Cold War, nuclear proliferation was disciplined by the Warsaw Pact-NATO rivalry. Russia, the United Kingdom, France, China, and Israel acquired nuclear weapons and a number of Soviet satellites and Western-friendly nations (e.g., Italy, Sweden, Switzerland, Australia, Yugoslavia, Romania) considered acquisition. By the 1970s, binary rivalries (e.g., Brazil-Argentina, India-Pakistan, Iran-Iraq, North and South Korea, Taiwan and the People's Republic of China) largely propelled nuclear proliferation.

Today, U.S. allies – South Korea, Japan, Germany, and Turkey – which previously toyed with acquiring nuclear weapons in the 1970s, are returning to this fetish. Poland, which is new to the game of nuclear weapons machinations, can be added to this list. Others, for instance Turkey, see acquiring nuclear weapons as a way to bolster their regional aspirations. Meanwhile, in South Korea, some believe acquiring nuclear weapons could help them confederate with their neighbor to the north.[4]

In the greater Middle East, motives for going nuclear are more complicated. Saudi Arabia sees nuclear weapons as a hedge against Iranian bombs. If Tehran goes nuclear, the United Arab Emirates may follow Riyadh's example. Saudi Arabia has already secured security guarantees from a nuclear-armed Pakistan, and there's loose talk of working with Turkey on security cooperation as well. How Egypt and Algeria will view these developments is unclear, but Israeli observers are already worried that these two may go nuclear as well.[5]

DENIAL

Washington has largely ignored these proliferation possibilities. The latest *National Defense Strategy* and *National Security Strategy* identify only Iran and North Korea as nuclear proliferation worries.[6] Some security experts have suggested that "friendly" proliferation to countries like South Korea or Saudi Arabia are inevitable and might even be beneficial.[7]

Then there are the military realists who suggest that whatever friendly or hostile proliferation threats there might be, none are greater than the nuclear threats China and Russia pose. If America can deal with Beijing and Moscow, they argue, it can deal with any lesser nuclear power. Finally, those who think more nuclear weapons might be better insist that every nuclear state will automatically deter every other—and that this, in turn, will allow America to disengage and reduce its own defense spending on allies.[8]

Yet if the last century's two largest security catastrophes – World War I and World War II – are any indication, much of this thinking is magical. Prior to both wars,

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> **Welcome to the latest era of nuclear proliferation, in which not just our enemies, but also our friends, lust for the bomb and where our alliance system is not nearly as great a brake on those impulses as it once was.**

alliance diplomacy and deterrence failed. In 1939, Poland tried to save itself by signing a non-aggression pact with Hitler's Germany.[9] This, however, only egged Hitler on. Meanwhile, Stalin, not fully sensing the Nazi danger, agreed to help Germany invade Poland in exchange for Polish territory.[10] Similarly, before World War I, Europe frantically cut secret diplomatic security guarantees and simultaneously planned military mobilizations.[11]

The assumption in 1914 and 1939 was these sophisticated maneuvers could produce stability. They did not. Even President Franklin Delano Roosevelt's eleventh-hour forward deployments of B-17s to the Philippines and of the Western Fleet to Pearl Harbor proved to be fleckless. They didn't deter; they only encouraged the Japanese to launch devastating first strikes.[12]

These disappointments helped shape sounder policies that emerged during the Cold War. First, America created security alliances (including NATO, SEATO, ANZUS), established security pacts with Japan and South Korea, and made commitments to defending the Republic of China (Taiwan). The United States backed these guarantees with the world's largest navy and air force and the forward deployment of large numbers of nuclear weapons. The latter deployments were required early on because the United States lacked accurate long-range nuclear bombers and missiles. Once the Pentagon acquired such systems, however, America was able to withdraw almost all of its forward-deployed nuclear weapons, which were becoming increasingly vulnerable to first strikes.

Finally, the United States leveraged its security guarantees to keep its allies from "going nuclear." The aim here was to keep America's friends tightly aligned with U.S. efforts to defeat the Communist Bloc. American strategists from Schlesinger to Wohlstetter to Kissinger understood that as the number of nuclear-armed states increased, each would have more agency to act independently of Washington.[13] As a result, more nuclear states would be worse rather than better.

STRENGTHENING EXTENDED DETERRENCE

Washington needs to recapture the nonproliferation wisdom of the Cold War. At a minimum, Washington needs to strengthen existing security ties with our European, Middle Eastern, and Asian allies to allay their security anxieties. In the case of NATO, Washington needs to get serious in opposing Russian adventurism: Any peace reached between Kyiv and Moscow needs to be on terms acceptable to Ukraine. The United States and NATO also must work more closely to meet their respective military and homeland security requirements.

In the Middle East, America and its closest allies should develop alternative shipping routes to Strait of Hormuz for getting fossil fuels out of the Gulf. Washington and its allies should also help rebuild, expand, and make the region's critical civilian infrastructure more resilient to military attacks.

Meanwhile, Washington should work with South and East Asia nations to fend off undesirable Chinese influence and adventurism. Besides military cooperation, the United States can work with these countries to counter Beijing's soft efforts to win the hearts, minds, and pocketbooks of their regional neighbors.

As for nuclear guarantees, the United States needs to increase the depth and frequency of joint nuclear exercises and consider the RAND Corporation's proposal to create nuclear escrow accounts. [14] Doing so would encourage American allies that have expressed a desire for nuclear weapons to pay to refurbish surplus U.S. nuclear weapons slated for dismantlement. These restored weapons should be placed in escrow at a nuclear storage site within the United States. The U.S. military would continue to conduct joint nuclear exercises with these nations. It also would build hardened nuclear weapons storage sites on their soil. Washington would only move weapons to these sites, however, in case of war.

Taking such steps will likely provoke Moscow and Beijing. However, Washington and its allies should only relent if China and Russia are willing to restrain their own nuclear misbehavior. The United States and its allies might demand that Russia redeploy all its nuclear weapons to sites east of the Urals and to open these sites to intrusive routine inspections. In exchange, Washington could promise not to redeploy American nuclear weapons, and even to withdraw the handful it has based in Europe. As for China, Washington could promise to freeze any U.S. nuclear weapons redeployments to either to Japan or South Korea. In exchange, the United States could ask for a moratorium on all "peaceful" Chinese fast reactor and reprocessing activities.

The negotiators understood that nuclear fuelmaking was too close to bombmaking. By the time any military diversion of nuclear fuelmaking could be detected, there wouldn't be enough time to intervene to prevent a bomb from being built.

TIGHTENING THE NUCLEAR RULES

As more nations consider getting nuclear bombs of their own, the United States should strengthen existing nuclear nonproliferation rules. Stronger regulations would help distinguish violators from the law-abiding states — a distinction is essential to enforcement.

Unfortunately, the Nuclear Nonproliferation Treaty (NPT) and the International Atomic Energy Agency (IAEA) charter don't clearly define what dangerous nuclear activities are. These should include making nuclear fuel by enriching uranium and recycling plutonium, processes that can bring non-weapons states within days or weeks of acquiring nuclear bombs.

There is nothing in the NPT or the IAEA charter, however, that clearly authorizes these activities. In fact, negotiators on the NPT explicitly rejected efforts to include them in the treaty's text.[15] The reason why was simple: the negotiators understood that nuclear fuelmaking was too close to bombmaking.[16] By the time any military diversion of nuclear fuelmaking could be detected, there wouldn't be enough time to intervene to prevent a bomb from being built. It's time to drive this point home again. The United States and other like-minded nations need to interpret the NPT to prohibit non-weapons states from engaging in these activities.

Another loophole worth eliminating is the ease with which nations can withdraw from the NPT. North Korea, which violated the NPT, withdrew with impunity in 2003.[17] Iran is threatening to do so now.[18] Iran's exit should be blocked: no country that has promised not to get nuclear weapons should be able to break this promise without immediately being sanctioned for doing so, much less be allowed to withdraw before they come back into compliance.

Finally, the treaty clearly prohibits countries from providing or acquiring nuclear weapons or control over them, either directly or indirectly, or to manufacture or otherwise acquire them or seek or receive assistance to do so.[19] There is nobody in charge of enforcing this provision. The IAEA says it can only monitor the presence or absence of special nuclear materials.[20] It lacks the expertise or the authority to look for nuclear weapons. The United Nations Security Council, meanwhile, lacks a secretariat to oversee adherence to the NPT. At a minimum, the permanent members of the Security Council—China, Russia, the United States, the United Kingdom, and France—should attempt to take on this responsibility and let a majority determine violations.

TOWARD NEW GENERATION WARFARE

Will tightening these nuclear rules end the furthe spread of nuclear weapons? No, but it could delay it. That's important. Military science is progressing. For the last 100 years, military planners have been seized with the possibility that air forces could defeat or deter enemies by either physically obliterating them or threatening to do so. This organizing principle, air war theory, received a boost with the development of nuclear weapons.

Recently, a new theory of combat—new generation warfare—has emerged. It promises to use the manipulation, exploitation, collection, and sharing of information to disable and deter adversaries without having to physically decimate them.

This form of warfare has been playing out in the war in Ukraine. In four years, Russia has killed roughly 15,000 Ukrainian civilians. This is a large number, but it's nowhere near as many as were killed in a day during World War II: the bombing of Tokyo alone killed over 100,000 Japanese residents in a two-hour firebombing.

Also, what Russia has been targeting isn't Ukraine's population per se, but their will to fight. Moscow believes it can break Ukrainian morale by disabling specific military and civilian infrastructure nodes rather than totally obliterating Ukrainian cities.

This new form of warfare could conceivably push nations' reliance on indiscriminate nuclear strikes further into the background. The nuclear option wouldn't go away, but it would be much less likely to be exercised. Nations would still wage wars, but the drive to go nuclear might recede. That would be a good thing.

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Extended Deterrence at a Crossroads

Dr. Mark Bucknam

U.S. extended nuclear deterrence is at a crossroads. Down one road lies nuclear proliferation by America's allies and the near certain erosion, if not outright collapse, of the nuclear nonproliferation regime that America helped to establish and lead for more than half-a-century. To avoid going down that road, Washington must take a different, more arduous path—one that leads to credible U.S. deterrent capabilities and renewed assurances and coordination with America's allies and partners.

Such a discussion begins with a proper understanding of deterrence. Fundamentally, for a deterrent threat to be effective, it must be credible and it must be communicated. The party issuing the threat must possess the capability to deliver on the threat and actually impose unacceptably painful consequences if the adversary takes the action that the deterring party is trying to deter. It is not sufficient for the deterring party to objectively possess such a capability; the adversary must perceive that the party issuing the deterrent threat possesses the capability and that the deterring party has the will to follow through on the deterrent threat.

In sum, credible deterrence demands communicating with one's adversary so as to convince that adversary that one has both the *capability* and *will* to inflict unacceptably painful consequences if that adversary chooses to violate the status quo. The unacceptable consequences can come in two forms: 1) imposing costs on the attacker (punishment), or 2) denying the attacker the benefit or outcome sought by the attacker (denial).

Early theorizing about nuclear deterrence assumed a rational actor model in which the target of deterrent threats would weigh the expected costs and benefits of acting against the anticipated costs and benefits of refraining from acting. But scholarship dating back to the Cold War has shown that there are many ways in which the rational actor model can break down and lead to a failure of deterrence. More recent scholarship postulating a cognitive theory of deterrence and rooted in replicable experiments demonstrates that human psychology, an actor's (dis)satisfaction with the *status quo*, and framing of likely outcomes as losses or gains can lead to deterrence failures. The above helps to explain why deterrence experts like Keith Payne reject the notion of existential deterrence (that nuclear weapons exist and therefore they deter) and argue instead that deterrence is difficult[1]—in fact, that it is more difficult than rocket science.[2]

A MORE COMPLICATED STRATEGY

Extended deterrence is more difficult than central deterrence (i.e., than deterring attacks against oneself), and everyone knows it. At bottom, it is not rational to threaten to use nuclear weapons against an adversary that possesses the capability to respond with a devastating nuclear retaliatory strike. Only when one's own existence is threatened do threats to use nuclear weapons against a nuclear-armed adversary begin to appear somewhat rational. Sir Lawrence Freedman of King's College London, the man who literally wrote the book on nuclear strategy, considered the problem of extended deterrence one of "the basic dilemmas of nuclear strategy."[3] As Charles DeGaulle reportedly asked President John F. Kennedy in early June 1961, "Would the United States really be willing to trade New York for Paris?"

Although DeGaulle might not have believed it, the answer apparently was, "Yes." Declassified TOP SECRET documents from the Cold War show that the United States did indeed plan to risk nuclear conflict in defense of its allies. The U.S. National

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Security Council's 1974 "Policy for Planning the Employment of Nuclear Weapons" is typical of Cold War presidential guidance in spelling out U.S. extended deterrence policy and planning objectives:

> Planning Nuclear Weapons Employment for Deterrence
> The fundamental mission of U.S. nuclear forces is to deter nuclear war, and plans for the employment of U.S. nuclear forces should support this mission. Our deterrence objectives are:
>
> (1) To deter nuclear attacks against the United States, its forces, and its bases overseas.
>
> (2) In conjunction with other U.S. and allied forces, to deter attacks—conventional and nuclear—by nuclear powers against U.S. allies and those other nations whose security is deemed important to U.S. interests.
>
> (3) To inhibit coercion of the United States by nuclear powers and, in conjunction with other U.S. and allied forces, help inhibit coercion of U.S. allies by such powers.
>
> The United States will rely primarily on U.S. and allied conventional forces to deter conventional aggression by both nuclear and non-nuclear powers. Nevertheless, this does not preclude U.S. use of nuclear weapons in response to conventional aggression.[4]

U.S. extended nuclear deterrence is at a crossroads. Down one road lies nuclear proliferation by America's allies and the near certain erosion, if not outright collapse, of the nuclear nonproliferation regime that America helped to establish and lead for more than half-a-century.

The answer to DeGaulle's question still seems to be in the affirmative, as evidenced by guidance that appeared in the Biden administration's 2022 *National Defense Strategy* and *Nuclear Posture Review,* as well as in the second Trump administration's *2025 National Security Strategy*, which stated, "We want the world's most robust, credible, and modern nuclear deterrent, plus next-generation missile defenses… to protect the American people, American assets overseas, and *American allies.*" [emphasis added][5]

The most recent Congressionally mandated Department of Defense (DOD) "Report on the Nuclear Employment Strategy of the United States"—known as the "491-report"—from November 2024 also stressed the importance of U.S. extended deterrence, noting that, "the fundamental role of nuclear weapons is to deter attack on the United States or its allies and partners" and among the updated elements in the 2024 report was, "Enabling deeper consultation, coordination, and combined planning with NATO and Indo-Pacific allies and partners in order to strengthen U.S. extended deterrence commitments."[6]

Notwithstanding the challenges of making extended deterrence credible to America's nuclear-armed adversaries and to U.S. allies, the list of countries to which Washington currently extends the protective coverage of its "nuclear umbrella" has ballooned to include thirty-one NATO allies plus, in the Pacific, Australia, Japan, the Philippines, and the Republic of Korea (South Korea).

These guarantees are not offered out of altruism; they are meant to serve U.S. national interests. Through such guarantees, America aims to deter its nuclear-armed adversaries from attacks against U.S. allies, including adversary attacks with conventional or non-nuclear means. A conventional conflict between nuclear-armed powers could cross the threshold to nuclear weapons employment if either side faced military defeat and chose to escalate in an attempt to salvage the situation. Thus, U.S. nuclear weapons help to deter attacks wherever American vital national interests are at stake, thereby keeping clear of the slippery slope to nuclear escalation.

Moreover, from the outset of the nuclear age, Washington has endeavored to prevent the spread of nuclear weapons. The United States was a leader in negotiating

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and implementing the Treaty on the Non-proliferation of Nuclear Weapons (NPT) and later in establishing the Nuclear Suppliers Group (NSG). Both the NPT and NSG have for decades helped to stop the proliferation of nuclear weapons materials and technology. By extending the U.S. "nuclear umbrella" to its allies, Washington alleviates the need its allies might feel to pursue nuclear weapons of their own.

DETERRENCE IN COMPARATIVE PERSPECTIVE

Here, three important caveats need to be observed. First, there is nothing automatic about the employment of U.S. nuclear weapons; America's extended nuclear deterrent guarantees are political commitments, and the U.S. president retains complete authority and control over the use of U.S. nuclear weapons wherever they might be based, including those based on foreign soil. Second, an American president could authorize the use of U.S. nuclear weapons for the defense of a country that does not have a mutual defense treaty with the United States (e.g., Taiwan, Ukraine, or Saudi Arabia). Finally, the United States has never had a no-first-use declaratory policy, meaning that it has always reserved the right to cross the nuclear threshold first in a conflict rather than refrain from nuclear employment until after being attacked with nuclear weapons.

It is worth noting that the concept of strategic deterrence held by Moscow and Beijing is very different. For Russia, as for the People's Republic of China (PRC), deterrence is subsumed into a broader concept of coercion. Thus, what Washington views as deterrence of PRC aggression, Beijing sees as U.S. aggressive containment of China, and an attempt to compel Beijing to modify its behavior. As China expert Andrew Scobell has noted, "the Chinese word for deterrence, *weixie*, literally translates as 'terrorize.' … [For Chinese Communist Party leaders,] Deterrence is conceived of as something a strong state does to bully a weaker state."[7] Similarly, Russian military scholar Dima Adamsky explains that Moscow's concept of "New Generation Warfare" relies on nuclear coercion: "Russian professional discourse often mixes the terms *coercion*, *deterrence*, and *compellence* and uses them interchangeably." [8]

In other words, extended deterrence, seen by Washington as defensive and nonthreatening, is viewed very differently in Moscow and in Beijing.

WHAT IS CHANGING?

Today, the viability of U.S. extended nuclear deterrence is being jeopardize from without and from within. First, America's nuclear armed adversaries—Russia, China, and North Korea—are pursuing revisionist aims while fielding and wielding new nuclear capabilities. Second, U.S. extended deterrence is being jeopardized from within—by the things America does and says and by what America has failed to do: for instance, it has not maintained credible nuclear weapons appropriate to evolving threats and to the most plausible scenarios likely to test U.S. extended deterrence guarantees. Finally, there are now growing questions about the very nature of U.S. foreign relations and the durability of Washington's commitment to the security of its allies.

In light of the above, one should not be surprised to see America's allies hedging toward obtaining their own indigenous nuclear weapons. The trendline is deeply dangerous; if U.S. allies begin to proliferate, it seems likely that other countries less friendly toward America will also move to get the bomb. The elimination of Iran's nuclear weapons program in 2025-2026 might not count for much in a few decades if a dozen or more new nuclear powers emerge from today's unsettled state of affairs.

All of which creates difficult choices for the United States. Washington must avoid the road toward a less stable, proliferated world and commit to a path that reinvigorates U.S. capabilities for extended deterrence and

reassures America's allies that Washington remains dedicated to ensuring their security.

In the near term, America's NATO allies lack feasible and credible options for supplanting the U.S. extended nuclear deterrent. But Washington must not assume that will always be the case, or that it gives the United States a great deal of leverage over its allies. U.S. extended deterrence guarantees serve U.S. national interests and are not altruistically or unselfishly gifted to allies. Washington can reward those allies who are doing the most to strengthen their own conventional military capabilities, thus strengthening deterrence of aggression and contributing to their own defense if deterrence fails. The United States should encourage the United Kingdom and France to modernize, strengthen, and expand their nuclear deterrent forces, not as a replacement for U.S. extended deterrence but as a stronger complement to it.

To enhance U.S. extended deterrence, America must field new nuclear systems appropriate for deterring and responding to adversaries' attempts at nuclear coercion and limited nuclear attacks. To eliminate adversary perceptions of a gap in U.S. nuclear deterrent capabilities, the United States should expedite development and deployment of the nuclear sea-launched cruise missile (SLCM-N) and then field a land-based version of the same missile (GLCM-N). To remain viable, U.S. and other NATO dual-capable aircraft (DCA) need to be armed with accurate standoff weapons with variable-yield warheads that include a low-yield setting. Such a theater nuclear triad would make a powerful deterrent force that would reassure U.S. allies that they need not pursue their own nuclear weapons and deter nuclear-armed adversaries from gambling on conventional aggression, nuclear coercion, or limited nuclear use against U.S. allies and other U.S. vital national interests.

Again, U.S. extended deterrence is now at a crossroads. Let us hope Washington chooses the right path.

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Artificial Intelligence, Hypersonics, and the Illusion of Stategic Stability

Christopher Stone

Strategic stability has long been understood as a condition in which no state has an incentive to conduct a first strike, particularly in the nuclear domain. At its core, the concept rests on three interrelated assumptions: the survivability of second-strike forces, the reliability of attribution, and the availability of sufficient time for rational decision-making.[1] These assumptions underpinned Cold War deterrence theory, and they continue to inform contemporary strategic thought in many strategic circles.

But these foundations are increasingly eroding. Artificial intelligence (AI) and hypersonic weapons are often framed as disruptive technologies that threaten to destabilize an otherwise stable strategic environment. This interpretation is misleading. These technologies do not fundamentally alter the nature of strategy; rather, they intensify enduring dynamics of strategic competition—uncertainty, fear, and the pursuit of advantage.[2]

More precisely, AI and hypersonics amplify offensive incentives, compress decision-making timelines, and degrade confidence in the survivability of a second strike. When integrated with space-based sensing, tracking, and targeting architectures, they create a battlespace in which speed and precision confer decisive advantages. The result is not the sudden breakdown of a stable system, but an exposure of the fragility of a system that was always more brittle than assumed.

COMPRESSION OF TIME, EXPANSION OF UNCERTAINITY

AI's most profound impact on strategic stability lies not in its physical effects, but in its influence on time and cognition. As history and the literature tells us, deterrence is fundamentally a psychological phenomenon, dependent on the ability to shape an adversary's perceptions of risk, capability, and intent.[3] AI intervenes directly in this process.

First, AI accelerates decisionmaking toward what can best be described as "machine-speed warfare." Modern military systems increasingly rely on automated data processing, algorithmic threat detection, and machine-assisted targeting. These capabilities enable the rapid ingestion and analysis of vast quantities of data, dramatically reducing the time required to identify and engage targets.

The implications of this acceleration become clearer when placed in historical context. During the early Cold War, strategic warning timelines were measured in hours, as bomber-based nuclear delivery systems were susceptible to detection and interception well before weapons reached their targets. The introduction of intercontinental ballistic missiles (ICBMs) reduced this window to approximately thirty minutes, compressing decisionmaking while still permitting some degree of deliberation. Submarine-launched ballistic missiles (SLBMs) further reduced warning times, to less than fifteen minutes, particularly in scenarios involving forward-deployed platforms.[4]

Today, the integration of AI-enabled sensing, hypersonic delivery systems, and space-based targeting architectures compresses these timelines further still. Hypersonic glide vehicles can maneuver below traditional radar horizons, evading ground-based early detection systems. At the same time, reliance on geosynchronous missile warning satellites introduces potential gaps in tracking and discrimination. When combined with AI-driven processing and automated targeting, decision windows in some scenarios may shrink from minutes to mere seconds. In such an environment, the temporal foundation of deterrence—time for observation, orientation, and deliberation—begins to collapse.

Second, AI introduces opacity into strategic interac-

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tion. Machine learning systems, particularly those based on deep neural networks, often function as "black boxes," producing outputs that are difficult to interpret even for their designers. This opacity complicates efforts to assess adversary behavior and intent. If a state cannot determine whether an adversary's actions are deliberate, accidental, or the result of algorithmic processes, deterrence signaling becomes significantly more difficult.

Third, AI increases the risk of misperception and error. Algorithms trained on incomplete or biased datasets may misclassify benign activities as hostile or fail to detect genuine threats. In a high-tempo operational environment, such errors could trigger escalation before human operators have the opportunity to intervene.[5]

In this sense, a combination of AI and hypersonics as a military strategy does not merely accelerate warfare; it weaponizes time itself. The struggle for strategic advantage becomes a contest over who can perceive, decide, and act first—and who can deny the adversary the ability to do the same.

Taken together, these dynamics potentially undermine the cognitive foundations of deterrence. If deterrence depends on the ability to influence an adversary's perceptions, then a battlespace increasingly mediated by opaque and autonomous systems is inherently less stable and less predictable.

HYPERSONICS AND FIRST-MOVER ADVANTAGE

Hypersonic weapons likewise exacerbate instability by compressing physical timelines and enhancing strike capabilities. Traveling at speeds exceeding Mach 5 and often capable of maneuvering in flight, these systems reduce warning times and complicate defensive interception.[6]

Their strategic significance lies not merely in speed, but in their ability to enable precise, time-sensitive strikes against high-value targets. Command and control nodes, missile silos, mobile launchers, and space-based assets all become more vulnerable in the face of hypersonic threats. This increased vulnerability reintroduces a dynamic that has long been central to strategic competition: first-mover advantage.

If a state believes it can significantly degrade an adversary's retaliatory capability through a rapid and precise strike, the incentive to act first increases. And even if such a belief is only partially accurate, the perception alone can drive destabilizing behavior.[7] Hypersonic weapons, in this sense, do not guarantee successful counterforce operations, but they do increase their plausibility—and in deterrence, perceived plausibility could be sufficient for credibility in the minds of adversary leadership.

Moreover, hypersonics complicate escalation management. Their speed and ambiguity may make it difficult to distinguish between conventional and nuclear payloads, increasing the risk of misinterpretation and unintended escalation. Strategic and operational intelligence gathering and processing thus would be imperative to mitigate such risks in a rapidly moving and uncertain environment.

The compression of decision-making time can be understood through the OODA loop framework developed by John Boyd—Observe, Orient, Decide, Act. Boyd argued that success in conflict depends on the ability to cycle through this process more rapidly than an adversary, thereby disrupting the adversary's decision-making cycle.[8]

Together, AI and hypersonic systems enable a dramatic acceleration of the OODA loop. AI enhances the Observe and Orient phases by rapidly processing data from multiple sources, including space-based sensors, cyber networks, and terrestrial ISR systems and other tools for rapid decisionmaking. Hypersonic weapons compress the Act phase, enabling near-immediate execution of decisions.

The result is a battlespace in which the entire OODA loop is potentially compressed into seconds or less. More

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importantly, these technologies enable one actor to operate "inside" the adversary's decision cycle, acting faster than the adversary can observe, interpret, or respond.

This dynamic has profound implications for strategic stability. If one side believes it can consistently outpace the other's decisionmaking cycle, it may conclude that preemption offers decisive advantages. Conversely, a state that fears being outpaced may adopt a "use-or-lose" posture, thereby increasing the risk of rapid escalation.

THE CHALLENGE AHEAD

U.S. command and control (C2) systems face significant challenges in this emerging environment. Designed for a strategic context characterized by longer timelines and clearer signals, they may struggle to function effectively under conditions of extreme time compression and uncertainty, for several reasons.

First, time compression places immense pressure on decisionmaking processes. Systems that rely on human judgment may be too slow to respond to rapidly evolving threats. Delegating authority to automated systems, however, introduces additional risks, particularly given the opacity and potential fallibility of AI.

Second, U.S. C2 systems are heavily reliant on space-based assets, including satellites for communication, navigation, and early warning. These systems are increasingly vulnerable to attack, raising the possibility that C2 could be degraded or disrupted in the early stages of a conflict.

Third, there is a growing mismatch between doctrine and reality. U.S. strategic doctrine continues to emphasize resilience, attribution, and escalation management.[9] But while these concepts remain important, they may be insufficient in an environment where the ability to act quickly and decisively is paramount.

Simply put, a command-and-control system designed for minutes-to-hours decision cycles cannot survive unchanged in a battlespace operating at machine speed. Without significant adaptation, the United States risks being outpaced by adversaries who are better prepared to operate within compressed decision timelines.[10]

In this sense, a combination of AI and hypersonics as a military strategy does not merely accelerate warfare; it weaponizes time itself. The struggle for strategic advantage becomes a contest over who can perceive, decide, and act first—and who can deny the adversary the ability to do the same.

EXPANSION OF THE KILL CHAIN

The destabilizing effects of AI and hypersonics are magnified when integrated with space-based systems. Space provides the backbone for all instruments of national power as well as in modern military operations, enabling global surveillance, communication, navigation, and targeting.

AI-enabled ISR systems, including space-based sensors, can provide near-real-time tracking of adversary forces. This persistent surveillance capability reduces uncertainty and enables more precise targeting. Hypersonic weapons, in turn, provide the means to exploit this information rapidly.

Together, these capabilities form an integrated kill chain that extends from space to ground. Fixed targets, such as missile sites and command centers, as well as mobile systems, including transporter-erector-launchers, mobile anti-satellite (ASAT) missiles, and submarines in port, become more vulnerable when they can be continu-

ously monitored and rapidly engaged.

At the same time, space-based systems themselves have become critical vulnerabilities. Satellites that provide ISR, navigation, and communication support are attractive, less defended targets for adversary attacks. Disrupting these systems could degrade an adversary's ability to detect and respond to incoming threats, further enhancing the effectiveness of an AI/hypersonic-enabled first strike.

This integration of space, AI, and hypersonics thus reinforces the logic of offensive action and increases the feasibility of counterforce strategies.

Together, AI and hypersonic systems enable a dramatic acceleration of the OODA loop. AI enhances the Observe and Orient phases by rapidly processing data from multiple sources, including space-based sensors, cyber networks, and terrestrial ISR systems and other tools for rapid decisionmaking. Hypersonic weapons compress the Act phase, enabling near-immediate execution of decisions.

THE COLLAPSE OF TRADITIONAL SECURITY

The cumulative effect of these developments is the erosion of the assumptions that have historically underpinned theories of so-called strategic stability. These include:

Survivable Second-Strike Forces. Advances in targeting, surveillance, and strike capabilities challenge the survivability of nuclear forces and their supporting infrastructure. As complete nuclear disarmament remains unlikely, the perception that a significant portion of retaliatory capability could be neutralized may be sufficient to destabilize deterrence in the Western conception. Indeed, there is now gravitation toward a more forward-leaning posture on the part of adversary nations, as seen in Chinese views of "attack to deter" and more proactive views of self-defense.[11]

Reliable Attribution. AI, cyber operations, and space-based, low-threshold attacks can likewise complicate attribution. In a complex, multi-domain environment, it may be difficult to determine the origin of an attack or to distinguish between deliberate and accidental actions. This is also likely the case in a scenario where AI-enabled hypersonic strikes from such weapons such as fractional/orbital bombardment systems (FOBS), such as was demonstrated by China in 2021, could be fired through gaps in early warning coverage, further hindering tracking and attribution.

Deliberate Decision-Making. The compression of time reduces the opportunity for careful deliberation. Decisionmakers may be forced to act on incomplete or ambiguous information, increasing the likelihood of error and unintended escalation in strategically perilous situations.[12] These changes do not eliminate deterrence, but they make it less likely for effectiveness in an era of rapid AI-enabled decision making and hypersonic, space-enabled war-fighting capabilities. Coupled with an already proactive view of attack as deterrence, such a scenario would require a shift in deterrence strategy and warfighting postures for the United States and its allies, sooner than later.

COMPETING IN AN ERA OF INSTABILITY

If strategic stability cannot be assumed, then U.S. policy must adapt to a more proactive, competitive and less predictable environment. It can do so in several ways.

First, the United States must restore counterforce credibility. Deterrence requires the ability to hold adversary assets at risk, including not only nuclear forces but also the space-based and terrestrial systems that enable them.

Second, the United States must develop active defense and damage limitation capabilities. Missile defense, space control, and other active measures can reduce the

effectiveness of adversary attacks and mitigate their consequences.

Third, command and control systems must be AI-enabled, hardened, and distributed. This includes increasing redundancy, improving resilience, and developing the ability to operate under degraded conditions. Keeping a "human in the loop" must always remain a key part of this system, despite the increasingly short time frames envisioned. This, however, does not mean that we cannot use AI to speed up command and control decisionmaking. However, we need to have some sort of failsafe, so as not to lose control to a self-learning and more capable AI system.

Fourth, U.S. strategy must become more adversary-centric. Understanding how adversaries perceive and employ AI and hypersonic capabilities is essential for effective deterrence—and for our warfighting posturing, should deterrence fail.

WINNING VERSUS "STABILITY"

AI and hypersonic weapons do not themselves create instability. They intensify existing dynamics, exposing the limits of traditional deterrence frameworks and accelerating the pace of competition. By compressing time, increasing uncertainty, and enhancing the feasibility of counterforce strategies, they challenge the assumptions that have long underpinned strategic stability.

The integration of these technologies with space-based systems further amplifies their impact, creating a battlespace in which speed and precision confer decisive advantages. In this environment, the ability to operate inside an adversary's decision cycle becomes a central determinant of success.

The question is no longer whether strategic stability can be preserved in its traditional form. It is whether the U.S. can adapt to a strategic environment defined by speed, uncertainty, and persistent competition—and whether it is willing to confront strategic reality as it is, rather than as it is hoped to be

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Understanding the Threat of Nuclear Weapons in Space

Dr. Peter A. Garretson and Richard M. Harrison

The placement or use of a nuclear weapon in space would pose an unprecedented threat to U.S. national security, to global stability, and to the commercial space economy. Such an event has the power to disable critical satellite constellations, disrupt communications and navigation, and trigger cascading geopolitical crises.

Unfortunately, it seems increasingly likely that the U.S. will confront such a reality in the future. Members of Congress and Administration officials alike now worry that Russia may be working on a nuclear anti-satellite (ASAT) weapon that could make low Earth Orbit (LEO) unusable.[1] Likewise, China may be considering pre-positioning a nuclear weapon in orbit to guard against asteroids.[2]

The question, therefore, is no longer if this threat will emerge, but when—and what the U.S. can do to respond effectively. Currently, it lacks the plans, authorities, and capabilities to do so.

A FLASHPOINT IN ORBIT

To understand why the threat is so grave, consider what actually happens when a nuclear weapon detonates in low Earth orbit.

Once the command is given and the device triggered, the actual nuclear explosion occurs in barely a millionth of a second, releasing a megaton of energy in the form of X-rays, gamma rays, UV light, visible light, as well as a ball of super-hot plasma. Even the slowest particles race outward at 10,000 kilometers per second. An observer on the ground within line of sight of the detonation would see a very bright, star-like flash, followed by expanding luminous clouds and auroral-looking curtains along Earth's magnetic field lines.

Every satellite within 16 kilometers is instantly destroyed by gamma rays. Within that same second, neutrons damage satellites up to 40 kilometers from the burst point. For an explosion at 400 kilometers, Earth provides shielding to 80 percent of satellites from this instant burst, but the remaining 20 percent (today numbering about 2,200 satellites) are at high risk of immediate failure. X-rays can still cause ionizing faults as far away as 20,000 kilometers, potentially causing faults or reducing the life of the GPS constellation.

But the prompt radiation is not the primary kill mechanism. The weapon also releases a large number of charged particles, primarily electrons, which become trapped in the Van Allen belts. These trapped fission products repeatedly strike all other spacecraft in LEO, exposing them to much higher radiation in a short period than they are designed to absorb in their entire service life, causing their solar panels and electronics to rapidly fail. This "Argus effect" raises the peak radiation flux in some parts of LEO by 1,000 to 10,000 times the normal rate. Most commercial LEO satellites are designed to endure normal levels for five years. They would be exposed to 1,000 times that flux, and fail within a day. The International Space Station would fail in about a day as well, certainly within four.

The Argus effect, moreover, lasts for weeks and months, even years. The initially high flux decays rapidly over the next 10–20 days, slows at the six-month period, and steadies at about 300 days, with the average lifetime of a trapped electron being 1.5 years.

From 2,000 initially failed satellites, the number of satellite failures would climb to close to 11,000 within a week. One collision creates debris that hits another satellite, two collisions then become four, four become eight, and so on in an exponentially increasing cascade. As a re-

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sult, hundreds of billions of dollars of infrastructure will have been destroyed, and trillions of dollars of economic activity that depends on that infrastructure lost.

Moreover, no operational radiation belt remediation capability exists, and no replacement satellites are ready to be launched. It will be at least a year before it is safe to launch replacements, and most military replacements could not be built and launched in less than two. And a capable adversary would retain the option to detonate additional weapons, compounding the catastrophe.

WHAT THIS MEANS FOR THE AVERAGE AMERICAN

If a nuclear detonation occurred in Low Earth Orbit, the average American might not see or hear anything unless they happened to be under the blast at night looking up. However, its effects would be felt almost immediately in daily life.

Connectivity and applications. Satellite internet and satellite direct-to-phone service would suddenly fail. Many systems and applications that depend on space-based services (Uber, Lyft, Amazon, and others) could stop working, disrupting the livelihoods of millions of Americans.

Supply chains. Amazon, United Parcel Service, the United States Postal Service, and many other wholesalers and retailers might lose information on their packages.

Public safety and defense. Law enforcement and the military would encounter communications outages. In the first hour, airplanes might need to divert or land, with disruptions negatively affecting navigation and safety.

Weather and disaster response. Satellites that track hurricanes, wildfires, and crop conditions could be blinded, leaving Americans more vulnerable to natural disasters. Earth imagery and commercial imaging used for farming, real estate, and disaster relief could be lost.

Navigation. While GPS satellites in medium Earth orbit may not be immediately destroyed, radiation could degrade them, disrupting navigation, shipping, and aviation safety over time.

If the explosion occurred over the United States at a low altitude, effects could be much more severe, with large segments of the power grid, mobile devices, and even cars failing. Replacing certain components of the power grid could take months.

In short, while a nuclear detonation in space might seem like an abstract or distant concept, its effects would be both immediate and disruptive, with cascading consequences for communications, transportation, commerce, disaster response, and even the power grid.

WARGAMING THE UNTHINKABLE

The American Foreign Policy Council's Space Policy Initiative designed four scenarios to stress-test the draft concept of operations plans (CONPLANs) and explore U.S. options relating to nuclear weapons in space. The SPI wargames brought together former senior officials from the White House/National Security Council, Department of Defense, intelligence community, U.S. Space Force, U.S. Space Command, and the commercial sector. This represents the first unclassified comprehensive wargaming of space nuclear scenarios that sought to test CONPLANs. The scenarios and observations of the four workshop scenarios are summarized here:

Scenario 1: Suspected Nuclear Payload on Orbit. In this scenario, Russia places into orbit a satellite that U.S. intelligence suggests but cannot conclude is a nuclear explosive device. Workshop participants quickly realized that if a nuclear weapon was suspected in orbit, it would be a disaster of significant magnitude. There are technical problems of verification and inspection, and risks of further escalation depending on the method used to assess if a nuclear device is indeed present. Participants confirmed that "right now we do not have anything in that orbit" to meet CONPLAN timelines.

Scenario 2: Declared Nuclear Payload with Coercion Threats. This scenario posited that Russia, unhappy with U.S. and allied actions in its near abroad, announces it has a nuclear weapon in orbit and that the U.S. must comply with its demands or face the consequences of the loss of its military satellites and complicit commercial satellites. Workshop participants described this as a "low-cost, asymmetric deterrent" for Russia, exploiting the West's dependence on large numbers of unhardened commer-

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cial satellites. Participants acknowledged a strong possibility that Russia would adopt a "use-it-or-lose-it" mentality once the blackmail ultimatum was public, severely compressing the decision window.

Scenario 3: High-Damage Detonation (Kessler Syndrome Risk). In this scenario, Russia detonates the nuclear ASAT weapon, causing significant damage. Workshop participants warned that cascade prevention would be the first priority: dead or damaged satellites could rapidly become uncontrolled debris, initiating a Kessler-like chain reaction that might permanently contaminate key orbital bands. Space traffic management in a crisis would be wholly inadequate, with existing systems barely able to track routine debris, let alone coordinate mass deorbits.

Scenario 4: Low-Damage Detonation (Demonstrative Use). Here, we posited that China is engaged in a conflict with Taiwan and wants to limit the amount of outside support for the island. Accordingly, the PRC uses a low-impact nuclear detonation to deter the U.S. and its allies from intervening. Unlike a notional nuclear blast in LEO, which affects all satellites indiscriminately, a more focused detonation at geostationary orbit affects the targeted satellite and those in close proximity. This type of detonation offered an escalation option that provides a strong signal of a state's willingness to escalate, without directly taking lives or affecting too many neutrals.

These workshops confirmed that the United States currently lacks the capabilities required to manage such contingencies effectively. In particular, workshop participants noted five serious deficiencies. First, there are no operational radiation belt remediation or active debris removal capabilities currently in existence. Second, CONPLANs and mobilization strategies remain immature and untested for nuclear space contingencies. Third, attribution and monitoring are inadequate to confirm nuclear payloads. Fourth, command and control responsibilities are unclear, risking policy paralysis in the event of a crisis. Finally, reconstitution timelines are too slow, with replacements satellites requiring years to get back into orbit.

These gaps leave the U.S. and its allies vulnerable to both coercion and catastrophic disruption in space and on Earth. Policymakers lack an understanding of the options, risks, and timelines necessary to respond to these potential eventualities. They also lack clarity as to what guidance to provide to the Executive Branch about how best to respond to this threat.

WHAT POLICYMAKERS MUST DO NOW

The choice facing policymakers is clear: act now, or risk facing a nuclear space contingency without the tools to deter, respond, or recover.

Fortunately, there has been some positive movement in this direction. In December 2025, the White House released an executive order instructing federal agencies to develop "a space security strategy that accounts for United States interests in, from, and to space…" and "a technology plan for detecting, characterizing, and countering potential adversary placement of nuclear weapons in space."[3] However, the deadline of mid-June 2026 to do so is already here.

Moreover, while the presidential directive is a great step forward, it is not comprehensive. The U.S. government should consider the following recommendations as well.

In the next *National Defense Authorization Act*, Congress should task the White House to assign responsibilities for nuclear weapons on orbit contingency planning, execution, and capability development. It should likewise direct the immediate development of capabilities to verify a nuclear payload (including neutral particle

beam, X-ray, gravimetrics, and radiation detectors) and fund those efforts. Congress should additionally direct the immediate development of capabilities to negate an on-orbit nuclear weapon, including low-visibility co-orbital anti-satellite weapons, and should direct the Department of War to develop and maintain ready remediation tools.

The White House, meanwhile, should assign the relevant responsibilities via Executive Order to bodies like U.S. Space Command and the Office of the Director of National Intelligence. The Secretary of War, meanwhile, should amend Contingency Planning Guidance to plan for a nuclear weapon in space and recommend appropriate Unified Command Plan language specifying the responsibility of each Combatant Command in the event of a space nuclear weapon contingency.

From 2,000 initially failed satellites, the number of satellite failures would climb to close to 11,000 within a week.

With these measures in place, the U.S. will be significantly better prepared should the nation need to confront the reality of a nuclear explosive device in space. Inevitably, the planned megaconstellations of the U.S., allied nations, and a few commercial operators will further compound the problem of a nuclear detonation. This proliferation of satellites in low Earth orbit makes them an increasingly attractive target for negation or coercion. Exploring the scenarios outlined above can therefore posture policymakers to respond decisively. Developing prospective policies and CONPLANs, and exercising them, is essential to advance the level of discourse and ensure that when the moment of crisis arises, policymakers have a more solid foundation to act.

ENDNOTES

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