Challenges of the Second Nuclear Century
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Nuclear Order and Global Disorder **Brad Roberts**

Reading Russia's Nuclear Threats **Adam N. Stulberg**

Phantom Signaling: The Waning of American Nuclear Credibility **Amy J. Nelson**

An AI Driven Second Nuclear Age **Paul Bracken**

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Editor's Corner

Rachel Whitlark

As my colleagues Larry Rubin and Nick Gvosdev wrote in the introduction to our first issue, "The mission of the relaunched Orbis is to bridge the gap between scholarship and policy by asking strategic questions, interpreting technological change, and examining emerging geopolitical competition." Since its inception in 1957, they note that the purpose of this journal has been "to help scholars, policy makers, and practitioners understand a world where power, technology, and political order are constantly being reshaped."

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To that end, the first issue explored the vast technological changes in the international system under way and the role of the United States within that evolving order. Our second issue focuses on one key topic of international politics: nuclear weapons. The contributions each explore a critical element of the nuclear domain shaping the international system.

Across institutional positions, high-level bureaucratic experience, and professional and educational backgrounds, the authors' perspectives vary. Their articles affirm that there are major changes afoot in the nuclear landscape that will shape the future of international politics. They do not necessarily agree, however, on the sources of the emerging challenges, and where potential solutions might lie. Nevertheless, their pieces contribute to a debate over just how problematic the coming nuclear landscape might be.

Reinterpreting the Old Architecture for a More Nuclear World

As Brad Roberts notes in this issue, "The international nuclear order was the first major offshoot of the global political order put in place after World War II." Though no agreed-upon definition of that nuclear order exists, for Roberts it comprises the nuclear-relevant treaties for nonproliferation, arms control, and disarmament, as well as the distribution of nuclear capabilities across the global system. It is here—within the structures, institutions, and collective understandings of the system—that many major changes have taken place: The existing guardrails are crumbling; the core tenets of the old order may no longer hold, and the nuclear arsenals of existing weapons states and aspirations of would-be nuclear possessors are evolving.

The world is losing its Cold War institutional frameworks for managing nuclear politics alongside the means of both communication and risk management that have atrophied. Amy Woolf highlights that the arms control treaties that once kept arms races in check and prevented nuclear accidents have disappeared. Great-power relations are increasingly adversarial, and without institutional frameworks for open communication, information sharing, and risk reduction, may become increasingly dangerous, as Lowell H. Schwartz argues. Roberts emphasizes that the fact that the United States may be ceding its critical leadership role as guarantor of the nuclear non-proliferation regime and key facilitator of most of these institutions suggests that strategic stability—that no side is advantaged by striking first with nuclear weapons—may now be imperiled.

It is not just that the formal institutions supporting this order have unraveled. As Woolf reminds us, of equal if not greater importance is that the nuclear norms that facilitated the lack of nuclear use on the battlefield since World War II

are increasingly called into question. During the Cold War, nuclear thinking evolved in the United States and Soviet Union, such that both states recognized that their mutual vulnerability dissuaded nuclear use against each other. Eventually, others also recognized that nuclear weapons were useful for retaliation—not coercion or warfighting. In 1985, the leaders of the United States and Soviet Union declared that "a nuclear war cannot be won and must never be fought." In 2022, the five permanent members of the UN Security Council collectively re-affirmed this sentiment. Though just four short years have transpired since then, it seems that now, thinking about nuclear weapons and their utility may be shifting if states believe nuclear coercion and warfighting are useful for achieving their goals. Under such conditions, states may rely even more on their nuclear arsenals to secure their aims, and the value of nuclear weapons as tools of statecraft will increase.

The world is losing its Cold War institutional frameworks for managing nuclear politics alongside the means of both communication and risk management that have atrophied.

Alongside these institutional and normative changes, a technological revolution is also underway. On the civilian side, the advancement of fission and fusion energy may yield a new era in nuclear energy, with an expanded material and knowledge base to match, as Austin Long elucidates. This development, while useful from a civilian energy perspective, presents new challenges for nonproliferation: novel reactor designs require novel safeguards and new expertise; equipment and know-how may similarly be increasingly available for nefarious actors. On the military side, Paul Bracken describes an AI-enabled nuclear order—where large scale data processing allows for myriad developments including counterforce targeting of mobile targets—as a key driver of the coming era. Augmented counterforce targeting is important for undermining the perceived security of mobile targets thought to be critical for a state's security, including everything from mobile missiles, to submarines, to state leadership. To repel the possibility of suffering a debilitating or decapitating conventional counterforce attack, something made more feasible in an AI-enabled world, states with smaller nuclear arsenals may seek deterrence

We can imagine a future world with a greater number of states possessing nuclear weapons, states with larger nuclear arsenals than they previously thought necessary, and a race for novel and potentially destabilizing technologies to try to counteract the additional nuclear weapons and the advanced capabilities that might be making them necessary in the first place.

via vertical proliferation—growing the size of their nuclear arsenals to compensate for conventional vulnerability.

Combining a perceived shift in the coercive value of nuclear weapons with their potential ability to deter conventional attack and the absence of the architecture that facilitated non-proliferation, arms control, and disarmament, the result is that we may soon find ourselves in a more nuclear world. We can imagine a future world with a greater number of states possessing nuclear weapons, states with larger nuclear arsenals than they previously thought necessary, and a race for novel and potentially destabilizing technologies to try to counteract the additional nuclear weapons and the advanced capabilities that might be making them necessary in the first place. The politics and the conflict of this new world may be even more nuclear than the first nuclear age.

A Path Ahead?

If the worst permutations of the above possibilities are borne out, then the scenario we will find ourselves in will be volatile. It will be a very nuclear, unstable, and dangerous political world. But opportunities to prevent the worst from happening exist even in such a potentially bleak landscape. As the authors in this issue highlight, there are multiple potential avenues worth exploring.

To start, when credibility is harder to come by in an increasingly nuclear, but arms control-free world, Amy Nelson advocates prioritizing better intelligence signaling to secure and sustain US credibility. She prompts us to remember that adversary deterrence and allied assurance don't just happen spontaneously. Instead, they are like muscle memory that must be used diligently and de-

liberately to maintain. Consequently, Nelson argues the United States must strategically deploy nuclear intelligence disclosure to signal credibility. Absent substantiation, she warns that accusations of adversary testing or proliferation violations are hollow, assurance falls on deaf ears to allies who do not believe the United States will come to their defense, and American words are not credible. Only when claims of cheating or promises of assistance are accompanied by timely and substantive intelligence disclosures can the United States signal resolve and credibility, which will only increase in importance in a more nuclear world.

More broadly, the international community and the United States itself could make choices now that might stave off the most competitive possible futures. As Woolf suggests, the great powers could reimagine or resurrect the view that mutual vulnerability may be stabilizing and work to avoid dangerous and costly arms racing spirals. Doing so might mean consciously avoiding AI-enabled counterforce capabilities targeting the adversary's most vulnerable assets, among other choices. In other words, states might be thoughtful about not building novel, sophisticated technologies despite their potential first mover advantages. They might even consider new arms control or risk mitigation frameworks to inject needed stability back into the system. Regardless of the specifics, nuclear-armed states could work together to rebuild nuclear norms for the new world, either resuscitating old ones or creating new ones more appropriate to the new context. Of course, getting to this admittedly rosier future requires willing partners. And to that end, Schwartz encourages deep thinking now about the procurement and political decisions we are taking and what they will mean for the nuclear relationships we hope for moving forward. The choices we make today will make those relationships more or less adversarial; it is worth thinking through the implications of our choices while we still can.

Thankfully, there are tools available to help navigate the looming decisions. Despite the challenges AI-enabled technology presents, like many innovations, it also comes with opportunities. Looking at the difficulty of parsing Russian nuclear behavior specifically, Adam Stulberg reminds us that large language models and large-scale data processing can be useful for navigating adversarial behavior and understanding that behavior it its own context. He notes how Russia's conduct in Ukraine could suggest both traditional modes of Russian deterrence but also more risk-acceptant and brinksmanship-like behavior. Given the risks of failing to understand Russian red lines and models of escalation, AI-enabled models can help scholars and analysts not only understand Moscow's coercive threats without imposing a Western-worldview on them but determine the appropriate allied response. Additionally, Long describes

what we can learn from the first nuclear century to help navigate the coming second. He points to recently declassified Cold War documents that might help answer previous unknowns that may be consequential moving forward: Why, for example, did the severity and nature of the bipolar competition vary from one technological domain to another? The Soviets had far less success in space relative to the United States than their 1957 Sputnik launch might have portended. By contrast, they successfully closed the strategic forces gap with the United States in less than a decade. It is possible that the answers to such questions are out there if only we choose to look. Long also recalls that the decisions the United States and Soviet Union made during the Cold War—about proliferation, arms control, and alliance dynamics—helped manage what might have been a less stable and more dangerous system. The importance of leadership on these critical issues then and now should not be forgotten.

Much More to Learn

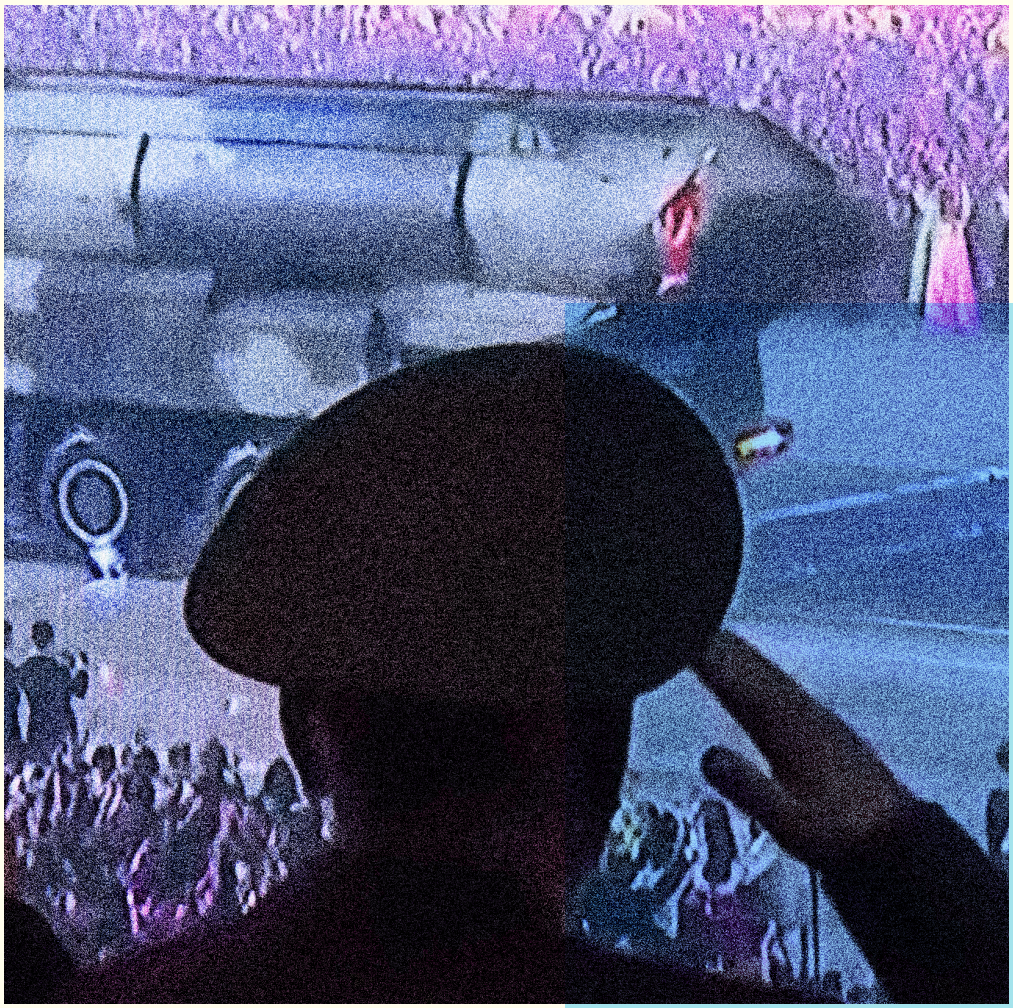
As the pages of this special issue make clear, there are many unanswered questions about the nuclear environment that is evolving, the technology driving those changes, and how best to navigate the coming world. In the months and years ahead, we hope you'll look to the pages of Orbis as we continue to prioritize analysis and commentary on these critical topics. It is too soon to know if we are heading toward the nuclear precipice or if with time, effort, and clear-headedness, stability may once again prevail. O

Dr. Rachel Whitlark

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Changing Rules of the Road



Reinterpreting the Old Architecture for a More Nuclear World

Nuclear Order and Global Disorder

Brad Roberts

How long can the international nuclear order survive? There is good reason to be pessimistic about both the fate of that order and what comes next. But we should not be fatalistic: US leadership can still make a difference. Its stake in the nuclear order is compelling enough to sustain a leadership role.

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What Is the International Nuclear Order?

The international nuclear order was the first major offshoot of the global political order put in place after World War II. That political order prized the right to national self-determination, human rights, an open international trading system, self-defense and collective security, and a rules-based approach governing competition. It was built on the foundation of a stable balance of power and peaceful coexistence among ideologically and militarily competitive rivals. The international nuclear order that came together in the 1950s and 1960s would not have been possible without these attributes of the political order.

Of course there is no agreed definition of the international nuclear order. Some experts associate this order with the web of nuclear-relevant international treaties for nonproliferation, arms control, and disarmament and their associated implementation mechanisms and the associated norms against nuclear weapons. Others associate this order with the distribution of existing capabilities in the international system. It is better thought of as both.

An Order in Peril

The international nuclear order is in peril, largely due to erosion of the global political order. Relations among the major powers are increasingly adversarial, international norms are increasingly contested, the US leadership role is increasingly uncertain, and alignments and political preferences are reforming around new expectations. Opponents of the existing order, led by Moscow and Beijing, seek a world with much-diminished US influence and built on values different from the post-World War II liberal international order. They do not seek sovereignty for their neighbors; they seek deference from them. They seek the freedom to change borders by force. The diplomacy of collective security has largely collapsed under the pressures of major power rivalry, as Russia and China seek to use the United Nations system to obstruct American influence and redistribute power in their favor. In Vladimir Putin's infamous words from 2014, he seeks "new rules or no rules."

At the same time, the Western world has become less committed to that order and those rules and the United States has become less committed to its traditional leadership role. Moreover, stability among the nuclear forces of the United States, Russia, and China is slowly but steadily giving way to a much more unpredictable and dangerous situation as a result of a new tripolar offense-defense arms race and the rising risks of nuclear coercion and escalation in war.

To be sure, the global political order has not fully collapsed. But it has contracted, as fewer states accept the legacy rules as legitimate. And it is much more contested than before, as more states seek norm-setting roles.



IAEA Director General Rafael Mariano Grossi and his team of experts visit Zaporizhzhya Nuclear Power Plant to assess important aspects of nuclear safety. Ukraine, February 7, 2024. (IAEA)

All of this translates into trouble for the international nuclear. The resulting situation is both fragile and volatile, as is evident in many ways. The major powers no longer cooperate as successfully as they once did to safeguard the international legal regime, the Nuclear Non-Proliferation Treaty, the International Atomic Energy Agency, the system for coordinating export controls, and security guarantees. And the balance of nuclear power among them has entered a newly competitive phase with rising concerns about the likelihood of armed confrontation and nuclear escalation.

A key and newly fragile part of that order relates to the US practice of extended nuclear deterrence. This is the practice of providing US nuclear protection to allies and partners. This practice has been essential for both achieving nonproliferation goals and securing the safety of US allies and the stability of the regions in which they live, thus making America safer. But the practice is under growing duress. Threats to allies in both Europe and Asia are growing, along with threats to the US homeland. Moreover, doubts about the political resolve of the United States to defend these allies, especially when presented with new nuclear threats, have resurged.

A tipping point may soon be reached at which one or more allies, in one or more regions, cross the nuclear threshold, resulting in a sudden cascade of proliferation among US allies and more generally. This would inevitably result

in the collapse of the nonproliferation regime and a dramatic growth in the risk of nuclear conflict and of the diversion of nuclear materials and technologies and possibly weapons to non-state actors.

Another critical factor is renewed US reliance on counterproliferation strikes to enforce the nonproliferation norm. On the one hand, these strikes have demonstrated the capacity of the United States to use military force to enforce the nonproliferation norm. On the other hand, they illuminate the failure of nonproliferation diplomacy and the division of the world into those who bomb and those who are bombed, further eroding the international political order. Moreover, it remains unclear whether they will prove effective in the long run. Tehran may choose to cross the nuclear threshold decisively. If it does so, others will follow.

With skillful diplomacy and luck, a contracting and contested global political order may long survive. But the international nuclear order may not long survive a contracting and contested global political order, especially when a falling out among the major powers is at the core of the international political problem. Is collapse imminent? The case that it is not follows from the observation that the regime has proven durable through decades of volatility and difficulty because, at the end of the day and whatever their grievances, all states are better off in the regime than having witnessed its collapse. The case that it is follows from the paralysis of the UN Security Council, Russia's aid to proliferators, and the disaffection of leading members of the Global South. A better case can be made that its collapse is already underway with the hollowing out of institutions, norms, and expectations.

The international nuclear order may not long survive a contracting and contested global political order, especially when a falling out among the major powers is at the core of the international political problem.

What Comes Next?

Plausible successors to the current international nuclear order are not numerous. Is a replacement order possible? Some imagine a pathway forward linked to implementation of the Treaty for the Prohibition of Nuclear Weapons (TPNW). This imagined pathway envisions the rejection of extended nuclear deterrence by US allies, followed by the rejection of nuclear weapons by the democracies more generally, followed finally by disarmament by authoritarian states "under the weight of international pressure."



Nevada - Frenchman's Flat - members of 11th AB Div. kneel on ground as they watch mushroom cloud of atomic bomb test, 1951. (Library of Congress)

The disarmament history of the 1930s illuminates the folly and danger of this vision.

If a replacement order is not possible, the plausible successors to the current international nuclear order are all more disorderly than the present order, not less so. The alternatives range from the merely chaotic to the catastrophic. The worst case would be a rapid descent into nuclear conflict and the normalization of nuclear weapons as instruments of war fighting. But this is another imagined future that doesn't stand up to scrutiny. Regular repeats of the bombings of Hiroshima and Nagasaki will never be "normalized." This leaves the "merely chaotic" option. This would be

a world of many nuclear uncertainties and heightened nuclear dangers, amidst a scramble to not be left behind in the rush for a nuclear deterrent for life in the nuclear jungle.

der is largely a US creation, designed to safeguard broad international interests (in reaping the peaceful benefitsof nuclear energy and escaping the potential catastrophe of nuclear war)

The United States has too much at stake to cede leadership to others or, worse, to stand by idly while the order collapses.

At a time of growing doubt about the US leadership role, it is appropriate and useful to ask what forms of leadership might and can be expected of others. China might be willing to step into some of the roles that the United States might no longer play; but its policy agenda would likely diverge sharply from US preferences. For example, it is already well focused on undermining US extended deterrence in the Indo-Pacific. States in the Global South might be able to exercise more constructive influence than heretofore; but many appear already committed to the principles of the TPNW. Leadership might also be exercised by individuals and organizations outside the governmental realm—self-described "norm entrepreneurs."

But the United States has too much at stake to cede leadership to others or, worse, to stand by idly while the order collapses. The international nuclear order is largely a US creation, designed to safeguard broad international interests (in reaping the peaceful benefitsof nuclear energy and escaping the potential catastrophe of nuclear war) while also advancing the self-interests of the United States. Those interests include the avoidance of nuclear wars, freedom from nuclear coercion for itself and its allies and partners, positive control of highly sensitive materials and technologies, the peaceful application of those materials and technologies, and the prevention of nuclear terrorism.

First Principles

In these perilous times, US policy should be guided by the following principles.

First, avoid unforced errors. Don't abandon the project. Don't cede leadership to others. Don't reward bad behavior. Do not let the perfect be the enemy of the good enough.

Second, shore up the ordering institutions. Give them the political and other resources they need.

Third, tend to the requirements of a stable nuclear balance of power with a

more robust extended nuclear deterrent and a central strategic deterrent tailored to the two-peer challenge.

Fourth, don't give up on engagement with Moscow and Beijing. Keep near-term expectations low and think of this as a long-term project. In current circumstances, Putin and Xi Jinping want the United States and its allies to worry about nuclear risk. They're also more confident in running more of their own nuclear risks. But this does not mean that they would welcome the catastrophic failure of the international nuclear order and the rise of new and direct nuclear threats to Russia and China that would come with it. Thus, a foundation for cooperation with them and/or their successors remains and can be rediscovered politically, in due course. O

Dr. Brad Roberts

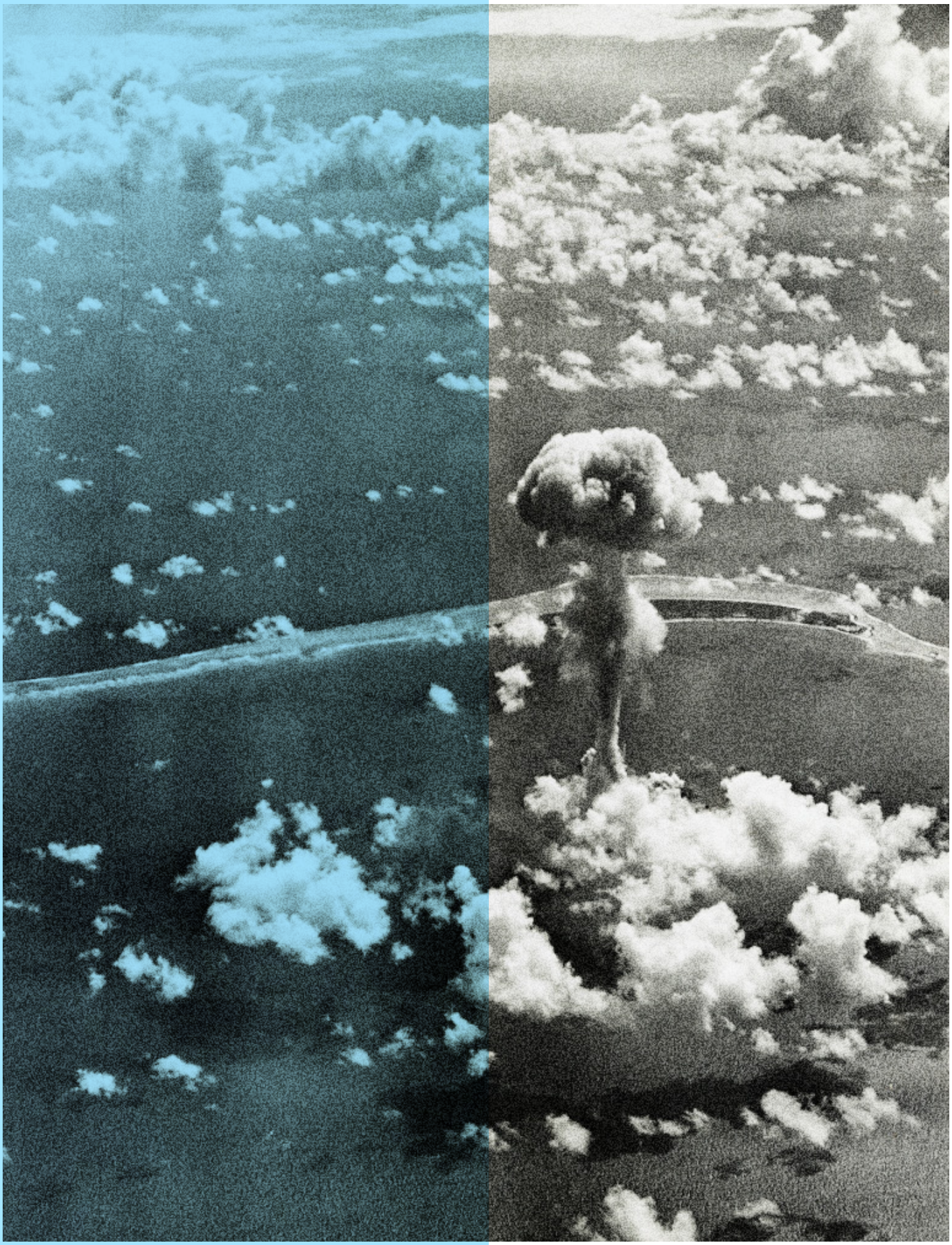
Dr. Brad Roberts has served as director of the Center for Global Security Research at Lawrence Livermore National Laboratory since 2015.

Nuclear Norms In An Era of Renewed Nuclear Competition

Amy F. Woolf

When the New Strategic Arms Reduction Treaty (New START) expired on February 5, 2026, the United States and Russia were left without any legally binding restrictions on their nuclear forces. The United States and Soviet Union had opened the era of arms control in the 1960s and eventually negotiated several agreements that restrained their competition and reduced their forces. This process was one of the more visible elements of the post-1945 nuclear order that sought to mitigate the risks created by the existence of nuclear weapons.

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The nuclear order includes two systems that address the risk of nuclear war: a system of deterrence and restraint that seeks to reduce the risk of nuclear use in a conflict between nuclear weapons states, and a system of nonproliferation that seeks to impede the acquisition of nuclear weapons by additional nations.[1] Each of these systems has contributed to efforts to reduce nuclear dangers; both are showing signs of strain in the current security environment. The absence of any negotiations towards a future arms control agreement has amplified concerns about the erosion of that order and the fading relevance of the norms that support it.

I focus specifically on the arrangements that seek to reduce the risk of nuclear use among nuclear weapons states. These include not only formal treaties like those adopted during the arms control era, but also informal and implicit norms that set the boundaries of nuclear competition. The challenge in an era without arms control is to amplify the potential role of norms in managing competition when nations have seemingly increased their reliance on nuclear weapons. The nuclear weapons states can begin this process by reissuing past statements that recognize the dangers of unrestrained nuclear competition and by reaffirming their commitment to cooperate in reducing nuclear risks.

Norms, Arms Control, and the Nuclear Order

The nuclear attacks on Hiroshima and Nagasaki in August 1945 revealed horrific levels of physical, psychological, and humanitarian destruction. Evidence of this devastation inspired many to advocate for either international control over atomic weapons or their outright elimination. Nevertheless, as the 1950s unfolded, the United States and Soviet Union continued to develop nuclear arsenals that would eventually total tens of thousands of warheads on each side.

A path to cooperation began to open in the 1960s, after the Cuban Missile Crisis underscored the acute risks of unrestrained nuclear competition. During his 1963 commencement address at American University, President John F. Kennedy argued that total war "makes no sense in an age when a single nuclear weapon contains almost ten times the explosive force delivered by all the allied air forces in the Second World War." He suggested that the United States and Soviet Union focus on a practical approach to peace based on "a series of concrete actions and effective agreements which are in the interest of all concerned."[2]

Arms Control

The nuclear weapons states began to identify "concrete actions and effective agreements" in 1963. In June the United

1 William Walker, "Nuclear order and disorder," *International Affairs*, 76:4 (2000), 703. https://library.fes.de/libalt/journals/swetsfulltext/9283305.pdf.

2 President John F. Kennedy, "Commencement Address at American University," June 10, 1963, https://www.jfklibrary.org/archives/other-resources/john-f-kennedy-speeches/american-university-19630610.



Hiroshima, Japan. Photo by Kaito Ogasawara/Unsplash

States and Soviet Union agreed to set up a direct, secure communications system between the two nations. This Hot Line would allow "quick and reliable communication directly between the heads of government" and would, therefore, help "reduce the danger that accident, miscalculation, or surprise attack might trigger a nuclear war."[3] In August, the United States, Soviet Union, and United Kingdom agreed to ban nuclear explosions in the atmosphere, outer space, and underwater.[4] They did not ban underground nuclear weapons tests, so this Limited Test Ban Treaty did little to slow the growth of nuclear arsenals. It did, however, respond to growing concerns around the world about the detrimental effects of radioactive fallout from nuclear tests.[5]

3 US Department of State, "Memorandum of Understanding Between the United States of America and The Union of Soviet Socialist Republics Regarding the Establishment of a Direct Communications Link," June 20, 1963, **https://2009-2017.state.gov/t/isn/4785.htm**.

4 US Department of State, "Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water," August 5, 1963, **https://2009-2017.state.gov/t/isn/4797.htm#treaty**.

5 US Department of State, Office of the Historian, "The Limited Test Ban Treaty, 1963," **https://history.state.gov/milestones/1961-1968/limited-ban**.

By the end of the 1960s, the United States and Soviet Union had begun to negotiate agreements to directly address their nuclear weapons programs. Those signed in the 1970s began to restrain the nuclear competition and dampen arms race pressures by limiting the numbers of launchers for offensive ballistic missiles and restraining the deployments of ballistic missile defenses. The agreements did not, however, reduce or restrain the numbers of deployed nuclear warheads. In contrast, the agreements signed in the 1980s and after the end of the Cold War did require significant reductions in the numbers of deployed weapons. This change coincided with improvements in the US-Soviet and US-Russian relationships. The nations decided that they could meet their national security requirements with fewer nuclear weapons; they codified these lower numbers in the limits in their treaties.

Norms

The norms of the nuclear order developed during the 1950s and 1960s, when atmospheric nuclear tests combined with memories of Hiroshima to remind political leaders and civilian populations that nuclear weapons were different from other military capabilities. Many scientists, policy experts and political leaders feared that nuclear war could not be controlled and recognized that any nuclear war created the potential for catastrophic consequences. Over time, the idea that nuclear weapons should be reserved for only the most extreme circumstances grew into a norm of non-use, a norm that rested on the fundamental calculation that the costs of a nuclear conflict would far outweigh any national security benefits a state could achieve by initiating a war with nuclear weapons.

Thus, the United States and Soviet Union eventually recognized that their mutual vulnerability to nuclear attack provided "a prudential rationale for not using nuclear weapons against an opponent who also has a nuclear arsenal."[6] This idea is the core of the norm of deterrence. Most nuclear weapons states have shared the view, at least since the 1960s, that "the overwhelming destructive power of nuclear weapons meant such weapons were useful for retaliatory deterrence only, not for coercive threats or actual nuclear warfighting purposes."[7]

Disorder in the Nuclear Order

The collapse of the nuclear arms control process began long before New START expired in 2026. Russia had suspended its participation in the treaty's mandated data exchanges and notifications in 2023 and refused to engage in discussions on a future treaty or risk reductions measures in the years after its 2022 invasion of Ukraine. Early signs were also evident

6 Sir Lawrence Freedman, "Disarmament and Other Nuclear Norms," *The Washington Quarterly*, 36:2 (2013), 96, **https://www.tandfonline.com/doi/full/10.1080/0163660X.2013.791085#d1e150**.

7 Nina Tannenwald, "The Great Unraveling: The Future of the Nuclear Normative Order," in *Meeting the Challenges of the New Nuclear Age: Emerging Risks and Declining Norms in the Age of Technological Innovation and Changing Nuclear Doctrines,* American Academy of Arts and Sciences, 2018, 11, **https://www.amacad.org/nuclearage**.

in 2019, when the United States detected evidence of China's buildup of nuclear warheads and missile silos, and 2020, when China refused to join existing arms control talks or even discuss its nuclear plans and programs with the United States. Warnings also appeared in 2018 when President Vladimir Putin revealed Russia's plans to deploy new types of nuclear delivery systems that would not count under the limits in New START and even earlier in the decade when Russia apparently tested a cruise missile with a range banned by the INF Treaty.

In the United States, the Trump administration began to advocate for new types of nuclear weapons in its 2018 Nuclear Posture Review, withdrew the United States from the INF Treaty in 2019, and rejected calls to extend New START in 2020. The Biden administration initially extended New START, but had concluded by 2024 that the United States might need to expand its nuclear forces.

The norm of deterrence has also faced recent challenges because nuclear weapons have evolved into tools of coercion that seek to limit the options and operations of other states even if they, too, are armed with nuclear weapons. Russia used this strategy during the early months of the war in Ukraine, when it referenced its nuclear forces in statements intended to convince the United States and NATO to limit their support to for Ukraine. China's growing nuclear force posture could also become a tool



Presidents Obama and Medvedev shown after signing the Prague Treaty in 2010. (kremlin.ru)

of coercion if China seeks to limit US engagement in the Western Pacific. Moreover, either of these nations could challenge the norm of non-use if they believed nuclear use could advance their goals in a regional conflict. In the United States, several experts have concluded that the United States might need to use nuclear weapons in response to a conventional attack by China against Taiwan.

Coercive nuclear threats against nuclear-armed adversaries and plans for nuclear use during regional conventional conflicts are inconsistent with the norms that have helped reduce the risk of nuclear war for decades. The nuclear weapons states have begun to reject restraint in their nuclear plans, programs, and operations and accept the fact that any crisis or conflict could escalate to nuclear war. The challenge, then, is to identify a role for norms in managing nuclear competition and reducing the risk of war in an era when nations have seemingly increased their reliance on nuclear weapons and have expanded their thinking to view nuclear weapons as coercive tools of statecraft.

Rebuilding the Nuclear Order

Efforts to rebuild the nuclear order will not rely on a return to the long-standing US-Russian arms control process. The United States and Russia have been unable to agree on an agenda for a future treaty and the United States rejected Russia's suggestion that the two nations remain within the limits in New START. China has refused to participate in any negotiations that would restrain its nuclear forces. Moreover, officials in both the Biden and Trump administrations believe the United States needs to deploy more nuclear weapons to meet simultaneous challenges from Russia and China.

Efforts to rebuild the nuclear order also cannot rely on pressure from the international community or civil society. Voices from outside the nuclear weapons states have always influenced discussions about nuclear dangers and suggested steps that might reduce the risk of nuclear war. But they cannot convince the nuclear weapons states to restrain their nuclear programs when each of these states believes that nuclear weapons remain at the center of their national security strategies.

Voices from outside the nuclear weapons states have always influenced discussions about nuclear dangers and suggested steps that might reduce the risk of nuclear war.

As a result, efforts to rebuild the nuclear order must come from engagements and agreements between and among the nuclear weapons states. They must recover their understanding of the risks created by unrestrained competition and recognize the dangers created by coercive nuclear threats and operational plans that anticipate the use of nuclear weapons in less than extreme circumstances.

Restoring Norms

During the Cold War, the United States and Soviet Union signed several joint statements that acknowledged the dangers of nuclear use and their responsibility for taking steps to reduce the risk of nuclear war. The 1971 Accident Measures agreement highlighted "the devastating consequences that nuclear war would have for all mankind."[8] In the 1973 Agreement on the Prevention of Nuclear War, the two nations agreed "that an objective of their policies is to remove the danger of nuclear war and of the use of nuclear weapons."[9] In 1985 Presidents Ronald Reagan and Mikhail Gorbachev reaffirmed these sentiments when they stated that "a nuclear war cannot be won and must never be fought."[10]

When issuing these statements, each nation recognized that both nations would suffer if either initiated a nuclear war. This is the reality that gave rise to the norms of non-use and deterrence. Restoring the recognition of this reality, particularly among leaders from the nuclear weapons states, is central to any effort to restore these norms and rebuild the nuclear order.

To begin this process, the United States, Russia, China, France, and the United Kingdom should highlight the dangers of coercive nuclear threats and highlight their concerns about the dangers of nuclear war. Political leaders from these countries should also reaffirm their commitments to the norms of non-use and deterrence with statements similar to those issued during the Cold War. They took a step in this direction in 2022, when they reissued the Reagan-Gorbachev statement, but this was prior to Russia's invasion of Ukraine, the expiration of New START, and the growing use of nuclear threats as a coercive tool.

These types of statements would do little to restrain the nuclear competition but could offer a low-cost, high-impact avenue for restoring cooperation in an era of renewed great-power rivalry. Agreement on even the most basic statements regarding nuclear dangers can also set a baseline for more comprehensive negotiations in the future.

Managing Risks

Over the years, the United States and

8 US Department of State, "Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War between the United States of America and the Union of Soviet Socialist Republics," September 30, 1971, https://2009-2017.state.gov/t/isn/4692.htm.

9 US Department of State, "Agreement between the United States of America and the Union of Soviet Socialist Republics on the Prevention of Nuclear War," June 22, 1973, https://2009-2017.state.gov/t/isn/5186.htm

10 "Joint Soviet–United States Statement on the Summit Meeting in Geneva," November 21, 1985, https://www.reaganlibrary.gov/archives/speech/joint-soviet-united-states-statement-summit-meeting-geneva.

Soviet Union, and Russian Federation have adopted a range of mechanisms to improve communication, increase transparency, and avoid misunderstandings that could lead to crises, conflicts, and the potential use of nuclear weapons. These include communications channels like the Hot Line Agreement mentioned above, notifications of major military exercises and test launches of ballistic missiles, and restraints on dangerous military operations that could lead to accidents or misunderstandings. These types of measures reduce the risk of accidents or misunderstandings that could lead to nuclear war.

While many of these mechanisms remain in place, they may have little effect on the risks created by coercive threats or active plans for nuclear use in regional conflicts. They also do not address dangers created by new and emerging technologies. Moreover, China has rejected most efforts to address the sources of risks or solutions that will mitigate the dangers.

As a result, the United States, Russia, and China should re-imagine and rebuild the risk reduction process with expert working groups focused on shared concerns about nuclear risks. If the major nuclear powers can agree on the sources of risk, they can then seek to craft concrete measures to mitigate those risks. This should be a collaborative process, with each nation respecting the views of others and all nations agreeing that their central goal should remain the prevention of nuclear war.

Conclusion

For more than 60 years, nuclear weapons states have recognized the dangers created by nuclear weapons and the benefits of cooperation to reduce the risk of nuclear war. This recognition has faded as nuclear weapons states plan for the use of these weapons in regional conflicts and try to shape their security environments with coercive threats. It is incumbent on all of us to remember how devastating nuclear war would be and to take steps to rebuild the nuclear order and recover the norms that support it. O

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What Kind of Nuclear Relationship Should the United States Seek With Russia and China?

Lowell H. Schwartz

The most consequential nuclear challenge US policymakers face is determining what kind of nuclear relationship with Russia and China is desirable and/or possible in an era of heightened competition and conflict. Choices the United States makes about its nuclear relations with its most powerful adversaries will have a profound impact on its overall bilateral relations with them and should shape any assessment of the proper size and posture of US nuclear forces.

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US nuclear relations with both Russia and China have reached a crossroads in 2026. In February, the New Strategic Arms Reduction Treaty (New START), the last remaining bilateral nuclear agreement between Russia and the United States, expired. New START, which entered into force in 2011, placed verifiable limits on US and Russian nuclear warheads and the delivery systems associated with them that have intercontinental-range. The expiration of New START means that for the first time since the end of the Cold War, the two countries lack any legally binding bilateral mechanisms limiting the size and posture of their nuclear forces. According to President Vladimir Putin, the demise of New START is directly linked to the conflict in Ukraine and the dramatic downturn in relations between the two countries.

China is now regarded as the "pacing challenge" for US national security policy. In the nuclear sphere, China has initiated a dramatic buildup in the size and sophistication of its nuclear forces. This includes a major increase in its intercontinental-range nuclear delivery systems, particularly its land-based nuclear missiles, and an expected quadrupling in the total size of its arsenal by 2030. Although China's overall nuclear forces will remain smaller than those of the United States for the foreseeable future, China for the first time will possess a force that could meet the criteria for the assured destruction of American society. This change moves nuclear issues with China into a new status, increasing their importance in US-Chinese bilateral relations.

What Are Nuclear Relations?

The term "nuclear relations" is not a concept that has been strictly defined in the international relations literature. Scholars have, however, noted for decades the ways in which the destructive properties of nuclear weapons and the delivery systems associated with them influence bilateral relations. Indeed, the presence of nuclear weapons shape diplomatic, military, and strategic interactions between states in profound ways, although their role is not always openly stated. In the simplest terms, therefore, nuclear relations are how nuclear weapons impact and shape relations between sovereign countries.

Nuclear relations are based upon the overall status of bilateral relations operating alongside the nuclear military capabilities of each state. The prominence of nuclear forces in a bilateral relationship emerges from the capability of one side or both to target each other with nuclear weapons, the degree of hostility or strategic competition (or cooperation) between the two states, and how each side communicates the role it sees for nuclear weapons in the relationship.

Nuclear relations can range from cooperative to adversarial. One potential aspect of cooperative nuclear relations is the direct exchange of nuclear weapons equipment, technology, and information. For example, the United States and the United Kingdom for over 60 years



People walk past the "Oreshnik" ride, named after a nuclear-capable hypersonic missile, at an amusement park in Saint Petersburg, Russia June 5, 2026. REUTERS/Stringer

under a mutual defense agreement have exchanged nuclear materials, components of nuclear weapons, and submarine reactors. Another form of cooperation is the coordination of independent nuclear forces, such as planning for a joint response to a nuclear threat or agreement on how each side would target an adversary. France and the United Kingdom, in the recently signed Northwood Declaration, agreed to this step alongside additional coordination across nuclear policy, capabilities, and operations. A final form of cooperation is nuclear sharing. In the NATO context, non-nuclear states agree to host and provide support for US nuclear forces. The Nuclear Planning Group within NATO provides a mechanism for joint planning and a training program for the potential use of nuclear weapons.

Cooperative arrangements build trust and confidence between nuclear-ar-

med states and between nuclear-armed states and non-nuclear powers. They provide information about the other side's views on the circumstances in which it might use nuclear weapons and their nuclear capabilities. Joint institutions provide a degree of coordination on nuclear policies and assurance that nuclear forces in extreme circumstances will protect them. These steps contribute to a bilateral relationship where another state's nuclear weapons are viewed as contributing to security and not, despite the vast powers nuclear weapons confer, a threat.

Adversarial bilateral nuclear relations, by contrast, are defined by a country building, deploying, and posturing nuclear weapons in a manner that is a direct military threat to another state. This threat is often officially conveyed by nuclear doctrine, which outlines the role of a state's nuclear weapons and defines the circumstances under which they might be used.

In general, nuclear threats are an outgrowth of a bilateral relationship defined by direct strategic competition and conflict. Often, the role of nuclear weapons in adversarial relationships is tied to a potential military clash between the two sides that could credibly trigger in extreme circumstances nuclear use. Sometimes however, nuclear threats stem from the other side's nuclear weapons posture and the size of its forces, which trigger concerns unconnected to a conventional military scenario. For example, when the Cold War ended, the United States altered its defense planning to regional conflicts and away from a major conventional war in Europe. Yet, the United States and Russia maintained large, highly capable nuclear forces that can only be explained by fear of the other side's nuclear capabilities and lingering mistrust between the two.

In general, nuclear threats are an outgrowth of a bilateral relationship defined by direct strategic competition and conflict. Often, the role of nuclear weapons in adversarial relationships is tied to a potential military clash between the two sides that could credibly trigger in extreme circumstances nuclear use.

One potential tool for managing an adversarial nuclear relationship is arms control, which is defined as "all the forms of military cooperation between poten-

tial enemies in the interest of reducing the likelihood of war, its scope and violence if it occurs, and the political and economic costs of being prepared for it."[1] In a bilateral relationship with arms control, leaders believe the benefits of avoiding a nuclear exchange through miscalculation or accident have greater value than efforts to achieve nuclear superiority[2] over your opponent. Henry Kissinger described the Nixon administration's arms control approach toward the Soviet Union as "treating the communist world as both an adversary and collaborator; adversary in fundamental ideology and in the need to prevent communism from upsetting the global equilibrium, collaborator in keeping the ideological conflict from exploding into a nuclear war."[3]

Introducing arms control into a bilateral relationship implies a degree of trust between the two sides, or at least the possibility of achieving one. Negotiating agreements and treaties with your adversaries is only a worthwhile enterprise if you believe the other side will uphold and carry out treaties it signs on to. Concerns about violations of agreements can be mitigated by verification measures, but a certain level of trust is required between the parties in any complex arms control negotiation. Arms control also confers legitimacy on your negotiating partner. It implies in the international arena that you regard them as a normal actor with whom you can conduct diplomacy and reach agreements.

US Nuclear Relations with Russia

Nuclear weapons are a central component of US-Russian relations. Starting in the détente period of the Cold War, the United States and the Soviet Union (and later Russia) sought to minimize the costs and risks of nuclear competition and maintain strategic stability.[4] This goal was achieved through arms control agreements that provided for a rough parity of the two sides' strategic nuclear forces and risk reduction measures that sought to reduce the dangers of an accidental or inadvertent nuclear war. Monitoring and verification measures further contributed to strategic stability by providing transparency on the current status of nuclear forces and insight into future nuclear systems being developed.

This cooperative approach to nuclear relations occurred simultaneously with military efforts to build, deploy, and maintain US nuclear forces to deter Russian attacks against the United States and US allies. Even after the Cold War ended, when conventional conflict

1 Thomas C. Schelling and Morton H. Halperin, *Strategy and Arms Control* (Twentieth Century Fund, 1961), 2.

2 Nuclear superiority is a situation where one nuclear power has the ability to implement a disarming first strike against other nuclear power, seriously reducing the possibility of nuclear retaliation from the adversary or limiting the damage an adversary can cause in a retaliatory strike to a manageable level.

3 Henry Kissinger, *Diplomacy* (Simon & Schuster, 1994), 742.

4 Strategic stability in the nuclear sphere is the absence of incentives to use nuclear weapons first (crisis stability) and the absence of incentives to build up a nuclear force (arms race stability).



Russian Ministry of Defence officials have claimed they have successfully test-launched their Sarmat intercontinental ballistic missile - the latest addition to weapons that can deploy its nuclear arsenal. Ministry of Defence of the Russian Federation, April 2022.

between Russia and the United States seemed unlikely, deterring Russian nuclear forces remained the primary mission of US nuclear forces. Thus, even during the most positive periods of US-Russian relations, nuclear relations remained at their core adversarial.

For contemporary Russia, bilateral nuclear relations with the United States also serve another purpose. Nuclear weapons are perhaps the only area where Russia remains the equal of the United States, and this is a source of international prestige for Russia's leaders. High-profile nuclear-related summits have consistently served as an opportunity for Putin to put himself on the same level as various US presidents.

The end of legally binding bilateral arms control, which had been a defining feature of US-Russian nuclear relations, is directly linked to the conflict in Ukraine and the downward spiral of US-Russian relations. Putin has repeatedly said he sees the Ukraine war as a battle between Russia, NATO, and the "collective West," and this battle with the West means arms control as it was practiced before the war is impossible. In his speech suspending the implementation of the New START Treaty in 2023, Putin called US requests to inspect defense facilities, a verification requirement of the New START treaty, the "theater of the absurd."[5] Putin asked how Russia could allow US inspectors onto its military facilities, in the midst of Ukrainian efforts, assisted by US intelligence services, to strike Russian strategic aviation bases.

From the Russian perspective, the problem with New START was the advantages provided to the United States through inspections on Russian soil and the exchanges of data on nuclear forces, not the central limitations on its nuclear forces. Before the war, Russia accepted the need for on-site inspections to verify the missile and warhead limitations contained in the treaty. Once the war started, these inspections were now

5 Vladimir Putin, "Presidential Address to Federal Assembly," February 21, 2023, http://en.kremlin.ru/events/president/news/70565.

intolerable because they would allow a hostile power, with the stated goal of imposing a strategic defeat upon Russia, the ability to gather actionable intelligence on Russian forces, which could be passed on to Ukraine.

Even though the treaty has now expired, Putin has offered to voluntarily adhere to its limitations as long as the United States does the same. The United States has not responded to this offer, only indicating that future arms control measures must include China.

Within this context, the direction of US-Russian nuclear relations will be shaped by US perspectives on several questions.

> *Is rough parity of nuclear forces still the right measuring stick with Russia, or should the United States seek nuclear superiority through enhanced strategic nuclear forces and global missile defenses?*
>
> *How fragile is strategic stability without legally binding arms control agreements?*
>
> *Is Russia trustworthy enough to reach arms control agreements with? Have they now become a revisionist rogue state that refuses to adhere to any of its international obligations?*
>
> *Should the United States continue to treat Russia as an equal of the United States in the nuclear field, conferring power and legitimacy to its leadership through arms control negotiations?*

US Nuclear Relations with China

Until fairly recently, nuclear weapons played only a minor role in US-Chinese bilateral relations. Far more important were economic ties, regional tensions over Taiwan and the South China Sea, human rights, and China's role in global issues such as non-proliferation and climate change. In 2014, China became America's largest trading partner, highlighting the high level of economic and social interaction that dominated the bilateral relationship. China's nuclear arsenal for decades was small and postured for a strategy of limited assured retaliation, the ability to deliver an effective and limited nuclear counterattack after absorbing an initial strike. Since 1964, China's official nuclear doctrine has been no first use, a defensive stance that means it will only use nuclear weapons after it has suffered a nuclear attack.

Nuclear issues were rarely discussed at the leadership level and, despite US efforts, the United States and China never developed robust diplomatic channels to discuss strategic matters. The United States was mostly content with this situation, believing China could be deterred with US nuclear forces sized and postured for Russia and that discussions about nuclear weapons would distract from more positive and productive areas of the US-Chinese relationship.

The United States now finds itself in a completely different situation. China has emerged as a formidable nuclear competitor with the deployment of a

large number of strategic nuclear forces targeting the United States and regional nuclear forces that could serve as a retaliatory capability against US conventional strikes. Finally, despite its large buildup of nuclear forces, China has not acknowledged or offered an explanation for its expansion and refuses to engage in substantive arms control negotiations or confidence-building measures.

What type of nuclear relationship the United States should strive for with China is complicated by two sets of issues. First, current US nuclear strategy is based upon a quantitative and qualitative superiority of its strategic nuclear weapons vis-à-vis China. There is a belief that US nuclear superiority tempers China's regional military aggression because at the highest level of nuclear escalation the United States can limit the damage China can cause to the United States. Keeping this advantage in the face of China's nuclear buildup will not be easy, requiring a significantly larger US nuclear force and highly capable missile defenses.

In terms of bilateral relations, an attempt to retain nuclear superiority through a large buildup of US nuclear forces directed at China would be a clear indication of a nuclear arms race, heightening each side's nuclear fears of the other. This arms race would likely spill over into US-Russian nuclear relations as well, with Russia responding with its own buildup to retain strategic nuclear parity with the United States. By contrast, not responding to China's buildup could undermine US efforts to deter Chinese regional aggression.

Second, while trade, investment, and social interactions between the United States and China have decreased over the last several years, they remain robust. It is unclear whether an intensely adversarial nuclear relationship, with no arms control or guardrails to restrain it, can exist alongside deep levels of financial and economic integration. Tradeoffs will probably be required between maintaining economic ties and unconstrained nuclear competition.

As with Russia, the direction of US-Chinese nuclear relations will be shaped by US perspectives on a number of questions.

An attempt to retain nuclear superiority through a large buildup of US nuclear forces directed at China would be a clear indication of a nuclear arms race, heightening each side's nuclear fears of the other.

Should the United States raise nuclear issues at the leadership level? Where do nuclear issues rank among the multitude of other critical issues the United States would like to discuss with China?

How important is it to maintain nuclear superiority against China? Is it even possible in the long-term versus a country with vast resources and manufacturing capabilities?

What are the costs and benefits of acknowledging China's assured destruction capability against the United States? Does acknowledging this situation make it more or less likely that the United States can achieve strategic stability with China through arms control?

Are there ways to impose costs or provide incentives that will encourage China to enter into a dialogue about ways to avoid a nuclear exchange through miscalculation or accident?

Options

The United States has a variety of options it can strive for in US-Russian and US-Chinese nuclear relations. These options elucidate the choices policymakers confront about whether to seek strategic stability with Russia and/or China or if US national security would be better served by efforts to achieve nuclear superiority. US officials will also need to determine whether arms control is possible and desirable with China and Russia's current leadership and where nuclear weapons fit in bilateral relations with both. Unlike in the past, the dual nuclear threats posed by Russia and China require consideration of how the nuclear relationship with one adversary will impact US nuclear relations with the other.

Below are a few options the United States could seek, although others are possible.

Option 1: Seek Clear Nuclear Superiority Over China and Russia

In this option, the United States would base its nuclear relations on a purely competitive model and would be unconcerned about maintaining strategic stability with its adversaries. The United States would embark on a large-scale buildup of its nuclear forces in an effort to develop a force capable of limiting the damage Russia and China could cause in a retaliatory strike to a manageable level. Part of this strategy would include major investments in strategic defense, including Golden Dome, with the aim of the system being directed at intercepting as many nuclear forces of Russia and China as possible. Diplomatic efforts under this option would focus on entrenching US superiority over its nuclear adversaries.

Option 2: Seek Strategic Stability with Russia at a Force Level Adequate to Maintain Nuclear Superiority Against China

Under this option, the United States, with Russia, would seek to continue



A nuclear-powered Type 094A Jin-class ballistic missile submarine of the Chinese People's Liberation Army (PLA) Navy in waters during a military display in the South China Sea April 12, 2018. REUTERS/Stringer

an arms control process to maintain strategic stability and rough parity in nuclear forces. The United States would seek to match the projected increase in Chinese nuclear forces and get Russia to agree to a higher ceiling for strategic nuclear forces. This would allow the United States to maintain its current nuclear strategy, strategic superiority in the nuclear sphere, against China. In terms of nuclear relations with China, the United States would continue to focus bilateral relations on other issues with the perspective that fruitful nuclear discussions with China are not possible. Arms control with Russia under this option would look different from in the past, with both sides agreeing to force levels through political agreements rather than legally binding treaties with strict monitoring and verification measures.

Option 3: Focus Arms Control Efforts on Reducing Nuclear Risks with China, Ignore Russia

If China is the pacing national security challenge of the 21st century and the chances of a nuclear conflict with China have increased, the United States could choose to focus its efforts on achieving strategic stability and reducing nuclear risks with China. In this option, the United States at the leadership level would press China to begin nuclear discussions with the incentive that the United States would acknowledge the two countries are in a situation of mutual assured destruction with each other. The United States would then attempt to build a nuclear relationship with China similar to the one it had with Russia before the Ukraine war, one based upon mutual deterrence and the aversion of a nuclear exchange through miscalculation or accident. Under this option, the United States would regard Russia as

a weak, rogue international actor with which it cannot reach agreement and which it can deter with current nuclear force levels.

Conclusion

In March 2026, Robert Kadlec, the assistant secretary of defense for nuclear deterrence, chemical, and biological defense, announced that the Pentagon would be conducting a "nuclear strategy review" to assess strategic force requirements and potential additional theater nuclear wepons programs. In congressional testimony, he said this mini-review was in lieu of a full nuclear posture review and would narrowly focus on the pace of nuclear modernization and whether US nuclear forces were robust enough to deter both Russia and China simultaneously.

The Trump administration's approach to nuclear strategy, which only focuses on military force requirements, is a serious mistake. It ignores the profound consequences nuclear weapons have on bilateral relations with China and Russia and how shifts in the US nuclear posture might impact strategic stability, potentially increasingly the chances of a nuclear exchange through miscalculation or accident. Instead, the first step in the administration's review should be an appraisal of the current status of US nuclear relations with key adversaries and what kind of nuclear relationship from the US perspective is desirable over the coming decades. O

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Shifting Ground

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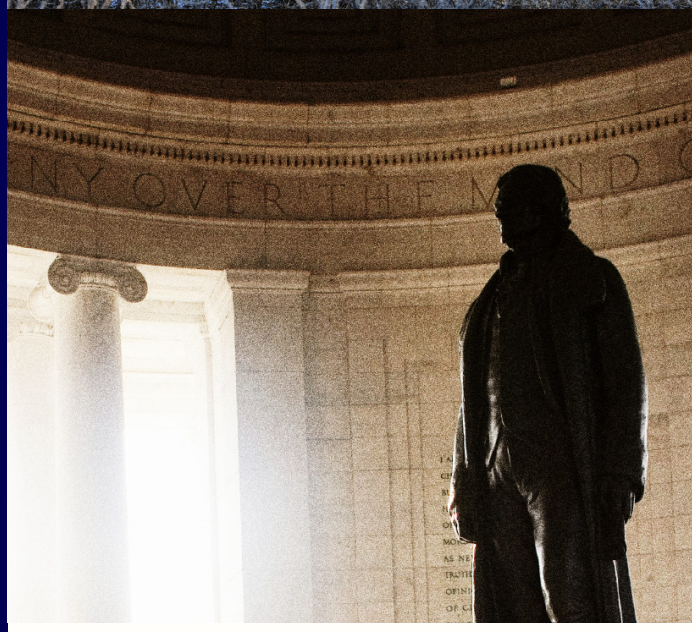
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Intelligence, Strategy, and the Reality of Modern Conflict

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The Hon. John Tien



Technology and Strategy in a Nuclear Era



Opportunities and ideas for charting a path forward in an increasingly nuclear and unstable political world.

History, Strategy, and Technology

Thinking About the Second Nuclear Century

Austin Long

The world is more than three quarters of the way through the first century of living with nuclear weapons. Despite crises and close calls, this period has been an era of nuclear peace, with no nuclear detonations in anger since August 1945. At the end of the Cold War, the salience of nuclear weapons receded but now they once again cast a long shadow over world affairs.

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From conflict with Iran over its nuclear program, to serious concerns of Russian nuclear employment in the fall of 2022, to the transformation of China's nuclear force, nuclear weapons are ubiquitous. At the same time, new technologies and approaches to nuclear power offer opportunities for nearly unlimited clean energy even as other technologies like artificial intelligence promise transformation as profound as the Industrial Revolution.

For scholars and policymakers alike, looking ahead to the impending second nuclear century requires reflecting on three distinct but related arenas. The first is the history of the Cold War and nuclear weapons, about which more information has become available in recent years. The second is the 21st-century evolution of the nuclear order built on the strategic choices of the United States and other nuclear powers, especially China. The third is the advance of technology, from fusion energy to artificial intelligence.

The Unknown History of the Cold War Competition

In 2026, the Cold War has been over for nearly as many years as it endured. Yet it remains the only global competition between nuclear armed superpowers and thus is a major source of what data we have on living with nuclear weapons. Moreover, thanks to declassification and other revelations we continue to learn more about the many facets of nuclear competition.

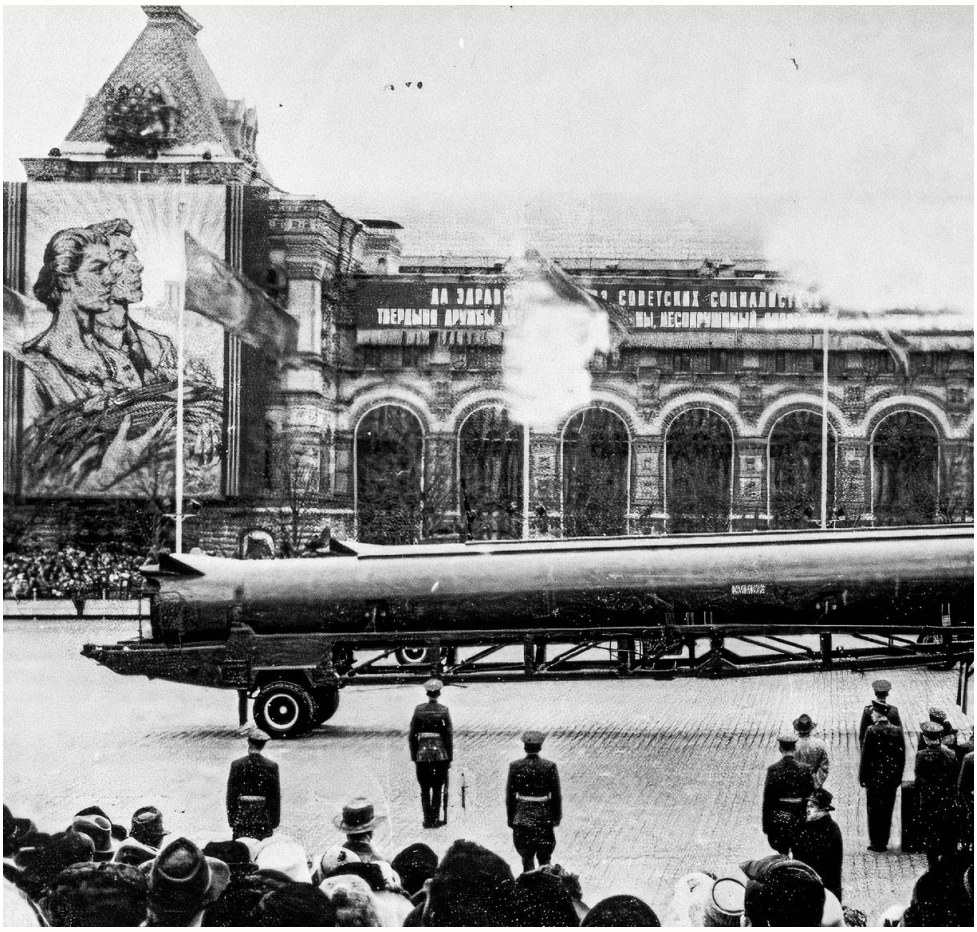
For example, the now declassified 1981 *History of the Strategic Arms Competition 1945–1972* runs to over 1,000 pages.[1] A magisterial work drawing on a wide array of classified and unclassified sources available at the time, it is both invaluable and incomplete. The history is detailed but lacks the information that has become available from Soviet archives as well as the final years of the Cold War, which includes the Carter-Reagan nuclear modernization. Recent scholarship and other declassified works continue to fill out our understanding of the dynamics of the nuclear competition between the United States and Soviet Union.[2] Yet we still know relatively little about the reasons the Cold War competition went the way it did.

If one had predicted in 1959 following 1957's Sputnik launch that in only 20 years the United States would thoroughly dominate the military and intelligence uses of space, one would have been greeted with skepticism.[3] However, by 1980, this was the reality as the Soviet Union lagged far behind in satellites for early warning and intelligence collec-

1 Ernest R. May, John D. Steinbruner, and Thomas M. Wolfe, *History of the Strategic Arms Competition 1945–1972*, (Government Printing Office, 1981).

2 See also Bruce M. Sugden, "A Primer on Analyzing Nuclear Competitions," *Texas National Security Review* vol. 2 no. 3 (July 2019), http://dx.doi.org/10.26153/tsw/2925.

3 See US Information Agency, Office of Research and Analysis, "Impact of U.S. and Soviet Space Programs on World Opinion," 7 July 1959, online at: https://www.nasa.gov/history/sputnik/july59.html.



CIA reference photograph of Soviet medium-range ballistic missile (SS-4 in US documents, R-12 in Soviet documents) in Red Square, Moscow, 1962. (National Security Archive/GWU)

tion.[4] Was it because the Soviet Union simply had fewer resources that it was not in fact a superpower capable of internally balancing against the United States?[5] Possibly, yet on paper the Soviet Union had access to massive amounts of every natural resource as well as brilliant scientists and engineers. Was it perhaps the inferiority of the Soviet political-economic system?[6] Again plausible, but the Soviets excelled in some aspects of the broader competition. In 1962, the Soviet strategic nuclear force was small and woefully inadequate in terms of survivability. Yet by the end of the decade the Soviet strategic force had reached rough quantitative parity with the United States, with substantial increases in survivability.

4 See declassified National Intelligence Estimate 11-1-80, *Soviet Military Capabilities and Intentions in Space* (1980), online at https://www.cia.gov/readingroom/docs/DOC_0000284010.pdf.

5 The claim of a bipolar distribution of power between the superpowers was and is central to structural realism and, crucially, the theory of the nuclear revolution. On the former see, Kenneth Waltz, *Theory of International Politics* (Addison-Wesley, 1979). On the latter, see Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Cornell University Press, 1989).

6 See Matthew Evangelista, *Innovation and the Arms Race: How the United States and the Soviet Union Develop New Military Technologies* (Cornell University Press, 1988) and Brendan R. Green and Austin Long, "The MAD Who Wasn't There: Soviet Reactions to the Late Cold War Strategic Balance," *Security Studies*, vol. 26 no. 4 (Fall 2017), https://doi.org/10.1080/09636412.2017.1331639.

Why then did the Soviet Union have so much less success in the space competition, given its importance to the nuclear balance as well as international prestige? Similar questions arise about the undersea competition, where United States dominance only began to erode modestly at the very end of the Cold War.[7] Allies surely played a part, from Tromsø to Pine Gap, in US dominance under the sea and above the atmosphere, but how and to what extent are underexplored, particularly from a theoretical perspective.[8] Explanations at the level of the individual firms and organizations may be important as well, but virtually nothing comparative has been done here.

These questions are of more than simple historical interest. If the second nuclear century will be marked by competition, then understanding the determinants of the last such competition are crucial to looking ahead to the future. Simply asserting the futility of competition is an insufficient guide, given that such competition was hardly futile in the Cold War.[9]

Choices About Strategy and Order in the Second Nuclear Century

The Cold War produced the principles for nuclear order that governed much of the first nuclear century (and I use the term "order" here rather loosely). The United States and Soviet Union sought to limit the proliferation of nuclear weapons, with some success, particularly in the key case of Germany, and to avoid nuclear war except as (perhaps) the last resort. The result was nuclear order with two dominant nuclear powers and a handful of much smaller nuclear states, with tacit and explicit agreements about the status quo. This order proved stable and durable, built on both liberal internationalist institutions (e.g., the International Atomic Energy Agency) and realist hard power (US alliances and extended nuclear deterrence), with the Nuclear Nonproliferation Treaty at its center.[10] US-Soviet bilateral arms control further cemented this order by enabling the shaping and management of the military competition described in the previous section.[11]

7 Owen Coté, *The Third Battle: Innovation in the US Navy's Silent Cold War Struggle with Soviet Submarines* (US Naval War College, 2003).

8 Some work has begun to explore these questions. See, for example, Aaron Bateman, "U.S. Space Power and Alliance Dynamics in the Cold War," *International Security* (2025) vol. 50 (2), https://doi.org/10.1162/ISEC.a.12.

9 See for example James Acton, "Optimal Deterrence: How the United States Can Preserve Peace and Prevent a Nuclear Arms Race with China and Russia," (Carnegie Endowment for International Peace, 2025), https://carnegieendowment.org/russia-eurasia/research/2025/06/optimal-deterrence-prevent-nuclear-arms-race.

10 Francis Gavin, "Strategies of Inhibition: U.S. Grand Strategy, the Nuclear Revolution, and Nonproliferation," *International Security,* Summer 2015, https://www.jstor.org/stable/24480594; and Gene Gerzhoy, "Alliance Coercion and Nuclear Restraint: How the United States Thwarted West Germany's Nuclear Ambitions," *International Security* vol. 39, no. 4 (Spring 2015), https://www.jstor.org/stable/24480608.

11 Brendan Green, *The Revolution that Failed: Nuclear Competition, Arms Control, and the Cold War* (Cambridge University Press, 2020); and John Maurer, *Competitive Arms Control*

Nixon, Kissinger, and SALT, 1969-1972 (Yale University Press, 2022).

The principles and foundations of this nuclear order are now in flux, with some abandoned already and some under question. Most seismically, China, long held out as a paragon of minimal nuclear forces being sufficient for deterrence, has totally transformed its nuclear forces and posture.[12] Within a decade it will join Russia as a nuclear peer of the United States, resulting in the so-called "two peer" or "three body" problem.[13]

The nuclear risks of a transformed China and conventionally enfeebled Russia have clear implications for US allies dependent on extended nuclear deterrence.

Beyond China, Russian conventional weakness, on full display in Ukraine, will likely reinforce its reliance on nuclear weapons to achieve its aims.[14] This strategy was most clearly underscored in the fall of 2022, when the United States and its allies believed the possibility of Russian nuclear employment to forestall conventional catastrophe was close to a coin toss.[15] Such nuclear use would have brought to a close the era of nuclear non-use, with unknowable consequences—an outcome avoided in 2022 but perhaps not in the next such crisis. Russian conventional weakness and increasing reliance on nuclear weapons, potentially including weapons in orbit, makes future crises more fraught than those of the old nuclear order, where Soviet conventional strength was taken as a given. Moreover, the demise of bilateral arms control, with the end of the New START agreement in February 2026, removed another foundation of the old nuclear order.

The nuclear risks of a transformed China and conventionally enfeebled Russia have clear implications for US allies dependent on extended nuclear deterrence. Yet the commitment of the United States to extended nuclear deterrence is viewed as shakier than ever, particularly by European allies.[16] Such changes in turn lead to questions about nonproliferation and how the United

12 For an example of the long-held view of China and its nuclear forces, see Fiona Cunningham and M. Taylor Fravel, "Assuring Assured Retaliation: China's Nuclear Posture and U.S.-China Strategic Stability," *International Security* (Fall 2015), http://dx.doi.org/10.1162/ISEC_a_00215.

13 See for example, *China's Emergence as a Second Nuclear Peer: Implications for US Nuclear Deterrence* (LLNL Center for Global Security Research, 2023).

14 Even before Ukraine this was apparent. Kristin Ven Bruusgard, "Russian nuclear strategy and conventional inferiority," *Journal of Strategic Studies* vol. 44 no.1 (2021), https://doi.org/10.1080/01402390.2020.1818070.

15 Colin Kahl, "The Fall 2022 Crisis," *Defense and Security Analysis* vol. 42 no. 2 (May 2026), https://doi.org/10.1080/14751798.2026.2635157.

16 "Mind the Deterrence Gap: Assessing Europe's Nuclear Options," Report of the European Nuclear Study Group (2026), online at: https://securityconference.org/en/publications/special-editions/mind-the-deterrence-gap/.

States (along with China and Russia) would respond to so-called "friendly" proliferation by US allies.[17] This is in addition to ongoing concerns about proliferation in Iran, the growing North Korean nuclear arsenal, and the uneasy nuclear relationship between India and Pakistan. The latter saw one of the most serious direct clashes between nuclear-armed states in 2025—and the United States played a key role in mediating an end to the crisis.[18] These developments—the evolution in the extended deterrence landscape, concern about both allied and other proliferation, and the growing possibility of crises between nuclear states—all underscore the enduring importance of US power to the nuclear order.

Yet even if the United States wants to bolster extended deterrence and ensure its power continues to underpin the nuclear order, there are questions about its ability to do so in the "two peer" environment. A military competition with China and Russia in the 21st century would look different than the competition with the Soviets, and the United States might not prevail. Yet the United States retains strong advantages over both Russia and China, though not the same advantages over both, as I have argued elsewhere. In brief, Russia has operational experience and a large nuclear complex but few resources. China has vast (though not unlimited resources) but limited operational experience and a small (but growing) nuclear complex.[19]

A military competition with China and Russia in the 21st century would look different than the competition with the Soviets, and the United States might not prevail.

However, without understanding what was consequential during the Cold War we cannot begin to predict what is important now and what will be in the future. Regardless, a second nuclear century with less (or no) US extended deterrence and more nuclear proliferation by US allies would be radically different than what has gone before, with potentially far-reaching consequences from more nuclear accidents in nascent proliferators to perhaps a

17 Toby Dalton, ""Friendly" Nuclear Proliferation and its Discontents," *The Washington Quarterly,* vol. 49, 2026, https://doi.org/10.1080/0163660X.2026.2639849.

18 Christopher Clary, "Four Days in May: The India-Pakistan Crisis of 2025," Stimson Center, May 28, 2025, https://www.stimson.org/2025/four-days-in-may-the-india-pakistan-crisis-of-2025/.

19 For more detail on these arguments, see Austin Long, "Damage Limitation in the 21st Century," in Brad Roberts, ed., *Counterforce in Contemporary U.S. Nuclear Strategy* (Center for Global Security Research, 2025).

more heavily armed but deeper nuclear peace.[20] As with the Cold War history, the consequences of these choices means they should merit the highest level of attention from scholars and policymakers.

Technology in the Second Nuclear Century

Beyond choices about strategy and order, the second nuclear century will be molded by technology that is very different than that of the first.[21] In terms of nuclear energy, the first nuclear century was dominated by early nuclear fission reactor designs. These reactors had a number of limitations, including with safety and enormous initial capital investment. Accidents at Three Mile Island, Chernobyl, and Fukushima underscored these limits and stunted the development of nuclear power that once promised energy "too cheap to meter."

As we approach the second nuclear century, developments in both fission and fusion energy may, after false starts, yield a renaissance in nuclear power. Small modular fission reactors, along with other alternative reactor designs, offer more efficiency, greater safety, or reduced capital costs—perhaps even all of the above. Fusion power offers potentially limitless power with minimal

20 Scott Sagan and Kenneth Waltz, *The Spread of Nuclear Weapons: An Enduring Debate* (W.W. Norton, 2012).

21 See Dan Byman, "Governing Emerging Technologies," *Orbis*, March 16, 2026, https://orbisjournal.org/commentary/governing-emerging-technologies/.



A TV screen in Seoul, South Korea showing North Korea's stagedmassive military parade to celebrate the 70th anniversary of the Korean War armistice. (Kim Jae-Hwan/SOPA Images via ZUMA Press Wire)

radioactive waste and no need for fissile material like uranium or plutonium.

Yet these advanced power sources also yield different challenges for proliferation than older systems. Fusion power techniques are not easily weaponizable but will, if widely adopted, expand the knowledge base of nuclear fusion processes and the ability to experiment with them—potentially highly useful for proliferators seeking a thermonuclear weapon. Right now, the United States has invested massively in just two sites—the National Ignition Facility at Lawrence Livermore National Laboratory and the Z-machine at Sandia National Laboratory—to conduct research on fusion relevant to nuclear weapons. In the future, potential proliferators may be able to turn to a number of commercial technologies or providers to enable their research. Even if fusion power never becomes commercially viable the vast private sector investments being made now will still create a pool of expertise and equipment potentially relevant to thermonuclear proliferation—a pool with perhaps no economically lucrative future.

Small modular reactors will potentially enable cheap and stable power in remote locations. But inherent mobility and the dispersal to remote locations makes them much more challenging to monitor than the large reactors of today. Moreover, many of these new reactor designs use high-assay low enriched uranium (HALEU)—a form of uranium that is well short of "weapons grade" but much closer to being useful in a weapon than fuels typically used in commercial reactors. This will mean more uranium enrichment capacity and technology around the world—another proliferation risk in addition to the reactors themselves. Safeguards for these new systems are possible but will require different approaches than today, and thoughtfulness now on the best ways to proceed.

Beyond nuclear power, artificial intelligence promises profound military and economic change. Many of these changes will impact nuclear weapons, from design to survivability.

Beyond nuclear power, artificial intelligence promises profound military and economic change. Many of these changes will impact nuclear weapons, from design to survivability. Ukraine's Operation Spiderweb—a clandestine attack on Russian strategic bombers—

used partly autonomous drones.[22] A fully autonomous version of the attack is probably already possible and may become even easier in the future. The confluence of artificial intelligence and nuclear command and control raises the specter of films like *War Games* and *The Terminator* becoming reality—an area attracting much study but with much more granular work to be done.[23]

As we approach *la fin de siècle nucléaire*, the good news for scholars and policymakers is both that we survived our first nuclear century and there are many interesting questions about our nuclear past, present, and future that remain. The bad news is there are many interesting questions about our nuclear past, present, and future that remain—and survival may depend on the answers. The next nuclear century awaits. O

22 James Marson, Jane Lytvynenko, and Serhii Bosak, "Inside Ukraine's daring 'operation Spiderweb' attack on Russia," *Wall Street Journal*, December 9, 2025, https://www.wsj.com/world/europe/ukraine-russia-drone-attack-operation-spiderweb-24d821ab.

23 For an excellent overview see Herbert Lin, "Artificial Intelligence and Nuclear Weapons: A Commonsense Approach to Understanding Costs and Benefits," *Texas National Security Review* v.8 n.3 (2025).

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Reading Russia's Nuclear Threats

Adam N. Stulberg

Since the full-scale invasion of Ukraine in February 2022, Russia has issued well over a hundred nuclear threats. The tough talk put to bed Moscow's reputation for responsible nuclear "custodianship," sparking debate in the West over the meaning of the Kremlin's intimidating nuclear rhetoric.

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Yet, the conspicuous gap between the bark and bite of the Kremlin's nuclear saber-rattling raises fundamental questions not only about how to decipher Moscow's coercive threats, but about how to formulate an appropriate Western response. President Vladimir Putin's initial cryptic threats caught international experts and policymakers by surprise, prompting restraint amid fear of a tactical nuclear detonation by Moscow to stave off Kyiv's counter-offensive in 2022. Once those fears proved unfounded, many observers concluded that the Kremlin's nuclear threats lacked credibility and chastised Western policymakers for delaying vital military assistance to Kyiv. This optimism about the hollowness of Putin's nuclear threats, however, has been subsequently tested by Moscow's successive setbacks on the battlefield and Ukraine's increasingly bold airstrikes deep into Russian territory. The mounting pressure on the Kremlin has raised the specter of a turning point in the war, elevating both the credibility of Moscow's intimations of a nuclear backlash and risk of inadvertent escalation. Parsing the opaque nuclear rhetoric, therefore, is critical to managing fear and resolve in standing up to foreign aggression across the international system.

Unfortunately, several realities exposed by the war in Ukraine confound making strategic sense of Putin's nuclear threats. The fast-paced innovation conducted during the war is blurring established notions of thresholds between nuclear and non-nuclear escalation. Moreover, just as the "fog of war" is becoming increasingly dense, the prospects are dimming that respective strategic signals sent by Russia and the West can be received as intended. Entrenched suspicion—compounded by the evisceration of established confidence-building forums and volatility of post-conflict remilitarization—mar the promise that Russia and the United States/NATO can seize on even the lowest-hanging fruit for risk reduction. In addition, the Russian approach to coercion diverges significantly from classic assumptions about deterrence and escalation, presenting different meanings of red lines and methods of nuclear signaling. As they struggle to sift through what is old and new in this complex environment, Western analysts and policymakers should turn to applying novel digital tools for deconstructing the internal logic and gravity of Russia's nuclear threats, while prioritizing resilience to blunt Moscow's aggressive opportunism and deter future nuclear adversaries.

The Morphing Character of War

The changing character of war shapes the context for interpreting Russia's nuclear threats and the ensuing risks of inadvertent escalation. Moscow and Kyiv have shifted from reliance on heavy mechanized units to the use of cheap and accurate swarms of drones and robots to inflict nearly 80 percent of the destruction on the battlefield. This is tied to a swelling ecosystem of semi-autonomous, AI-supported dual-use



A handout image from Ukraine's Energoatom shows damage to a spent nuclear fuel storage facility, following what the company said was a drone strike, amid Russia's attack on Ukraine, near Chornobyl, Ukraine, in this undated image released June 7, 2026. Energoatom/Handout via REUTERS

tools. Accordingly, Western and Russian defense experts now openly refer to the emergence of a "transparent battlefield," whereby the strategic significance of core operational elements to traditional warfare—mass, maneuverability, survivability, sensor-shooter links, centralization, and linear R&D-to-acquisition processes—are fundamentally contested by the application of emerging technologies.

Take for example strikes into an adversary's hinterland that are rapidly blurring the distinction between conventional and nuclear operations. By projecting power with drones and sabotage, dubbed as "long-range sanctions" by Ukrainian officials, Kyiv has effectively taken the fight deep into Russian territory, including attacks on strategic bombers used to deliver nuclear capabilities. Although these small-scale, intermittent assaults do not constitute the classically envisioned surprise nuclear first-strikes, they underscore the vulnerability of traditional basing modes to inspired planning. This development complicates the calculus of the survivability of Russia's nuclear deterrent forces, possibly instilling fear of a declining strategic trajectory. Here, the cumulative costs incurred by piecemeal strikes on Russia's strategic assets may justify the risks associated with launching a preventive nuclear attack against a non-nuclear foe.

Russia's strategic predicament stands to

worsen with the proliferation of increasingly cheap, autonomous long-range cruise and ballistic missiles that carry ever larger payloads. As NATO members and other countries along Russia's periphery come to rely on such accessible offensive missiles as a hedge against Moscow's future aggression, they could readily excite the latter's enduring insecurity over strategic depth. The anxiety could place greater pressure on the Kremlin to turn to limited nuclear first-strike options early in future low-level militarized conflicts with a diverse set of non-nuclear rivals and, possibly, their Western nuclear allies. The latter could entail following through on Moscow's nuclear threats, including precipitous resort to tactical nuclear *fait accompli* in Ukraine or elsewhere along Russia's immediate periphery. Growing domestic pressure on the Putin regime may only reinforce this calculus.

Russia's repeated nuclear threats to deter Kyiv from retaking the Zaporizhzhia nuclear power plant and strikes on Ukrainian spent fuel facilities, also can induce inadvertent escalation. The attacks elevate risks of radiation release, underscoring the existential stakes of the war for Kyiv. At the same time, Moscow's nuclear intimidation may inadvertently encourage Kyiv to perpetuate the deep attacks on Russia's strategic assets described above. The blowback of advanced disinformation or false flag operations, that blanketly attribute attacks on the nuclear facilities to Kyiv, also fortify Moscow's own nuclear rhetoric in this dangerous spiral.

A s psychological and political burdens mount to keep pace with each revolution in the compressed operational innovation-countermeasure cycle—occurring over several weeks on the contemporary battlefield—misperceptions could intensify just as confidence in escalation dominance wanes.

The accelerating speed of innovation at the operational level also aggravates problems of strategic misperception and miscalculation. Armed conflict in the shadow of nuclear weapons is not new, with mutual deterrence among nuclear weapons states and their proxies presumably placing a ceiling on escalation. Yet, as psychological and political burdens mount to keep pace with each revolution in the compressed operational innovation-countermeasure cycle—occurring over several weeks on the contemporary battlefield—misperceptions could intensify just as confidence in escalation dominance wanes. The dynamic adds pressure on decision-makers to jettison prevailing assumptions of a linear progression from low-intensity conflict to nuclear

war. This can include taking short-cuts up the metaphorical ladder of nuclear escalation, as well as precipitous action across multiple domains of competition that can catch adversaries by surprise. Both pathways risk creating less predictable and more complex opportunities for sudden escalation that can confound judicious assessment of threats and resolve among rivals.

Uncertainty Compounded by Resentment

New scenarios for nuclear escalation are Janus-faced. Just as AI-supported technologies disrupt established norms and forms of warfare, they introduce opportunities to deflect or counter the effects, including capabilities to detect network vulnerabilities and preempt an adversary's surprise attack. However, the abilities to distinguish these scenarios, as well as risk from uncertainty in Russia's nuclear discourse, are more difficult sans a robust Euro-Atlantic security architecture. Even with progress towards a ceasefire in Ukraine, the fluidity of future disengagement arrangements and post-war remilitarization will raise the bar for transparency and verification. Yet, the breakdown in strategic communication and deep political distrust sowed by the invasion put diplomacy on the back foot when proactive confidence-building will be most needed.

The gutted bilateral US-Russian arms control architecture makes it increasingly difficult to identify nuclear thresholds amid the "fog of war." The expiration of the 2010 New Strategic Arms Reductions Treaty, the last remaining bilateral nuclear arms control agreement, effectively removed carefully crafted transparency protocols. For all its limitations, the reciprocal on-site inspections of deployed and non-operational systems, as well as data exchanges and confirmation procedures, provided a technical baseline for monitoring obligations and detecting strategic deception. The loss of these intrusive verification mechanisms, coupled with the lull in substantive military dialogue over strategic stability, deprives the leaderships of established channels for holding each other to account.

At the same time, the default to unilateral measures for interpreting the other's strategic behavior portends a yawning "understanding gap" during a period of fluid rearmament and warfare transformation. Invigorated investment in ubiquitous space-based and cyber capabilities, as well as mass arsenals of cheap AI-supported long-range drones and missiles, are obscuring lines of escalation and muddling risk assessments. They present new challenges to uncovering novel and non-linear pathways to nuclear escalation, unpacking vulnerability and restraint across domains, and establishing norms for keeping humans in the loop of nuclear command and control. Accordingly, strategic stability talks of the future will require leveraging opportunities for innovative formats while summoning concerted political will to convey credible commitments to implement unprecedented transparency.



Russian of the world's largest nuclear explosion, caused when the Soviet Union detonated the so-called Tsar Bomba in 1961. (Reuters)

The toxicity to Russia's relations with the West fuels mutual intransigence and suspicions that can stymie even the best intentions of both sides to look beyond the intimidating nuclear rhetoric. Moscow has made it clear that it will only consider re-engagement in mutually beneficial strategic stability and arms control negotiations with a reboot of the overall US-Russia relationship; it will not return to pre-2022 approaches that compartmentalize strategic issues to calibrate risks of escalation. But problems for parsing nuclear threats run deep, as the intensity of mutual resentment sap the political will needed not only to transcend assumptions of hostile intent and worst-case planning, but to envision new processes and endpoints to guide constructive engagement. Even after the war is settled, strategic distrust will loom large over military regeneration and the interpretation of stability across Europe, rendering any notion of

forgiveness associated with reciprocity in deescalation hard to fathom. One side's sincere gesture of restraint could be readily misconstrued as a bargaining ploy, thus elevating the political costs to taking a chance on compromise or synchronizing unilateral de-escalatory steps. Amid the intense acrimony, shared interests alone at avoiding catastrophe, that is otherwise required for coordinating nuclear risk reduction or the non-interference with respective national technical means of verification, will be hard pressed to carry the day. The bar will be significantly raised for realizing altogether new horizons for arms control to stem AI-driven strategic challenges, especially if the parties embrace alternative approaches to coercion and restraint.

Schrodinger's Cat

Faced with intense uncertainty and protracted distrust between Russia and the West, experts and decision-makers must increasingly rely on sound assumptions and analytical frameworks to deduce links between the ends, means, and ways of nuclear diplomacy. However, the current state of debate over nuclear deterrence in Russia's war on Ukraine resembles the famous thought experiment from quantum mechanics whereby the observed phenomenon—deterrence—is observed to be effective and ineffective at the same time. While referencing common understandings of credibility, resolve, and restraint, proponents of alternative theories are stalemated over lessons for deterrence and stability drawn from partial evidence. For example, one camp downplays Putin's nuclear threats as cheap talk or has confidence in deterrence. The lack of a nuclear detonation is treated as restraint, ascribed either to Russia's propensity to bluster out of weakness or to the sobering effects of nuclear weapons. Critics of this view, however, presume that the Kremlin is resolved to use its vast arsenal of non-strategic nuclear weapons. Moscow is simply looking for the right moment to marshal a nuclear response to repeated Western transgressions of its red lines, the mounting toll of the war, or a proclivity to impose victory. But is the absence of nuclear war amid rampant nuclear threats evidence of stability or a sign of the Kremlin biding its time? By leaning into common understandings of nuclear coercion and deterrence, this debate

But is the absence of nuclear war amid rampant nuclear threats evidence of stability or a sign of the Kremlin biding its time?

raises fundamental questions that cannot be conclusively addressed by narrow focus on capabilities and behavior.

As Albert Einstein famously opined in response to Schrodinger's thought experiment, the key to transcending the indeterminacy of external measurement rests with exploring hidden variables and inner-workings—in this case the content, context, and coherence of Putin's coercive threats that do not comport with basic precepts of classic Western deterrence theory. Recent research demonstrates that his sporadic literal references to "red lines" seem less about making nuclear deterrence explicit or demonstrating credibly, and more indicative of muddled musings intended to grab attention and stoke confusion.[1] Putin uses positive (threats to employ force), negative (references to seeing no need to respond with excessive force or nuclear weapons), and dismissive (denials of possessing red lines and claims of being misunderstood) rhetorical constructions that together obfuscate meaning. His more prevalent implicit red lines, however, appear "consistently inconsistent" regarding threats, lines, and consequences. Similarly, Putin's explicit nuclear discourse neither systematically responds to US nuclear threats and posturing, nor hues closely to traditional Soviet practice of following the apogee of a crisis or presenting as a *fait accompli* attendant to conventional offensives. Rather, Putin has been equally prone to issue red line and nuclear threats before, during, and after prospective external trigger events—including upticks in US nuclear signaling, NATO lethal military assistance, Ukrainian deep strikes, or Western sanctions. Aside from a few discrete periods—particularly in fall 2022 and fall 2024—Putin's red lines also generally do not overlap with his explicit nuclear discourse. Rife with ambiguity—both in content and timing—Moscow's red lines and nuclear threats hardly appear to be part of concerted efforts to demonstrate resolve as expected from classic approaches to deterrence.

Rife with ambiguity—both in content and timing—Moscow's red lines and nuclear threats hardly appear to be part of concerted efforts to demonstrate resolve as expected from classic approaches to deterrence.

Without better insight into Putin's strategic rationale for nuclear blustering, it is hard to know if Western deterrence has been effective or simply lucky. This is es-

1 Stulberg, Adam N., De Spiegeleire, Stephan, "Putin's Red Lines Lost in Translation," Contemporary Security Policy (*Forthcoming*, 2027)

pecially challenging as alternative logics seem to be at play with Putin's nuclear and non-nuclear coercion. A deep dive into the construction of his red line and nuclear threats, for example, reveals distinct patterns in threats, thresholds, and consequences. When it comes to his explicit nuclear intimidation directed at the West, there is a pronounced combination of clarity in rhetorical threats and targets, coupled with ambiguity of consequences. This resembles the famed deterrence logic associated with "threats that leave something to chance" premised on manipulating risks. Yet, Putin's frequent open-ended red line allusions are marred by opacity across all internal dimensions that challenge established modes of demonstrating credibility, resolve, and risk-taking. They are more consistent with the classic Russian "reflexive control" strategy. The latter is characterized by hyping uncertainty and confusion; shaping an adversary's strategic predicament; and choreographing its responses through indirect, subtle, and deniable influence gestures. This form of "cognitive warfare" is rooted in opportunism that betrays a reticence for nuclear risk-taking. With the transformation of warfare that is blurring operational pathways for hori-



Russia's President Vladimir Putin (5th L) visits the National Defence Control Centre (NDCC) to oversee the test of a new Russian hypersonic missile system called Avangard, which can carry nuclear and conventional warheads, in Moscow, Russia December 26, 2018. Sputnik/Mikhail Klimentyev/Kremlin via REUTERS

zonal and vertical escalation, it remains unclear which strategy—opportunistic probing or competition in risk-taking—informs Russia's specific nuclear threats and how they will be received under these changing strategic circumstances.

Towards an Analytical Refresh

Thankfully, there are better ways to interpret Russia's imprecise nuclear intimidation than by strictly monitoring capabilities and debating the Kremlin's intent. The growing complexity and acrimony also warrant a rethink of the analytical benchmarks by which we judge deterrence and stability. The latter necessitates relaxing assumptions that mirror-image an adversary's strategy, turning focus on capturing the reality of patterns in what, how, when, under which conditions, and to what effect Russia's threats are issued in the first place.

A holistic understanding of Moscow's nuclear saber-rattling starts with a "3-D" mapping of the threat landscape. Advances in digital tools and AI information processing offer new avenues for illuminating multidimensional patterns in adversarial strategy and behavior to inform the selection of specific theories of the case for assessing nuclear threats. With judicious adherence to analytical guardrails, frontier large language models (LLMs) in particular offer promise for refining datasets at scale, devising robust substantive taxonomies to extract nuanced patterns in discourse, and integrating multi-media sources to visualize non-linear insights. Leveraging AI with subject matter expertise in this regard augurs well for greater fidelity at identifying trends in Russian discourse and behavior to expose the contours of change to Russia's way of war. Doing so can facilitate empirically grounded, wide-angle understandings of operative logics, thresholds, domains, and modalities of escalation and restraint surrounding Moscow's nuclear allusions. This can illuminate non-obvious points of convergence to inform coordinated risk reduction, if not deeper forms of constructive engagement as the relationship with Russia evolves.

There also is a need to explore creative methodologies for reassessing alternative pathways to nuclear escalation. The dynamic strategic landscape challenges prevailing assumptions of reciprocity, cost-benefit analysis, and risk-taking at the crux of nuclear bargaining. Leaning into empirically anchored knowledge to inform AI-generated "trusted" scenarios, red teaming, and interactive simulations will help to expand analytical prisms. This can prepare analysts, defense planners, and decisionmakers to distinguish conditions ripe for high-risk nuclear escalation from those of horizonal cross-domain opportunism. They will be well positioned to comprehend how Russia's lessons from the "transparent battlefield" in Ukraine are bumping up against those gleaned in the West, China, and elsewhere in order to discern the strategic significance of future nuclear threats.

Finally, Western leaders should adapt their own playbooks to calibrate ap-

propriate responses. Given the opportunistic rationale behind Putin's red line threats, NATO allies should place resilience at the forefront of strategy. Western leaders can blunt Russia's opportunities to exploit vulnerabilities by strengthening critical infrastructure and supply chains through redundancy as well as preempting Russian disinformation. Resilience can complement strategies of deterrence by denial and punishment by shrinking the surface area of hybrid attack and easing recovery to bid up the internal risks to Russia's embrace of reflexive control. With little to show from its opportunistic gambits, Moscow would be forced to settle for fewer or episodic gains, if not discouraged altogether from mounting futile offensives. It also facilitates flipping the script to advance favorable Western asymmetries, especially in the space, energy, and information domains, as well as in emerging markets for foreign military assistance. Such competitive strategies will compel Moscow to confront the limits to risk-taking below the nuclear threshold. At the same time, by remaining attuned to punctuated signals conveyed by the Kremlin's overlapping red line and nuclear threats, Western decision-makers can gain greater purchase on the dangers of pushing too hard amid changing strategic and political landscapes. The greater clarity surrounding these episodic nuclear threats should alert policymakers to reassess their own commitment to risk-taking, while integrating conspicuous elements of reassurance to bolster the credibility of open-ended escalation options. O

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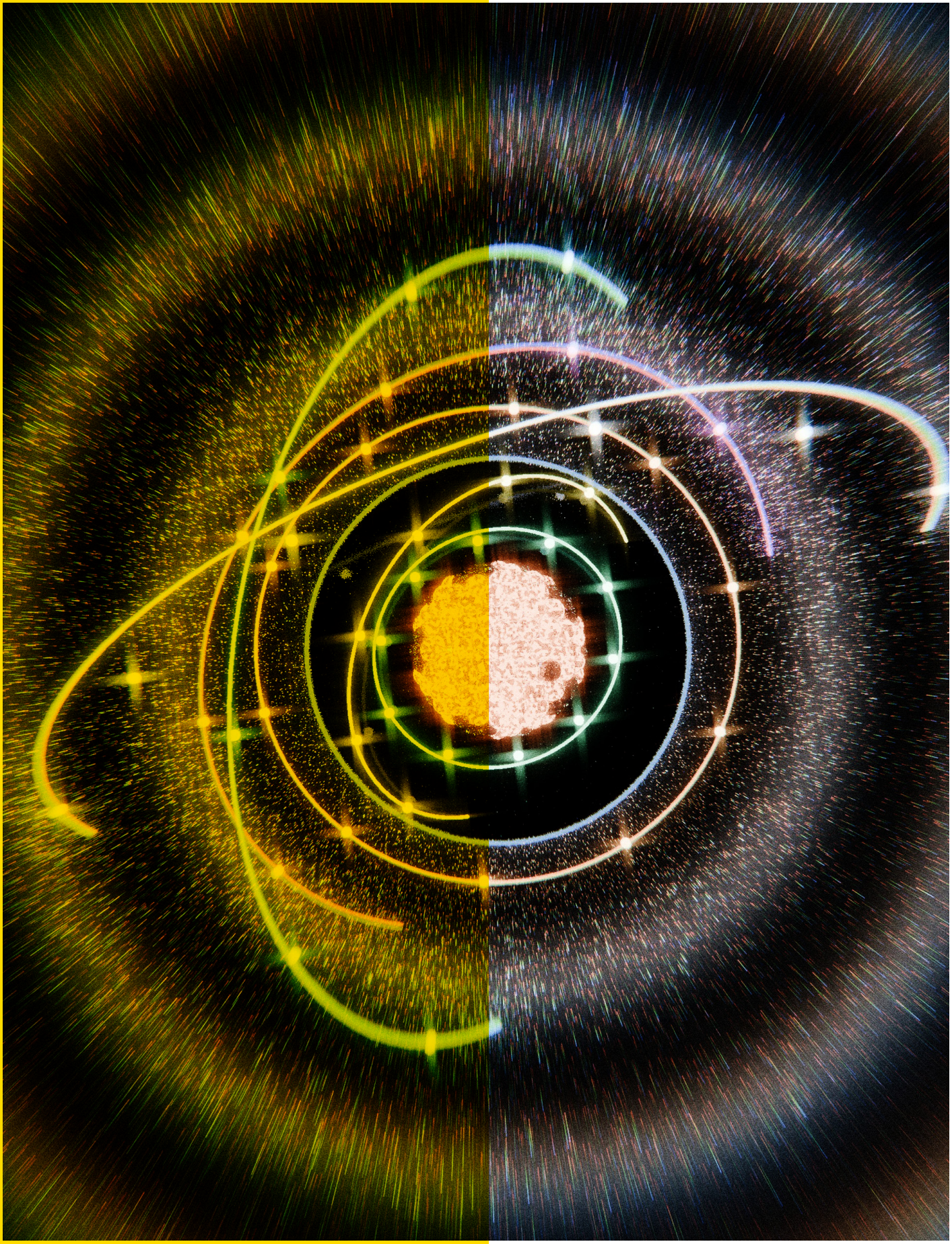
An AI Driven Nuclear Age

Paul Bracken

The world is in an AI-driven second nuclear age. Over the next 15 years international security will become intrinsically more dangerous, perhaps unacceptably so. This is not the result of any specific US policy, or of any other country's strategy. Nor does it follow from how conflicts currently underway turn out. The danger arises for deeper structural reasons.[1]

1 This paper is based on my forthcoming book, Paul Bracken, *New War Machines: The Nuclear Age and Its Dangerous Successors* (New Haven: Yale University Press, 2027).

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One is that a collection of new technologies is changing the nature of warfare. Militarized AI, cyber, space weapons, and new kinds of political warfare. Many items on this list are interconnected by AI.

Another structural change is the return of nuclear weapons to strategic competition. Nuclear weapons are even more deeply embedded in the international system now than they were in the Cold War. This is the case for superpowers and now for second and third-tier countries. While the "classic" nuclear dangers of the Cold War are recognized, those of successor worlds—our world—are not. They will have to be discovered along the way, and the world is only at the beginning of this learning curve. What few people recognize is that new AI technologies will unavoidably spill over into nuclear forces and strategy. The consequences of this are too jarring, too unsettling to think about at the present time. But this will change by necessity as that process unfolds.

The third factor that makes successor worlds to the first nuclear age dangerous are major shifts in international power. This stems from changes in economic clout, business, and the spread of advanced technologies to many parts of the world that historically have had little access to them. Others increasingly have access to advanced technology. This has major consequences in both peace and war.

New Technologies

Technology and innovation will play an outsized role in strategic competition in the future, even more than it has in past. AI is the standout exemplar. But other technologies are undergoing extraordinary innovation as well. Cyber, weapons in space, hypersonic missiles, precision strike, missile defense, autonomous weapons, drones, lasers, stealth, superintelligent machines, hyperscale data centers: these technologies are revolutionizing warfare. They are changing competition just as they have in virtually every business, from automobiles to retail and from communications to health care. Competition based on technology and innovation is much more unpredictable than standard forms of rivalry. This is because performance is highly uncertain in the beginning. Moreover, no advantage lasts very long because others copy it or come up with something better. Each performance improvement leads to a counter that tries to offset it. Agility—the ability to change direction quickly—becomes a significant competitive advantage. As a result, much more effort has to go into research and development, both to stay ahead of rivals and to keep a close eye on what competitors are doing.

AI, in particular, is transformative in many different parts of the military. Here, I define AI in the common, widely used sense of the term: computer systems performing tasks that would typically require human intelligence. It will have such wide-ranging consequences that it is difficult to make broad generaliza-



US.service members monitor screens aboard the Freedom-class variant littoral combat ship USS Wichita (LCS 13)during the annual Fleet Experimentation (FLEX) 2026 event which integrates commercially developed unmanned systems and artificial intelligence with traditional manned naval platforms. (US Navy)

tions. It's better to get into specific applications of AI, much the way business schools frequently use case studies to teach broader lessons.

One major application of AI applies its computational power to the problem of tracking and destroying *mobile* targets—those whose survival depends on movement, hiding, or relocating. Examples are aircraft carriers, satellites, leadership groups, airplanes, submarines, and many missiles. Such targets have been around for a long time, clearly, but until quite recently they could not be reliably tracked. AI in combination with other technologies like cyber, phones hacks, computer vision, sensors in space, and drones provide a new capability to track—and destroy—these moving targets.

A business example shows how this works. It is highly suggestive of what is going on in the military in the United States and China now, as will be made clear.

US automobile insurance companies offer downloadable apps for your phone. A customer receives a discount on their insurance premium if they download the insurer's app, so there is an incentive to do so. The downloaded app accesses other parts of the phone, especially GPS and the cell phone network. Given this access, the insurance company can track how fast you accelerate from a

red light. Should you run a stop sign without slowing down, they will know. They can record your speed, where you go, and even how many left turns you make—left turns lead to more accidents than right turns.

The insurance company integrates this data into a behavioral life pattern of the customer. They can look to see how your driving changes after you've been out to dinner and perhaps had a drink or two. They can see how your driving changes after one hour at a pub, or after two hours. In the near future, they will have ways to turn off your car if you drive erratically. China has this ability today.

If you add a new driver for the car, such as a teenager, they can determine from the driving pattern whether it's you driving the car or the teen. Should you claim the teens aren't allowed to drive the car, they can determine if they are doing so, or whether you are driving.

AI can process all the diverse data on this "mobile target," your automobile. They can compare your driving to other drivers. Moreover, and this is important, the company can scale the tracking because the data is in digital form. The data is used to train their AI models. State Farm insures 45 million automobiles in the United States. Their algorithms set your premium and decide whether to terminate your policy. A cancelation notice is immediately sent to the insured customer, and perhaps to the Department of Motor Vehicles.

Almost every business school in the United States has courses that go into the processes used by AI to track customers. There are case studies of DoorDash, Uber, and Amazon on their algorithms and processes. AI for mobile tracking is even more advanced in China than it is in the United States.

A big difference between commercial and military applications of AI, obviously, is that the former are cooperative targets. In the military they are not. Nonetheless, there is a tremendous amount of data that exists for moving military targets. Data collectors include satellites, drone video, heat (infrared) signatures, radar tracks, sonar, telephone hacks, computer breaches, gravitational and electric field disturbances, telemetry, automated license plate readers, security camera hacks, radio intercepts, and data from tracker beacons. Each of these is an "information touchpoint." There is an extraordinary amount of information in aggregate about moving targets because the data is updated frequently. This is one reason why hyperscale data centers are sprouting up everywhere—storing and processing this data is a major challenge.

Downloaded apps to mobile devices like phones and tablets are as useful to military intelligence as they are in business delivery services. Tracking apps may be concealed into social media accounts, sports betting apps, contests, or a special discount. Such "cover" apps conceal intelligence tracker software of various kinds. These apps can be disguised as automatic system updates, or people can be enticed to download them with a promise of winning a free meal.

Users, of course, would have no idea they were being used by an enemy intelligence service. Enemy soldiers, say, assigned to a missile brigade could be tracked without their knowledge or cooperation. Their proximity to nuclear warhead storage sites, launch sites, or support centers could then be estimated. This is where machine learning comes in. Data collected for years of military exercises could be used to map out the timing and spatial layouts of, say, an enemy missile brigade as it sets up to fire. Patterns in timing and physical distances would emerge. These patterns would tip an observer off about the purpose of the exercise. In this manner one could learn about the brigade's vulnerabilities that even its commanders were unaware of. For example, they might find that certain trucks break down frequently and cannot be relied on to carry out their role with reliability.

We can take this example a step further. Suppose that in addition to tracking mobile phones with covert apps installed on them there are additional data streams: computer email/text hacks, radio intercepts, or drone video of the brigade. Data from these sources could be combined into an overall picture of the missile brigade. This leads to something called multimodal AI, meaning there are multiple modes of description of the target's behavior pattern. It is not hard to see how this could be useful for targeting purposes.

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Militarized AI has many other applications. One is that it integrates the weapons used to destroy a target into the tracking process. AI can synchronize surveillance, sensors, and shooters. Synchronization of killer drones, aircraft, and missile readiness is complicated. AI drives the kill chain that ensures its parts are coordinated to destroy the target.

AI powered cyber-attacks are another application. The key driver here is AI's ability to analyze cyber defenses very, very fast. Moreover, they can do this analysis for large scale cyber defenses. What used to take months and years to locate weak spots can now be done in much shorter time periods because computer search can go through billions of lines of code in far shorter time. The implications of this for cyber war are enormous.

There are many other applications of



An exhibition attendee uses a virtual reality armored vehicle training software during the «Eurosatory» defense exhibition, on June 26, 2026, in Paris, France. Justin Yau/Sipa USA via Reuters Connect

militarized AI. Autonomous weapons, cryptography, and new kinds of political warfare are coming and are described in my cited book. We are only at very beginning of the learning curve for this.

It is hard to believe that these applications will not spill over into nuclear forces and strategy. After all, these weapons are key targets because they can do so much damage. In addition, the broad shift in nuclear force structure in recent decades is to make nuclear weapons mobile. They gain survivability by moving, hiding, or relocating. Since nuclear stability depends on survivability after a first strike, a technology that undermines their survival, like AI, has enormous consequences for national leadership decapitation, destroying mobile nuclear missiles and ships, and blinding enemy satellites. The technologies to do

this are in gestation right now. They are not yet ready for employment at scale, but they are growing in performance and budget.

Further advances are based on digital technology. This means that they are likely to be scalable in ways that older innovations based on industrial capability were not. To produce tanks, ships, and missiles at large scale is difficult in the United States. History shows this. The new AI technologies give a much bigger, faster bang for the buck.

Possibilities for creative thinking are wide open in this field. Audacity, guile, and deceit play a key role. They could be more important than technical innovations. Press reports of military use of AI in the wars in Gaza, Lebanon, and Iran show this. For all of these reasons AI is certain to spill over into the world of nuclear forces and strategy.

The Nuclear Context

No country today is giving up its nuclear weapons. Every nuclear-armed state is enlarging or modernizing its force. As a result, the nuclear context of international affairs is "thickening." The background, setting, and circumstances that shape how international politics, crises, and wars are seen will increasingly have nuclear weapons in it as a factor. The question of "where things might go next" in a conflict or a crisis will be shaped to a greater degree by this nuclear context more than it has been since the days of the Cold War.

China's nuclear break out is the most jarring example of a thickened nuclear context. It is big and bold, with intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), bombers, medium range missiles, new warheads, expanded testing facilities, and satellite-based warning and navigation systems. The breakout is accelerated. Beijing could have rolled out a larger nuclear force slowly, over many years. Instead, Beijing chose to compress development into a small number of years.

China's nuclear breakout is an intellectual shock because few experts in the 2000s and 2010s thought China would develop into a nuclear superpower. Now, nuclear parity with the United States is coming in the early 2030s. We do not know if the buildup will stop there, at parity. Beijing could go for nuclear su-

Every nuclear-armed state is enlarging or modernizing its force. As a result, the nuclear context of international affairs is "thickening."

periority. I can think of a wide range of future possibilities for a nuclear China except one: China's returning to minimum deterrence.

Russia, for its part, is building new kinds of nuclear weapons: a megaton "tsunami-maker" autonomous torpedo, giant ICBMs carrying 8 to 15 hydrogen bombs, orbital nuclear weapons. At the same time, Russia's conventional army and navy have been shown to be dysfunctional in the war in Ukraine. This is an example of a new danger that is yet to be identified and named. I call it a "half made" military. It is a "modern" military with advanced technology weapons like AI, cyber, drones, and nuclear weapons. It has "half" of a modern force in technology. What it doesn't have is the "other half," of a modern force: training, organization, and system integration.

In the nuclear age, a half-made military is a danger to itself and the world. This is because it may be forced into a position where it has no other options to defend itself except the use of nuclear weapons. I very much doubt that Russia will be the only example of a half-made military in the years ahead.

India's nuclear weapons also are modernizing. Delhi has a more complex nuclear structure now. It has a nuclear triad, a three-tiered nuclear force, like the Cold War superpowers had. ICBMs form one leg of its triad, SLBMs are a second leg, and bombers make up the third leg. This gives Delhi a reliable second-strike capability against China or Pakistan because the triad concept is that at least one part will survive a first strike to retaliate.

Pakistan and North Korea are building nuclear weapons and missiles as fast as they can. Both have weapons with short, medium, and long-range capabilities. North Korea, in particular, has operational ICBMs that can reach the United States. In the 2030s they will have many more of these.

North Korea will not have a high-tech nuclear force like the United States, Russia, or China. They will not have space-based warning satellites and modern command and control. It is likely to be more accident prone for this reason if it is pushed too far in a crisis. Indeed, that is the main point. No one in their right mind would want to press North Korea too far with its "jittery" nuclear command and control. It just might go off—to launch something at someone.

North Korea will possess an adequate deterrent against the United States based on a large missile force—and on Pyongyang's inability to control it if it were raised to high alert level. Call it a threat that leaves something to chance.

What is also interesting is the emerging competitive dynamic between North Korea and the United States. Pyongyang may plan a nuclear force against a US conventional counterforce attack. In other words, North Korea would size its nuclear force against a conventional attack that exploits the new AI and related technologies that allow the United States to track mobile missiles. This is quite a change from the "classic" Cold War dynamic, which assessed nuclear

weapons versus nuclear weapons. Missile exchange models, accuracy, and the number of warheads on a missile (MIRVs) described that competition. Now, we are looking at something quite different: An assessment of the military balance has to compare nuclear versus conventional weapons. AI drives a conventional counterforce attack against an opponent with mobile nuclear missiles.[2] This leads to a very different kind of competition than in the Cold War. Again, we are only in the early stages of this learning experience.

Even France and the UK are getting into nuclear modernization. Paris worries over its ability to penetrate the new technologies of missile defense. Consequently, the French have a multiple-warhead hypersonic missile in development. The UK has a massive nuclear modernization underway too. It includes new warheads and submarines, and nuclear capable F-35s.

The outcome of the war in Iran will likely have a large impact on what Israel does on nuclear issues. Though this eventuality is uncertain, it is hard to imagine that Israel's response will be to reduce its nuclear forces.

The United States has its own nuclear modernization underway. The legacy triad of bombers, ICBMs, and SLBMs is receiving replacements in the B-21 bomber, the Sentinel ICBM, and the Columbia class of submarines. Command-and-control improvements and new warheads also are in the works. So too is "thicker" missile defense for living in a nuclear world where more countries have these weapons.

Still another part of the US modernization is nuclear-capable F-35 aircraft. A new warhead, the B61-12 precision guided thermonuclear gravity bomb, has been developed for this mission. This brings together the stealth technology of the F-35 with AI-driven target tracking of mobile missiles described above. It further shows how advanced technologies—stealth and militarized AI—spill over into US nuclear forces and strategy.

Taking together these national trends

An assessment of the military balance has to compare nuclear versus conventional weapons. AI drives a conventional counterforce attack against an opponent with mobile nuclear missiles.

2 See Paul Bracken, *The Hunt for Mobile Missiles: Nuclear Weapons, AI, and the New Arms Race* (Foreign Policy Research Institute, 2020).



Pakistan's nuclear-capable air-launched «Ra'ad» cruise missile is driven past during the National Day military parade in Islamabad in this March 23, 2008. REUTERS/Mian Khursheed

means that nuclear weapons are more deeply embedded in the international system than they were even in the Cold War, the first nuclear age. That world had two nuclear superpowers that mattered. There were other smaller nuclear powers, like China, France, the United Kingdom, and Israel. But for the most part, the smaller powers didn't matter in the overall strategic rivalry. They were contained in taut disciplined blocs like NATO or they were greatly dependent on a superpower, like Israel was on the United States. The two superpowers drove the strategic competition.

Today, in the second nuclear age, nuclear superpowers like the United States, Russia, and China still matter very much. But second- and third-tier nuclear states matter very much as well. They matter in ways that France, the United Kingdom, and China did not in the Cold War. For one thing, they have independent command and control. North Korea, Pakistan, India, and China really are independent decision-making centers. Others, like Iran were they to field a nuclear force, would be independent as well. This has far-reaching implications for war and peace in the years ahead. We are only beginning to understand what they are. The classic dangers of the Cold War are understood. But the new dangers of a second nuclear age are only beginning to be identified.

Can the World Absorb the Coming Arms Race?

It is useful to take a step back to understand the structure of the military technological world we are in. People worry about the nuclear arms race. They worry about militarized AI.

What I worry about is a *concurrent* arms race in all of the technologies—cyberwar, space, militarized AI, stealth, and nuclear weapons. In a few years we may have to add quantum computing to the list. It makes little sense to separate out the competition technology by technology. Each technology reinforces the other. What matters are the consequences that result from the synergy between them.

We need to change how we think about technology and war. In the Cold War, strategists and arms controllers had the luxury of a binary concentration on nuclear versus conventional weapons. Complex models were built on this dichotomy. But the days of this intellectual luxury are over: the familiar categories need to be rethought, repositioned, in a world with a wide array of new and *interacting* technologies. Our old strategic concepts were based on this separation of conventional and nuclear weapons.

But there is nothing sacred or immortal about old strategic concepts. We should be willing to look beyond old concepts and assumptions in regard to the new technologies. To label military AI, cyber, and space as "conventional weapons," and anything with a nuclear warhead on it as a "nuclear weapon" overlooks what the weapons in combination mean.

Admittedly, the old binary labeling—conventional and nuclear—is easier, intellectually speaking. Our strategic concepts and organizations use them for this reason. They are familiar. But continuing to call AI and cyber "conventional weapons" overlooks the far-reaching implications they have on nuclear stability and more broadly on the gestalt shift that AI, especially, is having on the world.

This leads me to question whether we understand the arms race that is now underway. It is likely to be unfathomable if it is analyzed with old intellectual capital and outdated categories. Countries are unlikely to see "only conventional threats" if AI driven counterforce targets their central nervous system and the brain of their armed forces.

The technological arms race is going to be very messy for other reasons beyond outmoded intellectual capital. The "newness" of the technologies themselves creates problems. We are early in the learning curve of each technology described in this paper. How they work together and how they are entangled with politics are only beginning to be identified. There is reason to doubt that a president, paramount leader, or a general staff may not understand their own forces. This has happened before in history.

The difference now is that the technologies are more complex, and more escalation prone because reaction times are so short. There is no time for human

beings to make all the decisions in the time needed. Algorithms—and AI—have to do it.

For these and other reasons some people believe that the coming arms race itself could be as dangerous as the threats it was designed to deal with. This belief extends to many countries. It only takes one country to make a lot of trouble for the United States. But there are many countries who will have the capability to do so. It is asking a lot to expect all countries with modern military technology to be prudent, risk averse, and conservative. There are more decision centers that matter. Some may not be cautious and careful. New military technology has spread and so have nuclear weapons. Absent a broader, sober analysis of the world that is coming we are in serious danger for reasons we do not yet even recognize. O

Paul Bracken

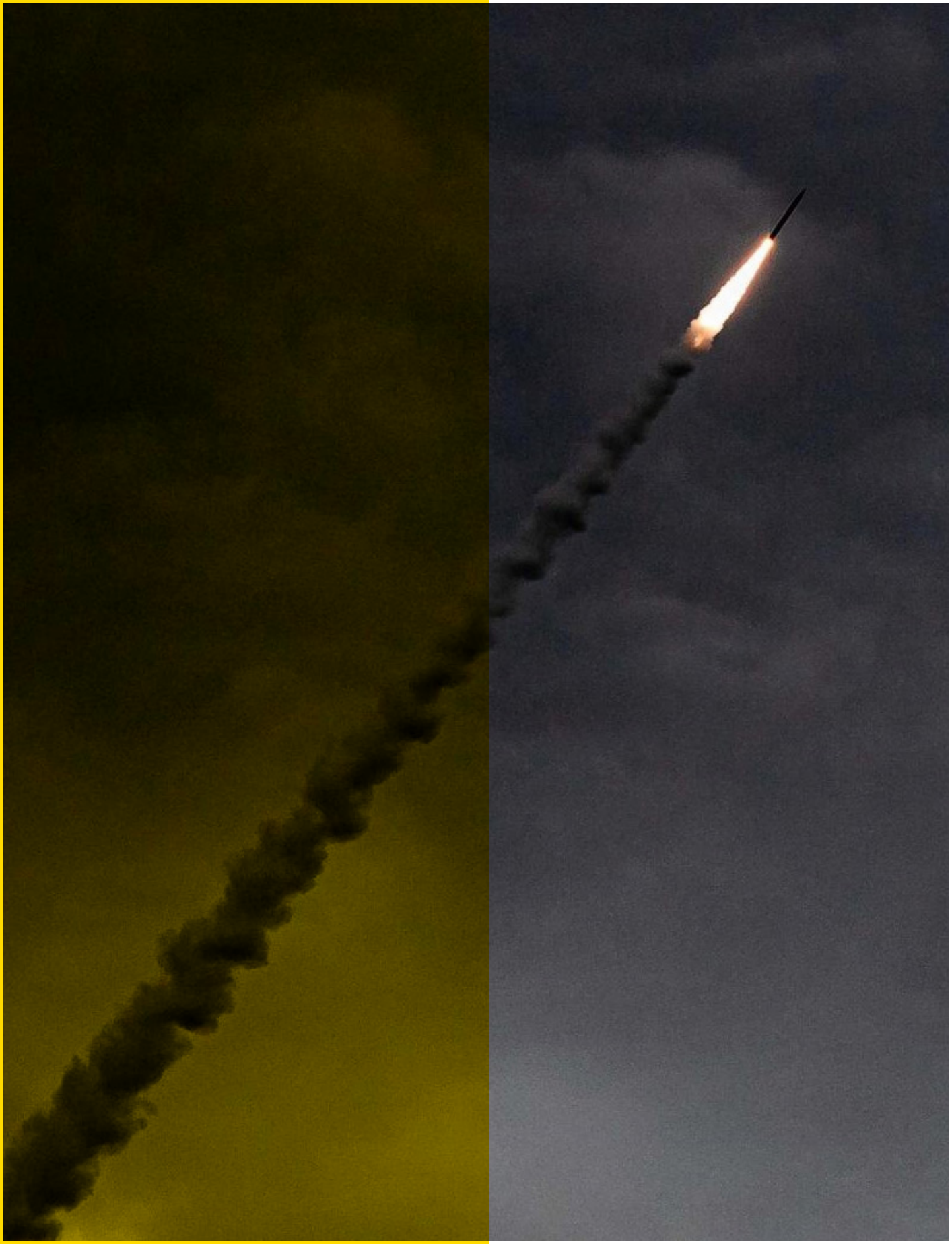
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Phantom Signaling: The Waning of American Nuclear Credibility

Amy J. Nelson

America's word on nuclear matters is losing value: Allies increasingly doubt its promises, and adversaries increasingly dismiss its accusations. This credibility problem is often diagnosed as a shortfall in US military capabilities. It is better understood as a failure of signaling discipline: the ability to deploy intelligence disclosures in ways that reassure allies and deter adversaries. This article introduces "phantom signaling," a growing problem in post-arms control nuclear statecraft. Phantom signaling is the invocation of intelligence to project resolve or reassurance without the evidentiary follow-through that makes a signal credible.

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It is "phantom" because the signal appears to be sent—the accusation is made, the guarantee offered—but nothing verifiable stands behind it. Intelligence is invoked but never substantiated. Deployed without defined thresholds (a stated line whose crossing triggers a response) or legible standards (criteria outsiders can see and apply themselves), intelligence becomes noise rather than signal, and disclosure becomes theater rather than statecraft: officials perform the act of signaling credibility without producing credible signals. Three recent cases show the same failure: the Intermediate-Range Nuclear Forces (INF) Treaty dispute, China's low-yield testing controversy, and the Iran nuclear program. In each, ***phantom signaling*** actively erodes the credibility on which deterrence depends. Adversaries learn that accusations carry no defined consequences, and allies learn that guarantees rest on evidence they cannot evaluate.

Introduction

In a multipolar nuclear order, a state's credibility—the belief that its threats and promises will be honored— is strategic capital. It shapes alliance cohesion and adversary risk calculations. Its durability can be spent to hold allies together, raise the risks that adversaries perceive in probing, and sustain norms that increasingly lack a treaty architecture to enforce them.

The United States has a growing nuclear credibility problem. Washington fields a large and sophisticated nuclear arsenal, maintains formal alliances with over 30 countries, and spends more on defense than the next several competitors combined. The problem is how effectively its threats and guarantees are believed—not necessarily the capabilities it has. What Washington increasingly lacks is signaling discipline across the full spectrum of nuclear statecraft: in its declaratory policy, in red-line articulation, in alliance assurances, and most acutely in the public invocation of intelligence. Deploying classified assessments in nuclear disputes is a particular kind of statecraft. It requires evidence that allies can anchor to, that adversaries cannot dismiss, and that compliance norms can absorb. Recent controversies over Russian treaty violations,[1] possible Chinese low-yield testing,[2] and Iran's advancing nuclear program[3] show what happens when that discipline lapses. In each case, US officials cited classified assessments while offering limited public evidence, undefined compliance thresholds, and ambiguous consequences. Used this way, intelligence becomes noise rather than signal.

1 US Department of State, «Russian Noncompliance with and Invalid Suspension of the New START Treaty,» 2021–2025, https://2021-2025.state.gov/russian-noncompliance-with-and-invalid-suspension-of-the-new-start-treaty/.

2 Joseph Rodgers and Joseph S. Bermudez Jr., «Satellite Imagery Analysis of China's Alleged 2020 Nuclear Test at Lop Nur,» Center for Strategic and International Studies, February 13, 2026, https://www.csis.org/analysis/satellite-imagery-analysis-chinas-alleged-2020-nuclear-test-lop-nur.

3 Mariel Ferragamo, Jonathan Masters, and Will Merrow, «What Are Iran's Nuclear and Missile Capabilities?,» Council on Foreign Relations, last modified March 4, 2026, https://www.cfr.org/articles/what-are-irans-nuclear-and-missile-capabilities.



Iran-made ballistic missiles and two satellite carriers are displayed at a war museum in Tehran, Iran, on April 2, 2026, amid U.S.-Israeli military operations in Iran. (Photo by Morteza Nikoubazl/ NurPhoto)

The architecture that once absorbed the credibility burden is thinning. As formal verification erodes, more of the work of maintaining nuclear stability falls on state signaling and reputation. In that environment, the difference between intelligence that signals and intelligence that merely generates noise is the difference between deterrence that holds and deterrence that drifts.

A Treaty-Thin World

For decades, formal agreements absorbed much of the credibility burden in nuclear politics—the work of making nuclear commitments believable—so that governments did not have to. Treaties defined thresholds of permissible behavior, established verification procedures, and provided institutional mechanisms to adjudicate disputes. They reassured allies that compliance would be monitored and communicated red lines to adversaries. That architecture is now significantly thinner. The INF Treaty is gone.[4] New START has lapsed.[5] The Comprehensive Nuclear-Test-Ban Treaty (CTBT) remains unratified. The Iran

4 US Department of State, «U.S. Withdrawal from the INF Treaty on August 2, 2019,» 2017–2021, https://2017-2021.state.gov/u-s-withdrawal-from-the-inf-treaty-on-august-2-2019/.

5 Nikolai Sokov, «End of New START: Short- and Medium-Term Options,» Vienna Center for Disarmament and Non-Proliferation, January 14, 2026, https://vcdnp.org/end-of-new-start/.

nuclear deal has collapsed.[6] As formal frameworks erode, that burden shifts to signaling—the actions by which governments communicate intentions, resolve, and reputation. Ultimately, that burden depends on predictability: whether governments have given adversaries and allies sufficient reason, through past conduct, to believe what they say and to predict what they will do.[7]

For adversaries, an accusation that names no threshold and carries no predictable consequence also provides no guidance about what behavior will actually be punished.

That shift creates a dual credibility problem. For adversaries, an accusation that names no threshold and carries no predictable consequence also provides no guidance about what behavior will actually be punished. Meanwhile, ambiguity about punishment invites probing (testing the line to see whether anything happens). For allies, credibility cannot function episodically; it must function continuously. Japan, South Korea, and NATO members should not have to reassess their security assumptions, weighing whether American security guarantees remain reliable enough to forego independent nuclear alternatives, every time Washington asserts, on the strength of intelligence it declines to share, that an adversary has crossed the line—an accusation of threshold-crossing that names neither the evidentiary standard it meets nor the consequence that follows. Allies are left to infer both what Washington believes and what it intends to do. The February 2026 China episode, discussed below, is the paradigmatic case of phantom signaling where accusations relied upon classified intelligence that was never revealed. In such a case, when a single signal must simultaneously constrain adversaries and reassure allies, its coherence is a strategic requirement, not a communications preference.

Extended deterrence raises the stakes further because it is where credibility is tested most directly. Unlike homeland deterrence, which rests on capabilities an adversary can count, extended deterrence depends on third-party perception: allies must believe not only that the United States possesses capability, but that it will interpret adversary behavior consistently and act

6 Amy J. Nelson, «What Iran Signals About the Future of Nuclear Arms Control,» New America, March 2, 2026, https://www.newamerica.org/insights/what-iran-signals-about-the-future-of-nuclear-arms-control/.

7 Amy J. Nelson, «After New START: The Case for Disciplined Ambiguity,» New America, February 23, 2026, https://www.newamerica.org/insights/after-new-start-the-case-for-disciplined-ambiguity/.

predictably on its commitments. If compliance standards appear fluid or evidence appears selectively politicized, assurance weakens over time, through accumulated uncertainty that manifests in hedging strategies, defense diversification, and political hesitation. Debates over indigenous nuclear options that were unmentionable a decade ago are now openly conducted in serious policy circles in Seoul, Tokyo, and European capitals. Credibility erodes gradually, then irreversibly.

The Discipline Is Harder Now

Nuclear statecraft has always required calibrating disclosures of sensitive information. During the Cuban Missile Crisis in 1962, President John F. Kennedy declassified U-2 imagery of Soviet medium-range ballistic missile sites for Adlai Stevenson's United Nations address,[8] while withholding the signals intelligence and human source reporting that had shaped the administration's threat assessment. Two decades later, the Euromissiles Crisis[9] demanded a different kind of calibration. NATO governments needed sufficient detail on Soviet SS-20 deployments to sustain domestic support for the 1983 Pershing II and GLCM counter-deployments, but disclosure had to stop short of compromising the collection methods that made continued monitoring possible. The demand for calibration is unchanged; the structural environment in which it must occur is not.

Three structural shifts have widened the gap between secrecy and credibility. First, nuclear signaling—the declarations, deployments, alert changes, and disclosures by which a state communicates what it would do with its nuclear forces—is no longer directed at a single audience. In a multipolar system, a message intended for one audience may unsettle another, forcing Washington to reassure allies, deter rivals, and manage escalation across several fronts at once. Second, the evidentiary bar has risen. Iraq's nonexistent weapons of mass destruction, mischaracterizations of progress in Afghanistan, and a series of contested intelligence claims since have left allies and adversaries discounting American assertions—even doubting them by default—in ways earlier generations of officials did not face: a discount earned outside the nuclear realm, now applied within it. Audiences that once deferred to official assurance now demand a demonstrable basis for a claim. Third, technological gray zones have widened. Low-yield testing, dual-use systems, and hypersonic delivery platforms blur compliance thresholds in ways that resist clear public explanation, and the burden of proof falls precisely on the kinds of classified assessments that are hardest to substantiate publicly.

Disciplined ambiguity—knowing what to reveal and what to withhold, and

8 Adlai E. Stevenson, «Address to the United Nations Security Council on the Presence of Nuclear Missiles in Cuba,» October 25, 1962, https://www.americanrhetoric.com/speeches/adlaistevensonunitednationscuba.html.

9 Susan Colbourn, Euromissiles: The Nuclear Weapons That Nearly Destroyed NATO (Cornell University Press, 2022).

why—was never easy.[10] The cost of getting it wrong is now higher.

When Intelligence Stops Signaling

In principle, intelligence disclosure is a tool of statecraft. It can establish behavioral standards, anchor compliance judgments, and demonstrate to allies that American security guarantees rest on something more than assertion.11 Three recent examples illustrate how this mechanism is now falling short. Each case exemplifies a distinct mode of phantom signaling: a sequencing failure in the INF Treaty dispute, a threshold failure in the China testing controversy, and a failure of message coherence in the Iran case.

INF Treaty

The INF Treaty dispute illustrates the sequencing failure, in which accusation, consequence, and evidence arrived in the wrong order. Beginning with the July 2014 State Department Compliance Report, the Obama administration publicly accused Russia of violating the INF Treaty—which banned both powers' ground-launched missiles with ranges of 500 to 5,500 kilometers—by developing a prohibited ground-launched cruise missile. The unclassified report did not name the system. Allies received private briefings but no material they could use to build public consensus against Russia's violation. The United States did not publicly identify the specific missile, the 9M729 (designated SSC-8 by NATO), until December 2017. The most detailed technical account of the violation did not come until Director of National Intelligence Dan Coats' November 2018 disclosure, weeks after the Trump administration had already announced its intent to withdraw from the treaty. The sequence inverted the logic of evidentiary signaling: accusation came first, the decision to withdraw came second. Substantive public substantiation came third, deployed to justify a choice already made. A disciplined sequence would have run the other way: substantiation released alongside the accusation, allied consensus built on a shared record, and withdrawal announced as the stated consequence of continued violation. By the time the United States completed its withdrawal in August 2019, no shared evidentiary record had ever been established. The signal of accusation had been sent, but the substance never had to follow. Russia's violation was real, but even a true accusation fails as a signal when substantiation arrives as justification rather than foundation.

China's Low Yield Tests

The low-yield testing controversy illustrates the threshold failure: an accusation sustained for years without ever specifying what evidence, or what level of yield, would constitute a violation. Beginning with the 2020 State Department compliance report, US of-

10 Amy J. Nelson, «After New START: The Case for Disciplined Ambiguity.»

11 David V. Gioe and Michael J. Morell, «Spy and Tell: The Promise and Peril of Disclosing Intelligence for Strategic Advantage,» Foreign Affairs, January/February 2023, https://www.foreignaffairs.com/united-states/spy-and-tell-gioe-morell.



Photo taken at a newsstand in Beijing on July 7, 2026, shows a local newspaper reporting on the Chinese military's test-firing the previous day of a nuclear-capable ballistic missile from a submarine toward the Pacific. (Kyodo)

ficials raised concerns about activity at China's Lop Nur test site, including year-round operational preparations, explosive containment chambers, and blocking of data from the International Monitoring System (IMS), the global sensor network operated by the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO). All were framed as questions about Chinese adherence to the "zero-yield" standard for nuclear testing.[12] The concerns may be well-founded, but the public record has consisted only of suggestive circumstantial signatures and classified assessments that were never substantiated openly. In February 2026, US Undersecretary Thomas DiNanno used a Conference on Disarmament address in Geneva to accuse China explicitly of a yield-producing test on June 22, 2020, allegedly concealed through decoupling techniques.

Within 24 hours, CTBTO Executive Secretary Robert Floyd responded that the IMS had detected no event consistent with a nuclear test on that date.[13] The US accusation engaged only selectively with the IMS, the verification architecture that exists precisely to provide a shared evidentiary baseline, and the institutional reply made the gap visible. Without sustained engagement with that system, either to demonstrate its findings or to explain its limitations, Washington leaves the threshold question open: What yield, what instrumentation, what pattern of activity would constitute a violation? China can contest the basis indefinitely because no publicly legible standard has been articulated. The result is not productive ambiguity. It is a credibility vacuum that serves neither deterrence nor nonproliferation, and that weakens the very monitoring institutions whose authority matters most in a world without comprehensive test ban enforcement.

Iran's Nuclear Program: From Imminent to Obliterated

The Iran case illustrates a failure of message coherence: official claims

12 US Department of State, 2020 Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments (2020), https://2017-2021.state.gov/2020-adherence-to-and-compliance-with-arms-control-nonproliferation-and-disarmament-agreements-and-commitments-compliance-report/.

13 Robert Floyd, «Statement by Robert Floyd, Executive Secretary, CTBTO,» Comprehensive Nuclear-Test-Ban Treaty Organization, February 6, 2026, https://www.ctbto.org/resources/for-the-media/press-releases/statement-robert-floyd-executive-secretary-ctbto-2026-02-06.

contradicted the intelligence and one another, as rhetoric substituted for evidence and for engagement with verification institutions. Following the Trump administration's withdrawal from the Joint Comprehensive Plan of Action (JCPOA or Iran Deal) in May 2018 and Iran's subsequent stepwise departure from its commitments—abandoning enrichment caps, restarting advanced centrifuges, breaching the 3.67 percent enrichment ceiling, and restricting International Atomic Energy Agency (IAEA) inspector access—US officials began citing shrinking breakout timelines with increasing frequency. At no point did they specify what Iranian action would trigger an American response.[14] The assessments rested on classified intelligence not shared with allies or Congress in actionable form. European partners, unable to evaluate the analytic basis, did not converge on the US position.[15] Public messaging compounded the problem by compressing Iran's capabilities and intentions into a single claim, implying that enrichment capacity equaled weapons intent, a conflation the intelligence community itself resisted. In open testimony, Director of National Intelligence and CIA assessments consistently emphasized that Iran had not made a decision to pursue a weapon. Political messaging implied otherwise.[16]

The pattern reached its sharpest expression in June 2025, when US strikes on Iranian nuclear facilities were followed by a presidential declaration that the program had been "completely and totally obliterated."[17] Within days, a leaked Defense Intelligence Agency assessment concluded that the facilities had been damaged but not destroyed, and that the program had been delayed by months rather than eliminated.[18] The gap between claim and intelligence was no longer inferential. It had become documented. What followed compounded it. The administration described Iran as actively rebuilding its nuclear program, then as posing an imminent nuclear threat, then as on the verge of collapse, each assertion made without a shared evidentiary basis, and each contradicting the last.[19] With IAEA access degraded by the strikes and congressional briefings reported as inadequate, the verification environment that might have stabilized interpretation had itself become a casualty. Phantom signaling

14 «The Iran Deal, Then and Now,» Center for Arms Control and Non-Proliferation, accessed April 2026, https://armscontrolcenter.org/the-iran-deal-then-and-now/; Congressional Research Service, «Iran and Nuclear Weapons Production,» updated 2025, https://www.congress.gov/crs-product/IF12106.

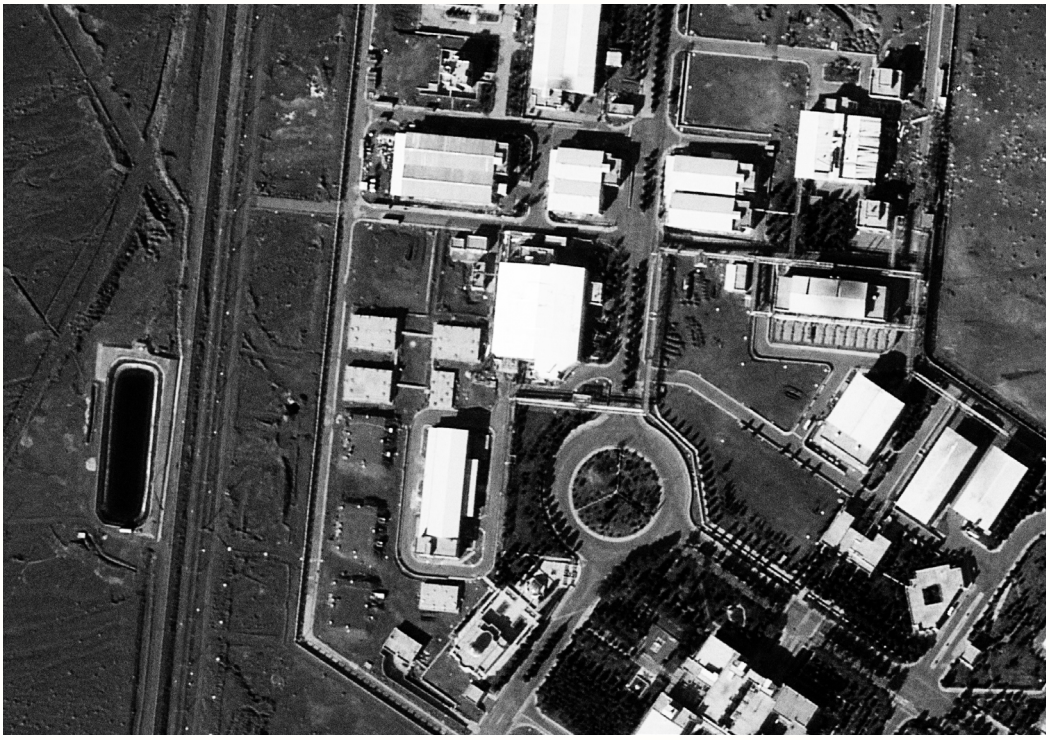
15 Mariel Ferragamo, Jonathan Masters, and Will Merrow, «What Are Iran's Nuclear and Missile Capabilities?»

16 Office of the Director of National Intelligence, Annual Threat Assessment of the U.S. Intelligence Community (2024); see also «2024 U.S. Intelligence Report on Iran,» The Iran Primer, United States Institute of Peace, March 11, 2024, https://iranprimer.usip.org/blog/2024/mar/11/2024-us-intelligence-report-iran.

17 The White House, «Iran's Nuclear Facilities Have Been Obliterated — and Suggestions Otherwise Are Fake News,» June 2025, https://www.whitehouse.gov/releases/2025/06/irans-nuclear-facilities-have-been-obliterated-and-suggestions-otherwise-are-fake-news/.

18 Katie Bo Lillis, Natasha Bertrand, and Oren Liebermann, "Exclusive: Early US intel assessment suggests strikes on Iran did not destroy nuclear sites, sources say," CNN, June 24, 2025, https://www.cnn.com/2025/06/24/politics/intel-assessment-us-strikes-iran-nuclear-sites

19 «Trump's Chaotic and Reckless Iran Nuclear Policy,» Arms Control Today, Arms Control Association, March 2026, https://www.armscontrol.org/act/2026-03/focus/trumps-chaotic-and-reckless-iran-nuclear-policy.



A satellite imagery taken on January 30, 2026 shows a new roof over a previously destroyed building at Natanz nuclear site, Iran. 2026 PLANET LABS PBC/via REUTERS

normally means asserting what the evidence does not support. In this extreme case, it meant asserting what the evidence directly contradicted. Washington was asserting outcomes it could not demonstrate, in an environment it had helped make unverifiable. The consequence extends beyond this episode: Future American claims about nuclear programs—Iran's or anyone else's—will now be evaluated against a documented record of assertion outrunning intelligence, in an environment where the institutions capable of independent verification have themselves been compromised.

What Disciplined Ambiguity Requires

Across all three cases, the lesson emerges: *phantom signaling* does not merely fail to deter, it actively degrades the credibility on which deterrence depends. Adversaries learn that accusations carry no defined consequences, while allies learn that assurances rest on evidence they cannot evaluate. What disciplined signaling is meant to deter spans the cases: treaty violations, covert testing, unchecked proliferation—collectively, conduct that unravels what remains of the nonproliferation regime.

Two consequences follow, one behavioral and one institutional. Behaviorally, allies build institutional substitutes for credibility they can no longer take on assertion alone. The 2023 Washington Declaration, in which South Korea extracted a formal Nuclear Consultative Group as the price for forgoing independent nuclear options, is the clearest recent instance. What Seoul obtained was, at its core, access: standing consultation on nuclear planning and information-sharing that it could participate in rather than assurances it had to take on faith.

Institutionally, the organizations that stabilize nuclear politics lose the shared evidentiary baseline on which their authority rests. Iran is the sharpest expression. The June 2025 strikes terminated IAEA access precisely when independent verification would have mattered most: inspectors withdrew within weeks, and Tehran formally suspended cooperation in July. A year later, the agency reported it could not provide information on the size, composition, or whereabouts of Iran's enriched uranium stockpile.[20] Assessments that followed flowed into that vacuum. Within a month, judgments of the damage derived from overlapping evidence emerged, ranging from a setback of months to many years. Whether the stockpile had been moved before the strikes was disputed as a matter of basic fact with a range of estimates that was not merely wide but unadjudicable.[21] The institution that would normally have narrowed the gap had been taken out of the game by the action under assessment. The result is an environment in which no party—ally, adversary, or inspectorate—can establish what is true about the program at issue. The deeper cost falls on the next dispute, which will arrive with no way to settle it.

Institutionally, the organizations that stabilize nuclear politics lose the shared evidentiary baseline on which their authority rests.

The solution, however, is not maximal transparency. Strategic stability has long rested on uncertainty—on the mutual-

20 David Albright, Sarah Burkhard, Spencer Faragasso, and Andrea Stricker, "Analysis of IAEA Iran Verification and Monitoring and NPT Safeguards Reports,» Institute for Science and International Security," June 9, 2026, https://isis-online.org/isis-reports/analysis-of-iaea-iran-verification-and-monitoring-and-npt-safeguards-reports-june-2026.

21 Oliver Meir, "Containing the Non-proliferation Damage From Israel's Attacks on Iran's Nuclear Programme," European Leadership Network, June 8, 2025, https://europeanleadershipnetwork.org/commentary/containing-the-non-proliferation-damage-from-israels-attacks-on-irans-nuclear-programme/.



Rafael Mariano Grossi, IAEA Director General, delivers his remarks at the opening of the 1807th Board of Governors meeting held at the Agency headquarters in Vienna, Austria. 8 June 2026. (Dean Calma / IAEA)

ly held recognition that some questions about capabilities, intentions, and thresholds are more stabilizing when left unanswered rather than resolved. Rigid publicly declared thresholds narrow escalation options and can lock states into commitment traps in crises—positions they must escalate to defend;[22] detailed disclosures can foreclose the diplomatic latitude that allows the adversary to back down without humiliation; revealing sources and methods can compromise the intelligence collection process upon which future judgments depend. Each of these costs is real, as the cases above confirm. The task is not to eliminate ambiguity but to discipline it—to preserve uncertainty where it stabilizes deterrence and reduce it where miscalculation would be catastrophic, where allied confidence cannot be sustained on assertion alone, or where adversary behavior must be held to a publicly legible standard. That discrimination, between the ambiguity that stabilizes and the ambiguity that corrodes, is what disciplined ambiguity demands and what recent practice has ceased to provide.

The US intelligence declassification

22 Reid B. C. Pauly, «The Psychology of Nuclear Brinkmanship,» International Security 47, no. 3 (Winter 2022/23): 9–51, https://direct.mit.edu/isec/article/47/3/9/114669/The-Psychology-of-Nuclear-Brinkmanship.

campaign preceding Russia's 2022 invasion of Ukraine shows what disciplined ambiguity looks like in practice. Washington selectively released satellite imagery, intelligence assessments, and warnings about Russian false-flag preparations without exposing sources wholesale or publishing full intelligence dossiers.[23] It revealed enough to shape international perception, preempt disinformation narratives, and strengthen allied cohesion. Rather than deterring the invasion, it worked to strategic advantage: Russia's narrative space was constrained, partners were unified, and American credibility was enhanced rather than spent.

What distinguished this episode was its structure. Disclosure was tied to specific behaviors and bounded by specific purposes. Where the INF Treaty dispute put accusation before evidence, the Ukraine campaign released evidence before the consequence it warned of. Where the China accusations left the threshold undefined, the Ukraine warnings named the line in advance. And where the Iran case substituted rhetoric for engagement with verification frameworks, the Ukraine campaign worked alongside open-source analysis and allied intelligence services rather than around them. The threshold was named in advance: National Security Advisor Jake Sullivan warned publicly that any military action preceded by a staged pretext would be identified as Russian aggression before Russia could deploy it. The evidence was public: satellite imagery documented troop positions at specific locations along the Ukrainian border. And the demanded behavior was clear: stand down, or be seen by every ally and partner as having crossed a line Washington had defined in advance.[24]

That structure is what the INF, China, and Iran cases lack. Restoring it means treating intelligence disclosure as an instrument of statecraft rather than episodic messaging—and that, in turn, requires four disciplines that recent practice has neglected. First, evidentiary thresholds should be defined before public accusations are made because precommitment reduces the perception of ad hoc politicization and gives both adversaries and allies a standard against which to evaluate any claim. Second, disclosure should be tied to a strategic purpose. Deterrence and alliance reassurance each require different levels of transparency and should not be collapsed into a single institutional reflex. Third, where verification mechanisms exist, they should be visibly engaged; even partial public alignment with established monitoring bodies raises the evidentiary bar for adversarial contestation and reinforces institutional legitimacy from which the United States ultimately benefits. Fourth, intelligence rhe-

23 Mark F. Cancian and Brian Katz, «Intelligence Disclosures in the Ukraine Crisis and Beyond,» War on the Rocks, March 11, 2022, https://warontherocks.com/2022/03/intelligence-disclosures-in-the-ukraine-crisis-and-beyond/.

24 Jake Sullivan, "Press Briefing by Press Secretary Jen Psaki and National Security Advisor Jake Sullivan, February 11, 2022," The White House, February 11, 2022, https://bidenwhitehouse.archives.gov/briefing-room/press-briefings/2022/02/11/press-briefing-by-press-secretary-jen-psaki-and-national-security-advisor-jake-sullivan-february-11-2022/.

toric should be deployed selectively. Routine invocation of "we have intelligence" trains adversaries and allies alike to discount the signal—and exhausts the credibility reservoir that disciplined disclosure is meant to protect.

None of these is a radical proposal. Each represents a return to the practices the United States has demonstrated it can sustain when disclosure is treated as a strategic instrument rather than a rhetorical reflex.[25]

Conclusion

The INF Treaty, China, and Iran cases point to the same conclusion: phantom signaling actively spends the credibility on which deterrence depends. Adversaries learn that American accusations carry no defined consequences. Allies learn that guarantees rest on evidence they cannot evaluate. Rebuilding that credibility requires coherence: alignment between evidence, thresholds, and consequences—legible to adversaries, anchorable by allies, and absorbable by the residual architecture of arms control norms. No amount of assertion—invoking intelligence, resolve, or red lines—closes that gap.

The 2022 declassification campaign showed that this credibility is achievable. As formal arms control constraints weaken, the burden on signaling will only increase. The challenge ahead is to restore the discipline—structuring uncertainty where it stabilizes deterrence, reducing it where miscalculation would be catastrophic, and ensuring that the signals Washington sends are legible to the audiences that matter most. In a world where the institutional architecture that once carried much of this burden has eroded, signaling discipline is not a communications preference, but a condition of strategic stability.

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25 Toby Dalton and Ain Han, «Continuity and Changes: The Effects of Russia's War Against Ukraine on Japanese and South Korean Nuclear-Weapons Discourse,» Nonproliferation Review 31, no. 1 (2024), https://www.tandfonline.com/doi/full/10.1080/10736700.2024.2435143.

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Page 3: *Cuban missile crisis (National Security Archive/The George Washington University); Tsiky Raharinaivo/Unsplash*

Page 9: *The mushroom cloud from the Castle Bravo thermonuclear weapon test in 1954, the largest nuclear weapons test ever conducted by the United States. (US Department of Energy/Wikimedia)*

Page 10: *A TV screen shows an image of solid-fuel Hwasong-18 intercontinental ballistic missile (ICBM) at a military parade to mark the 70th anniversary of the signing of the armistice that halted the 1950-53 Korean War, during a news program at the Yongsanl Railway Station in Seoul. (ZUMA Press Wire via Reuters Connect)*

Page 11*: A test launch of the Russian Yars intercontinental ballistic missile at the Kapustin Yar test site in the Astrakhan region, Russia, is shown in this still image taken from handout footage released on May 21, 2026. (Russian Defense Ministry/ Handout via REUTERS)*

Page 19: *Mushroom cloud with ships below during Operation Crossroads nuclear weapons test on Bikini Atoll, 1946. (Library of Congress)*

Page 28: *Hypersonic strike missiles YJ-20 of the hypersonic missile formation pass through Tian'anmen Square during the V-Day military parade on September 3, 2025 in Beijing, China. (Photo by VCG/VCG)*

Page 42: *An MH-60S Sea Hawk prepares for takeoff during night-time flight operations aboard amphibious assault ship USS Tripoli (LHA 7) in the U.S. Central Command area of responsibility, April 3, 2026. (US Marine Corps photo)*

Page 44: *A clock hangs on the wall in the Lazurnyi swimming pool in Prypiat, a city abandoned after the Chornobyl accident, Kyiv region, Ukraine, on April 14, 2026. (Kyrylo Chubotin/Ukrinform/ NurPhoto via REUTERS)*

Page 54: *A handout image from Ukraine's Energoatom shows damage to a spent nuclear fuel storage facility, following what the company said was a drone strike, amid Russia's attack on Ukraine, near Chornobyl, Ukraine, in this undated image released June 7, 2026. (Energoatom/Handout via REUTERS)*

Page 66: *Brecht Corbeel./Unsplash*

Page 78: *US forces conduct air defense operations in the US Central Command area of responsibility during Operation Epic Fury, April 2, 2026. (US Army photo)*

Opposite: *Operation Cue, May 5, 1955. (National Archives)*

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