



The Long Shadow

Russian Nuclear Calibration in the War in Ukraine

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THE ISSUE:

*Russian nuclear threats have cast a long shadow over the war in Ukraine. As the conflict enters its third year, it is crucial to understand the objectives of Russia's nuclear signaling at various stages and the effectiveness of U.S. and allied responses thus far. To explore these issues, the CSIS Project on Nuclear Issues recently compiled a **database** and released a **digital report** on Russian nuclear narratives and their evolution during the first 18 months of the war.[1] This brief builds on that work and finds that Russian officials noticeably calibrated their nuclear signaling at key points in the war. It also concludes that the risks of nuclear use will likely rise if Russia faces significant battlefield setbacks in the future or the conflict expands in new or unexpected ways. Accordingly, Washington should work to maintain international pressure against nuclear use in Ukraine while combatting narratives that downplay or rationalize Russia's nuclear threats.*

INTRODUCTION

A nuclear shadow has loomed over the war in Ukraine since Russia invaded on February 24, 2022.¹ Following a large-scale nuclear exercise, Putin announced a “special military operation” as Russian troops crossed the border and threatened, “No matter who tries to stand in our way or all the more so create threats for our country and our people, they must know that Russia will respond immediately, and the consequences will be such as you have never seen in your entire history.”²

Russia's nuclear signaling—its deliberate efforts to influence foreign decisionmaking through the implicit or explicit threat of nuclear use—is part of its wider strategy to deter direct Western intervention and support for Ukraine. Moscow has used explicit threats, including mention of crossing a “red line” in September 2022 if the United States supplied longer-range missiles to Ukraine, as well

as implicit threats such as frequent reference to Russia's nuclear doctrine.³ Russia has also used disinformation campaigns, exercises, and new nuclear force deployments to Belarus to manipulate risks and attempt to weaken Western support for Ukraine.

Russia's nuclear rhetoric and posturing have made the risk of nuclear weapons use the highest it has been for decades and revived calls for new risk reduction efforts.⁴ Amidst these rising nuclear risks, however, Russia is working to weaken the institutions and norms designed to manage those very risks. Since the February 2022 invasion, Russia has blocked consensus on the Nuclear Non-Proliferation Treaty, suspended the New Strategic Arms Reduction Treaty (New START), and withdrawn its ratification of the Comprehensive Nuclear-Test-Ban Treaty (CTBT).⁵ The success or failure of Russia's nuclear signaling in Ukraine

will have wider strategic implications. In a December 2023 speech, U.S. secretary of defense Austin stated, “If we do not stand up to the Kremlin’s aggression today, if we do not deter other would-be aggressors, we will only invite more aggression, more bloodshed and more chaos.”⁶ Indeed, other countries are likely watching and learning from how Russia is brandishing its nuclear weapons.

On the one hand, Russia’s nuclear signaling may have successfully deterred the North Atlantic Treaty Organization (NATO) states from directly engaging in the war, particularly in the early stages.⁷ On the other hand, NATO may have never been willing to put “boots on the ground” in Ukraine—meaning the United States and NATO were never deterred from doing something they never intended to do.⁸ A more nuanced understanding of how Russia’s nuclear signaling has evolved since the February 2022 invasion, along with the impact of messaging from NATO and external actors—particularly China and India—can shed light on Russia’s reliance on nuclear weapons and the role of nuclear weapons in the Ukraine war and beyond. Russia’s nuclear signaling, including rhetoric and actions, has evolved since the beginning of the war and is not static. Instead, officials in Moscow noticeably calibrated their nuclear messaging, ramping up their threats in the face of setbacks on the battlefield while at times showing a receptiveness to external pressures. With the war far from over, Washington, Kyiv, and NATO should expect to see continued calibration in the coming months and years.

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This brief assesses the impact of Russian nuclear signaling on the war in Ukraine, the effectiveness of Western de-escalation efforts, and whether or not Putin would consider using nuclear weapons in the future. It draws on a wider CSIS study **of nearly 450 public statements, policy announcements, and military developments in the first 18 months of the war.**⁹ The brief first provides background of the nuclear shadow leading up to the war in Ukraine, with a summary of Russian nuclear capabilities and doctrine. It then summarizes Russian nuclear activities across three phases of the conflict: February–July 2022, August–October 2022, and November 2022–July 2023, although arguably, Russian nuclear signaling began even before the invasion, such as with the nuclear exercise in February 2022. The brief concludes with findings and recommendations for Western policymakers on how to respond to Russian nuclear bullying and de-escalate crises with the potential for nuclear use.

This brief’s overarching finding is that leaders in Moscow escalated their nuclear signaling when facing battlefield setbacks, a trend that will almost certainly continue. Russia has relied on a range of signals and implicit and explicit nuclear threats in an attempt to deter NATO intervention in Ukraine and divide the alliance. As the intelligence community assessed in its 2023 annual threat assessment, “Moscow’s military forces have suffered losses during the Ukraine conflict that will require years of rebuilding.”¹⁰ As a result, U.S. intelligence sources conclude, “Moscow will become even more reliant on nuclear, cyber, and space capabilities as it deals with the extensive damage to Russia’s ground forces.”¹¹ Navigating these challenges will require policymakers to assess and manage the enduring nuclear shadow looming over the war in Ukraine.

RUSSIAN NUCLEAR FORCES AND DOCTRINE

Nuclear weapons play a fundamental role in Russia’s deterrence strategy. The declaratory policy governing their use has gone through four iterations since the end of the Cold War. The Kremlin implemented the first changes to its nuclear policy in the 1993 military doctrine, which eliminated mention of the “no first use” policy that Russia inherited from the Soviet Union. This omission suggested that Russia could use nuclear weapons to counter significant conventional aggression, and it likely reflected the Kremlin’s concerns about Russia’s diminished conven-

tional military power and U.S. precision strike capabilities demonstrated during the Gulf War.¹² Russia's 2000 military doctrine—released less than a year after NATO's intervention in Kosovo—stated that Russia could use nuclear weapons in response to nuclear attacks, attacks using other weapons of mass destruction (WMD), and certain types of conventional attacks on its territory.¹³ Building on this policy, the 2010 military doctrine stated that Russia could use nuclear weapons in response to an attack against Russia or its allies using WMDs, or in response to a large-scale conventional attack against Russia that threatens “the very existence of the state.”¹⁴ This language went unchanged in Russia's 2014 military doctrine.¹⁵

In 2020, the Kremlin published its first declassified nuclear doctrine (as opposed to military doctrine), which made explicit two additional factors that could provoke a Russian nuclear response. This document lists four scenarios for nuclear employment¹⁶:

1. Receipt of reliable data about the launch of ballistic missiles against Russia or its allies
2. Use of nuclear weapons or other weapons of mass destruction (WMDs) against Russia or its allies
3. Attacks against Russian nuclear command, control, and communications infrastructure
4. Aggression against Russia with conventional weapons that threatens “the very existence” of the Russian state

Numerous questions remain about the specifics of Russia's nuclear doctrine. Of particular importance is the question of whether Putin draws a distinction between the Russian state and his own regime. Given the risks that Putin has taken in his efforts to gain political control over Ukraine, it is possible that he believes defeat would pose a threat to the “very existence” of his rule.¹⁷ Independent of its declaratory policy, experts assess that the Kremlin could use nuclear weapons in a regional conflict to control escalation and signal resolve.¹⁸

As of summer 2023, Russia had an estimated stockpile of approximately 4,489 active nuclear warheads for use on strategic and theater-range delivery systems—1,197 on intercontinental ballistic missiles (ICBMs), 896 on submarine-launched ballistic missiles (SLBMs), 580 on bombers, and 1,816 on a wide range of nonstrategic systems. Only 1,674 warheads, however, are currently deployed.¹⁹ “Deployed” warheads are mated to delivery systems and ready for immediate use. “Reserve” warheads are kept in storage, often partially disassembled.²⁰

The current composition of Russia's strategic nuclear force reflects an ongoing, decades-long modernization program that has gradually replaced Russia's Soviet-era arsenal with more modern weapons.²¹ This program has impacted each leg of the nuclear triad differently. Since the 2000s, Russia's Strategic Rocket Forces have slowly replaced the ageing SS-18, SS-19, and SS-25 ICBMs with the more modern SS-27 mod 1 and SS-27 mod 2 (both of which have silo-based and road mobile variants), as well as the SS-29 ICBM and the Avangard boost-glide vehicle.²² The Russian navy began replacing its Delta IV ballistic missile submarines (SSBNs) with new Borei Class boats in 2013, and it introduced the SS-N-32 SLBM in the same year.²³ The Russian air force deployed a new model of nuclear-capable air-launched cruise missile (ALCM) in 2012, and it is in the process of extensively modernizing its fleet of Tu-160 strategic bombers.²⁴ Several additional delivery systems are currently under development, including a stealth bomber, a nuclear-powered cruise missile, and an intercontinental torpedo. According to Russian defence minister Sergei Shoigu, modern weaponry now comprises 95 percent of Russia's nuclear triad.²⁵

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THE LONG SHADOW

Russia's 2022 invasion of Ukraine followed several unsuccessful efforts to exert political control over the country. The current conflict traces its origins to the winter of 2013–2014. In late 2013, Putin pressured pro-Russia Ukrainian president Viktor Yanukovich to abandon the path to partnership with the European Union in favor of a deal with the Kremlin for \$15 billion in aid and cheaper energy prices.²⁶ Protests against Yanukovich's decision forced him to flee the country in February 2014. Putin responded by illegally seizing Crimea (home to Russia's Black Sea Fleet) and

providing military support to separatists in Donbas. Between 2015 and 2022, the frontlines in Donbas were largely static, but Ukraine's ties to the West grew stronger, as did the Ukrainian military.²⁷ The Kremlin became increasingly strident in its opposition to Ukraine's ties to NATO.²⁸

In the leadup to the second invasion in February 2022, Russia made several demands of the United States and NATO²⁹:

1. Cease NATO expansion
2. Seek Russian permission for NATO exercises in Eastern Europe
3. Withdraw NATO forces from former Warsaw Pact states
4. Remove U.S. nuclear weapons from Europe

For example, Russian foreign minister Sergei Lavrov warned in December 2021, "We will not allow anyone to drag out our initiatives in endless discussions. If a constructive response does not follow within a reasonable time and the West continues its aggressive course, Russia will be forced to take every necessary action to ensure a strategic balance and to eliminate unacceptable threats to our security."³⁰ Western responses emphasized the need for diplomacy, while also emphasizing the enduring principle of sovereignty and Ukraine's right "to choose their own security arrangements and alliances," as stressed by U.S. secretary of state Anthony Blinken.³¹

RUSSIAN NUCLEAR CALIBRATION FEBRUARY 2022–JULY 2023

PHASE 1: THE INVASION AND DETERRENCE, FEBRUARY–JULY 2022

On February 24, 2022, following months of military buildup and in the wake of a large out of cycle nuclear exercise, Putin launched a full-scale invasion of Ukraine.³² The invasion was intended to topple the Western-aligned government of Volodymyr Zelensky within 72 hours.³³ As Russian troops crossed the Ukrainian border, Vladimir Putin issued the first of many implicit threats against direct NATO intervention in the conflict: "I would now like to say something very important for those who may be tempted to interfere in these developments from the outside. No matter who tries to stand in our way or all the more so create threats for our country and our people, they must know that Russia will respond immediately, and the consequences will be such as you have never seen in your entire history."³⁴

On February 27, Belarusian resident Aleksandr Lukashenko held a referendum to approve a new Belarusian constitution that eliminated Belarus' non-nuclear status, thereby opening the door for Russian nuclear weapons to be stationed in the country.³⁵

On the same day, Putin placed Russia's nuclear forces on "high combat alert." Specifically, Putin stated, "You see that Western countries are not only taking unfriendly economic actions against our country . . . but top officials of the leading NATO countries are indulging in aggressive statements directed at our country. Therefore, I order the Defence Minister and Chief of the General Staff to put the Russian Army's deterrence forces on high combat alert."³⁶ Putin claimed that this decision was a response to the "illegitimate sanctions" and "aggressive statements" from the senior officials of NATO member states.³⁷ It is unclear exactly which statements Putin was referring to. He may have been referencing a statement by Liz Truss, the United Kingdom's foreign secretary at the time, on February 27 about the need to defeat Russia in Ukraine, or a statement by French foreign minister Jean-Yves Le Drian on February 24 about NATO's nuclear status.³⁸ On February 28, 2022, the Russian defence minister of Shoigu, stated that in accordance with Putin's order the Ministry of Defence had increased manning levels at command posts of Russia's strategic nuclear forces.³⁹

Putin's announcement of this special alert status drew immediate condemnation from White House and NATO officials as "provocative," "dangerous," and "add[ing] to the risk of miscalculation."⁴⁰ In response to a question posed a day later about whether U.S. citizens should be concerned about a nuclear war breaking out, President Biden responded with a resounding "no."⁴¹ The military significance of this shift was unclear. U.S. officials stated that they did not fully understand the meaning of the announcement and observed no "muscle movements" in Russia's nuclear forces.⁴²

U.S. officials also took steps to de-escalate the situation. Days after Putin ordered Russia's nuclear forces to go on "high combat alert," on March 2, 2022, Pentagon press secretary John Kirby announced that "in an effort to demonstrate that we have no intention of engaging in any actions that can be misunderstood or misconstrued, the secretary of defense has directed that our Minuteman III intercontinental ballistic missile test launch scheduled for this week to be postponed."⁴³ A month later, the U.S. Air Force canceled the postponed test.⁴⁴ While this kind of public posturing may have appealed to some Western audiences and U.S. allies,

Russia largely ignored the move and instead continued with its own tests and exercises, including an April 20 test of Russia's new Sarmat ICBM that Putin himself announced. Ultimately, Washington resumed testing and highlighted the routine nature of such tests in its messaging. In June, the U.S. Navy tested four unarmed Trident II (D5LE) missiles, and the U.S. Air Force later conducted its ICBM test launch in August 2022 and then again in September.⁴⁵

On the ground, Russian forces quickly became bogged down, withdrew from around Kyiv in late March, and began a grinding offensive in Donbas.⁴⁶ Throughout the spring and summer and into the fall of 2022, Russia also generated international concerns about a nuclear incident by occupying, hazardously managing, shelling, and allegedly sabotaging the Zaporizhzhia nuclear power plant.⁴⁷

During the first phase of the war, Russia used a combination of threats and signals, including through exercises, tests, and nuclear modernization updates, to warn NATO against intervening directly in Ukraine.⁴⁸ This focus likely reflected the Kremlin's initial expectation that, barring NATO intervention, Russia could swiftly occupy Ukraine. Russian officials made repeated references to Russia's nuclear doctrine, both to deny that Russia would use nuclear weapons and to create ambiguity about the exact conditions that might prompt nuclear use. For example, Kremlin spokesperson Dmitry Peskov said on March 28, 2022:

We have a security concept that very clearly states that only when there is a threat for existence of the state in our country, we can use and we will actually use nuclear weapons . . . But, at the same time, if you remember the statement of the president when he ordered the operation on the 24th of February, there was a part of his statement warning different states not to interfere in the affairs between Ukraine and Russia during this operation . . . I think that everyone understands what he meant.⁴⁹

Nonetheless, the Kremlin was clear that direct NATO intervention would be likely to prompt a nuclear response.⁵⁰

In response to these signals, Western leaders sought to balance efforts to punish Russia and support Ukraine with the need to avoid escalation during the initial phase of the war. To do so, the West adopted an incremental approach, wherein Western states gradually increased the amount and sophistication of aid for Ukraine.⁵¹

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PHASE 2: COUNTER-OFFENSIVE AND HEIGHTENED RISK OF NUCLEAR USE, AUGUST-OCTOBER 2022

In a shift in narrative, Russian officials launched a diplomatic offensive in August to coincide with the Nuclear Non-Proliferation Treaty (NPT) Review Conference. Russian leaders, including Putin, repeatedly stated, "There can be no winners in a nuclear war and it should never be unleashed."⁵² During the NPT meeting, the Russian diplomat stated, "We would like to firmly reject absolutely ungrounded and unacceptable allegations of Russia allegedly threatening to use nuclear weapons."⁵³ And Shoigu said, "From a military point of view, there is no need to use nuclear weapons in Ukraine to achieve the set goals."⁵⁴ Kremlin officials quickly abandoned this narrative following the failure of the NPT meeting, where Russia alone blocked consensus among 191 states.

The Kremlin resumed its menacing rhetoric in September. Ukrainian forces went on the offensive in Kherson and Kharkiv oblasts in August and September 2022, respectively. Ukraine had success on both fronts, and Russian rhetoric escalated as Ukrainian forces advanced. Foreign ministry officials began to warn of the nuclear risks created by Western aid for Ukraine. Russian deputy foreign minister Sergei Ryabkov, for example, cautioned, "The more the United States is involved in supporting the Kiev regime on the battlefield, the more they become a party to a military confrontation with Russia, which means they risk provoking a direct armed clash between the largest nuclear powers, fraught with catastrophic consequences."⁵⁵ Russian officials also signaled that Russia could use nuclear weapons to defend illegally annexed territory in Ukraine. Lavrov, for example, declared in late September that "the entire territory of the Russian Federation, which is enshrined and could be further enshrined in the constitution of the Russian Federation, unquestionably is under the full protection of the state . . . all of the laws, doctrines, concepts, and strategies of the Russian Federation apply to all of its territory."⁵⁶

As Russia's battlefield situation further deteriorated in October, the Russian narrative took a dramatic shift on October 23, 2022, and focused on the alleged threat of a Ukrainian dirty bomb. Shoigu and chief of the Russian general staff Valery Gerasimov called their counterparts in the United States and United Kingdom to discuss the alleged threat of a dirty bomb, while Putin, Lavrov, and Peskov

echoed this narrative in addresses and comments. Russia's ambassador to the United Nations wrote a letter to the UN secretary general to the same effect, and the Russian Ministry of Defence also announced preparations to operate in a radioactive environment.

There were fears that this narrative may have been intended to either provide pretext for nuclear use or to cover for a false flag operation. Western leaders challenged Russia's narrative and warned publicly of severe consequences for nuclear use while privately threatening to retaliate with conventional weapons.⁵⁷ The NATO secretary general attempted to dismiss these claims on October 24, stating, "The allegation that Ukraine is preparing to use dirty bombs in Ukraine is absurd . . . This is part of a pattern we have seen before from Russia—in Syria, but also at the start of the war, or just before the war started in February. And that is that Russia is accusing others [of] doing what they intend to do themselves."⁵⁸ Non-Western leaders also weighed in. During a call with Shoigu on October 26, Indian defence minister Rajnath Singh warned his Russian counterpart against nuclear use and cautioned that nuclear use "goes against the basic tenets of humanity."⁵⁹

Russian warnings about a Ukrainian dirty bomb coincided with large-scale Russian nuclear exercises and followed warnings that attacks on the illegally annexed territories could prompt nuclear use. False Russian claims that Ukraine and its Western partners might stage a "provocation" using a nuclear or radiological device were not new; the dirty bomb or Ukrainian nuclear weapon narrative dates back to the beginning of the invasion.⁶⁰ What was different this time were claims that the threat was imminent, along with the seeming coordination in messaging and the sheer number of statements to this effect. Kremlin officials issued these warnings as the Russian army appeared near to collapse, generating concern in the West and internationally that Russia might use tactical nuclear weapons to avert a rout. A November *New York Times* article reported that Russian military leaders discussed the conditions for nuclear employment in October, although these conversations did not involve President Putin.⁶¹

Russian warnings of an imminent dirty bomb attack ended shortly after Singh's call to Shoigu on October 26. In an address on October 26, Putin reiterated claims that Ukraine was preparing to use a dirty bomb while simultaneously asserting that Russia had "no need" to use nuclear weapons.⁶² Dmitry Polyansky, Russia's first deputy perma-

nent representative to the United Nations, reiterated the Kremlin's claims about a dirty bomb the next day, after which the Kremlin's warnings abruptly ended.⁶³ In a seeming effort to reduce tensions, the Russian Foreign Ministry released a statement on November 2 reaffirming that a nuclear war cannot be won and must never be fought, while Russian officials, including Peskov, made similar comments.⁶⁴

Of all the phases of the war, the risk of nuclear use appears to have been highest during this period of significant Russian battlefield losses.⁶⁵

PHASE 3: DIGGING-IN AND NUCLEAR CALIBRATION, NOVEMBER 2022–JULY 2023

In December 2022, Russian forces began an offensive across the frontline in Eastern Ukraine. This push, paired with an ongoing strike campaign against Ukrainian energy infrastructure, made limited gains at enormous cost throughout the winter and spring. After a period of de-escalatory signaling in November, Russian officials resumed their nuclear rhetoric (including suspending participation in New START) and actions (such as deploying nuclear weapons to Belarus). Russian officials also threatened against the West's supply of depleted uranium ammunition and F-16s to Ukraine, Ukrainian strikes against Crimea and the Russian homeland, efforts to retake Crimea, and the possibility of Russian defeat.⁶⁶ To the alarm of the West, Putin announced on February 21, 2023, that he would suspend Russia's participation in New START. Putin framed the decision as a response to U.S. support for Ukraine and other, unspecified, hostile actions: "Now, they are using NATO to give us signals . . . whereby Russia should, no questions asked, implement everything that it agreed to, including the New START Treaty, whereas they will do as they please. As if there is no connection between strategic offensive weapons and, say, the conflict in Ukraine or other hostile Western actions against our country."⁶⁷

Of all the phases of the war, the risk of nuclear use appears to have been highest during this period of significant Russian battlefield losses.

The nuclear landscape shifted again on March 25, 2023, when Putin announced that Russia would station tactical nuclear weapons in Belarus. In his justification for the move, Putin pointed to NATO's nuclear mission: "We are not handing over [the weapons]. And the U.S. does not hand [them] over to its allies. We're basically doing the same thing they've been doing for a decade. They have allies in certain countries and they train . . . their crews. We are going to do the same thing."⁶⁸ Moscow and Minsk had already laid the groundwork for the deployment. Lukashenko modified the Belarusian constitution to eliminate its non-nuclear status in February 2022, and Putin agreed in June 2022 to provide Belarus with dual-capable delivery systems. Putin's March announcement drew a critical but restrained response from the West. In his justification for the deployment of nuclear weapons to Belarus, Putin pointed to NATO's ongoing nuclear mission as precedent and justification. This increased diplomatic pressure on the United States and NATO allies to justify nuclear sharing agreements, while deflecting international pressure on Russia.

By July 2023, Russia's nuclear rhetoric had proven to be evolutionary, whereby it changed with developments on the ground in the war in Ukraine, along with Western and international pressure.

FINDINGS AND RECOMMENDATIONS

Initially, when the Kremlin believed that it could seize Kyiv in a matter of days, Russian officials used the threat of nuclear use in an attempt to deter direct NATO intervention in the war. As it became clear that the war would drag on, the Kremlin attempted to use nuclear signaling to deter a wider range of activities. Although Russian officials maintained a steady drumbeat of menacing nuclear rhetoric from late 2022 through mid-2023, the urgency and intensity of this signaling paled in comparison to that of September and October 2022. Russian officials downplayed the risks of nuclear use in November and offered muted reactions as Ukraine launched strikes deep into Russia, and NATO supplied new types of military aid. Western officials took Russian warnings seriously, but they increasingly cited a decreased risk of nuclear use. In the absence of more aggressive nuclear threats, Russia soon began manipulating risk by other means. The Kremlin suspended participation in the final strategic arms control treaty between Russia and the United States and announced plans to station nuclear weapons in Belarus.

While the Kremlin's narrative was not static, it also was not inconsistent. Russia's nuclear messaging has consistently pointed to Russia's nuclear arsenal as the ultimate security guarantor, and it has used nuclear signals—whether explicit rhetoric and messaging or posturing—as part of a wider strategy. This nuclear calibration is an important trait of Russia's war in Ukraine and will likely continue to shape its actions going forward. There are a variety of factors that may have contributed to these shifts and calibrations in Russia's nuclear rhetoric: Western signaling, intervention by India and China, events on the ground and Russia's failure to deliver a quick, decisive victory, and, of course, the fighting of the Ukrainians themselves. This brief does not attempt to assess which of these, if any, was the decisive driver, but it acknowledges that they likely all contributed to—and will continue to shape—shifts and calibrations in Russia's nuclear signals.

This study set out to answer three primary questions. First, to what ends has Russia used nuclear signaling, and what impact has it had? Russian nuclear signaling appears to have been intended to deter three developments: 1) direct NATO intervention in Ukraine, 2) Western aid for Ukraine, and 3) attacks on Crimea and Russia. It is possible that Russian nuclear signals deterred NATO intervention and slowed military aid. But these messages have not deterred incremental military aid for Ukraine nor have they enabled Russia to achieve its goals in Ukraine.

Although Russian officials maintained a steady drumbeat of menacing nuclear rhetoric from late 2022 through mid-2023, the urgency and intensity of this signaling paled in comparison to that of September and October 2022.

Second, have Western efforts to prevent nuclear use been effective? Western deterrence signaling appears to have played a role in the de-escalation of Russian rhetoric. This is particularly true following a period of alarming signaling in October 2022. Western officials repeatedly warned of severe consequences if Russia used nuclear weapons but largely stopped short of specifying publicly what a response might entail. While the United States, United Kingdom, and France reportedly warned the Kremlin that they would respond to nuclear use with conventional weapons, most messaging from President Biden and senior U.S. officials was ambiguous and highlighted the certainty of a response, not the nature of it.⁶⁹ For example, in September 2022, U.S. national security adviser Jake Sullivan stated, “We have communicated directly, privately, at very high levels to the Kremlin, that any use of nuclear weapons will be met with catastrophic consequences for Russia, that the United States in our allies will respond decisively.”⁷⁰ External actors, namely India and China, also seem to have played a role.⁷¹ An improved understanding of what deterred Russia from nuclear escalation during the war in Ukraine may point to ways for the United States and NATO to continue to strengthen deterrence—including through financial and military aid to Ukraine and through bolstering NATO’s conventional and nuclear force postures—without being overly concerned about escalation.

Third and finally, would Putin consider using nuclear weapons if Russia were facing defeat in Ukraine? Based on the connection between Russian nuclear rhetoric and events on the ground, along with open-source reporting, it appears that Putin likely would consider nuclear use in Ukraine. Russia relies on nuclear weapons to manipulate risk over the war in Ukraine. Nuclear rhetoric is tied to developments on the battlefield and appears intended to deter Western intervention and support for Ukraine. The Kremlin’s nuclear signaling was most intense when Russian forces faced collapse in the fall of 2022. There is reason to believe that Russian nuclear signaling would intensify, and the risks of nuclear escalation might rise, if Russia faces a similar battlefield situation in the future, or if the conflict expands in new or unexpected ways, such as sustained Ukrainian strikes on Russian critical infrastructure. These signals could include nuclear exercises or military testing that could risk misperceptions and lead to unintended escalation. Russian nuclear rhetoric, however, is seemingly responsive to international pressure, as

it became more conciliatory in November 2022 after clear international warnings against nuclear use in September and October. The Kremlin also cares about its international image: officials deny that Russia has threatened to use nuclear weapons at international fora and strike a comparatively reassuring tone when discussing nuclear risks with non-Western media.

As Russia calibrates its nuclear signaling and reliance on nuclear weapons, an important question is what lessons Russia has learned from the first two years of the war. Arguably, Russian signaling has had limited success in achieving its goals in Ukraine, as U.S. and NATO support for Ukraine has incrementally increased since the war began. But Russian nuclear threats should nonetheless be taken seriously, since Russia could consider nuclear use if its forces face collapse or the nature of the conflict changes significantly in the future. The Western response to Russia’s messaging has delicately balanced support for Ukraine with the need to avoid escalation and nuclear use. Patterns and trends in Russian and Western nuclear signaling since the start of the war point to opportunities for the United States and NATO to continue to strike this balance.

There is reason to believe that Russian nuclear signaling would intensify, and the risks of nuclear escalation might rise, if Russia faces a similar battlefield situation in the future, or if the conflict expands in new or unexpected ways, such as sustained Ukrainian strikes on Russian critical infrastructure.

The United States and its allies should consider the following recommendations to minimize the risks of nuclear use as the war continues:

1. **Better understand the impacts of international pressure on Russian decisionmaking.** It is unclear

exactly what impact U.S., NATO, Indian, and Chinese messaging had on Putin's thinking about nuclear use. The U. S. government should prioritize efforts to develop a better understanding of who, if anyone, influenced thinking in the Kremlin about the utility of nuclear weapons. Doing so would help the United States and NATO to better calibrate their own deterrence signals and messaging.

2. **Continue to signal certainty of retaliation while preserving ambiguity as to the nature of the response.** Western leaders have consistently emphasized that Russian nuclear use will be met with severe consequences. However, they have not specified the exact nature of the response. Maintaining the credibility of this signal will require continued consultation and coordination among NATO allies on messaging, including the nuclear sharing mission.
3. **Coordinate with India and China to maximize international pressure against nuclear use.** U.S. leaders should seek to ensure that India and China continue to make clear that nuclear use would be met with severe consequences for Moscow. This could be done through bilateral channels or through a multilateral risk reduction dialogue.
4. **Combat Russian narratives that downplay or rationalize the Kremlin's nuclear threats.** The United States and its allies have used public messaging and intelligence disclosures to counter Russian disinformation since the outset of the invasion. The U.S. government should build on these efforts. It should also ensure that the international community (beyond the West) fully understands the dangers posed by the Kremlin's irresponsible rhetoric and behavior. Doing so could help to deprive Russia of the tacit political support that it currently enjoys

from many developing states and could help to decrease the risks of nuclear use.

5. **Remain prepared for potential use scenarios.** While fears of Russia using nuclear weapons in Ukraine have subsided considerably, Russia's increased reliance on its nuclear weapons could still pose a threat to Ukrainian and Western forces if the nature of the conflict changes. Western leaders need to remain prepared to deal with possible use scenarios, and they must take steps to continue to enhance preparedness. This includes prioritizing efforts to strengthen chemical, biological, radiological, and nuclear (CBRN) defenses and making good on the commitments made during the Vilnius summit to "strengthen training and exercises that . . . facilitate greater coherence between conventional and nuclear components of NATO's deterrence and defence posture across all domains and the entire spectrum of conflict."⁷²

Many of these efforts are already underway, but they will face challenges over time. Maintaining NATO unity and staying ahead of Russian disinformation will be two of the greatest hurdles for confronting Russian aggression and controlling the risks of nuclear escalation.

Russian nuclear weapons have been a constant shadow over the war in Ukraine. Russia has relied on them to deter Western intervention and support for Ukraine. Russia has also attempted to manipulate nuclear risk when it faces battlefield setbacks. These trends are unlikely to change anytime soon. In fact, Russia will likely rely increasingly on nuclear threats to offset its conventional losses and to advance its broader strategic objectives. Navigating these signals and managing escalation will be a continued priority for Western leaders as they continue to confront Russian aggression in the coming months and years. ■

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ENDNOTES

- 1 This brief builds on a previous CSIS digital report and database, “Nuclear Signaling during the War in Ukraine,” Project on Nuclear Issues, CSIS, <https://nuclearukraine.csis.org/#about>;
- 2 Tom Balmforth and Maria Kiselyova, “Putin Leads Sweeping Nuclear Exercises as Tensions Soar,” Reuters, February 19, 2022, <https://www.reuters.com/world/europe/putin-starts-russias-strategic-nuclear-exercises-tensions-soar-2022-02-19/>; and Vladimir Putin, “Address by the President of the Russian Federation,” Kremlin, President of Russia, February 24, 2022, <http://en.kremlin.ru/events/president/news/67843>.
- 3 “Briefing by Foreign Ministry Spokeswoman Maria Zakharova, Moscow, September 15, 2022 - Ministry of Foreign Affairs of the Russian Federation,” Mid.ru, 2022, https://mid.ru/ru/foreign_policy/news/1829920/?lang=en; and “Foreign Minister Sergey Lavrov’s Interview with Lenta.ru Online Newspaper, July 13, 2023 - the Ministry of Foreign Affairs of the Russian Federation,” Mid.ru, 2023, https://mid.ru/en/foreign_policy/news/1896659/.
- 4 For example, “The G7 supports good faith efforts to continue a S.-Russian dialogue on the reduction of nuclear and strategic risks, but negotiation requires a willing partner operating in good faith.” U.S. Department of State, “Statement of the G7 Non-Proliferation Directors Group,” Press release, April 17, 2023, <https://www.state.gov/statement-of-the-g7-non-proliferation-directors-group/#:~:text=The%20G7%20emphasizes%20the%20importance,recognized%20principles%20of%20international%20law>.
- 5 Filipp Lebedev and Mark Trevelyan, “Russian Lawmakers Vote to Scrap Ratification of Nuclear Test Ban Treaty,” Reuters, October 18, 2023, <https://www.reuters.com/world/europe/russian-duma-passe-s-law-revoke-ratification-nuclear-test-ban-treaty-2023-10-18/>.
- 6 David Vergun, “U.S. Support for Ukraine ‘Unshakable,’ Says Austin,” U.S. Department of Defense, December 11, 2023, <https://www.defense.gov/News/News-Stories/Article/Article/3613826/us-support-for-ukraine-unshakable-says-austin/>.
- 7 Josh Wingrove, “Biden Says He’d Fight World War III for NATO but Not for Ukraine,” *Bloomberg*, March 11, 2022, <https://www.bloomberg.com/news/articles/2022-03-11/biden-says-he-d-fight-world-war-iii-for-nato-but-not-for-ukraine>.
- 8 Anna Clara Arndt, Liviu Horovitz, and Michal Onderčo, “Russia’s Failed Nuclear Coercion against Ukraine,” *Washington Quarterly* 46, no. 3 (July 3, 2023): 167-184, <https://doi.org/10.1080/0163660x.2023.2259665>.
- 9 “Nuclear Signaling during the War in Ukraine,” Project on Nuclear Issues, CSIS.
- 10 Office of the Director of National Intelligence, *Annual Threat Assessment of the U.S. Intelligence Community* (Washington, DC: ODNI, March 2023), <https://www.dni.gov/index.php/newsroom/reports-publications/reports-publications-2023/3676-2023-annual-threat-assessment-of-the-u-s-intelligence-community>.
- 11 Ibid.
- 12 James Slagle, “New Russian Military Doctrine: Sign of the Times,” *Parameters* (Spring 1994): 88-99, <https://apps.dtic.mil/sti/citations/ADA528125>; Alexei Arbatov, “The Transformation of Russian Military Doctrine: Lessons Learned from Kosovo and Chechnya,” *Marshall Center Papers* no. 2 (July 2000), <https://www.marshallcenter.org/en/publications/marshall-center-papers/transformation-russian-military-doctrine-lessons-learned-kosovo-and-chechnya/transformation-russian-military>.
- 13 “Военная доктрина Российской Федерации” [Military Doctrine of the Russian Federation], *www.ng.ru*, April 21, 2000, https://www.ng.ru/politics/2000-04-22/5_doktrina.html.
- 14 “Военная доктрина РФ” [Military Doctrine of the Russian Federation], *Российская газета [Rossiyskaya Gazeta]*, February 5, 2010, <https://rg.ru/documents/2010/02/10/doktrina-dok.html>.
- 15 “Военная доктрина Российской Федерации” [Military Doctrine of the Russian Federation], *Российская газета [Rossiyskaya Gazeta]*, December 30, 2014, <https://rg.ru/documents/2014/12/30/doktrina-dok.html>.
- 16 “Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence,” Mid.ru, June 8, 2020, https://archive.mid.ru/en/web/guest/foreign_policy/international_safety/disarmament/-/asset_publisher/rp0fiUBmANaH/content/id/4152094.
- 17 Laura Kelly, “Putin Takes Big Risk by Mobilizing Greater Force for Ukraine War,” *The Hill*, September 21, 2022, <https://thehill.com/policy/international/3654548-putin-takes-big-risk-by-mobilizing-greater-force-for-ukraine-war/>.
- 18 Michael Kofman, Anya Fink, and Jeffrey Edmonds, *Russian Strategy for Escalation Management: Evolution of Key Concepts* (Washington, DC: CNA, April 13, 2020), <https://www.cna.org/reports/2020/04/russian-strategy-for-escalation-management-key-concepts>.
- 19 Hans Kristensen, Matt Korda, and Eliana Johns, “Nuclear Notebook: Russian Nuclear Weapons, 2023,” *Bulletin of the Atomic Scientists* 79, no.3 (May 8, 2023): 174-99, <https://doi.org/10.1080/00963402.2023.202542>.
- 20 Steven Starr, “An Explanation of Nuclear Weapons Terminology,” Nuclear Age Peace Foundation, November 29, 2007, <https://www.wagingpeace.org/an-explanation-of-nuclear-weapons-terminology/>.
- 21 Kristensen, Korda, and Eliana Johns, “Russian Nuclear Weapons, 2023.”
- 22 “Russia Deploys ICBM That Putin Says Will Make Enemies ‘Think Twice,’” AP News, September 1, 2023, <https://apnews.com/article/russia-icbm-satan-putin-bf32b659736c9a5fd7129f3aac2f1107>.
- 23 “RSM-56 Bulava (SS-N-32),” *Missile Threat*, CSIS, November 7, 2016, <https://missilethreat.csis.org/missile/ss-n-32-bulava/>.
- 24 “Kh-101 / Kh-102,” *Missile Threat*, CSIS, <https://missilethreat.csis.org/missile/kh-101-kh-102/>.
- 25 Ministry of Defence of the Russian Federation, “Statement by Minister of Defence of the Russian Federation General of the Army Sergei Shoigu at Extended Session of Defence Ministry Board,” Press release, December 19, 2023, https://eng.mil.ru/en/news_page/country/more.htm?id=12491871@@egNews.

- 26 Lidia Kelly, "Russian Bailout Wins Ukraine Economic Respite but Deepens Political Rift," Reuters, December 17, 2013, <https://www.reuters.com/article/us-ukraine/russian-bailout-wins-ukraine-economic-respite-but-deepens-political-rift-idUSBRE9BF1IU20131217>.
- 27 Eugene Rumer and Andrew S. Weiss, "Ukraine: Putin's Unfinished Business," Carnegie Endowment for International Peace, November 12, 2021, <https://carnegieendowment.org/2021/11/12/ukraine-putin-s-unfinished-business-pub-85771>.
- 28 Andrew Osborn, "Putin Warns NATO against Closer Ties with Ukraine and Georgia," Reuters, July 19, 2018, <https://www.reuters.com/article/us-russia-nato-putin/putin-warns-nato-against-closer-ties-with-ukraine-and-georgia-idUSKBN1K92KA>.
- 29 Gabrielle Tétrault-Farber and Tom Balmforth, "Russia Demands NATO Roll Back from East Europe and Stay out of Ukraine," Reuters, December 17, 2021, <https://www.reuters.com/world/russia-unveils-security-guarantees-says-western-response-not-encouraging-2021-12-17/>; and Andrew Roth, "Russia Issues List of Demands It Says Must Be Met to Lower Tensions in Europe," *The Guardian*, December 17, 2021, <https://www.theguardian.com/world/2021/dec/17/russia-issues-list-demands-tensions-europe-ukraine-nato>.
- 30 "Foreign Minister Sergey Lavrov's Interview with Rossiya Segodnya, December 31, 2021 - the Ministry of Foreign Affairs of the Russian Federation," Mid.ru, 2021, https://www.mid.ru/en/press_service/minister_speeches/1793028/?lang=en.
- 31 Michael Crowley and David E. Sanger, "U.S. And NATO Respond to Putin's Demands as Ukraine Tensions Mount," *New York Times*, January 27, 2022, <https://www.nytimes.com/2022/01/26/us/politics/russia-demands-us-ukraine.html>.
- 32 Tom Balmforth and Maria Kiselyova, "Putin Leads Sweeping Nuclear Exercises as Tensions Soar," Reuters, February 19, 2022, <https://www.reuters.com/world/europe/putin-starts-russias-strategic-nuclear-exercises-tensions-soar-2022-02-19/>.
- 33 Jack Watling and Nick Reynolds, *Operation Z: The Death Throes of an Imperial Delusion* (London: Royal United Services Institute for Defence and Security Studies, 2022), <https://static.rusi.org/special-report-202204-operation-z-web.pdf>.
- 34 Office of the President of Russia, "Address by the President of the Russian Federation," Press release, February 24, 2022, <http://en.kremlin.ru/events/president/news/67843>.
- 35 "Belarus Referendum Approves Proposal to Renounce Non-Nuclear Status - Agencies," Reuters, February 27, 2022, <https://www.reuters.com/world/europe/launchpad-russias-assault-ukraine-belarus-holds-referendum-renounce-non-nuclear-2022-02-27/>.
- 36 Office of the President of Russia, "Meeting with Sergei Shoigu and Valery Gerasimov," Press release, February 27, 2022, <http://en.kremlin.ru/events/president/news/67876>.
- 37 Ibid.
- 38 "France Says Putin Needs to Understand NATO Has Nuclear Weapons," Reuters, February 24, 2022, <https://www.reuters.com/world/europe/france-says-putin-needs-understand-nato-has-nuclear-weapons-2022-02-24/>; "In Full: Trevor Phillips on Sunday," Sky News, February 27, 2022, <https://news.sky.com/video/in-full-trevor-phillips-on-sunday-12553126>.
- 39 "Russian Nuclear Forces Placed on High Alert after Putin Order - Interfax," Reuters, February 28, 2022, <https://www.reuters.com/world/russian-strategic-missile-forces-placed-high-alert-after-putin-order-ifax-cites-2022-02-28/>.
- 40 "'No Reason' to Change US Nuclear Alert Level amid Putin's Threat: Psaki," ABC News, February 28, 2022, <https://abcnews.go.com/Politics/reason-change-us-nuclear-alert-level-amid-putins-story?id=83159115>.
- 41 Ibid.
- 42 Phil Stewart and Idrees Ali, "No Russian 'Muscle Movements' after Putin's Nuclear Readiness Alert, U.S. Says," Reuters, February 28, 2022, <https://www.reuters.com/world/europe/no-russian-muscle-movements-after-putins-nuclear-readiness-alert-us-says-2022-02-28/>.
- 43 Phil Stewart and Idrees Ali, "U.S. Delays ICBM Test-Launch in Bid to De-Escalate Russia Nuclear Tensions," Reuters, March 2, 2022, <https://www.reuters.com/world/us/us-delays-icbm-test-launch-bid-de-escalate-russia-nuclear-tensions-2022-03-02/>.
- 44 Phil Stewart and Idrees Ali, "Exclusive: U.S. Cancels ICBM Test due to Russia Nuclear Tensions," Reuters, April 1, 2022, <https://www.reuters.com/business/aerospace-defense/exclusive-us-cancels-icbm-test-due-russia-nuclear-tensions-2022-04-01/>.
- 45 United States Strategic Command (@@STRATCOM), "#BravoZulu to @@USNavy's Strategic Systems Programs and all involved in the scheduled missile test flights of four unarmed Trident II (D5LE) missiles successfully launched from an Ohio-class ballistic missile submarine off the coast of southern California," X (formerly Twitter), July 17, 2022, 1:23 p.m., https://twitter.com/US_STRATCOM/status/1537848521910525952.
- 46 Ian Lovett, "Russian Forces Expand Donbas Assault, Take Heavy Losses," *Wall Street Journal*, May 25, 2022, <https://www.wsj.com/articles/russian-forces-expand-donbas-assault-but-at-steep-cost-11653472850>; and Nathan Hodge et al., "Russia Says It Will Reduce Military Operations around Kyiv Following Talks with Ukraine," CNN, March 29, 2022, <https://www.cnn.com/2022/03/29/europe/russia-reduce-assault-kyiv-plan-intl/index.html>.
- 47 Matt Farmer, "Zaporizhzhia Nuclear Plant: A Timeline of Events since Russia's Invasion," Power Technology, October 21, 2022, <https://www.power-technology.com/features/ukraine-zaporizhzhia-timeline-nuclear-plant/?cf-view&cf-closed>.
- 48 "Russia Has Military Resources, Willpower to Defend Sovereignty - MFA," TASS, April 4, 2023, <https://tass.com/defense/1599375>.
- 49 Ryan Chilcote, Dan Sagalyn, and Morgan Till, "Putin's Spokesman Dmitry Peskov on Ukraine and the West: 'Don't Push Us into the Corner,'" PBS NewsHour, March 28, 2022, <https://www.pbs.org/newshour/show/putins-spokesman-dmitry-peskov-on-ukraine-and-the-west-dont-push-us-into-the-corner>.
- 50 Martha Kelner, "Russian Diplomat: If NATO Threatens Us We Have the Right to Press the Nuclear Button," Sky News, March 25, 2022, <https://news.sky.com/story/russian-diplomat-if-nato-threatens-us-we>

have-the-right-to-press-the-nuclear-button-12573773.

- 51 Cristina Gallardo, “Ukraine Got Its Tanks. Now It Wants Jet Fighters Too,” *Politico*, January 26, 2023, <https://www.politico.eu/article/ukraine-volodymyr-zelenskyy-russia-war-after-tanks-the-west-mulls-discussion-on-fighter-jets/>.
- 52 Mark Trevelyan, “Putin Says No One Can Win a Nuclear War,” Reuters, August 1, 2022, <https://www.reuters.com/world/putin-there-can-be-no-winners-nuclear-war-it-should-never-be-started-2022-08-01/>.
- 53 “Russian Delegation Rejects Accusations of Threats to Use Nuclear Weapons in Ukraine at UN,” TASS, August 3, 2022, <https://tass.com/politics/1488461>.
- 54 “На открытии X Московской конференции по международной безопасности с приветственным словом выступил Министр обороны России” [At the opening of the 10th Moscow conference on international security, the Minister of Defence of Russia delivered welcoming remarks], Министерство Обороны Российской Федерации [Ministry of Defence of the Russian Federation], August 16, 2022, [@egNews](https://function.mil.ru/news_page/country/more.htm?id=12433677).
- 55 “Интервью заместителя Министра иностранных дел России С.А.Рябкова МИА ‘Россия сегодня’ в связи с 60-летием Карибского кризиса - Министерство иностранных дел Российской Федерации” [Interview with Deputy Minister of Foreign Affairs of Russia S.A. Ryabkov by International News Agency ‘Russia Today’ in Connection to the 60th Anniversary of the Caribbean Crisis - Ministry of Foreign Affairs of the Russian Federation], Mid.ru, 2018, https://www.mid.ru/ru/foreign_policy/news/183384/.
- 56 “Press Conference: Sergey Lavrov, Minister for Foreign Affairs of the Russian Federation,” UN Web TV, September 24, 2022, <https://media.un.org/en/asset/k1p/k1phn109wf>.
- 57 Max Seddon, “Why Vladimir Putin Toned down His Nuclear Rhetoric,” *Financial Times*, November 1, 2023, <https://www.ft.com/content/d98446ac-b56e-4f1d-bfa9-ebaed4e26884>.
- 58 Lili Bayer, “Russia’s Dirty Bomb Claim ‘Absurd,’ Says NATO Chief,” *Politico*, October 24, 2022, <https://www.politico.eu/article/russia-ukraine-dirty-radioactive-bomb-claim-absurd-says-nato-chief-jens-stoltenberg/>.
- 59 Government of India Press Information Bureau, “Telephonic Conversation between Raksha Mantri Shri Rajnath Singh & Defence Minister of Russia Mr Sergei Shoigu,” Press release, October 26, 2022, <https://pib.gov.in/PressReleasePage.aspx?PRID=1870962>.
- 60 “Украина могла создать ядерное оружие в ближайшей перспективе - информированный источник в РФ” [Ukraine Could Build a Nuclear Weapon in the Near Future - Knowledgeable Source in the Russian Federation] Interfax. ru, March 6, 2022, <https://www.interfax.ru/russia/826642>.
- 61 Helene Cooper, Julian E. Barnes, and Eric Schmitt, “Russian Military Leaders Discussed Use of Nuclear Weapons, U.S. Officials Say,” *New York Times*, November 2, 2022, <https://www.nytimes.com/2022/11/02/us/politics/russia-ukraine-nuclear-weapons.html>.
- 62 Office of the President of Russia, “Valdai International Discussion Club Meeting,” Press release, October 27, 2022, <http://www.en.kremlin.ru/events/president/transcripts/69695>.
- 63 “Полянский назвал главную цель Киева при провокации с ‘грязной бомбой’” [Polyansky named Kyiv’s main goal for the provocation with a ‘dirty bomb’], РЕИ ТВ [Ren TV], October 29, 2022, <https://ren.tv/news/v-mire/1040152-polianskii-nazval-glavnuu-tsel-kieva-pri-provokatsii-s-griaznoi-bomboi>.
- 64 “Statement of the Russian Federation on Preventing Nuclear War - the Ministry of Foreign Affairs of the Russian Federation,” Mid.ru, 2022, https://mid.ru/en/foreign_policy/news/1836575/.
- 65 The September/October peak in Russian nuclear signaling maps closely to the course of events on the battlefield, but, given that the authors cannot know Putin’s perception of battlefield events or the state of the Russian war effort during this period, it is important to acknowledge that the intensification of Russian signaling may have been tied to other events and objectives, including the Kremlin’s efforts to legitimize its September 2022 annexation referendums.
- 66 Guy Faulconbridge and Felix Light, “Putin Ally Warns NATO of Nuclear War If Russia Is Defeated in Ukraine,” Reuters, January 19, 2023, <https://www.reuters.com/world/europe/putin-ally-medvedev-warns-nuclear-war-if-russia-defeated-ukraine-2023-01-19/>.
- 67 Vladimir Putin, “Presidential Address to Federal Assembly,” The Kremlin, President of Russia, February 21, 2023, <http://en.kremlin.ru/events/president/news/70565>.
- 68 “Путин: заявление Британии послужило поводом для переговоров с Лукашенко” [Putin: the British statement was the reason for discussions with Lukashenko], РИА Новости [RIA Novosti], 2023, <https://ria.ru/20230325/putin-1860659321.html>.
- 69 Max Seddon, “Why Vladimir Putin Toned Down His Nuclear Rhetoric,” *Financial Times*, November 1, 2023, <https://www.ft.com/content/d98446ac-b56e-4f1d-bfa9-ebaed4e26884>.
- 70 “Transcript: National Security Adviser Jake Sullivan on ‘Face the Nation,’ Sept. 25, 2022,” CBS News, September 25, 2022, <https://www.cbsnews.com/news/jake-sullivan-face-the-nation-transcript-09-25-2022/>.
- 71 Max Seddon et al., “Xi Jinping Warned Vladimir Putin against Nuclear Attack in Ukraine,” *Financial Times*, July 5, 2023, <https://www.ft.com/content/c5ce76df-9b1b-4dfc-a619-07da1d40cbd3>.
- 72 “Vilnius Summit Communiqué Issued by NATO Heads of State and Government Participating in the Meeting of the North Atlantic Council in Vilnius 11 July 2023,” NATO, July 19, 2023, https://www.nato.int/cps/en/natohq/official_texts_217320.htm.