



RESEARCH BRIEF

# Understanding the Risk of Escalation in the War in Ukraine



## Key Findings

Russian President Vladimir Putin's invasion of Ukraine in February 2022 has imposed devastating losses on the Russian military and on Ukraine's military and civilian populations, but both sides have avoided certain escalatory options. Putin has been restrained for several reasons, including fear of NATO's military response; an information flow that filters out negative facts, promoting the view that Russia can win a protracted war; and incremental increases in NATO support for Ukraine.

The fact that Putin has avoided certain escalatory options to date does not mean that he will avoid them in the future. The Kremlin's control of Russia has become brittle, potentially encouraging Putin to consider options to shorten the war. Withdrawal from Ukraine is one such option. Greater escalation is another, including attacking NATO directly, intensifying the use of Russian air forces against Ukraine, and using chemical weapons. Putin could also use nuclear weapons inside Ukraine. The risks to the Kremlin would be enormous, but a sudden deterioration of Russian forces or threats to internal stability could lead Putin to view nuclear weapons as the best among a set of bad options. Should he choose to take that risk, he may not be restrained in the number or types of weapons he uses inside Ukraine.

### RAND's assessment highlights implications for U.S. and NATO policymakers.

- **Maintaining NATO alliance cohesion** is critical to sustaining support for Ukraine and deterring Russian escalation.
- **A continued incremental approach** to providing greater support to Ukraine could limit escalation risks, but it could work against Ukraine if Russia fields new forces quickly and Ukrainian losses increase.
- Putin may be politically **unable to reduce his war aims**, giving him less room to maneuver.
- More-destructive attacks against Ukraine's civilian population could initiate an **escalatory spiral** if Ukraine retaliates with intensified attacks inside Russia.
- **Internal instability** in Russia is likely to influence Putin's calculations, but the direction of its effects is not yet clear.
- U.S. ability to **control future escalation may diminish**. U.S. and allied policymakers should plan to respond to Russian escalation while striving to maintain diplomatic and military communication channels with Russia that could arrest an escalatory spiral.

# Studying the Risks of Escalation

Russia's invasion of Ukraine in February 2022 has imposed devastating losses on both the Russian military and Ukraine's military and civilian populations. But to date, both sides have avoided certain escalatory options. Russian president Vladimir Putin has not broadened the conflict by attacking the United States or other NATO members to punish them for supporting Ukraine. He has also not pursued certain escalation options against Ukraine—most notably, the use of nuclear weapons.

Russia's decision calculus about escalation was, not surprisingly, the focus of prewar analyses by the United States and NATO. However, events in the past year have proven those analyses wrong. Putin has proven to be more hesitant to escalate, particularly against NATO, than was generally assumed before the war, and how escalation decisions appear to be made in Russia differs from prewar expectations, with Putin making key decisions largely on his own without substantial influence from the Russian General Staff. However, the fact that Putin has avoided certain escalatory options to date does not mean he will avoid them in the future. If Russian territorial, personnel, and materiel losses continue to mount without improvements on the battlefield, he will face a set of unpalatable choices, including negotiations from a position of weakness, more-extensive and potentially destabilizing mobilizations, or more-draconian attempts to ensure internal control. A changing environment may prompt him to rethink

the risk calculation, making escalation preferable to other options.

To explore the multiple dimensions of escalation in the war in Ukraine, the RAND research team posed three main questions.

- What can be learned from Russia's behavior to date about the risks of escalation in the present conflict?
- What trajectories might the war take that could increase Russia's willingness to escalate, particularly regarding nuclear use?
- What lessons can be drawn that could inform decisions by U.S. and NATO policymakers, both in the current conflict and in future conflicts involving nuclear powers?

## Defining Escalation

Previous RAND researchers defined *escalation* as an increase in the intensity or scope of a military conflict “that crosses threshold(s) considered significant by one or more of the participants.”<sup>1</sup> It can be vertical (i.e., changes in the intensity of conflict) or horizontal (i.e., changes in the geographic scope of conflict). Escalation can be deliberate, inadvertent, or accidental (see Table 1).

The risks of accidental escalation are likely to persist for the duration of the conflict. However, it is difficult to predict when or how accidental escalation might occur. This analysis focuses on risks of inadvertent and deliberate escalation.

**TABLE 1**  
**Types of Potential Escalation in Conflict**

TYPE OF ESCALATION	DEFINITION	EXAMPLE
Deliberate	One side escalates purposefully to prevent defeat or gain an operational advantage	A state decides to use nuclear weapons to eliminate a conventional capability of its adversary
Inadvertent	One side takes an action it does not perceive as escalatory but its opponent interprets it as such	A state undertakes a conventional strike that inadvertently damages its adversary's nuclear command and control systems; the adversary interprets this action as intentional targeting of these systems
Accidental	Unintended action or mistake	A communications failure in a nuclear missile silo leads to a launch that was not authorized by the state's leadership

## Learning from the Conflict About Russian Escalation Decisions



Assumptions of U.S. analysts about how and why Russia would consider escalation have proven inaccurate for two reasons: (1) misunderstanding how strategic decisions in Russia are actually made and (2) substantially misreading Russian risk tolerance and willingness to militarily confront NATO. As one expert pointed out, Putin was treated “as a rational thinker with good information.”<sup>2</sup> In reality, Putin overemphasized secrecy in planning the invasion, overestimated the quality of his plan and prospects for success, and underestimated both Ukrainian will and Western cohesiveness.

### What Putin Got Wrong

#### **Strategic misjudgment and poor invasion planning.**

Putin’s miscalculations created situations for which he and his advisers were unprepared. They believed they could seize Kiev quickly, rendering NATO promises to provide Ukraine with support basically irrelevant. NATO cohesion appeared mixed before the invasion, but Russia’s brazen invasion and ruthless prosecution of the campaign brought about a sea change in European political and strategic calculations. In this changed environment, Russia has seemed uncertain about how to deter NATO from providing this assistance.

**Misperceptions about Ukrainian capabilities and will to fight.** The ease with which Putin seized Crimea in 2014 led him to assume that capturing the remainder of Ukraine would be comparably easy: Russia would be confronting the same corrupt, effectively leaderless entity it encountered in early 2014. Putin missed signs of Ukraine’s

democratic political development over the previous eight years, the growth of a cohesive national identity, and substantial investments in Ukraine’s military capabilities.

These misperceptions led Putin to conclude that he did not need to plan for escalation. When battlefield reversals could not be denied, he attacked Ukraine’s civilian population and critical infrastructure, again misjudging Ukrainian resolve.

#### **Misperceptions about European politics and Western unity.**

Putin believed that the Western alliance could be fractured if appropriate threats and pressure were applied, including shutting off natural gas exports to Europe. He misperceived the latent degree of allied political and diplomatic unity, failing to recognize that unity would be enhanced by the experience of observing Russia’s brutal conduct in the war. At least initially, he may have believed that limited horizontal escalation efforts could work, curtailing NATO assistance to Ukraine without taking further risks.

## What the West Got Wrong

### **Russian tolerance of NATO assistance to Ukraine.**

**Ukraine.** The West underestimated Russia's fear of NATO and accompanying hesitance to confront NATO directly.

**Overestimation of the effectiveness of Russian escalatory tools and options.** In addition, battlefield losses and depletion of weapons stockpiles have left Russian leaders with a more limited set of escalation tools. Attempts to starve and freeze populations by withholding energy and food resources or attacking critical infrastructure failed to change European or Ukrainian behavior.

**Russia's insular decisionmaking.** Putin and his inner circle appear to have made little use of economic or military expertise in their "shambolic plan for invasion," as one expert described.<sup>2</sup> Putin has narrowed the funnel of information that reaches him to exclude the diplomats, economic ministers, and others who might have offered contrary advice; increasingly, he makes his decisions in isolation. Crises also appear to have affected

him personally, adding emotion and anger to an already insular decisionmaking process.

## Why Has Russia Not Escalated More?

The two most significant examples of Russian escalation involved attacking Ukraine's civilian population and targeting critical infrastructure. Russia has made no sustained effort to interdict NATO support efforts in Ukraine.

Why has Russia not escalated more? Russia's fear of NATO encourages the Kremlin to behave cautiously rather than risk direct conflict. In addition, the information flow in the Russian system filters out negative facts, promoting the view that Russia's prospects for winning a protracted war are still high. Russian incentives to escalate may also have been diminished because support to Ukraine has increased gradually. No single change in assistance was sufficiently dramatic to risk war with NATO to prevent it.



# Future Escalation in the War in Ukraine

## Three Possible Scenarios Illustrate the Risk of Inadvertent Escalation

The ongoing war carries with it risks of inadvertent escalation that have yet to materialize. To better appreciate these risks, we outline three horizontal escalation scenarios that are plausible based on what we know of Russian, Ukrainian, and NATO activities to date.

**1**

**A Russian strike inside Ukraine could kill NATO officials.** Russia may not have intended to target the officials, but the NATO member state might not believe the explanation, triggering political pressure to attack Russia or diplomatic demands for a collective NATO response. Putin could wait to see how NATO responds or attempt to preempt any attack by striking NATO capabilities first. Either possibility could lead to direct exchange of fire between Russian and NATO militaries.

**2**

**Aggressive Russian maneuvers against U.S. surveillance aircraft kill U.S. military personnel.** Aggressive Russian maneuvers targeting a manned U.S. surveillance aircraft operating in or near the Black Sea could plausibly lead to the deaths of U.S. personnel. U.S. policymakers would face pressure to respond, possibly by targeting the Russian aircraft or supporting base involved. Russia may view any U.S. response strike as highly escalatory, leading Putin to consider retaliatory strikes.

**3**

**Russia misperceives NATO moves as signals of intervention in Ukraine.** A substantial increase in higher-readiness forces with longer-range strike capabilities near Russia's borders, accompanied by explicit discussions about a near-term pathway to Ukraine's membership in NATO, or comparable security guarantees, could convince Moscow that it is on a slippery slope to direct NATO intervention. Putin could decide to push for a ceasefire, but he could also decide to strike NATO targets preemptively to degrade NATO capabilities or deter a future intervention by underlining Russia's willingness to bring the war directly to NATO countries. In response to what it would likely view as an unprovoked Russian attack, NATO could be deterred, but it could also be outraged and seek to punish Moscow through direct military action.

Through these or other scenarios, the potential for inadvertent escalation is likely to persist for the duration of the conflict, highlighting the value of maintaining open lines of military and diplomatic communications with Russia to help disrupt such spirals.



## Both Russia and Ukraine Have Capability and Motivation for Deliberate Escalation

However, it is deliberate escalation decisions that pose the greatest risk. Putin appears to believe that a war of attrition will eventually fracture either Ukrainian capabilities and will or diminish Western support for Kyiv. However, near-term prospects for either outcome are diminishing. The commitment of resources to invading Ukraine has left the Kremlin's control of Russia itself brittle, potentially reducing its appetite for a protracted war of attrition and encouraging options to shorten it. Withdrawal from Ukraine is one such option. Greater deliberate escalation is another.

The research team identified options for deliberate escalation that Russia or Ukraine could pursue (see Table 2). Russia remains the actor with the greatest potential to deliberately escalate the conflict, but Ukraine also has motivation and some capabilities to escalate. For each escalation option, the team identified the likely *motivations* that could prompt the country to take this step, assessed whether it has the *capabilities* to take the step as of summer 2023, and identified *restraining factors* that may have so far inhibited Moscow or Kiev.

---

The potential for inadvertent escalation is likely to persist for the duration of the conflict, highlighting the value of maintaining open lines of military and diplomatic communications with Russia to help disrupt such spirals.

---



TABLE 2

## Options for Deliberate Escalation That Would Fundamentally Change the Dynamics of the Conflict

OPTION	MOTIVATION	ABILITY TO EXECUTE	RESTRAINING FACTORS
<b>OPTION A</b> Limited Russian attack against NATO in Europe	Coerce NATO to limit or cease support to Ukraine	Varies depending on scale and nature of attack	<ul style="list-style-type: none"> <li>• Russia does not view direct NATO intervention as inevitable</li> <li>• Russia anticipates that NATO's response would be devastating</li> <li>• Ukrainian use of U.S.-NATO-supplied military capabilities against Russian territory is restricted</li> <li>• Increase in NATO assistance has been gradual</li> <li>• Russia believes it can win a war of attrition</li> <li>• No acute threats to Russian domestic stability</li> </ul>
<b>OPTION B</b> Russia provokes out-of-area crisis	Distract U.S. and allies to reduce support for Ukraine	Challenging to incentivize a state to provoke a crisis unless it was already predisposed	<ul style="list-style-type: none"> <li>• Russian reluctance to take further risks</li> <li>• Potential for hardening international opposition to Russia</li> </ul>
<b>OPTION C</b> Russia conducts large-scale air and missile campaign against Ukraine	Establish some measure of air superiority in skies over Ukraine	Russia may incur serious losses to destroy Ukrainian air defenses but may be able to achieve air superiority	<ul style="list-style-type: none"> <li>• Russian desire to preserve its capabilities to deter NATO attack</li> <li>• Difficulty of replacing lost aircraft and pilots</li> <li>• Public and diplomatic reaction to high-profile losses</li> <li>• Russia believes it can win a war of attrition</li> <li>• No acute threats to Russian domestic stability</li> </ul>
<b>OPTION D</b> Russia initiates large-scale use of chemical weapons in Ukraine	Battlefield advantage; break Ukrainian civilian and military morale; motivate NATO members to push Ukraine to negotiations	Size and scope of chemical weapons arsenal unclear; logistical challenges in employment	<ul style="list-style-type: none"> <li>• Risk of triggering direct NATO intervention</li> <li>• Potential loss of status in developing world</li> <li>• Potential loss of PRC's support</li> <li>• Russia believes it can win a war of attrition</li> <li>• No acute threats to Russian domestic stability</li> </ul>
<b>OPTION E</b> Russia conducts underground nuclear test	Signal to NATO that continued support risks escalation; threat to nonproliferation efforts to use as leverage	Russia likely has capability to conduct nuclear tests	<ul style="list-style-type: none"> <li>• No plausible direct link to Ukrainian actions, ensuring that step is viewed as aggressive</li> <li>• Potential loss of status in developing world</li> <li>• Potential loss of PRC's support</li> <li>• Uncertainty about U.S and NATO reactions</li> <li>• Russia believes it can win a war of attrition</li> <li>• No acute threats to Russian domestic stability</li> </ul>
<b>OPTION F</b> Russia uses nuclear weapons inside Ukraine	Prevent rapid catastrophic Russian battlefield losses that could threaten regime; coerce NATO to push for a ceasefire	Extensive Russian nuclear capabilities; however, tactical weapons kept at lower readiness levels, and Russian ground forces likely ill prepared to operate on nuclear battlefield	<ul style="list-style-type: none"> <li>• Possibility of NATO entry into the war</li> <li>• Potential loss of PRC's support</li> <li>• Potential loss of regime's legitimacy</li> </ul>
<b>OPTION G</b> Ukraine expands its strikes inside Russia	Increase domestic political costs for Russian leadership, hamper Russia's military activities by striking logistics or command and control centers	Some demonstrated capability to execute unmanned aircraft system strikes. Expanding campaign likely possible if willing to accept losses, trade-offs with frontline operations	<ul style="list-style-type: none"> <li>• Strikes might not be effective</li> <li>• More-pressing military needs for their forces</li> <li>• Russia might target Ukrainian leadership in response</li> <li>• NATO might reduce its support if NATO-provided weapons are used to strike inside Russia</li> </ul>

NOTE: PRC = People's Republic of China.

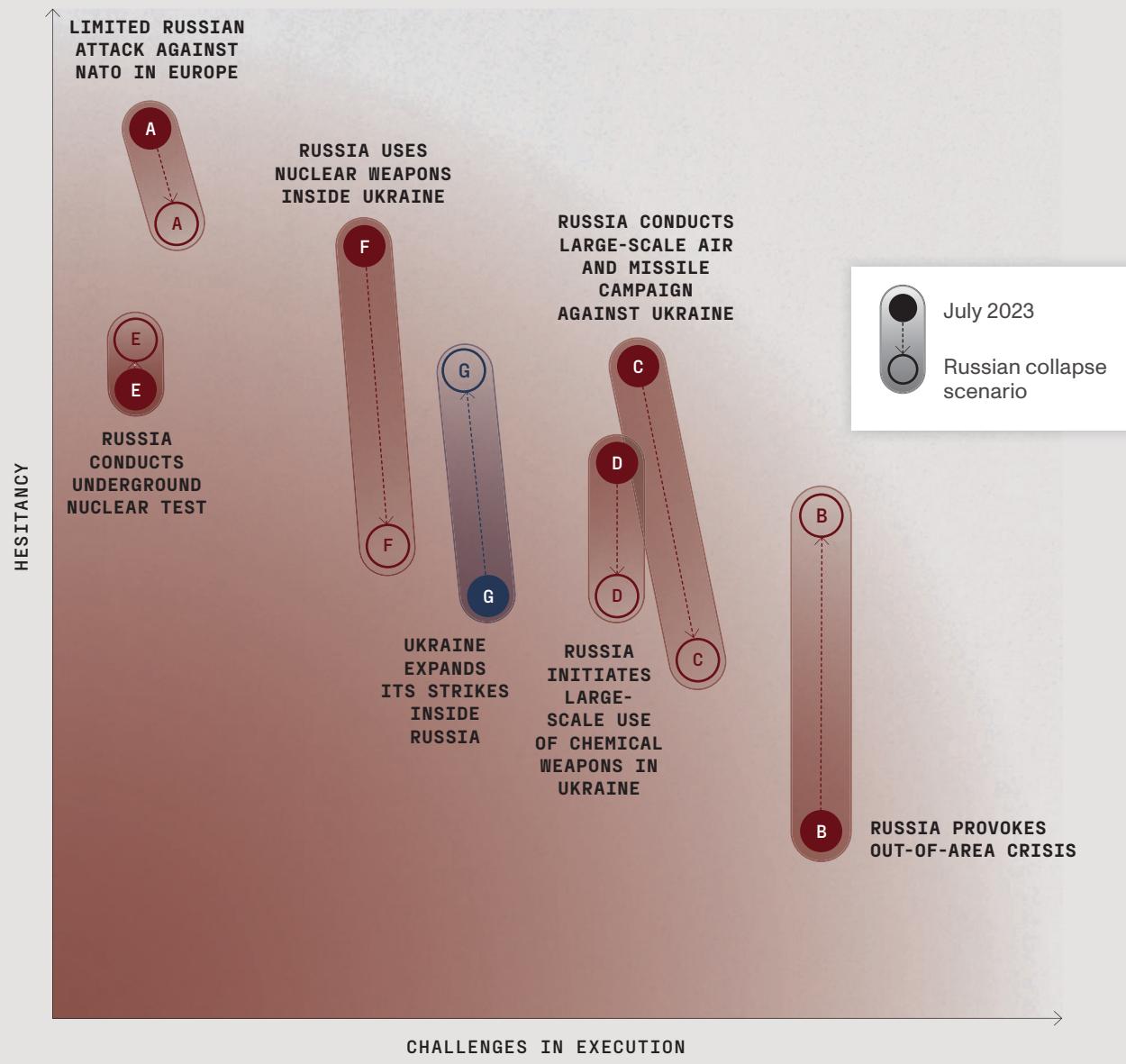
## Changing the Calculus

Both Russia and Ukraine have additional escalation options. Figure 1 illustrates how the risk of different options may vary depending on the trajectory of the war. The horizontal axis of the figure shows the challenges that Russia or Ukraine would face in executing each option, with more-executable options to the left and less-executable options to the right. The vertical axis shows the likely degree of Russian or Ukrainian hesitancy to attempt the option, given both motivations and restraining factors. Taking these two dimensions together,

options that are closer to the bottom left of the figure are those most likely to occur. Although illustrative, Figure 1 shows how a dramatic shift in battlefield conditions—in this case, an imminent Russian military collapse that threatens the survival of the current Russian regime—could alter the likelihood of different escalation options. In the event of such collapse, several highly destructive escalation options, including nuclear use inside Ukraine, would become more likely.

FIGURE 1

### Illustrative Summary of Likelihood of Deliberate Escalation Options (July 2023 vs. Russian Collapse Scenario)



## An Inexact and Messy Process

Any assessment of the risk of Russian escalation should be approached with humility. Russian behavior to date does not provide definitive information about future Russian escalation decisions: The circumstances that could prompt escalation in the future may not be ones that the Russian leadership has previously faced. Nonetheless, we can learn from Russian behavior in the conflict to date.

### Learning from Russian and Ukrainian Escalation Decisions

Russia and the West both entered the early stages of the war with several misperceptions and faulty assumptions. Because Russia overestimated its own capabilities and prospects for success while underestimating Ukrainian will to resist and NATO cohesion, it devoted little effort to developing viable escalatory strategies. However, Russia has since improvised several escalatory actions, including shutting off gas exports to Europe and expanding missile strikes inside Ukraine. These efforts reflect a Kremlin exploring and testing reactions to different escalation options.

What has restrained Russia from going further? A fundamental factor appears to be an acute fear of NATO's military capabilities. Russia also remains sensitive to international relations, at least with more established partners, such as the People's Republic of China. But Russia's belief that it can still win a war of attrition is likely also key. As long as Russia can endure its own extensive costs, and its domestic challenges do not increase, Putin may cling to the belief that he will eventually prevail without taking further risks.

This calculus could change if Russia decides that escalation is required to protect the regime's survival.

Ukraine also has both the motivation and at least limited potential to escalate the conflict by undertaking more sustained strikes inside Russia. But thus far, Ukrainian escalation in this area has been limited by the enormous operational demands of expelling Russian forces from their territory, and likely to a lesser extent by its promises not to use NATO-supplied military capabilities to attack inside Russia. However, should Ukraine decide that greater strikes inside Russia are necessary to win the war or avoid defeat, NATO pressure or prior promises may not deter them.



### The Problem of Nuclear Escalation

Russian nuclear escalation options against Ukraine may become more attractive to Putin and his inner circle if they perceive a threat to regime security. Technical and operational issues impose a very high bar for battlefield nuclear use in Ukraine. But in an effort to coerce NATO to push Ukraine to a ceasefire, Russia could use nuclear weapons to signal to Ukraine and NATO that the risks of escalation to general nuclear war have become acute if the battlefield situation is not stabilized.

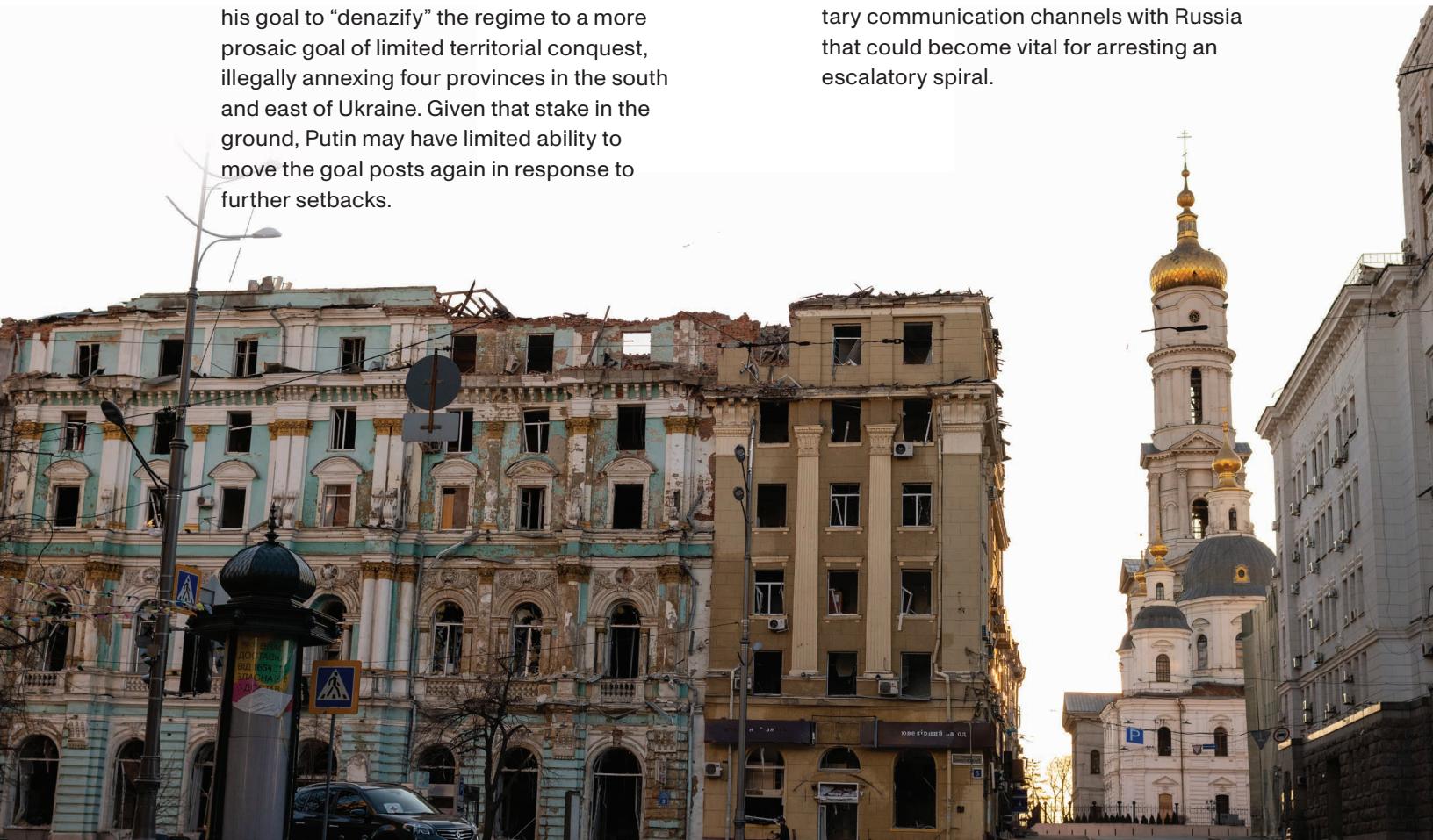
It is uncertain whether that tactic would achieve the desired operational or psychological impact, and the risks to the Kremlin from using nuclear weapons would be enormous. But a sudden deterioration of Russian forces in Ukraine or sharp increase in threats to internal stability could lead the Kremlin to view nuclear use as the best of a series of bad options.

Should Russia decide to use nuclear weapons inside Ukraine, it may not be restrained in the number or types of weapons it employs there. Russia's leadership may perceive that the costs and risks of using only a few or only small nuclear weapons are not dramatically different from those associated with using more or larger weapons, particularly if the Kremlin believed that the latter would achieve Russian battlefield objectives while the former may not.

## Implications for U.S. and NATO Policymakers

This assessment of escalation risks in the war in Ukraine highlights implications for U.S. and NATO policymakers, underscoring several critical trade-offs.

- NATO alliance cohesion regarding which escalation risks to accept is critical to sustaining support for Ukraine and deterring Russian horizontal escalation. Public disagreement within the alliance could feed Russian perceptions that efforts to coerce NATO by threatening further escalation could succeed.
- The incremental approach to supporting Ukraine may have helped to limit Russian escalation, but the strategy could work against Ukraine if Russia fields new forces and Ukrainian losses increase. Western leaders could face a decision to either increase the technical capability and lethality of their support or maintain a gradual approach, limiting some escalation risks but also leaving open the possibility of eventual Russian success.
- Putin may now be politically unable to reduce his war aims. Initially, he amended his goal to “denazify” the regime to a more prosaic goal of limited territorial conquest, illegally annexing four provinces in the south and east of Ukraine. Given that stake in the ground, Putin may have limited ability to move the goal posts again in response to further setbacks.
- More-destructive attacks against Ukraine’s civilian population could touch off an escalatory spiral if Ukraine retaliates with attacks inside Russia. Risks of horizontal escalation against the United States and Europe may also then become elevated. U.S. and NATO policymakers should be prepared to interrupt such escalation while not undercutting Ukrainian battlefield objectives inside Ukraine.
- The demands of the invasion have made Putin’s control of the country increasingly brittle, but how this trend will affect his escalation calculus is unclear. He could reduce resources committed to the conflict, exploring partial withdrawals or ceasefire arrangements to gain room for reconstitution. However, Putin could consider further escalatory options to shorten the conflict, even at the risk of possible NATO involvement or loss of Chinese support.
- Depending on the trajectory of the conflict, U.S. ability to control future escalation may diminish. This reality makes it necessary for U.S. and allied policymakers to develop plans for responding to potential Russian escalatory actions. It also highlights the importance of maintaining political and military communication channels with Russia that could become vital for arresting an escalatory spiral.





## Implications for Future Conflicts

Examination of Russia's escalatory behavior and future options in Ukraine suggests implications for policymakers as they consider future crises and conflicts, particularly those involving nuclear-armed states where the United States would be concerned about potential nuclear escalation risks.

### Some key factors restraining escalation in this conflict may not be present elsewhere

- Risks of escalation may be substantially greater in conflicts where U.S. treaty allies are involved directly in combat or U.S. adversaries have a more comprehensive set of effective military capabilities.
- Escalation might be more likely if the nature of the conflict requires earlier decisions on both sides regarding whether to execute attacks on sensitive targets inside their opponent's territory.

### Future scenarios may not provide time for collective deliberation

- Russia's failure to achieve its objectives at nearly every turn, paired with Ukraine's gradually built ability to counterattack, has given the United States and its allies time to gain consensus on the types of support they would provide Ukraine. As a result, in nearly

all cases, one ally's willingness to provide a particular system was followed by others who provided similar support.

- In the end, no single ally was left exposed as a singular target for Russian escalation or retaliation, and NATO established and built a pattern and reputation for cohesion and unity.

### Geographic conditions limiting escalation in Ukraine may not apply

- Because of Ukraine's size and the amount of Ukrainian territory that Russia has controlled from the early days of the war, military operations could be confined to Ukraine's territory.
- In conflicts over smaller pieces of territory or involving smaller states, military operations would cross international borders more frequently out of necessity, heightening incentives for cross-border retaliatory or preemptive attacks and increasing escalation risks.

An end to the war in Ukraine without substantially greater escalation should not necessarily hearten policymakers and military planners as they consider risks in other conflicts. However, greater escalation in Ukraine despite mitigating factors would underscore the likely risks in other contexts, reinforcing the need for policymakers to confront and plan for those risks before any future conflict with a nuclear-armed adversary.

### Notes

1 Forrest E. Morgan, Karl P. Mueller, Evan S. Medeiros, Kevin L. Pollpeter, and Roger Cliff, *Dangerous Thresholds: Managing Escalation in the 21st Century*, RAND Corporation, MG-614-AF, 2008, p. xi.

2 All quotes in this brief, unless otherwise noted, are drawn from brainstorming sessions conducted in person with these 15 experts in Arlington, Virginia, in April 2023 and May 2023. These brainstorming sessions included a total of 15 experts with extensive experience focusing on Russia in and out of government, including experts working at RAND and other nongovernmental and governmental organizations, and deep expertise in Russian leadership decisionmaking, military affairs, and nuclear weapons doctrine and capabilities.

This brief describes work done in RAND's National Security Research Division and documented in *Escalation in the War in Ukraine: Lessons Learned and Risks for the Future*, by Bryan Frederick, Mark Cozard, and Alexandra Stark, RR-A2807-1, 2023 (available at [www.rand.org/t/RRA2807-1](http://www.rand.org/t/RRA2807-1)). To view this brief online, visit [www.rand.org/t/RRA2807-1](http://www.rand.org/t/RRA2807-1). The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. RAND is a registered trademark. RAND® is a registered trademark.

**Limited Print and Electronic Distribution Rights:** This document and trademark(s) contained herein are protected by law. This representation of RAND intellectual property is provided for noncommercial use only. Unauthorized posting of this publication online is prohibited; linking directly to this product page is encouraged. Permission is required from RAND to reproduce, or reuse in another form, any of its research documents for commercial purposes. For information on reprint and reuse permissions, please visit [www.rand.org/pubs/permissions](http://www.rand.org/pubs/permissions).

© 2023 RAND Corporation

Image credits: Cover—azazello/Adobe Stock, A\_Gree/Alamy Stock Photo; p. 2—misu/Adobe Stock; p. 4—Kremlin Pool/Alamy Stock Photo; p. 5—Kay Nietfeld/dpa picture alliance/Alamy Stock Photo; pp. 6–7—Oleksandr/Adobe Stock; p. 10—Vitaly V. Kuzmin (CC BY-SA 3.0, via Wikimedia Commons), Victory/Adobe Stock; p. 11—Oleksandr/Adobe Stock; p. 12—misu/Adobe Stock.