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In his televised address to the nation on Wednesday 21 September, Vladimir Putin, who ordered Russia's first mobilisation since World War II², also raised anew the spectre of a nuclear conflict in Europe. The first purpose of this e-Note is to take stock of Russia's strategic and non-strategic nuclear capabilities. Russia is often described as the nuclear power possessing the largest stockpile of nuclear warheads. We will try to go beyond this allegation by establishing a breakdown of these capabilities as precisely as possible. Second, this article will describe Russia's nuclear doctrine. In June 2020, President Vladimir Putin approved an updated version of the Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence. This document is currently the most recent version of the doctrine giving us an overview of the circumstances in which Russia might make use of nuclear weapons. In the last part of this e-Note, we will elaborate more on the likelihood of Russia resorting to the tactical use of nuclear weapons — a scenario that is often mentioned. Which circumstances could push Russia to resort to such action? Does Russia apply criteria for the use of tactical nuclear weapons other than those generally put forth? These are some of the questions we will try to answer.

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² Russian Defence Minister Sergei Shoigu put forth a target number of 300,000 call-ups with military experience. According to some estimations, up to one million personnel could be mobilised by Russia's military. Nonetheless, many uncertainties remain about the precise number of potential conscripts for the decree has been purposefully written to be as vague as possible.

The context

In the first days of the invasion of Ukraine, President Putin warned he would inflict unprecedented damage on all nations that would either obstruct Russia's objectives or threaten the very existence of the state. To most of the Western media, it quickly became obvious that Russia's declarations were just a blustering attempt to weaken international support for Ukraine. Such a vision is, however, somewhat simplistic. This time, things seem to get worse as Vladimir Putin has issued the same warning in starkly different circumstances.

First, it is worth noting that Putin is fully aware that his previous announcement about Russia's resolve to use nuclear weapons did not achieve its original objective of undermining Western support for Kyiv. "In the event of a threat to the territorial integrity of our country and to defend Russia and our people, we will certainly make use of all weapon systems available to us. This is not a bluff", Putin said³. It is very likely that his last ultimatum was supposed to be taken more seriously. Should we worry that the world – and especially Europe – is heading for such a nuclear scenario? At present, no one is able to provide a clear answer to such a question. It is still difficult to link this last declaration to any stage of the Russian decision-making process. Moreover, the repeated allusions about the country's readiness to use nuclear weapons tend to weaken its deterrence posture. Maybe Putin is trying to extract maximum diplomatic value from its nuclear arsenal regardless of whether he intends to use it or not⁴.

Second, even though the Ukrainian counteroffensive will not suffice to reverse the situation, it has clearly undermined Russian confidence about the so-called special military operation's goals. Russian defeat in northeastern Ukraine has fuelled many speculations about the future course of war. In his televised address, the master of the Kremlin did not hesitate to evoke a scenario in which Ukraine might be encouraged to push military operations into Russia itself. Vladimir Putin possibly thinks that the fear of a direct attack against Russia's territory could operate as a catalyst for greater mobilisation among Russian citizens. As recent events tend to suggest, mobilisation comes with serious discontent within Russian society. There is some evidence that Vladimir Putin had anticipated this kind of scenario. First, he decided to call for a partial rather than a full mobilisation. Second, it appears that Putin decided to postpone its allocution. Did he revise its content or its scope?

Third, Russia's determination should never be underestimated as far as nuclear deterrence is concerned. Few observers in the West used to note that, in mid-February 2022, shortly before the invasion of Ukraine, Russia conducted military exercises with its nuclear forces. Normally, such manoeuvres take place in the fall season. By anticipating these manoeuvres, Moscow clearly sent a warning to NATO.

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³ "Address by the President of the Russian Federation," Kremlin.ru, September 21, 2022, http://en.kremlin.ru/events/president/news/69390.

⁴ Keir Giles, Mathieu Boulègue, Oscar Jonsson, Alexander Lanoszka, Kalev Stoicescu, Andre Kendall-Taylor, Robin Häggblom, Valeriy Akimenko, Richard Connolly, Katarzyna Zysk, Kristin Ven Bruusgaard, and Margarete Klein, "Myths and Misconceptions Around Russian Military Intent: How They Affect Western Policy, and What Can Be Done," *Chatham House*, July 14, 2022, https://www.chathamhouse.org/2022/07/myths-and-misconceptions-around-russian-military-intent/myth-6-russias-nuclear-threats-are.

Putin's apparent readiness to use nuclear weapons has been analysed in the light of the so-called referendums held in the occupied areas of Ukraine. Will any form of annexation of these regions be used by Moscow as a justification to condemn any Ukrainian attempt to defend or recapture these 'lost regions' as a direct attack against Russia's territorial integrity? Such an assumption should not be underestimated, although any reflection about Russia's resolve needs to take account of a whole range of elements. As previously mentioned, it is not the first time that Putin talked about nuclear weapons in the context of military operations in Ukraine. Similarly, diverse Russian authorities have repeatedly expressed their views about Russia's determination to use nuclear weapons or to rely on all sorts of ultimate warnings aimed at preventing nuclear escalation. Once again, to evaluate the seriousness of Putin's warnings as precisely as possible, it is mandatory to examine his two main speeches⁵. Yet, in his national address on March 2018 (the famous "listen to us now" speech), in front of hundreds of top officials and lawmakers, President Putin sent a clear message to all those who "sought to win unilateral advantages over Russia" by claiming that they failed to contain Russia. On this occasion, Putin announced that Russia had tested new nuclear weapons⁶. Through such a showcase of Russia's modernised arsenal, Vladimir Putin clearly intended to deter Western leaders from engaging in any form of action that could endanger Russia's existential interests.

Another reading of Putin's multiple warnings regarding any probable use of Russia's nuclear arsenal must be made, especially as regards the content of his last televised address. The question might be raised whether Vladimir Putin's intention was not rather to incite the West to question the risks to European and international security that could result from the overthrow of the presidential regime of a power possessing the world's greatest nuclear weapons stockpile. In other words, the current tenant of the Kremlin is letting out the message that, while the security situation in Europe is currently dreadful, it could very quickly become irreversibly tragic. Nuclear weapons are not only the ultimate guarantee of national security for a country that possesses them; they are also presented as a privileged instrument for state consolidation. The world cannot afford to witness the collapse of a nuclear state. Besides the fear of an imploding North Korea or Pakistan, Vladimir Putin seems to be adding the prospect of a Russian collapse and its consequences.

Taking stock of Russia's nuclear forces

Russia has reached the last phase of the modernisation programme of its nuclear forces. With this modernisation, the Russian Ministry of Defence aimed at progressively replacing the Soviet era capabilities. In December 2021, Sergei Shoigu declared that modern nuclear systems now represent more than 89% of Russia's nuclear triad⁷. This percentage clearly attests that the country has recently accelerated the pace of transformation of its nuclear arsenal. Russia's fear of being qualitatively and quantitatively outclassed by its competitors is a real obsession. At several occasions in the past,

⁵ Emily Ferris, "Vladimir Putin's Speech – Scrutinised," *Royal United Services Institute*, September 22, 2022, https://rusi.org/explore-our-research/publications/commentary/vladimir-putins-speech-scrutinised.

⁶ Tony Wesolowsky, "'Listen to Us Now': Putin Unveils Weapons, Vows to Raise Living Standards in Fiery Annual Address," *Radio Free Europe*, March 1, 2018, https://www.rferl.org/a/putin-set-give-annual-address-amid-presidential-election-campaign/29069948.html.

⁷ Hans M. Kristensen and Matt Korda, "Russian nuclear weapons, 2022," *Bulletin of the Atomic* Scientists 78, no. 2 (February 2022): 98-121, https://doi.org/10.1080/00963402.2022.2038907.

President Putin reiterated his concerns about the risk of Russia being relegated to the background of nuclear powers: "It is absolutely unacceptable to stand idle. The pace of change in all areas that are critical for the Armed Forces is unusually fast today. It is not even Formula 1 fast – it is supersonic fast. You stop for one second and you start falling behind immediately."

Russia has also expressed its concerns about the US global missile defence system – which received a European extension throughout its endorsement by NATO – that could integrate Tomahawk strike components instead of the standard interceptors originally planned. Russia warns that, should these missile defence systems that are deployed in the immediate vicinity of Russian territory be fitted with such strike systems, then a Russian response would not be long in coming in the case of a suspected attack.

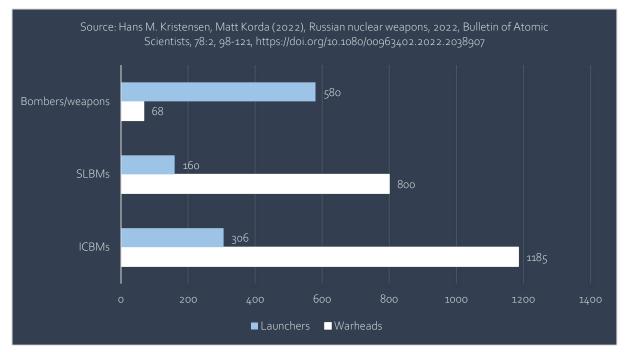


Figure 1: Russia's strategic offensive forces

ICBMs⁹ include: SS-18 M6 Satan, SS-19 M3 Stiletto, SS-19 M4, SS-25 Sickle, SS-27 Mod 1 (mobile systems), SS-27 Mod 1 (silo), SS-27 Mod 2 (mobile), SS-27 Mod 2 (silo), SS-X-29 (silo). SLBMs¹⁰ include: SS-N-18 M1 Stingray, SS-N-23 M2/3 and SS-N-32. Bombers/weapons include: Bear-H6/16 and Blackjack. Western reporting names are mentioned.

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⁸ "Expanded Meeting of the Defence Ministry Board, Address of President Vladimir Putin at the occasion of the visit of the National Defence Control Centre," Kremlin.ru, December 21, 2021, http://en.kremlin.ru/events/president/news/64684.

⁹ Intercontinental Ballistic Missile.

¹⁰ Submarine-Launched Ballistic Missile.

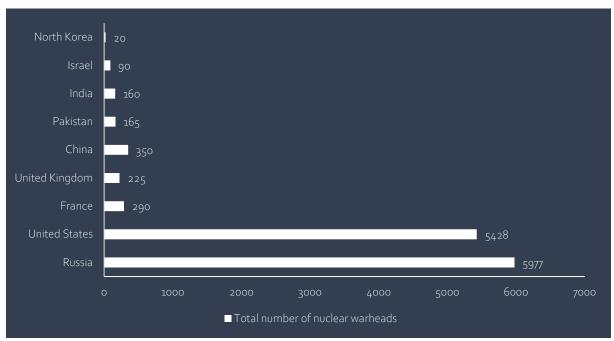


Figure 2: Total number of nuclear warheads by country (source: https://www.bbc.com/news/world-60664169)

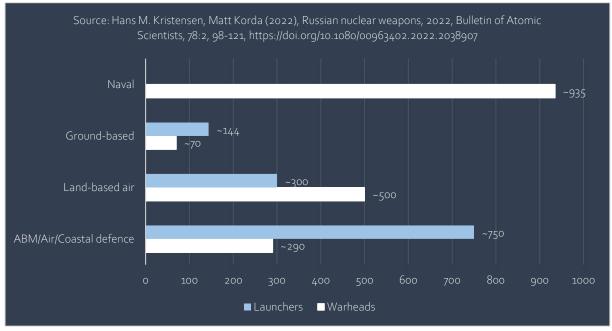


Figure 3: Russia's non-strategic and defensive weapons

Naval forces include: submarines, surface ships and aerial systems. Ground-based weapon systems include: SS-26 Stone SSM (9K720, Iskander-M), SSC-7 Southpaw GLCM¹¹ (R-500/9M728, Iskander-M) and SSC-8 Screwdriver GLCM (9M729). Land-based weapon systems include: bombers/fighters (TU-22M3 (M3M)/Su-24M/Su-34/Mig-31K. ABM/Air/Coastal defense include: S-300/S-400 (SA-20/SA-21), 53T6 Gazelle, SSC-1B Sepal (Redut) and SSC-5 Stooge (SS-N-26) (K-300P/3M-55). Western reporting names are mentioned.

¹¹ Ground-Launched Cruise Missile.

As of early 2022, Russia is estimated to have a stockpile of approximatively 4,477 nuclear warheads to be used by long-range strategic launchers and short-range tactical nuclear forces. Among these stockpiled warheads, 1,588 are reportedly deployed, 812 of which are equipping land-based ballistic missiles and 576 are supposed to be fitted on submarine-launched ballistic systems. Another 200 nuclear warheads are suspected to be located on heavy bomber bases. In addition to all these capacities, it should be mentioned that approximatively 977 strategic and 1,912 non-strategic warheads are in storage. Besides these operational or near operational nuclear capabilities, Russia is still suspected to possess approximatively 1,500 nuclear warheads waiting to be dismantled. The reason why they should be integrated into the breakdown is that they are still intact and could potentially be armed within a certain time frame. If we add up all these capacities, we get a total of 5,977 nuclear (strategic and non-strategic) warheads in Russia's possession. Russia and the United States mutually agreed on extending the provisions of the Strategic Arms Reduction Treaty (START) by signing the New START agreement, two days before its predecessor expired. Unless both parties refuse to prolong it, New START is expected to stay in force until 4 February 2026 (which is a noticeably short deadline for this type of agreement). Meanwhile, Russia and the United States have conducted several on-site inspections, exchanges of information and notifications in compliance with the New START's provisions. As of January 2022, the United States and Russia have completed 328 on-site inspections and exchanged 23,100 notifications. Yet, by April 2020 and at the height of the pandemic, on-site Type 1 and Type 2 inspections were suspended. Inspections were expected to resume by November 2021, but given the rising tensions between Russia and the West resulting from the Ukraine crisis, no more inspections have been conducted ever since. Moreover, the last meeting of the Bilateral Consultative Commission (a framework specifically established by the New START Treaty) dates back to October 2021. Russia and the United States have recently announced that they will resume negotiations on the New START nuclear treaty in late November/early December in Cairo. This was confirmed on 11 November by Russian deputy foreign minister Sergei Riabkov. These confidential discussions will only concern the Bilateral Consultative Commission (BCC)¹².

Under which conditions is Russia supposed to make use of its nuclear weapons?

Since the outbreak of hostilities between Russia and Ukraine on 24 February this year, considerable comments have been made about the conditions under which Russia could make use of its nuclear arsenal. Many statements failed to correctly address Russia's nuclear doctrine provisions. This situation clearly results from years of disinvestment in nuclear strategy studies among scholars and academic experts. Since the end of the Cold War, nuclear strategy has progressively been considered as a relic of that period. As soon as the Trump administration released the new US Nuclear Posture Review (NPR) in February 2018, assumptions contained in the document about Russia's nuclear doctrine gave rise to multiple controversies. The NPR states that "Russian strategy and doctrine emphasize the potential coercive and military uses of nuclear weapons." It adds that "[the Russian doctrine] mistakenly assesses that the threat of nuclear escalation or actual first use of nuclear

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¹² Department of State, "Department Press Briefing," November 8, 2022, https://www.state.gov/briefings/department-press-briefing-november-8-2022/.

weapons would serve to 'de-escalate' a conflict on terms favourable to Russia¹³." In other words, the NPR alleges that, in order to end a conflict on its terms, Russia might resort to coercive nuclear threats or limited first use to paralyse the United States and NATO. Russia would thus opt for escalation at the very beginning of a conflict in the hope that its behaviour could lead the West to capitulate.

Russia has always contested US assumptions about the Kremlin adopting a so-called "escalate to de-escalate" approach. Rather, Moscow reminds that the Russian Federation has always considered nuclear weapons as a means of deterrence. Moreover, its official policy regarding the use of nuclear weapons lays out four circumstances under which the country may consider such an option:

- 1. the arrival of reliable data about the launch of ballistic missiles attacking the territory of the Russian Federation and/or its allies;
- 2. the use of nuclear weapons or other types of weapons of mass destruction by an adversary against the Russian Federation and/or its allies;
- 3. an attack by an adversary against critical governmental or military sites of the Russian Federation that could lead either to the total disruption or the undermining of nuclear response actions;
- 4. aggression against the Russian Federation with the use of conventional weapons when the very existence of the state is in jeopardy.

These have officially been and still are the four conditions under which Russia might use nuclear weapons in a conflict situation. Apart from some unofficial statements on the possible use of nuclear weapons in certain contexts, it appears that Russia's principles on the use of nuclear weapons are based on a very stable doctrine that has largely remained unchanged since Vladimir Putin has gained the presidency. Nonetheless, historically, Russia has been far more secretive about its nuclear policy than the United States. Even today, we only have a partial view of its doctrine. Only a few references from the Russian military doctrine and the national security strategy give us some indications of Russian strategic thinking about nuclear deterrence and the use of nuclear weapons¹⁴.

Yet, some observers argue that President Putin has admitted during a discourse delivered at the Valdai Club in October 2018, that Russia's nuclear doctrine uses a no-first-use policy. Actually, he just reminded that the doctrine does not provide for a pre-emptive strike. Although the updated version of the Foundations of State Policy in the Area of Nuclear Deterrence does not advocate "first use" in a nuclear scenario, it does not rule out such a possibility in response to a conventional attack under certain circumstances either.

Despite the existing doctrine, it can be extremely difficult to apprehend how Russia will use nuclear force. Several statements by officials (whose mandate is not well understood) suggest that the use of nuclear weapons could be considered according to political-military circumstances. Since such statements are not systematically denied, the exact content of the doctrine on the use of nuclear weapons is subject to considerable uncertainty.

Moreover, the fact that Russian military planners continue to develop new and modernised nuclear capabilities suggests that the country's real nuclear doctrine is not merely limited to the principle of deterrence, but also encompasses specific strategies at the regional level or even methods of use designed to inflict terror on the opponent. Russia could also use tactical nuclear weapons as a 'game changer' in a context of severe operational setbacks on the field. James Acton, a nuclear expert at the

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¹³ Office of the Secretary of Defense, *Nuclear Posture Review* (Washington DC, U.S. Department of Defense, 2018), https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF, 8.

¹⁴ Claire Mills, *Nuclear weapons at a glance: Russia* (London: House of Commons Library, 2022), https://researchbriefings.files.parliament.uk/documents/CBP-9091/CBP-9091.pdf.

Carnegie Endowment for International Peace in Washington DC, expressed his concerns about the plausibility of such a scenario in an interview with the BBC: "I am legitimately worried that in that circumstance, Putin might use a nuclear weapon – most likely on the ground in Ukraine to terrify everyone and get his way." At the same time, he tries to reassure worried minds: "We are not at that point yet." In 2018, President Putin unveiled a number of new nuclear weapons capabilities under development that are intended to dodge US and NATO missile defence systems. These programmes include hypersonic missiles and glide vehicles, a nuclear-powered cruise missile and a next-generation, nuclear-powered torpedo: the Status-6 project, also known as 'Poseidon'. The Status-6 programme consists in developing a long-range nuclear-powered torpedo equipped with a nuclear warhead. Due to its wide range and discretion, the Poseidon torpedo must be capable of detonating a long-range nuclear charge in the immediate vicinity of the adversary's coasts or an enemy aircraft carrier group. The goal is to create an area of high radioactivity over a long period of time.

Putin's statement shortly before the invasion of Ukraine suggests that Russia no longer considers its nuclear arsenal to be exclusively dedicated to defensive purposes. According to Russia's official doctrine (see above), Moscow may use its nuclear forces in the event of a nuclear attack against Russia and/or if the existence of the state were at risk. However, Putin's announcements may let us foresee that the Kremlin could use its nuclear arsenal to pursue expansive political goals as well¹⁶.

Could Russia make use of tactical nuclear weapons?

In the light of the current context and given the situation of Russian forces on the field, there is an increased likelihood of Moscow using strategic nuclear weapons. Rather, the existing military balance could lead Putin to rely on its tactical nuclear arsenal. In order to evaluate the plausibility of such a scenario, it is useful to recall Putin's words during his last address to the nation: "If the territorial integrity of our country is threatened, we will, without a doubt, use all available means to protect Russia and our people. This is not a bluff." It is particularly difficult to interpret Putin's will. Not one single language element of the Russian president convinces us that his warning will actually lead to a nuclear attack. Nevertheless, to the extent that nuclear deterrence is primarily based on the principle of credibility, it is reasonable to infer from Putin's statement that the only nuclear option Russia could rely on would be the use of tactical nuclear weapons. The tactical nuclear option refers to an old approach envisaged by both superpowers during the Cold War: the limited nuclear option (LNO)¹⁷. This option assumes that a direct confrontation between both nuclear superpowers would not necessarily result in the massive destruction and the loss of millions of lives on both sides. As part of a LNO approach, a country's military commanders could either shift the targeting of nuclear missiles from enemy cities to enemy military installations or choose to make use of tactical nuclear weapons against adversary installations and infrastructures. Another remaining option would be the launch of a tactical nuclear warhead in an uninhabited zone with the aim of demonstrating the country's strong resolve to engage in nuclear escalation. Worded differently, the LNO implied that a struggle between

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¹⁵ "Ukraine War: Could Russia Use Tactical Nuclear Weapons?" *BBC News*, September 25, 2022, https://www.bbc.com/news/world-60664169.

¹⁶ Liviu Horovitz, Lydia Wachs, "Russia's nuclear threats in the war against Ukraine: Consequences for the international order, NATO and Germany," *Stiftung Wissenschaft und Politik*, no. 29 (April 2022), https://www.swp-berlin.org/10.18449/2022C29/.

¹⁷ Britannica, "Limited Nuclear Options," https://www.britannica.com/topic/limited-nuclear-options.

two nuclear powers could be perceived as something other than a zero sum game. Its purpose is to reinforce the credibility of an attack aimed at preventing any further nuclear escalation. In some regards, the LNO option could be a form of the previously mentioned 'escalate to de-escalate' strategy. How the United States and NATO would respond to any tactical use of nuclear weapons in a LNO scenario is very hard to predict, even though it is clear that such a use would, in Biden's words, "change the face of war unlike anything since World War II" and thus imply a response from NATO. The nature and extent of such a response would be based on a difficult balance between two interests at stake: avoiding any risk of an all-out nuclear war on the one hand and the inevitable necessity to draw a red line on the other.

The hypothesis of a tactical use of nuclear weapons in Ukraine was expressly raised by the former president of the Russian Federation, Dmitry Medvedev, currently vice-chairman of the National Security Council¹⁹. He reminds that Russia considers itself to be entitled to resort to nuclear weapons if the country were to be pushed to its limits. In addition, Medvedev says he does not believe that NATO countries will be willing to respond to this type of use of nuclear weapons. His statement is diplomatic rather than military. It must therefore be interpreted as a refined version of the previous threat issued by Vladimir Putin at the beginning of the invasion of Ukraine. While Putin's global threat does not seem to have achieved its objective of shattering the pro-Ukrainian coalition, evoking the prospect of the use of tactical nuclear power is assumed to be more credible. However, it should be noted that Russia might be deterred by China to use tactical nuclear weapons. The latter having no 'first-use' nuclear doctrine, it could break away from Russia in the event of such an attack.

Moreover, Russia has embarked on a modernisation process of its tactical nuclear capabilities, with a view to replacing an important part of its Cold War arsenal. The Trump administration accused Russia of concentrating its efforts on increasing the total number of non-strategic nuclear weapons while improving its strike capabilities. Reality appears to be more complex and calls for greater caution. Indeed, it seems that the process of modernising Russian tactical nuclear systems is less comprehensible and, above all, less inclusive than that of modernising strategic weapons. Moreover, given the effectiveness of new-generation conventional weapons, the potential benefit of tactical nuclear weapons is increasingly limited and justifies a reduction in arsenals.

Conclusion: nuclear weapons as the ultimate instrument of military force

From 1989 to 2014, nuclear weapons were generally perceived as nothing more than Cold War relics²⁰. However, in terms of strategy, Putin's posture is nothing new. The master of the Kremlin reminded us that nuclear weapons remain the ultimate tool of military force in the twenty-first century.

It is important to remember that many actors, especially outside the West, see nuclear weapons as a potential way to solve regional problems or, more simply, to gain power and international recognition. While the Western opinions seem to be indifferent to nuclear deterrence, it has gained great attention

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¹⁸ Joe Biden, "9/18/2022: President Biden, Ebrahim Raisi," interview by Scott Pelley, September 18, 2022, video, 43:00, https://www.cbs.com/shows/video/S1B7oiiFI5dzrbMN21cEWZDfbM8tziQk/.

¹⁹ Guy Faulconbridge and Caleb Davis, "Medvedev Raises Spectre of Russian Nuclear Strike on Ukraine," *Reuters*, September 27, 2022, https://www.reuters.com/world/europe/russias-medvedev-warns-west-that-nuclear-threat-is-not-bluff-2022-09-27/.

²⁰ Matthew Kroening, *The logic of American nuclear strategy: why strategic superiority matters* (New York: Oxford University Press, 2018).

of other powers, be they large, medium or small. The world is far from moving towards complete denuclearisation. On the contrary, an increasing number of countries will try to acquire nuclear weapons. Given the changing landscape of nuclear deterrence, it is essential to keep in mind that the rules of the deterrence game could change tomorrow. There is no reason to believe that the rationality that has guided the attitude of the main nuclear powers so far will guide the decisions of the future nuclear states tomorrow.

It is generally said that "nuclear makes wise" or, to put it another way, the control and possession of nuclear weapons induces a certain restraint. This statement could not be more risky. As a rule, the analysis of nuclear deterrence must be based on a degree of caution, among both military planners and observers of strategic affairs. The question, however, is not whether nuclear weapons generate a certain amount of wisdom, but whether the possession of such weapons creates common rationality that is shared among the owners. In spite of Russia's numerous provocations, NATO member states, and in particular those possessing nuclear capabilities, have shown great restraint. On several occasions, the Russian authorities, have, through various spokesmen, blown hot and cold by manipulating the spectre of the nuclear threat. Despite the media rarely reporting on this matter, Russia has on a number of occasions tried to temper its statements about the risk of an effective use of nuclear weapons. Nuclear deterrence is governed by subtle rules made up of statements, demonstrations, attitudes that are sometimes disproportionate and sometimes more measured. Russian officials also dramatise the stakes of nuclear weapons for internal purposes. It reinforces Russian public opinion that Western pressure is the cause of the current extreme conditions in Russia and that the Russian authorities are ready to use all means at their disposal to protect the country from this pressure²¹. The desired effect is, obviously, to rally the majority of the population around the flag. However, in the current Russia-Ukraine war, the risk of Russia using nuclear weapons is minimal, even though this scenario cannot be completely ruled out and will depend on future developments of the war.



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Sources image: Military-technical forum ARMY-2016 - Demonstration - Vitaly Kuzmin

²¹ Isabelle Facon, "Guerre en Ukraine : le sens du signalement nucléaire russe," *Fondation pour la recherche stratégique*, no. 30/22, (July 2022), https://www.frstrategie.org/sites/default/files/documents/publications/notes/2022/202230.pdf.