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Assessing Russian State Capacity to Develop and Deploy Advanced Military Technology

Michael Kofman, Richard Connolly, Jeffrey Edmonds,
Andrea Kendall-Taylor, and Samuel Bendett



About the Authors



Michael Kofman is the research program director in the Russia Studies Program at CNA and an adjunct senior fellow in the Transatlantic Security Program at CNAS. His research focuses on Russia and the former Soviet Union, specializing in the Russian armed forces, military thought, capabilities, and strategy.



Richard Connolly is an adjunct senior fellow in the Transatlantic Security Program at CNAS. His research interests include economic policy, industrial development, and the development of the defense and energy industries in Russia, the impact of Western sanctions on the Russian economy, and Russia's place in the global economy.



Jeffrey Edmonds is a research scientist in the Russia Studies Program at CNA and an adjunct senior fellow in the Transatlantic Security Program at CNAS. His research focuses on the Russian military, foreign policy, Russian threat perceptions, and Russian information

operations.



Andrea Kendall-Taylor is a senior fellow and director of the Transatlantic Security Program at CNAS. Formerly, she served as deputy national intelligence officer for Russia and Eurasia at the National Intelligence Council and as a senior intelligence officer at the CIA.



Samuel Bendett is an advisor with CNA Strategy, Policy, Plans and Programs Center, where he is a member of the Russia Studies Program. He is also an adjunct senior fellow in the Technology and National Security Program at CNAS. His work involves research on Russian

defense and technology developments, unmanned and autonomous military systems and artificial intelligence, and Russian military capabilities and decision-making during crises.

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Introduction

Even before Russia's invasion of Ukraine in February 2022, many analysts and policymakers viewed Russia as a declining power. This mindset, formed by the sharp juxtaposition between the seeming strength of the Soviet Union and the chaos and weakness of Russia in the 1990s, has been an enduring heuristic for how Russia today is understood. The country's stagnant and resource-dependent economy, declining population, and substantial brain drain have fed a sense that Russia's days as a global power are numbered. The war in Ukraine has only accelerated some of these trends, further reinforcing such views. The Russian military's poor performance, the degradation of its forces, and the imposition of sanctions and export controls that will restrict Russia's ability to regenerate its forces have already led some to dismiss the country as a Potemkin power and pronounce the end of its great power status.¹

Russia undoubtedly will emerge from its war on Ukraine as a weaker power. But even during the post-Soviet period of sustained economic stagnation, brain drain, and demographic decline, the Russian state developed a new generation of hypersonic missiles, air and missile defenses, and nuclear weapons with novel means of propulsion. Russia has demonstrated that it is able not only to bring to fruition late-Soviet designs, but also to develop a follow-on generation of capabilities. Likewise, the Kremlin has continued to modernize and expand its nuclear capabilities. Despite economic constraints, the Kremlin prioritized the development of its strategic nuclear forces by investing significant resources into developing and deploying new nuclear warheads and launchers, upgrading all legs of the nuclear triad, completing work on a hypersonic glide vehicle, and building a new intercontinental, nuclear-armed, nuclear-powered undersea autonomous torpedo.

Moving forward, as a result of its invasion of Ukraine, Russia will face new and more significant constraints on its ability to modernize its military. But it is too soon to count Russia out.

Of course, Russia's past performance was under a different set of conditions. Moving forward, as a result of its invasion of Ukraine, Russia will face new and more significant constraints on its ability to modernize its military. But it is too soon to count Russia out. Policymakers need a more nuanced assessment of the nature of the future Russian threat. This report provides such an assessment, focusing on Russia's ability to develop and deploy its nuclear capabilities through 2030.

To that end, this report first identifies Russia's own stated goals and objectives for the development of its nuclear forces looking out to 2030. Because Russia's invasion of Ukraine and the resulting military degradation and economic sanctions and export controls introduce critical uncertainties about the Kremlin's ability to execute these objectives, this report adopts a scenarios approach to forecasting Russia's future nuclear capabilities. The report identifies two drivers that the authors view as most critical in shaping Russia's ability to fulfill its stated objectives: the impact of Western sanctions on Russia's government revenue and ability to access critical technology, and the extent of the degradation of the Russian military in Ukraine, which will force choices on the Kremlin about how to prioritize military expenditures. This report uses these two drivers to describe two scenarios that define the upper and lower

boundaries of expectations for Russia's nuclear capabilities, along with the implications of each of these scenarios for the United States and its allies. The scenarios, in

other words, describe both a worst- and best-case state of affairs for Russia, and thus they help frame the problem for U.S. policymakers and planners. The report concludes with an assessment of key findings that emerge from the analysis and associated recommendations for the United States and Europe.

Russia's Key Capabilities and Objectives for Its Deterrent Out to 2030

Since the early 2000s, the Russian military has attempted to modernize its force with three functional components: forces for strategic deterrence, general purpose, and rapid reaction. Because strategic deterrence forces include nuclear capabilities of various kinds as well as strategic conventional capabilities, they are subdivided into nuclear and conventional elements. General-purpose forces are relatively self-explanatory for their role in conventional deterrence and warfighting. Rapid-reaction forces are formations capable of quickly responding to crises or conflicts (such as airborne or special forces).

The Russian military historically has been willing to take on greater risk in the modernization of its general-purpose forces, sometimes calibrating modernization based on the need to fulfill the ability to produce strategic deterrence capabilities. The priority for modernization is strategic deterrence, followed by rapid reaction, and then, finally, general purpose. That said, the means of delivery for strategic conventional versus nuclear systems overlap tremendously, in practice being dual-capable, which makes Russian force employment in this area more difficult to discern. For example, long-range precision-guided weapons are typically considered missiles with a range beyond 400 kilometers, yet few such weapon systems are solely conventional. Arguably, some capabilities discussed here, such as Kinzhal (a nuclear-capable hypersonic air-launched ballistic missile), are considered conventional only. However, they are convertible for carrying nuclear warheads, meaning they are initially deployed as conventional capabilities but could evolve as dual-capable systems.

This paper begins with a brief discussion of current Russian modernization programs to set the baseline for the current trajectory of Russian nuclear forces. Within its nuclear triad, the Russian military is pursuing modernization through the following initiatives. For its intercontinental ballistic missile (ICBM) leg, it seeks to retire the single-warhead Topol-M ICBM and replace legacy Soviet systems with newer missiles like the RS-24, and eventually deploy new Sarmat ICBMs to replace its heavy liquid-fueled SS-18 ICBM. These missiles are designed to carry multiple independent reentry vehicles (MIRV), which enables them to have greater levels of destruction and, in part, provides more targets and decoys to trick and overwhelm ballistic missile defense

systems. According to Sergey Karakaev, commander of Russia's Strategic Rocket Forces, the Sarmat is theoretically capable of a trajectory across the South Pole, making it difficult for missile defenses to intercept it. It also will be able to carry the Avangard hypersonic glide vehicle (HGV). Most recently, the Sarmat was tested successfully in April 2022 and is scheduled to begin entering the force by the end of 2022.² Russia's current goal for its ground-based nuclear deterrent is to have half of its launchers mobile and the other half silo-based. Just as the sea-based leg of the U.S. strategic deterrent is the most survivable, Russia views its road-mobile force as the most survivable leg of its triad.

For its sea-based strategic nuclear deterrent, the Russian military continues to replace its older Delta-IV ballistic missile submarines (SSBNs) with the more advanced Borei-class SSBNs.³ The Russian goal is to split these new SSBNs between the Pacific and Northern fleets. These fleets also will maintain several overhauled Delta-IVs, the Russian Navy's older, Soviet-era ballistic missile submarines. Russia does not maintain a continuous at-sea presence in the sense of having Russian SSBNs continually patrolling in Russia's bastions in the Barents and Okhotsk Seas, and it is unclear whether this is a long-term goal.

Russia's strategic bomber force relies on its Tu-160 and Tu-95 bombers, which carry Kh-101/102 long-range air-launched cruise missiles. Currently, Russia has an order for 10 modernized Tu-160 strategic bombers, with two projected for delivery by the end of 2022. This suggests that most of the 10 ordered will be operational by 2030.⁴ There also are plans for a new generation of strategic bombers utilizing stealth technology, the PAK DA, with production reported to begin in 2027 and preliminary tests to begin in 2023.⁵ Given Russia's platform development track record, it is likely these timelines will slip, especially under the current uncertain economic conditions.

New and Novel Nuclear Weapons

In 2018, Russian President Vladimir Putin announced that the military was developing a series of novel weapons.⁶ These include the Peresvet directed energy weapon, the Kinzhal air-launched ballistic missile (ALBM), the Burevestnik nuclear-powered cruise missile, the Poseidon nuclear torpedo, the Avangard HGV, and the Sarmat ICBM.

The Peresvet directed-energy weapon is a laser system designed as an anti-satellite weapon capable of targeting reconnaissance satellites in orbits up to 1,500 kilometers, according to a Russian deputy prime minister.⁷

In December 2019, Russian Defense Minister Sergei Shoigu announced that the military had completed fielding the Peresvet laser system within five missile divisions of Russia's Strategic Rocket Forces.⁸ The system appears designed to enable road-mobile Russian ICBMs to disperse, while blinding reconnaissance satellites to prevent tracking.

The Kinzhal ALBM is touted in Russia as a hypersonic weapon, although this characteristic is misleading. As a ballistic missile, the Kinzhal can reach hypersonic speeds for a period of its flight profile, but this system should not be confused with weapons capable of sustained hypersonic velocities. The Kinzhal appears closely related to the dual-capable, ground-based Iskander missile system.⁹ The first operational use of the Kinzhal by Russian forces occurred against a purported logistics hub in the Mykolaiv region of Ukraine on March 20, 2022.¹⁰ Much of the Russian discussion about the Kinzhal seems related to concerns about missile defense and being able to strike well-defended targets.

Russia maintains a diverse family of nonstrategic nuclear weapons, an arsenal that is not limited by arms control agreements.

The intent of the Burevestnik is to have a missile with unlimited range and loitering time, enabled by its nuclear propulsion. The unlimited range also means it can maneuver to avoid missile defenses longer than, say, hypersonic glide vehicles. Little is known about this weapon system, although there is suspicion that its testing was responsible for the Nyonska radiation accident in Russia's far north.¹¹ There is some evidence to suggest that the Burevestnik, like the Poseidon underwater torpedo, was designed to ensure retaliation in the event that the United States attempted a disarming first strike.¹² This missile has struggled in testing, and the program's status is unclear.

The Poseidon unmanned underwater vehicle, also commonly referred to as a nuclear torpedo, is a nuclear-capable drone that is launched by another, specially designed submarine. The torpedo is part of the Status-6 system, initially designed to deliver a nuclear warhead to a coastal city. Follow-on development may allow the torpedo to zero in on high-value targets at sea, such as carrier strike groups. At the time of this writing, Poseidon does not appear to be operational. The modified submarine designed to launch Poseidon was delivered to the Russian Navy in July 2022.¹³

Finally, the Avangard is an ICBM-launched HGV that has reached initial operating capability in the Russian Strategic Rocket Forces. Currently, the Avangard is deployed on the SS-19 ICBM, but it eventually will be launched by the Sarmat ICBM. The HGV reportedly has onboard countermeasures that help it evade missile defense systems. According to open sources, the HGV had successful tests in 2016 and 2019, along with one failed launch in 2017.¹⁴ Avangard's exact purpose is not clear, but it appears designed to neutralize missile defenses to enable successful strikes by follow-on Russian nuclear forces. Deployment atop silo-based ICBMs suggests that it is not a second-strike weapon.

Dual-Capable Missiles

Russia's development of its long-range precision-guided munitions generally includes both conventional and nuclear warheads—a trend unlikely to change by 2030 and beyond. For example, the Kalibr family of sea-based missiles is routinely reported in Russian open sources as being dual-capable. Kalibr missiles have been deployed in the Russian Navy for about a decade and are one of the key sea-based

land strike and antiship missiles.

The Russian Navy also is developing the Tsirkon hypersonic cruise missile, which can serve in both an antiship and land attack role. This most recently

was tested in a Russian strategic nuclear exercise in February 2022.¹⁵ Finally, the Iskander is a mobile short- and intermediate-range missile system capable of firing both ballistic and cruise missiles. In late 2019, Russian media reported that the military would expand the size of its Iskander brigades from 12 to 16 launchers; however, there was no indication of timing for the expansion. The Russian military claims to have used Iskander missiles in the war in Ukraine.¹⁶

Nonstrategic Nuclear Weapons

Russia maintains a diverse family of nonstrategic nuclear weapons (NSNW), an arsenal that is not limited by arms control agreements. There is far less visibility into the state of Russia's NSNW capabilities, and there is debate as to whether this arsenal is growing or remains relatively stable. These systems include tactical short-range weapons (0–100 km), tactical-operational weapons that generally cluster in the 100–500 km range, and theater weapons in the 500–2,000 km range. Russia may have up to 2,000 weapons deployed in all categories.¹⁷ Mission and operational ranges are more useful ways to categorize Russia's NSNW arsenal than potential warhead yields. Here, the U.S. and Russian lexicon do not necessarily align.

The bulk of this arsenal likely consists of sea-based Kalibr SS-N-30A land attack cruise missiles, Oniks SS-N-26 antiship missiles, older antiship missile variants with nuclear warheads assigned, depth charges, Tu-22M3 air-launched AS-4 missiles (Kh-22/32), ground-launched Iskander-M missile variants (SS-26 and SSC-7), the supposedly intermediate range SSC-8 ground-launched cruise missiles, and potentially warheads for certain air defense systems (not including the A-135 missile defense systems).¹⁸ This is unlikely an exhaustive list, but most delivery systems are probably concentrated in the 300–500 km and 500–2,000 km ranges. Russia retains substantial advantages in NSNW capability over the United States and NATO allies, given its advantage in the number of warheads and systems that can deliver them. Despite employing a considerable number of long-range precision guided weapons in Ukraine since February 2022, the study team assumes that the Russian military has likely kept missiles in reserve for nuclear missions.

Key Drivers of Russia's Nuclear Development

Russia's invasion of Ukraine undoubtedly will complicate its ability to execute on its own stated goals for the modernization and expansion of its nuclear capabilities. Moscow will become increasingly isolated, sanctioned, and disconnected from the global economy, hindering its capacity to meet its objectives. However, uncertainty about the trajectory of the war in Ukraine and the extent of its effect on Russia make it difficult to assess just how significant those complications will be and how they will impact Russia's nuclear force development more specifically. Amid this uncertainty, the authors identified two factors as most likely to affect Russia's ability to meet its stated objectives for its nuclear force development: the impact of sanctions—especially on budgetary revenues and access to critical technologies—and the extent of degradation of the Russian military from the war in Ukraine. This section explores these drivers and their most probable impacts on Russia's capacity to develop its nuclear forces.

Impact of Sanctions

The sanctions imposed by the United States and its allies in response to Russia's invasion of Ukraine will significantly affect the development of the Russian economy. The sanctions and export controls are designed to impose costs on Russia for its invasion of Ukraine, make it hard for Russia to finance its war, and to degrade Russian capabilities over time such that Moscow no longer can

sustain its aggression beyond its borders. To accomplish these objectives, the sanctions and export controls are intended to reduce the size and sophistication of the Russian economy and therefore hinder Moscow's ability to finance its military and build the weapons and systems that a modern military requires. In quantitative terms, the Russian economy undoubtedly will be smaller than it would have been had sanctions not been imposed. In qualitative terms, the range and sophistication of goods and services produced in Russia also are likely to decrease. Both factors, in turn, will shape the prospects for the modernization of the Russian military.

The first way in which Western sanctions will affect Russia's future military capabilities will be through their impact on the country's defense spending. The sanctions imposed to date have already caused a sharp reduction in the volume of Russian trade. Many goods that were previously imported are prevented now from reaching Russia. This has caused a drop in imports not observed since the period of economic turbulence that followed the collapse of the Soviet Union in the early 1990s. Many Russian firms exposed to foreign trade and reliant on imported goods (e.g., automobile manufacturers) are unable to function as they did prior to the sanctions. Western companies that provided important technical services also have left or are likely to abandon the Russian market.

The sharp compression of imports likely will generate a recession, as it will deter investment and constrain consumption. While the precise magnitude of the fall of economic activity is unclear at this stage, most reputable forecasts from both inside and outside Russia envisage a gross domestic product (GDP) contraction of between 6 and 15 percent in 2022.¹⁹ Most recently, the IMF upgraded its forecast for the Russian economy, anticipating a 6 percent contraction in 2022. This could be followed by further recession in 2023, although it is plausible that a successful import substitution campaign could dampen the decline.

Looking to 2030, Russia's economy will be far smaller than envisaged before the invasion. Precisely how much smaller will depend on how long the current sanctions regime remains in place, whether or not the sanctions regime changes (for example, if sanctions or other measures move to target the country's oil revenue or, conversely, if any sanctions measures eventually are rolled back), and the effectiveness of any Russian adaptive measures. In principle, a coherent and broadly successful import substitution program could generate a recovery. However, this would require a degree of policy effectiveness and state investment not observed in Russia for many decades, making it unlikely.

While the prospects for economic growth are bleak, at least in the short term, the Russian state's fiscal position may not be quickly weakened. This finding appears contradictory at first. This is because it is important to separate the health of the economy from the state's earnings and reservoir of financial means. A combination of elevated prices for Russia's principal exports (oil, gas, coal, grains, and other commodities) and a weak currency mean that ruble tax revenues have grown since sanctions were imposed. A record current account surplus of \$250 billion for 2022 has been forecast by some (the previous high of \$120 billion was recorded in 2021), with much of this generated by state-owned firms.²⁰ A federal budget surplus of 2.6 percent of GDP was recorded in the first quarter of the year.²¹ This would rise further if commodity prices continued to increase.

In short, the Russian state is not running out of funds. Ministry of Finance data for the first quarter of 2022 suggest that military spending (including on para-military forces such as Rosgvardiya) was nearly double the planned sum in March. If spending over the course of the rest of the year remains at this level, Russia may spend in the region of eight to nine trillion rubles in 2022 (\$115–125 billion at market exchange rates, and likely double that figure if using purchasing power parity), compared with the five trillion rubles envisaged in the budget for the year.²² Assuming an economic contraction of 10–15 percent, this could result in military spending rising to 8–10 percent of GDP.²³ For as long as global commodity prices remain high, this volume of spending is likely to be feasible for the government, even if it will come at the expense of other spheres of government spending such as health and education.

Russia has a history of insulating defense spending from economic downturn. It is striking that even though the country has endured much greater economic hardship than its NATO counterparts over the past three decades, it has nevertheless allocated almost as high an average share of economic output to defense (3.8 percent) as has the United States (3.9 percent), and a higher share than China (1.8 percent). Both China and the United States have enjoyed calmer economic conditions during the same period. Even in the 1990s, when Russia was in the throes of a deep economic crisis as living standards plummeted and the state itself

experienced several severe financial crises, defense spending did not drop below 2.7 percent of GDP.²⁴ Within the defense budget, spending on nuclear forces—especially strategic nuclear forces—always has been the top priority. While most branches of the armed forces did not receive any new weaponry during the 1990s and early 2000s, Moscow continued to allocate scarce funds to the development and construction of new nuclear systems.

Beyond the economic resources available for defense spending, Western sanctions also will affect Russia's future military capabilities by limiting Russia's access to technology. As a result of Russia's invasion of Ukraine, the United States and its allies imposed an expanded ban on the export of dual-use goods, meaning items with both a civilian and military purpose, such as vehicle parts. Similar sanctions have been in place since 2014, although the list of prohibited items and targeted entities has grown and the scope for evasion is much reduced. Perhaps even more important, a greatly enhanced export control regime is now in place, resembling the Cold War

Coordinating Committee for Multilateral Export Controls regime with respect to its significant restrictions on the export or transfer of products and technology to Russian end-users.

While the quantitative effect of the sanctions regime is being felt immediately, the qualitative impact is likely to unfold over a longer period of time. Although Russia since 2014 has been operating under constraints in accessing dual-use components, the extent of restrictions in place is now much greater, affecting a broader range of goods and a wider range of sanctioned entities. Furthermore, the imposition of export controls means that Russia cannot access strategically important goods such as semiconductors or precision machine tools that are produced in third countries, including China, India, Singapore, and Taiwan, when they use equipment licensed from the United States or its allies.

The extent to which sanctions will undermine economic development in Russia will depend on whether the Kremlin can realize an import substitution campaign and source new supplies from countries outside the U.S. alliance system. Both initiatives will be important, as Russia is unlikely to be able to rely on only one of them proving sufficient. Without an effective policy response, the impact on productivity in technology-intensive sectors probably will rise sharply once Russia's existing inventories of components are exhausted (in the second

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half of this year and beyond). In many cases, it is likely that Russia will experience some degree of “technological regress,” in which the range and sophistication of products available in the country dwindle over time.²⁵ Not only will this result in a lower technological level across the economy, but it also will probably be accompanied by higher prices, because protected firms—usually those owned by or linked to the state—will use their privileged positions to engage in price-gouging activities.

The restrictions imposed on Russia’s ability to access sensitive technologies are certainly severe; however, they also are something with which Russia, and before it the Soviet Union, has some experience. Russia’s response to the sanctions imposed in 2014 is instructive.²⁶ After being denied access to military and dual-use technologies, as well as some important technologies used in the energy sector, the leadership developed an institutionally sophisticated, well-funded program to develop domestic alternatives and also to source alternative supplies from other countries. The efficacy of the import substitution program remains subject to debate, although Russian military systems continue to employ Western-made components and chips, including some whose export had been banned outright since 2014. Even given the restrictions, Russian military procurement largely continued to run according to schedule, with only a few prominent programs adversely affected by the unavailability of Western technologies. The bulk of the delays post-2014 were caused by a sudden halt to imports of Ukrainian components, as the two defense sectors were deeply intertwined.

A similar response is expected to take place over the coming months, although Russia will not be able to continue as it did post-2014, and in order to sustain present defense procurement, the country likely will have to adapt at a much larger scale. It is reasonable to assume that Russia will allocate significant funds to replace its most sensitive technologies. The form this will take may vary, ranging from using espionage and illicit trade networks that pass through friendly countries (e.g., Eurasian Union states) to developing Russian-made alternatives, or even jointly developing technologies with China and India. While Moscow may find it difficult to access the volume of components required to supply civilian manufacturing (such as the automotive industry), it may be possible to secure access to smaller volumes of technologies needed for specific weapons programs. As was the case after 2014, Russia’s response may not be successful across the board, but it remains unclear how significant a disruption Russia will face in its military procurement.

Evidence gained from Russian advanced weapons systems used in Ukraine shows that Russian import substitution has failed in important areas. Russia has continued to be able to produce advanced weapons systems by finding ways around Western sanctions and export controls, sustaining its access to Western components. According to a recent think tank report published by RUSI, “much of Russia’s procurement of Western microelectronics for military purposes involved the use of false end-user certificates, front companies and transshipments.”²⁷ Looking forward, Russia almost certainly will seek to adapt its tactics, creating new front companies, fake end-user certificates, and transshipment points. Just as the Soviet Union was adept at gaining access to Western technologies, Russia too may be able to continue this game of technological cat-and-mouse post-2022. Furthermore, Moscow has the option of switching to less reliable but readily accessible components from China, especially as the sophistication of China’s own defense industrial production grows.

In sum, the sanctions regime means that the Russian economy looks set to be smaller than previously forecast. The living standard and incomes of its citizens, on average, will fall. Inflation will remain a challenge, while the range of goods consumed by the population will be smaller and lower in quality. The manufacturing sector will face constraints in accessing higher-technology components. However, as long as commodity prices remain high, the Russian state is unlikely to experience the same financial stress that the wider economy will endure. This means it is possible that military spending could be sustained at a high level. However, Russia will face challenges stemming from the inherent inefficiency of import substitution and funding investment in domestic production, which also will suffer from a lack of access to critical technologies.

Impact of the Degradation of the Russian Military

Russia’s capacity to devote increasingly scarce financial and technological resources to its nuclear weapons programs will be shaped by the need to replenish losses incurred in its expensive campaign in Ukraine. Put simply, the more degraded Russia’s military becomes as a result of its attack on Ukraine, the more difficult it will be for political leadership to decide where to devote resources—to replenish lost forces or to add or develop new capabilities.

Much of the analytical and media coverage of the war in Ukraine has focused on heavy losses incurred by the Russian military. Some have suggested that Russia’s military modernization program that began more than

a decade ago has been set back by years. This may be true when considering the human losses for an army that is not large by historic standards (approximately 375,000 ground and airborne forces), but it is not clear that confirmed losses of weaponry will require excessive replenishment across all categories.²⁸

The most reliable open-source estimate of Russian equipment losses is compiled by Oryx.²⁹ Oryx estimates suggest that while a large amount of equipment has been lost, the losses predominantly have been older equipment delivered before the military modernization program began in 2011.³⁰ According to Oryx data from early August, Russia has lost at least 930 main battle tanks (MBTs). Of these, about two-thirds likely were delivered to the armed forces before 2011. Similar trends are observed in losses of other armored vehicles.

Losses of Russian aircraft and helicopters also are smaller than Ukrainian Ministry of Defense estimates would suggest. A total of 38 confirmed aircraft losses were recorded. Of these, 17 Su-25 aircraft and a single An-26 were of pre-2011 vintage. A total of 20 post-2011 aircraft (Su-30SM, Su-34, Su-35S) have been lost. Given that Russia took delivery of about 400 new combat aircraft during the past decade, the number lost so far does not look very significant. A similar story can be seen for helicopters. As of early August 2022, 49 have been confirmed lost. Of these, about 22 were delivered in the past 10 years. The rest are older. This compares with a total of 210 attack helicopters delivered to the armed forces during the past decade.³¹

Even assuming that the Oryx estimate represents a lower-boundary estimate of Russian losses (losses in Russia and areas under Russian control are less likely to be reported), it is evident that Russia has lost a tremendous amount of armored equipment, but only a relatively small amount of the advanced equipment delivered after 2011.³² On average during the past decade, each year the defense industry has delivered about 30 combat aircraft, 20 attack helicopters, and about 150 MBTs of different varieties (T-72B3M, T-80BVM, T-90M).³³ This includes several years of relatively low production, with output peaking in or around 2015. At the current level of production, it could be within the capabilities of the Russian defense industry to replace recent losses of its most modern equipment within five to seven years. In some cases, losses could be replaced within one to two years when looking at the aerospace sector, air defense systems, and supporting enablers.

If Russia increases production to recoup its losses faster, which is likely, by pulling and modernizing equipment out of warehouses, the result could be a surge effort

that seeks to replace within three years many of the lost armored fighting vehicles. The replacements likely will be of a lower quality, consisting of older platforms in storage such as the BMP-1, MT-LB, or T-80BV. This will mean that Russia is forced to accept a less modernized force in the coming years, but it nonetheless will be able to replace a fair amount of the equipment lost in the war so far.

Russia's capacity to devote increasingly scarce financial and technological resources to its nuclear weapons programs will be shaped by the need to replenish losses incurred in its expensive campaign in Ukraine.

It also is useful to consider what has not been lost. Russia retains a formidable arsenal of ICBMs, Borei-class SSBNs, Yasen M-class guided missile submarines (SSGNs), hypersonic missiles, and nuclear-capable long-range strike aircraft, not to mention high-end cyber capabilities that may have been held in reserve for conflict with the United States and NATO. While it is almost certain that Russia will need to focus on replenishing its stocks of precision-guided munitions, especially the longer-range varieties, it is not clear that the losses incurred to date will necessitate a wholesale replenishment program. Russia will be able to focus on specific categories requiring replacement as many of its advanced capabilities had not necessarily been employed or expended in the war.

Russia's confirmed losses of more modern (i.e., post-2011) equipment are not as large as they may at first appear. So far, they account for a relatively smaller proportion of the equipment delivered to the military during the past decade. At historic production rates, replacing lost modern platforms will take years, but perhaps not as long as some anticipate. Sanctions, however, may result in a slower rate of production than that observed previously. Unfortunately, it is too early to tell the extent of the losses and how quickly Russia may be able to recapitalize. Based on prior experience, however, the duration could be considered as the span of one state armament program, which is typically five years. By implication, this will set Russia back competitively, as it will have to divert funds toward replacing lost modernized systems and rely on inefficient ways to work around sanctions, rather than serially producing new weapons and types of equipment.

Impact of Sanctions and Military Degradation: Two Scenarios

Given the high degree of uncertainty about the effects of Russia's invasion of Ukraine on the Russian military and economy, CNAS adopted a scenarios approach to explore the possible future states of Russia's nuclear capabilities looking out to 2030. Using the two key drivers above, the report authors chose the following two scenarios because they identify the upper and lower boundaries of expectations for Russia's nuclear capabilities. In other words, these scenarios describe both a worst- and best-case situation for Russia, and in this way, they help bound the problem for U.S. policymakers and planners.

Scenario One postulates that sanctions have a relatively lower impact on the Russian economy and military-industrial complex, perhaps due to a successful adaptive policy response from the Russian government, or because sanctions could not be effectively enforced. It also postulates that Russian forces do not experience a substantial amount of further degradation in the war in Ukraine. Scenario Two assumes that the sanctions regime is highly effective in reducing the size of the Russian economy and the availability of higher-end technological capabilities, and that the campaign in Ukraine results in a much higher degree of degradation of the military.

Scenario One: Low Sanctions Impact/Low Degradation

In this scenario, the Russian economy contracts sharply in 2022. However, as the war drags on at a lower intensity, commodity prices remain at elevated levels, giving the Russian government the financial resources needed to mitigate the worst of the recession. Politically important social groups are protected from the worst effects of the recession, preserving regime stability. Spending on the campaign in Ukraine continues, but resources are still available for most existing development and procurement programs. Most important, the state is able to promote several successful import substitution programs in strategically significant manufacturing sectors. This generates higher employment and enables Russia to produce lower-quality components (or import them from third countries) in sufficient numbers to prevent a catastrophic collapse in military-industrial output. Alongside the use of existing reserves of imported components, commercial off-the-shelf technologies, and a large-scale espionage campaign, military production is only marginally affected. Success in import

substitution helps boost a rapid recovery from the 2022 recession. While the economy is not as large in 2030 as previously forecast, it is not as small as many expected. Most important, the fiscal capacity of the state remains robust. Military spending rises to 6–7 percent of GDP, as the regime reaches for national mobilization to retain power and sustain development.

Russia embarks on a military modernization program, on the one hand to remedy the deficiencies revealed in the Ukraine campaign, and on the other to address the heightened perceived threat on its western borders posed by NATO expansion and its reinforcement of its eastern flank. However, because the losses of modern equipment in the Ukraine campaign are not disastrously high, the bulk of the modernization program is focused on strategic and sub-strategic systems designed to pose a greater risk to the United States and its allies. A slow process of reorganization of personnel and training in the army occurs, but it takes place alongside greater investment in asymmetrical capabilities such as theater and strategic systems, both nuclear and conventional.

IMPLICATIONS

In this scenario, there will be a strong temptation to discount Russia as a serious adversary because of the Russian military's poor performance in Ukraine, the degradation of its forces, and the sense that sanctions will constrict its future military capabilities. However, Russia will retain significant capabilities and is likely to double down on nonstrategic nuclear weapons and other asymmetric advantages that will result in sustained challenges to the United States and NATO. Implications of this scenario include:

A problematic military balance. The Russian military will not be substantially weakened in terms of capabilities most concerning to the United States and NATO. It will retain the capacity for a short, sharp campaign. Russian investment in military recapitalization is highly likely, NATO's is less certain, and both are equally on a delayed timeline. The addition of Finland and Sweden brings new capabilities but a vastly increased border to potentially defend. Secular trends in U.S. strategy, such as prioritizing the Indo-Pacific, will remain unchanged. This means Europe remains a secondary theater. Consequently, European security will remain unsettled and unstable. An aggressive Russia, with sufficient military capability to engage in revanchism, also probably will have an expanded nuclear arsenal with a panoply of nonstrategic nuclear weapons alongside its strategic nuclear force.

Russian prioritization of capabilities for which it has the available components and that are considered cost-effective. In this scenario, Russia will modernize existing short-range ballistic missile systems, such as Iskander-M, and complete current hypersonic projects such as Tsirkon. The Russian military also may complete the current family of submarines, Borei-M and Yasen-M, while retiring older variants. Russia has an advantage in its capacity for nuclear-powered submarine production, advanced nuclear propulsion, and associated technologies. It may judge these platforms to be relatively cost-efficient despite their high price. Similarly, Russia will complete the current Sarmat heavy ICBM project and may look to increase its deployed warhead count if arms control constraints are removed.

Increasing importance for the Kremlin of the nuclear offset. For Russia, the most effective offset is likely to remain theater nuclear weapons. To this end, Russia may prioritize development of nonstrategic nuclear systems, including a range of air-launched missiles and ground-launched cruise missiles such as the SSC-7/8, and it may consider deploying additional intermediate-range systems such as the suspended SS-26. These will represent a conventional/nuclear mix. Russia may cut back on boutique projects. These include Poseidon, Burevestnik, and similar costly novel programs. The submarines designed to carry Poseidon, such as the Khabarovsk, therefore could be delayed. The Russian leadership also may pare back the more ambitious aerospace programs and emphasize modernization of the current fleet over acquisition of new systems. The war in Ukraine has demonstrated that the technological level of Russian fighter-bombers remains a generation behind the West and needs upgrades. Conversely, this means Russia is likely to suspend new platform lines, for instance Armata, and instead invest in a recapitalization of the armored fleet by using up existing stocks in warehouses.

Russian efforts to exploit areas of asymmetry. Many surprises and lessons emerged from the Russian invasion of Ukraine, including an undetected flight of unmanned aircraft through NATO airspace that rattled the alliance.³⁴ Russia may seek an asymmetric advantage to exploit the gaps in NATO's collective airspace awareness by investing in and fielding tactical- and operational-level unmanned aerial systems, which can penetrate NATO borders with outsized impacts on basing and the civilian populace. Proliferation of such systems to non-state actors and terrorists would negatively impact NATO's concept for Deterrence and Defense of the Euro-Atlantic Area.³⁵

A need to revisit the structure and role of the U.S. nuclear deterrent. Policymakers will have to remain focused on the fact that Russia maintains not only a largely modernized nuclear force, but one with significant upload capacity should arms control fail.³⁶ Coupled with a potential higher emphasis on the utility of strategic and nonstrategic nuclear weapons in Russian approaches to conflict, policymakers may have to revisit the structure and role of the U.S. nuclear deterrent, both strategically and at the theater level.

Increased importance of unmanned air and ballistic missile defenses. Due to advanced Russian and Chinese weapon systems, the United States will continue to advocate for Next Generation Air Dominance, the B-21, and hypersonic weapons for deterrence and offensive capability. The United States should acknowledge that it requires more investment in the development of counter-unmanned air and ballistic missile defenses for itself and the rest of NATO. The United States will remain concerned about the export of any Russian advanced system.

A need to plan for managing the information environment during a nuclear crisis. Russia's invasion of Ukraine is likely the most transparent war in modern history, with virtually live updates on many social media platforms. Prior to the invasion, private, open-source analysts were able to track the Russian military's buildup with considerable accuracy. Also, the proliferation of inexpensive unmanned aerial vehicles has made operational security considerably more difficult and complex. The U.S. defense community needs to consider steps that it can take to maintain battlespace information dominance. In the nuclear realm, any use of a tactical nuclear weapon in a theater of war is likely to generate immediate public outcry—with demands for retaliation and constraint competing in the public space. Policymakers will need to anticipate and plan for managing the information environment during a nuclear crisis.

Scenario Two: High Sanctions Impact/High Degradation

In this scenario, the impact of sanctions not only causes a sharp recession in the immediate term, but also generates a permanently lower rate of economic growth as the Kremlin's policy response proves ineffective, and third countries fail to supply adequate substitutes for Western technology. European governments invest huge sums in generating new green sources of energy supply, causing a significant reduction in global demand for hydrocarbons. Russian tax revenues decline as the decade progresses,

placing the government under increasing fiscal stress. In response, the ruling elite turns more extreme, dialing up domestic repression even further and blaming its misfortune on Western forces.

Military expenditure remains high and, due to a stagnant economy, rises as a share of GDP. Russia begins to resemble the Soviet Union in the militarization of its society. Large swathes of this military are underfunded and rely on outdated weaponry. Plans to develop emerging technologies, such as artificial intelligence and robotics, amount to little. Much of the modern equipment lost in the Ukrainian campaign is not replaced. Instead, Russia's remaining technological capabilities and financial resources are allocated toward (a) maintaining a conventional force that is fit only for local conflicts and domestic repression, and (b) maintaining a nuclear arsenal as well as several niche asymmetrical capabilities that continue to pose a serious threat to the United States and its allies. Nuclear weapons grow in importance, due to both the weakness of Russia's post-Ukraine campaign conventional forces and the production of nuclear weapons. As well, delivery systems are one of the few areas of high-technology production where Russia remains at the frontier of global technology and is largely self-sufficient.

IMPLICATIONS

In this scenario, Russia's sense of vulnerability about its conventional inferiority causes Moscow to significantly increase its focus and dependence on strategic and nonstrategic nuclear weapons. It is essential for policymakers to understand that despite losses in Ukraine, Russia's nuclear modernization program is in its later stages and will remain a credible threat both strategically and at the theater level.³⁷ The implications of this scenario include:

Russian prioritization of nuclear weapons as a cost-effective offset. Russia will prioritize nuclear weapons as a cost-effective offset and those conventional capabilities that will allow it to successfully engage in local wars. The Russian approach will hedge on nuclear deterrence against a regional or large-scale war, optimizing for theater nuclear employment and strategic forces survivability. This will involve deploying more MIRV road-mobile systems and liquid-fuel ICBMs, squeezing what service life is possible out of the current SSBN force, and suspending novel weapons projects. Maintaining numbers parity with the United States and China will be a priority for status. Some of the more exotic or boutique weapons systems will be suspended,

while Russia focuses on practical systems and the ability to retain influence in its near-abroad. The list of practical systems logically will include liquid-fuel ICBMs such as Sarmat, which can deliver multiple warheads and cheaply maintain high counts of deployed warheads on launchers.

Greater Russian emphasis on early nuclear escalation and employment for warfighting. The Russian armed forces largely will abandon any pursuit of conventional parity or the ability to take on NATO in a conventional fight, emphasizing early nuclear escalation and employment for warfighting purposes. That means refocusing its long-range precision-guided weapons on a nuclear-delivery mission rather than working to establish a non-nuclear deterrent. With nuclear warheads emplaced, these missiles likely will have a longer range and lower requirements for accuracy. To this end, Russia will procure more systems in the operational range and theater delivery range of 500–2,000 kilometers. Some tactical nuclear warheads might be returned to arsenals, for example, shorter-range air-to-ground missiles with nuclear payloads or nuclear artillery for high-power artillery brigades. (This is, to some extent, conjecture.) That said, Russia still retains tactical nuclear weapons in select roles such as depth charges, and possibly for air defense systems. Russia will focus on cost-effective counters whose impact could prove significant, for example, direct ascent anti-satellite systems or its large arsenal of mines.

Setbacks for some Russian capabilities. Russia will be unable to fulfill its desires for an improved layer of space-based intelligence, surveillance, and reconnaissance, instead having to rely on cheaper and relatively shorter-range drone systems. Moscow may seek commercial workarounds, as it often has, to address the lack of more advanced remote sensing capabilities. Targeting will continue to suffer, as will the sophistication of Russian means of detection. Serial production of hypersonic weapons will prove challenging, with these capabilities becoming strategic offsets rather than warfighting systems spread throughout the force. In some areas Russia will be forced to look to the export market, procuring drones and other systems from willing suppliers.

Newer platforms and designs will be suspended as older late-Soviet vehicles are pulled out of storage and modernized. The aerospace sector will become largely moribund, depending on exports for subsistence. This means modernized versions of current aircraft, for instance, Su-34M, are unlikely to see significant

production. Su-57 fifth-generation fighter production will become contingent on export sales, and similar projects will remain in the design phases.

An increasingly autarkic Russian defense sector.

Russia will seek to maximize self-sufficiency, developing industries to produce components and subcomponents that previously were imported. Russian leadership already has authorized “parallel imports,” which is a euphemism for lifting copyright protections and copying foreign import technologies. In some areas this will not be possible, leading to gray imports via the black market or through a chain of companies designed to conceal the end-user. Electronic components, chips, and machine tools will prove high-demand items. Russia may substitute what it can from China and other providers of lower-quality equipment. This is a hypothesis; much depends on the extent of Russian-Chinese cooperation. However, Russia will have to pursue a familiar path of component acquisition akin to that of North Korea and Iran. That said, if states with fewer resources can sustain missile development programs and sizable conventional forces, it stands to reason that Moscow too will find workarounds over time.

Rhetorical emphasis from Russia on its strategic systems. Moscow will revise military doctrine and other formal documents to visibly reduce the threshold for nuclear employment. Russian public statements and declaratory policy make clear the likelihood of nuclear use in the event of a conventional conflict or a large-scale aerospace attack on Russia, among other types of attacks on critically important infrastructure. The conditions for nuclear employment become further loosened and vague, in the hope of bolstering the deterrent effect of Russia’s nuclear arsenal in the absence of effective conventional deterrence. Feeling vulnerable about the state of the country’s conventional forces, senior Russian leaders amplify their nuclear rhetoric. In this scenario, the Kremlin seeks to brand its statecraft in nuclear terms, regularly reminding the West about its nuclear prowess. Russian posture may include provocative forward deployments—for example, establishing a storage facility in Syria for the purpose of deploying nuclear weapons to the eastern Mediterranean.

Rising risks of proliferation. Desperate for access to foreign exchange and the opportunity to maintain production lines via exports, Russia will offer its latest

generation of weapons and know-how to states such as China. This will include a range of technologies, from quieting for submarines, nuclear propulsion, advanced missiles, and space-based sensors to engines and air defense systems. Defense cooperation will be secretive, with neither Russia nor China disclosing the deals. Russia increasingly will move into the role of subcontractor, transferring key knowledge on Chinese projects rather than discrete sales of completed systems. The two countries will take up joint development projects and civilian cooperation to serve as a potential cover for technology transfer. China in turn may prove to be a key supplier or middleman for Russian acquisition of components. Of course, Russia is likely to struggle on the export markets, with the prospect of selling to many countries uncertain due to the threat of U.S. sanctions and the complexity of finding a suitable financial instrument for conducting transactions. Over time, those interested in cooperating with Russia will find ways of doing so, and in some cases the United States may be forced to make exceptions for countries with strategic significance. Consequently, Russia may still retain many of its main defense partners, including India.

A shortened pathway to nuclear war. Russia will have few options in the event of conventional war other than nuclear coercion, escalation, and employment of nuclear weapons for warfighting in theater. The pathway to nuclear war will be shortened dramatically as Russia’s attempts to build a non-nuclear deterrent collapse. Arguably, the weak efficacy of Russia’s long-range conventional strike capabilities in Ukraine already will have begun a debate in military circles as to the viability of non-nuclear deterrence. Throughout the evolution of this concept, there had been counterarguments in Russian military thought that these capabilities were hyped, and that pursuing them in large quantities ultimately was an uncompetitive strategy.

The deepening of Russia-China military relations.

Russia will become increasingly dependent on China, which will begin to affect its policy options. This could be especially consequential for the United States if the Kremlin should share Russia’s key military technologies with China. Russia also may back China in disputes and, following U.S. support for Ukraine in the current conflict, choose to directly support Beijing in any future conflict. Additionally, cooperation in the space and cyber domains could have grave consequences for the West due to numbers, geography, capability, and ethics of use.

Key Findings and Recommendations

It is quite probable that Russian military power will be diminished following its poor showing in the war.

Yet while it may take Russia years to recapitalize its conventional forces, the same is true for NATO. NATO members' stocks of key munitions have been expended in this war (supplied to Ukraine), and the backlog of procurement orders stretches years out. Furthermore, under substantial economic strain from a global recession, high rates of inflation, and commodity disruptions, the trajectory of the military balance in Europe may prove far less rosy when looking out to 2030. Russia will retain the conventional and unconventional capability to conduct a campaign near its borders. Thus, even though Russia will emerge weakened from the war in Ukraine, it will maintain not just the intent, but also the capacity to challenge the United States and Europe. This section lays out the key findings from the report and their associated recommendations.

A shortened pathway to nuclear war. Russia's sense of vulnerability, given the degradation of its conventional capabilities, will lead Moscow to double down on the development of its nuclear forces, especially theater nuclear weapons. Coupled with greater emphasis on the development of its nuclear forces, Russian political and military leaders likely will see a greater utility for nuclear weapons in managing escalation between Russia, the United States, and NATO, both strategically and at the theater level. To address these changing dynamics, U.S. and European policymakers should consider the following steps.

- Because of Russia's likely greater reliance on nuclear deterrence and coercion in escalation management, U.S. policymakers should review the structure and role of the U.S. nuclear arsenal and its place in central and extended deterrence to ensure it is adequate to the deterrent task.
- The United States and NATO also should invest in developing escalation management capabilities across the peacetime, conventional, and nuclear spectrum. This will help mitigate against gaps that either lead to an inability to escalate or produce unintended escalation.
- The armed forces of the United States and NATO need to anticipate, plan, and train against the possibility of fighting in a nuclear environment. Some of these skills almost certainly have atrophied since the end of the Cold War, because of the focus on counterinsurgencies

in Iraq and Afghanistan. In a conflict with the United States and NATO, in the near- to mid-term, Russia's greater reliance on nonstrategic nuclear weapons will mean that forces in Europe may have to fight through nuclear environments sooner than traditionally anticipated.

- The U.S. defense community needs to consider steps that it can take to maintain battlespace information dominance. In the nuclear realm, any use of a tactical nuclear weapon in a theater of war is likely to generate immediate public outcry, with demands for retaliation and constraint competing in the public space. Policymakers will need to anticipate and plan for managing the information environment during a nuclear crisis.

The end of arms control. The current political situation significantly complicates the prospects that the United States and Russia will agree to a replacement for the New START Treaty once it expires in 2026. In the absence of any agreement, Russia's ability to produce strategic nuclear weapons and deploy new or novel systems will be unconstrained. Moscow is also likely to divert significant resources into nonstrategic and theater nuclear weapons, amplifying challenges to the United States in the long run. Russia's growing dependence on tactical nuclear weapons reduces the likelihood for negotiated limits addressing that arsenal and may make new forms of regional arms control more challenging to attain in Europe. Hence, the outlook for new stabilizing instruments appears pessimistic. China too is likely to invest in its nuclear arsenal. Thus, the United States, which only recently has begun its nuclear modernization cycle, will find itself dealing with two unconstrained nuclear arsenals, both principally focused on the United States as the primary threat.

- Even absent an active strategic stability dialogue with Russia, the United States should increase dialogue and information sharing across the NATO landscape on the evolution of the Russian threat, including the shortened pathway to nuclear conflict. Such intra-NATO consultations are critical for alliance management, the development of coherent aims for any future efforts to negotiate agreements with Moscow, or, failing such an outcome, enhancing deterrence and defense through military deployments and adjustments.

Increased proliferation risks. As the United States works to isolate Russia from the international community, there is no impetus for Moscow to continue participating in normative proliferation regimes. This means Russia

might be willing to begin transferring various types of capabilities to other states where it has previously demonstrated restraint, specifically to North Korea, Iran, and other actors considered U.S. opponents but friendly to Moscow.

- The United States should work with non-proliferation organizations to both monitor and pressure Russia to adhere to its non-proliferation commitments. Non-proliferation remains in the interest of both countries, and the United States should continue to underscore this point.

Growing Russia-China defense cooperation. Russia is expected to increase its dependence on China, including cooperation in the defense sector, and Moscow may further proliferate advanced systems to foreign buyers. Consequently, the risk from sustained Russia-China defense alignment will only grow and may include key technology transfers previously unseen.

- Washington should increase the priority it places on gathering intelligence on Russia-China defense cooperation, secret deals on licensed production, technology co-development projects, and undisclosed arms transfers.

Russia may recapitalize its armed forces faster than expected. The war, combined with sanctions, could set Moscow behind by approximately five years (based on past performance). However, as long as global commodity prices remain high, Russia can sustain moderate levels of defense spending. Further, Moscow will prioritize defense spending as a share of GDP.

- The United States and NATO should conduct deliberate, joint reviews of the lessons learned from watching the war in Ukraine and what it tells us about modern warfare. Among the changes needed may be greater protection of forces, given the increased transparency of modern combat. There also is much to be learned from the warfighting capabilities that are changing combat, including how to manage the information environment and other new developments.

Conclusion

The war in Ukraine has reinforced the view of many analysts and policymakers that Russia is a declining power. But while the damage wrought by the war undoubtedly will weaken Russia, it is far too soon to count Russia out. Russia will seek to adapt and evolve in the face of its current challenges, requiring updated and nuanced assessments of the nature of the future Russian threat. This report provided such an assessment, focusing on Russia's ability to develop and deploy advanced conventional and nuclear capabilities through 2030.

Two factors will be key in shaping Russia's ability to meet its defense objectives: the effectiveness of Western sanctions on Russia, and the extent of degradation of the Russian military as a result of the Kremlin's invasion of Ukraine. However, regardless of how the war develops, Russia's largely modernized nuclear force will remain viable for the foreseeable future and could pose strategic dilemmas for the United States, especially if nuclear arms control collapses.

Loosing forward, Russia's war in Ukraine and the weakening of its conventional forces likely will drive the Russian political and military leadership to see the use of nuclear weapons as more potentially effective in managing escalation and conflict. This likely will increase the focus on nuclear acquisition—with perhaps a growing emphasis on asymmetric, novel nuclear and dual-capable weapons. And if Western sanctions are enduring and scaled up (to include restricting the Kremlin's oil and gas revenue), and if the Russian military suffers major conventional losses, Moscow largely will abandon any pursuit of conventional parity or the ability to take on NATO in a conventional fight. Instead, it will emphasize early nuclear escalation and employment for warfighting purposes, shortening the pathway to nuclear war. Proliferation risks increase, as does Russian cooperation with other U.S. adversaries such as China.

Russia's invasion of Ukraine has set in motion several new dynamics that require the United States and its NATO allies to reassess the nature of the future Russian threat. The United States and its allies now must remain united in their understanding of these changes and in their efforts to anticipate, plan, and prepare to effectively navigate these new realities.

1. Paul Krugman, "Russia Is a Potemkin Superpower," *The New York Times*, February 28, 2022, <https://www.nytimes.com/2022/02/28/opinion/putin-military-sanctions-weakness.html>; and David von Drehle, "War Proves That Russia Is No Longer a Superpower," *The Washington Post*, March 15, 2022, <https://www.washingtonpost.com/opinions/2022/03/15/ukraine-war-proves-russia-no-longer-a-superpower/>.
2. "Rogozin Announced the Timing of Supply of 'Sarmat' Ballistic Missiles to the Troops," *Izvestia*, May 21, 2022, <https://iz.ru/1337881/2022-05-21/rogozin-nazval-sroki-postavok-ballisticheskikh-raket-sarmat-v-voiska>.
3. Alexey Ramm, Bogdan Stepovoy, and Evgeny Dmitriev, "Armed in the Pacific: New 'Borei' Nuclear Submarines Will Go to Kamchatka" [Вооружат по Тихому: Новые атомные лодки <<Борей>> отправятся на Камчатку], *Izvestia*, March 23, 2020, <https://iz.ru/988502/aleksei-ramm-bogdan-stepovoi/vooruzhat-po-tikhomu-novye-atomnye-loodki-borei-otpraviatsia-na-kamchatku> АРМИ.
4. "New Tu-160 Strategic Missile Carrier to Be Built by 2022" [Новый стратегический ракетоносец Ту-160 построят в 2022 году], *Izvestia*, March 22, 2022, <https://iz.ru/1308789/2022-03-22/novyi-strategicheskii-raketono-setc-tu-160-postroiat-v-2022-godu>.
5. Anton Lavrov, Roman Kretsul, and Alexey Ramm, "Package Agreement: The Newest Bomber Was Given a Release Date for the Series" [ПАКетное соглашение: новейшему бомбардировщику назначили сроки выхода в серию. Начался очередной этап в разработке самого современного в мире стратегического ракетоносца], *Izvestia*, March 14, 2020, <https://iz.ru/963694/anton-lavrov-roman-kretcul-aleksei-ramm/paketnoe-soglashenie-noveishemu-bombardirovshchiku-naznachili-sroki-vykhoda-v-seriiu>.
6. Vladimir Putin, "Address to the Russian Federal Assembly," March 1, 2018, https://www.youtube.com/watch?v=LSog_qcxAIo.
7. "Military Expert Spoke about the Features of the Peresvet Laser Complex" [Военный эксперт рассказал об особенностях лазерного комплекса «Пересвет»], *Izvestia*, May 18, 2022, <https://iz.ru/1336302/2022-05-18/voennyi-ekspert-rasskazal-ob-osobennostiakh-lazernogo-kompleksa-peresvet>.
8. "Russia Completed the Deployment of 'Peresvet' According to Shoigu" [В России завершили развертывание установок «Пересвет», заявил Шойгу], *Ria Novosti*, December 24, 2019, <https://ria.ru/20191224/1562774710.html>.
9. "A Battery of Missiles near Kharkov Can reach Moscow, but Our Tactical Missile Will Destroy It Earlier" [Батарея ракет под Харьковом может достать до Москвы, но наша тактическая ракета уничтожит ее раньше], *Business-Gazeta*, February 17, 2022, <https://www.business-gazeta.ru/article/539951>.
10. Irina Alshaeva, "Kinzhal Is a Complex Sausage. Anything Can Get Attached to It" [Кинжал – это сложная колбаса. К нему можно пристыковать что угодно], *Gazeta.Ru*, March 21, 2022, <https://www.gazeta.ru/army/2022/03/21/14652625.shtml?updated>.
11. "Putin vows to perfect mystery rocket after engine blast," *BBC News*, November 22, 2019, <https://www.bbc.com/news/world-europe-50514306>.
12. Alexey Leonkov, "Nuclear 'Burevestnik': A New Cruise Missile Will Become a 'Weapon of Retaliation'" [Ядерный 'Буревестник': новая крылатая ракета станет 'оружием возмездия'], *Russian Weapons* [Русское Оружие], July 18, 2019.
13. Viktor Sokurko, "Potential New York Killer: What Is 'Poseidon' and 'Scythian'" [Потенциальный убийца Нью-Йорка]. Что такое «Посейдон» и «Скиф»], *Gazeta.Ru*, December 29, 2021, <https://www.gazeta.ru/army/2021/12/29/14372341.shtml>.
14. Kelly M. Sayler, "Hypersonic Weapons: Background and Issues for Congress," Report No. R45811, Congressional Research Service, updated May 5, 2022, <https://crsreports.congress.gov/product/pdf/R/R45811>.
15. *Ria Novosti*, "The Northern Fleet and Black Sea Fleets Launched Kalibr and Zircon Missiles," *Ria Novosti*, February 19, 2022, <https://ria.ru/20220219/rakety-1773772880.html>.
16. "Strike by Russian Iskander Mobile Ballistic Missile System," *Euronews*, March 3, 2022, <https://www.euronews.com/2022/03/30/strike-by-russian-iskander-mobile-ballistic-missile-system>.
17. Hans M. Kristensen, Matt, Korda, "Russian nuclear weapons, 2021," *Bulletin of Atomic Scientists*, 77 no. 2 (2021), <https://www.tandfonline.com/doi/full/10.1080/00963402.2021.1885869>.
18. Hans M. Kristensen, Matt, Korda, "Russian nuclear weapons, 2022," *Bulletin of Atomic Scientists*, 78 no. 2 (2022), <https://www.tandfonline.com/doi/full/10.1080/00963402.2022.2038907>.
19. Dmitrii Butrin, "Prosyadem vse," *Kommersant*, April 13, 2022, https://www.kommersant.ru/doc/5306315?from=glavnoe_52; RBK Group, "Bloomberg uznal, chto Minfin ozhidayet khudshego spada ekonomiki s 1994 goda," May 10, 2022, https://www.rbc.ru/economics/10/05/2022/6279a1399a79470f390a7f56?from=from_main_5.
20. Bank of Finland Institute for Emerging Economies, "Export Earnings Fattened Russia's Q1 Current Account Surplus," *BOFIT Weekly*, April 14, 2022, https://www.bofit.fi/en/monitoring/weekly/2022/vw202215_2/.
21. Bank of Finland Institute for Emerging Economies, "Export Earnings Flattened Russia's Q1 Current Account Surplus."

22. Ministry of Finance of the Russian Federation, “Operativnaya informatsiya ob ispolnenenii raskhodov federal'nogo byudzheta v razreze razdelov i podrazdelov klassifikatsii raskhodov byudzhetrov za yanvar' 2022 goda; za yanvar'-fevral' 2022 goda; za yanvar'-mart 2022 goda,” https://minfin.gov.ru/ru/press-center/?id_4=37765-predvaritelnaya_otsenka_ispolneniya_federalnogo_byudzheta_za_yanvar_2022_goda.
23. Authors' calculations are based on an extrapolation of military expenditure observed in Ministry of Finance data between January and April, assuming a GDP contraction of 10–15 percent in 2022. Federal'nyi byudzheth operativnyi, <https://roskazna.gov.ru/ispolnenie-byudzhetrov/>.
24. Stockholm International Peace Research Institute, Military Expenditure Database, <https://www.sipri.org/databases/milex>.
25. Bank of Russia, “O chem govoryat trendy: Makroekonomika i rynki,” Bulletin of the Department for Research and Forecasts, April 2022, http://www.cbr.ru/Collection/Collection/File/40953/bulletin_22-02.pdf.
26. Richard Connolly, *Russia's Response to Sanctions* (Cambridge: Cambridge University Press, 2018).
27. James Byrne, Gary Somerville, Joe Byrne, Jack Watling, Nick Reynolds and Jane Baker, *Silicon Lifeline*, RUSI, August 2022.
28. For the size of armed forces, the International Institute for Strategic Studies' *Military Balance 2021* (London: Routledge, 2021) was consulted.
29. Stijn Mitzer et al., “Attack on Europe: Documenting Russian Equipment Losses during the 2022 Russian Invasion of Ukraine,” *Oryx*, February 24, 2022, <https://www.oryxspioenkop.com/2022/02/attack-on-europe-documenting-equipment.html?m=1>.
30. The start of the modernization program corresponds with the GPV 2020, which began in 2011. See Richard Connolly and Cecile Sendstad, “Russian Rearmament: An Assessment of Defense-Industrial Performance,” *Problems of Post-Communism*, 63 no. 3 (2018), 143–60.
31. Data here relies on Mitzer et al., “Attack on Europe: Documenting Russian Equipment Losses.”
32. Mitzer et al., “Attack on Europe.”
33. Eastern Advisory Group consultancy, *Russian Defense Industry Analysis 13*, 2022.
34. Jasmina Kuzmanovic and John Follain, “Stray Soviet-Era Drone from Ukraine Raises NATO Concerns,” *Bloomberg*, March 15, 2022, <https://www.bloomberg.com/news/articles/2022-03-15/stray-soviet-era-drone-from-ukraine-raises-nato-defense-concerns>.
35. Gen. Tod D. Wolters, Commander, Supreme Allied Commander Europe, NATO, “Keynote Address: CEPA Forum 2021,” September 29, 2021, Supreme Headquarters Allied Powers Europe, Casteau, Mons, Belgium, <https://shape.nato.int/saceur/keynote-address-cepa-forum-2021>.
36. Vince Manzo, “Nuclear Arms Control without a Treaty? Risks and Options after New Start,” Report No. IRM-2019-U-019494, CNA, March 2019, <https://www.cna.org/reports/2019/04/IRM-2019-U-019494.pdf>.
37. Amy F. Woolf, “Russia's Nuclear Weapons: Doctrine, Forces, and Modernization,” Report No. R45861 Congressional Research Service, updated April 21, 2022, <https://crsreports.congress.gov/product/pdf/R/R45861>.

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