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How Many Nuclear Weapons Does Russia Have?

The Size and Characteristics of the Russian Nuclear Stockpile

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Foreword by
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NATIONAL INSTITUTE FOR PUBLIC POLICY

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Foreword

Sound national security policy requires an accurate understanding of the threats we face. This is especially true with regard to nuclear threats. Successful deterrence is dependent on a number of conditions, including a realistic appreciation of adversarial objectives and capabilities. Having the best possible assessment of the size and characteristics of their arsenals is essential.

In this *Occasional Paper*, Dr. Mark Schneider details the long record of the Federation of Atomic Scientists (FAS) in publishing mostly undocumented assessments of Russian nuclear capabilities that appear to undercount consistently Russia's stockpile size and minimize its substantial advantages in both strategic and non-strategic forces. This apparent undercounting, dating back to at least the end of the Cold War, has been repeatedly adopted by journalists, academic observers, and anti-nuclear advocates. As a result, the FAS numbers have taken on a false sense of authenticity simply because they are so frequently cited and because the U.S. government has provided very limited information to the public about the Russian nuclear threat, perhaps to promote an arms control agenda similar to that of the Federation.

Most importantly, the author makes clear the dangerous consequences of basing national security strategies on an undercounting of the Russian nuclear threat. Numbers matter: quantity has a quality of its own. Undercounting suggests that Russia remains in compliance with its arms control commitments when it is not. Undercounting suggests that there is essential parity in U.S. and Russian force postures when there is not. Russia's massive upload capability and its other qualitative and quantitative advantages undermine deterrence. Putin's threats to use nuclear weapons in Ukraine and the Russian doctrine of "escalate to win" likely reflect Moscow's calculation that it

can control escalation in a nuclear conflict with the United States. Undercounting Russian nuclear capabilities leads to complacency about the threat and undermines support for developing and fielding the forces essential for deterrence. Getting it wrong can result in provocation, and provocation can lead to conflict.

The repetition of problematic FAS assessments leads to the conclusion that they are based less on wishful thinking than on a possible desire to shape the public and congressional debate in a way that encourages the belief that arms control should be pursued as an alternative to strengthening our nuclear deterrent capabilities and that a minimum deterrent capability is all that is needed. Ironically, contrary to this motivation, the prospects for arms control may well be a casualty of a seemingly ideologically motivated undercounting of the threat.

In today's security environment, we have grown accustomed to Russian, Chinese, and North Korean nuclear threats, threats that should be taken seriously. Our response must be based on hard realities, not on the aspiration for a world free of nuclear weapons. By exposing the many likely weaknesses in the FAS estimates and, most importantly, how they can undermine the prospects for effective deterrence, this monograph makes a major contribution to our security.

Amb. Robert G. Joseph

Preface

Western civilization is facing very dangerous times. Putin's vicious war of aggression against Ukraine, a subset of his larger conflict with the West, is backed by Russia's nuclear capability, while high-level Russian nuclear war threats are being made every week or two. There is no question that Russia has obtained numerical superiority and much greater diversity in its nuclear arsenal than even the combined capability of the United States, Britain and France. Numerically, Russia's nuclear arsenal may even be twice as great and it is growing. Despite this, there is a dearth of detailed information concerning Russian nuclear capability and the danger it represents. Yet, such information is necessary to establish and assess the adequacy of the U.S. nuclear deterrent and nuclear strategy. This study will not deal with deterrence requirements, but it will provide the reader with information that is available in both Western and Russian open sources concerning Russian nuclear capabilities and policy. Russian sources have mainly been ignored by Western media—probably because their content is not very palatable to Western sensibilities. Repetition of the mantra that "nuclear war cannot be won and must never be fought" has no more relevance to the deterrence of nuclear war than the mantra of "never again" in the 1920s and 1930s did in preventing World War II. Today, the potential consequences of the failure of deterrence are far greater than they were before the Second World War.

I would like to thank the National Institute for Public Policy and the Smith Richardson Foundation for their funding of this study. In particular, I would like to express my great appreciation to Dr. Keith B. Payne, the Hon. David J. Trachtenberg, James R. Howe and Matthew R. Costlow for their extensive comments, suggestions and substantive contributions to this publication. Finally, I would also like

to thank Amy Joseph who turned the many drafts into a coherent publication, and my wife, Vivianne, who not only put up with me but made countless useful suggestions on its substantive content. I would like to thank Ambassador Robert Joseph for his excellent Foreword. However, any errors in fact are exclusively my own.

Executive Summary

Introduction

Putin's war of aggression against Ukraine, backed by frequent nuclear threats, has focused attention on the scope of Russia's nuclear capabilities and the possibility that it will initiate the first use of nuclear weapons. Non-Governmental Organizations (NGOs) such as the left-of-center Federation of American Scientists (FAS) estimate the size and composition of the Russian nuclear force, but those estimates may consistently undercount the delivery capability of the new and modernized Russian strategic missiles. Nevertheless, FAS estimates are cited globally as if authoritative and definitive; they clearly are not. They may not provide a realistic portrayal of Russia's strategic and non-strategic nuclear capabilities, potentially hampering an informed understanding of the size and scope of the Russian nuclear threat. It is impossible to determine if what appear to be systematic low estimates of Russian nuclear capabilities are deliberate, but they seem to lean consistently in that direction.

The potential for underestimating Russian nuclear capabilities, particularly if doing so suggests that Russia is in compliance with arms control agreements, is extremely troubling. Doing so would essentially misinform the U.S. public and, potentially, members of Congress regarding the true value of treaties intended to control the number of Russian arms. Perhaps more importantly, undercounting Russian nuclear capabilities could misinform the U.S. public and congressional leadership regarding the adequacy of U.S. forces to meet deterrence requirements because the adequacy of the U.S. deterrence posture must be shaped by a realistic understanding of Russian nuclear capabilities. In short, an undercounting of Russian nuclear

capabilities could misinform the formulation of U.S. nuclear policies for both deterrence and arms control. This study details what may be a systematic undercounting of Russian strategic and non-strategic nuclear forces and addresses why these issues should be a matter of great concern to the American people and U.S. policy makers.

To understand why possibly erroneous depictions of Russian nuclear doctrine and quantitative and qualitative errors in the presentations of Russia's nuclear capabilities are important, it is necessary to examine Russian nuclear doctrine and policy, the size and scope of Moscow's strategic and non-strategic modernization programs, as well as the failure of arms control agreements to provide a reliable basis for measuring Russian nuclear forces or to constrain the growing nuclear threat.

Russian Nuclear Doctrine and Threats

Putin's nuclear strategy entails the lowest threshold for the first use of nuclear weapons in the world today. Under Putin's June 2020 decree, nuclear first use could occur in response to: 1) a ballistic missile attack on Russia (launch before it is known whether the attack was nuclear); 2) WMD use (an expansion of the previous formulation of chemical or biological weapons attack); 3) kinetic or cyberattacks on "critical governmental or military sites," the "disruption of which would undermine nuclear forces response actions"; and, 4) aggression against Russia which threatens the "very existence of the state." In addition, the former Chief of the Russian General Staff has said, "…conditions for pre-emptive nuclear strikes…is contained in classified policy documents."[1] Russian nuclear war threats made at the most senior level since February 2022 are clear attempts to deter

[1] "Russia Classifies Information on Pre-emptive Nuclear Strikes – Military," *BBC Monitoring Former Soviet Union*, September 5, 2014, available at http://search.proquest.com/professional/login.

Western assistance to Ukraine, the victim of Russian aggression.

Russian warhead numbers and technical characteristics are the central components of Russian nuclear deterrence policy. Moscow's perceived qualitative and quantitative advantages matter because: 1) Putin and his senior staff appear to believe these factors are crucial for intimidation and, ultimately, they may be required to achieve military victory against Russia's enemies; 2) Russia's leaders appear to believe numbers and technical superiority are meaningful; 3) the more nuclear weapons Russia has, the greater the number and types of targets it can attack, increasing options for nuclear targeting strategies; and, 4) a large Russian numerical advantage, particularly when combined with thousands of low-yield and low-collateral damage nuclear weapons, could encourage the belief that nuclear weapons can be substituted for precision conventional weapons, increasing the risk that Moscow will introduce nuclear weapons into a conflict. Russia sees its numerical superiority and apparent monopoly on advanced nuclear weapons and delivery systems such as hypersonic missiles as a major element of leverage against the West, and a potential critical component of war-fighting that would *support* a Russian victory. Moreover, Moscow sees itself in a long war with Western civilization that includes military hostilities. The Biden Administration's warning that, "Heavy losses to its ground forces and the large-scale expenditures of precision-guided munitions during the [Ukraine] conflict have degraded Moscow's ground and air-based conventional capabilities and increased its reliance on nuclear weapons," should be taken seriously. At some point, Russia may introduce nuclear weapons into its long war with the West if it deems that to be necessary and is undeterred.

Counting Russian Nuclear Forces

Since the end of the Cold War, the U.S. government has provided the American people with very limited information on the Russian nuclear threat to the United States and its allies. Until Putin's war of aggression against Ukraine, the national press largely ceased any form of investigative journalism into Russian nuclear capabilities. Instead, there has been endless repetition of supposed Russian nuclear weapons numbers from the FAS that are largely undocumented and for which little documentation apparently exists. The annual FAS report creates the illusion that it is possible to know from open sources the exact number of Russian nuclear weapons (5,977, according to the February 2022 edition, and 5,889 in the May 2023 version). Yet, the decline in warhead numbers recorded in the May 2023 edition is implausible given current events and is directly contrary to the repeated statements by the Biden Administration that the number of Russian nuclear weapons is increasing. The FAS numbers are *not* an estimate of total Russian nuclear warhead numbers the way the United States defines them, i.e., active and inactive weapons and weapons awaiting dismantlement, although they often are repeated as such. In fact, there is an enormous upward uncertainty with regard to Russia's actual nuclear warhead stockpile size.

The FAS studies are referenced globally as being authoritative and definitive regarding the size of Russia's nuclear inventory, but they clearly are not. The 2022 and 2023 FAS Russian nuclear forces charts appear to depict an estimate of the total Russian nuclear weapons inventory, but this is not the case; rather they present: 1) a likely low estimate of the maximum nuclear warhead upload potential of Russian strategic offensive forces; 2) either an estimate of the total inventory or the number of "assigned" Russian non-strategic (or tactical) nuclear warheads (it is unclear

which it is and there is a significant difference between the two); and, 3) the estimated number of Russian nuclear weapons awaiting dismantlement. The maximum upload capability of Russian ballistic missiles *is not necessarily the same* as the size of the Russian strategic nuclear inventory as readers may take from the FAS estimates. The many journalists who uncritically cite the FAS numbers are apparently unaware of this difference.

The FAS assessment of Russia's maximum nuclear warhead upload potential (about 400 ballistic missile warheads) is unlikely to be close to the real number. In fact, the Russian upload potential is growing. The warhead numbers presented by the FAS reports for each type of Russian ICBM and SLBM are mainly taken from the 1990 START Treaty Memorandum of Understanding (MOU) on strategic forces, or, in the case of the new Bulava-30 SLBM, a more than 15-year-old Russian data update to the START Treaty MOU. Yet, START Treaty MOU numbers do *not* always reflect the maximum number of warheads a Russian missile type can carry. Moreover, Russian strategic nuclear systems have been almost completely modernized and replaced since 1997. In most cases, Russian press reporting indicates that the new or improved Russian missiles have a warhead potential two or three times larger than START Treaty MOU numbers.

Exact calculations of warhead upload numbers are not credible because the necessary information is simply not available in open sources. However, available information allows reasoned estimates of the upload number—which could be up to 2,000 more warheads than the FAS assessment portrays, even without the assumption of Russian cheating involving mobile ICBMs or circumvention through launcher reloads. The Russian upload potential is about to grow substantially due to the deployment of new Sarmat heavy ICBMs, which the Russian Defense Ministry says "…will be able to carry up to 20 warheads of small,

medium, high power classes."[2] This warhead load is expensive and suggests that Russia has no plans for an arms control restricted force.

In the emerging, unprecedented multipolar nuclear threat environment that the United States and its allies face, sustaining an effective U.S. nuclear deterrence is challenging. The existing U.S. nuclear force posture is increasingly obsolescent and badly needs modernization given the expanding nuclear threats. Yet, FAS numbers may undercount Russian nuclear capabilities and thereby misrepresent the severity of the nuclear threat. This may well have the effect of reducing public and congressional support for a defense budget needed to sustain a credible U.S. deterrence posture.

The minimum deterrence advocacy that appears to underlie minimalist presentations of Russian nuclear weapons and strategy usually discounts the potential significance of a Russian advantage in nuclear force numbers by presuming that: 1) nuclear weapons are targeted against highly vulnerable cities for deterrence purposes; 2) few are needed to engage in a "city-busting" strategy; and thus, 3) a minimal number of nuclear weapons is needed for mutual deterrence. Yet, for decades, every U.S. Democratic and Republican administration has said that the United States would not purposefully attack opponents' populations and has instead validated that deterrence requires the capability to threaten legitimate military targets—a deterrence strategy for which nuclear force numbers and diverse types are clearly needed, especially as the number of Russian and Chinese military facilities expand.

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[2] "Guaranteed defeat of enemy infrastructure: how the Sarmat ballistic missile will enhance the combat potential of the Strategic Missile Forces," *RT*, December 16, 2019, available at https://russian.rt.com/russia/article/698699-sarmat-raketa-rvsn-perevooruzhenie.

The FAS reports appear to assume Russian compliance with the New START Treaty warhead limits despite: 1) the absence of on-site inspections for over three years and, thus, the impossibility of confirming Russian compliance; 2) clear Russian violation of the New START Treaty by denying the United States its Treaty-mandated, on-site inspection rights and data notifications; 3) reports in Russian state media of activities that, if accurate, clearly violate the New START Treaty; and, 4) Putin's illegal "suspension" of the Treaty.

Virtually everything that Russia has done in regard to New START in 2022-2023 suggests that Moscow intends to exploit the opportunities that its effective termination of the Treaty generates to expand its nuclear potential. Indeed, Deputy Foreign Minister Sergey Ryabkov hinted at this when he said, "We have gained additional opportunities to ensure our security."[3] It is not possible to acquire "additional opportunities" without exceeding the New START warhead limits.

Verification of the New START Treaty warhead limits literally depended on the modest on-site inspection regime that the Russians have now terminated. New START chief negotiator and former Under Secretary of State Rose Gottemoeller has pointed out, "…we discarded the counting rules in favor of confirming declared warheads on the front of missiles *through reciprocal inspections*; in fact, we did not need telemetry measures to confirm compliance with the warhead limits in the new treaty."[4] Without on-site inspections, the assumption of Russian Treaty compliance is little more than wishful thinking.

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[3] "Russia says leaving New START has given it new security options," *Reuters*, April 4, 2023, available at https://www.reuters.com/world/europe/russia-says-leaving-new-start-has-given-it-new-security-options-2023-04-04/.

[4] Rose Gottemoeller, "The New START Verification Regime: How Good Is It?," *Bulletin of the Atomic Scientists*, May 21, 2020. (Emphasis added.) Available at https://thebulletin.org/2020/05/the-new-start-verification-regime-how-good-is-it/.

Numbers matter. Indeed, in December 2019, Rose Gottemoeller cautioned that the United States may lose nuclear parity because, if freed from the New START warhead limit, "…without deploying a single additional missile,"[5] Russia, "could readily add several hundred – by some accounts, one thousand – more warheads, to their ICBMs…"[6] Russian "suspension" of the New START Treaty has placed Moscow in a position where it can have, and perhaps already has, this number of extra warheads or even more.

There may be a linkage between the FAS analyses of Russian nuclear weapons numbers and capabilities and the apparent FAS arms control objectives—which have been rejected by Russia and China. The main author of the FAS analyses, Hans Kristensen, has described his own position as favoring a "minimal" nuclear deterrence posture. He has advocated reducing the U.S. nuclear deterrent to 500 weapons, completely eliminating the U.S. submarine-launched ballistic missile force, and reducing the yield of residual U.S. nuclear weapons to three-to-10 kilotons in order to eliminate any U.S. capability against military targets. He presented this agenda as a step toward eliminating all nuclear weapons.

Repetition in the Western press of the FAS February 2022 analysis has had substantial impact on domestic political commentary and can shape congressional

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[5] Rose Gottemoeller, as quoted in, U.S. Congress, House of Representatives, *The Importance of the New START Treaty* (Washington, D.C.: Committee on Foreign Affairs, December 4, 2019), p. 61, available at https://www.congress.gov/116/meeting/house/110302/documents/CHRG-116hhrg38543.pdf.

[6] Rose Gottemoeller, *The Importance of the New START Treaty* (Washington, D.C.: House of Representatives, Committee on Foreign Affairs, December 4, 2019), p. 2, available at https://www.congress.gov/116/meeting/house/110302/witnesses/HMTG-116-FA00-Wstate-GottemoellerR-20191204.pdf.

considerations of both arms control and deterrence—which appears to rely largely on unclassified public information. A realistic presentation of likely Russian numbers, doctrine and capabilities demonstrates expanding capabilities in conformity with Russian nuclear strategy and, correspondingly, that arms control has been mainly a failure at restricting Russian nuclear warheads and constraining a dangerous Russian strategy.

The original START Treaty gave the U.S. government 15 years of technical data, missile telemetry, and cooperative measures to enhance National Technical Means of verification and a much more extensive and effective on-site inspection regime. This makes it possible for government officials to have a reasonably good understanding of the *maximum* possible number of nuclear warheads that can be deployed on the *Russian strategic nuclear missiles that are known to exist*. However, there is a serious concern about the U.S. government's ability to monitor mobile ICBM deployment because of the New START Treaty's loss of almost the entire original START Treaty's mobile ICBM verification regime, including the vital mobile ICBM production monitoring. The United States has not monitored Russian mobile ICBM production since 2009. And, after *more than* three years *without on-site inspections*, the United States likely cannot effectively monitor whether Russian ballistic missiles downloaded to comply with the New START Treaty remain downloaded or how many warheads the newly deployed missiles are carrying. Washington can have even less confidence in the size of the total Russian inventory of nuclear weapons. Despite frequent assertions to the contrary, the United States historically has dramatically *underestimated* the number of Soviet nuclear weapons.

There is simply no doubt that Russia has an arsenal of non-strategic (tactical) nuclear weapons that is much larger, much more diverse and much more capable than that of the

United States. Russia has even increased the diversity of the arsenal it inherited from the Soviet Union. Both the FAS and the U.S. government's estimates of about 2,000 Russian non-strategic nuclear warheads are likely to be much too low. Those estimates are inconsistent with the claimed Russian post-Cold War reductions, which translate into a residual force of at least 5,000 tactical nuclear weapons. They are also inconsistent with many other Russian and Western assessments of Russian non-strategic nuclear weapons numbers, which range from 3,000 to over 10,000 weapons. Russia has thousands of low-yield nuclear weapons, including advanced types of low-collateral damage nuclear weapons. Again, numbers are quite important, including because all sensor and defense systems have limits on the number of warheads they can track and engage. Numbers also are clearly relevant to target coverage, damage expectancy and the survivability of nuclear forces—all factors pertinent to U.S. deterrence considerations. For example, a vastly outnumbered U.S. non-strategic nuclear deterrent based entirely on a relatively small number of fighter aircraft is likely vulnerable to even a small preemptive Russian nuclear strike using a fraction of the likely Russian force.

It is unclear how the United States can successfully deter Russian nuclear escalation under *plausible circumstances* if Russia has such a large quantitative and qualitative advantage in non-strategic nuclear weapons. Moscow's military failures in the Ukraine war could result in Russia substituting a precision nuclear strike for conventional strikes.

Under all credible estimates, Putin's Russia is ahead of the United States in nuclear weapons numbers and in new technologies such as hypersonic missiles. In 2021, Pavel Felgenhauer wrote, "Indeed, taking into account non-strategic (tactical) nuclear weapons, which no one has ever verifiably counted, Russia may have more (maybe twice as

many overall) than all the other official or unofficial nuclear powers taken together."[7] If the high estimates of its nuclear capability are true, Russia would have an advantage of 25-to-one or more in non-strategic nuclear weapons. The uncritical repetition of the FAS claims about Russia's nuclear warhead numbers could create a false sense of comfort that is particularly dangerous under current circumstances.

The likely low and largely undocumented FAS estimates of Russian nuclear capabilities seem to coincide with its arms control agenda—even as Russia is in the process of discarding arms control treaties (e.g., New START and Conventional Forces Europe). Yet, the FAS analyses seem to promote the idea that more arms control enhances national security, irrespective of the realities of the Russian nuclear expansion and violations of existing agreements. The apparent FAS undercounting of Russian capabilities suggests a misleading picture of the actual effectiveness of agreements and obscures the long history of Soviet/Russian arms control non-compliance. Russian arms control treaty circumventions and violations do not fit into the FAS arms control advocacy—which appears to largely ignore how Russia's substantive violations likely impact force numbers. Russian arms control violations reflect the fact that it regards numbers and technical capabilities as important, but Moscow does not regard compliance with treaties to limit those capabilities and numbers as important.

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[7] Pavel Felgenhauer, "Putin Delivers More Restrained National Address as Moscow Announces Partial Troop Withdrawal," *Eurasia Daily Monitor*, Vol. 18, Iss. 65 (April 22, 2021), available at https://jamestown.org/program/putin-delivers-more-restrained-national-address-as-moscow-announces-partial-troop-withdrawal/.

Chapter 1
Introduction

Today, the United States and the West in general face a "new normal," one in which Russia uses a broad range of nuclear threats on a regular basis in pursuit of its aggressive war aims in Ukraine. As *The Washington Post* has reported, "Russia's president has been warning of nuclear consequences with increasing intensity since the first week of his war in Ukraine—when he put his arsenal on higher alert. Now he is threatening to use nuclear weapons to defend the Ukrainian territory that Russia has illegally annexed."[1] In May 2023, writing in *Foreign Affairs*, Professor Dmitry Adamsky pointed out, "For decades, nuclear weapons have been central to Russian national security and to the population's collective mentality. The country's arsenal is the world's largest… It is diverse, with thousands of large nuclear weapons designed to level cities and thousands of smaller tactical ones theoretically built for the battlefield."[2]

Russian nuclear threats are not new, but the extreme nature of the current ones is new.[3] Putin's Deputy Chair of the Russian National Security Council (and former

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[1] Karoun Demirjian, "Here are the Nuclear Weapons Russia has in its Arsenal," *The Washington Post*, October 6, 2022, available at https://www.washingtonpost.com/world/2022/10/05/russia-nuclear-weapons-military-arsenal/.

[2] Dmitry Adamsky, "Russia's New Nuclear Normal: How the Country Has Grown Dangerously Comfortable Brandishing Its Arsenal," *Foreign Affairs*, May 19, 2023, available at https://www.foreignaffairs.com/russian-federation/russias-new-nuclear-normal.

[3] Mark B. Schneider, "Russian Use of Nuclear Coercion against NATO and Ukraine" (Fairfax, VA: National Institute for Public Policy, May 2, 2022), *Information Series*, No. 521, available at https://nipp.org/information_series/mark-b-schneider-russian-use-of-nuclear-coercion-against-nato-and-ukraine-no-521-may-2-2022/.

President) Dmitri Medvedev has declared, "The Donbas (Donetsk and Luhansk) republics and other territories will be accepted into Russia… Russia has announced that not only mobilisation capabilities, but also any Russian weapons, including strategic nuclear weapons and weapons based on new principles, could be used for such protection."[4] Even with the enormous cost of his war against Ukraine, President Putin in his December 21, 2022 meeting with Russia's Defense Ministry Board declared, "We will continue equipping our strategic forces with the latest weapon systems. Let me repeat that we will carry out all of our plans."[5] Moreover, the Biden Administration has warned, "Our competitors and potential adversaries are investing heavily in new nuclear weapons," and, as a result of its war with Ukraine, Russia, "…will likely increase Moscow's reliance on nuclear weapons in its military planning."[6]

Comparisons between the number of Russian nuclear weapons and those of the United States have been subjected to considerable press discussion since the start of the Ukraine crisis. Organizations such as the left-of-center Federation of American Scientists (FAS) create the illusion that they can present the number of Russian nuclear warheads with precision and confidence, despite the fact that they cite almost no sources for their numbers and appear to consistently underestimate the delivery capability of the new and modernized Russian strategic missiles.

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[4] "Russia's Medvedev: New Regions can be Defended with Strategic Nuclear Weapons," *Reuters*, September 22, 2022, available at https://www.reuters.com/world/europe/russias-medvedev-strategic-nuclear-weapons-can-be-used-defend-new-regions-2022-09-22/.

[5] "Meeting of Defence Ministry Board," *Kremlin.ru*, December 21, 2022, available at http://en.kremlin.ru/events/president/news/70159.

[6] The White House, *National Security Strategy* (Washington, D.C.: The White House, October 2022), pp. 21, 26, available at https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf.

If one did a Google search in 2022 on this issue, one would likely be informed that Russia has 5,977 nuclear weapons, including 1,912 non-strategic nuclear weapons.[7] These numbers typically are derived from the commonly cited FAS analyses of Russian force numbers. It is fair to say that the probability that either of these numbers is correct is very low. It is possible that Russia has about 6,000 nuclear weapons, but it is also possible Russia has about 12,000, and that there exists a particularly large disparity in the given number of Russian non-strategic nuclear weapons presented and the reality of Moscow's arsenal. A serious look at the analysis that produced the numbers 5,977 and 1,912 creates doubts concerning what the February 2022 FAS numbers actually represent, and their accuracy. Moreover, the assumed accuracy of these numbers appears now as being worked into policy recommendations for handling the Russian aggression against Ukraine.[8] While Putin must be defeated in Ukraine, the United States should not deceive itself about the nuclear imbalance in non-

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[7] "Status of World Nuclear Forces," *Federation of American Scientists*, accessed 2022, available at https://fas.org/issues/ nuclear-weapons/status-world-nuclear-forces/; Demirjian, "Here are the Nuclear Weapons Russia has in its Arsenal," op. cit.; "What Nuclear Weapons does Russia have, What Damage could they Cause, and could they Reach the UK?," *Sky News*, October 7, 2022, available at https://news.sky.com/story/what-nuclear-weapons-does-russia-have-what-damage-could-they-cause-and-could-they-reach-the-uk-12554087; and, Theodore Bunker, "Defense Policy Expert: China's CCP Believes It Can Win Nuclear War," *Newsmax*, December 9, 2022, available at https://www.newsmax.com/newsfront/china-nuclear-weapons-ccp/2022/12/09/id/1099851/.

[8] Max Boot, "The U.S. is a lot stronger than Russia. We should act like it," *The Washington Post*, July 27, 2022, available at https://www.washingtonpost.com/opinions/2022/07/27/ukraine-win-war-us-stronger-weapons-russia/; "Putin Threats: How many Nuclear Weapons does Russia have?," *BBC*, October 7, 2022, available at https://www.bbc.com/news/world-europe-60564123; and, "Russia Country Spotlight," *NTI*, accessed 2022, available at https://www.nti.org/countries/russia/.

strategic nuclear weapons that Washington has allowed to develop. Putin's threats to use nuclear weapons regionally cannot be ignored and Washington should maximize its deterrent against this eventuality.[9]

No open source estimate (all of which are subject to a significant margin of uncertainty) reflects anywhere near the level of accuracy that is repeated in the media, which almost always ignores assessments other than those of the FAS. It is doubtful that exact numbers exist anywhere outside of the Russian Defense and Atomic Energy Ministries; Russia is very secretive about its nuclear weapons numbers. There are legitimate concerns about the ability of even the United States government to make credible assessments in light of: 1) the politics of nuclear weapons and arms control; 2) the retirement of Soviet-era analysts; and, 3) the cut in the U.S. government's analytical capability during the Bush Administration as resources were shifted to the fight against terrorism.

Until the Clinton Administration in the late 1990s, the U.S. government kept the public reasonably well-informed about the nature of the Soviet/Russian nuclear threat. This usually included a full chapter in the annual report of the Secretary of Defense to the U.S. Congress on Soviet/Russian strategic nuclear forces, in addition to some treatment of Soviet/Russian non-strategic or tactical nuclear forces.[10] In the 1980s, the annually published *Soviet Military Power* report provided substantial coverage of Soviet nuclear

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[9] Mark B. Schneider, "Dealing With Vladmir Putin's Nuclear Crisis – The Case for Maximum Deterrence," *Real Clear Defense*, November 17, 2022, available at https://www.realcleardefense.com/articles/2022/11/17/dealing_with_vladmir_putins_nuclear_crisis__the_case_for_maximum_deterrence_865351.html.

[10] The Historical Office of the Office of the Secretary of Defense has conveniently posted all of these reports from FY 1969 to FY 2005, available at https://history.defense.gov/Historical-Sources/Secretary-of-Defense-Annual-Reports/.

programs. This does not mean that these reports were always correct, but they made an effort to be accurate and forthcoming. During the late Clinton Administration and throughout much of the George W. Bush Administration, the amount of information released to the public on an annual basis concerning Russian nuclear weapons programs declined to essentially zero. After the publication of the 2002 Secretary of Defense's annual report to the Congress, which declared "Russia is no longer an enemy…,"[11] the Bush Administration said essentially nothing about the Russian nuclear threat until September 2008 when the Department of Energy (DOE) and the Department of Defense (DoD) published a joint monograph on nuclear weapons which contained less than a page (356 words) on the Russian nuclear threat.[12] This, in some areas, still represents the most detailed treatment by DoD to date—with the exception of the 2018 *Nuclear Posture Review* report, which took a serious look at nuclear deterrence, released some information about Russian capabilities that was not previously available in public sources, and discussed the implications of the new low-yield Russian nuclear weapons.[13]

The Obama Administration's 2010 *Nuclear Posture Review Report* contained almost nothing concerning the size,

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[11] Donald H. Rumsfeld, *Annual Report to the President and the Congress* (Washington, D.C.: Department of Defense, 2002) p. 83, available at https://history.defense.gov/Portals/70/Documents/annual_reports/2002_DoD_AR.pdf?ver=2014-06-24-153732-117.

[12] U.S. Department of Energy and U.S. Department of Defense, *National Security and Nuclear Weapons in the 21st Century* (Washington, D.C.: U.S. Department of Defense, September 2008), pp. 7-8, available at https://dod.defense.gov/Portals/1/Documents/pubs/nuclearweaponspolicy.pdf.

[13] U.S. Department of Defense, *Nuclear Posture Review* (Washington, D.C.: Department of Defense, 2018), available at https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF.

characteristics and development of the Russian nuclear force.[14] In November 2011, in congressional testimony, then Principal Deputy Under Secretary of Defense for Policy Dr. James Miller stated that, "Unclassified estimates suggest that Russia has 4,000 to 6,500 total nuclear warheads, of which 2,000 to 4,000 are tactical nuclear warheads."[15] This was a very unusual formulation for a senior government official. Were these numbers declassified U.S. estimates or something else, and, if so, what were they? A few months later, senior Obama Administration officials used the same numbers but characterized them as what the United States believed Russia "approximately" had.[16] After this time frame, there appears to be no new official U.S. estimate of the total size of the Russian nuclear force.

Where did these numbers come from? Apparently, the only reference to 2,000-4,000 Russian non-strategic nuclear weapons before Dr. Miller's testimony was a statement by the head of the non-governmental Arms Control Association who, in August 2010, said that, "There are various independent estimates that put the total number of

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[14] U.S. Department of Defense, *The Nuclear Posture Review Report* (Washington, D.C.: U.S. Department of Defense, April 2010), available at https://dod.defense.gov/Portals/1/features/defenseReviews/NPR/2010_Nuclear_Posture_Review_Report.pdf.

[15] James Miller, as quoted in, U.S. House of Representatives, *The Current Status and Future Direction for U.S. Nuclear Weapons Policy and Posture* (Washington, D.C.: Armed Services Committee, Subcommittee on Strategic Forces, November 2, 2011), available at https://www.govinfo.gov/content/pkg/CHRG-112hhrg71527/html/CHRG-112hhrg71527.htm.

[16] Madelyn Creedon and Andrew Weber, *Joint Statement for the Record* (Washington, D.C.: United States Senate, Senate Armed Services Committee, March 28, 2012), p. 3, available at https://www.armed-services.senate.gov/imo/media/doc/Creedon-Weber%2003-28-121.pdf.

Russian tactical nuclear weapons around 2,000 to 4,000."[17] It would appear that the implied ~2,500 strategic nuclear weapons in Dr. Miller's statement were a combination of the 1,566 declared Russian Treaty accountable warheads on September 1, 2011[18] and the known delivery capability of Russian heavy bombers.[19]

It must be noted that, absent serious documentation, one must be cautious about accepting claims about Russian force numbers from arms control advocacy groups; they have a vested interest in minimizing perceptions of Russian nuclear force numbers and the aggressive character of Russian nuclear doctrine. These groups tend to advocate for any and all nuclear arms control proposals and agreements, including those that do not limit non-strategic or tactical nuclear weapons. Hans Kristensen, the main author of the FAS numbers (5,977 and 1,912), generally cited in 2022 in the West as factual, described his own position as "minimal deterrence."[20] Mr. Kristensen defined his preferred "minimal deterrence" posture as: 1) the reduction of the U.S. nuclear deterrent to 500 nuclear weapons; 2) the

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[17] "Short-Range Nuclear Weapons Not Part of New START Treaty," *VOA News*, August 10, 2010, available at https://www.voanews.com/a/short-range-nuclear-weapons-not-part-of-new-start-treaty-100463824/170167.html.

[18] U.S. Department of State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," *State.gov*, October 25, 2011, available at https://2009-2017.state.gov/t/avc/rls/176096.htm.

[19] The nuclear warhead delivery capability of all existing types of heavy bombers was documented in the Memorandum of Understanding of the START II Treaty (which never entered into force). See "Treaty Between the United States of America and the Russian Federation on Further Reduction and Limitation of Strategic Offensive Arms (START II)," *State.gov*, January 3, 1993, available at https://2009-2017.state.gov/t/avc/trty/102887.htm#mou.

[20] Hans M, Kristensen, Robert S. Norris, and Ivan Oelrich, *From Counterforce to Minimal Deterrence* (Washington, D.C.: Federation of American Scientists, April 2009), Occasional Paper No. 7, available at https://nuke.fas.org/norris/nuc_10042901a.pdf.

complete elimination of U.S. ballistic missile submarines; and, 3) that all "…existing warheads should carry inert secondaries, limiting their yields to ten or so kilotons and, when possible, the primary should be unboosted, limiting their yield to a few kilotons."[21] Even U.S. government officials generally do not relish trying to obtain Senate ratification of a nuclear arms control agreement in the context of public recognition of a massive Russian non-strategic nuclear advantage.

The entire range of the Obama Administration's 2011 reported numbers may have been below the actual Russian count in late 2011. In October 2011, former Undersecretary of State, Ambassador Robert Joseph, wrote that "a key Obama adviser" said that Russia had between 3,500 and 4,000 tactical nuclear weapons and that "in 2009 the congressional Strategic Posture Commission estimated the Russian operational-warhead inventory in 2009 to be 7,900."[22] As for Russian open sources, in April 2011, Russian Colonel General (ret.) Viktor Yesin, a well-connected former Chief of Staff of the Strategic Missile Forces, stated that estimates of the Russian tactical nuclear stockpile ranged from "tens of thousands to 4,000 - 4,500."[23] Russian sources frequently report much higher numbers than those which circulate in the Western media. While much of the Western media seem to believe that Russia has exactly 1,912 non-strategic nuclear weapons, noted Russian journalist Pavel Felgenhauer has said that estimates of Russia's non-strategic nuclear weapons range between several thousand

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[21] Ibid., pp. 41, 43-44.

[22] Robert G. Joseph, "Second to One," *National Review*, October 17, 2011, available at https://www.nationalreview.com/2012/07/second-one-robert-g-joseph/.

[23] "Moscow, Washington Must Demonstrate Openness Regarding Nuclear Potentials – Expert," *Interfax*, April 18, 2011, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=31236848.

to over 10,000.[24] In October 2022, *The Washington Post* accurately observed that the, "Full tally of Russia's nuclear arsenal is difficult to come by," but failed to mention any of the higher-than-usual estimates of Russian numbers.[25]

Probably the most detailed treatment concerning Russia's strategic nuclear weapons programs during the Obama Administration occurred in 2012 when then Assistant Secretary of Defense Madelyn Creedon stated Russia would deploy "…several substantially MIRVed new strategic missiles, including the MIRVed Yars ICBM, new Borey-class missile submarines carrying 16 MIRVed Bulava SLBMs, and, in the event it is deployed during the life of the [New START] Treaty, a planned new 'heavy' ICBM to replace the SS-18 that will almost certainly carry several MIRVs."[26] While helpful, this description of Russian capabilities was significantly less informative than what appeared in the Russian press at the time. For example, it was reported that the new heavy Russian ICBM (later named the Sarmat) could carry not "several," but 10 heavy or 15 medium nuclear warheads.[27] Moreover, these numbers were for the then-planned 100-ton version of the missile, not the current, much more capable, reported 200-

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[24] Pavel Felgenhauer, "Kremlin Overrules Own Defense and Foreign Policy Establishment on Arms Control," *Eurasia Daily Monitor*, Vol. 17, Iss. 149, October 22, 2020, available at https://jamestown.org/program/kremlin-overrules-own-defense-and-foreign-policy-establishment-on-arms-control/.

[25] Demirjian, "Full tally of Russia's nuclear arsenal difficult to come by," op. cit.

[26] Madelyn Creedon, *Statement of Ms. Madelyn Creedon, Assistant Secretary of Defense for Global Strategic Affairs* (Washington, D.C.: Senate Foreign Relations Committee, June 21, 2012) p. 5, available at http://www.foreign.senate.gov/imo/media/doc/Madelyn_Creedon_Testimony.pdf.

[27] Mark B. Schneider, "The State of Russia's Strategic Forces," *Defense Dossier*, Iss. 12 (October 2014), p. 14, available at https://www.afpc.org/uploads/documents/defense_dossier_october_2014.pdf.

ton version of the Sarmat.[28] In December 2019, *RT* (Russian state media) said, "According to the Ministry of Defense, 'Sarmat' will be able to carry up to 20 warheads of small, medium, high power classes." [29]

The Biden Administration's 2022 *Nuclear Posture Review* report contained very little information concerning the size and characteristics of Russia's nuclear capability. It provided no information on the total size of the Russian nuclear arsenal and expansion plans, repeating only the New START limit on deployed warheads counted under the Treaty, without noting the fact that bomber nuclear weapons are hardly counted at all under New START;[30] and, it described the Russian non-strategic nuclear force as up to 2,000 weapons and expanding.[31] At the December 2022 STRATCOM change of command ceremony, Secretary of Defense Lloyd Austin stated, "Russia is also modernizing

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[28] See, "Russia begins tests of promising Sarmat missile complex," *TASS*, March 1, 2018, available at https://tass.com/defense/992191; see also, "Russian Missile Designer Reviews Arguments Over Liquid, Solid Fuel Missiles," *Nezavisimoye Voyennoye Obozreniye Online*, July 15, 2011, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=39793684; "Putin says Sarmat system to enter operational service in 2020," *TASS*, May 18, 2018, available at https://tass.com/defense/1005163; and, "Russia begins tests of promising Sarmat missile complex," *TASS*, March 1, 2018, available at https://tass.com/defense/992191.

[29] "Guaranteed defeat of enemy infrastructure: how the Sarmat ballistic missile will enhance the combat potential of the Strategic Missile Forces," *RT*, December 16, 2019, available at https://russian.rt.com/russia/article/698699-sarmat-raketa-rvsn-perevooruzhenie.

[30] U.S. Department of State, "The New START Treaty," *State.gov*, no date, available at https://www.state.gov/new-start/.

[31] *2022 Nuclear Posture Review*, in the *2022 National Defense Strategy of the United States of America, Including the 2022 Nuclear Posture Review and the 2022 Missile Defense Review* (Washington, D.C.: U.S. Department of Defense, 2022), p. 4, available at https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF.

and expanding its nuclear arsenal."[32] Again, no specifics were made available to the public.

Open source assessments of Russian nuclear capability are hampered by the loss of the extensive data that were previously available to the public in the original 1991 START Treaty data exchanges, which expired in 2009. According to Mr. Kristensen, "The START treaty provided the public with detailed overviews of U.S. and Russian strategic nuclear forces."[33] Under the New START Treaty, the Department of State releases only three numbers with no details: 1) the number of deployed ICBMs, deployed SLBMs, and deployed heavy bombers; 2) the number of counted warheads on deployed ICBMs and deployed SLBMs, and the number of warheads attributed to deployed heavy bombers; and, 3) the number of deployed and non-deployed launchers of ICBMs, SLBMs, and heavy bombers.[34] When he discovered the limited information that would be made public under the New START Treaty, Russian expatriate and arms control enthusiast Pavel Podvig declared, "This is an absolutely scandalous (as in disgraceful, shameful, outrageous, shocking, infamous, ignominious, flagrant) policy and I certainly hope that the arms control community will work to make the U.S.

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[32] Idrees Ali, "Russia is Expanding its Nuclear Arsenal, U.S. Defense Secretary Says," *Reuters*, December 9, 2022, available at https://www.reuters.com/world/russia-is-expanding-its-nuclear-arsenal-us-defense-secretary-says-2022-12-09/.

[33] Hans M. Kristensen, "New START Data Exchange: Will it Increase or Decrease International Nuclear Transparency?," *Federation of American Scientists*, March 22, 2011, available at https://fas.org/publication/startexchange/.

[34] U.S. Department of State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," *State.gov*, September 1, 2022, available at https://www.state.gov/new-start-treaty-aggregate-numbers-of-strategic-offensive-arms-4/.

administration to rescind it."[35] How he expected the Obama Administration to rescind a legally binding treaty provision that it had negotiated was not explained.

The 2009 demise of the original START Treaty ended the era of being able to "look up" a threat assessment for Russian strategic nuclear forces. The START Treaty data were not perfect, but for most purposes they were reasonably good and far superior to what followed under the New START Treaty. Toward the end of the START Treaty, some of the Russian numbers appear not to have reflected actual operational systems, but it was possible to adjust these numbers by taking into account Russian press reporting. Russia was a much freer country in 2009 with much more open press reporting on this subject.

However, the further into the past the START Treaty recedes, the less relevant its data are to current estimates. Russian strategic nuclear missiles today are increasingly not those that existed under the START Treaty, and they are much more capable. According to Russian Defense Minister General of the Army Sergei Shoigu, Russia has modernized 91.3 percent of its strategic nuclear forces.[36] The new and modernized systems frequently are depicted in the Russian media as having the ability to carry many more warheads than the missiles they replace.[37] It is useful that data on

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[35] Pavel Podvig, "Where is the New START Data?" *Russian Strategic Nuclear Forces*, March 28, 2011, available at https://russianforces.org/blog/2011/03/where_is_the_new_start_data.shtml.

[36] Sergei Shoigu, as quoted in, "Meeting of Defence Ministry Board," *Kremlin.ru*, December 21, 2022, available at http://www.en.kremlin.ru/events/president/news/70159.

[37] Mark B. Schneider, *Russia Growing Strategic Nuclear Forces and New START Treaty Compliance* (Fairfax, VA: National Institute for Public Policy, June 21, 2016), No. 407, available at https://nipp.org/informationseries/schneider-mark-russias-growing-strategic-nuclear-forces-and-new-start-treaty-compliance-information-series-no-407/; and, Mark B. Schneider, *Russian Violations of the INF and New START Treaties* (Fairfax, VA: National Institute for Public Policy,

some of the new Russian strategic systems were incorporated into the START database before it expired, but even these are of declining value. For example, data on the new Bulava-30 SLBM were put into the START Treaty data base while it was in effect. This provided the United States with information on the throw-weight of the missile and the number of warheads it carried (or at least what it carried when it was declared).[38] It also has implications for the assessment of the multiple warhead Russian Yars ICBM. However, in May 2023, the Commander of Russia's Navy announced the development of a follow-on to the Bulava-30, giving little information about it.[39]

The data declarations in the original START Treaty were in the context of a verification regime that was vastly better than what exists under the New START Treaty. Moreover, the New START Treaty did not require that data with regard to launch-weight, throw-weight and warhead numbers on new ICBMs and SLBMs or variants of older types be shared even without release to the public.[40] In the

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August 15, 2016), No. 410, available at https://nipp.org/informationseries/schneider-mark-russian-violations-of-the-inf-and-new-start-treaties-information-series-no-410/.

[38] Pavel Podvig, "How Many Warheads?," *Russian Strategic Nuclear Forces*, May 17, 2007, available at https://russianforces.org/blog/2007/05/how_many_warheads.shtml.

[39] Isabel Van Brugen, "Russia Creating Unstoppable Submarine Nuclear Missiles—Report," *Newsweek*, May 15, 2023, available at https://www.newsweek.com/russia-new-unstoppable-intercontinental-ballistic-missile-submarine-navy-1800313.

[40] New START Working Group, "An Independent Assessment of New START," *The Heritage Foundation*, April 30, 2010, available at https://www.heritage.org/arms-control/report/independent-assessment-new-start; The New START Working Group, "New START: Potemkin Village Verification," *The Heritage Foundation*, June 24, 2010, available at https://www.heritage.org/arms-control/report/new-start-potemkin-village-verification; Mark B. Schneider, *New START: The Anatomy of a Failed Negotiation* (Fairfax VA: National Institute Press, July 2012), p. 45, available at http://www.nipp.org/wp-content/uploads/2014/12/New-start.pdf; and, James Woolsey, "Old

public domain, there exists Russia's declared START Treaty data on the single warhead version SS-27 Mod 1 (Russian name Topol M Variant 2.)[41] This allows a reasonable extrapolation of the approximate maximum warhead delivery potential of the MIRVed version of this missile – the SS-27 Mod 2/RS-24 Yars. The Yars was never declared under the START Treaty, probably because that Treaty prohibited putting multiple warheads on a missile (the SS-27 Mod 1) which had been declared to be a single warhead missile.[42] Again, with the passage of time, improved versions can alter the originally declared START Treaty data. For example, the newer Yars-S reportedly carries "medium yield" MIRVed warheads compared to the earlier "small power" warheads.[43] Moreover, in May 2023, Russian media reported the near-term deployment of the Yars-M, a missile with significant propulsion improvements and replacement of the post-boost vehicle with a reported unique system of multiple third stages.[44]

Problems with New START," *The Wall Street Journal*, November 15, 2010, available at https://www.wsj.com/articles/SB10001424052748703514904575602992172574172.

[41] Ibid. A summary of the last Russian START Treaty data is available at U.S. Department of State, "START I Aggregate Number of Strategic Offensive Arms," *State.gov*, October 1, 2009, available at https://2009-2017.state.gov/t/avc/rls/130149.htm.

[42] Mark B. Schneider, "Russia Cheats," *Air Force Magazine*, July 2016, p. 40, available at https://www.airandspaceforces.com/PDF/MagazineArchive/Magazine%20Documents/2016/July%202016/0716russia.pdf.

[43] "Russian paper discusses nuclear missile force upgrade plans," *BBC Monitoring Former Soviet Union*, January 8, 2021, available at https://dialog.proquest.com/.

[44] Thomas Newdick, "Russia To Get Yars-M Ballistic Missiles With Novel Warhead Delivery System: Reports," *The Drive*, May 16, 2023, available at https://www.thedrive.com/the-war-zone/russia-to-get-yars-m-ballistic-missiles-with-novel-warhead-delivery-system-reports.

During the Cold War, the United States put a great deal of effort into collecting and analyzing information about Soviet strategic nuclear forces. U.S. understanding of the technical characteristics of Russian missiles (if you compare *Soviet Military Power*[45] data on Soviet missiles with the START Treaty MOU data on the same Soviet missiles[46]) was not perfect but appears generally to have been fairly good. Washington had a reasonable understanding of Soviet nuclear weapons technology until Moscow ceased testing in the atmosphere. And, the United States understood the offensive nature of the Warsaw Pact war plan. What Washington appears to have missed during the Cold War, however, was also very important. The United States seems to have massively underestimated the number of nuclear weapons and the quantity of fissile material the Soviets had amassed in the late Cold War period. It appears to have missed the fact that Moscow planned on the large-scale first use of nuclear weapons to support the rapid advancement of the Red Army into NATO territory.[47] The United States

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[45] The Strategic Forces section from the editions of *Soviet Military Power* from 1983 to 1989 are posted by the Federation of American Scientists at https://irp.fas.org/dia/product/smp_index.htm. The original START Treaty database, which dates from 1990, is available in U.S. Department of State, "START Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms Signed in Moscow July 31, 1991," *State.gov*, July 31, 1991, available at https://2009-2017.state.gov/t/avc/trty/146007.htm.

[46] Ibid., pp. 208-214. Updated START MOU data were never posted by the Department of State but they were available on request. The Department of State did publish summaries of undated Russian data. The last data were published in U.S. Department of State, "START Aggregate Numbers of Strategic Offensive Arms," *State.gov*, April 1, 2009, available at https://2009-2017.state.gov/t/avc/rls/121027.htm.

[47] "Soviets Planned Nuclear First Strike to Preempt West, Documents Show," *National Security Archive*, May 13, 2005, available at https://nsarchive2.gwu.edu/NSAEBB/NSAEBB154/index.htm; and, "This Is How the World Could Have Ended - World War III would have kicked off with hundreds of nukes," *Medium.com/War is Boring*, January

also apparently missed growing Soviet interest in low-yield nuclear weapons and low-yield nuclear testing.

In the early post-Cold War period, Russia's Minister for Atomic Energy Viktor Mikhaylov disclosed that the Soviet nuclear weapons stockpile peaked in 1986 at 45,000 nuclear weapons.[48] William Broad of *The New York Times* reported that this was "…12,000 more than generally believed and twice the number held by the United States at the time… Surprisingly large, the 45,000 number rivals what Western analysts had previously thought to be the size of [the] world's combined nuclear arsenals at their apex—50,000 weapons spread among the Soviet Union, the United States, France, Britain, China and Israel."[49] In 2014, the late Colonel (ret.) Richard Hawkins of the Los Alamos National Laboratory, in an important article, wrote that the 45,000 number "was 17,000 warheads above estimates developed by the U.S. intelligence community (IC) at the time."[50] Dr. Phil Karber, President of the Potomac Foundation, says the underestimate was 20,000.[51] Information released by the Biden Administration in 2021, when compared to the Soviet number for 1986, indicates that the Soviets had achieved

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14, 2014, available at https://medium.com/war-is-boring/this-is-how-the-world-could-have-ended-1ecd1db17ff2.

[48] William J. Broad, "Russian Says Soviet Atom Arsenal Was Larger Than West Estimated," *The New York Times*, September 26, 1993, available at https://www.nytimes.com/1993/09/26/world/russian-says-soviet-atom-arsenal-was-larger-than-west-estimated.html.

[49] Ibid.

[50] Houston T. Hawkins, *Rethinking the Unthinkable* (Los Alamos, NM: Los Alamos National Laboratory, July 23, 2014), p. 8, available at https://www.osti.gov/biblio/1148302.

[51] Phillip A. Karber, "Deterrence—Then & Now, European–American Workshop on: Lessons from the Cold War in Europe For Future Stability in Asia," June 7, 2013, mimeo.

almost a two-to-one advantage in warhead numbers in 1986.[52]

Mr. Broad reported that Minister Mikhaylov also indicated that Russia had 1,200 tons of highly enriched uranium, "more than twice as large as commonly believed" and "1.5 to 1.7 times greater than the combined stores of all other countries. …"[53] Admiral (ret.) Bobby Ray Inman, former Director of the National Security Agency, linked the size of the Soviet stockpile to Soviet nuclear strategy: "The large numbers lead you to worry that some of the planners may have had a first strike in mind—using large numbers of weapons and having large numbers in reserve."[54] This is still relevant today because Soviet thinking is still the role model for Putin's military and, to the extent that they can, they are copying its resulting programs. The new Russian Sarmat heavy ICBM is a classic example of Soviet Cold War thinking.

Mr. Broad pointed out that the Reagan Administration's Secretary of Defense, Caspar Weinberger (who had access to the relevant classified information), once said that Russia had 46,000 nuclear weapons.[55] This number, however, as suggested in Col. Hawkins' quote (above) is significantly higher than the usual U.S. estimates in public statements.[56] Evidence of the size and scope of the Soviet nuclear arsenal that must have existed frequently seems to have been

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[52] "U.S. Department of State, Transparency in the U.S. Nuclear Weapons Stockpile (Washington, D.C.: Department of State, October 5, 2021), available at https://www.state.gov/wp-content/uploads/2021/10/Fact-Sheet_Unclass_2021_final-v2-002.pdf.

[53] Broad, "Russian Says Soviet Atom Arsenal Was Larger Than West Estimated," op. cit.

[54] Ibid.

[55] Ibid.

[56] Christopher Drew, "CIA Director Warns of Soviet Nuclear 'Brain Drain,'" *Chicago Tribune*, January 16, 1992, available at https://www.chicagotribune.com/news/ct-xpm-1992-01-16-9201050368-story.html.

largely ignored. The seeming confusion with regard to Moscow's actual nuclear forces numbers appears to endure.

There were "colossal difficulties" in collecting intelligence concerning the Soviet empire during the Cold War.[57] After the Cold War, the U.S. analytical capability against Russia considerably eroded. *Politico* pointed this out and quoted Bob Baer, reportedly formerly of the CIA, as saying, "They stopped spying on Russia."[58] This seems to have made a bad situation worse. After the bomber and missile gap episodes in the 1950s, and after the development of satellites dramatically improved the U.S. ability to assess Soviet strategic nuclear forces, Washington continued to underestimate the growth of Soviet nuclear capabilities. Dr. Albert Wohlstetter, one of the great post-World War II theorists of nuclear strategy, documented beyond any doubt the U.S. 1960s underestimates of the projected growth in Soviet nuclear forces, which probably reflected an unwillingness to accept that Moscow was pursuing a dramatically different and more aggressive policy on nuclear weapons. As former Assistant Secretary of Defense Richard Perle later wrote, Wohlstetter "…demonstrated that U.S. and Soviet strategic weapons programs were largely independent of each other and that American nuclear weapons had peaked 15 years earlier and had been declining ever since, even as Soviet programs had expanded significantly."[59] Indeed, a now declassified study by the

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[57] Calder Walton, "Can Intelligence Tell How Far Putin Will Go?," *War on the Rocks*, February 28, 2022, available at https://warontherocks.com/2022/02/lessons-of-cold-war-intelligence-for-ukraine-today/.

[58] Burgess Everett and Josh Gerstein, "Why Didn't the U.S. Know Sooner?," *Politico*, March 4, 2014, available at https://www.politico.com/story/2014/03/united-states-barack-obama-ukraine-crimea-russia-vladimir-putin-104264.

[59] Richard Perle, "The Arms Race Myth, Again," *American Enterprise Institute*, March 3, 2008, available at https://www.aei.org/articles/the-arms-race-myth-again/.

Central Intelligence Agency generally acknowledged the accuracy of the Wohlstetter assessment.[60] A 1986 book by the Consortium for the Study of Intelligence documented underestimates continuing through the mid-1980s.[61]

Mr. Broad also reported that, in 1992, the size of the Russian nuclear stockpile immediately following the demise of the Soviet Union was 32,000 nuclear warheads.[62] This is important because Russia has made many claims about the size of its current non-strategic or tactical nuclear weapons stockpile by comparing the existing number to the late Soviet number. The availability of public information concerning Russian non-strategic nuclear forces is less than what exists for the strategic forces because Russian officials do not speak about Russia's non-strategic nuclear weapons nearly as much as they do about Russia's strategic nuclear weapons. (It also appears that some of the most extreme underestimates of Soviet capabilities were in non-strategic weapons.) A January 2001 report the Clinton Administration published just before it left office roughly confirmed the 32,000 number. It said that in December 2000 the Russian stockpile "was estimated to be well under 25,000 warheads, a reduction of over 11,000 since the elimination began in 1992."[63] This likely was not intended

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[60] Central Intelligence Agency, *Wohlstetter, Soviet Strategic Force, And National Intelligence Estimates* (Washington, D.C.: Central Intelligence Agency, date unknown, approved for release on April 18, 2005), available at https://www.cia.gov/readingroom/document/cia-rdp83m00171r001600010001-9.

[61] Mark. B. Schneider, "Intelligence in the Formulation of Defense Policy," in Roy Godson, ed., *Intelligence Requirements for the 1980's – Intelligence and Policy* (Lexington, MA.: Lexington Books, 1986), pp. 55-76.

[62] Broad, "Russian Says Soviet Atom Arsenal Was Larger Than West Estimated," op. cit.

[63] U.S. Department of Defense, *Proliferation: Threat and Res*ponse (Washington, D.C.: Office of the Secretary of Defense, January 2001), p. 55, available at https://irp.fas.org/threat/prolif00.pdf.

to educate the public on the Russian nuclear threat, but instead to foster support for funding U.S. assistance programs aimed at preventing the proliferation of Russian nuclear weapons.

Today, Washington probably knows less about the scope of deployed Russian strategic nuclear warheads than it did at the end of the Cold War. Washington has declared Russia to be in violation of the New START Treaty by denying U.S. Treaty rights to conduct on-site inspections.[64] The New START Treaty verification regime, such as it is, depends critically on on-site inspections. According to former Under Secretary of State Rose Gottemoeller, who negotiated the New START Treaty, "…we discarded the counting rules in favor of confirming declared warheads on the front of missiles *through reciprocal inspections*; in fact, we did not need telemetry measures to confirm compliance with the warhead limits in the new treaty…"[65] Attribution rules are the counting rules that allow information from National Technical Means (NTM) of verification to determine the number of Treaty *accountable* weapons. It says that deployed missiles of each type are counted as carrying a specific number of warheads and they cannot carry more. START Treaty on-site inspections were designed to assure that they did not carry more.[66] The information available to the public today, which is mainly from Russian sources,

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[64] Ellen Mitchell, "US Accuses Russia of Violating Major Nuke Treaty," *The Hill*, January 31, 2023, available at https://thehill.com/policy/defense/3838195-us-accuses-russia-of-violating-major-nuke-treaty/.

[65] Rose Gottemoeller, "The New START Verification Regime: How Good Is It?," *Bulletin of the Atomic Scientists*, May 21, 2020. (Emphasis added.) Available at https://thebulletin.org/2020/05/the-new-start-verification-regime-how-good-is-it/.

[66] Mark B. Schneider, "The Iron Pyrite Standard of Arms Control," *Real Clear Defense*, March 27, 2021, available at https://www.realcleardefense.com/articles/2021/03/27/the_iron_pyrite_standard_of_arms_control_770088.html.

only allows calculation of the maximum reasonable warhead numbers for known Russian missile types. Absent on-site inspections, there is little or no ability to verify Russia's numbers; on September 1, 2022, they were reported by Moscow to be just one warhead below the Treaty limit.[67]

According to Rose Gottemoeller, it is possible to verify Russian New START compliance with the twice annual data exchanges (which were lost in 2023 when Putin "suspended" the New START Treaty) and NTM of verification.[68] If NTM-derived data could verify the number of nuclear warheads deployed on Russian missiles *without* attribution rules, the United States would not have needed on-site inspections in the START and INF Treaties—which it demanded for both. It was not exactly easy to get the Soviets to accept this verification regime requirement. Unless one wants to believe in the honesty of Russia's declared data, more than three years without inspections is roughly equivalent to having no verifiable treaty constraints on Russia. The reason for this will be discussed later in this study, but the short explanation is: 1) the legs of the nuclear Triad can be uploaded in "weeks, months and years";[69] and, 2) there have been no on-site inspections since March 2020.[70] And, Russia's MIRVed mobile ICBMs should

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[67] The Ministry of Foreign Affairs of the Russian Federation, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," *MID.ru*, October 13, 2022, available at https://www.mid.ru/en/foreign_policy/international_safety/1833766/.

[68] Rose Gottemoeller, "Resuming New START Inspections Must be a Critical Goal of Upcoming US-Russia Talks," *Bulletin of the Atomic Scientists*, November 23, 2022, available at https://thebulletin.org/2022/11/resuming-new-start-inspections-must-be-a-critical-goal-of-upcoming-us-russia-talks/.

[69] Rumsfeld, *Annual Report to the President*, op. cit., p. 90.

[70] U.S. Department of State, *Report to Congress on Implementation of the New START Treaty Paragraph (a)(10) from Declaration (13) of Senate Executive Report 111-6 accompanying the New START Treaty (Treaty Doc. 111-5)*, (Washington, D.C.: Department of State, April 2021), available at

be up-loadable more quickly and more covertly than U.S. silo-based ICBMs because they likely can be uploaded at their bases inside their buildings.

It is clear that President Putin wanted more missile warheads than are allowed under the New START Treaty because Russian notifications under New START indicated that Moscow had increased its warhead numbers well above the Treaty limits *before the Treaty limits came into effect*.[71] This is not generally taken into account in press discussions of Russian strategic nuclear weapons numbers. Putin, who is constantly threatening nuclear war, has every incentive to increase covertly the number of deployed Russian nuclear warheads. Based on history, Putin may well believe that the United States will not violate its treaty commitments in response.

Whether Putin will use nuclear weapons in the Ukraine war is uncertain. However, he knows how many nuclear weapons Russia has and the Biden Administration has informed Moscow how many the United States has. The Biden Administration announced in 2021 that the total U.S.

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https://www.state.gov/wp-content/uploads/2021/04/Annual-New-START-Report.pdf; U.S. Department of State, "The New START Treaty," *State.gov*, August 4, 2022, available at https://www.state.gov/new-start/; and, U.S. Department of State, *Report to Congress on Implementation of the New START Treaty Paragraph (a)(10) from Declaration (13) of Senate Executive Report 111-6 accompanying the New START Treaty (Treaty Doc. 111-5)*, (Washington, D.C.: Department of State, April 2022), available at https://www.state.gov/wp-content/uploads/2022/04/New-START-Treaty-Annual-Implementation-Report.pdf.

[71] U.S. Department of State, *New START Treaty Aggregate Numbers of Strategic Offensive Arms* (Washington, D.C.: Department of State, October 1, 2016), available at https://2009-2017.state.gov/documents/organization/262836.pdf; and, David Axe, "Russia's Nuclear Surge: Putin Adding Nukes While Obama Cuts," *The Daily Beast*, October 7, 2016, available at https://www.thedailybeast.com/russias-nuclear-surge-putin-adding-nukes-while-obama-cuts.

active and inactive weapons inventory was 3,750.[72] Russian leaders believe they have nuclear superiority. In 2018, *CNN* reported that President Putin said to the Russian Duma, while showing animated nuclear attacks on the United States with Russian superweapons, that, "Russia still has the greatest nuclear potential in the world, but nobody listened to us. Listen now."[73] In March 2023, Medvedev declared, "Thank God, we have parity *and even superiority* in strategic nuclear forces which, in effect, is even more vital for the existence of our country, because otherwise we would have been torn apart."[74] In March 2022, Russian Security Council Secretary Nikolai Patruschev said, "Russia is patient and does not intimidate anyone with its military advantage. However, it possesses advanced unique weapons capable of destroying any enemy, including the United States, in case of a threat to its existence."[75]

Putin and his colleagues constantly brag about the capabilities of Russia's new nuclear superweapons, particularly their new hypersonic nuclear-capable missiles,[76] and have linked these to their refusal to negotiate new arms control agreements. In 2013, then Kremlin Chief

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[72] U.S. Department of State, *Transparency in the U.S. Nuclear Weapons Stockpile*, op. cit.

[73] Nathan Hodge, Barbara Starr, Matthew Chance, and Emma Burrows, "Putin Claims New 'Invincible' Missile Can Pierce US Defenses," *CNN*, March 1, 2018, available at https://www.cnn.com/2018/03/01/europe/putin-russia-missile-intl/index.html.

[74] "Medvedev Says Russia has Strategic Nuclear Superiority," *TASS*, March 23, 2023. (Emphasis added.) Available at https://tass.com/defense/1593313.

[75] "Russia Possesses Weapons Capable of Wiping out any Enemy, Including US — Patrushev," *TASS*, March 27, 2023, available at https://tass.com/defense/1594905.

[76] Mark B. Schneider, "The Expanding List of Putin's New Nuclear Superweapons," *Real Clear Defense*, May 27, 2021, available at https://www.realcleardefense.com/articles/2021/05/27/the_expanding_list_of_putins_new_nuclear_superweapons_778989.html.

of Staff (and former Defense Minister) Colonel General Sergei Ivanov stated, "When I hear our American partners say: 'let's reduce something else', I would like to say to them: 'excuse me, but what we have is relatively new.' They [the United States] have not conducted any upgrades for a long time. They still use Trident [missiles]."[77] In 2022, Medvedev declared, "Let them [Washington] run or crawl back themselves and ask for it [nuclear arms negotiations]."[78]

The current geopolitical situation, certainly the most severe since the Cuban missile crisis, requires maximum understanding concerning Russian nuclear capabilities and, in particular, where Russia is going with regard to its nuclear forces and doctrine. Yet, the American public has less reliable information concerning the Russian nuclear threat now than in any previous crisis period. As such, it is imperative that Washington seeks to understand the scope and character of the nuclear threat the nation faces. Estimates of Russian nuclear capability that are not grounded in reality are dangerous. The adequacy of the U.S. deterrence posture and U.S. arms control considerations must be shaped by a realistic understanding of Russian nuclear capabilities. This paper, using Russian and Western open sources, provides as much information as possible on the number and characteristics of Russian nuclear weapons and doctrine. Undercounting Russian nuclear capabilities can serve only to misinform the U.S. public and leadership regarding the adequacy of U.S. forces to meet deterrence requirements and the effects of arms control agreements. It

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[77] "Russia today is not interested in U.S.-proposed arms reduction - Sergei Ivanov (Part 2)" *Interfax*, March 5, 2013, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=30010953.

[78] "Russia's Medvedev Suggests U.S. Should beg for Nuclear Arms Talks," *Reuters*, June 20, 2022, available at https://www.reuters.com/world/europe/russia-should-not-negotiate-with-us-nuclear-issues-yet-ex-president-says-2022-06-20/.

can cast a dangerous shadow of misinformation over the discussion of U.S. nuclear policies for both deterrence and arms control. This study addresses Russian nuclear capability and why these issues should be a matter of great concern to the American people and U.S. policy makers.

Chapter 2
Putin's Nuclear Doctrine and its Role in Shaping Russian Nuclear Capability

In 1993, soon after the demise of the Soviet Union, Russian military doctrine moved toward overt threats of, and planning for, the first use of nuclear weapons.[1] President Putin took this trend much further when he developed Russia's nuclear doctrine as Secretary of the Russian National Security Council in 1999.[2] This doctrinal evolution involved the first use of nuclear weapons in the event of chemical and biological weapons attack and, most significantly, "…in response to wide-scale aggression using conventional weapons in situations critical to the national security of the Russian Federation and its allies."[3] (Putin characterized his invasion of Ukraine in similar terms.) Putin signed this new doctrine into law as Acting President in 2000.

This development in strategy, as then Commander of the Strategic Missile Forces Colonel General Vladimir Yakovlev stated in 1999, came about because, "Russia, for objective reasons, is forced to lower the threshold for using nuclear weapons, extend the nuclear deterrent to smaller-scale conflicts and openly warn potential opponents about

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[1] "The Basic Provisions of the Military Doctrine of the Russian Federation," *Federation of American Scientists*, 1993, available at https://nuke.fas.org/guide/russia/doctrine/russia-mil-doc.html.

[2] Mark B. Schneider, "Russian Nuclear Strategy," *Journal of Strategy and Politics*, Vol. 2, No. 1 (2017), p. 122, available at https://studyofstrategyandpolitics.files.wordpress.com/2017/12/russian-nuclear-strategy.pdf.

[3] "Draft Russian Military Doctrine," *Federation of American Scientists*, 1999, available at https://nuke.fas.org/guide/russia/doctrine/991009-draft-doctrine.htm.

this."[4] In 2009, Nikolai Patruschev, Secretary of the Russian National Security Council, said that in the proposed new version of the nuclear doctrine, "We have corrected the conditions for use of nuclear weapons to resist aggression with conventional forces not only in large-scale wars, but also in regional or even a local one… There is also a multiple-options provision for use of nuclear weapons depending on the situation and intentions of the potential enemy."[5]

Russia's "escalate to de-escalate" (or "escalate to win"[6]) nuclear strategy was officially announced in 2003 in a Russian Defense Ministry publication which said, "De-escalation of aggression is forcing the enemy to halt military action by a threat to deliver or by actual delivery of strikes of varying intensity with reliance on conventional and (or) nuclear weapons."[7] While numerous Western commentators initially denied the existence of such a Russian doctrine (and some continue to do so),[8] it dates back

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[4] Quoted in Mark B. Schneider, *The Nuclear Forces and Doctrine of the Russian Federation* (Fairfax, VA: National Institute Press, 2006), p. 2, available at https://nipp.org/wp-content/uploads/2021/05/Russian-nuclear-doctrine-NSF-for-print.pdf.

[5] "Russia to Broaden Nuclear Strike Options," *RT*, October 14, 2009, available at http://rt.com/news/russia-broaden-nuclear-strike/.

[6] John E. Hyten, as quoted in, U.S. Senate, *Hearing to Receive Testimony on United States Strategic Command Programs* (Washington, D.C.: Committee on Armed Services, April 4, 2017), p. 20, available at https://www.armed-services.senate.gov/imo/media/doc/17-31_04-04-17.pdf.

[7] Ministry of Defense, Russian Federation, *The Priority Tasks of the Development of the Armed Forces of the Russian Federation* (Moscow: Ministry of Defense, 2003),

p. 70, available at https://web.archive.org/web/20040609012809/http://www.mil.ru/articles/article5005.shtml.

[8] Olga Oliker, "New Document Consolidates Russia's Nuclear Policy in One Place," *Russia Matters*, June 4, 2020, available

to 1999, when Colonel General Vladimir Muravyev, then Deputy Commander of the Strategic Missile Forces, said that "…the deterrent actions of strategic forces…[involve] strikes with both conventional and nuclear warheads with the goal of de-escalating the military conflict," and, Russian forces "…should be capable of conducting 'surgical' strikes…using both highly accurate, super-low yield nuclear weapons, as well as conventional ones…"[9] In 2015, the Obama Administration focused attention on the danger of this policy, characterizing it as a "reckless gamble for which the odds are incalculable and the outcome could prove catastrophic,"[10] and noted that Russia is "playing with fire."[11]

The now common Russian nuclear threats reflect Moscow's "escalate to de-escalate" doctrine. Putin often implies nuclear weapons first use and his subordinates are explicit about it. What is new are Moscow's threats of full-

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at https://www.russiamatters.org/analysis/new-document-consolidates-russias-nuclear-policy-one-place.

[9] Quoted in James R. Howe, "Exploring the Dichotomy Between New START Treaty Obligations and Russian Actions and Rhetoric," *Vision Centric, Inc.*, Slide #25, February 17, 2016, available at https://www.exchangemonitor.com/wp-content/uploads/2016/04/Thu-9am-Future-Nuclear-Arms-Control-Stacked.pdf.

[10] Robert Scher, *Statement of Robert Scher, Assistant Secretary of Defense for Strategy, Plans, and Capabilities* (Washington, D.C.: House Armed Services Committee, Subcommittee on Strategic Forces, March 2, 2016), p. 3, available at http://docs.house.gov/Meetings/AS/AS29/20160302/104619/HHRG-114-AS29-Wstate-ScherR-20160302.pdf.

[11] Robert Work and James Winnefeld, *Statement of Robert Work, Deputy Secretary of Defense, and Admiral James Winnefeld, Vice Chairman of the Joint Chiefs of Staff* (Washington, D.C.: U.S. House of Representatives, Committee on Armed Services, June 25, 2015), p. 4, available at http://docs.house.gov/meetings/AS/AS00/20150625/103669/HHRG-114-AS00-Wstate-WorkR-20150625.pdf.

scale nuclear war over Ukraine.[12] Other than North Korea's Kim family, Putin is the only head of state of a nuclear-armed nation who has frequently made nuclear threats.[13] Indeed, he began the most recent stage of the war against Ukraine with a nuclear threat.[14] This has continued throughout the conflict. In January 2023, Medvedev declared, "The defeat of a nuclear power in a conventional war may trigger a nuclear war."[15] While he denies it, in 2022, Putin reportedly even threatened then British Prime Minister Boris Johnson with a missile attack.[16] The formulation Putin denies using is the same as the nuclear threats he made in public to NATO countries as early as 2007 to 2008.[17] The missile targeting threat was formulated in 2007 by the Commander of Strategic Missile Forces who threatened to attack missile defense sites in Europe with

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[12] Mark B. Schneider, *Russian Use of Nuclear Coercion against NATO and Ukraine*, *Information Series* No. 521, May 2, 2022, available at https://nipp.org/wp-content/uploads/2022/04/521-final.pdf.

[13] U.S. Senate, *Examining the Proper Size of the Nuclear Weapons Stockpile to Maintain a Credible U.S. Deterrent* (Washington, D.C.: Committee on Appropriations, July 25, 2012), available at https://www.govinfo.gov/content/pkg/CHRG-112shrg75444/html/CHRG-112shrg75444.htm; and, "Putin's made more than 30 nuke threats during Ukraine invasion, Boris tells LBC," *LBC.co.uk*, June 30, 2022, available at https://www.lbc.co.uk/news/ukraine-war-putin-boris-johnson/.

[14] Vladimir Putin, "Address by the President of the Russian Federation," *Kremlin.ru*, February 24, 2022, available at http://en.kremlin.ru/events/president/news/67843.

[15] "Putin Ally Medvedev Warns NATO of Nuclear War if Russia Defeated in Ukraine," *Reuters*, January 19, 2023, available at https://www.reuters.com/world/europe/putin-ally-medvedev-warns-nuclear-war-if-russia-defeated-ukraine-2023-01-19/.

[16] "Britain's Boris Johnson says Putin Threatened him with Missile Strike," *Reuters*, January 30, 2023, available at https://www.reuters.com/world/uk/britains-boris-johnson-says-putin-threatened-him-with-missile-strike-2023-01-30/.

[17]Schneider, as quoted in, U.S. Senate, *Examining the Proper Size of the Nuclear Weapons Stockpile to Maintain a Credible U.S. Deterrent*, op. cit.

nuclear missiles.[18] Despite a U.S. protest, Putin's response was to repeat the threat, and it became the norm. For example, in 2015, Russia's Ambassador to Denmark said, "I don't think that Danes fully understand the consequence if Denmark joins the American-led missile defence shield. If they do, then Danish warships will be targets for Russian nuclear missiles."[19] As part of his nuclear threats, Putin began provocative flights of nuclear bombers.[20]

Since 2007, the focus of Russia's nuclear threats has been against NATO, missile defense, and preventing a response to its violation of the INF Treaty.[21] In addition, Russian nuclear war threats made at the most senior level since February 2022 are clear attempts to deter Western assistance to Ukraine, the victim of Russian aggression. The threat of Russian nuclear escalation has clearly limited U.S. and allied military assistance to Ukraine, particularly with respect to long-range conventional strike capabilities. In the case of Ukraine, restrictive Western rules of engagement apparently intended to reduce the risk of escalation play into the hands of an aggressive dictator like Putin.

In June 2020, President Putin issued his most comprehensive public statement of Russia's nuclear doctrine. It is likely not Moscow's full doctrine, but appears to reveal more of it than ever previously officially stated.

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[18] "Missile Shield in Europe could Lead to Cold War - Slovak ex-premier," *Sputnik News*, February 20, 2007, available at https://sputnikglobe.com/20070220/61003316.html.

[19] Julian Isherwood, "Russia warns Denmark its Warships could Become Nuclear Targets," *Telegraph*, March 21, 2015, available at https://www.telegraph.co.uk/news/worldnews/europe/denmark/11487509/Russia-warns-Denmark-its-warships-could-become-nuclear-targets.html.

[20] Jens Stoltenberg, "Adapting to a Changed Security Environment," *NATO.int*, May 27, 2015, available at http://www.nato.int/cps/en/natohq/opinions_120166.htm.

[21] Schneider, *Russian Use of Nuclear Coercion against NATO and Ukraine*, op. cit.

Paragraph 19 of the document lists four circumstances under which Russia may employ nuclear weapons first:

> 19. The conditions specifying the possibility of nuclear weapons use by the Russian Federation are as follows:
>
> a) arrival of reliable data on a launch of ballistic missiles attacking the territory of the Russian Federation and/or its allies;
>
> b) use of nuclear weapons or other types of weapons of mass destruction by an adversary against the Russian Federation and/or its allies;
>
> c) attack by adversary against critical governmental or military sites of the Russian Federation, disruption of which would undermine nuclear forces response actions;
>
> d) aggression against the Russian Federation with the use of conventional weapons when the very existence of the state is in jeopardy.[22]

All of the content of paragraph 19, or something very similar to it, had been reported in the Russian press before its official publication.[23] Paragraph 19(a) clearly allows a nuclear response before it is known whether the attack on Russia is nuclear or not. In December 2022, President Putin said, "I assure you, after the early warning system receives

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[22] The President of the Russian Federation, "Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence," *MID.ru*, June 8, 2022, available at https://mid.ru/en/foreign policy/international_ safety/1434131/.

[23] Mark B. Schneider, "Putin's Plan to Send Russians to Heaven," *Real Clear Defense*, December 2, 2018, available at https://www.realcleardefense.com/articles/2020/09/19/will_russia_further_lower_its_nuclear_weapons_use_ threshold_577995.html; and, Mark B. Schneider, "Russian Nuclear 'De-escalation' of Future War," *Comparative Strategy*, Vol. 37, No. 5 (2018).

a signal of a missile attack, hundreds of our missiles are in the air."[24] This likely is intended to deter U.S./NATO *conventional retaliatory* missile strikes against Russia in the event of conflict.

Paragraph 19(c) is potentially very permissive because it speaks about attacks on "nuclear forces" rather than "strategic nuclear forces." Since dual capable weapons are the norm in Russia,[25] large numbers of Russian facilities could be deemed to be part of Moscow's nuclear force.[26] The definition of what constitutes a critical governmental site is left ambiguous and potentially quite broad.

In February 2023, President Putin stated that a "strategic defeat" in the Ukraine war would mean "an existential threat to our country."[27] A few days later Putin also said, "I do not even know if such an ethnic group as the Russian people will be able to survive in the form in which it exists

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[24] Caitlin McFaul, "Putin says one Missile will Trigger 'Hundreds' of Warheads in Stark Message on Nuclear Deterrence," *Fox News*, December 9, 2022, available at https://www.foxnews.com/world/putin-says-one-missile-trigger-hundreds-warheads-stark-message-nuclear-deterrence.

[25] Dave Johnson, *Russia's Conventional Precision Strike Capabilities, Regional Crises, and Nuclear Thresholds* (Livermore, CA: Lawrence Livermore National Laboratory, Center for Global Security Research, February 2018), pp. 39, 57, available at https://cgsr.llnl.gov/content/assets/docs/Precision-Strike-Capabilities- report-v3-7.pdf; and, U.S. Department of Defense, *Nuclear Posture Review* (Washington, D.C.: Department of Defense, 2018), p. 9, available at https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF.

[26] Mark B. Schneider, "Putin's New Nuclear Doctrine," *Real Clear Defense*, June 23, 2020, available at https://www.realcleardefense.com/articles/2020/06/23/putins_new_nuclear_doctrine_115405.html.

[27] Vladimir Putin, "Presidential Address to Federal Assembly, *Kremlin.ru*, February 21, 2023, available at http://en.kremlin.ru/events/president/news/70565.

today."[28] Under Paragraph 19(d), an "existential threat" to Russia triggers the right to use nuclear weapons first.

Paragraph 4 of the directive links nuclear deterrence to Russia's "national sovereignty and territorial integrity." Medvedev's statement quoted above links the use of "strategic nuclear weapons" to the defense of Ukrainian territory seized by invasion. Indeed, in 2009, Lieutenant General Andrey Shvaychenko, then Commander of Strategic Missile Forces, said, "In a conventional war, [the nuclear ICBMs] ensure that the opponent is forced to cease hostilities, on advantageous conditions for Russia, by means of single or multiple preventive strikes against the aggressors' most important facilities."[29]

Russia's 2023 edition of "The Concept of the Foreign Policy of the Russian Federation" accuses the United States and its "satellites" (i.e., NATO allies) of waging "a new type of hybrid war" against Russia aimed at "limiting its sovereignty in foreign and domestic policy, [and] violating its territorial integrity." It discusses the role of nuclear weapons in Russian security in an unprecedented manner for a foreign policy document. It states, "…the Russian Federation intends to give priority attention to: 1) strategic deterrence, preventing the aggravation of interstate relations to a level capable of provoking military conflicts, including with the use of nuclear and other types of weapons of mass destruction…."[30]

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[28] Lauren Sforza, "Putin says Ukraine War Poses Existential Threat to 'Russian People,'" *The Hill*, February 26, 2023, available at https://thehill.com/policy/international/3874880-putin-says-ukraine-war-poses-existential-threat-to-russian-people/.

[29] "Russia may Face Large-scale Military Attack, says Strategic Missile Troops Chief," *ITAR-TASS*, December 16, 2009, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=33098965.

[30] Foreign Ministry of the Russian Federation, "The Concept of the Foreign Policy of the Russian Federation," *MID.ru*, March 31, 2023, available at https://mid.ru/en/foreign_policy/fundamental_documents/1860586.

The content of Putin's 2020 decree is likely not all of Russia's nuclear doctrine. For example, former Chief of the General Staff and General of the Army (ret.) Yuriy Baluyevskiy stated in 2014 that the "conditions for pre-emptive nuclear strikes…is contained in classified policy documents."[31] He likely developed the 2010 version of the doctrine. In May 2023, after predicting a multi-decade war in Ukraine, making a ridiculous claim that some NATO nations might supply nuclear weapons to Ukraine, and declaring that, "*It is necessary to destroy the very nature of the Nazi government in Kiev*"[32] Medvedev threatened a pre-emptive nuclear strike against NATO should the alliance supply nuclear weapons to Ukraine: "…it will mean that a missile with a nuclear warhead will come flying to them."[33]

Russia has been exercising its nuclear escalation strategy since the Zapad-1999 theater war exercise against NATO. Then Russian Defense Minister Marshal Igor Sergeyev declared, "Our Army was forced to launch nuclear strikes first which enabled it to achieve a breakthrough in the theater situation."[34] This likely was an overt signal to NATO. After Zapad-1999, nuclear escalation was the norm in Russian theater exercises but it was leaked

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[31] "Russia Classifies Information on Pre-emptive Nuclear Strikes – Military," *BBC Monitoring Former Soviet Union/Interfax AVN*, September 5, 2014, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/15028002DA366B30.

[32] "Kiev Regime must Cease to Exist – ex-Russian President," *RT*, May 26, 2023. (Emphasis in the original.) Available at https://www.rt.com/russia/576928-medvedev-ukraine-conflict-decades/.

[33] "West Fails to Grasp Possibility of Preemptive Nuclear Strike — Medvedev," *TASS*, May 26, 2023, available at https://tass.com/politics/1623285.

[34] Jacob W. Kipp, "Russia's Nonstrategic Nuclear Weapons," *Military Review*, May-June 2001, available at https://cgsc.contentdm.oclc.org/digital/collection/p124201coll1/id/235/rec/6.

to the media rather than announced. In 2014, Russian expatriate Dr. Nikolai Sokov wrote that "…nuclear exercises have been conducted with targets in Europe, the Pacific, Southeast Asia, the Indian Ocean, and even the continental United States," adding that "…all large-scale military exercises that Russia conducted beginning in 2000 featured simulations of limited nuclear strikes."[35] One indication of how low the Russian nuclear use threshold may be was evident in a 2010 report in the official newspaper of the Russian Far East Military District. It said that during the Vostok - 2010 exercise, "To suppress a large center of the separatists' resistance and to achieve minimal losses of the attacking troops a low-yield 'nuclear' attack was mounted against the enemy."[36] In January 2016, NATO Secretary General Jens Stoltenberg wrote, "Russia has conducted at least 18 large-scale snap exercises, some of which have involved more than 100,000 troops. These exercises include simulated nuclear attacks on NATO Allies (e.g., ZAPAD) and on partners (e.g., March 7, 2013 simulated attacks on Sweden) …"[37]

The Obama Administration's National Intelligence Council said, "Russian military doctrine purportedly includes the limited use of nuclear weapons in a situation

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[35] Nikolai N. Sokov, "Why Russia Calls a Limited Nuclear Strike 'De-escalation,'" *Bulletin of the Atomic Scientists*, March 13, 2014, available at https://thebulletin.org/2014/03/why-russia-calls-a-limited-nuclear-strike-de-escalation/.

[36] John W. Parker, *Russia's Revival: Ambitions, Limitations, and Opportunities for the United States* (Washington, D.C.: National Defense University, Institute for National Strategic Studies, January 2011), p. 23, available at https://ndupress.ndu.edu/Portals/68/Documents/stratperspective/inss/Strategic-Perspectives-3.pdf.

[37] *The Secretary General's Annual Report 2015* (Brussels: NATO, January 2016), p. 18, available at http://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2016_01/20160128_SG_AnnualReport_2015_en.pdf.

where Russia's vital interests are at stake to 'deescalate' a conflict by demonstrating that continued conventional conflict risks escalating the crisis to a large scale nuclear exchange."[38] In 2017, then DIA Director Lieutenant General Vincent Stewart stated Russia is "the only country that I know of that has this concept of escalate to terminate or escalate to deescalate but they do have that built into their operational concept, we've seen them exercise that idea and it's really kind of a dangerous idea…"[39] He also said that he had seen no evidence that this policy was changing.[40] The 2018 *Nuclear Posture Review* report indicated that, "Moscow threatens and exercises limited nuclear first use, suggesting a mistaken expectation that coercive nuclear threats or limited first use could paralyze the United States and NATO and thereby end a conflict on terms favorable to Russia."[41]

Large Russian strategic nuclear exercises (usually called Grom or Thunder) are generally personally presided over by Putin and reportedly end with a simulated massive nuclear strike.[42] Indeed, in the October 2022 Grom exercise,

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[38] U.S. National Intelligence Council, *Global Trends, Paradox of* Progress (Washington, D.C.: National Intelligence Council, January 2017), p. 36, available at https://www.dni.gov/files/documents/nic/GT-Full-Report .pdf.

[39] Vincent Stewart, as quoted in, U.S. Senate, *Hearing to Receive Testimony on Worldwide Threats* (Washington, D.C.: Committee on Armed Services, May 23, 2017), p. 38, available at https://www.armed-services.senate.gov/imo/media/doc/17-49_05-23-17.pdf.

[40] Ibid., pp. 38-39.

[41] U.S. Department of Defense, *Nuclear Posture Review*, 2018, op. cit., p. 9.

[42] Pavel Felgenhauer, "Russia Escalates Its Reliance on Nuclear Deterrence," *Eurasia Daily Monitor*, Vol. 16, Iss. 156 (November 7, 2019), available at https://jamestown.org/program/russia-escalates-its-reliance-on-nuclear-deterrence/; "Russian Armed Forces Train for Nuclear Attack," *Novinite.com*, May 8, 2014, available at https://www.novinite.com/articles/160361/Russian+Armed+Forces+Train+for+Nuclear+Attack; and, "Russia holds military drills to repel

Russia's Defense Minister Sergei Shoigu told President Putin that the exercise was "a training session" which involved "delivering a massive nuclear strike by strategic offensive forces…"[43] Russian state television reported it was practice for an attack on the United States.[44] The two 2022 Grom exercises (the norm is one) were part of Putin's orchestrated campaign of nuclear threats.[45]

Russian nuclear doctrine fuels its pursuit of higher warhead numbers and advanced technical characteristics. It requires a large number and diversity of nuclear weapons that may otherwise seem inexplicable to Westerners. These are seen as the central components of Russian nuclear deterrence policy. A declassified Clinton Administration CIA report indicated that, "Moscow's military doctrine on the use of nuclear weapons has been evolving and probably has served as the justification for the development of very low-yield, high-precision nuclear weapons."[46]

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nuclear strike," *RT,* May 8, 2014, available at https://www.rt.com/news/157644-putin-drills-rocket-launch/.

[43] "Russia Holds Exercise to Practice Massive Retaliatory Nuclear Strike — Shoigu," *TASS*, October 26, 2022, available at https://tass.com/defense/1527705.

[44] Zoe Strozewski, "Putin's Nuclear Missile Test Was Practice for Attacking U.S.: State TV," *Newsweek*, October 27, 2022, available at https://www.newsweek.com/putins-nuclear-missile-test-was-practice-attacking-us-state-tv-1755235.

[45] Mark B. Schneider, "Putin's Nuclear Firepower Demonstration in Support of His Invasion of Ukraine," *Real Clear Defense*, March 1, 2022, available at https://www.realcleardefense.com/articles/2022/03/01/putins_nuclear_firepower_demonstration_in_support_of_his_invasion_of_ukraine_819309.html; and, Mark B. Schneider, "Putin's October Grom Strategic Nuclear Exercise," *Real Clear Defense*, November 15, 2022, available at https://www.realcleardefense.com/articles/2022/11/15/putins_october_grom_strategic_nuclear_exercise_ 864944.html.

[46] Central Intelligence Agency, *Evidence of Russian Development of New Subkiloton Nuclear Warheads* [Redacted] (Langley, VA: CIA, August 30, 2000), available at https://www.cia.gov/readingroom/docs/DOC_0001260463.pdf.

In line with Russia's doctrinal requirements, Putin has focused on the development of new and improved Russian nuclear warheads, delivery vehicles, nuclear testing and, in particular, low-yield nuclear weapons development and deployment. Russia has covertly continued nuclear testing,[47] and its new strategic nuclear missiles apparently carry new nuclear warheads.[48] In Putin's Russia, nuclear weapons are officially stated to be Moscow's "highest" or "absolute" military priority.[49] They are viewed as the basis of Russia's great power status.

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[47] Mark Schneider, "The Future of the U.S. Nuclear Deterrent," *Comparative Strategy*, Vol. 27, No. 4 (2008), pp. 347-349; U.S. Department of State, *Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments* (Washington, D.C.: State Department, June 2020), pp. 50-51, available at https://www.state.gov/wp-content/uploads/2020/06/2020-Adherence-to-and-Compliance-with-Arms-Control-Nonproliferation-and-Disarmament-Agreements-and-Commitments-Compliance-Report-1.pdf; U.S. Department of State, *Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments* (Washington, D.C.: Department of State, April 2022), pp. 29-30, available at https://www.state.gov/wp-content/uploads/2022/04/2022-Adherence-to-and-Compliance-with-Arms-Control-Nonproliferation-and-Disarmament-Agreements-and-Commitments-1.pdf; and, Mark B. Schneider, "Yes, the Russians Are Testing Nuclear Weapons and It Is Very Important," *Real Clear Defense*, August 8, 2019, available at https://www.realcleardefense.com/articles/2019/08/08/yes_the_russianare_testing_nuclear_weapons_and_it_is_very_important_114651.html.

[48] Loc. cit.

[49] "Russia: Armaments Chief/RF Deputy Defense Minister Vladimir Popovkin Interviewed," *Ekho Moskvy*, September 19, 2009, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=39744786; "Russian Ministry of Defense Releases Details of 2011-2020 State Armament Program," *RIA-Novosti Online*, February 25, 2011, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=39838541; Pavel Felgenhauer, "Kremlin Learning to Navigate Washington's New Unpredictability," *Eurasia Daily Monitor*, Vol.14, No. 3 (January 19, 2017), available at https://jamestown.org/program/ kremlin-learning-navigate-

Noted Russian journalist Pavel Felgenhauer has written that Russia believes its coercive leverage is enhanced by being "…able to carry out low-yield 'precision' nuclear strikes against military targets anywhere in the world. It is assumed that a 'precision' strike of this kind will not result in immediate global nuclear war."[50] The declassified Clinton Administration CIA report cited above noted that "The range of applications [for low-yield Russian nuclear weapons] will ultimately be determined by Russia's evolving nuclear doctrine, and could include artillery, air-to-air weapons, ABM weapons, anti-satellite weapons or multiple rocket launchers against tanks or massed troops.…"[51] The 2018 *Nuclear Posture Review* report confirmed that many of these types of weapons now exist in the Russian arsenal.[52] NATO information posted by the United Kingdom's Ministry of Defence in 2021 indicated the

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washingtons-new-unpredictability/; "Military Dominance over Russia Impossible, Nuclear Deterrent Top Priority – Defense Ministry," *RT*, January 30, 2015, available at http://rt.com/news/227811-russia-military-supremacy-modernization; "Russian Shield: Nukes Priority, but High-Precision Weapons to Play Greater Role," *Sputnik News*, February 21, 2017, available at https://sputnikglobe.com/20170221/russia-nuclear-high-precision-weapons-1050899629.html; and, "Russian Defense Minister Shoigu: 'The Attempts Of The U.S.-Led West To Impede The Establishment Of A New, Fair World Order Are Leading To Growing Chaos... Russia's Strategic Partner Is China,'" *MEMRI*, March 3, 2017, available at https://www.memri.org/reports/russian-defense-minister-shoigu-attempts-us-led-west-impede-establishment-new-fair-world.

[50] "Russia mulls 'precision' use of nuclear weapons to counter NATO power – paper," *BBC Monitoring Former Soviet Union - Political*, May 6, 1999, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/0F99F7FA2FF3A939.

[51] Central Intelligence Agency, *Evidence of Russian Development of New Subkiloton Nuclear Warheads* [Redacted], op. cit.

[52] U.S. Department of Defense, 2018 *Nuclear Posture Review*, op. cit., p. 8.

same and the United Kingdom noted that Russia's nuclear arsenal was expanding.[53]

The apparent purpose of low-yield nuclear weapons in Putin's nuclear strategy is to make nuclear escalation less risky for Russia and to facilitate nuclear use in multiple circumstances. In 1999, then First Deputy Defense Minister Nikolai Mikhailov wrote, "The amount of damage should be such as not to provoke the aggressor into escalating the use of nuclear weapons without a justified reason. In other words, the point at issue is a limited use of strategic nuclear forces adequate to the threat."[54] Not only low-yield but low-collateral damage weapons are part of the strategy. Vice Admiral (ret.) Robert Monroe, former Director of the Defense Nuclear Agency, wrote, "Russia has followed exactly the opposite course from the United States. It has focused on low-yield weapons research, design, testing, and production. It has pursued advanced concepts, and greater use of fusion, less of fission (possibly achieving pure fusion)."[55] Less fission means less fallout and sometimes more military effectiveness. Former Russian Atomic Energy Minister Viktor Mikhaylov, when Director of the Sarov nuclear weapons laboratory, discussed Russian development "…of a 'nuclear scalpel' capable of 'surgically removing' and destroying very localized targets. The low-yield warhead will be surrounded with a superhardened casing which makes it possible to penetrate 30–40 meters into rock and destroy a buried target—for example, a troop command and control point or a nuclear munitions storage

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[53] "NATO Graphic," *United Kingdom Ministry of Defence*, February 17, 2022, available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/972413/NATO_graphic.png.

[54] Quoted in Schneider, *The Nuclear Forces and Doctrine of the Russian Federation*, op. cit., p. 21.

[55] Robert R. Monroe, "Change U.S. Nuclear Weapons Policies!," Nuclear Deterrence Summit (Arlington, VA: February 16-19, 2016), p. 3, mimeo.

facility."[56] He also said Russia was improving thermonuclear weapons which range from "megaton class" to "weapons yielding hundreds of tons."[57]

The Russian Defense Ministry states Russia's strategic nuclear forces target "…the enemy's military and military-economic potential by means of large-scale, group or single nuclear missile attacks."[58] Weapons like its new Sarmat heavy ICBM will likely be Russia's main counterforce weapon and its hypersonic missiles may be used for targeting national command authorities.[59] Both are used extensively for nuclear threats.

The emphasis on "large scale" and the "massive nuclear strike by strategic offensive forces" in Russian nuclear policy and its large nuclear exercises—if the initial limited nuclear strike fails to achieve Russian objectives—suggest that Russia sees an advantage in obtaining a numerical and qualitative edge through procurement of Putin's nuclear superweapons, particularly including hypersonic missiles. Since there are very large numbers of adversary (i.e., U.S.) military targets, the number of available nuclear weapons will determine whether or not many types of military targets can actually be struck and the probability of their

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[56] Quoted in Schneider, "The Future of the U.S. Nuclear Deterrent," op. cit., p. 348.

[57] Ibid., p. 347.

[58] "The Strategic Missile Forces," Ministry of Defense of the Russian Federation, no date, available at https://eng.mil.ru/en/structure/forces/strategic_rocket/mission.htm.

[59] Mark Schneider, "Is the West Ready for Russia's Sarmat Heavy ICBM?," *The National Interest*, July 22, 2022, available at https://nationalinterest.org/feature/west-ready-russia%E2%80%99s-sarmat-heavy-icbm-203659; and, Mark B. Schneider, "Russia's Hypersonic Missile Threat to the U.S. National Command Authority," *Real Clear Defense*, September 11, 2019, available at https://www.realcleardefense.com/articles/2019/09/11/russias_hypersonic_missile_threat_to_the_us_national_command_authority_4736.html.

destruction. The required number of weapons also impacts the size of Russia's nuclear reserve force.

Extremely destructive weapons like the Poseidon nuclear-powered, nuclear-armed drone submarine are likely intended to deter an in-kind nuclear response to Russian low-yield first use of nuclear weapons. Such a weapon can only be used to devastate major port cities and there is no realistic way to limit collateral damage from that type of attack.[60] Whether its yield is two megatons or 100 megatons, the amount of damage would be massive.[61] Like Russian nuclear doctrine and threats, the purpose of these weapons appears to be to generate fear and negate resistance to Putin's empire building.

Russia does not openly discuss its non-strategic nuclear weapons as much as its strategic nuclear forces. However, Russia's nuclear doctrine and policy also drive it to procure them in very large numbers. A declassified CIA analysis dated May 4, 1999 stated that, "The Security Council Secretary Putin emphasized to journalists that the weapons covered by these decrees include tactical nuclear weapons" and that, "At a minimum the decrees point to a more robust tactical nuclear arsenal, suggesting Moscow is moving away from relying almost solely on strategic weapons for

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[60] Mark B. Schneider, "The Barbarians in the Bay: Russia's Nuclear Armed Drone Submarine," *Real Clear Defense*, July 25, 2020, available at https://www.realcleardefense.com/articles/2020/07/25/the_barbarians_in_the_bay_russias_nuclear_armed_drone_submarine_115493.html; and, "Belgorod Submarine Completes Throw Tests of Poseidon Torpedo Model — Source," *TASS*, January 10, 2023, available at https://tass.com/defense/1560311.

[61] Robyn White, "What Damage Could Tests of Russia Apocalypse Poseidon Weapon Do?," *Newsweek*, October 4, 2022, available at https://www.newsweek.com/what-damage-tests-russia-apocalypse-poseidon-weapon-do-1748797.

deterrence."[62] In 2022, Defense Intelligence Agency (DIA) Director Lieutenant General Scott Berrier said Putin has "invested in tactical nuclear weapons…I believe that he thinks that [this] gives him an asymmetric advantage."[63] More importantly, Putin's perception of a Russian military advantage may impact a decision to use them.

A nuclear doctrine relying on low-yield nuclear weapons puts a particular premium on numbers. They are much more effective militarily than conventional weapons, but a larger number of these weapons is required to achieve the same military effect compared to the higher yield nuclear weapons emphasized in Soviet doctrine. There are very large numbers of potential targets for low-yield/low-collateral damage battlefield nuclear weapons. If the United States seeks to keep a conflict limited by refraining from strategic weapons use, it will clearly be at a significant disadvantage in non-strategic nuclear force numbers. Indeed, the more the United States seeks to keep the nuclear conflict limited by creating a firebreak between non-strategic and strategic nuclear weapons, the more significant the Russian nuclear advantage will become.

Russia's nuclear doctrine is aimed at helping it intimidate the United States/NATO, and any other potential adversary. The role of Russian nuclear weapons in intimidation and potentially in warfighting is reflected in Moscow's resistance to meaningful nuclear arms control limits, particularly with respect to non-strategic nuclear weapons. Russia's desire to enhance its nuclear capability also appears to be the basis for Russia's 2023 "suspension"

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[62]Central Intelligence Agency, *Senior Executive Intelligence Brief* [Redacted] (Langley, VA: CIA, May 4,1999), pp. 9-10, available at https://nsarchive2.gwu.edu/NSAEBB/NSAEBB200/19990504.pdf.

[63] Scott Berrier, as quoted in, U.S. House of Representatives, *Hearing on Annual Worldwide Threats* (Washington, D.C.: Permanent Select Committee on Intelligence, March 8, 2022), p. 24, available at https://www.congress.gov/117/meeting/house/114469/documents/HHRG-117-IG00-Transcript-20220308.pdf.

of the New START Treaty, its termination of the Conventional Forces in Europe Treaty,[64] and of the long-standing pattern of Soviet/Russian violations of arms control agreements going back decades.

Aleksey Arbatov, then Deputy Chairman of the Duma Defense Committee, and Duma Deputy Petr Romashkin, moderates by Russian standards, suggested that nuclear weapons could be used in something similar to NATO's military action in Kosovo.[65] In other words, they could be used in support of Russia's expansion of its sphere of influence and empire building.

For some reason, the FAS May 2023 analysis lists only two of the four first nuclear use criteria in paragraph 19 of Putin's nuclear deterrence decree. Despite the clear language in paragraph 19, some still argue that Russia "…will not use them for simple battlefield advantage or to 'escalate to de-escalate.'"[66] To its credit, the FAS report does recognize that, "Russian officials have made many statements about nuclear weapons that appear to go beyond the published doctrine, threatening to potentially use them in situations that do not meet the conditions described [in Putin's decree]," and that Russia's "real doctrine goes beyond basic deterrence and toward regional war-fighting strategies, or even weapons aimed at causing terror."[67] On

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[64] "Russia Officially Withdraws from European Arms Control Treaty," *ANews.com*, May 29, 2023, available at https://www.anews.com.tr/world/2023/05/29/russia-officially-withdraws-from-european-arms-control-treaty.

[65] Schneider, *The Nuclear Forces and Doctrine of the Russian Federation,* op. cit., p. 21.

[66] Olga Oliker, "New Document Consolidates Russia's Nuclear Policy in One Place," *Russia Matters*, June 4, 2020, available at https://www.russiamatters.org/analysis/new-document-consolidates-russias-nuclear-policy-one-place.

[67] Hans M. Kristensen, Matt Korda, and Eliana Reynolds, "Russian Nuclear Weapons, 2023," *Bulletin of the Atomic Scientists*, Vol. 79, No. 3 (2023), p. 178.

the other hand, the analysis downplays the risk of Russian nuclear escalation in the Ukraine conflict. It even asserts that, "Russia's nuclear signaling appears to have been mainly intended to deter the United States and NATO from intervening directly with military forces in Ukraine to prevent a wider war."[68] Russian nuclear threats go well beyond that limited objective.

Despite Putin's confirmation of decades of ominous reports on Russia's first-use nuclear strategy, there are those—mainly in the Minimum Deterrence advocacy community—that still appear to minimize perceptions of Russian reliance on nuclear escalation and the dangerous implications of the Russian "escalate to de-escalate" nuclear strategy. This relatively benign view of Russian nuclear strategy seems linked to the tendency to provide low estimates of Russian nuclear capability. The May 2023 report issued by the Federation of American Scientists appears in denial of the threatening implications of the thousands of Russian low-yield nuclear weapons and their relationship to Russia's "escalate to de-escalate" nuclear strategy,[69] and attributes this view to the 2018 *Nuclear Posture Review* report. In fact, that report said, "Russia's belief that limited nuclear first use, potentially including low-yield weapons, can provide such an advantage is based, in part, on Moscow's perception that its greater number and variety of non-strategic nuclear systems provide a coercive advantage in crises and at lower levels of conflict. Recent Russian statements on this evolving nuclear weapons doctrine appear to lower the threshold for Moscow's first-use of nuclear weapons."[70]

The seeming FAS minimization of the risk of Russian nuclear escalation appears suited to a U.S. policy of

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[68] Ibid., p 179.

[69] Ibid., p. 178.

[70] U.S. Department of Defense, 2018 *Nuclear Posture Review*, op. cit., pp. xi-xii.

"minimal deterrence." Similarly, the FAS largely undocumented estimates of the size of Russia's nuclear capability may serve both to reduce perceptions of a need for a U.S. programmatic response to growing Russian nuclear capabilities and to rationalize the apparent, extensive FAS nuclear arms control agenda.

Chapter 3
Analyses of the Russian Nuclear Stockpile by the Federation of American Scientists

For decades, the Federation of American Scientists has issued an annual analysis of Russian nuclear weapons. The February 2022 edition was drafted by Hans Kristensen and Matt Korda, and the May 2023 edition was written by Kristensen, Korda and Eliana Reynolds. Their numbers are very similar to those presented by the Stockholm International Peace Research Institute (SIPRI). Both Kristensen and Korda also work for SIPRI and apparently make a major contribution to SIPRI's annual assessment of Russian nuclear forces. Both the FAS and SIPRI assessments suggest that the number of Russian nuclear weapons is known with precision when, in fact, such precision is not possible given the lack of transparency in Russia's nuclear programs and the inability of the United States to accurately verify Russian nuclear weapons totals. Indeed, there are many higher estimates of the number of Russian nuclear weapons, particularly with respect to non-strategic nuclear weapons.

The annual FAS Russian nuclear weapons reports published by the *Bulletin of the Atomic Scientists* are clearly the product of extensive research. *But almost no sourcing* is provided for the Russian warhead numbers;[1] estimates appear to be derived from 1990 START accountability numbers and updates to those numbers provided by Russia.

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[1] Hans M. Kristensen and Matt Korda, "Russian Nuclear Weapons, 2022," *Bulletin of the Atomic Scientists*, Vol. 78, No. 2 (February 25, 2022), pp. 99-100, available at https://www.tandfonline.com/doi/full/10.1080/00963402.2022.2038907.

Moreover, the February 2022 report, which was cited globally as authoritative, contained two completely different sets of numbers for the then-current Russian strategic nuclear weapons inventory.

Page one of the February 2022 FAS report contained an abstract stating that "…Russia's nuclear arsenal…includes a stockpile of approximately 4,477 warheads."[2] This number included 2,565 strategic nuclear warheads and 1,912 non-strategic warheads. Russia is also assessed to have 977 warheads in storage for strategic forces upload. The authors also said that 1,500 warheads are retired and awaiting dismantlement. When combined with the numbers for strategic and non-strategic nuclear weapons, the total adds up to 5,977, which is frequently cited as the total number of nuclear weapons in the Russian nuclear arsenal. Yet, later in the report, the authors indicated that the 2,565 number was *not* the size of the Russian strategic nuclear stockpile but rather what they claimed (inaccurately, it appears) was the maximum upload capability of Russian strategic nuclear forces.[3] The "Russian nuclear forces, 2022" chart (Table 1 in the report) indicated that Russia had 1,185 warheads on its ICBM force and the text of the report said this was what the authors estimated the 306 nuclear-armed Russian ICBMs "can carry."[4] In addition to the ICBM numbers, the chart stated that Russia had 800 SLBM warheads and 580 bomber weapons.[5] These totals put Russia almost 500 warheads above the New START Treaty limit of 1,550 warheads.[6] This total of 500 warheads above the New START Treaty limit does not take into account the New START Treaty heavy bomber counting rule, which counts only one warhead per bomber,

[2] Ibid., p. 98.

[3] Ibid., p. 102.

[4] Ibid., p. 98.

[5] Ibid., p. 99.

[6] Ibid.

Consequently, the number of warheads above the Treaty limit could be much higher than 500.

Hence, there was a disparity between the numbers reflected in the text of the report and the numbers listed on the chart. The many journalists who cite the numbers in the FAS chart seem unaware of, or unconcerned with, this apparent discrepancy. Moreover, a November 2022 article on arms control published by the authors stated that because of the New START Treaty limits Russia only had 812 ICBM warheads, 576 SLBM warheads and 200 bomber weapons.[7] Again, the many journalists who cited the "Russian nuclear forces, 2022" chart numbers were apparently unaware of these contradictions. Much of the apparent confusion between the Russian upload capacity and total warhead numbers could be addressed if FAS were to use the same standard for presenting Russian force numbers as it uses to present total U.S. numbers in its 2023 report—which in the U.S. case are labeled "total available warheads" rather than simply "total warheads."

There is also a difference in Russian warhead numbers presented in the May 2023 version of the report, which stated:

> As of early 2023, we estimate that Russia has a stockpile of approximately 4,489 nuclear warheads *assigned* for use by long-range strategic launchers and shorter-range tactical nuclear forces. This is a net increase of approximately 12 warheads from last year, largely due to the addition of new intercontinental ballistic missiles and one new ballistic missile submarine, as well as the retirement of older warheads. Of the

[7] Jessica Rogers, Matt Korda, and Hans M. Kristensen, "Nuclear Notebook: The long view—Strategic arms control after the New START Treaty," *Bulletin of the Atomic Scientists*, November 9, 2022, available at https://thebulletin.org/ premium/2022-11/nuclear-notebook-the-long-view-strategic-arms-control-after-the-new-start-treaty/.

> stockpiled warheads, approximately 1,674 strategic warheads are deployed: about 834 on land-based ballistic missiles, about 640 on submarine-launched ballistic missiles, and possibly 200 at heavy bomber bases. Approximately another 999 strategic warheads are in storage, along with about 1,816 nonstrategic warheads. In addition to the military stockpile for operational forces, a large number—approximately 1,400—of retired but still largely intact warheads await dismantlement, for a total inventory of approximately 5,889 warheads…[8]

The February 2022 and the May 2023 "Russian nuclear forces" charts appear to be a combination of the authors' estimates of: 1) the maximum upload capability of Russian strategic offensive forces; 2) either the total inventory or the number of "assigned"[9] Russian non-strategic (or tactical) nuclear warheads (it is unclear which); and, 3) the number of Russian nuclear weapons awaiting dismantlement. Maximum upload capability, *however, is not necessarily the same* as the size of the Russian strategic nuclear inventory.

Thus, it appears that the 2022 numbers that were quoted worldwide as authoritative are not estimates of the total number of Russia's nuclear weapons inventory. Indeed, the February 2022 FAS report and the subsequent Kristensen, et al. arms control articles *do not contain any estimate of the total Russian nuclear stockpile* the way the United States defines

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[8] Hans M. Kristensen, Matt Korda, and Eliana Reynolds, "Russian Nuclear Weapons, 2023," *Bulletin of the Atomic Scientists*, Vol. 79, No. 3 (May 9, 2023), p. 174. (Emphasis added.) Available at https://www.tandfonline.com/doi/epdf/10.1080/00963402.2023.2202542?needAccess=true&role=button.

[9] The concept of "assigned" nuclear warheads is taken from a flawed analysis by a Russian emigree, Dr. Igor Sutyagin, which will be discussed in Chapter 6. It is a potential mechanism for understating the number of actual Russian nuclear weapons.

stockpile size—active and inactive weapons as well as weapons awaiting dismantlement.[10] Neither does the May 2023 version of the FAS report.

The May 2023 version of the FAS report identified its most important sources. It said that, "Essential references for following Russian strategic nuclear forces include the general New START aggregate data that the US and Russian governments release biannually; BBC Monitoring; Pavel Podvig's website on Russian strategic nuclear forces…and the Russia profile maintained by the James Martin Center for Nonproliferation Studies."[11] Certainly, *BBC Monitoring* and Pavel Podvig's website are important sources of information, but they represent only a small portion of the information that is available from Russian and Western sources. The *BBC* does useful translations of Russian language articles, but its scope does not compare to what the CIA's Open Source Center once made available. Like the FAS, Podvig and the James Martin Center for Nonproliferation Studies appear to support an extensive arms control agenda. Podvig—a Russian expatriate who focuses on Russia's strategic nuclear forces—in particular, appears to downplay or ignore the reality of Russian arms control violations, including those of the former Intermediate-range Nuclear Forces (INF) Treaty.[12] This is

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[10] U.S. Department of Energy, *Transparency in the U.S. Nuclear Weapons Stockpile* (Washington, D.C.: Department of Energy, October 5, 2021), pp. 1-3, available at https://www.state.gov/wp-content/uploads/2021/10/Fact-Sheet_Unclass_2021_final-v2-002.pdf.

[11] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 192.

[12] Pavel Podvig, "Moscow Shows the 9M729 Missile and its Launcher," *RussianForces.org,* February 19, 2019, available at https://russianforces.org/blog/2019/01/moscow_shows_the_9m729_missile.shtml; Pavel Podvig, "What was so Secret? United States Presents its Theory of the INF Violation," *RussianForces.org*, December 1, 2018, available at https://russianforces.org/blog/2018/12/what_was_so_secret_united_stat.shtml; and, Pavel Podvig, "Did the United States just Change its

pertinent because many of the difficulties associated with estimating the true number of Russian nuclear warheads involve examples of Russian non-compliance with existing arms control treaties. The FAS analyses illustrate the basic point that there is a great need to separate assessments of Russian nuclear capabilities from arms control advocacy. This will be discussed in more detail later.

Credible information on the Russian nuclear weapons inventory contained in these sources does not appear in either the February 2022 or the May 2023 FAS reports. Russian New START Treaty information released by the Department of State is minimal and unlikely to document all substantive Russian Treaty violations. The James Martin Center for Nonproliferation Studies 2018 report does not confirm the FAS data because its own main sources cited are the earlier FAS reports and Pavel Podvig's writings.[13] In short, the FAS reports offer references to works that include earlier FAS reports as main sources of information. This apparent circular referencing does not inspire confidence—particularly when the authors appear to advocate an arms control agenda that downplays Russian Treaty violations.

The FAS February 2022 and May 2023 assessments of Russian missile warhead upload potential were virtually the same. Yet these estimates likely are far too low to be the maximum Russian strategic nuclear force upload. In particular, the FAS estimate that Russia has only 200 bomber weapons at its bomber bases is highly unlikely in light of: 1) the delivery capability of Russian bombers, which the May 2023 FAS study admitted is about 800

Theory of INF Violation?," *RussianForces.org*, February 19, 2019, available at https://russianforces.org/blog/2019/02/did_the_united_states_just_cha.shtml.

[13] "Russia Nuclear Overview," *NTI*, October 11, 2018, available at https://www.nti.org/analysis/articles/russia-nuclear/.

nuclear weapons;[14] and, 2) the relatively low cost of nuclear cruise missiles, short-range nuclear missiles and nuclear bombs. Indeed, there is no limit in the New START Treaty on nuclear weapons at bomber bases and bomber base weapons storage areas are not subject to on-site inspection.

It appears that the February 2022 and May 2023 FAS reports assumed Russian New START compliance. This assumption—despite the absence of on-site inspections for almost two years at the time of the publication of the February 2022 report—is dubious.[15] It appears even more questionable in the May 2023 report. Given extensive and repeated Soviet/Russian violations of arms control obligations, there is little to inspire confidence in the accuracy of Russian data declarations in the absence of on-site inspections.

The February 2023 FAS paper advocating the New START Treaty and the May 2023 FAS Russian nuclear weapons report both claimed, without citing sources, that Russia had 1,674 actual (as distinct from accountable) deployed nuclear warheads.[16] Russia's September 2022 New START data indicated Russia had 1,549 accountable

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[14] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

[15] U.S. Department of State, *Report to Congress on Implementation of the New START Treaty Paragraph (a)(10) from Declaration (13) of Senate Executive Report 111-6 accompanying the New START Treaty (Treaty Doc. 111-5)*, (Washington, D.C.: Department of State, 2021), available at https://www.state.gov/wp-content/uploads/2021/04/Annual-New-START-Report.pdf.

[16] Matt Korda, "If Arms Control Collapses, US and Russian Strategic Nuclear Arsenals Could Double In Size," *Federation of American Scientists*, February 7, 2023, available at https://fas.org/blogs/security/2023/02/if-arms-control-collapses-us-and-russian-strategic-nuclear-arsenals-could-double-in-size/; and, Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 174.

warheads.[17] (In February 2023, *Sputnik News* said that Russia had reached 1,550 warheads.[18] Absent a major Kremlin decision, Russian state media will likely not report more than the Treaty limited number.) The FAS report claimed that Russia had a large number of SS-18 silos that were in the process of being converted to the new Sarmat, which reduced the number of deployed warheads on a temporary basis.[19]

The FAS reports assumed the SS-25s had been retired, supposedly on the basis of a statement made by Colonel General Karakayev in a December 2022 interview about Russian ICBM modernization.[20] However, it is a stretch to say he implied no SS-25s would be operational in early 2023. Since the SS-25 is a mobile ICBM, there is no requirement to retire it well before its replacement missiles arrive. Moreover, there is apparently no other source which says that 14 SS-18 silos were being converted to house the Sarmat heavy ICBM in early 2023. In November 2022, Pavel Podvig reported that, "As of October 2022, construction was underway at two silos [heavy ICBM] of the 302nd regiment of the 62nd missile division at Uzhur…"[21] If the FAS number is correct, there will be a rapid buildup of the

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[17] U.S. Department of State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," *State.gov*, September 1, 2022, available at https://www.state.gov/new-start-treaty-aggregate-numbers-of-strategic-offensive-arms-4/.

[18] Fantine Gardinier, "Hypersonic Missiles & Modernization: Putin Vows to Strengthen Russia's Nuclear Triad," *Sputnik*, February 22, 2023, available at https://sputnikglobe.com/20230222/hypersonic-missiles--modernization-putin-vows-to-strengthen-russias-nuclear-triad-1107721479.html.

[19] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., pp. 175-176.

[20] Ibid., pp. 180-182.

[21] Pavel Podvig, "Construction of Silos for Sarmat at Uzhur," *RussianForces.org*, November 22, 2022, available at https://russianforces.org/blog/2022/11/construction_of_silos_for_sarm.shtml.

Sarmat force and, hence, a large potential increase in the number of deployed Russian strategic nuclear warheads.

Russian Ballistic Missile Warhead Loadings

There are much higher estimates of the number of Russian strategic nuclear weapons than those offered in the FAS reports. For example, Russian expert Sergei Rogov has said the Russian strategic nuclear stockpile may be around 6,000 nuclear weapons.[22] The number of deployed Russian strategic nuclear warheads depends on warhead numbers per missile and, hence, uploading.

The warhead numbers for each type of Russia's strategic nuclear forces in the FAS "Russian nuclear forces, 2022" and in the FAS "Russian nuclear forces, 2023" charts (they are the same) come mainly from 1990 START Treaty data and two subsequent Russian additions to the START Treaty's Memorandum of Understanding (MOU), which expired in 2009. Yet, the current Russian strategic nuclear force is not composed of the missiles the Soviets had in 1990, but in most cases, by more capable variants of these missiles and mainly new types and variants of these new types. And, the FAS estimates are not even near the maximum possible warhead loads for current Russian nuclear missiles reported in the Russian press, official statements and, in one instance, a statement by the management of the Russian firm that builds the Layner/Liner SLBM missiles. Apparently, the FAS uses warhead yield numbers taken

[22] Pavel Felgenhauer, "Kremlin Overrules Own Defense and Foreign Policy Establishment on Arms Control," *Eurasia Daily Monitor*, Vol. 17, Iss. 149 (October 22, 2020), available at https://jamestown.org/program/kremlin-overrules-own-defense-and-foreign-policy-establishment-on-arms-control/.

from the same Russian press sources but dismisses the total warhead numbers from those sources.

The difference between Russian press reporting and the FAS warhead numbers is particularly striking with regard to the new versions of the SS-N-23 SLBM, the Sineva SLBM and the Layner/Liner SLBM. Both the February 2022 and the May 2023 editions of the FAS annual report list the Layner/Liner as having a maximum capability of four warheads.[23] The May 2023 report attributed this, in part, to a 2011 statement by Pavel Podvig.[24] What Podvig actually said, however, was that it was "a ten-warhead version of the R-29RM Sineva missile."[25]

Four warheads was the 1990 START Treaty accountability number for the SS-N-23 on which the Sineva and Layner/Liner are based.[26] This low number probably reflected a Soviet desire to minimize the required START Treaty reductions of its SLBM force. START Treaty accountability numbers do not necessarily depict the maximum delivery capability of the missiles; indeed, they are numbers negotiated for treaty purposes. For example, the 1987 edition of *Soviet Military Power* described the SS-N-23 as a 10-warhead missile.[27] Another report characterized

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[23] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 99; and, Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

[24] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

[25] Pavel Podvig, "Liner SLBM Explained," *RussianForces.org*, available at https://russianforces.org/blog/2011/10/liner_slbm_explained.shtml.

[26] *START Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms* (Washington, D.C.: Department of State, July 31, 1991), p. 121; and, U.S. Department of Defense, *Soviet Military Power, 1987* (Washington, D.C.: U.S. Government Printing Office, 1987), p. 33, available at https://apps.dtic.mil/sti/tr/pdf/ADA189858.pdf.

[27] U.S. Department of Defense, *Soviet Military Power, 1987*, op. cit.

it as capable of carrying 10 warheads.[28] In 2011, state-run *Sputnik News* wrote, "According to the developer of the missile, the State Missile Center, the Liner can carry up to four medium-yield warheads or up to 12 small-yield warheads, or their mixture."[29] In December 2022, *Sputnik News* reported that the Sineva and Layner/Liner SLBMs "are armed with between 4 and 12 MIRV warheads, with firepower of between 100 and 500 kilotons."[30] Presumably, the 100-kt is the "small-yield" warhead and the 500-kt is the "medium-yield" warhead.

The same holds true with regard to the Russian SS-N-18 SLBM. While the SS-N-18 is apparently no longer operational, the February FAS "Russian nuclear forces, 2022" chart credited it with three warheads, while the Defense Department's *Soviet Military Power* indicated that there was a seven-warhead version of the SS-N-18.[31] Indeed, a July 2000 FAS analysis said a version of the SS-N-18 Mod 3 carried seven nuclear warheads.[32] Therefore, even the FAS reports appear internally inconsistent.

The FAS "Russian nuclear forces, 2022" and "Russian nuclear forces, 2023" charts credited the new Bulava-30 SLBM with *a maximum of six warheads* and the SS-27 Mod

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[28] "Bulava ICBM Can Be Made Operational 2011 - RF Navy," *ITAR-TASS*, October 8, 2010, available at https://wnc.eastview.com/wnc/article?id=32801296.

[29] "Russia Tests New Ballistic Missile," *Sputnik News*, September 29, 2011, available at https://sputniknews.com/20110929/167259462.html.

[30] "How Many Nuclear Submarines Does Russia Have?," *Sputnik News*, December 19, 2022, available at https://sputniknews.com/20221205/how-many-nuclear-submarines-does-russia-have-1105034535.html.

[31] U.S. Department of Defense, *Soviet Military Power 1987*, op. cit., p. 33.

[32] "R-29R/R-2S / SS-N-18 STINGRAY," *Federation of American Scientists*, July 13, 2000, available at https://nuke.fas.org/guide/russia/slbm/r29r_r2s.htm.

2/RS-24 Yars ICBM *with a maximum of four warheads*.[33] Yet, there are numerous Russian reports suggesting the Bulava-30 and the SS-27 Mod 2/RS-24 Yars have a six-to-10 warhead capability or a 10-warhead capability.[34] About 15 years ago, the Bulava-30 SLBM was declared by Russia under the START Treaty as being a six warhead missile.[35] In 2017, *Sputnik News* wrote that the, "Bulava R-30 intercontinental ballistic missiles [are] each carrying six individually targeted 150-kiloton warheads."[36] (Russia calls SLBMs "intercontinental ballistic missiles.")

Where does the 10-warhead number for the Bulava-30 come from? In 2008, *SpaceNews.ru* said that Russia was developing a "super-lightweight" warhead for the Bulava-30.[37] This reported program may be the basis of Russian

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[33] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 99.

[34] "Watch: Russian Cutting-edge Nuclear Sub Fires Barrage of Four Intercontinental Ballistic Missiles," *RT*, December 3, 2020, available at https://www.rt.com/russia/509510-nuclear-submarine-missile-launch/; "Russian Submarine Successfully Test-Fires Bulava Intercontinental Missile," *TASS*, June 26, 2017, available at https://tass.com/defense/953398; "How Many Nuclear Submarines Does Russia Have?," op. cit.;"Russia's Nuclear Submarine Successfully Test-Fires Bulava Missiles," *TASS*, May 22, 2018, available at https://tass.com/defense/1005632; and, "Bulava Missile Could Be Put in Service Before Year's End - Defense Ministry," *Interfax*, June 2, 2011, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=39856794.

[35] Pavel Podvig, "Bulava has six warheads," *RussianForces.org,* April 3, 2006, available at https://russianforces.org/blog/2006/04/bulava_has_six_warheads.shtml.

[36] "Super Boomer: What's So Special About Russia's New Borei-A Missile Sub?," *Sputnik News*, November 18, 2017, available at https://sputniknews.com/20171118/russia-missile-sub-launch-1059220240.html.

[37] Mark B. Schneider, *New START: The Anatomy of a Failed Negotiation* (Fairfax, VA: National Institute Press, July 2012), p. 29, available at http://www.nipp.org/wp-content/uploads/2014/12/New-start.pdf.

press stories that the Bulava-30 and the SS-27 Mod 2/ RS-24 Yars have a 10-warhead capability. To make the number 10 credible, the new "super-lightweight" warhead would have to be smaller and have about two-thirds of the mass of the relatively small and light warhead originally deployed on the Bulava-30 and the Yars. If so, the yield of this warhead would likely be significantly less than the reported 100-150 kilotons, which apparently corresponds to a six-warhead package.

There is some evidence associating the SS-27 Mod 2/RS-24 Yars with four warheads, but *not as its maximum capability as asserted by the FAS*.[38] In 2009, Colonel General Nikolai Solovtsov, then Commander of Strategic Missile Forces, said it will carry "no fewer than four" warheads.[39] Russia's main governmental news agency, *ITAR-TASS*, reported that the single warhead Topol M ICBM "could be modified to carry up to six warheads."[40] (The MIRVed Topol M was later named RS-24 Yars and the United States calls it the SS-27 Mod 2.) The RS-24 Yars ICBM reportedly has more throw-weight than the Bulava-30 SLBM which was declared under the START Treaty to carry six warheads.[41] Pavel Podvig noted that if the Bulava-30 and the Yars (he used the then-current name "Topol M" for the Yars) can carry the

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[38] "Russia's strategic missile forces partly rearmed with advanced Yars systems," *Xinhuanet*, March 29, 2018, available at http://www.xinhuanet.com/english/2018-03/29/c_137074642.htm.

[39] Pavel Podvig, "'No fewer than four' warheads on RS-24," *RussianForces.org*, March 17, 2009, available at https://russianforces.org/blog/2009/03/no_fewer_than_four_warheads_on.shtml.

[40] "Strategic Rocket Forces To Start Deploying MIRVed RS-24 In Dec (Adds)," *ITAR-TASS*, October 12, 2009, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=32549903; and, "Topol Or Voyevoda Warhead Equivalent To Several Thousand Bombs - General," *ITAR-TASS*, December 16, 2009, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=33098813.

[41] Podvig, "Bulava has Six Warheads," op. cit.

same warhead, the Yars would "be able to carry seven of them…"[42] (In the late 1970s, the somewhat less capable U.S. Minuteman III was tested with seven warheads.)[43]

Podvig later wrote that a new warhead was developed for the Bulava-30 and the Yars and that, "…I was told that it's a design that had been tested before the Soviet Union ended its nuclear test program in 1991. One option that I described a few years ago seems to fit a warhead that weighs about 90 kg and has a yield of about 100 kt…"[44] He was probably referencing the same warhead *Sputnik News* indicated had a yield of 150-kt since the yield difference would not likely justify the high cost of a new design.

The FAS "Russian nuclear forces, 2022" chart did not list the Yars-S, which is the improved version of the SS-27 Mod 2/RS-24 Yars. The May 2023 version of the chart did differentiate between the Yars and Yars-S, but the Yars-S was treated no differently in terms of its warhead potential than the original version of the Yars.[45] This is important because the different versions of the Yars reportedly carry substantially different warheads.

For a few years, the Russians mentioned the Yars-S but did not describe it until 2021 when the Russian Ministry of Defense (MoD) said it had a throw-weight of 1,250-kg, which is 50-kg more than the SS-27 Mod 1, the missile that

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[42] Pavel Podvig, "How Many Warheads?" *RussianForces.org*, May 17, 2007, available at https://russianforces.org/blog/2007/05/how_many_warheads.shtml.

[43] Congressional Budget Office, *The Trident II Missile Test Program: Implications for Arms Control* (Washington, D.C.: Congressional Budget Office, November 1987), p. 20, available at https://www.cbo.gov/sites/default/files/100th-congress-1987-1988/reports/doc17a.pdf.

[44] Pavel Podvig, "Liner SLBM explained," *RussianForces.org*, October 4, 2011, available at https://russianforces.org/blog/2011/10/liner_slbm_explained.shtml.

[45] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

later became the MIRVed SS-27 Mod 2/RS-24 Yars.[46] (Russia never declared the first version of the RS-24 Yars missile under the START Treaty, presumably because it was a START Treaty violation – MIRVing the single warhead SS-27 Mod 1/Topol M Variant 2 was prohibited and the MOU data would have shown it to be a violation).[47] The Russian MoD provided no information on the number of warheads the Yars-S carries, although it reportedly carries "medium yield warheads."[48] Since the *1970 vintage* U.S. Minuteman III with 1,150-kg of throw-weight could carry three warheads of similar size and weight,[49] four "medium" warheads on the Yars-S are plausible. Indeed, *Sputnik News* reported that the IRBM version of the Yars (the RS-26 Rubezh, which Russia claimed was an ICBM to avoid an

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[46] "Russia 'Reveals' Yars-S ICBM data," *BBC Monitoring Former Soviet Union*, January 29, 2021, available at https://infoweb.newsbank.com/apps/news/openurl?ctx_ver=z39.88-2004&rft_id=info%3Asid/infoweb.newsbank.com&svc_dat=WORLDNEWS&req_dat=0D7AB4CAB745C82A&rft_val_format=info%3Aofi/fmt%3Akev%3Amtx%3Actx&rft_dat=document_id%3Anews/18050FCC8E90BAB0; and, Podvig, "How Many Warheads?," op. cit.

[47] Schneider, *New START: The Anatomy of a Failed Negotiation,* op. cit., p. 62.

[48] "Russian paper discusses nuclear missile force upgrade plans," *BBC Monitoring Former Soviet Union*, January 8, 2021, available at https://infoweb.newsbank.com/apps/news/openurl?ctx_ver=z39.88-2004&rft_id=info%3Asid/infoweb.newsbank.com&svc_dat=WORLDNEWS&req_dat=0D7AB4CAB745C82A&rft_val_format=info%3Aofi/fmt%3Akev%3Amtx%3Actx&rft_dat=document_id%3Anews%252F17FE3201B999B270.

[49] "Complete List of All U.S. Nuclear Weapons," *Nuclear Weapons Archive*, June 12, 2020, available at https://nuclearweaponarchive.org/Usa/Weapons/Allbombs.html; and, *START Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms Signed in Moscow July 31, 1991*, op. cit., p. 120.

INF Treaty violation),[50] carried four 300-kiloton warheads.[51] This suggests the Yars-S can do the same. However, the possibility cannot be ruled out that it is deployed with three such warheads, as the FAS studies suggest.[52]

Both the February 2022 and the May 2023 FAS reports referred to the Russian SS-18/R-36M2 heavy ICBM as a 10-warhead missile.[53] This appears to confuse SALT II and START Treaty warhead number limitations and attribution rules with maximum delivery capability; these are not the same. As early as 1979, then Senator Jake Garn (R-UT) indicated that the SS-18 might carry more than 10 warheads.[54] Since 1980, the Russian SS-18 (at that time the Mod 4) had been reported as capable of delivering 14 warheads. In 1980, *Air and Space Forces Magazine* stated, "Under SALT II rules the SS-18 can carry up to ten MIRVs, but it has been tested for the release of fourteen warheads."[55] An early 1980s publication by the prestigious Committee on the Present Danger credited the Soviet SS-18

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[50] Mark B. Schneider, "Russia's INF Treaty Violations: Evidence and Implications," *Journal of Strategy and Politics*, Volume 2, Number 3 (2020), pp. 54-66, available at https://studyofstrategyandpolitics.files.wordpress.com/2020/06/jsp-7-schneider-russias-inf-treaty-violations.pdf.

[51] "Doomsday Weapon: Russia's New Missile Shocks and Dazzles US, China," *Sputnik News*, March 9, 2016, available at https://sputniknews.com/20160309/russia-missile-shocker-1036002714.html; and, "RS-26 Rubezh," *CSIS Missile Threat*, July 31, 2021, available at https://missilethreat.csis.org/missile/ss-x-31-rs-26-rubezh.

[52] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 99.

[53] Ibid., p. 103.

[54] John Rees, "Senator Jake Garn," *The Review of the News*, May 23, 1979, p. 33.

[55] Edgar Ulsamer, "Alarming Soviet Developments," *Air & Space Forces Magazine*, November 1, 1980, available at https://www.airandspaceforces.com/article/1180alarming/.

with 10-14 warheads.[56] In 1985, the *Associated Press* stated that SS-18s "have been tested carrying 12 warheads—two more than the ceiling set by the unratified 1979 Strategic Arms Limitation Treaty."[57] Because of the date of this report, it apparently refers to the SS-18 Mod 4. According to Pavel Podvig, one version of the SS-18 considered by the Soviets in the 1970s (and less capable than the new Russian Sarmat heavy ICBM), could carry up to 38 warheads.[58] While somewhat more capable than the SS-18 Mod 5/R-36M2 version actually developed, the throw-weight difference was less than 10 percent. In 1986, the *San Diego Union* reported that, "The SS-18 has been tested twice with 14 warheads; some believe it could carry 30."[59] In 1987, the *Los Angeles Times* indicated that the Soviet SS-18 could carry up to 14 warheads.[60]

In 1988, after leaving the Arms Control and Disarmament Agency, Patrick Glynn credited the SS-18 with "10-plus warheads per missile."[61] In 1989, Robert

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[56] Charles Tyroler, II, ed., *Alerting America – The Papers of the Committee on the Present Danger* (Washington, D.C.: Pergamon Brassey's, 1984), p. 239.

[57] "Soviets Tried to Fool U.S. on Missile Accuracy," *Associated Press*, August 8, 1985.

[58] Pavel Podvig, "Multiple (as in 'up to 38') Warheads," *RussianForces.org,* August 8, 2006, available at https://russianforces.org/blog/2006/08/multiple_as_in_up_to_38_warhea.shtml.

[59] Edward Nichols, "Arms Talks art must be Finding the extra mile," *The San Diego Union-Tribute*, June 15, 1986, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/11791EFEC81361F0.

[60] "New Soviet SS-18 Explodes Twice in Tests," *Los Angeles Times*, September 18, 1986, available at https://www.latimes.com/archives/la-xpm-1986-09-18-mn-11441-story.html.

[61] Patrick Glynn, "Reagan Rush to Disarm," *Commentary*, March 1988, available at https://www.commentary.org/articles/patrick-glynn/reagans-rush-to-disarm/.

Evans and Rowland Novak wrote that, "U.S. intelligence reports that the SS-18 actually can carry at least 14 warheads, and probably even more than that."[62] A declassified CIA report contained the text of a study by David Sullivan (former CIA analyst and long-time senior Congressional staffer), which stated that a National Intelligence Estimate "reportedly says [the] SS-18 [was] deployed with 14 warheads each."[63] In 2009, *Kommersant*, one of Russia's leading business publications, reported the SS-18 could deliver "up to 14 individually guided warheads yielding up to 800 kt."[64] The data supplied about the missile made it clear that it was the more capable SS-18 Mod 5. In November 2022, images of the SS-18 Mod 5 warhead dispensing "bus" and its warhead tweeted by a Russian missile expert confirmed that it "can carry up to 14 warheads, in two rows of 7."[65] The photos made it clear beyond any reasonable doubt that the SS-18 could deliver 14 very powerful warheads; hence, it was not a 10-warhead missile. The Russian MoD said the yield of the SS-18 Mod 5 warhead ranges from 550-750 kilotons.[66]

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[62] Robert Evans and Rowland Novak, "Report may put START on hold," *Chicago Sun-Times*, March 24, 1989, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/0EB36E4636C90675.

[63] "Soviet SALT Violations – Soviet Break Out from Arms Control," Central Intelligence Agency, original January 29, 1987, published online December 27, 2016, available at https://www.cia.gov/readingroom/document/cia-rdp89t00234r000100030027-5.

[64] "The Ministry of Defense Made a Difficult Decision," *Kommersant.ru*, December 18, 2009, available at https://www.kommersant.ru/doc/1294272.

[65] Joseph Trevithick, "Russia Releases Incredibly Detailed Views Of Its Massive 'Satan' Missile," *TheDrive.com*, November 7, 2022, available at https://www.thedrive.com/the-war-zone/russia-releases-incredibly-detailed-views-of-its-massive-satan-missile.

[66] "Intercontinental ballistic missile R36M2 Voivode," Defense Ministry of the Russian Federation, no date, available at

During the New START negotiations, *ITAR-TASS* reported that, "An SS-18 missile can deliver up to 36 warheads, whereas a Minuteman-III missile could deliver no more than 3 warheads."[67] This is likely a theoretical number based upon the throw-weight of the SS-18 Mod 5 rather than the number of attachment points on the SS-18 warhead dispensing system. Very large numbers of relatively low-yield warheads (e.g., about 100-kt or 150-kt) are not consistent with the likely counterforce mission of the missile. Its numbers, high accuracy and yield give it the best capability against hard targets. It is possible that Russia has uploaded the SS-18, or at least some of them, to 14 of the standard high-yield weapons because it likely can be done cheaply and covertly in the absence of on-site inspections. A 14-warhead SS-18 will have a greater probability of successfully targeting the United States than a 10-warhead version even with a large number of penetration aides since the U.S. strategic missile defense system is so limited and deliberately designed to avoid undermining Russia's strategic nuclear forces.

The FAS February 2022 and May 2023 "Russian nuclear forces" charts also treated the Sarmat as a 10-warhead ICBM with the authors stating that, "Rumors that the SS-X-29 [the Sarmat] could carry 15 or more MIRV warheads, though, seem exaggerated."[68] These are not "rumors," however, but rather Russian press reports, and 15 warheads is likely an underestimate based on the throw-weight of the Sarmat. As noted above, the reports of 15 warheads refer to the early

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https://eng.mil.ru/en/structure/forces/strategic_rocket/more.htm?id=10357430@morfMilitaryModel.

[67] The New START Working Group, "New START: Potemkin Village Verification," The Heritage Foundation, June 24, 2010, available at https://www.heritage.org/arms-control/report/new-start-potemkin-village-verification.

[68] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., pp. 99, 106.

100-ton Sarmat design, not the 200-ton design Russia apparently built with twice the throw-weight.[69] There had to be a reason for Russia to double the weight of the missile because this is an expensive undertaking. The February 2022 and the May 2023 FAS studies completely ignored an *RT* report which said the Russian MoD indicated it was a 20-warhead missile with a 10,000-kg throw-weight.[70] *RT*'s account should be seen as credible because it is consistent with other Russian statements about the throw-weight of the Sarmat missile. The SS-18 Mod 4 has a reported throw-weight of 7,300-kg[71] compared to 10,000-kg reported for the Sarmat.[72] Indeed, a FAS publication said the SS-18 Mod 4

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[69] "Russian Missile Designer Reviews Arguments Over Liquid, Solid Fuel Missiles," *Nezavisimoye Voyennoye Obozreniye Online*, July 15, 2011, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=39793684; "Putin says Sarmat system to enter operational service in 2020," *TASS*, May 18, 2018, available at https://tass.com/defense/1005163; "Russia begins tests of Promising Sarmat Missile Complex," *TASS*, May 18, 2018, available at https://tass.com/defense/1005163; and, Sakshi Tiwari, "Russia's 200-Ton 'Monster Missile' RS-28 Sarmat ICBM That Can Fire Hypersonic Weapons Enters Serial Production," *Eurasian Times*, November 24, 2022, available at https://eurasian times.com/russias-200-ton-rs-28-sarmat-icbm-hypersonic.

[70] "Formidable Sarmat: Satan's successor that can Pierce any Defense," *TASS*, October 25, 2016, available at http://tass.com/defense/908575; "Guaranteed Defeat of Enemy Infrastructure: How the Sarmat Ballistic Missile will Enhance the Combat Potential of the Strategic Missile Forces," *RT*, December 16, 2019, available at https://russian.rt.com/russia/article/698699-sarmat-raketa-rvsn-perevooruzhenie.

[71] Schneider, *New START: The Anatomy of a Failed Negotiation*, op. cit., p. 65; and, "Most Powerful Strategic RS-20 to Remain In Inventory - Kommersant Moscow," *Kommersant.com*, July 29, 2008, available at http://www.kommersant.com/p-12927/r_500/RS-20_inventory/.

[72] "Formidable Sarmat: Satan's Successor that can Pierce any Defense," op. cit; "Guaranteed Defeat of Enemy Infrastructure," op. cit.; and, "Russia: Sarmat heavy ICBM is being prepared for pop-up tests this year," *BBC Monitoring of the Former Soviet Union*, February 12, 2015,

had a throw-weight of 7,200-kg and noted the Western press reports of a 14-warhead capability.[73] Although multiple reports provide conflicting information, much is already known about the SS-18 Mod 4 because of Russian efforts to market it as a space-launch vehicle.

In light of the throw-weight increase in the Sarmat, a 20-warhead payload appears credible. Moreover, the Sarmat is replacing the SS-18 Mod 5s, which the FAS analysis said "…now carry only five warheads each to meet the New START limit for deployed strategic warheads."[74] However, according to the Russian Ministry of Defense, each Sarmat that is deployed in the near future could carry 15 more warheads than the FAS estimates for the SS-18s.

It can be argued that the New START Treaty would limit Russia to five-to-10 warheads on the Sarmat ICBM, but Russia has "suspended" its participation in New START, and the on-site inspections needed for verification have not taken place for years. It simply is not plausible to argue that 10 warheads is the maximum number the Sarmat can deliver. Yet, the May 2023 FAS report, while noting some uncertainty about the yield, assesses that the *maximum* Sarmat capability is 10 warheads of 500-kt.[75] That is about what the FAS attributed to the 1980s vintage Soviet SS-24 ICBM (not the RS-24-Yars) which had only about 40 percent of the throw-weight of the Sarmat.[76] Moreover, the Russians

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available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/1537372ECBB02C18.

[73] "R-36M / SS-18 SATAN Overview," *Federation of American Scientists*, no date, available at https://programs.fas.org/ssp/nukes/nuclearweapons/russia_nukescurrent/ss18.html.

[74] Kristensen, Korda and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

[75] Loc. cit.

[76] *START Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms Signed in Moscow July 31, 1991*, op. cit., p. 120; and, "RT-

say the Sarmat will be deployed this year[77] in a time frame where there will almost certainly be no on-site inspections, making it impossible to confirm the number of warheads the Russians deploy on it.

The FAS February 2022 and May 2023 "Russian nuclear forces" charts credited Russia with no operational SS-19 ICBMs with their original six ballistic warheads, but provided no source.[78] There apparently has been no announced retirement of these missiles. However, in 2020, state-run *Russia Beyond the Headlines* carried an article with a list of operational Russian ICBMs which contained only the SS-19s converted to hypersonic boost glide vehicles (the Avangard) as being operational.[79] In April 2021, *TASS* reported that there are "currently 50" SS-19s deployed.[80] An item on the Center for Strategic and International Studies (CSIS) Missile Threat website dated August 2021 said the SS-19 was still operational.[81] Since the FAS reports count zero legacy SS-19 in its assessed Russian strategic nuclear force, every SS-19 that actually remains deployed with ordinary ballistic warheads would increase their assessed warhead number.

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23 / SS-24 SCALPEL," *Federation of American Scientists*, no date, available at https://nuke.fas.org/guide/russia/icbm/rt-23.htm.

[77] "Congratulations on the Occasion of Defender of the Fatherland Day," *Kremlin.ru*, February 23, 2023, available at http://en.kremlin.ru/events/president/news/70575.

[78] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 99; and, Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

[79] Igor Rozin, "Russia's Ground-Based Nuclear Shield set to Become Invulnerable," *Russia Beyond the Headlines*, February 21, 2020, available at https://www.rbth.com/science-and-tech/331727-russias-ground-based-nuclear-shield.

[80] "Russia may extend service life of SS-19 Stiletto ICBMs by three years," *TASS*, April 2, 2021, available at https://tass.com/defense/1273521.

[81] "UR-100 (SS-19)," *CSIS Missile Threat*, August 2, 2021, available at https://missilethreat.csis.org/missile/ss-19/.

Russian Bomber Weapons

The assertion in the February 2022 FAS report and in the February 2023 FAS New START Treaty advocacy paper that Russia had only 200 nuclear bomber weapons at its heavy bomber bases appears to be exceedingly low in light of the fact that the February 2022 report itself said that Russian bombers can carry 580 nuclear warheads,[82] and that many sources credit them with the ability to carry 800 or more. Indeed, the May 2023 FAS report credited the Russian bomber force with the ability to carry 800 warheads.[83]

The New START Treaty is so permissive concerning nuclear bomber weapons that in 2010 Kristensen stated that the bomber weapon counting rule was "totally nuts," further adding that the rule "frees up a large pool of warhead spaces under the treaty limit that enable each country to deploy many more warheads than would otherwise be the case…"[84] Russian Major General (ret.) Vladimir Dvorkin echoed these comments saying, "Firstly, it [New START] does not provide a real reduction of strategic offensive armaments by the number of nuclear warheads as compared with the Moscow Strategic Offensive Reductions Treaty [SORT] of 2002 due to the new rules in counting nuclear armaments of heavy bombers: one heavy bomber—one warhead."[85] He estimated Russian

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[82] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 99.

[83] Kristensen, Korda and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 185.

[84] Peter Baker, "Arms Control May Be Different on Paper and on the Ground," *The New York Times*, March 30, 2010, available at http://www.nytimes.com/2010/03/31/world/europe/31start.html.

[85] "New START Enables Russia To Keep Nuclear Balance With USA – Expert," *Interfax AVN*, December 23, 2010, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/134523B70B3F7888.

bomber capability at over 850 warheads.[86] A 2013 report by the U.N. Institute for Disarmament Research stated the Russian bomber warhead number "could be as high as about 800."[87] The source cited for this number was the 2012 edition of the FAS report on Russian nuclear weapons, at the time authored by Hans Kristensen and Robert Norris.[88] The May 2023 FAS report acknowledged that the Russian bomber force can carry about 800 nuclear long-range cruise missile warheads, but still estimated that they had only 200 at their bomber bases.[89] The report did not explain a basis for this discrepancy.

Most estimates appear to be based on the officially agreed bomber accountability numbers in the START II Treaty. These credit Russian bombers with 6-16 long-range nuclear cruise missiles depending on the bomber type. *Sputnik News* indicated that, "Under the [New START] Treaty, one nuclear warhead will be counted for each deployed heavy bomber which can carry 12-24 missiles or bombs, depending on its type."[90] A Western source also reported that the Tu-160 heavy bomber can carry 24 nuclear Kh-15 short-range supersonic missiles.[91] There are

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[86] Schneider, *New START: The Anatomy of a Failed Negotiation*, op. cit., p. ii.

[87] Tamara Patton, Pavel Podvig, and Phillip Schell, "A New START Model for Transparency in Nuclear Disarmament" (Geneva, Switzerland: United Nations Institute for Disarmament Research, 2013), p. 23, available at https://www.unidir.org/publication/new-start-model-transparency-nuclear-disarmament.

[88] Hans M. Kristensen and R.S. Norris, "Russian Nuclear Forces, 2012," *Bulletin of the Atomic Scientists*, Vol. 68, No. 2 (2012), available at https://journals.sagepub.com/doi/full/10.1177/0096340212438665.

[89] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 186.

[90] "New START Treaty based on Mutual Russian–U.S. Concessions," *RIA Novosti*, April 12, 2010, available at http://en.rian.ru/analysis/20100409/158499862.html.

[91] Ryan Cunningham, *Modern Russian Military Aircraft* (London: Amber Books Limited, 2023), p. 66.

conflicting reports on whether the Kh-15 missiles are still operational.[92] There are, however, many small Russian cruise missiles that could be nuclear-capable and carried by the Tu-160. Moreover, the Tu-160 reportedly can also carry nuclear bombs.[93]

Pavel Podvig described the genesis of the New START Treaty's bomber weapons intentional undercounting rule as follows: "The United States said that it was ready to count bombers with their actual weapons load, but Russia objected to the transparency provisions that this arrangement would entail."[94] Hans Kristensen said the same thing: "According to U.S. officials, the United States wanted the New START Treaty to count real warhead numbers for the bombers but Russia refused … on-site inspections of weapons storage bunkers at bomber bases."[95] It is implausible that Russia would insist on such a large loophole without an intent to exploit it.

Russia reportedly has a program underway to develop the Pak DA stealth bomber and another program to produce at least 50 of a new version of the Tu-160 heavy bomber.[96]

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[92] Ibid., pp. 65-66. "Winged Snipers: Best of the Best of Russia's Ballistic and Cruise Missiles," *Sputnik News*, December 23, 2017, available at https://sputniknews.com/military/01712231060272064-Russian-air-launched-ballistic-cruise-missiles/.

[93] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op, cit., p. 99.

[94] Pavel Podvig, "The New START Bomber Count and Upload Potential," *RussianForces.org*, March 31, 2010, available at http://russianforces.org/blog/2010/03/the_new_start_bomber_count_and.shtml.

[95] Hans M. Kristensen, "New START Treaty Has New Counting," *Federation of American Scientists*, March 29, 2010, available at http://www.fas.org/blog/ssp/2010/03/newstart.php.

[96] "Russia to Renew Production of Tu-160 'Blackjack' Strategic Bomber," *Sputnik News*, April 29, 2015, available at http://sputniknews.com/military/20150429/1021514706.html; "Russia Wants To Build Its Very Own 'B-2 Stealth Bomber' Here Come the Problems," *National Interest*, February 22, 2020, available at

Russia also reportedly is increasing the production rate of the new version of the Tu-160.[97] This creates the potential for a substantial increase in the Russian inventory of strategic nuclear weapons that would not be counted under the New START Treaty. There is no apparent evidence suggesting that Russia has changed its views concerning the importance of bomber nuclear weapons. Indeed, in 2021, *TASS* singled out the nuclear capabilities of the Tu-95 heavy bomber, stating "The Tu-95MS strategic missile-carrying bomber is designated to accomplish the tasks of striking vital targets in remote military-geographical areas and deep in the rear of continental theaters of military operations, employing nuclear missile weapons."[98]

Russian Suspension of the New START Treaty

In his February 2023 State of the Nation Address, President Putin announced, "…I am forced to announce today that Russia is suspending its participation in the strategic

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https://nationalinterest.org/blog/buzz/russia-wants-build-its-very-own-b-2-stealth-bomber-here-come-problems-126421; "Russia's Tu-160M2 Bomber More Advanced Than Anything Pentagon Has In Its Arsenal," *Sputnik News*, June 22, 2017, available at https://sputniknews.com/military/201706221054888100-tu160m2-prospects-analysis/; and, "Russia's Modernized Tu-160M Nuclear-capable Bomber takes to the Skies for the 1st time (VIDEO)," *RT*, February 6, 2020, available at https://www.rt.com/russia/480238-russian-modernized-tu160m-flight/.

[97] "Russia to ramp up Tu-160M Strategic Bomber Production in Coming Years – Rostec," *TASS*, December 30, 2022, available at https://tass.com/defense/1557695.

[98] "Tu-95MS strategic bombers perform night flights in southern Russia drills," *TASS*, July 6, 2021, available at https://tass.com/defense/1310863.

offensive arms treaty."[99] Putin signed into law a Duma bill suspending (illegally) the New START Treaty.[100] This came just shy of the third anniversary of the end of the New START Treaty's on-site inspections. The Russian Foreign Ministry's statement on suspension said that Russia "…will continue to strictly comply with the quantitative restrictions stipulated in the Treaty for strategic offensive arms within the life cycle of the Treaty. Russia will also continue to exchange notifications of ICBM and SLBM launches with the United States in accordance with the relevant Soviet-US agreement signed in 1988."[101]

In essence, Russia is attempting to convince the world that suspension of its participation in New START is not a suspension of its New START obligations. This, however, is false. Soon after this announcement, Russia ended the mandatory data notifications required under New START.[102] Despite the Russian Foreign Ministry's statement linking Russia's New START suspension to U.S. policy regarding Ukraine, an additional motivation appears to be an attempt to play upon the fears of those in the West who see the loss of the only remaining strategic arms control

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[99] Joseph Trevithick, "Russia Releases Incredibly Detailed Views Of Its Massive 'Satan' Missile," *The War Zone*, November 21, 2022, available at https://www.thedrive.com/the-war-zone/russia-releases-incredibly-detailed-views-of-its-massive-satan-missile.

[100] Vladimir Isachenkov, "Putin signs bill to suspend last nuclear arms pact with US," *Associated Press*, February 28, 2023, available at https://apnews.com/article/russia-us-nuclear-pact-suspension-ukraine-putin-e579b7562fb816d899e037d1d271a8c5.

[101] "Foreign Ministry Statement in Connection with the Russian Federation Suspending the Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START)," *Foreign Ministry of the Russian Federation*, February 21, 2023, available at https://mid.ru/en/foreign_policy/news/1855184/.

[102] "Russia Stops Sharing Information about Nuclear Forces with the U.S.," *NBC News*, March 29, 2023, available at https://www.nbcnews.com/news/world/russia-nuclear-information-us-new-start-treaty-war-ukraine-putin-rcna77150.

agreement with Russia as an indication that the United States must redouble its commitment to arms control and seek to accommodate Russian concerns. Indeed, many Western commentators have advocated that the United States do so. Yet, as Russian Deputy Foreign Minister Sergei Ryabkov made clear, Russia's New START suspension would not end anytime soon: "Until the United States changes its behavior, until we see signs of common sense in what they are doing in relation to Ukraine ... we see no chance for the decision to suspend New START to be reviewed or re-examined."[103]

The May 2023 FAS report had a long treatment of "suspension" (which occasionally seems to lend credence to Russia's arguments) but it completely ignored the most important questions: 1) Have the Russians used the more than three years without on-site inspections and "suspension" to upload their strategic missile force covertly?; 2) If so, when did it start and how extensive has it been?; and, 3) What are the implications of this for the U.S. nuclear deterrent posture and U.S. national security?

Another possible motive for "suspension" of the Treaty would be to legitimize Russian actions if they are caught illegally uploading warheads and if they ever want to announce that they have gone beyond the New START Treaty limits. This would be a difficult decision, but Russia may see it as another form of nuclear threat.

Pavel Luzin, a Jamestown Institute Russia analyst, has pointed out, "…evidence suggests that Russia did not intend to abide by the New START Treaty after its full-scale invasion of Ukraine, exactly one year ago."[104] This appears

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[103] "Russia will not Rejoin Nuclear Treaty Unless U.S. changes Ukraine Stance - Deputy Foreign Minister," *Reuters*, March 2, 2023, available at https://www.reuters.com/world/europe/russia-will-not-rejoin-nuclear-treaty-unless-us-changes-ukraine-stance-deputy-2023-03-01/.

[104] Pavel Luzin, "Why Did Russia Suspend the New START Treaty?," *Eurasia Daily Monitor*, Vol. 20, Iss. 33, February 24, 2023, available at

to be correct. In September 2022, the Russian space agency indicated it was not planning a required demonstration of the new Sarmat heavy ICBM until February 2024.[105] This information appears to have been made public inadvertently because it was contained in a budget document.

Every new mobile Yars ICBM Moscow deploys is replacing a single warhead ICBM with a multiple warhead ICBM and, as noted above, the Sarmat likely has substantially more warhead potential than the SS-18 it will replace. Russia's stated reasons for refusing to resume on-site inspections in 2022 are implausible: The Covid pandemic; the price of airline tickets; or, the cost of flying an inspection aircraft from Russia to the United States. While potential Russian upload activity since the end of the New START Treaty's on-site inspections will be discussed later in this paper, if the FAS assessments of Russian vs. U.S. upload potential are accurate, this would explain the Russian Foreign Ministry's statement urging the United States *not* to upload its missiles in response to Russian suspension of on-site inspections. If the FAS is correct about Russian upload potential, the United States would gain much more from the elimination of the New START Treaty limit on deployed warheads. While the evidence indicates that the FAS analyses understate Russian upload potential, the Russians certainly do not want the United States to upload its nuclear systems, which could improve the U.S. deterrent posture.

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https://jamestown.org/program/why-did-russia-suspend-the-new-start-treaty/.

[105] "Roscosmos to Demonstrate Sarmat ICBM to US Inspectors by late February 2024," *TASS*, September 23, 2022, available at https://tass.com/society/1512509.

Russian Non-Strategic Nuclear Weapons

The February 2022 FAS report provided no documentation for its estimate that Russia has 1,912 non-strategic nuclear weapons. The May 2023 FAS assessment of a decline in Russian non-strategic nuclear weapons to 1,816 also lacked needed documentation.[106] The intensified level of interest in Russia's non-strategic nuclear capability since Putin's invasion of Ukraine is so great that if any credible sources for a decline in numbers existed, they would have almost certainly been subject to considerable press attention. No such sources have surfaced**.** Indeed, in June 2023, NATO Secretary General Jens Stoltenberg stated there is, "…a pattern we have seen over several years, where Russia has modernised [its] nuclear weapons, deployed more nuclear weapons – also up in the High North – but now also for the first time permanently deploying weapons to Belarus."[107]

The FAS May 2023 analysis also appears to have ignored repeated statements by the Biden Administration since the Russian invasion of Ukraine that Russia has about 2,000 *active* non-strategic nuclear weapons and that the number is increasing.[108] Additionally, it appears to have ignored the

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[106] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., pp. 174-175, 187-190.

[107] "Press Conference by NATO Secretary General Jens Stoltenberg Following the Meeting of NATO Ministers of Defence in Brussels," *NATO*, June 16, 2023, available at https://www.nato.int/cps/en/natohq/opinions_215694.htm.

[108] U.S. Department of Defense, 2022 *Nuclear Posture Review*, op. cit., p. 4; "2022 Space and Missile Defense Symposium," *STRATCOM.mil*, August 11, 2022, available at https://www.stratcom.mil/Media/Speeches/Article/3126694/ 2022-space-and-missile-defense-symposium/; and, Anthony J. Cotton, *Statement of Commander Anthony J. Cotton, United States Strategic Command* (Washington, D.C.: House Armed Services Committee, Subcommittee on Strategic Forces, March 8, 2023), p. 8, available at https://armedservices.house.gov/sites/republicans.armedservices.hou

Biden Administration's warning that Russia has "increased its reliance on nuclear weapons."[109]

Furthermore, the FAS May 2023 analysis appears to ignore other Western and Russian media estimates of Russian non-strategic nuclear weapons numbers that do not agree with its estimates. For example, the 2019 and 2021 reports produced by the Congressional Research Service indicated estimates for Russian non-strategic nuclear weapons range from 1,000 to 6,000.[110] Some estimates are significantly higher. For example, noted Russian journalist Pavel Felgenhauer has said estimates range from several thousand to 10,000.[111]

The February 2022 FAS report stated that Russia has 500 non-strategic nuclear bombs.[112] There are sources for this number that are *not* cited in the FAS paper, but they are a decade or more old.[113] The February 2022 FAS report

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se.gov/files/2023%20USSTRATCOM%20Congressional%20Posture%20Statement%20-%20HASC-SF.pdf.

[109] Office of the Director of National Intelligence, *Annual Threat Assessment of the U.S. Intelligence Community* (Washington, D.C.: Office of the Director of National Intelligence, February 6, 2023), p. 14, available at https://www.dni.gov/index.php/newsroom/reports-publications/reports-publications-2023.

[110] Amy F. Woolf, *Non-strategic Nuclear Weapons* (Washington, D.C.: Congressional Research Service, September 6, 2019), available at https://crsreports.congress.gov/product/pdf/RL/RL32572/38.

[111] Felgenhauer, "Kremlin Overrules Own Defense and Foreign Policy Establishment on Arms Control," op. cit.

[112] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., pp. 99, 112.

[113] Alexei Arbatov, *Missile Defence and the Intermediate Nuclear Forces Treaty* (Canberra, Australia: The International Commission on Nuclear Non-proliferation and Disarmament, March 2009), available at http://www.icnnd.org/Documents/Arbatov_INF_Paper.pdf; "Moscow, Washington Must Demonstrate Openness Regarding Nuclear Potentials – Expert," *Interfax*, April 18, 2011, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=31236848; and, Alexei Arbatov, "The Modern Arsenals of Nuclear States," in Alexei Arbatov and Vladimir Dvorkin, eds.; English version edited by Natalia Bubnova,

reasonably assumed that there are warheads for each of Russia's nuclear-armed ABM interceptor missiles and credited Russia with 290 nuclear warheads for Surface-to-Air Missiles (SAMs).[114] The number for SAMs given, however, is much lower than the last available Russian source (700), which is about 10 years old.[115] The February 2022 FAS study credited Russia with 70 nuclear-armed Iskander and R-500 missiles, and 20 nuclear-armed SSC-8/9M729 missiles that violated the INF Treaty (and which were based on the R-500 missile); there was no entry for the Bastion anti-ship/land attack missiles.[116] There was also no entry for nuclear-armed Close Range Ballistic Missiles (CRBMs), despite the fact that the 2018 *Nuclear Posture Review* report said Russia has them.[117] The February 2022 paper credited Russia with 935 naval nuclear weapons including those deployable on submarines, surface ships and aircraft.[118] These numbers appear to be low, particularly when viewed in the context of how many conventional versions of its missiles Russia has used against Ukraine.[119]

Nuclear Reset: Arms Reduction and Nonproliferation (Moscow, Russia: Carnegie Moscow Center, 2012), p. 55, available at https://carnegieendowment.org/files/nuclear_reset_Book2012_web.pdf.

[114] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 99.

[115] "Expert Urges Pre-talks Consultations on Russian-US Tactical Nuclear Arms Cuts," *Interfax-AVN Online*, April 27, 2011, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=39829324.

[116] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 99.

[117] 2018 *Nuclear Posture Review*, op. cit., p. 53.

[118] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 99.

[119] Benjamin Brimelow, "Russia is Using its Newest and Oldest Missiles Indiscriminately against Ukraine," *Yahoo*, available at https://www.yahoo.com/news/russia-using-newest-oldest-missiles-222900918.html.

While the May 2023 FAS estimate largely lacked sources, it assessed a modest reduction in Russian non-strategic nuclear weapons compared to the February 2022 numbers. However, the suggestion that Putin is reducing Russian nuclear forces while making almost weekly nuclear war threats seems highly implausible. The May 2023 FAS report appears not to accept the reality of Moscow's "escalate to de-escalate" nuclear doctrine and completely ignores the fact that it was the Obama Administration that focused high-level attention on this issue. It essentially dismisses the content of Putin's June 2020 nuclear decree and asserts that the Putin regime's nuclear threats are "mainly intended to deter the United States and NATO from intervening directly with military forces in Ukraine to prevent a wider war."[120]

Both versions of the FAS reports characterized the Russian non-strategic nuclear arsenal as "held in reserve."[121] This terminology appears to be an effort to minimize public perception of the size and significance of what has been reported as at least a 10-to-one Russian non-strategic nuclear weapons advantage.[122] The basis for characterizing Russian non-strategic nuclear weapons as being "in reserve" is the FAS conclusion that, "All nonstrategic warheads are thought to be in central storage."[123]

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[120] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 179.

[121] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 98.

[122] Jason Willick, "Putin has a huge Advantage in the Kind of Nuclear Weapon he would be most likely to use," *The Washington Post*, March 3, 2022, available at https://www.washingtonpost.com/opinions/2022/03/03/putin-has-tactical-nuclear-advantage/.

[123] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 100.

However, it is unlikely that all Russian non-strategic nuclear weapons are in storage and that none are operationally deployed. Indeed, there is evidence that they are not all in central storage, although this issue is complicated by the fact it is an arms control compliance issue with respect to the 1991/1992 Presidential Nuclear Initiatives.[124] Ironically, Hans Kristensen has produced the best analysis of the presence of nuclear weapons stored in Kaliningrad and Pavel Podvig has written that there are nuclear weapons at Backfire bomber bases.[125] (Backfire is not classified as a New START Treaty-limited heavy bomber so it is in the non-strategic category). Both the February 2022 and the May 2023 FAS annual reports stated that, "We estimate that Russia stores its nuclear weapons at approximately 40 permanent storage sites across the country, including about 10 national-level central storage sites…"[126] Such a large number of storage sites, some of which are near NATO borders, hardly suggests that all Russian non-strategic nuclear weapons are in central storage.[127] A study by the U.K. House of Commons Library

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[124] Mark B. Schneider, "Dealing With Vladmir Putin's Nuclear Crisis – The Case for Maximum Deterrence," *Real Clear Defense*, November 17, 2022, available at https://www.realcleardefense.com/articles/2022/11/17/dealing_with_vladmir_putins_nuclear_crisis__the_case_for_maximum_deterrence_865351.html.

[125] Hans Kristensen, "Russia Upgrades Nuclear Weapons Storage Site In Kaliningrad," *Federation of American Scientists*, June 18, 2018, available at https://fas.org/blogs/security/2018/06/kaliningrad/; and, Pavel Podvig, "Non-Strategic Weapons Storage and Deployment Procedures in Russia," *RussianForces.org*, October 2, 2022, available at https://russianforces.org/blog/2022/10/non-strategic_weapons_storage_.shtml.

[126] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 192; and, Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 115.

[127] Nick Mordowanec, "Russia Removes Nuclear Munitions From Belgorod Amid Conflict: Ukraine," *Newsweek*, May 22, 2023, available

stated, "Most analysts concur that storage facilities are often located near to operational bases."[128] Moreover, in May 2023, Ukraine stated that Russia was evacuating a supposedly central or national nuclear weapons storage site, located only a few miles from the Ukrainian border, because of fighting in the area.[129]

With regard to Russian nuclear ABM warheads, they are unlikely to be in central storage because that would render the system completely useless. These too must be counted as part of Russia's non-strategic nuclear weapons and, again, they are likely not in central storage.

Assumed Russian Compliance with New START Force Limits

The February 2022 and the May 2023 FAS reports appear to assume that Russia is in compliance with the New START Treaty with regard to deployed force numbers, despite substantial evidence to the contrary. Unfortunately, the reality as noted by Boris Bondarev, a former Russian diplomat who resigned in opposition to Russia's war against Ukraine, is that Putin "…has consistently violated…arms control treaties and commitments—

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at https://www.newsweek.com/russia-removes-nuclear-munitions-belgorod-amid-conflict-ukraine-1801940.

[128] Claire Mills, *Nuclear Weapons at a Glance: Russia* (London: House of Commons Library, March 29, 2022) p. 14, Fn. 32, available at https://researchbriefings.files.parliament.uk/documents/CBP-9091/CBP-9091.pdf.

[129] "Russia Evacuates Nuclear Arsenal Storage Facility near Belgorod, Ukrainian Intelligence Says," *The New Voice of Ukraine*, May 22, 2023, available at https://english.nv.ua/nation/russia-evacuates-nuclear-arsenal-storage-facility-near-belgorod-war-news-50326358.html; and, "Russia Transport Nuclear Weapons from Storage Facility in Belgorod Oblast – Intelligence," *Ukrainska Pravda*, May 22, 2023, available at https://news.yahoo.com/russia-transport-nuclear-weapons-storage-161007018.html.

destroying the fragile system of international security and strategic stability and provoking a new arms race."[130]

The February 2022 FAS report acknowledged the statements made by Colonel General Sergei Karakayev, Commander of Strategic Missile Forces, that between 2016 and December 2019 "…Russia had approximately 400 ICBMs on combat duty," and that this is inconsistent with the declared total number of Russian strategic delivery vehicles.[131] However, it seemed to dismiss the statements stating, "It is possible that Karakayev is referring to all ICBMs in the inventory (including those in storage), not just those that are deployed."[132] Colonel General Karakayev clearly did not say or imply that. Indeed, his statements about 400 ICBMs actually go back to 2013.[133] In one of the most explicit of these statements, in 2016, he said, "At present, the Strategic Missile Force grouping comprises about 400 intercontinental ballistic missiles with nuclear warheads of various categories of their capacity."[134] If Karakayev's statement refers only to the number of deployed ICBMs, then it suggests either: 1) the existence of an undeclared force of mobile ICBMs; 2) the circumvention of the New START Treaty limit through rapid launcher

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[130] Boris Bondarev, "The Fallacy of Negotiating With Putin," *Eurasia Daily Monitor*, Vol. 20, Iss. 76 (May 10, 2023), available at https://jamestown.org/program/the-fallacy-of-negotiating-with-putin/.

[131] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p.102.

[132] Ibid.

[133] "Russian Strategic Missile Troops have about 400 ICBM Launchers – Commander," *Interfax-AVN Online*, December 17, 2013, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=37881791.

[134] Quoted in Franz-Stefan Gady, "Russian General: Russia Now Fields 400 Intercontinental Ballistic Missiles," *The Diplomat*, December 16, 2016, available at https://thediplomat.com/2016/12/russian-general-russia-now-fields-400-intercontinental-ballistic-missiles/.

reload; or, 3) a combination of both involving up to 400-600 uncounted nuclear warheads.

In addition, there are non-compliance issues involving Russian long-range nuclear cruise missiles on aircraft that are not declared under New START as heavy bombers.[135] These issues will be discussed subsequently in this paper. These non-compliance issues could add up to at least hundreds of unaccountable strategic nuclear warheads. Russia's "suspension" of New START suggests it intends to exploit the situation to expand its own nuclear potential. Indeed, Deputy Foreign Minister Sergey Ryabkov hinted at this when he said, "This [Treaty suspension] gave us additional opportunities to ensure our own security…" It is not possible to acquire "additional opportunities" without exceeding the New START warhead limits. The reality is that there is little interest in Russia or China in limiting their own armaments through arms control.[136]

Comparing the Number of U.S. and Russian Nuclear Warheads

Annually, the FAS compares the number of U.S. and Russian nuclear warheads. The last (2022) FAS assessment of global nuclear weapon stockpiles used numbers for Russia taken from the FAS "Russian nuclear forces, 2022" chart.[137] The FAS assessment of U.S. warhead numbers is

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[135] Mark B. Schneider, "The Most Serious Russian Violation of the New START Treaty Yet," *Real Clear Defense*, May 16, 2022, available at https://www.realcleardefense.com/articles/2022/05/16/the_most_serious_russian_violation_of_the_new_start_treaty_yet_832443.html.

[136] Keith B. Payne, *Nuclear Disarmament: The Contemporary 'Great Illusion'?, Information Series*, No. 552 (April 19, 2023), available at https://nipp.org/information_series/keith-b-payne-nuclear-disarmament-the-contemporary-great-illusion-no-552-april-19-2023/.

[137] Hans Kristensen, Matt Korda, Eliana Johns, and Kate John, "Status of World Nuclear Forces," accessed in 2022, available at

reasonably accurate. After all, the United States has announced the number of its nuclear warheads, most recently in 2021.[138] The only issue is the number of active vs. inactive U.S. warheads. Here, too, the FAS numbers are apparently accurate.

The issue in the FAS comparisons of U.S. and Russian warhead numbers rests on the accuracy of its assessment of the Russian numbers and how they correspond to the U.S. numbers. The publicly released U.S. numbers include the total active and inactive warheads and warheads awaiting dismantlement. The Russian numbers from the FAS February 2022 and the May 2023 reports appear to be based on substantial underestimates of the maximum number of deployable Russian strategic nuclear weapons. Neither the February 2022 nor the May 2023 reports contained an estimate of the number of Russian active and inactive strategic nuclear weapons. Thus, even if the FAS numbers were correct for what they purport to represent, the FAS would once again be making an apples to oranges comparison.

In the absence of adequate source documentation, the February 2022 and the May 2023 FAS numbers should *not* be regarded as authoritative or accurate. Most of their numbers appear not to be found in reliable open sources and some of their numbers are simply implausible. The strategic force numbers in the FAS February 2022 and May 2023 "Russian nuclear forces" charts are not what they claim to be. In almost all cases, they are not even close to the maximum warhead loads likely for current Russian ICBMs and SLBMs. Indeed, the Russian upload potential could exceed the FAS estimate by up to 2,000 warheads (as discussed in Chapter 5). The FAS apparent assumption of

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https://fas.org/initiative/status-world-nuclear-forces/; and, Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 99.

[138] U.S. Department of Energy, *Transparency in the U.S. Nuclear Weapons Stockpile*, 2021, op. cit.

Russian New START Treaty compliance with regard to Russian deployed strategic nuclear forces appears to be wishful thinking in the absence of on-site inspections for more than three years and the U.S. inability to verify numbers without those inspections.

Implications of Undercounting Russian Nuclear Capabilities

There may be a linkage between the FAS analyses of Russian nuclear weapons numbers and capabilities and the apparent FAS arms control objectives—which have been rejected by Russia and China. The main author of the FAS analyses, Hans Kristensen, has described his own position as favoring a "minimal" nuclear deterrence posture. He has advocated reducing the U.S. nuclear deterrent to 500 weapons, completely eliminating the U.S. submarine-launched ballistic missile force, and reducing the yield of residual U.S. nuclear weapons to three-to-10 kilotons in order to eliminate any U.S. capability against military targets. He presented this agenda as a step toward eliminating all nuclear weapons. [139]

Minimum deterrence advocates typically discount the importance of numbers by positing that, if U.S. nuclear weapons were targeted against cities, not many weapons would be needed for such a "countervalue" deterrence strategy. However, Kristensen seems to omit the fact that the United States has long avoided intentionally targeting

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[139] Hans M. Kristensen, Robert S. Norris, and Ivan Oelrich, *From Counterforce to Minimal Deterrence: A New Nuclear Policy on the Path Toward Eliminating Nuclear Weapons*, Occasional Paper 19, (Washington, D.C.: Federation of American Scientists and The National Resources Defense Council, April 2009), pp. 41, 43-44, available at https://pubs.fas.org/_docs/occasionalpaper7.pdf.

civilian populations as a matter of policy.[140] As David Trachtenberg has written, deliberate civilian targeting by the United States *is a myth*.[141] Every U.S. administration since at least the mid-1970s has validated the need to be able to hold at risk legitimate military targets for deterrence purposes, and later U.S. policy statements fully rejected purposeful targeting of civilian centers in an effort to minimize societal destruction consistent with the Law of Armed Conflict. Kristensen's preferred nuclear deterrent force would be so small that it likely would be inadequate even for countervalue targeting in light of the problems of survivability and defense penetration.[142]

Kristensen's minimal deterrence views appear to influence the FAS analyses of Russian nuclear capabilities. Public perception of the state of the U.S-Russian nuclear balance will likely have an impact upon U.S. policy developments and understating the Russian advantages may be seen as facilitating the FAS deterrence and arms control agenda.[143]

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[140] For more, see, Keith B. Payne, et al., *Nuclear Force Adaptability for Deterrence and Assurance: A Prudent Alternative to Minimum Deterrence* (Fairfax, VA.: National Institute Press, 2014), available at https://nipp.org/wp-content/uploads/2021/05/MD-II-for-web.pdf.

[141] David J. Trachtenberg, *Mischaracterizing U.S. Nuclear Deterrence Policy: The Myth of Deliberate Civilian Targeting*, *Information Series*, No. 542, available at https://nipp.org/information_series/david-j-trachtenberg-mischaracterizing-u-s-nuclear-deterrence-policy-the-myth-of-deliberate-civilian-targeting-no-542-december-14-2022/.

[142] See the discussion in, Richard Mies, "Strategic Deterrence in the 21st Century," *Undersea Warfare* (Spring 2012), pp. 12-19.

[143] In the current Ukraine crisis, Kristensen's recommended deep nuclear reductions appear to be particularly questionable. The question must be asked: Would Ukraine have been attacked if it had retained the nuclear weapons it had inherited from the Soviet Union? As former President Bill Clinton has stated, "I feel terrible about it because Ukraine is a very important country and I feel a personal stake because I got them to agree to give up their nuclear weapons." See, James Franey, "I'm to Blame for Russia's Invasion: Bill Clinton Admits 'Terrible' Mistake in Forcing Ukraine to give up its Nuclear Weapons in 1994 -

The potential for underestimating Russian nuclear capabilities, particularly if doing so suggests that Russia is in compliance with arms control agreements, is extremely troubling. Doing so would essentially misinform the U.S. public and potentially members of Congress regarding the true value of treaties intended to control the number of Russian arms. Perhaps more importantly, undercounting Russian nuclear capabilities could misinform the U.S. public and congressional leadership regarding the adequacy of U.S. forces to meet deterrence requirements because the adequacy of the U.S. deterrence posture must be shaped by a realistic understanding of Russian nuclear capabilities. In short, an undercounting of Russian nuclear capabilities could misinform the formulation of U.S. nuclear policies for both deterrence and arms control.

Numbers of nuclear weapons are clearly relevant to deterrence considerations and impact target coverage, damage expectancy and the survivability of U.S. nuclear forces. Numbers also provide a degree of survivability against advanced missile and air defense systems. All sensor and defense systems have limits on the number of warheads they can track and engage. The greater Russia's advantages in non-strategic nuclear forces, the more problematic is the U.S. capability to support its regional deterrence goals—especially if Moscow believes it can exploit those advantages to achieve its strategic objectives. Russia's conventional military failures in the Ukraine war could ultimately lead Russia to resort to precision non-strategic nuclear strikes to accomplish its goals. A vastly outnumbered and relatively unsurvivable U.S. non-strategic nuclear deterrent may be insufficient to deter even the limited Russian first use of nuclear weapons.

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and Putin would not have Attacked if they still had them," *DailyMail.com*, April 5, 2023, available at https://www.dailymail.co.uk/news/article-11942467/Bill-Clinton-admits-terrible-mistake-forcing-Ukraine-nuclear-weapons.html.

The most important question in the current geopolitical crisis is whether the U.S. nuclear deterrent posture is sufficient to deter nuclear escalation. If the higher estimates of Russian nuclear capability are true, parity does not exist at the strategic or nonstrategic level. If Russia has uploaded its missile forces, it would have a significant advantage in strategic nuclear forces and all estimates concede a significant Russian advantage in nonstrategic nuclear weapons. Russian leaders appear to believe that they have nuclear superiority, and that it is important. Medvedev even thanked God that Russia had "parity and even superiority in strategic nuclear forces which, in effect, is even more vital for the existence of our country, because otherwise we would have been torn apart,"[144] With respect to non-strategic nuclear forces, Pavel Felgenhauer wrote in 2021, "Indeed, taking into account non-strategic (tactical) nuclear weapons, which no one has ever verifiably counted, Russia may have more (maybe twice as many overall) than *all the other official or unofficial nuclear powers taken together*."[145] In the current geo-political environment, Russian nuclear superiority could result in Russian nuclear weapons use, especially if Russia believes it has an exploitable nuclear advantage over the United States. Such a result would be devastating for the functioning of deterrence, extended deterrence, and for the assurance of allies and partners—the latter being the "glue" that holds U.S. alliances together.

In short, the apparent undercounting of Russian nuclear capabilities casts a dangerous shadow of likely

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[144] "Medvedev says Russia has Strategic Nuclear Superiority," *TASS*, March 23, 2023, available at https://tass.com/defense/1593313.

[145] Pavel Felgenhauer, "Putin Delivers More Restrained National Address as Moscow Announces Partial Troop Withdrawal," *Eurasia Daily Monitor*, Vol. 18, Iss. 65 (April 22, 2021). (Emphasis added.) Available at https://jamestown.org/program/putin-delivers-more-restrained-national-address-as-moscow-announces-partial-troop-withdrawal/.

misinformation over the formulation of U.S. nuclear policies with respect to both deterrence and arms control.

Conclusion

FAS analyses create the misleading impression that the exact number of Russian nuclear weapons is known. FAS reports do *not* provide adequate documentation of their estimated numbers and appear to systematically undercount the maximum number of warheads Russian strategic systems can carry. FAS numbers appear to be based mainly upon old START Treaty accountability numbers which generally do not reflect maximum warhead upload capability. Moreover, the existing Russian strategic nuclear force is composed largely of new and improved systems, with more capability than is reflected in the old START accountability numbers. The FAS estimates appear to ignore credible media accounts and Russian statements, including some official statements, indicating that Russia's more modern systems have greater capabilities than the FAS attributes to them. Some of the FAS numbers are internally inconsistent and the FAS reports appear to assume Russian New START Treaty compliance. But the absence of on-site inspections, past Russian non-compliance, and Moscow's strategy requirements all suggest that an assumption of Russian arms control compliance is highly problematic. The FAS numbers are often cited uncritically in press reports worldwide without apparent recognition of the lack of adequate sourcing and Russian noncompliance. Similarly, FAS estimates of Russian non-strategic nuclear weapons appear to be understated and lack adequate documentation. Given these considerations and their general paucity of credible sourcing, FAS numbers should *not be regarded as definitive or authoritative*.

Chapter 4
The Challenges in Estimating the Number of Russian Nuclear Weapons

The 2023 edition of the Director of National Intelligence (DNI) *Annual Threat Assessment of the U.S. Intelligence Community* provides an ominous warning about the Russian nuclear threat. It states: 1) "Russian leaders thus far have avoided taking actions that would broaden the Ukraine conflict beyond Ukraine's borders, but the risk for escalation remains significant"; (2) "Heavy losses to its ground forces and the large-scale expenditures of precision-guided munitions during the conflict have degraded Moscow's ground and air-based conventional capabilities and increased its reliance on nuclear weapons"; and, 3) "*Russia maintains the largest and most capable nuclear weapons stockpile, and it continues to expand and modernize its nuclear weapons capabilities*."[1] While the DNI report appears to provide a grim confirmation that Russia has achieved a growing margin of nuclear advantage, this level of detail does not allow for any real understanding of Russian nuclear capabilities or the nature of the nuclear threat Moscow poses to the United States and its allies.

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[1] Office of the Director of National Intelligence, *Annual Threat Assessment of the U.S. Intelligence Community* (Washington, D.C.: Office of the Director of National Intelligence, February 6, 2023), pp. 12, 14. (Emphasis in the original.) Available at https://www.dni.gov/index.php/newsroom/reports-publications/reports-publications-2023/item/2363-2023-annual-threat-assessment-of-the-u-s-intelligence-community.

Sources of Information on Russian Nuclear Capability

Since the public generally receives minimal information from the U.S. government concerning the Russian nuclear threat, and this appears unlikely to change anytime soon, other sources of information must be examined. These include:

- Data from START, START II, and New START Treaties. (Unfortunately, the 1991 START Treaty data are old; the START II Treaty never entered into force and its data were never updated; and, New START Treaty data provided very little public information and the data flow is not likely to resume anytime soon, if ever);
- Information released under the Freedom of Information Act, although usually in a highly redacted form;
- Congressional hearings, one of the best Western sources;
- Russian press reports concerning Russia's strategic and non-strategic nuclear weapons, which until recently were almost entirely ignored in the Western press;
- Statements by active duty and retired senior Russian military officers;
- Russian journalists writing in Western aviation and other publications;
- Statements by senior Russian political officials concerning the scope of reductions from Soviet levels; and,
- Reports from Western journalists.

While these sources are useful, none of them is a good substitute for a responsible U.S. government policy to provide the public with information concerning Russian nuclear capabilities—the largest and most serious nuclear threat today. Thanks to Washington's apparent policy to provide scant information in this regard, the public has no sanity check on much of what is reported in the Western press or in the Russian press—the latter being the most abundant source of information on Russian nuclear capabilities. Unfortunately, as the Putin dictatorship expands, there is less and less of a free press in Russia and, hence, more dependence on Russian state media. In 2012, Putin ended U.S. involvement in the elimination of Soviet-era nuclear forces, removing that source of insight.[2]

Today, few Western journalists consistently cover Russian nuclear weapons developments, although the information they provide can be very important. Congress has mandated annual reports that cover the nuclear threat from China, Iran and North Korea, *but not Russia*, despite the fact that the Russian nuclear stockpile is far larger and far more sophisticated. Russia is fighting a vicious war of aggression against Ukraine and issuing unprecedented nuclear threats to the United States and NATO. The only alternative today is to piece together information about Russian nuclear weapons capabilities from as many credible sources as possible.

The startling revelation starting in 2021 of hundreds of Chinese ICBM silos (reported publicly by NGOs *before it was confirmed* by the Pentagon) illustrates both the paucity of information provided by Washington and why the FAS numbers should not be accepted at face value absent adequate documentation. The March 2023 FAS China nuclear weapons report registered an increase of only 60

[2] "Cooperative Threat Reduction Timeline," *Russia Matters*, no date, available at https://www.russiamatters.org/facts/cooperative-threat-reduction-timeline.

Chinese nuclear warheads compared to their November 2021 report. Yet, this number seems implausible—there are now hundreds of additional Chinese ICBM silos and China is MIRVing its ICBMs and SLBMs.[3]

During the Cold War, the U.S. government kept the American people well-informed about the Russian nuclear threat until the Clinton Administration gradually reversed this openness. This state of affairs deteriorated further during the George W. Bush Administration. It said virtually nothing about the Russian nuclear threat after the 2001 *Nuclear Posture Review* (NPR),[4] (which itself said little and was dominated by the apparent perception that Russia no longer posed a threat), until 2008 when U.S. threat perceptions slowly began to change following Russia's invasion of Georgia.[5] The Obama Administration's 2010 *Nuclear Posture Review Report* contained very little information concerning Russian nuclear capabilities.[6] The

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[3] Mark B. Schneider, "Will the Pentagon Ever Get Serious About the Size of China's Nuclear Force?," *Real Clear Defense*, December 15, 2022, available at https://www.realcleardefense.com/articles/2022/12/15/will_the_pentagon_ever_get_serious_about_the_size_of_chinas_nuclear_force_870335.html; Hans M. Kristensen, Matt Korda, and Eliana Reynolds, "Chinese Nuclear Weapons, 2023," *Bulletin of the Atomic Scientists*, Vol. 79, No. 2 (2023); and, Hans M. Kristensen and Matt Korda, "Chinese Nuclear Weapons, 2021," *Bulletin of the Atomic Scientists*, Vol. 77, No. 6 (2021).

[4] For example, see, Donald H. Rumsfeld, *Annual Report to the President and the Congress* (Washington, D.C.: Department of Defense, 2002), p. 12, available at https://history.defense.gov/Portals/70/Documents/annual_reports/2002_DoD_AR.pdf?ver=2014-06-24-153732-117.

[5] Samuel W. Bodman and Robert M. Gates, *National Security and Nuclear Weapons in the 21st Century* (Washington, D.C.: Department of Defense, September 2008), p. 8, available at https://apps.dtic.mil/sti/tr/pdf/ADA487443.pdf.

[6] U.S. Department of Defense, *Nuclear Posture Review Report* (Washington, D.C.: U.S. Department of Defense, April 2010), available at

United States has not released an unclassified estimate for the size of Russia's total nuclear weapons inventory in more than 10 years and, with few exceptions, government officials and senior military leaders tend to be circumspect in what they say publicly about Russian nuclear forces.

The 2018 NPR is an exception to this data vacuum; it made available to the public significant information that had not previously appeared in the press. Even the February 2022 FAS report noted that it "constituted the first substantial official US public statement on the status and composition of the Russian nonstrategic nuclear arsenal in more than two decades…"[7] In contrast, the 2022 NPR report provided very little information. It merely recited the New START Treaty limit on accountable, deployed strategic nuclear warheads, ignored the fact that it grossly undercounted bomber weapons, provided no detail on Russian modernization programs, and ignored Russian non-compliance issues with the New START Treaty.[8] The one useful piece of information it contained was that its estimate of "up to" 2,000 Russian non-strategic nuclear weapons counted only active weapons.[9] In March 2023, STRATCOM Commander General Anthony Cotton said, "Russia also has a stockpile of approximately 2,000 theater

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https://dod.defense.gov/Portals/1/features/defenseReviews/NPR/2010_Nuclear_Posture_Review_Report.pdf.

[7] Hans M. Kristensen and Matt Korda, "Russian Nuclear Weapons, 2022," *Bulletin of the Atomic Scientists*, Vol. 78, No. 2 (2022), p. 11. The FAS attack on the Trump Administration's assessment is inaccurate and ignores the critical role played by then-Secretary of Defense Ashton Carter in bringing public attention to the dangerous aspects of Russian nuclear strategy.

[8] U.S. Department of Defense, *2022 Nuclear Posture Review* (Washington, D.C.: Department of Defense, 2022), p. 4, available at https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF.

[9] Ibid., p. 4.

nuclear weapons that does not fall under the limits established by the NST [New START Treaty]."[10]

Problems in Assessing the Number of Russian Nuclear Weapons

As noted above, the United States had a poor track record of estimating the size of the Soviet nuclear warhead stockpile. The same may be happening now regarding Russia. Why was this so? Dr. Fred Iklé, Under Secretary of Defense during the Reagan Administration, explained it as follows: "These things don't take that much space," and so, "It's conceivable that we could have missed them, as we did many other things in Russia, like the big fissures in their economy."[11] Nuclear weapons, particularly those initially developed in the 1970s and 1980s,[12] are very small. They are *not* manufactured, stored, maintained, deployed and eventually dismantled in the open where they can be imaged by satellites and then counted.

Former Under Secretary of State Rose Gottemoeller was mistaken with regard to the verification of the number and

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[10] Anthony J. Cotton, *Statement of Commander Anthony J. Cotton, United States Strategic Command* (Washington, D.C.: House Armed Services Committee, Subcommittee on Strategic Forces), p. 8, available at https://armedservices.house.gov/sites/republicans.armedservices.house.gov/files/2023%20USSTRATCOM%20Congressional%20Posture%20Statement%20-%20HASC-SF.pdf.

[11] William J. Broad, "Russian Says Soviet Atom Arsenal Was Larger Than West Estimated," *The New York Times*, September 26, 1993, available at https://www.nytimes.com/1993/09/26/world/russian-says-soviet-atom-arsenal-was-larger-than-west-estimated.html.

[12] U.S. Department of Defense, *Nuclear Posture Review* (Washington, D.C.: Department of Defense, 2018), p. 9, available at https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF; and, Mark Schneider, "The Future of the U.S. Nuclear Deterrent," *Comparative Strategy*, Vol. 27, No. 4 (2008), pp. 347-348.

types of Russian nuclear weapons when she recently argued:

> The verification regime of the [New START] treaty has worked remarkably well, with the parties exchanging data twice a year on their weapon holdings and regularly—sometimes multiple times a day—informing each other of the movement of their nuclear systems.
>
> Through these measures—backed up by its own national technical means (satellites, reconnaissance aircraft, radars, etc.)—the United States has been able to keep a close eye on developments in the Russian strategic nuclear forces. This effort has proven highly important in recent months. It has been a significant source of predictability, offering 24/7 insights into Russian nuclear operations.[13]

Secretary Gottemoeller did not acknowledge the fact that the most detailed and frequent information the United States obtained from Russia concerning deployed strategic nuclear weapons occurred *during on-site inspections which have now not taken place for more than three years*. The information provided to the inspectors included, "The number of reentry vehicles emplaced on each deployed" ICBM and SLBM.[14] While "satellites, reconnaissance

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[13] Rose Gottemoeller, "Resuming New START Inspections must be a Critical Goal of Upcoming US-Russia Talks," *Bulletin of the Atomic Scientists*, November 23, 2022, available at, https://thebulletin.org/2022/11/resuming-new-start-inspections-must-be-a-critical-goal-of-upcoming-us-russia-talks/.

[14] United States of America and the Russian Federation, *Protocol to the Treaty between the United States of America and the Russian Federation on Measures for the Further Reduction and Limitation of Strategic Offensive Arms* (Washington, D.C.: Department of State, 2010), pp. 122-123, available at https://2009-2017.state.gov/documents/organization/140047.pdf.

aircraft, radars, etc." do provide useful information relevant to assessing the capabilities of Russian missiles, none of these National Technical Means of Verification (NTM) can count the number of nuclear warheads actually deployed on any Russian missile. Indeed, in May 2020, Secretary Gottemoeller expressed a different opinion about the critical importance of on-site inspections. She argued, "…we discarded the counting rules in favor of confirming declared warheads on the front of missiles *through reciprocal inspections*; in fact, we did not need telemetry measures to confirm compliance with the warhead limits in the new treaty…"[15] This also is a problematic assessment. A decade earlier, Senator Christopher Bond (R-MO), then Vice Chairman of the Senate Select Committee on Intelligence, pointed out that the New START Treaty "discarded" the "critical counting rules" (sometimes called attribution rules) of the original START Treaty which were "…designed to work hand-in-glove with our satellites, in favor of reliance on no more than ten sample inspections a year—again, just 2 to 3 percent of Russia's force."[16] The Obama Administration even argued during New START ratification that less verification was adequate for New START because of the supposed benign nature of Putin's Russia and the "reset."[17]

A report by Republican Senators on the Senate Foreign Relations Committee—James Risch (ID), Jim DeMint (SC),

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[15] Rose Gottemoeller, "The New START Verification Regime: How Good Is It?," *Bulletin of the Atomic Scientists*, May 21, 2020. (Emphasis added.) Available at https://thebulletin.org/2020/05/the-new-start-verification-regime-how-good-is-it/.

[16] Christopher Bond, "The New START Treaty," *Federation of American Scientists*, November 18, 2010, available at https://irp.fas.org/congress/2010_cr/bond-nstart.html.

[17] Paula DeSutter, "Verification and the New START Treaty," The Heritage Foundation, July 12, 2010, available at https://www.heritage.org/arms-control/report/verification-and-the-new-start-treaty.

James Barrasso (WY), Roger Wicker (MS), and James Inhofe (OK)—explained the deficiencies of the New START Treaty in counting deployed warheads:

> Fortunately, START I did not rely on these inspections alone for verification; it wisely relied primarily on our National Technical Means (NTM) to verify an "attribution" rule that in general, counted warheads based on their demonstrated capability. (Under this rule, a missile type was considered to have a certain attributed number of warheads, such that warhead verification became an exercise of simply multiplying numbers of missiles observed with satellites multiplied by the attributed warhead number.)[18]

No one argued at the time that NTM alone could verify the New START deployed warhead limits. When the United States lost on-site inspections, it lost virtually the entire New START deployed warhead verification regime. No one in 2010 could have anticipated: that the United States would abide three years without inspections; Russia's refusal to resume inspections; the illegal Russian "suspension" of the Treaty and the end of data notifications; or, that Washington would take no programmatic action in response to these Russian actions. Indeed, if the Russian termination of on-site inspections amid the geopolitical crisis in Ukraine had been anticipated, the New START Treaty clearly would not have been approved by the Senate. The 1979 Soviet invasion

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[18] Senate Foreign Relations Committee, *Treaty with Russia on Measures for Further Reduction and Limitation of Strategic Offensive Arms* (Washington, D.C.: U.S. Senate, October 1, 2010), Executive Report 111-6, pp. 115-116, available at https://www.congress.gov/111/crpt/erpt6/CRPT-111erpt6.pdf.

of Afghanistan helped sink the SALT II Treaty.[19] Current events are much worse.

Russian Violations and "Suspension" of the New START Treaty

The United States is now in a one-sided arms control arrangement with Russia in which the United States is complying with the New START Treaty limitations despite Russian violations of the Treaty and the growing possibility that it has expanded its strategic nuclear forces substantially beyond the Treaty limits. This is happening in the context of unprecedented Russian nuclear war threats.

In its 2023 report on implementation of the New START Treaty, the State Department for the first time acknowledged that it could not certify Russian compliance with New START because Moscow refused to resume on-site inspections required under the Treaty, which had temporarily ceased due to the Covid pandemic. The report states:

> Based on the information available as of December 31, 2022, the United States cannot certify the Russian Federation to be in compliance with the terms of the New START Treaty. In refusing to permit the United States to conduct inspection activities on Russian territory, based on an invalid invocation of the "temporary exemption" provision, Russia has failed to comply with its obligation to facilitate U.S. inspection activities, and denied the United States its right to conduct such inspection activities. The Russian Federation has also failed to comply with the obligation to

[19] "Strategic Arms Limitations Talks/Treaty (SALT) I and II," *State.gov*, no date, available at https://history.state.gov/milestones/1969-1976/salt.

> convene a session of the Bilateral Consultative Commission (BCC) within the timeline set out by the Treaty.[20]

However, by focusing on procedural violations the Department of State appears to create the impression that this merely reduces the level of confidence in Russian data declarations, even asserting that: "…the United States assesses that Russia did not engage in significant activity above the Treaty limits in 2022. The United States also assesses that Russia was likely under the New START warhead limit at the end of 2022."[21]

This appears to be more wishful thinking than confident conclusion. NTM alone, without counting rules, cannot determine the actual number of warheads deployed on Russian missiles, particularly in an arms control environment where high levels of proof are required given Moscow's systematic violation of arms control agreements. The only good measure available today may be the actual maximum potential of Russian missiles. Russia appears to want the United States to believe that although it first illegally refused on-site inspections and then "suspended" the New START Treaty—ending data notifications—it continues to comply with the Treaty's numerical limitations. In the current Putin-created crisis atmosphere, the expectation of continued compliance lacks credibility. Why should Russia continue to comply when Treaty violations likely cannot be detected and there is little chance of Russia facing negative consequences for Treaty

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[20] U.S. Department of State, *Report to Congress on Implementation of the New START Treaty Pursuant to paragraph (a)(10) of the Senate's Resolution of Advice and Consent to Ratification of the New START Treaty (Treaty Doc. 111-5)*, (Washington, D.C.: Department of State, January 2023), p. 5, available at https://www.state.gov/wp-content/uploads/2023/01/2022-New-START-Implementation-Report.pdf.

[21] Ibid., p. 16.

violations? The State Department report itself cites Russian data that put it only one warhead below the limit in September 2022.[22] This means that to deploy any new ICBMs or SLBMs legally, Russia *would have to download an existing missile or missiles* depending on how many warheads the new deployed missiles carried. This would have to be done before the new missiles were deployed to avoid a New START Treaty violation.

Even if NTM detected activity at a Russian missile launcher site, there may be no way to determine if Russia is downloading or uploading warheads**.** In its last data update, Russia declared it had 1,549 warheads in September 2022[23] (to be discussed below). Since Russia has announced the deployment of new ICBMs after its last data update, unless Russia has done further downloading of its other ICBMs or SLBMs, it now is likely above the Treaty limit of 1,550 deployed nuclear warheads. The Russian number would be much higher if Moscow decided to upload its missiles covertly in the absence of on-site inspections, coinciding with its attack on Ukraine—hardly a far-fetched proposition.

Like Amb. Gottemoeller, the Department of State apparently is presuming that Russia has been telling the truth about its force numbers and that Russian data declarations are accurate. Yet, Moscow is a serial violator of arms control agreements and, in fact, data exchanges do not verify any number; they only provide numbers that must be verified.[24] Regarding deployed warheads, there is no

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[22] Ibid., p. 4.

[23] "Russian Missile Unit Puts Another Yars ICBM on Duty," *Interfax*, December 15, 2022, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/18E6C6996F8859A8.

[24] See the discussion in, The New START Working Group, "New START: Potemkin Village Verification," The Heritage Foundation, June 24, 2010, available at https://www.heritage.org/arms-control/report/new-start-potemkin-village-verification.

possible way to verify the total number without on-site inspections, and the Russian notification fig leaf no longer exists. In early March 2023, Congressman Doug Lamborn (R-CO), Chairman of the House Armed Services Strategic Forces Subcommittee, stated that, "*I understand that Russia has ceased providing the U.S. with treaty notifications, yet we continue to provide them to Russia.*"[25] The Department of State confirmed this was the case until March 30, 2023.[26] Jon Wolfsthal, who served as a Senior Advisor to the Obama Administration's NSC wrote, "…if Russia is indeed stopping data exchanges and notifications, it would fundamentally change the nuclear relationship with Russia."[27] The United States continued unilateral Treaty notifications until June 2023.[28]

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[25] Doug Lamborn, "Lamborn Opening Statement at FY24 Strategic Forces Posture Hearing," House Armed Services Committee, March 8, 2023. (Emphasis in the original.) Available at https://armedservices.house.gov/news/press-releases/lamborn-opening-statement-fy24-strategic-forces-posture-hearing.

[26] U.S. Department of State, "U.S. Countermeasures in Response to Russia's Violations of the New START Treaty," *State.gov*, June 1, 2023, available at https://www.state.gov/u-s-countermeasures-in-response-to-russias-violations-of-the-new-start-treaty/.

[27] Andrew Roth and Julian Borger, "Putin says Russia will halt Participation in New Start Nuclear Arms Treaty," *The Guardian*, February 21, 2023, available at https://www.theguardian.com/world/2023/feb/21/putin-russia-halt-participation-new-start-nuclear-arms-treaty.

[28] U.S. Department of State, "U.S. Countermeasures in Response to Russia's Violations of the New START Treaty," *State.gov*, June 1, 2023, available at https://www.state.gov/u-s-countermeasures-in-response-to-russias-violations-of-the-new-start-treaty/.

NTM and Assessment of Russian Deployed Missile Warhead Loadings

Thanks to the original 1991 START Treaty, which required the provision of technical data on ICBMs and SLBMs, telemetry tapes, and interpretative data, and contained a near ban on telemetry encryption, the United States likely has a reasonably good understanding of the *maximum* capabilities of most *existing* Russian strategic missiles. However, NTM without accepted attribution rules as part of an agreement cannot verify: 1) the number of warheads on newly deployed Russian ICBMs and SLBMs; 2) the strategic nuclear warhead reductions that have been made by means of downloading; and, 3) whether downloaded missiles have since been uploaded.

As is obvious from commercial satellite imagery, large platforms such as submarines and fixed missile silos are the easiest to monitor. Yet, even if the United States had counting rules to facilitate the counting of warheads, there would still be the problem of confirming the number of mobile ICBMs the Russians have produced and deployed, which would be necessary to confirm the number of Russia's deployed warheads. This difficulty is the reason why the United States insisted on Perimeter Portal Continuous Monitoring of mobile ICBM production in both the 1991 START and 1987 INF Treaties.[29] Washington lost this element of verification with the demise of the START Treaty in 2009 and Moscow would not allow it to continue under the New START Treaty.

Additionally, the Heritage Foundation's 2010 New START Treaty verification report incisively noted that,

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[29] New START Working Group, "An Independent Assessment of the New START Treaty," The Heritage Foundation, April 30, 2010, available at http://www.heritage.org/Research/Reports/2010/04/An-Independent-Assessment-of-New-START-Treaty; and, The New START Working Group, "New START: Potemkin Village Verification," op. cit.

"Also gone [from New START] are the START requirements for 'cooperative measures' to enhance the capability of National Technical Means (NTM) to monitor mobile missiles at their bases (called 'restricted areas' in START I), the restriction on the size of ICBM bases, [and] the restriction on the size of deployment areas for road-mobile ICBMs."[30] It observed that the New START Treaty discarded the previous START Treaty provision that granted each party the right to "conduct suspect-site inspections to confirm that covert assembly of ICBMs for mobile launchers of ICBMs or covert assembly of first stages of such ICBMs is not occurring," and the restriction that limits an ICBM base to a single type of mobile ICBM.[31]

Combined with the complete loss of inspections, the inadequate verification regime in New START poses a serious problem. As noted in Chapter 3 above, Colonel General Karkayev's repeated statements that he had 400 ICBMs on "combat duty" could be part of a cheating scenario involving undeclared mobile ICBM deployments or circumvention of the Treaty by the rapid reload of launchers. In either case, it could mean that Russia has more deployed strategic nuclear warheads than the number it has declared. Again, given Moscow's history as a serial violator of agreements, such a scenario is not far-fetched.

During the 2010 New START Treaty deliberations, there was no Senate Select Committee on Intelligence report on the Treaty's monitoring regime, as had been the norm. An objective report would probably have sunk the Treaty. Then Senator Christopher Bond stated on the floor of the Senate that, "The Select Committee on Intelligence has been looking at this issue closely over the past several months. As the vice chairman of this committee, I have reviewed the key intelligence on our ability to monitor this treaty and

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[30] The New START Working Group, "New START: Potemkin Village Verification," op. cit.

[31] Ibid.

heard from our intelligence professionals. There is no doubt in my mind that the United States *cannot reliably verify the treaty's 1,550 limit on deployed warheads*."[32] He offered his fellow members of the Senate a classified letter outlining the problems verifying Russian nuclear warhead numbers under New START.

Paula DeSutter, Assistant Secretary of State for Verification, Compliance, and Implementation during the George W. Bush Administration, has stated that the verification regime of the New START Treaty is so poorly designed that the U.S. capacity to confirm Russian warhead numbers is "very, very low," and it is "virtually impossible" to prove a substantive violation.[33] She also pointed out, "We do not have the independent satellite capabilities to be able to achieve the level of contribution to verification that we had in the Intermediate Nuclear Forces (INF) treaty or in the START treaty."[34] This suggests an erosion of U.S. capabilities to count Russian nuclear warheads since the end of the Cold War. Moreover, like everyone else in 2010, she was *not* assuming there would be *no on-site inspections for more than three years,* or that Treaty suspension would be accepted without a U.S. programmatic response**.**

The traditional methodology for estimating foreign nuclear threats and force numbers involves assessing: 1) adversary objectives; 2) their technology; 3) their nuclear testing activities; 4) the amount of fissile material they have; 5) their nuclear warhead technology; 6) their production capability; and, 7) the number and characteristics of their delivery vehicles. Efforts are made to collect as much information as possible concerning the number of nuclear weapons and delivery vehicles that have been produced. In

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[32] Bond, "The New START Treaty," op. cit. (Emphasis added.)

[33] "Paula A DeSutter on Strategic Arms Reduction Treaty (START II)," The Heritage Foundation, 2010, available at https://www.youtube.com/watch?v=AFdEAZt7Glw.

[34] Ibid.

a situation like the current one in which Russia places its highest priority on nuclear capability, has a massive amount of both fissile material and Cold War-level nuclear warhead production capabilities,[35] and is a serial violator of arms control treaties, the possibility for very large underestimates of Russia's nuclear stockpile clearly exists. This is especially true of any estimates based—even in part—on Moscow's arms control declarations regarding its force numbers in the absence of robust verification measures. Indeed, in the absence of a confident U.S. capability to confirm the number of Russian warheads, warhead numbers over Treaty limits may be expected. Russia is likely to try to get the most it can from the money that it is spending for its strategic nuclear forces and to optimize its delivery capabilities to meet its strategy requirements.

While Russia was below the New START Treaty deployed warhead limit on the first day of New START, it built up to well above the limit before it downloaded its forces mainly in the year before the Treaty limits went into effect.[36] Russia then had to download its missiles in order to meet the New START treaty limits.[37] Unfortunately, the traditional methodology of counting warheads does not

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[35] Robert P. Ashley Jr., "Russian and Chinese Nuclear Modernization Trends," *Defense Intelligence Agency*, May 29, 2019, available at https://www.dia.mil/Articles/Speeches-and-Testimonies/Article/1859890/russian-and-chinese-nuclear-modernization-trends/; and, Broad, "Russian Says Soviet Atom Arsenal Was Larger Than West Estimated," op. cit.

[36] "New START Treaty Aggregate Numbers of Strategic Offensive Arms," *Department of State*, June 1, 2011, available at https://2009-2017.state.gov/t/avc/rls/164722.htm; and, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," *Department of State*, April 1, 2016, available at https://2009-2017.state.gov/t/avc/rls/2016/255377.htm.

[37] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 100.

work in an arms control environment where reductions are made by downloading strategic missiles because, as discussed above, that likely cannot be verified in the absence of rigorous, continuing on-site inspections, which no longer exist with Russian termination of inspections.

From early 2018, when the New START limits on force numbers went into legal effect, to early February 2022, the FAS reports indicated that Russia added 71 MIRVed SS-27 Mod 2/RS-24 Yars ICBMs and 32 MIRVed Bulava-30 SLBMs.[38] The FAS May 2023 report said that Russia had deployed an additional 18 SS-27 Mod 2/RS-24 Yars MIRVed ICBMs and one Avangard hypersonic missile.[39] The May 2023 number is close to what Russia announced it had deployed in December 2022.[40] Since February 2022, Russia apparently has added one Borei-A class ballistic missile submarine (armed with 16 MIRVed missiles) to its operational force, and put another submarine on sea trials.[41] Russia's announced plans for 2023 involve deploying: 1) a total of 22 MIRVed Yars ICBMs and Avangard hypersonic boost glide vehicles; 2) the new Sarmat heavy ICBM; 3) a new Borei-A class ballistic missile submarine; and, 4) three new Tu-160 heavy bombers.[42] Russia clearly has a nuclear warhead upload capability far above New START limits and may have used the end of on-site inspections to exploit

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[38] Ibid., p. 99; and, Hans M. Kristensen and Robert S. Norris, "Russian Nuclear Forces, 2018," *Bulletin of the Atomic Scientists*, Vol. 74, No. 3 (2018), p. 188.

[39] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

[40] "Meeting of Defence Ministry Board," *Kremlin.ru*, December 21, 2022, available at http://en.kremlin.ru/events/president/news/70159; and, "A Board Session of the Ministry of Defence was held in Moscow under the Leadership of the Supreme Commander-in-Chief of the Armed Forces of Russia Vladimir Putin," *Kremlin.ru*, December 21, 2021, available at http://en.kremlin.ru/events/president/news/67402.

[41] Ibid.

[42] "Meeting of Defence Ministry Board," December 21, 2022, op. cit.

it. The point here is that there is no way to verify the number of Russian warheads deployed after the end of on-site inspections. The only metric Washington can estimate with reasonable confidence is the maximum possible Russian warhead loads.

Arms Control and Russian Nuclear Threat Assessment

It may be counterintuitive, but arms control agreements can complicate the public availability of information regarding the number and types of Russian nuclear weapons. In U.S. practice, a very high level of proof is required to charge Russia with a treaty violation. The intelligence on the treaty violation may be sensitive and it may not be possible to make it public. In addition, there are restrictions on what the Intelligence Community and the Department of Defense can say in public about Russian compliance. While compliance reports are issued by the State Department, compliance determinations are made by the National Security Council. This dates to Henry Kissinger's time in office and the beginning of strategic nuclear arms control restrictions in 1972 with the ABM Treaty and the SALT I Interim Agreement. In a 1978 report, the House Intelligence Committee reportedly said that, "Dr. [Henry] Kissinger wanted to avoid any written judgment to the effect that the Soviets have violated any of the SALT agreements. If the Director [of the CIA] believes the Soviets may be in violation, this should be the subject of a memorandum from him to Dr. Kissinger. The judgment that a violation is considered to have occurred is to be one that will be made at the NSC level."[43] The impact of this policy has been to turn ordinary intelligence and related discussions of

[43] "The Select Committee Investigative Record," *The Village Voice*, February 16, 1978, p. 92.

Russian nuclear warhead numbers into major political decisions.

In addition, there appear to be bureaucratic politics associated with compliance determinations. Sven Kraemer, who served on the NSC Staff as a senior official in three administrations, reported that, "…new interagency efforts to assess Soviet violations of the SALT II agreement were blocked by the Department of State during 1981…"[44] Kraemer also noted that "there were delaying tactics and resistance within the government bureaucracy, especially in the State Department, ACDA [Arms Control and Disarmament Agency] and parts of CIA."[45]

The same situation seems to be at play today. In 2017, Hans Kristensen wrote a report entitled, "NASIC [National Air and Space Intelligence Center] Removes Russian INF-Violating Missile From Report," which said, "…(NASIC) has quietly published a corrected report on the world's Ballistic and Cruise Missile Threats that deletes a previously identified Russian ground-launched cruise missile. The earlier version published on June 26, 2017, identified a 'ground' version of the 3M-14 [Kalibr] land-attack cruise missile that appeared to identify the ground-launched cruise missile the United States has accused Russia of testing and deploying in violation of the 1987 INF Treaty."[46] The lack of any unclassified U.S. government treatment of the ground-launched Kalibr issue before the 2020 State Department noncompliance report appears linked to the problems of dealing with compliance issues within the U.S. Intelligence Community. These cases illustrate the

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[44] Sven F. Kraemer, "The Krasnoyarsk Saga," *Strategic Review*, Vol. 18, No. 1(Winter 1990), pp. 27, 29.

[45] Ibid.

[46] Hans M. Kristensen, "NASIC Removes Russian INF-Violating Missile From Report," *Federation of American Scientists*, August 22, 2017, available at https://fas.org/blogs/security/2017/08/nasic-2017-corrected./.

difficulties of noncompliance determinations and the public discussion of the subject.

Russian violations of the INF Treaty illustrate this difficulty. For example, well before the publication of the State Department's 2020 non-compliance report, the 2018 NPR finally announced to the public that the missile the Obama Administration determined to be a violation of the INF Treaty was the SSC-8/9M729.[47] The ground-launched Kalibr was another INF Treaty non-compliance issue.[48] Another Russian missile, the R-500/9M728 (sometimes called the Iskander-K), was the subject of many Russian press reports which stated it had a range (usually 1,000-km but sometimes higher) that was in the INF Treaty-prohibited range (500-5,500-km).[49] The 2017 NASIC report on ballistic and cruise missiles had a photograph of the R-500 but there was no data entry that would have revealed

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[47] U.S. Department of Defense, 2018 *Nuclear Posture Review*, op. cit., p. 10; and, Paul McLeary, "The Rest Of The Story: Trump, DoD & Hill Readied INF Pullout For Years," *Breaking Defense*, October 22, 2018, available at https://breakingdefense.com/2018/10/the-rest-of-the-story-trump-dod-hill-readied-inf-pullout-for-years/.

[48] U.S. Department of State, *Adherence to and Compliance With Arms Control, Nonproliferation, and Disarmament Agreements and Commitments* (Washington, D.C.: Department of State, June 2020), p. 14, available at https://www.state.gov/wp-content/uploads/2020/06/2020-Adherence-to-and-Compliance-with-Arms-Control-Nonproliferation-and-Disarmament-Agreements-and-Commitments-Compliance-Report-1.pdf.

[49] Mark B. Schneider, "Additional Russian Violations of Arms Control Agreements," *Real Clear Defense*, December 18, 2017, available at https://www.realcleardefense.com/articles/2017/12/18/additional_russian_violations_of_arms_control_agreements_112795.html; and, Mark B. Schneider, "Russia's INF Treaty Violations: Evidence and Implications," *Journal of Strategy and Politics*, Vol. 2, No. 3 (2020), pp. 57-59, available at https://studyofstrategyandpolitics.files.wordpress.com/2020/06/jsp-7-schneider-russias-inf-treaty-violations.pdf.

its range.[50] There was also no mention in the NASIC report that the supersonic ground-launched Bastion anti-ship/land attack cruise missile had an INF Treaty-prohibited range, which the Russian press was openly reporting. Indeed, in July 2016, *Interfax*, the Russian news agency, reported, "The Bastion coastal defense system has an operational range of 600 kilometers and can be used against surface ships of varying class and type…"[51]

The point of this discussion is to emphasize that, when a treaty compliance issue is involved with Russian force numbers, information about Russian missile systems seems to become politicized and may be withheld from the public. Because neither the Intelligence Community nor the Pentagon can make public information that would indicate a violation of an arms control treaty without NSC sanction, it appears that what the United States says about Russian systems often is incomplete or in some cases possibly inaccurate. Indeed, the 1979 report of the Senate Select Committee on Intelligence on the monitoring of the SALT II Treaty reported that, "It is clear from the SALT I record that

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[50] Defense Intelligence Ballistic Missile Analysis Committee, *Ballistic and Cruise Missile Threat* (Wright-Patterson AFB, OH: National Air and Intelligence Center, 2017), available at https://www.nasic.af.mil/Portals/19/images/Fact%20Sheet%20Images/2017%20Ballistic%20and%20Cruise%20Missile%20Threat_Final_small.pdf?ver=2017-07-21-083234-343.

[51] "Russian Navy to get 5 Coastal Defense Missile Systems by end of 2016 - source (Part 2)," *Interfax*, July 22, 2016, available at https://dialog.proquest.com/professional/professional/docview/1806232632?accountid=155509. See also, "Russia to Boost its Baltic Fleet with Missile Ships – Paper," *Izvestia / BBC Monitoring*, October 26, 2016, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/16046D09ED1F9ED8; and, "Russian Paper Reports on Plans for Coastal Defence on Kuril Islands," *Izvestia / BBC Monitoring*, November 29, 2017, available at http://mutex.gmu.edu/login?url=https://www.proquest.com/wire-feeds/russian-paper-reports-on-plans-coastal-defence/docview/1971759334/se-2?accountid=14541.

intelligence of possible Soviet violation of the Treaty was, in some cases, and for a time, withheld from Executive branch officials who had a need for such information."[52] This pattern may be continuing. While reports that would indicate Russian violation of the INF Treaty appeared in Russian state and non-state media going back to 2007,[53] Paula DeSutter has stated, "I can assure you that when I left the Department of State in January 2009, I had not been briefed on any INF Treaty violations."[54]

In addition, DeSutter stated that her successor as Assistant Secretary of State, Rose Gottemoeller, did not inform the allies that Russia was violating the INF Treaty until it had been well-known for three years.[55] She also said that Congress was not informed and no serious effort was made to bring Russia back into compliance immediately following determination of violation.[56] In January 2014, Michael Gordon, then with *The New York Times*, reported that by 2011 the Intelligence Community was aware of the

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[52] U.S. Senate, Select Committee on Intelligence, *Principal Findings on the Capabilities of the United States to Monitor the SALT II Treaty* (Washington, D.C.: U.S. Government Printing Office, October 1979), pp. 3-4, available at https://www.intelligence.senate.gov/sites/default/files/publications/96salt.pdf.

[53] Mark B. Schneider, "Confirmation of Russian Violation and Circumvention of the INF Treaty," *Information Series*, No. 360, February 2014, pp. 3-5, available at http://www.nipp.org/wp-content/uploads/2014/11/Confirmation-of-Russian-Violations-of-the-INFTreaty8.pdf.

[54] Paula A. DeSutter, *Statement of Paula A. DeSutter: INF Treaty Withdrawal and the Future of Arms Control* (Washington, D.C.: House Armed Services Committee, February 26, 2019), p. 2, available at https://docs.house.gov/meetings/AS/AS29/20190226/108944/HHRG-116-AS29-Wstate-DeSutterP-20190226.pdf.

[55] Paula A. DeSutter, "Paula DeSutter Discussing Russian Nuclear and Ballistic Missile Modernization," George Marshall Institute, March 19, 2014, available at https://www.youtube.com/watch?v=x9rAqUXwVa8.

[56] Ibid.

INF noncompliance issue.[57] Official confirmation of Russian press reports about prohibited ground-launched INF-range missiles was only made public by the State Department when it confirmed the Michael Gordon story.[58] Not until later in 2014 did the State Department's public non-compliance report reveal that Russia had violated the INF treaty.[59]

Hence, it can rightly be concluded that the existence of an arms control agreement and related compliance issue can reduce the availability of open source data on Russian nuclear capabilities and negatively impact efforts to make open source assessments of Russian nuclear warhead numbers.

Reports of Russian Non-Compliance With New START Treaty Substantive Limitations

An examination of the Biden Administration's 2022 reports on arms control non-compliance reveals that Russia is violating all of the arms control treaties, most recently including New START.[60] Why would New START be an

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[57] Michael Gordon, "US Says Russia Tested Missile, Despite Treaty," *The New York Times*, January 29, 2014, available at https://www.nytimes.com/2014/01/30/world/europe/us-says-russia-tested-missile-despite-treaty.html.

[58] Jen Psaki, "Daily Press Briefing – January 30, 2014," *State.gov*, available at https://2009-2017.state.gov/r/pa/prs/dpb/2014/01/221045.htm.

[59] U.S. Department of State, *Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments* (Washington, D.C.: Department of State, July 2014), p. 8, available at https://2009-2017.state.gov/t/avc/rls/rpt/2014/230047.htm.

[60] U.S. Department of State, *Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments* (Washington, D.C.: Department of State, July 2022), available at https://www.state.gov/wp-content/uploads/2022/04/2022-

exception? There is substantial evidence of Russian non-compliance with the New START Treaty. Many of these issues involve cruise missiles, the very missiles Russia is using against Ukraine. This includes the Kh-101, a cruise missile which President Putin says has a range of 4,500-km and is nuclear-capable.[61] A long-range nuclear capable cruise missile deployed on any aircraft that is not a heavy bomber would violate the New START Treaty because a long-range, nuclear-capable cruise missile is recognized as nuclear-armed under the Treaty and would cause any aircraft carrying it to be counted as a heavy bomber under the Treaty. The Russian MoD has said the same thing.[62] In 2022, Yury Borisov, then Russia's Deputy Prime Minister in charge of defense procurement, stated that "*the Kh-101 airborne missile [is] carried by the Sukhoi Su-30 and Su-35 fighter-bombers*."[63] Later, *RT*, which is Russian state media, deleted the pertinent information stating that, "*This article has been amended in regards to a quote by Yury Borisov on the*

Adherence-to-and-Compliance-with-Arms-Control-Nonproliferation-and-Disarmament-Agreements-and-Commitments-1.pdf.

[61] "Meeting of Commission for Military Technical Cooperation with Foreign States," *Kremlin.ru*, July 6, 2017, available at http://en.kremlin.ru/events/president/news/54993; and, "Meeting with Defence Minister Sergei Shoigu," *Kremlin.ru*, December 8, 2015, available at http://en.kremlin.ru/events/president/news/50892.

[62] "In the Course of the Last 24 hours, Aircraft of the Russian Aerospace Forces have Performed 82 Combat Sorties Engaging 204 Terrorist Objects in Syria," *Defense Ministry of the Russian Federation*, December 9, 2015, available at http://eng.mil.ru/en/news_page/country/more.htm?id=12071355@egNew; and, "Strategic Tu-95MS Bombers Destroyed the ISIS Militants' Command Post and Storages in Syria with a Missile Attack," *Defense Ministry of the Russian Federation*, August 5, 2017, available at http://eng.mil.ru/en/newspage/country/more.htm?id=12132186@egNews.

[63] "Top Official Explains why Russia hasn't run out of Precision Missiles in Ukraine," *RT*, April 19, 2022. (Emphasis in the original.) Available at https://www.rt.com/russia/554134-borisov-interview-defense-industry/.

missiles carried by the Sukhoi Su-30 and Su-35 fighter-bombers."[64] Nuclear-capable Kh-101s on these fighter-bombers would put Russia far in violation of the deployed warhead and the deployed delivery vehicle limits of the New START Treaty since there are hundreds of them.

Russian state media have linked the Kh-101 and Kh-555 (reportedly nuclear-capable) cruise missiles to the Backfire bomber, which is not a heavy bomber counted under New START.[65] As noted, if Russia puts a long-range (i.e., 600-km or greater range) nuclear air-launched cruise missile (ALCM) on a non-heavy bomber, it turns every carrier of that type into a heavy bomber and *de facto* puts Russia in violation of the numerical limits of the New START Treaty on deployed warheads and deployed delivery vehicles.[66] This is one of the reasons U.S. fighter aircraft do not carry long-range nuclear ALCMs.

In 2012, then Commander of the Russian Air Force, Colonel General Alexander Zelin, stated that the Su-34 long-range strike fighter would be given "long-range missiles…Such work is under way and I think that it is the platform that can solve the problem of increasing nuclear deterrence forces within the Air Force strategic aviation."[67]

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[64] Loc. cit. (Emphasis in the original.)

[65] "Russia: First Tu-22M3M bomber due 2018, 30 to be Upgraded," *BBC Monitoring Former Soviet Union*, May 21, 2017, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/16486E6AB5806170; and, Alexander Fedor, "Flexible Strategic Fist," *Oborona.ru*, December 12, 2015, available at http://www.oborona.ru/includes/periodics/armedforces/2015/1214/145317358/detail.shtml. (In Russian.)

[66] Mark B. Schneider, "Russia's Modernization Programs for Strategic Nuclear Bombers," *Real Clear Defense*, March 24, 2020, available at https://www.realcleardefense.com/articles/2020/03/24russias_modernization_programs_for_strategic_nuclear_bombers_115141.html.

[67] "Russian strategic aviation to be reinforced with Su-34 frontline bombers," *Interfax-AVN*, March 19, 2012, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=40013181.

This is likely to be another instance of deploying the nuclear-capable Kh-101 on an aircraft that is not a heavy bomber—making that aircraft accountable under the Treaty and a likely violation of New START ceilings.

There are similar non-compliance issues, often identified by Russian state media, involving the deployment of nuclear-capable Russian Kh-22 and the Kh-32 cruise missiles on the Backfire bomber.[68] Yet, these issues are missing in the February 2022 FAS report and in the State Department's non-compliance reports. They could potentially involve hundreds of undeclared warheads, putting Russia in violation of all three New START Treaty limits—deployed warheads, deployed delivery vehicles and deployed and non-deployed delivery vehicles.[69] The State Department's non-compliance reports have never addressed General Karakayev's repeated statements that he has 400 ICBMs on "combat duty."

This study is not a review of Russian arms control violations, per se. However, it provides this detailed review of the subject to demonstrate that when there are arms control compliance issues involved, the State Department, the Defense Department and the Intelligence Community may be far from candid about Russian nuclear force numbers and types. Scholars, commentators, and members of Congress can essentially be left in the dark and reliant on

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[68] Mark B. Schneider, "Russian Air-Delivered Non-Strategic Nuclear Weapons," *Real Clear Defense*, June 15, 2018, available at https://www.realcleardefense.com/articles/2018/06/15/russian_air-delivered_non-strategic_nuclear_weapons_113537.html; and, Jack Buckby, "Russia Is Using Old Missiles Designed to Kill Aircraft Carriers to Strike Ukraine," *19FortyFive.com*, July 31, 2022, available at https://www.19fortyfive.com/2022/06/russia-is-using-old-missiles-designed-to-kill-aircraft-carriers-to-strike-ukraine/.

[69] Mark B. Schneider, "The Most Serious Russian Violation of the New START Treaty Yet," *Real Clear Defense*, May 16, 2022, available at https://www.realcleardefense.com/articles/2022/05/16/themost_serious_russian_violation_of_the_new_start_treaty_yet_832443.html.

estimates of Russian force numbers that lack credibility and may be intended to advance an arms control agenda.

Assessing the Size of the Russian Nuclear Arsenal

Making assessments of the total size of the Russian nuclear arsenal is much more difficult than assessing the number of its deployed strategic nuclear weapons. Nuclear weapons are produced for purposes other than immediate deployment—for example, spares, upload hedges and destructive dissections to detect reliability problems. Russia does not announce the size of its arsenal. Indeed, the Russian nuclear weapons stockpile has never been subject to any inspections.[70] Hence, the information needed for confident U.S. government assessments of the size of the Russian stockpile is exceedingly difficult to obtain, and there is the ever-present problem of possible Russian deception in this regard.

Russian deception with regard to its arms control compliance and force numbers is potentially linked to accurately estimating the number of Russian nuclear weapons. An adversary's ability to implement successful deception is impacted by the U.S. counterintelligence capability. The same is true regarding cheating on arms control commitments, which usually relies on denial and deception.

Yet, one of the most significant U.S. national security weaknesses reportedly has been in the area of counterintelligence. In January 2023, Bill Gertz wrote that

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[70] Pavel Felgenhauer, "Putin Delivers More Restrained National Address as Moscow Announces Partial Troop Withdrawal," *Eurasia Daily Monitor*, Vol. 18, No. 65 (April 22, 2021), available at https://jamestown.org/program/putin-delivers-more-restrained-national-address-as-moscow-announces-partial-troop-withdrawal/.

declassified documents just made public indicated that after the departure of James Angleton (then CIA chief of counterintelligence), "…the counterintelligence function …was downgraded and removed as an independent function, an action critics say resulted in major failures at the agency years later."[71] In September 2022, Michelle Van Cleave, the first person to serve as the statutory head of U.S. counterintelligence, told the Senate Select Committee on Intelligence that, "…the national CI [counter intelligence] office has failed to accomplish the principal goals for which it was created."[72] She continued, "hostile penetrations and foreign deception operations that have grown far bolder and deeper than the resources we have available to counter them, [are] putting lives and treasure and U.S. supreme national interests at risk." And, "Human intelligence is still Russia's forte… By contrast, the West's intelligence efforts against Russian targets were sharply reduced as the U.S. waged a global war on radical Islam—and also because we thought a post-Cold War Russia would no longer be counted among our adversaries."[73] Absent effective counterintelligence, U.S. adversaries can manipulate U.S. threat assessments by passing disinformation. According to Van Cleave, "the practice of deception, [is] an ever-present feature in intelligence work."[74]

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[71] Bill Gertz, "Once-secret Files Reveal New Details of CIA's Divisive Defector Dispute," *The Washington Times*, January 1, 2023, available at https://www.washingtontimes.com/news/2023/jan/1/once-secret-files-reveal-new-details-cias-divisive/.

[72] Michelle Van Cleave, Michelle Van Cleave Statement for the Record (Washington, D.C.: U.S. Senate, Select Committee on Intelligence, September 21, 2022) p. 1, available at https://www.intelligence.senate.gov/sites/default/files/os-mvcleave-092122.pdf.

[73] Ibid., p. 6.

[74] Michelle Van Cleave, "Strategic Counterintelligence: What Is It and What Should We Do About It?" *Studies in Intelligence*, Vol. 51, No. 2 (2007), available at

In addition to arms control enthusiasm in Washington and possible Russian disinformation, there is the growing problem of a generation gap within the Washington bureaucracy resulting in the Soviet-era being increasingly forgotten. The de-emphasis of intelligence on Russia during the George W. Bush Administration and the retirement and deaths of most analysts with Soviet-era experience have also had a negative impact on intelligence assessments in general, and public assessments of Russian force numbers in particular.

In summary, the unfortunate reality in open source assessments of Russian nuclear capabilities is that Washington tells the American people relatively little about Russian nuclear forces, or the nature of the threat posed by Russia's expanding and modernized nuclear arsenal. Furthermore, the existence of arms control agreements complicates assessments of Russia's nuclear forces and activities, and appears to undermine the public release of information on the subject. Russian termination of on-site inspections under New START may have left Washington largely in the dark for years with regard to the count of Russian strategic nuclear warheads, and certainly defies estimates based on a presumption of Russian compliance with New START force levels. Lastly, the United States may not have good intelligence about the scope of the Russian threat because of the inherent difficulty in collecting intelligence as well as the potential deficiencies in the U.S. government's counterintelligence capabilities.

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https://www.cia.gov/static/6adf09076081439a16d353b398420f33/what-is-what-do.pdf.

Chapter 5
Estimating the Number and Characteristics of Russia's Strategic Nuclear Weapons

Russian strategic nuclear modernization programs are the most extensive in the world, despite the fact that China is increasingly a competitor for this distinction. The sheer number of Russian nuclear programs is almost at the Soviet level, although the annual procurement rate is much more limited due to resource limitation and Western sanctions—resulting in a much slower pace of modernization than in the Soviet period. In January 2017, Russian Defense Minister General of the Army Sergei Shoigu stated that the development of the strategic nuclear forces was Russia's top priority, and that Russia will "…continue a massive program of nuclear rearmament, deploying modern ICBMs on land and sea, [and] modernizing the strategic bomber force."[1] Pavel Felgenhauer elaborated, "By 2020, Russia may have more than ten types of land-based deployed ICBMs and up to five different sea-based ballistic missiles, while the US has only two deployed long-range ballistic missiles—the vintage land-based Minuteman and the sea-based Trident."[2] Indeed, Russia has multiple systems for every leg of its nuclear Triad and is moving forward with novel systems with long-range capabilities that fall outside the traditional definition of a strategic Triad.[3]

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[1] Pavel Felgenhauer, "Kremlin Learning to Navigate Washington's New Unpredictability," *Eurasia Daily Monitor*, Vol. 14, No. 3 (January 19, 2017), available at https://jamestown.org /program/kremlin-learning-navigate-washingtons-new-unpredictability/.

[2] Loc. cit.

[3] Mary Beth D. Nikitin, *Russia's Nuclear Weapons: Doctrine, Forces, and Modernization* (Washington, D.C.: Congressional Research Service, April 21, 2022), p. 37, available at

Russia has announced more than 20 new or modernized strategic delivery systems since the end of the Cold War, most of which are being developed from post-Cold War designs.[4] In addition, Moscow is likely developing other strategic systems that have not been publicly announced. Indeed, the U.S. Department of Defense usually does not reveal anything about Russia's nuclear missiles that Moscow has not already made public. Russia's announced programs are in various stages of development, testing, or

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https://crsreports.congress.gov/product/pdf/R/R45861/16; and, Mark B. Schneider, "Russian Nuclear Weapons Policy," *Real Clear Defense*, April 28, 2017, available at https://www.realcleardefense.com/articles/2017/04/28/russian_nuclear_weapons_policy_111261.html.

[4] Ibid. See also, *Section II. Minimum Deterrence: Fragile Hope of a Constant and Benign Threat Environment* (Fairfax, VA: National Institute for Public Policy, September 2014), pp. 15-26, available at https://www.esd.whs.mil/Portals/54/Documents/FOID/Reading%20Room/Litigation_Release/Litigation%20Release%20-%20Section%20II%20Minimum%20Deterrence%20Fragile%20Hope.pdf; "Russia developing new 'Osina' Yars missile variant," *BBC Monitoring Former Soviet Union*, June 16, 2021, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/183279F7D59204B8; Isabel Van Brugen, "Russia Creating Unstoppable Submarine Nuclear Missiles—Report," *Newsweek*, May 15, 2023, available at https://www.newsweek.com/russia-new-unstoppable-intercontinental-ballistic-missile-submarine-navy-1800313; Mark B. Schneider, "The Russian Nuclear Buildup and the Biden Administration Nuclear Posture Review," *Real Clear Defense*, September 21, 2021, available at https://www.realcleardefense.com/articles/2021/09/29/the_russian_nuclear_buildup_and_the_biden_administration_nuclear_posture_review_796621.html; and, Mark B. Schneider, "Russian Strategic and Hypersonic Naval Nuclear Weapons," *Real Clear Defense*, November 21, 2020, available at https://www.realcleardefense.com/articles/2020/11/18/russian_strategic_and_hypersonic_naval_nuclear_weapons_650130.html.

deployment.[5] However, Russia sometimes has more than one name for a missile system, which creates confusion. (Note that the current Yars-M ICBM is different from the RS-24 Rubezh ICBM, which was also called the Yars-M.)[6] The Russian government sometimes does not announce when a program is suspended. However, such information is usually disclosed in Russian media reports.

This chapter uses a broad range of open sources, governmental and nongovernmental, to estimate the size and characteristics of Russian strategic nuclear forces. Doing so can help inform an understanding of the nature of the Russian threat.

Regardless of whether President Putin remains in power, a large percentage of these programs is expected to go forward. Russia sees strategic forces as the core of its "great power" status; its modernization programs are extensive and reflect this perspective. Given Russian modernization cycles, it is anticipated that every system will be replaced by either an improved version or a new type. Despite Western sanctions, a weakened economy and its war against Ukraine, Russia has continued with the expansion and modernization of its nuclear arsenal.

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[5] John A. Tirpak, "The Great Hypersonic Race," *Air Force Magazine*, June 27, 2018, available at https://www.airandspaceforces.com/article/the-great-hypersonic-race/.

[6] Pavel Podvig, "Too Many Missiles - Rubezh, Avangard, and Yars-M," *RussianForces.org*, July 6, 2013, available at https://russianforces.org/blog/2013/07/too_many_missiles_-_rubezh_ava.shtml.

New Russian Strategic Nuclear Delivery Vehicles

ICBMs:
- The new road-mobile and silo-based single warhead SS-27 Mod 1/Topol-M Variant 2 ICBM, which is operational and fully deployed;
- The new SS-27 Mod 2/RS-24/Yars MIRVed ICBM, which is operational and whose deployment is continuing;
- The improved Yars-S, which is operational and the deployment of which is continuing;
- The Yars-M, a novel missile design, which is under development;
- The Avangard hypersonic glider launched on the SS-19 ICBM, which is operational and the deployment of which is continuing;
- The Sarmat highly-MIRVed heavy ICBM, which is in testing with deployment announced for 2023;
- The new RS-26 Rubezh missile, called an "ICBM" by Russia, but in reality an intermediate-range missile, with deployment suspended pending a 2027 decision;
- The Barguzin rail-mobile ICBM, with deployment suspended pending a 2027 decision;
- The Osina-RV ICBM, perhaps a new road-mobile ICBM, which is under development; and,
- The Kedr ICBM, a reported replacement for the Yars, the development of which is probably about to start.

SLBMs and SSBNs:
- The new Borei and Borei A ballistic missile submarines;
- The new Bulava-30 missiles with new MIRV warheads which are operational, and deployment of which is continuing on new Borei submarines;
- An improved Bulava-30 SLBM, which is in development;
- A recently announced follow-on missile to replace the Bulava-30, the characteristics and status of which are unknown;
- The improved versions of the Soviet legacy SS-N-23 SLBM called the Sineva and the Layner/Liner, both of which are operational and the deployments which have been completed; and,
- The new Husky 5th generation ballistic missile submarine and a new liquid-fueled ballistic missile; the development of both probably is suspended.

Bombers:
- Repeated modernizations of the Blackjack (Tu-160) and the Bear (Tu-95) heavy bombers;
- A program to deploy at least 50 new Tu-160M2 bombers, the production of which is now underway;
- New nuclear cruise missiles including 1) the new Kh-102 stealthy long-range strategic cruise missile, which is operational; 2) the nuclear-capable Kh-101 long-range cruise missile, which is operational; and, 3) reported deployment of the Kinzhal hypersonic missile on the Tu-160; and,
- The development of a new stealthy heavy bomber, the Pak DA, which reportedly will carry cruise and hypersonic missiles.

Novel Systems:
- The Poseidon (previously called the Status-6) nuclear-powered, nuclear-armed drone carried by the large new Belgorod-class nuclear submarines, which is nearly operational; and,
- The Burevestnik nuclear-armed, nuclear-powered cruise missile, which is under development.

Russian Strategic Nuclear Capabilities

According to the Russian government, its strategic nuclear forces on September 1, 2022 were composed of: 1) 540 deployed ICBMs, SLBMs and heavy bombers; 2) 1,549 nuclear warheads deployed on ICBMs, SLBMs and one counted for each heavy bomber; and, 3) 759 deployed and non-deployed ICBM launchers, SLBM launchers and heavy

bombers.[7] At entry into force of the New START Treaty (February 2011), the declared Russian numbers were 527, 1,537 and 865, respectively. Thus, according to official Russian data, there has been a small increase in the number of its deployed warheads and delivery vehicles since the New START Treaty took effect.[8] However, the warhead number did not take into consideration the impact of Russian bomber modernization, which has enhanced the Russian bomber delivery capability considerably. The reduction in Russian non-deployed delivery vehicles appears to be the result of scrapping systems that were no longer functional, such as the Typhoon ballistic missile submarines, which reportedly were no longer operational even in 2011. (The main problem with the Typhoons was the lack of missiles**,** as many were eliminated by 2012 under the Cooperative Threat Reduction program.)[9]

Alexei Arbatov, former Deputy Chairman of the Duma Defense Committee, turned out to be correct in 2010 when he said that New START was a Treaty that would only limit U.S. strategic forces, which were reduced in all three New START categories by hundreds of weapons and delivery systems.[10] Indeed, during the 2010 Russian New START

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[7] U.S. Department of State "New START Treaty Aggregate Numbers of Strategic Offensive Arms," *State.gov*, September 1, 2022, available at https://www.state.gov/new-start-treaty-aggregate-numbers-of-strategic-offensive-arms-4/.

[8] U.S. Department of State, *New START Treaty Aggregate Numbers of Strategic Offensive Arms* (Washington, D.C.: Department of State, October 25, 2011), p. 1, available at https://2009-2017.state.gov/documents/organization/176308.pdf.

[9] Pavel Podvig, "Elimination of R-39/SS-N-20 Missiles," *RussianForces.org*, September 18, 2012, available at https://russianforces.org/blog/2012/09/elimination_of_r-39ss-n-20_mis.shtml.

[10] Quoted in Mark B. Schneider, *New START: The Anatomy of a Failed Negotiation* (Fairfax, VA: National Institute Press, July 2012), p. iii, available at http://www.nipp.org/wp-content/uploads/2014/12/New-start.pdf; and, U.S. Department of

ratification hearings, then Defense Minister Anatoly Serdyukov said, "The parameters laid down in the treaty will in no way reduce the potential of our strategic forces."[11] Furthermore, he said that Russia intended to *increase* its forces up to the New START Treaty limits of 700 deployed strategic delivery vehicles, 1,550 deployed warheads, and 800 total deployed and non-deployed delivery systems.[12]

The following chart was released by the Department of State in March 2022.[13] It does not include the increase in Russian force levels reported in the last Russian New START Treaty data notification provided to the United States on September 1, 2022.

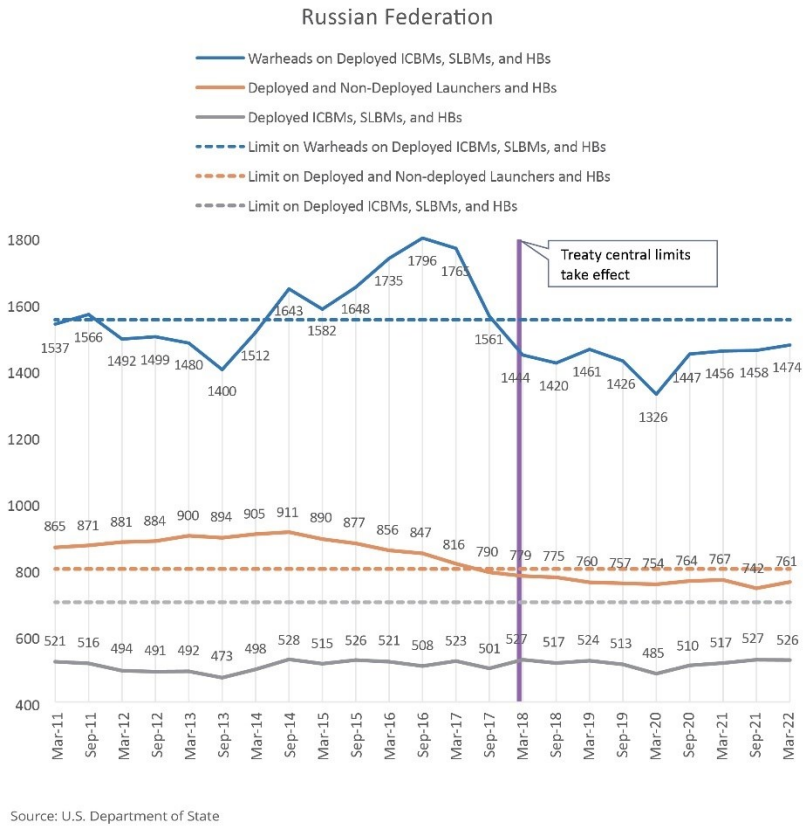
State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," September 1, 2022, op. cit.

[11] Keith B. Payne, "Postscript on New START - The Senate was Misinformed about the Nuclear Treaty," *National Review*, January 18, 2011, available at http://www.nationalreview.com/articles/257329/postscript-new-start-keith-bpayne; "Defence Minister Outlines Benefits of New START Treaty to Russia," *BBC Monitoring Former Soviet Union*, December 24, 2010, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/134578172F18FDD8; and, "Nuclear Treaty Goes Easy on Russia: Analysts," *Dawn.com,* December 27, 2010, available at https://www.dawn.com/news/593943/nuclear-treaty-goes-easy-on-russia-analysts.

[12] Ibid.

[13] U.S. Department of State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms of the United States and the Russian Federation, February 2011 – March 2022," *State.gov*, March 1, 2022, available at https://www.state.gov/new-start-treaty-aggregate-numbers-of-strategic-offensive-arms-of-the-united-states-and-the-russian-federation-february-2011-march-2022/.

Russian Nuclear Weapons and Treaty Limits



Source: U.S. Department of State

The Number of Russian Strategic Nuclear Weapons

As noted previously, then Principal Deputy Under Secretary of Defense for Policy Dr. James Miller's 2011 numbers on Russia's nuclear inventory[14] suggested it had

[14] James Miller, as quoted in, U.S. House of Representatives, *The Current Status and Future Direction for U.S. Nuclear Weapons Policy and Posture*

up to 2,500 strategic nuclear weapons. This number appears to be the then-declared Russian number of deployed strategic nuclear warheads under the New START Treaty plus the well-documented delivery capability of Russian strategic nuclear bombers, which is generally reported at about 800 (see Chapter 3). Dr. Miller's numbers with regard to the total Russian nuclear weapons inventory (4,000-6,500)[15] have never been publicly updated by the Defense Department.

The official Russian position, repeatedly stated at the Nuclear Non-Proliferation Treaty (NPT) review conferences, is that Russia has reduced its strategic nuclear forces by 85 percent since the Cold War.[16] However, this appears to be misleading, as Russia is comparing the New START Treaty accountability number (which grossly undercounts Russian bomber weapons) to the original (1990) START Treaty accountability number (10,271),[17] which used different counting rules.

Despite this apples-to-oranges comparison, in December 2018, General Karakayev stated that, "…the nuclear potentials of the sides have [been] reduced more than 66 percent since the signing of START I."[18] The

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(Washington, D.C.: Armed Services Committee, Subcommittee on Strategic Forces, November 2, 2011), available at https://www.govinfo.gov/content/pkg/CHRG-112hhrg71527/html/CHRG-112hhrg71527.htm.

[15] Loc. cit.

[16] *Statement by Mr. Dmitry Polyanskiy, First Deputy Permanent Representative of the Russian Federation to the UN, during General Debate at the UN Disarmament Commission 2018*, Permanent Mission of the Russian Federation to the United Nations, April 2, 2018, available at http://russiaun.ru/en/news/desarm0204.

[17] *START Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms Signed in Moscow July 31, 1991*, op. cit., p. 122.

[18] "U.S. to seek ways of leveling capacities of Russian strategic nuclear forces - Gen. Karakayev," *Interfax*, December 17, 2018, available at https://interfax.com/; and, "US to look for new ways of neutralizing

difference between an 85 percent reduction and a 66 percent reduction is almost 2,000 strategic nuclear warheads, which suggests Russia, at that time, had about 3,300 strategic nuclear weapons, well above the New START Treaty-allowed level of 1,550. It is not possible to get this high a number by just adding about 800 bomber-delivered weapons unaccountable under the New START Treaty.[19] Instead, it is likely that at least part of the difference is made up by additional cruise missiles, nuclear gravity bombs, and possibly short-range nuclear missiles.[20] Significant numbers of nuclear gravity bombs and short-range missiles could be included in the count of actual Russian bomber weapons. These could explain, in part, Karakayev's 3,300 overall number.

In addition, these systems could be augmented by undeclared SS-27 Mod 2/RS-24 Yars mobile ICBMs. If so, then the total number of deployed strategic nuclear weapons could easily reach 3,300. The Soviet Union established a precedent for covert deployment of mobile ICBMs; therefore, such a possibility today should not be summarily dismissed. Indeed, the Reagan Administration's first Soviet arms control non-compliance report in January 1984 concluded that the SS-16 ICBM was deployed at Plesetsk in "probable violation" of the SALT II Treaty

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Russian strategic nuclear forces." *TASS*, December 16, 2018, available at https://tass.com/defense/1036341.

[19] U.S. Department of State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," *State.gov*, October 2, 2017, available at https://2017-2021.state.gov/new-start-treaty-aggregate-numbers-of-strategic-offensive-arms-5/index.html.

[20] "Winged Snipers: Best of the Best of Russia's Ballistic and Cruise Missiles," *Sputnik*, December 23, 2017, available at https://sputnikglobe.com/20171223/russian-air-launched-ballistic-cruise-missiles-1060272064.html; and, Hans M. Kristensen and Matt Korda, "Russian Nuclear Weapons, 2022," *Bulletin of the Atomic Scientists*, Vol. 78, No. 2 (2022), p. 99.

prohibition on its deployment.[21] Many years later, when SALT II was apparently forgotten, Russian generals and the chief designer of the SS-16 acknowledged its deployment by the Soviet Union, which was a violation of the SALT II prohibition.[22]

If Russia had 3,300 deployed strategic nuclear weapons in 2018, the potential covert upload capability due to continued modernization, the end of on-site inspections in 2020**,** and Russia's New START Treaty "suspension" could have allowed Russia to add even more weapons to the 3,300 number. Indeed, well-known Russian expert Sergei Rogov reportedly stated that the "…overall number of [Russian] strategic nuclear weapons, including those in storage, could be as high as around 6,000."[23]

In a 2014 article, Colonel (ret.) Houston T. Hawkins of the Los Alamos National Laboratory, wrote that, "Today, estimates are that Russia has about 4,500 strategic weapons in its inventory. But how accurate are these new estimates?"[24] He noted that the primary driver for Cold War-era estimates of Soviet strategic nuclear weapons was the assessed amount of Soviet Highly Enriched Uranium (HEU), which the United States underestimated by at least

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[21] Ronald Reagan, *Message to the Congress Transmitting a Report and a Fact Sheet on Soviet Noncompliance With Arms Control Agreements*, ReaganLibrary.gov, January 23, 1984, available at https://www.reaganlibrary.gov/archives/speech/message-congress-transmitting-report-and-fact-sheet-soviet-noncompliance-arms.

[22] Schneider, *New START: The Anatomy of a Failed Negotiation*, op. cit., pp. 36-37.

[23] Pavel Felgenhauer, "Kremlin Overrules Own Defense and Foreign Policy Establishment on Arms Control," *Eurasia Daily Monitor*, Vol. 17, Iss. 149 (October 22, 2020), available at https://jamestown.org/program/kremlin-overrules-own-defense-and-foreign-policy-establishment-on-arms-control/.

[24] Houston T. Hawkins, *Rethinking the Unthinkable* (Los Alamos, NM: Los Alamos National Laboratory, July 23, 2014), LA-UR-14-25647, p. 10, available at https://www.osti.gov/biblio/1148302.

100 percent.[25] Today, it appears that the Russian stockpile of fissile material is vastly in excess of what Russia could possibly need for any of the currently estimated nuclear warhead numbers. The information in Hawkins's article was subjected to a security review and it is unlikely that a U.S. National Laboratory would have published an article on such an important subject that lacked credibility. A Russian strategic nuclear stockpile of 4,500 weapons in 2014 would have indicated a significant upload capability, allowing Russia to achieve a rapid breakout from the New START Treaty. In the current context of no on-site inspections for more than three years, such a hedge force could support large-scale cheating.

There is other evidence of Russian expansion of its nuclear force. In 2019, the Director of the Defense Intelligence Agency (DIA) Lt. General Robert P. Ashley, Jr., in a speech delivered at the Hudson Institute, stated that "…during the past decade, Russia has improved and expanded its [nuclear weapons] production complex, which has the capacity to process thousands of warheads annually."[26] Russia does not have money to waste even on its highest priority programs, strategic nuclear forces. Russia does not need a capability to produce and/or dismantle "thousands" of weapons a year to sustain a roughly 6,000-warhead stockpile as assessed by the FAS in its February 2022 and May 2023 reports. This suggests that Russia desires to increase its nuclear weapons capability massively. The question is: Why?

In December 2017, American journalist Bill Gertz reported, "Russia is aggressively building up its nuclear forces and is expected to deploy a total force of 8,000 warheads by 2026 along with modernizing deep underground bunkers, according to Pentagon officials. The

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[25] Ibid.

[26] Ashley, Jr., "Russian and Chinese Nuclear Modernization Trends," op. cit.

8,000 warheads will include both large strategic warheads and thousands of new low-yield and very low-yield warheads to circumvent arms treaty limits and support Moscow's new doctrine of using nuclear arms early in any conflict."[27] In August 2019, then Deputy Assistant Secretary of Defense for Nuclear Matters Rear Admiral (ret.) Peter Fanta, speaking at the Crane Naval Submarine Warfare Center Symposium on Strategic Nuclear Weapons Modernization and Hypersonics, confirmed the Gertz report stating that, "The Russians are going to 8,000 plus warheads."[28]

An incisive 2015 study by James R. Howe concluded that Russia had the potential to deploy 2,664-5,890 nuclear warheads on its then-planned strategic ballistic missile force.[29] In another analysis, published in September 2019, he said Russia would have between "2,976 WHs [warheads], and a maximum of 6,670 WHs" (depending on warhead loading) plus over 800 bomber weapons.[30] He noted that "the 2022 [Russian] strategic nuclear force's (SNFs) warhead (WH) levels will likely significantly exceed New START levels based on planned WH loadings."[31] Indeed, as a result of the lack of on-site inspections for more than three

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[27] Bill Gertz, "Russia Sharply Expanding Nuclear Arsenal, Upgrading Underground Facilities," *Washington Free Beacon*, December 13, 2017, available at http://freebeacon.com/national-security/russia-sharply-expanding-nuclear-arsenal-upgrading-underground-facilities/.

[28] Peter Fanta, Deputy Assistant Secretary of Defense for Nuclear Matters, speaking at the NWSC Crane Triad Symposium, August 23, 2019.

[29] James R. Howe, "Exploring the Dichotomy Between New START Treaty Obligations and Russian Actions and Rhetoric," *Vision Centric, Inc.*, October 2015, mimeo, slide 4.

[30] James R. Howe, "Future Russian Strategic Nuclear and Non-Nuclear Forces: 2022," in Stephen J. Blank ed., *The Russian Military in Contemporary Perspective* (Carlisle, PA.: U.S. Army War College, Strategic Studies Institute, September 2019), p. 358, available at https://press.armywarcollege.edu/monographs/907/.

[31] Ibid., p. 341.

years, some of this nuclear force growth may have already happened. Much of it depends on the scale of the Sarmat heavy ICBM deployment since it is a 20-warhead system (see below).

The Potential for Covert Upload of Russian Strategic Ballistic Missiles

After nine years of the degraded New START Treaty verification regime (2011-2020), which included no on-site monitoring of Russian mobile ICBM production, followed by more than three years of no on-site inspections, it is highly unlikely that the United States can rely on the accuracy of Russian data declarations (the last one occurred in September 2022). Moreover, on March 15, 2023, the U.S. Department of State announced that, "Russia has stopped providing its [New START] treaty-mandated notifications."[32] As discussed above, more than three years without on-site inspections means the treaty is essentially unverifiable. This stands Ronald Reagan's maxim, "Trust, but verify," on its head. As a result, Russia can deploy any number of strategic nuclear weapons it desires, up to the theoretical capability of its delivery systems, with potentially little risk of detection and, given past history, little risk of a robust and serious U.S. response. Russia also can produce large numbers of ICBMs and SLBMs and put them in storage, and they are not accountable under the New START Treaty.

The November 2022 FAS New START Treaty advocacy article stated that, without New START, Russia could increase its deployed strategic nuclear weapons to 2,425, an

[32] U.S. Department of State, "Russian Noncompliance with and Invalid Suspension of the New START Treaty," *State.gov*, March 15, 2023, available at https://www.state.gov/russian-noncompliance-with-and-invalid-suspension-of-the-new-start-treaty.

increase of 837 nuclear warheads over what the FAS estimated the Russians had deployed at that time.[33] However, the authors appear to have significantly underestimated Russian missile upload potential. They included 400 bomber weapons in the 837 number.[34] The authors said they were counting nuclear weapons in bomber base weapons storage areas.[35] Yet, the number of nuclear weapons that are available at bomber bases is not limited in any way under the New START Treaty. Indeed, in December 2019, Rose Gottemoeller cautioned that the United States may lose nuclear parity because, if freed from the New START warhead limit, "…without deploying a single additional missile,"[36] Russia, "could readily add several hundred—by some accounts, one thousand—more warheads, to their ICBMs…"[37] Both of these estimates likely understate Russian upload potential by a considerable amount.

While the United States has a good understanding of the maximum Russian warhead upload potential for existing

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[33] Jessica Rogers, Matt Korda, Hans M. Kristensen, "Nuclear Notebook: The Long View—Strategic Arms Control after the New START Treaty," *Bulletin of the Atomic Scientists*, November 9, 2022, available at https://thebulletin.org/premium/2022-11/nuclear-notebook-the-long-view-strategic-arms-control-after-the-new-start-treaty/.

[34] Ibid.

[35] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., pp. 98, 100, 110.

[36] Rose Gottemoeller, as quoted in, U.S. Congress, House of Representatives, *The Importance of the New START Treaty* (Washington, D.C.: Committee on Foreign Affairs, December 4, 2019), p. 61, available at https://www.congress.gov/116/meeting/house/110302/documents/CHRG-116hhrg38543.pdf.

[37] Rose Gottemoeller, *The Importance of the New START Treaty* (Washington, D.C.: House of Representatives, Committee on Foreign Affairs, December 4, 2019), p. 2, available at https://www.congress.gov/116/meeting/house/110302/witnesses/HMTG-116-FA00-Wstate-GottemoellerR-20191204.pdf.

missile types (thanks largely to the original START Treaty that gave the United States a significant amount of data plus 15 years of unencrypted telemetry), open source information is inadequate to assess how much upload has actually taken place since the end of on-site inspections and, in particular, since Putin's 2022 expanded invasion of Ukraine. The assessed upload potential in the February 2022 and the May 2023 FAS reports and the November 2022 FAS arms control advocacy article appears to have been significantly understated. The FAS reports did not reveal the assumed warhead loadings that make up its estimate of 1,388 deployed ballistic missile warheads in the February 2022 report or its May 2023 estimate of 1,474.[38]

The 2018 *Nuclear Posture Review* report stated that, "Russia is developing and deploying new nuclear warheads…"[39]—which Russia has acknowledged since 2005.[40] Russia's ability to break out of the New START Treaty by uploading warheads on the new strategic missiles deployed mainly over the last decade depends on the size and weight of the warheads themselves. A number of Russian press reports indicate that Russia has developed a new warhead with a weight of 100-kg and a yield of 100-kt.[41] (This may be the same as the "small" power warhead that is sometimes reported as 150-kt.) In general, evaluating open source assessments of Russian upload warhead numbers is done by taking half the throw-weight of the

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[38] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 98; and, Kristensen, Korda and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

[39] U.S. Department of Defense, *Nuclear Posture Review* (Washington, D.C.: U.S. Department of Defense, 2018), p. 9, available at https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF.

[40] Mark B. Schneider, "The Future of the U.S. Nuclear Deterrent," *Comparative Strategy*, Vol. 27, No. 4 (2008), p. 347.

[41] *Section II: Minimum Deterrence: Fragile Hope of a Constant and Benign Threat Environment*, op. cit., p. 21.

missile and dividing it by the weight of the warhead to get a plausible maximum number of warheads for that missile type.

The biggest uncertainty the United States faces in assessing Russian upload potential is whether or not the Russians have developed and deployed the 10-warhead package of "super-lightweight" warheads on the SS-27 Mod 2/RS-24 Yars ICBMs and the Bulava-30 SLBM.[42] In a technical sense, it is possible for Russia to create a "super-lightweight" warhead. Indeed, in the *late 1960s*, the United States reportedly developed and deployed a similar warhead on the Poseidon missile. The warhead was so small and light that 14 of them could have been deployed on it.[43] However, it was apparently never actually deployed with that number of warheads and, under the START Treaty, the U.S. Poseidon SLBM was limited to 10 warheads.[44] This illustrates the fact that there is always a tradeoff between missile range and warhead numbers and weight. Since Russia increased its accountable nuclear warheads to 1,796 under the New START Treaty in September 2016[45] (before the limit of 1,550 came into legal effect), it apparently saw a benefit in deploying a larger

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[42] Schneider, *New START: The Anatomy of a Failed Negotiation*, op. cit., p. 29.

[43] "Poseidon C-3 Missile," Smithsonian National Air and Space Museum, no date, available at https://airandspace.si.edu/collection-objects/missile-submarine-launched-poseidon-c-3/nasm_A19731668000; and, "United States of America Poseidon C-3," *Navweaps.com*, no date, available at http://www.navweaps.com/Weapons/WMUS_Poseidon.php.

[44] *START Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms Signed in Moscow July 31, 1991*, op. cit., p. 120.

[45] U.S. Department of State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," *State.gov*, January 1, 2017, available at https://2009-2017.state.gov/t/avc/rls/2016/266384.htm.

number of nuclear warheads than legally permitted under the New START limit.

This does not necessarily mean that the Russians will field the largest warhead load that is technically feasible on their missiles. Warhead numbers and technical characteristics relate to targeting objectives and Russia will clearly try to maximize its capabilities in this arena consistent with its overall strategic objectives. The yield of a "super-lightweight" warhead would have to be lower than the reported yields of the Russian "small," "medium" and "high" power warheads and Russian targeting objectives would be a consideration in determining the number they would deploy. It is likely they would deploy 10- and 12-warhead packages on their Bulava-30 and their Sineva and Layner/Liner SLBMs, respectively, because of the reported targets for these systems. In a September 13, 2007 interview in *Moskovskiy Komsomolets*, Colonel General (ret.) Viktor Yesin described Russian Navy strategic nuclear targeting, stating, "The sailors…largely hit targets that do not have any serious protection, such as cities and enterprises, and therefore they don't require a very high degree of accuracy."[46]

The recent FAS estimates placed Russian total upload capability at only about 500 warheads, which appears to be much too low. The number of additional warheads Russia could deploy by uploading depends upon: 1) the number of missiles deployed; 2) the number of warheads they now carry; and, 3) the maximum number of warheads they could carry. Available information on the maximum number of warheads Russian missiles are capable of carrying is

[46] Mark B. Schneider, "Russian Nuclear Targeting," *Real Clear Defense*, October 4, 2022, available at https://www.realcleardefense.com/articles/2022/10/04/russian_nuclear_targeting_857030.html.

summarized in the following chart as assembled by this author based on publicly available sources:[47]

Russian Nuclear Warhead Upload Potential

	Russian Missile Type	START Treaty Accountable[a]	FAS Estimates	Upload Potential[b]
ICBMs	SS-18	10	10	14
	Sarmat	N/A[c]	10	20
	SS-19	6	6[d]	6
	SS-25	1	1	1[e]
	SS-27 Mod 1/Topol M V2	1	1	4-7
	SS-27 Mod 2/RS-24 Yars	N/A[f]	4	6-10
	RS-24 Yars S	N/A[g]	N/A[h]	3-4
	Yars-M	N/A	N/A[i]	4 (?)
SLBMs	Bulava-30	6	6	6-10
	SS-N-23 Sineva/Layner[j]	4	4	8-12
	SS-N-18	3	3	7[k]

a START Treaty accountable warheads are not necessarily the largest number that can be deployed on the missile even without reducing the size and weight of the warheads.
b Based largely on Russian sources.
c The Sarmat did not exist during the START Treaty duration. It was originally planned to be a 100-ton missile but evolved into a 200-ton missile. Supposedly, it will become operational in 2023.
d The FAS includes an entry for the SS-19 ICBM on its forces chart; but oddly does not include SS-19 ICBMs in the count of Russian warheads.
e An upload for the SS-25 is theoretically possible but unlikely due to the age of the missile and its on-going phase out.
f The SS-27 Mod 2/RS-24 Yars was never declared under the START Treaty probably because of the compliance issue involving MIRVing a single warhead missile (the SS-27 Mod 1 ICBM).
g The RS-24 Yars S post-dates the end of the START Treaty in 2009.
h The RS-24 Yars is not mentioned in the FAS study. It reportedly carries medium yield warheads.
i The Yars-M is mentioned in the 2023 FAS report but not included in its main table of Russian nuclear forces.
j The Sineva and Layner/Liner SLBMs are upgraded versions of the SS-N-23 SLBM. Warhead upload was prohibited by the START Treaty.
k The FAS includes an entry for the SS-N-18 on its forces chart but does not include SS-N-18 missiles in the count of Russian warheads.

To highlight problems with the FAS analyses, their estimate of the maximum number of warheads that can be

[47] START Treaty accountability numbers did not necessarily represent the maximum possible warhead load. There were deployment limits and counting rules that allowed National Technical Means (NTM) to be used, in conjunction with on-site inspections, to verify Treaty limits. Information contained in the 1990 START Treaty Memorandum of Understanding, later updated in the case of the SS-27 Mod 1/Topol M Variant 2 and Bulava-30, is still useful in evaluating the credibility of Russian reports on the warhead capability and yield of the new Russian missiles. Available open source data on the characteristics of U.S. nuclear missile warheads, some dating back to the 1960s, provide a sanity check on the Russian press reporting. There is simply no doubt that Russia can duplicate the U.S. capabilities achieved 30-50 years ago.

uploaded on Russian ICBMs and SLBMs will be compared with the upload potential of these missiles reported in a wide variety of Western and Russian sources.[48]

The FAS May 2023 article on Russian nuclear forces stated, without citing any sources, that, "It is estimated that the SS-18 heavy ICBMs now carry only five warheads each to meet the New START limit for deployed strategic warheads," and can be uploaded to 10.[49] (The SS-18 is inaccurately referred to as "M6" [Mod 6] when it is the Mod 5. The Mod 6 was reportedly a single warhead 20-megaton yield version of the missile.)[50] There is now open source proof that the SS-18 Mod 5 has a maximum upload capability of up to 14 high-yield warheads.[51] By contrast, the FAS February 2022 report said it was "possible" that the SS-18 was downloaded to five warheads.[52] However, there

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[48] James R. Howe, "Exploring the Dichotomy Between New START Treaty Obligations and Russian Actions and Rhetoric," *Vision Centric, Inc.*, October 2015, mimeo.

[49] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

[50] Defense Intelligence Ballistic Missile and Analysis Committee (DIBMAC), *Ballistic and Cruise Missile Threat* (Wright-Patterson AFB, OH: NASIC, 2020), p. 29, available at https://media.defense.gov/2021/Jan/11/2002563190/-1/-1/1/2020%20%20BALLISTIC%20AND%20CRUISE%20MISSILE%20THREAT_FINAL_2OCT_REDUCEDFILE.PDF; U.S. Department of Defense, *Soviet Military Power: Prospects for Change 1989* (Washington, D.C.: U.S Department of Defense, 1989), p. 45, available at https://apps.dtic.mil/sti/pdfs/ADA212860.pdf; and, Steven J. Zaloga, *The Kremlin's Nuclear Sword: The Rise and Fall of Russia's Strategic Nuclear Forces: 1945-2000* (Washington, D.C.: Smithsonian Books, 2002), p. 237.

[51] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., pp. 99-100; and, Joseph Trevithick, "Russia Releases Incredibly Detailed Views Of Its Massive 'Satan' Missile," *The War Zone*, November 21, 2022, available at https://www.thedrive.com/the-war-zone/russia-releases-incredibly-detailed-views-of-its-massive-satan-missile.

[52] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 100.

appears to be no open source data that supports this assessment.

The May 2023 FAS report, again without sourcing, reduced its estimate of the number of operational SS-18 launchers from 46 in 2021 and 40 in February 2022 to only 34 in May 2023.[53] It also said, "It is also possible that a fourth regiment at Dombarovsky is operational."[54] The June 2020 joint report by the Defense Intelligence Agency (DIA) and the National Air and Space Intelligence Center (NASIC) said the number of SS-18 Mod 5s was "about 50."[55] While this was before the Sarmat conversion began, there appears to be no press reports indicating that Russian Sarmat conversion is as fast and on such a large scale as the FAS now assesses. The FAS has nine silos being converted to Sarmat and 14 off line.[56] If the FAS is correct about the scope of current Russian conversion from SS-18 to Sarmat activities, the increase in the potential number of Russian strategic nuclear weapons could be rapid and substantial since the Sarmat is able to carry many more warheads than the SS-18.

Even setting aside the conversion to Sarmat ICBMs, with 34 operational SS-18 launchers, the upload potential would be 136 warheads more than the FAS assesses. If there are 40 operational SS-18 launchers as assessed in the February 2022 FAS report, the upload number would be 160 extra warheads.

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[53] Loc. cit.; Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 100; and, Hans M. Kristensen and Matt Korda, "Russian Nuclear Weapons, 2021," *Bulletin of the Atomic Scientists*, Vol. 77, No. 2 (2021), p. 91.

[54] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175. This type of ICBM regiment typically includes six boosters.

[55] DIBMAC, *Ballistic and Cruise Missile Threat*, 2020, op. cit., p. 29.

[56] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

The SS-27 Mod 2/RS-24 Yars mobile ICBM likely is the quickest and easiest Russian missile to upload *covertly* in the protracted no on-site inspection environment because upload would likely be done within covered buildings on bases. If the Russians have covertly uploaded this missile, it likely could be deployed with a six- or even a 10-warhead package. The first version of the Yars is the most likely to be uploaded. As discussed in Chapter 3, the upload capability of both the SS-27 Mod 2/RS-24 Yars ICBM and the Bulava-30 SLBM is at least six warheads and possibly 10.

The May 2023 FAS study credited the SS-27 Mod 2/RS-24 Yars with a maximum of four warheads but stated, "It is estimated that the SS-27 Mod 2s now carry only three warheads each to meet the New START limit on deployed strategic warheads."[57] Here again, the assumption of Russian New START compliance is increasingly dubious. Moreover, the February 2022 edition of the report said only that, "It is *possible* that the SS-27 Mod 2s now carry only three warheads each to meet the New START limit on deployed strategic warheads."[58] This continues the pattern of less nuanced assessments by the FAS, without apparent evidence to back them.

If the SS-27 Mod 2/RS-24 Yars is uploaded to six warheads, which is clearly possible as it has more throw-weight than the six-warhead Bulava-30, it could deliver up to 386 more warheads than the FAS May 2023 estimate. A problem in making a confident estimate of the number of Russian warheads is that the number of Yars-S missiles and the number of warheads that missile carries is unknown from open sources. If there is a 10-warhead option, the upload potential could be, in theory, 1,158 warheads above the FAS estimate. Again, the problem is that it is unknown how many of the deployed missiles are the Yars-S. It is

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[57] Loc. cit.

[58] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 99. (Emphasis added.)

unlikely that Moscow would deploy the maximum theoretical number of the 10-warhead packages, as a 10-warhead package would require individual warheads with lower yields and less capability to destroy hard targets in a counterforce strike. "Low-yield" likely is not five kilotons or fewer, but significantly lower than the reported 100-150-kt yield of the original SS-27 Mod 2/RS-24 Yars warheads. The Yars-S would likely be uploaded to four of the medium-yield warheads, as the "medium" yield warheads would give the Yars-S more capability against hard targets. It is unlikely Russia would sacrifice this military capability just to have more warheads. Since the Yars-S was not deployed until several years ago, most Yars are probably the first version with the more numerous smaller yield warheads and greater upload potential.

Russia reportedly has 78 SS-27 Mod 1/Topol M variant 2 ICBMs which are presumed to be single warhead ICBMs but, according to Howe, the missile "…has been tested with multiple RVs [reentry vehicles], and there are reports it may be upgraded to carry 4 to 7 RVs, and stay in service until 2027."[59] Even at four warheads (or RVs), this adds up to 234 more warheads than the FAS assessed. At seven warheads each it would add an additional 468.

The February 2022 and the May 2023 FAS reports assume no operational SS-19 ICBMs other than those converted for use with Avangard hypersonic boost glide vehicles, despite the fact that the authors acknowledge that "activities continue at some former regiments," and, it "is possible that one or two SS-19 regiments are active."[60] The assumption of no operational SS-19s appears inconsistent with available evidence. In April 2021, *TASS* reported that

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[59] Howe, "Future Russian Strategic Nuclear and Non-Nuclear Forces: 2022," op. cit., p. 359.

[60] Loc. cit.; and, Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

there were "currently 50" SS-19s deployed.[61] The June 2020 DIA/NASIC report said "about 50."[62] In April 2021, Alexander Leonov, identified as the "CEO and Chief Designer of the Research and Production Association of Machine-Building," the manufacturer of the SS-19, said that, "We will keep this missile [the SS-19] on combat duty as long as necessary. Now we are going to extend its service life by three years."[63] He also said the SS-19s "…are being replaced by advanced Yars ICBMs…"[64] According to Howe, some SS-19s can be deployed until the late 2020s, using the 22 SS-19s Russia received from Ukraine that were never fueled.[65] Also, in December 2020, General Karakayev listed the SS-19 "Stilet" (possibly also known as the "Stiletto") as being operational.[66] There is open source evidence that the SS-27 Mod 2/RS-24 Yars ICBMs are still being deployed in SS-19 silos. This includes two missiles deployed in December 2022,[67] and a missile deployed in November 2021.[68] The May 2023 FAS report said Russia had deployed 22 Yars in silos, which would certainly be former SS-19

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[61] "Russia may Extend Service Life of SS-19 Stiletto ICBMs by Three Years," *TASS*, April 2, 2021, available at https://tass.com/defense/1273521.

[62] DIBMAC, *Ballistic and Cruise Missile Threat*, 2020, op. cit., p. 29.

[63] "Russia may Extend Service Life of SS-19 Stiletto ICBMs by Three Years," op .cit..

[64] Loc. cit.

[65] Howe, "Future Russian Strategic Nuclear and Non-Nuclear Forces: 2022," op. cit., p. 364.

[66] "Development of new Missiles for Russia's Strategic Forces to Begin Soon — Commander," *TASS*, December 15, 2020, available at https://tass.com/defense/1235501.

[67] "Next Yars ICBM Placed into Silo in Strategic Missile Formation in Central Russia," *TASS*, December 15, 2022, available at https://tass.com/defense/1550895.

[68] "Russia's Top Brass Uploads Video of Yars ICBM 'Being Loaded into Silo,'" *TASS*, November 29, 2021, available at https://tass.com/defense/1367663.

silos.[69] The 2020 edition of the FAS Russia nuclear weapons report said Russia had 11 silo-based SS-27 Mod 2/RS-24 Yars.[70] If the 11 added SS-27 silos are subtracted from the 50 reported deployed SS-19s in 2020, this leaves 39 SS-19s. Both the 2020 and 2021 FAS reports counted the deployed number of SS-19s at zero, despite the fact that the 2020 DIA/NASIC report credited Russia with about 50 deployed SS-19s.[71]

Unfortunately, there is no information on how many SS-19s have been downloaded and, if so, to what extent. However, it seems probable that the SS-19's contribution to the apparent FAS underestimate of Russian upload potential is 234 nuclear warheads.

As discussed above, and according to a statement by its manufacturer, the Sineva and the Layner/Liner SLBMs are reportedly capable of carrying eight-to-12 of the smaller Russian warheads developed for the SS-27 Mod 2/RS-24 Yars and the Bulava-30. Moreover, modifying these missiles to carry the new warheads makes sense. Upload of the Sineva and Layner/Liner to eight-to-12 warheads does *not* require the "super-lightweight" warhead associated with the Bulava-30's 10-warhead reports but merely the relatively light warhead originally deployed on the Bulava-30. In both the February 2022 and May 2023 FAS reports, the Bulava-30 was credited with a maximum potential of six warheads accountable under the original START Treaty. If the maximum Bulava-30 warhead upload is six warheads, the FAS assessment of its upload potential would be correct. If the Bulava-30 can carry 10 warheads, however, the

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[69] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

[70] Hans M. Kristensen and Matt Korda, "Russian Nuclear Weapons, 2020," *Bulletin of the Atomic Scientists*, Vol. 76, No. 2 (2020), p. 103.

[71] Loc. cit.; Hans M. Kristensen and Matt Korda, "Russian Nuclear Weapons, 2021," op. cit., p. 91; and, DIBMAC, *Ballistic and Cruise Missile Threat*, 2020, op. cit., p. 29.

current Russian SLBM force could carry 224 more warheads than assessed by the FAS.

Russian Strategic Low-Yield Nuclear Warheads

The "small," "medium," and "high power" warheads reported for the *new* Russian missiles apparently correspond to a series of yield numbers that appear routinely in the Russian and non-Russian press: these are the maximum yields of 100-150-kt, 300-350-kt and 800-kt.[72] A December 2022 *Sputnik News* report listed a 500-kiloton warhead option for the Sineva and Layner/Liner SLBMs.[73] Reports from Pavel Felgenhauer indicated that these new Russian warheads are variable yield and have very low,

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[72] "New Nuclear Triad: A Look Into the Future of Russia's Strategic Defenses," *Sputnik*, July 27, 2018, available at https://sputnikglobe.com/20180727/russian-strategic-arsenal-upgrades-analysis-1066749013.html; Nikolai Litovkin, "What Major Weapons will Russia's Military get in 2018," *Russia Beyond the Headlines*, January 19, 2018, available at https://www.rbth.com/science-and-tech/327300-what-major-weapons-russian-military-get-in-2018; "Sarmat ICBM: 8 Megatons at Hypersonic Speeds, Arriving 2 Years Ahead of Schedule," *Sputnik*, January 19, 2018, available at https://sputnikglobe.com/20160907/sarmat-ahead-of-schedule-analysis-1045062797.html; Schneider, "The Future of the U.S. Nuclear Deterrent," op. cit., p. 347; "Doomsday Weapon: Russia's New Missile Shocks and Dazzles US, China," *Sputnik*, March 9, 2016, available at https://sputnikglobe.com/20160309/russia-missile-shocker-1036002714.html; "RS-24 Yars Intercontinental ballistic missile," *MilitaryToday.com*, no date, available at http://www.military-today.com/missiles/yars.htm; and, "Russia test-launches Topol-M ballistic missile," *Xinhua News Agency*, October 1, 2019, available at http://www.xinhuanet.com/english/2019-10/01/c_138437734.htm.

[73] Ilya Tsukanov, "How Many Nuclear Submarines Does Russia Have?," *Sputnik*, December 19, 2022, available at https://sputnikglobe.com/20221205/how-many-nuclear-submarines-does-russia-have-1105034535.html.

minimum yields – *tens to hundreds of tons*.[74] General John Hyten stated that Russia had "thousands of low-yield nuclear and tactical nuclear weapons" and suggested that the new Russian ballistic missile weapons have variable yields.[75] Ten to 15 years ago, there were reports in Russian state and non-state media of Russian *deployment* of ultra-low-yield (50-200 tons yield) strategic nuclear warheads on its SLBMs.[76] In 2006, then Defense Minister Sergei Ivanov stated, "…the country's land and sea ballistic missiles will carry the same type of new warhead."[77] Thus, if the Bulava-30 has a low-yield option, it is likely the Yars does as well. The costs involved in developing a new type of nuclear warhead suggest that the "small" yield warhead for the Sarmat is probably the same warhead as that of the Bulava-30 and the SS-27 Mod 2/RS-24 Yars.

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[74] Pavel Felgenhauer, "Bomber Makers Trade Union," *The Moscow Times*, March 14, 2002, available at http://www.themoscowtimes.com/opinion/article/bomb-makers-trade-union/247805html.

[75] "General Notes Value, Limitations of New START Treaty," *Defense.gov*, February 26, 2021, available at https://www.defense.gov/News/News-Stories/Article/Article/2517670/general-notes-value-limitations-of-new-start-treaty/.

[76] Ilya Kramnik, "Nevsky and Novomoskovsk: Two Submarines for Putin," *Sputnik*, December 12, 2010, available at https://sputnikglobe.com/20101215/161784522.html; and, *Section II: Minimum Deterrence: Fragile Hope of a Constant and Benign Threat Environment*, op. cit., p. 22.

[77] "Russia to use Same Warheads on Land, Sea," *UPI*, April 24, 2006, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/11D655C0E0E31CF8; see also, "Russia: Ivanov Says New Warhead Test To Ensure Security To 2030," *ITAR-TASS*, April 26, 2006, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=31129705.

Russian ICBM Modernization

According to Professor Dmitry Adamsky, "A popular Russian rock singer, close to the Kremlin and sanctioned by Ukraine, produced a hymn to Sarmat—the country's newest class of intercontinental ballistic missiles." It included a background of music provided by "the military orchestra of the Strategic Nuclear Missile Forces" and declared that "God and Sarmat are with us."[78] The new Sarmat heavy ICBM is the most important of Russia's strategic nuclear modernization programs because of its potential to increase vastly the number and capabilities of Russian strategic nuclear weapons. The Sarmat reportedly is the first Russian ICBM with satellite-aided guidance.[79] This will increase Russian capabilities to target U.S. ICBM silos with greater precision and the flexibility to launch very low-yield (e.g., tens to hundreds of tons) nuclear strikes against the United States and its allies. According to the Russian Ministry of Defense, the "…Sarmat will be able to carry up to 20 warheads of small, medium, high power classes."[80] In light of the potential for the Soviet SS-18 Mod

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[78] Dmitry Adamsky, "Russia's New Nuclear Normal How the Country Has Grown Dangerously Comfortable Brandishing Its Arsenal," *Foreign Affairs*, May 19, 2023, available at https://www.foreignaffairs.com/russian-federation/russias-new-nuclear-normal.

[79] "RS-28 Sarmat Satan 2 SS-X-30 ICBM," *ArmyRecognition.com*, December 8, 2022, available at https://www.armyrecognition.com/russia_russian_missile_system_vehicle_uk/rs-28_sarmat_satan_ii_ss-x-30_icbm_silo-based_intercontinental_ballistic_missile_data.html; and, Ilya Tsukanov, "Russia's Sarmat ICBM Can Correct Trajectory Even If Hit by Enemy Missile Defense, Designer Says," *Sputnik,* September 22, 2022, available at https://sputnikglobe.com/20220922/russias-sarmat-icbm-can-correct-trajectory-even-if-hit-by-enemy-missile-defense-designer-says-1101087476.html.

[80] "Guaranteed Defeat of Enemy Infrastructure: how the Sarmat Ballistic Missile will Enhance the Combat Potential of the Strategic Missile

4 and Mod 5 to carry 14 powerful warheads (discussed in Chapter 3) and the references to a 100-ton version of the Sarmat that could carry 10-15 warheads,[81] the possibility that the 200-ton Sarmat missile that was actually built might carry 20 warheads appears credible.

The announced throw-weight of the Sarmat is 10,000-kilograms.[82] The 10-warhead Soviet SS-24 ICBM/RT-23 (*not* the RS-24/Yars) was declared under the START Treaty as a 10-warhead missile with a throw-weight of 4,050-kg,[83] or about 40 percent of the Sarmat. According to the FAS, its warheads ranged from 300- to 550-kt,[84] or roughly what the Russians are now apparently calling "medium" yield warheads. The SS-18 Mod 4 reportedly had a throw-weight of 7,300 kilograms and could carry 14 "high" yield warheads.[85] The increase in throw-weight from the SS-18

Forces," *RT*, December 16, 2019, available at https://russian.rt.com/russia/article/698699-sarmat-raketa-rvsn-perevooruzhenie.

[81] Viktor Litovkin, "New Russian 'Sarmat' ICBM will be like 'Son of Satan,'" *Russia Beyond the Headlines*, September 21, 2016, available at https://www.rbth.com/economics/defence/2016/09/21/new-russian-sarmat-icbm-will-be-like-son-of-satan_631869.

[82] "Formidable Sarmat: Satan's Successor that can Pierce any Defense," *TASS*, October 25, 2016, available at https://tass.com/defense/908575; "Guaranteed Defeat of Enemy Infrastructure," op. cit.; and, "Russia Completes pop-up Tests of most Advanced Sarmat ICBM," *TASS*, July 19, 2018, available at https://tass.com/defense/1014008.

[83] *START Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms Signed in Moscow July 31, 1991* (Washington, D.C.: U.S. Department of State, October 1991), Supplement No. 5, p. 121.

[84] "RT-23 / SS-24 SCALPEL," *Federation of American Scientists*, July 29, 2000, available at https://nuke.fas.org/guide/russia/icbm/rt-23.htm.

[85] Schneider, *New START: The Anatomy of a Failed Negotiation*, op. cit., p. 65; and, "Most Powerful Strategic RS-20 to Remain In Inventory - Kommersant Moscow," *Kommersant.com*, July 29, 2008, available at http://www.kommersant.com/p-12927/r_527/RS-20_inventory/. An anonymous FAS report credits it with 7,200-kg of throw-weight and notes, "According to some Western estimates, evidence suggested that

Mod 4 to the Sarmat seems consistent with the latter being able to carry up to 20 "high" yield warheads.

According to Colonel General (ret.) Viktor Yesin, Sarmat silos will be given:

> …a fundamentally new level of fortification protecting new ICBM silos, their technological and other renovation, operational, engineering and other means of camouflage, wide use of electronic jamming with the creation of a continuous field of impenetrable noise, measures to organize, alongside the passive defense of the silos their active defense, as well [as] through the deployment of long-range S-400 ABM systems and high-altitude S-500 systems capable of destroying on a par with space and air weapons the warheads of ICBMs and the enemy's precision weapons, including missiles and aircraft bombs and cruise missiles.[86]

In December 2019, Russia revealed that it intended to complete the modernization of its strategic nuclear forces by 2024 and President Putin was briefed on a plan involving the deployment of 20 regiments of the Sarmat by 2027.[87]

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the Mod 4 may be capable of carrying as many as 14 RVs…" See "R-36M / SS-18 SATAN Overview," *Federation of American Scientists*, no date, available at https://programs.fas.org/ssp/nukes/nuclearweapons/russia_nukescurrent/ss18.html .

[86] "Russia to have new Heavy ICBM 2018 – Missile Force Commander Adviser," *ITAR-TASS*, April 12, 2011 (No longer available on the internet). See also, "Yesin: Russia Will Have RS-20 Missile Replacement in 2018," *ITAR-TASS*, April 12, 2011, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=31220894.

[87] "Testing of Sarmat Intercontinental Missile to be over in 2021 - Russian Defense Management Center," *ITAR-TASS Daily*, December 24, 2019, available at https://on-demand-eastview-com.mutex.gmu.edu/browse/doc/56709629. State-run *Ria Novosti* also reported 20 planned regiments of the Sarmat. "Highlights of Russia's

This would result in the ability to carry at least 2,400 warheads. Twenty regiments of Sarmat ICBMs, with a minimum of six missiles per regiment, is an impractical allocation of resources, however, if Moscow has any intent to comply with the force ceilings of New START.

This report on the number of Sarmat regiments was surprising. Previously, the Russian press reported only 46 deployed Sarmat missiles and, in 2022, then Russian Space Agency Director Dmitry Rogozin also mentioned procuring 46 missiles.[88] It may be that Russia plans an open-ended procurement of the Sarmat at perhaps a regiment or two per year. Russia likely will be hard-pressed to deploy 46 Sarmats by 2027, much less another 20 regiments.

Russia says the Sarmat can attack the United States over the South Pole,[89] apparently to exploit limitations in U.S. early warning radar coverage. Russia has also indicated that the Sarmat is an orbital bombardment system; General Cotton, Commander of U.S. Strategic Command, has confirmed this, even hinting it might go beyond a "partial"

Arms Procurement Programme for 2018-2027," *BBC Monitoring Former Soviet Union*, December 30, 2019, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/17828B4D147ABCA0.

[88] Pavel Podvig, "Sarmat deployment plans," *RussianForces.org*, December 27, 2014, available at https://russianforces.org/blog/2014/12/sarmat_deployment_plans.shtml; and, "Russia Planning to Test Sarmat ICBMs Throughout 2022: Rogozin," *Asian News International / Sputnik*, May 21, 2022, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/18A23494827A4700. See also, "Russia's Sarmat ICBM Can Change Trajectory, Will Make Interception Hardly Possible in Coming Decades," *Sputnik*, May 22, 2022, available at https://sputnikglobe.com/20220522/russias-sarmat-icbm-can-change-trajectory-interception-hardly-possible-in-coming-decades-1095694819.html.

[89] "Russia's Sarmat ICBM Can Change Trajectory," op. cit.

orbital capability.[90] As part of the first Sarmat launch announcement, Colonel General Karakayev stated that the Sarmat can carry several Avangard hypersonic glide vehicles.[91] The heavy Avangard glider likely reduces the number of weapons that can be carried on each missile (the original SS-19 was a six-warhead missile) but dramatically increases the threat potential of the system against highly time-urgent targets such as the U.S. National Command Authority.[92]

The Avangard nuclear-armed hypersonic boost-glide vehicle became operational in December 2019. Formerly called Project 4202, it reportedly now uses the Soviet legacy SS-19/UR-100NUTTH ICBM, a large ballistic missile, to boost the large hypersonic glider.[93] The reported speed of the Avangard is 24,000-km per hour.[94] It is extremely large

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[90] Anthony J. Cotton, *Statement of Anthony J. Cotton, Commander, United States Strategic Command* (Washington, D.C.: House Armed Services Committee, Subcommittee on Strategic Forces, March 8, 2023), p. 8, available at https://www.stratcom.mil/portals/8/Documents/2023%20USSTRATCOM%20Congressional%20Posture%20Statement.pdf?ver=bFFdbYI2D5Tju5nPNsebbw%3D%3D.

[91] "Russian Officer: Missile to Carry Several Hypersonic Weapons," *Associated Press*, April 24, 2022, available at https://apnews.com/article/russia-ukraine-putin-business-europe-moscow-e577969b24c19398cc7fd025ba3327a6.

[92] Mark B. Schneider, "Russia's Hypersonic Missile Threat to the U.S. National Command Authority," *Real Clear Defense*, September 11, 2019, available at https://www.realcleardefense.com/articles/2019/09/11/russias_hypersonic_missile_threat_to_the_us_national_command_authority_114736.html.

[93] Pavel Podvig, "UR-100NUTTH Launch from Dombarovskiy, most likely with Project 4202 payload," *RussianForces.org*, October 25, 2016, available at https://russianforces.org/blog/2016/10/ur-100nutth_launch_from_dombar.shtml.

[94] Nikolai Litovkin, "3 Russian Weapons Systems that have no Equivalents Anywhere in the World," *Russia Beyond the Headlines*,

with a reported weight of 2,000-kg.[95] *TASS* stated that the Avangard carries a two-megaton nuclear warhead.[96] *Sputnik News* said it is between "0.8 and 2 megatons."[97] This apparently will be the equivalent of a "silver bullet" force because the Russians reportedly plan to deploy only 12 of them,[98] at least until the glider is deployed on some of the new Sarmat heavy ICBMs. Its main purpose appears to be to conduct a surprise nuclear attack on critical U.S. time-urgent strategic targets.

Russian ICBM force modernization will not end with the Yars variants, the Avangard and the Sarmat. In December 2020, *TASS* reported that Colonel General Karakayev said that, "The development of new missile systems for Russia's Strategic Missile Forces (RVSN) will begin in the short- and mid-term perspective."[99] Russia has

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January 15, 2019, available at https://www.rbth.com/science-and-tech/329848-3-russian-weapons-systems-that-no-one-has.

[95] "Avangard," *CSIS Missile Threat*, July 31, 2021, available at https://missilethreat.csis.org/missile/avangard/; and, "Explained: Why Russia Avangard missile will have US worried," *IndianExpress*.com, December 30, 2019, available at https://indianexpress.com/article/explained/explained-why-russia-avangard-missile-will-have-us-worried-6189727/.

[96] "Russia to use SS-19 ICBMs as Carriers for Avangard Hypersonic Glide Vehicles — source," *TASS*, March 20, 2017, available at http://tass.com/defense/995167.

[97] "From Avangard to Zircon: How Far Do Russian Missiles Fly?," *Sputnik*, May 13, 2023, available at https://sputnikglobe.com/20230512/from-avangard-to-zircon-how-far-do-russian-missiles-fly-1110296500.html.

[98] Pavel Podvig, "Avangard system is tested, said to be fully ready for deployment," *RussianForces.org*, December 24, 2018, available at http://russianforces.org/blog/2018/12/avangard_system_is_tested_said.shtml.

[99] "Development of new Missiles for Russia's Strategic Forces to Begin Soon — Commander," *TASS*, December 15, 2020, available at https://tass.com/defense/1235501; "Testing of Sarmat Intercontinental Missile to be over in 2021," op. cit.; "Highlights of Russia's Arms Procurement Programme for 2018-2027," *BBC Monitoring Former Soviet*

announced the new Kedr ICBM program but has provided no information about it. In June 2021, *TASS* reported the Kedr's first test launch, and said it would be mobile, silo-based, and manufactured by the Moscow Institute of Thermal Technology.[100] This means it is a solid-fuel missile. Reporting on the Kedr is highly contradictory with most sources saying that work on the program will not begin until 2023-2024.[101] Something new tested in 2021 is more likely to be an improved SS-27 Mod 2/RS-24 Yars than a completely new missile like the Kedr, which apparently is intended to replace the Yars in the 2030s.[102] The February 2022 FAS report mentioned a new ICBM called the "…Osina-RV ICBM, a follow-on system reportedly derived from the Yars ICBM…"[103] This was repeated in the May 2023 report.[104] The Osina-RV ICBM, or the 15P182, reported

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Union, December 30, 2019, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/17828B4D147ABCA0; and, "Испытания комплекса "Сармат" планируется завершить в 2021 году - Национальный центр управления обороной РФ, *Interfax*, December 24, 2019, available at https://www.militarynews.ru/story.asp?rid=1&nid =524255&lang=R.

[100] "Russia Successfully test-launches Latest ICBM — Source," *TASS*, June 28, 2021, available at https://tass.com/defense/1307845.

[101] Ivan Timofeev, "KEDR ICBM Production Starts in 2023-2024," *Dfnc.ru*, no date, available at https://dfnc.ru/en/russia-news/kedr-icbm-production-starts-in-2023-2024/; and, "Development of Russia's new-generation ICBM to begin in 2023-2024," *Eurasia Diary*, April 3, 2021, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/181A597C28E7B9B8.

[102] Leonid Nersisyan, "Russian ICBM tests shed light on Programme Progress," *ShephardMedia.com*, July 15, 2021, available at https://www.shephardmedia.com/news/defence-notes/russian-icbm-tests-shed-light-programme-progress/.

[103] Kristensen and Korda, "Russian Nuclear Weapons, 2022," op. cit., p. 106.

[104] Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 183.

to have been tested in 2022, apparently is a modification of the Yars-M,[105] and has a scheduled initial operational capability (IOC) of 2025.[106] *Voenno-Boltovoi* (*Military Chat*) said that the project began in 2019, that there are both mobile and silo-based versions of the missile, and that it will carry "various warhead payloads."[107]

Development of the Russian RS-26 Rubezh, an IRBM described as an ICBM—probably to avoid the INF Treaty ban—is reportedly on hold until 2027.[108] If it is revived after 2027, Russia will likely give it a new name and number. *Sputnik News* reported that the RS-26 can carry four 300-kiloton nuclear warheads.[109] It is also possible that instead of reviving it, Russia would develop an IRBM version of one of its new ICBMs.

According to *TASS*, the Russian program for a rail-mobile ICBM, the Barguzin, has been put on hold pending a 2027 decision.[110] Rail-mobile ICBMs would allow Russia to circumvent New START Treaty limitations as the treaty does not limit such systems. It also probably would require

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[105] It is unclear what the Yars-M is other than obviously a major modification of the Yars ICBM. Kristensen suggested that it was the IRBM version of the Yars which was later called the RS-26. See Hans Kristensen, "Russian Missile Test Creates Confusion and Opposition in Washington," *Federation of American Scientists*, July 3, 2013, available at https://fas.org/blogs/security/2013/07/yars-m/.

[106] "Osina-RV," *Deagel.com*, no date, available at https://www.deagel.com/Offensive%20Weapons/Osina-RV/a00 4141.

[107] "Russia developing new 'Osina' Yars missile variant," *BBC Monitoring Former Soviet Union*, June 16, 2021, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/183279F7D59204B8.

[108] "Avangard Hypersonic Missiles Replace Rubezh ICBMs in Russia's Armament Plan Through 2027," *TASS*, March 22, 2018, available at https://tass.com/defense/995628.

[109] "Doomsday Weapon: Russia's New Missile Shocks and Dazzles US, China," op. cit.

[110] "Russia's Strategic Missile Forces as its Decisive Defense," *TASS*, December 19, 2017, available at https://tass.com/defense/981811.

less manpower than road-mobile ICBMs. Fewer technicians and troops would probably be necessary to operate and guard a single train compared to what would be required to operate and guard individual ground-mobile launchers. Because the New START Treaty does not limit rail-mobile ICBMs, the development of a system like the Barguzin is a logical decision for Russia to take if it can afford to do so.

Russian Ballistic Missile Submarines

The official Russian program for ballistic missile submarines reportedly involves 10 fourth generation Borei and Borei-A submarines carrying 16 Bulava-30 missiles each.[111] The hull of the 955A Borei-A submarine apparently was modified for increased quietness.[112] In 2018, *TASS* reported that Russia planned 14 Borei submarines.[113] In April 2023, *TASS* stated that, "…the Navy will have 14 new strategic submarines: 11 Borey-A class subs and three Borey class ones."[114] In May 2023, Russia announced the development of a new SLBM to replace the Bulava-30.[115] In addition to ballistic missiles, Russian strategic missile

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[111] Thomas Nilsen, "Russia Launches New Borei-A class Ballistic Missile Sub," *The Barents Observer*, December 25, 2021, available at https://thebarentsobserver.com/en/security/2021/12/russia-launches-new-borey-class-ballistic-missile-sub.

[112] "Russian Submarine Hulls Modified for Better Stealth," *BBC Monitoring Former Soviet Union*, May 17, 2019, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/1737B6A90CBD3EE8.

[113] "Russia: Russia to Build 6 more Borei-A Strategic Nuclear-powered Submarines – Source," *TASS*, May 21, 2018, available at https://tass.com/defense/1005356.

[114] "The Pyotr Veliky Cruiser to Donate its name to Nuclear Submarine — Source," *TASS*, April 20, 2023, available at https://tass.com/defense/1606933.

[115] Van Brugen, "Russia Creating Unstoppable Submarine Nuclear Missiles—Report," op. cit.

submarines also reportedly carry nuclear-capable Kalibr long-range cruise missiles.[116] When deployed on a strategic nuclear ballistic missile submarine, the Kalibrs would likely have a nuclear mission.

In 2019, *TASS* reported that Russia might develop and deploy two Borei-K long-range cruise missile submarines after 2027.[117] With nuclear warheads, this would be a way of circumventing the New START Treaty. The new Kalibr-M is reported to have a range of 4,500-km, making it a strategic system in all but name**,** as a ship-based cruise missile with a range over 600 km is considered "strategic" under START Treaty definitions.[118]

At this point, Russia will apparently not go ahead with the reported Borei-B class submarines.[119] Russia has announced a program for a "5th generation" strategic missile submarine called the Husky which would carry both ballistic and cruise missiles.[120] For the time being, however, it appears to be on the back burner, as apparently there have been no official statements about it since 2020.

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[116] "All Russian Subs can be Fitted with Kalibr Missiles — Russian Navy Commander," *TASS*, March 16, 2023, available at https://tass.com/defense/1589983; and, "Meeting with Defence Minister Sergei Shoigu," *Kremlin.ru*, December 8, 2015, available at http://en.kremlin.ru/events/president/news/50892.

[117] "Russia may Build Borei-K Nuclear Subs with Cruise Missiles – Source," *TASS*, April 20, 2019, available at http://tass.com/defense/1054714; "Russia Launches R&D Work on Fifth-Generation Submarine," *TASS*, April 17, 2019, available at http://tass.com/defense/1054096.

[118] "Ukraine website details arms used in war by Russia," *BBC Monitoring Former Soviet Union*, April 1, 2022, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/1891B49AD032F900.

[119] "Russia to Build 6 more Borei-A Strategic Nuclear-powered Submarines — Source," op. cit.

[120] "Research into Russia's Fifth Generation Subs well in Progress — Navy's Commander," *TASS*, March 18, 2020, available at https://tass.com/defense/1131767.

Russian Strategic Nuclear Bomber Capability

Russia has been modernizing its strategic nuclear bomber strike capability for two decades. Initially, this involved repairing and upgrading the Soviet legacy Tu-95 and Tu-160 bombers with more advanced nuclear and dual-capable missiles. [121] Not surprisingly, strategic nuclear upgrades were given first priority.[122] Nine new Tu-160s were produced after the demise of the Soviet Union through 2018.[123] In 2015, Russia announced a program to develop and deploy at least 50 improved Tu-160M2s (recently Russia has begun to call them Tu-160M bombers) with new engines with 10 percent better performance, a 1,000-km range increase, new avionics, new electronic warfare equipment, new weapons, an active phased array radar and a modestly reduced radar cross section.[124] Fabrication of the

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[121] Mark B. Schneider, "Russian Violations of Its Arms Control Obligations," *Comparative Strategy*, Vol. 31, No. 4 (September 2012), p. 341.

[122] Dave Johnson, *Russia's Conventional Precision Strike Capabilities, Regional Crises, and Nuclear Thresholds* (Livermore, CA.: Lawrence Livermore National Laboratory, Center for Global Security Research, February 2018), p. 38, available at https://cgsr.llnl.gov/content/assets/docs/Precision-Strike-Capabilities-report-v3-7.pdf.

[123] "Tupolev Tu-160," *Air Forces Monthly*, January 2022, p. 87.

[124] "Russia to Renew Production of Tu-160 'Blackjack' Strategic Bomber," *Sputnik*, April 29, 2015, available at https://sputnikglobe.com/20150429/1021514706.html; "Russia Wants To Build Its Very Own 'B-2 Stealth Bomber.' Here Come the Problems," *National Interest*, February 22, 2020, available at https://nationalinterest.org/blog/buzz/russia-wants-build-its-very-own-b-2-stealth-bomber-here-come-problems-126421; "Russia's Tu-160M2 Bomber More Advanced Than Anything Pentagon Has In Its Arsenal," *Sputnik*, June 22, 2017, available at https://sputnikglobe.com/20170622/tu160m2-prospects-analysis-1054888100.html; "Decision to Prolong Life of Tupolev Tu-160 only

Tu-160M2 bombers reportedly began in 2018.[125] Two are now being tested.[126] Deputy Defense Minister Yuri Borisov has said that the combat effectiveness of the Tu-160M2 will be 2.5 times greater than that of its predecessor.[127] Reportedly, two to three Tu-160M2s will be produced each year.[128] *TASS* said that the Tu-160s will carry Kinzhal nuclear-capable hypersonic missiles.[129]

Russia apparently is also developing the Pak DA, a subsonic, stealthy, flying wing type, cruise missile-carrying bomber.[130] It is reportedly capable of carrying 30 tons of weapons including "high speed" missiles.[131] Nuclear-

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Correct Decision - Russian Deputy PM Borisov," *Interfax*, February 7, 2020, available at https://interfax.com/newsroom/top-stories/17608/; and, "Russia's modernized Tu-160M nuclear-capable bomber takes to the skies for the 1st time (VIDEO)," *RT*, February 6, 2020, available at https://www.rt.com/russia/480238-russian-modernized-tu160m-flight/.

[125] "Russia Launches Production of Upgraded Tu-160 Strategic Bombers," *TASS*, December 20, 2018, available at http://tass.com/defense/1037133.

[126] "Russia: Russia to ramp up Tu-160M Strategic Bomber Production in Coming Years – Rostec," *TASS*, December 30, 2022, available at https://tass.com/defense/1557695.

[127] "Russia Launches Production of Upgraded Tu-160 Strategic Bombers," op. cit.

[128] "Russia: Russia's Fifth-generation Fighter Jets to Start Arriving for Troops in 2019," *TASS*, May 24, 2017, available at https://tass.com/defense/947333.

[129] "Russia to arm Tu-160 Strategic Bombers with Hypersonic Missiles — Source," *TASS*, February 10, 2020, available at https://tass.com/defense/1118255; and, "Presidential Address to the Federal Assembly," *Kremlin.ru*, March 1, 2018, available at http://en.kremlin.ru/events/president/news/56957.

[130] Grigoriy Sysoev, "Russia Speeds Up Development of New Strategic Bomber," *Sputnik*, November 28, 2013, available at https://sputnikglobe.com/20131128/Russia-Speeds-Up-Development-of-New-Strategic-Bomber-185110769.html.

[131] Harrison Kass, "The PAK-DA Is Russia's Big Plan to Build Its Very Own B-2 Stealth Bomber," *19FortyFive.com*, July 21, 2022, available at https://www.19fortyfive.com/2022/07/the-pak-da-is-russias-big-plan-

capable hypersonic missiles are an obvious possibility. Russia has not announced any plans for a deployment number.

"Novel" Russian Nuclear Systems Not Covered by Arms Control

Russia is also reportedly developing a nuclear-powered, nuclear-armed drone submarine designed to deliver nuclear attacks against large port cities.[132] The nuclear warhead section of the drone submarine is enormous by the standards of late Cold War nuclear weapons. Based on the line drawing of the Status-6 (now called Poseidon) on a leaked Kremlin briefing slide, the nuclear warhead has been measured at 1.6 meters in diameter and 6.5 meters in length.[133] If this is accurate, or even close to being accurate, the nuclear yield would likely be immense. According to Russian press reports, the Poseidon carries a 100-megaton warhead, possibly salted with cobalt to intensify radioactive

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to-build-its-very-own-b-2-stealth-bomber/; "Russia's Defense Ministry to Receive First Newly-built Tu-160M Strategic Bomber," *TASS*, February 4, 2022, available at https://tass.com/defense/1398283; and, Piotr Butowski, "Russia Pushes Ahead with New Strategic Bomber," *Aviation Week*, July 29, 2022, available at https://aviationweek.com/defense-space/aircraft-propulsion/russia-pushes-ahead-new-strategic-bomber.

[132] Mark B. Schneider, "The Barbarians in the Bay: Russia's Nuclear Armed Drone Submarine," *Real Clear Defense*, July 25, 2020, available at https://www.realcleardefense.com/articles/2020/07/25/the_barbarians_in_the_bay_russias_nuclear_armed_drone_submarine_115493.html; and, Bill Gertz, "'Kanyon' Unmanned Sub to Target Harbors, Cities," *Washington Free Beacon*, September 8, 2015, available at https://freebeacon.com/national-security/russia-building-nuclear-armed-drone-submarine/.

[133] Steven Pifer, "Russia's Perhaps-not-real Super Torpedo," *Brookings Institution*, November 18, 2015, available at https://www.brookings.edu/articles/russias-perhaps-not-real-super-torpedo/.

fallout.[134] The Russian reports on Poseidon yield have been questioned. However, unless there is a very large measurement error on the size of the warhead compartment, a 50- to 100-megaton yield is possible. Russia has considerable experience with very high-yield single warheads for its large ICBMs.[135] In the 1963 Nuclear Test Ban Treaty hearings, then Secretary of Defense Robert McNamara stated that it would be possible to develop a new warhead for the Titan II ICBM (its warhead was much smaller than the Poseidon warhead section)[136] with a 35-megaton yield without further nuclear testing.[137] Russia would certainly be able to do today what the United States was able to do 60 years ago.

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[134]Lynn Berry and Vladimir Isachenkov, "Kremlin-controlled TV airs 'Secret' Plans for Nuclear Weapon," *Associated Press*, November 12, 2015, available at https://apnews.com/article/aaa75e4bb6e84d52948b9e6d8275c71d; Pavel Felgenhauer, "Russia Leaks Data About Doomsday Underwater Nuclear Drone," *Eurasia Daily Monitor*, Vol. 12, Iss. 206 (November 12, 2015), available at https://jamestown.org/program/russia-leaks-data-about-doomsday-underwater-nuclear-drone/; and, Pavel Felgenhauer, "The Hypersonic Hype and Russia's Diminished Nuclear Threshold," *Eurasia Daily Monitor*, Vol. 17, Iss. 116 (August 6, 2020), available at https://jamestown.org/program/the-hypersonic-hype-and-russias-diminished-nuclear-threshold/.

[135] Charles Tyroler, II, ed., *Alerting America: The Papers of the Committee on The Present Danger* (Washington, D.C.: The Pergamon Brasey's, 1984), p. 46; "R-36M / SS-18 SATAN," *Federation of American Scientists*, July 29, 2013, available at http://fas.org/nuke/guide/russia/icbm/r-36m.htm; and, "Big Ivan, The Tsar Bomba (King of Bombs)," *NuclearWeaponsArchive.org*, September 3, 2007, available at https://nuclearweaponarchive.org/Russia/TsarBomba.html.

[136] The B53 warhead for the Titan II was 1.26 meters in diameter and 3.81 meters long. See "The B-53 (Mk-53) Bomb," *NuclearWeaponsArchive.org*, April 3, 2007, available at https://nuclearweaponarchive.org/Usa/Weapons/B53.html.

[137] James Herbert McBride, *The Test Ban Treaty, Military, Technological and Political Implications* (Chicago: Henry Regnery Company, 1967), p. 33.

A high-yield warhead of the kind that Russia suggests is on the Poseidon would clearly be a terror weapon; it appears deliberately designed to maximize civilian casualties through massive blast and fallout[138] and, hence, its use would likely violate international law.

Russia has recently tested this system.[139] *TASS* reported that the first batch of nuclear warheads for these drones has been produced.[140] In July 2022, the Belgorod, the first Poseidon-armed submarine, was turned over to the Russian Navy.[141] Russia reportedly will have 30 deployed Poseidons by 2027.[142] While this is only 30 nuclear warheads, the blast effect of these weapons would be five-to-10 times greater

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[138] Schneider, "The Barbarians in the Bay: Russia's Nuclear Armed Drone Submarine," op. cit.; and, Sam LaGrone, "Analyst: Doomsday Nuclear Torpedo Leak Gives Insight to Russian Strategic Mindset, Ballistic Missile Defense Anxiety," *USNI News*, November 12, 2015, available at https://news.usni.org/2015/11/12/analyst-doomsday-nuclear-torpedo-leak-gives-insight-to-russian-strategic-mindset-ballistic-missile-defense-anxiety.

[139] Felix Allen, "Putin's World Record 604 ft 'City Killer' Nuclear Submarine now Primed for War Armed with Poseidon Nuke Torpedoes," *The Sun*, January 26, 2022, available at https://www.the-sun.com/news/4542914/belgorod-submarine-putin-city-killer-nuclear-drones/; and, Vijainder K Thakur, "Russia's Poseidon 'Nuke Drone' Test: Is US-Led NATO Making Mushroom Clouds Out Of A Molehill?" *Eurasian Times*, October 5, 2022, available at https://eurasiantimes.com/russias-nuclear-drone-test-rattled-us-led-nato-is-mushroom/.

[140] "First Batch of Nuclear-armed Drones Poseidon Manufactured for Special-purpose Sub Belgorod," *TASS*, January 15, 2023, available at https://tass.com/emergencies/1562553.

[141] "Belgorod: Nuclear Submarine Armed With Poseidon Torpedoes," *Sputnik*, April 10, 2023, available at https://sputnikglobe.com/20230410/belgorod-nuclear-submarine-armed-with-poseidon-torpedoes-1109325885.html.

[142] "'Doomsday Weapon': Advanced Russian Drones to Be Test-Launched From Nuclear Sub, Report Says," *Sputnik*, February 2, 2021, available at https://sputnikglobe.com/20210212/doomsday-weapon-advanced-russian-drones-to-be-test-launched-from-nuclear-sub-report-says-1082055313.html.

than ordinary Russian high-yield nuclear warheads and the fallout generated could be equivalent to up to a hundred times that of Russia's ordinary high-yield nuclear warheads.

General Cotton has stated that in addition to the Avangard, "Russia now fields nuclear-capable hypersonic systems such as…the Tsirkon land-attack cruise missile, and the Kinzhal air-launched ballistic missile, the last of which Russia has employed in Ukraine with conventional warheads."[143] Russia apparently plans to use them for both strategic and non-strategic missions. General Hyten, when Commander of U.S. Strategic Command, warned about the threat posed by Russian hypersonic weapons. He noted that a hypersonic missile "disappears, and we don't see it until the effect is delivered."[144] Existing Russian launchers for Kalibr and Oniks cruise missiles can reportedly launch the Tsirkon.[145] Widespread deployment is quite possible. Russian state-run television broadcast a "list of American targets" associated with the U.S. National Command Authority, that "…the Kremlin could strike with hypersonic nuclear missiles within five minutes if war breaks out."[146]

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[143] Cotton, *Statement of Commander Anthony J. Cotton*, op. cit., p. 8.

[144] Thomas Newdick, "Victory Day 'Bears'," *Combat Aircraft*, August 2019, p. 85.

[145] "'Deadliest Ever': Russia Launches New 4th-gen Nuclear-powered Submarine (VIDEO)," *RT*, December 25, 2019, available at https://www.rt.com/russia/476812-russia-nuclear-submarine-launched/.

[146] "Putin's US Nuclear hit list Revealed: Russian State TV Names Camp David as the Top Location the Kremlin would Target with 'Unstoppable' Hypersonic Nukes which can Strike in just Five Minutes," *Reuters*, February 25, 2019, available at https://www.dailymail.co.uk/news/article-6742481/After-Putins-warning-Russian-TV-lists-nuclear-targets-US.html.

The Impact of the Ukraine War on Russian Strategic Nuclear Capability

Except for the reported use of a few Kh-55 nuclear cruise missiles with inert warheads against Ukraine,[147] Russia's aggression has had no apparent impact on its strategic nuclear capabilities. Similarly, it did not impact the FAS estimate of Russian nuclear warhead numbers. The FAS report, until the May 2023 edition,[148] ignored official Russian statements about the nuclear capability of the Kh-101 and the state-media reports of a nuclear capability for the Kh-555 cruise missile. As noted above, President Putin has decreed that Russia "will carry out all of our plans" regarding nuclear modernization.[149]

Russia has launched thousands of missiles against Ukraine, depleting its inventory.[150] Russian cruise missiles with conventional warheads have displayed reliability and accuracy problems in the war against Ukraine. While the reliability problems will likely impact the performance of Kh-101 and Kh-555 cruise missiles used with nuclear warheads, the accuracy problem will have little impact on targeting effectiveness even with low sub-kiloton yield

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147 Tanmay Kadam, "Russia Fired Nuke-Capable Kh-55 Missile Into Kyiv After Simply Unscrewing 'Nuclear Warheads' — Ukraine StratCom," *The Eurasian Times*, November 19, 2022, available at https://eurasiantimes.com/ukraine-russias-nuclear-capable-kh-55-missile/.

148 Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 174.

149 "Meeting of Defence Ministry Board," *Kremlin.ru*, December 21, 2022, available at http://en.kremlin.ru/events/president/news/70159.

150 Benjamin Brimelow, "Russia is Using its Newest and Oldest Missiles Indiscriminately against Ukraine," *Yahoo*, available at https://www.yahoo.com/news/russia-using-newest-oldest-missiles-222900918.html.

nuclear warheads.[151] The Kh-101 is reported to have a "…circular error probable (CEP) of between 33 and 66 feet."[152] (CEP is a measure of accuracy based on a circle in which half of the attacking warheads will fall.) Any dual-capable missile will likely have more than enough accuracy for the nuclear mission. Dr. Phil Karber has stated that one in three Russian missiles used in Ukraine has destroyed its target, but if they had a 20-ton yield nuclear warhead, another third would have been destroyed.[153] In this context, targets are assumed to be fairly small and not super-hardened and/or deeply buried.

Russia is continuing to produce Kh-101 missiles,[154] but its inventory has been substantially depleted. In January 2023, Ukraine stated that Russia's stockpile of Kh-101, Kh-555 and Kalibr missiles was running low and that Moscow had only enough missiles left for two or three 80-missile strikes.[155] It is not clear from the Ukrainian statement whether they were counting the entire Russian missile inventory or excluding those that are reserved for the nuclear mission. In light of the priority given to nuclear

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[151] Mark B. Schneider, "Lessons from Russian Missile Performance in Ukraine," *Proceedings*, Vol. 148/10/1,436, October 2022, available at https://www.usni.org/magazines/proceedings/2022/october/lessons-russian-missile-performance-ukraine.

[152] Alexander Mlandenov, "Russia's Heavy Hitters," *AirForces Monthly*, May 2023, p. 79.

[153] "DEFAERO Strategy Series [Oct 20, '22] w/ Dr. Philip Karber," *Defense & Aerospace Report*, October 22, 2022, available at https://soundcloud.com/defaeroreport/defaero-strategy-series-oct-20-22-w-dr-philip-karber.

[154] "Top Official Explains why Russia hasn't run out of Precision Missiles in Ukraine," *RT*, April 19, 2022, available at https://www.rt.com/russia/554134-borisov-interview-defense-industry/.

[155] Isabel van Brugen, "Russia Has This Many Strikes Left as Kh-555 Cruise Missiles Run Out—Kyiv," *Newsweek*, January 4, 2023, available at https://www.newsweek.com/russia-missiles-running-out-kh-555-ukraine-1771174.

capability in Russian strategy, it is unlikely Russia would exhaust its supply of nuclear missiles. The Kh-101 is the best Russian missile for implementing a strategy of very low-yield nuclear escalation strikes against the United States. Indeed, the repeated warnings from the Biden Administration that Russia has increased its reliance on nuclear weapons[156] suggest that Moscow would not reduce its inventory of nuclear Kh-101s by using them in conventional strikes.

The April 2023 Russian test of an ICBM into the Sary Shagan test range[157] was indicative of further warhead development. Sary Shagan is where Russia conducts research and development tests on new warheads and missile defense tests. According to Pavel Podvig, "The situation with the Kapustin Yar to Sary Shagan launches is a bit different. These are tests of ICBM/SLBM re-entry vehicles. Yes, maybe what is tested is their capability to penetrate missile defense. But more likely these tests contribute to the overall improvement of RVs [reentry vehicles]."[158] This could be associated with the new ICBMs about which Russian officials talk.

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[156] Cotton, *Statement of Commander Anthony J. Cotton*, op. cit., p. 8; Office of the Director of National Intelligence, *Annual Threat Assessment of the U.S. Intelligence Community* (Washington, D.C.: Office of the Director of National Intelligence, February 6, 2023), p. 14, available at https://www.dni.gov/index.php/newsroom/reports-publications/reports-publications-2023; and, The White House, *National Security Strategy* (Washington, D.C.: The White House, October 2022), pp. 21, 26, available at https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf.

[157] Liam Coleman, "Putin Launches Huge New Ballistic Rocket and Takes Down Target in Kazakhstan," *Metro.com*, April 12, 2023, available at https://metro.co.uk/2023/04/12/putin-launches-huge-new-ballistic-rocket-and-takes-down-target-in-kazakhstan-18596094/.

[158] Pavel Podvig, April 12, 2023, available at https://twitter.com/russianforces/status/1646266841109610497.

It is clear that Russia has a very large and expanding strategic nuclear capability. Russia has the potential to upload thousands of nuclear warheads on its strategic nuclear forces and this capability will grow dramatically with the deployment of the Sarmat heavy ICBM, supposedly later in 2023. Warhead uploads may have already been covertly implemented since the end of the New START Treaty's on-site inspections more than three years ago. Russia will continue to modernize its strategic nuclear forces and is unlikely to stop when it reaches its 100 percent objective since there are announced follow-on ICBM and SLBM programs. Other than the Sarmat, there is little public information about the other new and improved Russian ICBMs that are under development. However, the pattern of Russian force expansion is likely to continue. The Biden Administration's stated objective is to reduce U.S. reliance on nuclear weapons. This is likely to be very difficult when an adversary is dramatically increasing its emphasizes on nuclear capabilities for coercive and prospective war-fighting purposes.[159]

[159] See, for example, Keith B. Payne and David J. Trachtenberg, *Deterrence in the Emerging Threat Environment: What is Different and Why it Matters*, *Occasional Paper*, Vol. 2, No. 8 (August 2022), available at https://nipp.org/papers/deterrence-in-the-emerging-threat-environment-what-is-different-and-why-it-matters/.

Chapter 6
Russia's Non-Strategic (Tactical) Nuclear Weapons

Since the February 2022 Russian full-scale invasion of Ukraine, the world has heard unprecedented Russian nuclear war threats. The critical question centers on whether Putin will use tactical nuclear weapons against Ukraine, as its military doctrine of "escalate to de-escalate" would suggest. However, the debate is being influenced by: 1) the lack of a reasonably accurate understanding of the potential size and characteristics of the Russian non-strategic (or tactical) nuclear weapons stockpile and how it compares to Western capabilities; 2) an inadequate understanding of nuclear weapons effects and how they compare with conventional weapons; and, 3) an ideological predisposition that views nuclear weapons, even tactical nuclear weapons, in apocalyptic terms and presumes the Russian leadership shares that view.

The general absence of public understanding of the Russian non-strategic nuclear arsenal is not surprising; even in the midst of unprecedented Russian nuclear first-use threats, some elements in the press, pundits and policymakers push for further cuts in the U.S. nuclear deterrent force. It should be noted in this regard that the Obama Administration's 2010 *Nuclear Posture Review* rightly stated that, "… large disparities in nuclear capabilities could raise concerns on both sides and among U.S. allies and partners, and may not be conducive to maintaining a stable, long-term strategic relationship, especially as nuclear forces are significantly reduced."[1]

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[1] U.S. Department of Defense, *Nuclear Posture Review Report* (Washington, D.C.: Department of Defense, April 2010), p. 30, available at https://dod.defense.gov/Portals/1/features/defenseReviews/NPR/2010_Nuclear_Posture_Review_Report.pdf.

If Putin were to escalate the Ukrainian conflict by employing nuclear weapons, the most likely possibility is Russian use of non-strategic nuclear weapons, particularly tactical battlefield nuclear weapons. While there is always uncertainty, all credible estimates give Russia a large advantage in non-strategic nuclear weapons numbers, particularly in low-yield weapons. Russia is well ahead in the diversity of these weapons and currently appears to have a monopoly in nuclear weapons designed specifically for low-collateral damage and in the new hypersonic non-strategic nuclear weapons.[2]

The large asymmetries between the United States/NATO and Russia are alarming. Russia's quantitative and qualitative advantage undermines the ability of the United States and NATO to respond in kind. The United States has retained only the B-61 gravity bomb and has nothing comparable to the Russian sub-strategic nuclear Triad or its emerging hypersonic nuclear triad. This asymmetry has developed as a result of U.S. policy decisions and likely has served to undermine the U.S. nuclear deterrent. This chapter examines the scope of the non-strategic nuclear challenge that the United States/NATO face in light of the enormous asymmetric Russian advantage in these weapons.

Russian non-strategic nuclear weapons vastly exceed Western capabilities. Non-strategic or tactical nuclear weapons range from short-range battlefield or naval weapons to long-range ship-launched cruise and hypersonic missiles that can be used as substitutes for strategic nuclear weapons. As a result of drastic U.S., U.K., and French cuts in these weapons from Cold War levels, Western non-strategic nuclear capabilities are extremely

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[2] See the discussion in, Philip A. Karber, with T. Cadieu, *Where Goest Ukraine & NATO Strategy*? (Vienna, VA: The Potomac Foundation, July 2023), p. 118, available at https://strategyandfuture.org/wp-content/uploads/2023/07/Ukraine-NATO-Strategy-1-JUIL-2023.pdf.

limited. Admiral Richard Mies, former Commander of U.S. Strategic Command noted, "…we have dramatically and unilaterally drawn down our tactical nuclear forces in contrast to Russia. To my knowledge our unilateral disarmament initiatives have done little to promote similar initiatives in our potential adversaries, and at the same time, have reduced our arms control negotiating leverage… [W]e have [had] virtually no warhead production capability for the past two decades and little likelihood of developing one within the coming decade."[3]

Current Russian capabilities appear to be the product of decisions made in 1999, which *The Washington Post* reported involved "…a new blueprint for beefing up thousands of short-range or tactical nuclear weapons…"[4] As Admiral Mies remarked, these weapons can be used with "strategic effect."[5] There is no significant dispute over the generic types of Russian non-strategic nuclear weapons. This is depicted in the following NATO graphic (Figure 1) posted in 2021 on the United Kingdom's Defence Ministry website.[6]

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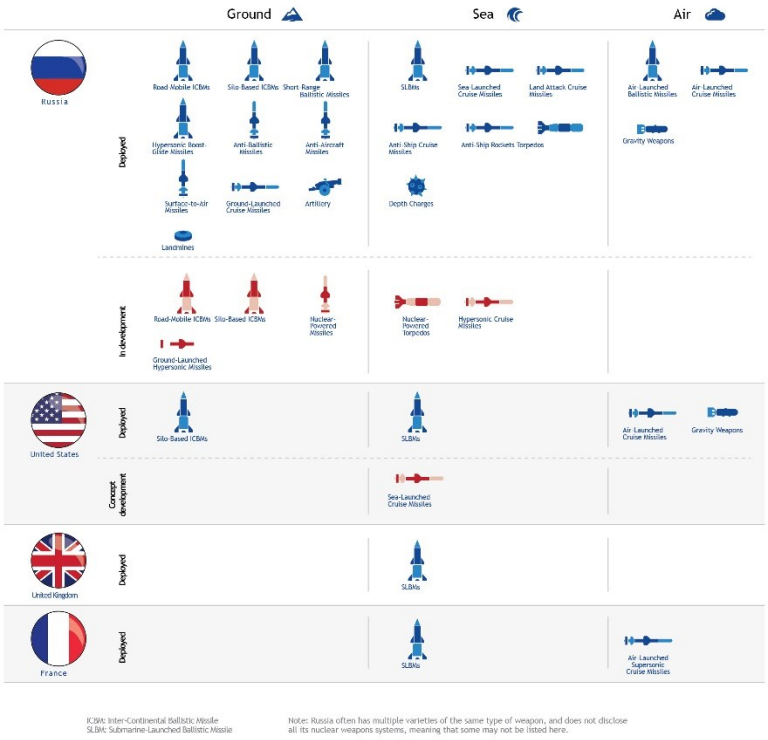
[3] Richard W. Mies, "Managing Risk and Uncertainties in a New Strategic Age," *Submarine Review* (Fall 2011), p. 15, available at https://s36124.pcdn.co/wp-content/uploads/2021/12/2011-Fall-OCRw.pdf.

[4] David Hoffman, "Yeltsin OKs Plan for Handling Tactical Nuclear Weapons," *The Washington Post*, April 30, 1999, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/1064018EC5896E9A.

[5] Mies, "Managing Risk and Uncertainties in a New Strategic Age," op. cit., p. 19.

[6] Original graphic found in, Jens Stoltenberg, *The Secretary General's Annual Report, 2020* (Brussels, BE: NATO, 2021), p. 32, available at https://www.nato.int/nato_static_fl2014/assets/pdf/2021/3/pdf/sgar20-en.pdf.

Figure 1: Comparing Non-Strategic Nuclear Weapons Arsenals



Source: Jens Stoltenberg, *The Secretary General's Annual Report*, 2020

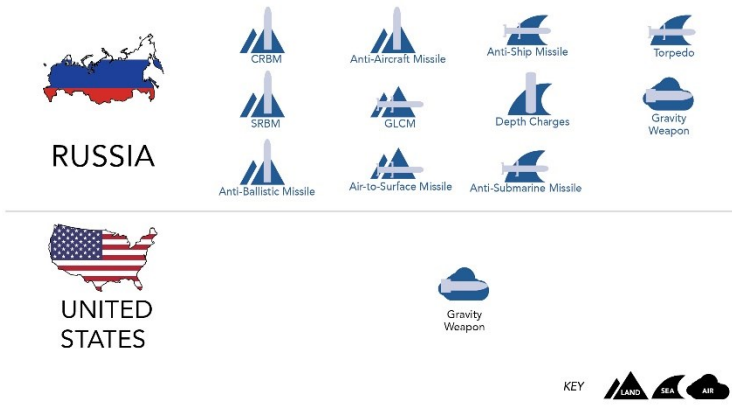
The 2018 *Nuclear Posture Review* summarized the types of Russian non-strategic nuclear weapons as follows:

> These include air-to-surface missiles, short-range ballistic missiles, gravity bombs, and depth charges for medium-range bombers, tactical bombers, and naval aviation, as well as anti-ship, anti-submarine, and anti-aircraft missiles and torpedoes for surface ships and submarines, a nuclear ground-launched cruise missile in

violation of the 1987 INF Treaty, and Moscow's antiballistic missile system.[7]

The 2018 *Nuclear Posture Review* also includes the following graphic (Figure 2), which depicts the types of Russian non-strategic nuclear weapons.[8]

Figure 2: Russia's Non-Strategic Nuclear Challenge



Source: 2018 *Nuclear Posture Review*

Figure 2 details the same systems as in the NATO graphic (Figure 1) and added CRBMs (Close Range Ballistic Missiles), which are usually called bombardment rockets.[9] Russia reportedly used these in its May 2014 large nuclear exercise (now sometimes called Grom or Thunder.)[10]

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[7] U.S. Department of Defense, *Nuclear Posture Review* (Washington, D.C.: Department of Defense, 2018), p. 53, available at https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF.

[8] Loc. cit.

[9] Loc. cit.

[10] Mark B. Schneider, "Putin's Nuclear Firepower Demonstration in Support of His Invasion of Ukraine," *Real Clear Defense*, March 1, 2022, available at https://www.realcleardefense.com/articles/2022/03/01/putins_nucle

There are other very similar assessments. A 2017 Defense Intelligence Agency (DIA) report, *Russia Military Power,* said Russian tactical nuclear weapons "…include air-to-surface missiles, short-range ballistic missiles, gravity bombs, and depth charges for medium-range bombers, tactical bombers, and naval aviation, as well as anti-ship, anti-submarine, and anti-aircraft missiles, and torpedoes for surface ships and submarines. There may also be warheads remaining for surface-to-air and other aerospace defense missile systems."[11] Russian sources said essentially the same thing concerning the types of non-strategic nuclear weapons Moscow has retained. For example, in 2011, Alexei Arbatov, former Deputy Chairman of the Duma Defense Committee and a recognized expert on Russian nuclear weapons policy, wrote that Russian non-strategic nuclear weapons included free-fall bombs, depth charges, sea-launched cruise missiles, torpedoes, and air defense warheads.[12] Almost all of these types were included in the 2018 *Nuclear Posture Review* graphic on Russian non-strategic nuclear weapons. It appears that all legacy Soviet-era and new cruise missile types, such as the advanced naval Kalibr, are "dual capable"—that is, able to deliver conventional and nuclear warheads.[13]

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ar_firepower_demonstration_in_support_of_his_invasion_of_ukraine_819309.html.

[11] Defense Intelligence Agency, *Russia Military Power* (Washington, D.C.: DIA, 2017), p. 31, available at https://www.dia.mil/Portals/110/Images/News/Military_Powers_Publications/Russia_Military_Power_Report_2017.pdf.

[12] "Moscow, Washington Must Demonstrate Openness Regarding Nuclear Potentials – Expert," *Interfax*, April 18, 2011, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=31236848.

[13] Alexander Mladenov, "Best in the Breed," *Air Forces Monthly*, May 2017, p. 51; Dave Johnson, *Russia's Conventional Precision Strike Capabilities, Regional Crises, and Nuclear Thresholds* (Lawrence, CA: Lawrence Livermore National Laboratory, Center for Global Security Research, February 2018), available at https://cgsr.llnl.gov/content/assets/docs/Precision-Strike-

The footnote at the bottom of the NATO graphic (Figure 1) is important. It states that Russia has multiple variants of each generic type of its nuclear weapons, does not disclose all of its nuclear weapons systems and, hence, there may be some types of Russian nuclear weapons not listed on the NATO chart. Russia has even increased the diversity of the arsenal it inherited from the Soviet Union. Moscow has violated its 1991-1992 Presidential Nuclear Initiative (PNI) commitments regarding the reduction or elimination of many types of its tactical nuclear weapons. Russia had committed to the complete elimination of its nuclear artillery, short-range missiles and land mines, which it did not do.[14] Instead, it is adding to its tactical nuclear weapons arsenal.[15]

Russia's Non-Strategic Nuclear Triad

Unlike the United States, Russia has a non-strategic nuclear Triad. If the Biden Administration is successful in terminating the nuclear Sea Launched Cruise Missile (SLCM) program—despite expressed senior military

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Capabilities-report-v3-7.pdf; and, "Meeting with Defence Minister Sergei Shoigu," *Kremlin.ru*, December 8, 2015, available at http://en.kremlin.ru/events/president/news/50892.

[14] U.S. Department of State, *Adherence to and Compliance With Arms Control, Non-Proliferation, and Disarmament Agreements and Commitments* (Washington, D.C.: Department of State, June 2020), pp. 23-24, available at https://www.state.gov/wp-content/uploads/2020/06/2020-Adherence-to-and-Compliance-with-Arms-Control-Nonproliferation-and-Disarmament-Agreements-and-Commitments-Compliance-Report-1.pdf.

[15] U.S. Department of State, *Report to the Senate on the Status of Tactical (Nonstrategic) Nuclear Weapons Negotiations Pursuant to Subparagraph (a)(12)(B) of the Senate Resolution of Advice and Consent to Ratification of the New START Treaty* (Washington, D.C.: Department of State, February 2023), pp. 4-5, available at https://www.state.gov/wp-content/uploads/2023/05/NSNW-2023-Unclass-Report-02-09-23-1-w-no-class-markings-Accessible-2.14.2023.pdf.

opposition to doing so—the U.S. non-strategic nuclear deterrent will remain a monad – the B-61 bomb. The logic of the deterrence value of the strategic Triad applies just as well to non-strategic nuclear weapons. The United States and its allies are at a serious disadvantage with regard to survivability, defense penetration, flexible and credible deterrence threat options, and capability to strike time-urgent targets. The comparison of Western and Russian systems is becoming more disadvantageous for the West because Russia is well on its way to creating an overlapping, non-strategic hypersonic nuclear Triad.[16]

The implications of the large disparity in the types of non-strategic nuclear weapons, including the large Russian numerical advantage, are critically important. Given the diversity of Russian non-strategic nuclear capabilities, Moscow has a wide range of nuclear systems with which to threaten or attack the full spectrum of Western target types. As noted, the United States, United Kingdom and France are extremely limited in the capabilities needed to threaten or *respond proportionally or in kind to Russian tactical nuclear threats or strikes*—a condition that may well significantly degrade Western deterrence options and positions. Given Russia's much more expansive non-strategic nuclear arsenal—and correspondingly diverse threat and strike options—Western nuclear response options may be disproportional and asymmetric, and thus lack the credibility needed to deter. In particular, those readily available U.S. or allied response options to a Russian first use of tactical nuclear weapons could well be seen as escalatory, with correspondingly little apparent U.S. or

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[16] Anthony J. Cotton, *Statement of Commander Anthony J. Cotton, Commander, United States Strategic Command* (Washington, D.C.: U.S. House Armed Services Committee, Subcommittee on Strategic Forces, March 8, 2023), p. 8, available at https://armedservices.house.gov/sites/republicans.armedservices.house.gov/files/2023%20USSTRATCOM%20Congressional%20Posture%20Statement%20-%20HASC-SF.pdf.

allied willingness to exercise escalatory options.[17] U.S. nuclear forces do not need to mimic Russian forces, but the significantly greater range of threat or strike options available to Moscow may undermine U.S. deterrence goals.

Russian Hypersonic Missiles

Russian non-strategic nuclear-capable hypersonic missile programs announced by the Russian government or reported in Russian state media include the following:

- The KH-32, which may be a hypersonic nuclear-capable cruise missile (reported maximum speed from Mach 4 to Mach 5), with a reported range of 1,000-km.[18]
- The Iskander-M and the improved Iskander-M nuclear-capable "aeroballistic" missile (both operational) with a reported maximum range of 700 to 1,000-km.[19] According to Russian Defense Minister Sergei Shoigu, the Iskander-M system "is capable of using both conventional and nuclear missiles."[20]

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[17] The U.S. and Western strong desire to avoid escalatory moves is fully apparent in the continuing Russian war against Ukraine.

[18] Mark B. Schneider, "Moscow's Development of Hypersonic Missiles… and What it Means," chapter in, *Defense Technology Program Brief: Hypersonic Weapons* (Washington, D.C.: American Foreign Policy Council, May 2019), p. 11, available at https://www.afpc.org/uploads/documents/Defense_Technology_Briefing_-_Issue_18.pdf.

[19] Ibid., pp. 11-12.

[20] "Iskander System Capable of Carrying Nuclear Missiles Transferred to Belarus — Shoigu," *TASS*, April 4, 2023, available at https://tass.com/defense/1599025. In 2006, the Sarov nuclear weapons laboratory took credit for developing the nuclear warhead for the Iskander-M. All Russian Research Institute of Experimental Physics,

- The now operational "high-precision hypersonic aircraft missile system" called the Kinzhal, which is capable of "delivering nuclear and conventional warheads in a range of over 2,000-km."[21] The Chief of the Russian Aerospace Force (Air Force) called it an "aeroballistic missile."[22] It is reportedly a derivative of the Iskander-M. In 2018, then Deputy Prime Minister for Defense and Space Industry Yuri Borisov said that 10 Kinzhals were operational on Mig-31 fighters, and *TASS* reported that an "aeroballistic missile," very likely the Kinzhal, will be carried by the Su-34 long-range strike fighter-bomber.[23] State-run *TASS* and *Sputnik News* reported that the Backfire bomber will also carry the Kinzhal.[24] In May 2023, state-run *Sputnik News* also linked the Kinzhal to the Backfire bomber and said

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Russian Federal Nuclear Center (Sarov, RU: All Russian Research Institute of Experimental Physics, 2006), p. 59.

[21] Vladimir Putin, "Presidential Address to the Federal Assembly," *Kremlin.ru*, March 1, 2018, available at http://en.kremlin.ru/events/president/news/56957.

[22] "Russian Commanders Comment on Putin's Weapons Announcement," *BBC Monitoring of the Former Soviet Union/Rossiyskaya Gazeta*, March 5, 2018, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/16A75DF1C76FA020.

[23] "Upgrading a Hellduck: Russia's Su-34 to Get State of-the-Art Overhaul," *Sputnik*, December 10, 2016, available at https://sputnikglobe.com/20161210/russia-su-34-strike-fighter-modernization-1048402800.html; and, Piotor Butowski, "Daggers, Stones and Foxbats," *Air International*, April 2018, pp. 12-13.

[24] "Russia to employ new Kinzhal Missile on Tu-22M3 Bomber," *BBC Monitoring Former Soviet Union*, July 8, 2018, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/16D09B58F609DCC0; and, "Russia's Tu-22M3M Bomber to Be Able to Carry Up to 4 Kinzhal Missiles – Source," *Sputnik*, July 2, 2018, available at https://sputnikglobe.com/20180702/russia-bombers-missiles-1065959682.html.

the missile "in nuclear mode" had "a 5-50 kiloton payload."[25]

- A smaller version of the Kinzhal to be carried by the Su-57 fighter aircraft.[26]
- The now operational Tsirkon, a scram jet-powered, nuclear-capable, hypersonic cruise missile, which Putin said has a range of more than 1,000-km and a speed of Mach 9. A retired Russian admiral said the range is 2,000-km.[27] *Sputnik News* said it has a warhead of "up to 200 kilotons."[28]

The recent Patriot intercepts of Russian Kinzhal hypersonic missiles are important technical achievements.[29] However, the amount of NATO territory (including the United States) that is actually defended by the Patriot is miniscule and is likely to remain so.

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[25] "From Avangard to Zircon: How Far Do Russian Missiles Fly?," *Sputnik*, May 12, 2023, available at https://sputnikglobe.com/20230512/from-avangard-to-zircon-how-far-do-russian-missiles-fly-1110296500.html.

[26] "Su-57 Jets will be Equipped with Hypersonic Missiles Similar to Kinzhal — Source," *TASS*, December 6, 2018, available at http://tass.com/defense/1034559.

[27] Schneider, "Moscow's Development of Hypersonic Missiles… and What it Means," op. cit., p. 13.

[28] "From Avangard to Zircon: How Far Do Russian Missiles Fly?," op. cit.

[29] Peter Mitchell, "Hypersonic Hype? Russia's Kinzhal Missiles and the Lessons for Air Defense," *Modern War Institute*, May 23, 2023, available at https://mwi.usma.edu/hypersonic-hype-russias-kinzhal-missiles-and-the-lessons-for-air-defense/.

Russian Low-Yield Non-Strategic Nuclear Weapons

Russia is extremely secretive about its tactical nuclear weapons except when it reveals its nuclear capability in order to brandish nuclear threats.[30] Despite official Russian denials of low-yield nuclear weapons programs and attacks on then non-existent U.S. low-yield programs after 2003, Russian generals and senior civilian officials have openly discussed their development of low-yield nuclear warheads in some detail.

In 1996, Viktor Mikhaylov, then Russia's Atomic Energy Minister, called for the construction of 10,000 very low-yield nuclear weapons.[31] Such a high number suggests that the idea was to substitute a precision nuclear strike for conventional strikes when suited to Moscow's military and political goals. Senior analyst James R. Howe has raised concerns about Russia achieving this objective with 1,200-1,500 low-yield/low-collateral damage nuclear weapons.[32]

In 1999, Colonel General Vladimir Muravyev, then Deputy Commander of the Strategic Missile Force, said Russian forces "…should be capable of conducting 'surgical' strikes…using both highly accurate, super-low yield nuclear weapons, as well as conventional ones…"[33]

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[30] "Russian Experts Divided Over Senator Nunn's Tactical Nuclear Weapons Control Initiative," *Interfax-AVN*, May 30, 2005, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=32175469.

[31] Nikolai Sokov, "Tactical Nuclear Weapons Elimination: Next Steps for Arms Control," *The Nonproliferation Review*, Vol. 4, No. 2 (Winter 1997), p. 18.

[32] James R. Howe, "Potential Military Utility of Russian Employment of Advanced Technology Nuclear Weapons in Europe—Implications for US Extended Deterrence," *Vision Centric, Inc*., no date, mimeo.

[33] James R. Howe, "Exploring the Dichotomy Between New START Treaty Obligations and Russian Actions and Rhetoric," *Vision Centric, Inc.*, February 17, 2016, available at https://www.exchangemonitor.com/wp-

Pavel Felgenhauer, a noted Russian journalist with a long and distinguished career covering Russian political-military developments, reported that the development of new low-yield nuclear weapons was authorized in April 1999 with yields equivalent to the explosive power of tens to hundreds of tons of Trinitrotoluene (TNT).[34] In September 2022, *Politico* quoted a Biden Administration official as saying, "They [the Russians] have warheads we call micro-nukes, with tens to hundreds of tons of explosive yield."[35]

Russian Colonel General Muravyev also said that nuclear weapons "are capable of nullifying the combat qualities of all modern conventional systems."[36] A declassified August 2000 CIA report noted Russian "…development of very low-yield, high-precision nuclear weapons," and stated "the range of applications…could include artillery, air-to-air weapons, ABM weapons, anti-satellite weapons or multiple rocket launchers against tanks or massed troops.…"[37] This report also remarked that,

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content/uploads/2016/04/Thu-9am-Future-Nuclear-Arms-Control-Stacked.pdf.

[34] Roy Boone, David Rehbein, John A. Swegle, and Christopher Yeaw, *The Challenge of Russia's Non-Strategic Nuclear Weapons* (Omaha, NE: National Strategic Research Institute, University of Nebraska, October 29, 2021), p. 7, available at https://nsri.nebraska.edu/-/media/projects/nsri/docs/academic-publications/2021/october/the-challenge-of-russias-nsnw.pdf; and, Pavel Felgenhauer, "Bomb Makers Trade Union," *The Moscow Times*, March 14, 2002.

[35] Bryan Bender, "U.S. Steps Up Intel, Surveillance after Putin's Nuke Threats," *Politico*, September 22, 2022, available at https://www.politico.com/news/2022/09/27/putin-nuke-russia-ukraine-intel-surveillance-00059020.

[36] Quoted in Mark B. Schneider, *The Nuclear Forces and Doctrine of the Russian Federation* (Fairfax, VA: National Institute for Public Policy, 2006), p. 22, available at https://nipp.org/wp-content/uploads/2021/05/Russian-nuclear-doctrine-NSF-for-print.pdf.

[37] Central Intelligence Agency, *Evidence of Russian Development of New Subkiloton Nuclear Warheads* [Redacted] (Langley, VA: CIA, August 30,

"Senior Russian military officers have advocated the use of highly accurate, super-low yield nuclear weapons in Russian military journals such as *Military Thought* and *Armeyskiy Shornik*."[38] In 2001, former Atomic Energy Minister Viktor Mikhaylov, then Director of the Sarov nuclear weapons laboratory, called for the development of "low and super-low yield nuclear weapons and precision weapons with nuclear warheads."[39]

In 2009, the bipartisan Congressional U.S. Strategic Posture Commission reported that Russia was developing "low-yield tactical nuclear weapons including an earth penetrator."[40] In 2009, *ITAR-TASS* (now called *TASS*) indicated that, "The nuclear submarine Severodvinsk will be equipped with long-range cruise missiles that can potentially carry low-capacity tactical warheads."[41] In March 2009, *ITAR-TASS* said, "The missiles [on the new Russian nuclear submarine Severodvinsk] are capable of carrying low-yield tactical nuclear warheads and are meant to be used against the potential enemy's aircraft carrying groups."[42] Also in 2009, Vice Admiral Oleg Burtsev, then First Deputy Chief of the Russian Navy Main Staff, declared

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2000), pp. 6, 10, available at https://www.cia.gov/readingroom/docs/DOC_0001260463.pdf.

[38] Ibid., p. 3.

[39] Quoted in Mark B. Schneider, "The Future of the U.S. Nuclear Deterrent," *Comparative Strategy*, Vol. 27, No. 4 (2008), p. 347.

[40] William J. Perry, Chairman, and James R. Schlesinger, Vice-Chairman, *America's Strategic Posture*: *The Final Report of the Congressional Commission on the Strategic Posture of the United States* (Washington, D.C.: U.S. Institute of Peace Press, 2009), p. 12, available at https://www.usip.org/strategic-posture-commission/view-the-report.

[41] "RF To Build 6 Nuclear Subs With Long-range Cruise Missiles," *ITAR-TASS,* March 27, 2009, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=32169150.

[42] "Russia's Severodvinsk Attack Sub to be Armed with New Cruise Missiles," *ITAR-TASS,* March 27, 2009, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=32169122.

that the role of tactical nuclear weapons may be increasing and, "There is no longer any need to equip missiles with powerful nuclear warheads. We can install low-yield warheads on existing cruise missiles."[43] Russia does not have to install these warheads on old systems given Putin's military buildup; it has introduced, and is continuing to introduce, a wide array of new and improved nuclear-capable cruise, ballistic and now hypersonic missiles.[44]

In 2017, General Paul Selva, then Vice Chairman of the Joint Chiefs of Staff, said Russia is "developing new nonstrategic nuclear weapons…"[45] In May 2019, Lt. General Ashley reported, "Russia's stockpile of non-strategic nuclear weapons—already large and diverse…is being modernized with an eye towards greater accuracy, longer ranges, and lower yields to suit their potential warfighting role."[46] In 2021, then Vice Chairman of the Joint Chiefs of Staff General John Hyten underscored that Russia had "thousands of low-yield nuclear and tactical nuclear

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[43] "Russia Could Focus on Tactical Nuclear Weapons for Subs," *Sputnik*, March 23, 2009, available at https://sputnikglobe.com/20090323/120688454.html.

[44] Mark B. Schneider, "Russian Strategic and Hypersonic Naval Nuclear Weapons," *Real Clear Defense*, November 18, 2020, available at https://www.realcleardefense.com/articles/2020/11/18/russian_strategic_and_hypersonic_naval_nuclear_weapons_650130.html; and, Mark B. Schneider, "Lessons from Russian Missile Performance in Ukraine," *Proceedings*, Vol. 148/10/1,436, October 2022, available at https://www.usni.org/magazines/proceedings/2022/october/lessons-russian-missile-performance-ukraine.

[45] Paul Selva, *Statement of General Paul Selva, USAF, Vice Chairman of the Joint Chiefs of Staff* (Washington, D.C.: House Armed Services Committee, March 8, 2017), p. 4, available at https://docs.house.gov/meetings/AS/AS00/20170308/105640/HHRG-115-AS00-Wstate-SelvaUSAFP-20170308.pdf.

[46] Robert P. Ashley, "Russian and Chinese Nuclear Modernization Trends," *DIA.mil*, May 29, 2019, available at https://www.dia.mil/Articles/Speeches-and-Testimonies/Article/1859890/russian-and-chinese-nuclear-modernization-trends/.

weapons."[47] Furthermore, Russia has continued covert low-yield nuclear testing in violation of its treaty obligations.[48] It is interesting to note that Dr. John Foster, former Director of the Lawrence Livermore National Laboratory, stated that hydronuclear tests "of less than one ton" yield could provide high confidence in the "performance [of nuclear weapons] at low yield."[49]

Advanced Russian Low-Collateral Damage Nuclear Weapons

According to Vice Admiral (ret.) Robert Monroe, former Director of the Defense Nuclear Agency, Russia "…has pursued advanced concepts, and greater use of fusion, less of fission (possibly achieving pure fusion)," and is now 20 years ahead of the United States in these weapons.[50] This

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[47] David Vergun, "General Notes Value, Limitations of New START Treaty," *Defense.gov*, February 26, 2021, available at https://www.defense.gov/News/News-Stories/Article/article/2517670/general-notes-value-limitations-of-new-start-treaty/.

[48] U.S. Department of State, *Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments* 2020, op. cit., pp. 46, 50-51; and, U.S. Department of State, *Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments* (Washington, D.C.: Department of State, April 2022), pp. 27, 29-30, available at https://www.state.gov/wp-content/uploads/2022/04/2022-Adherence-to-and-Compliance-with-Arms-Control-Nonproliferation-and-Disarmament-Agreements-and-Commitments-1.pdf.

[49] John S. Foster, "Future Possible Paths for the Nuclear Weapons Complex," SW21 Conference, January 22, 2016, p. 9, mimeo.

[50] Robert R. Monroe, "Change U.S. Nuclear Weapons Policies!," Nuclear Deterrence Summit Arlington, VA, February 16-19, 2016, p. 3, mimeo; Robert Monroe, "America Must Resume Underground Nuclear Testing," *The Washington Times*, January 27, 2017, available at https://www.washingtontimes.com/news/2017/jan/26/america-must-resume-underground-nuclear-testing/.

likely qualitative advantage is recognized in Russia. Mikhail Kovalchuk, head of the Kurchatov Institute, has stated that Russia is now ahead of the United States in nuclear weapons research.[51] In light of the sluggishness of U.S. post-Cold War nuclear policy, this would not be very difficult to achieve.

In 1999, Russian Major General (ret.) Vladimir Belous wrote about Russian development of pure fusion weapons in which "a chemical explosion or magnetic field compression is used to implode a thermonuclear mixture" and he stated that work was underway at Sarov (Arzamas-16) on such weapons.[52] In March 2002, Felgenhauer again reported that Russia was developing "superlow-yield weapons," penetators, and "'clean' nuclear weapons."[53] ("Clean" nuclear weapons are those that produce little nuclear fallout because their energy comes mainly from thermonuclear fusion which does not produce the types of heavy radioactive isotopes that result in fallout.) In September 2003, Lev Ryabev, a senior official in the Atomic Energy Ministry, revealed Russian efforts to develop a pure fusion weapon. He said Russia was researching the use of conventional explosives to achieve nuclear fusion for defense purposes.[54] In 2013, the Sarov nuclear weapons laboratory reported that during the Cold War it had developed a peaceful nuclear explosive (PNE) device that

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[51] "Russia First Time head of US in Nuclear Arms Research — Kurchatov Institute's Chief," *TASS*, March 29, 2023, available at https://tass.com/defense/1596203.

[52] Schneider, *The Nuclear Forces and Doctrine of the Russian Federation*, op. cit., p. 15.

[53] Loc. cit.

[54] Schneider, "The Future of the U.S. Nuclear Deterrent," op. cit., p. 348.

was 99.85 percent based on fusion.[55] A PNE is essentially a nuclear weapon used for another purpose.

A declassified August 2000 CIA report stated that, "Judging from Russian writing since 1995 and Moscow's evolving nuclear doctrine, new roles are emerging for very-low yield weapons—including weapons for tailored radiation outputs…"[56] Tailored radiation outputs refer to a variety of low-collateral damage nuclear weapons concepts which either enhance or suppress certain nuclear effects. A well-known example of this is the "neutron bomb" or enhanced radiation weapon.[57] All such U.S. weapons were eliminated as part of U.S. compliance with the Presidential Nuclear Initiatives of 1991-1992.

Viktor Mikhaylov noted Russian development of high-precision and deep-penetration nuclear weapons, stating that Moscow was ahead of the United States in these weapons.[58] Deep penetration enhances the effectiveness against underground facilities and deep penetration with low-yield warheads reduces collateral damage from nuclear weapon detonations. Mikhaylov declared that Russia had "*thermonuclear*" (i.e., fission-fusion) weapons yielding "*hundreds of tons*."[59] This is quite a technical accomplishment and he said this about 20 years ago. As mentioned in Chapter 2, he also said, "The scientists are

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[55] "About Snezhinsk," *CNCP.ru*, April 2013, available at http://www.cncp.ru/new_site/ng/participants/snezhinsk/snezinsk1.shtml.

[56] Quoted in Schneider, "The Future of the U.S. Nuclear Deterrent," op. cit., p. 348.

[57] Samuel T. Cohen, "Whither the Neutron Bomb? A Moral Defense of Nuclear Radiation Weapons," *Parameters*, Vol. 11, No. 1 (1981), available at https://press.armywarcollege.edu/cgi/viewcontent.cgi?article=1242&context=parameters.

[58] Quoted in Schneider, *The Nuclear Forces and Doctrine of the Russian Federation*, op. cit., pp. 15-16.

[59] Quoted in Schneider, "The Future of the U.S. Nuclear Deterrent," op. cit., p. 348. (Emphasis added.)

developing a nuclear 'scalpel' capable of 'surgically removing' and destroying very localized targets. The low-yield warhead will be surrounded with a superhardened casing which makes it possible to penetrate 30–40 meters into rock and destroy a buried target—for example, a troop command and control point or a nuclear munitions storage facility."[60] Penetrating 40 meters into rock is no mean accomplishment.

All low-yield nuclear weapons, particularly low sub-kiloton weapons, produce substantially less collateral damage than high-yield weapons, even if low-yield weapons are ground burst which maximizes fallout. Even high-yield weapons, if detonated above a certain altitude *in the right weather conditions* (i.e., avoiding "rainout"), produce no significant fallout.[61] Most of what circulates in the press concerning the effects of nuclear weapons, if used in a battlefield context against Ukraine, are inaccurate assertions that tactical nuclear weapons use would not be decisive tactically. (This stands in stark contrast to the usual apocalyptic treatment of nuclear weapons.) Comparing nuclear and conventional weapons kiloton by kiloton is misleading because the main kill mechanism in low-yield nuclear weapons is not blast but rather prompt radiation, particularly neutron flux against which field fortifications and tank armor is not effective.[62] The neutron bomb, or enhanced radiation nuclear weapon, reportedly generates high energy neutrons and "The blast would be confined to a radius of no more than a couple of hundred metres but a massive wave of radiation would knock out tank crews,

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[60] Loc. cit.

[61] James Ragland and Adam Lowther, "America Isn't Ready for Russia's Battlefield Nuclear Weapons," *19FortyFive.com*, February 1, 2022, available at https://www.19fortyfive.com/2022/02/america-isnt-ready-for-russias-battlefield-nuclear-weapons/.

[62] "Neutron Bomb," *Britannica.com*, no date, available at https://www.britannica.com/technology/neutron-bomb.

infantry and other personnel."[63] The high energy neutrons generated by a neutron bomb reduce collateral damage while increasing military effect.

As Adam Lowther, James Petrosky, James Ragland, and Robyn Hutchins have written, "China and Russia know and understand nuclear weapon effects well and are developing the very weapons needed to destroy targets without creating long-term radiological disasters."[64] In many instances, these weapons are also militarily more effective than a fission weapon with the same yield. Samuel Cohen, inventor of the U.S. enhanced radiation weapon, the "neutron bomb," pointed out that 85 percent of the energy from fission is released by blast compared to 20 percent from fusion, and fusion produces "no direct radioactivity."[65] He noted that this allows attacks on military forces with much reduced destruction of civilian housing resulting in far fewer collateral casualties. The prompt burst of high energy fusion neutrons is much more militarily effective than conventional weapons of the same power and produces much less collateral damage than fission weapons with the same yield.[66] However, even low-yield fission weapons are much more effective than conventional weapons against troops in field fortifications.

It is important to keep in mind that the United States apparently has *zero* weapons that combine low-yield and low-fission content, and this will not change under current policy. Washington has no ability to brandish in-kind retaliation against such weapons.

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[63] "Neutron Bomb: Why 'Clean' is Deadly," *BBC*, July 15, 1999, available at http://news.bbc.co.uk/2/hi/science/nature/395689.stm.

[64] Adam Lowther, James Petrosky, James Ragland, and Robyn Hutchins, "Just How Radioactive Are Low-Yield Nuclear Weapons?" *The Drive*, December 19, 2022, available at https://www.thedrive.com/the-war-zone/just-how-radioactive-are-low-yield-nuclear-weapons.

[65] Cohen, "Whither the Neutron Bomb?," op. cit., p. 22.

[66] Ibid., pp. 21-22.

How Many Non-Strategic Nuclear Weapons Does Russia Have?

All estimates of Russian non-strategic nuclear weapons give Russia a large numerical advantage. Typically, this is reported as 10-to-one.[67] The United States reportedly has 200-230 tactical nuclear B-61 bombs.[68] The most common Western estimate of Russian non-strategic nuclear weapons is about 2,000 which, when compared to the U.S. non-strategic arsenal, gives Russia the roughly 10-to-one advantage.[69] Other estimates of Russian numbers range much higher. For example, one expert noted, "… Russian theater nuclear forces outnumber those of the United States

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[67] "Obama Advisor Gary Samore: 'The Ball is Very Much in Tehran's Court,'" *Radio Free Europe/Radio Liberty*, April 14, 2011, available at http://www.rferl.org/content/interviewsamore_russia_iran_us_policy/3557326.html; "ICYMI: In the wake of Russia's Invasion, the US must Refocus on Nuclear Deterrence," *Office of Congressman Doug Lamborn*, March 9, 2022, available at https://lamborn.house.gov/media/press-releases/icymi-wake-russia-s-invasion-us-must-refocus-nuclear-deterrence; and, Harry Kemble, "Vlad's Russia will Crush Britain's POWERLESS Army, Warns Top General," *The Daily Star*, September 17, 2016, available at https://www.dailystar.co.uk/news/latest-news/britain-army-russia-vladimir-putin-17119316.

[68] Loc. cit.; and, Hans M. Kristensen and Matt Korda, "United States Nuclear Weapons, 2021," *Bulletin of the Atomic Scientists*, Vol. 77, No. 1 (2021), p. 44.

[69] "ICYMI: In the wake of Russia's Invasion, the US Must Refocus on Nuclear Deterrence," op. cit.: Brent M. Eastwood, "Why NATO Can't Match Russia's 2,000 Tactical Nuclear Weapons," *19FortyFive.com*, February 9, 2022, available at https://www.19fortyfive.com/2022/02/why-nato-cant-match-russias-2000-tactical-nuclear-weapons/; and, Chris Gordon, "US Nuclear Posture Unchanged Despite 'Concerning' Russian Threats, Officials Say," *AirandSpaceForces.com*, Oct. 3, 2022, available at https://www.airandspaceforces.com/us-nuclear-posture-unchanged-despite-concerning-russian-threats-officials-say/.

by at least 10 to 1 or as much as 25 to 1."[70] The mathematics suggests about 5,000 Russian theater nuclear warheads for the 25-to-one comparison.

As discussed in Chapter 4, there are many treaty noncompliance issues involving Russian non-strategic nuclear weapons. These are: 1) the New START Treaty cruise missiles discussed above; 2) the Presidential Nuclear Initiatives violations; and, 3) Russian INF Treaty violations.[71] It is possible that the legacy of the Kissinger edict that all findings on compliance must be made by the NSC may still be impacting U.S. government assessments of Russian numbers because, as a matter of policy, intelligence agencies cannot publicly report facts that would establish a Russian arms control violation without NSC approval.

Since 2017, U.S. government estimates of the number of Russian non-strategic nuclear weapons numbers have hovered around 2,000, with indications that the number was increasing.[72] However, the numbers released annually, with the exception of a 2022 suggestion by Admiral Richard that Russia has *more than* 2,000 non-strategic nuclear

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[70] Peter Huessy, "What is Russia's Long-Term Tactical Nuclear Strategy?," *Warrior Maven*, April 5, 2023, available at https://warriormaven.com/global-security/russia-long-term-tactical-nuclear-strategy.

[71] U.S. Department of State, *Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments*, 2020, op. cit., pp. 12-13, 24; and, U.S. Department of State, *Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments*, 2022, op. cit., p. 10.

[72] U.S. Department of Defense, *2022 Nuclear Posture Review* (Washington, D.C.: Department of Defense, 2022), p. 4, available at https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF; U.S. Department of Defense, *Nuclear Posture Review*, 2018, op. cit., p. 53; Cotton, *Statement of Anthony J. Cotton*, op. cit., p. 8; and, DIA, *Russia Military Power*, op. cit., p. 31.

weapons,[73] do not register an increase above 2,000. The 2,000 number could well be a byproduct of Russian disinformation designed to minimize the appearance of Russian numbers and thereby avoid pressure to reduce the number of Russian non-strategic nuclear weapons or to limit them by an arms control agreement as the Trump Administration attempted to do. According to the 2017 DIA report on *Russia Military Power*, "Russia continues to emphasize…denial and deception as part of its approach to all aspects of warfare…"[74]

There are Russian press estimates of Moscow's non-strategic nuclear weapons numbers that are much higher than the usual 2,000 count that is common in the West. In 2005, Colonel General (ret.) Leonid Ivashov stated, "US experts think that Russia has 18,000-19,000 tactical nuclear charges…"[75] The formulation he used—attributing the numbers to Western sources—could be linked to Russian classification rules regarding Russia's tactical nuclear weapons numbers. A 2012 Carnegie publication by Igor Ivanov, Wolfgang Ischinger and former Senator Sam Nunn said, "Russia has an estimated 3,700–5,400 nonstrategic nuclear warheads, of which some 2,000 are deliverable."[76] Also noteworthy is Colonel General Viktor Yesin's 2011

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[73] Admiral Richard said that the Russians had over 2,000 nuclear weapons not subject to New START limitation. At the time of this statement, these weapons would necessarily have been non-strategic. Charles Richard, "2022 Space and Missile Defense Symposium," *Stratcom.mil*, August 11, 2022, available at https://www.stratcom.mil/Media/Speeches/Article/3126694/2022-space-and-missile-defense-symposium/.

[74] DIA, *Russia Military Power*, op. cit., p. 32.

[75] "Russian Experts Divided Over Senator Nunn's Tactical Nuclear Weapons Control Initiative," op. cit.

[76] Igor Ivanov, Wolfgang Ischinger, and former Senator Sam Nunn, *Addressing Nonstrategic Nuclear Forces* (Washington, D.C.: Carnegie Endowment for International Peace, February 3, 2012), p. 2, available at https://carnegieendowment.org/files/WGP_AddressingNSNW_FINAL.pdf.

statement that estimates for Russian non-strategic nuclear weapons range from "tens of thousands to 4,000 - 4,500."[77] Note that U.S. Defense Department officials were saying 2,000-4,000 weapons in this time period.[78] Moreover, in 2009, the U.S. bipartisan Congressional Strategic Posture Commission observed that, "Senior Russian experts have reported that Russia has 3,800 operational tactical nuclear warheads with a large additional number in reserve."[79] Indeed, in October 2020, Pavel Felgenhauer said that, "…assessments range between several thousand and over 10,000."[80]

In 2011, Major General Vladimir Dvorkin, former chief of the Russian Defense Ministry's 4th Central Research and Development Institute, called for the *unilateral reduction* of Russian non-strategic nuclear weapons, starting with Russian missile and air defense weapons so that, "…Russia and the US would have roughly an equal number of nuclear warheads on deployed and non-deployed strategic and

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[77] "Moscow, Washington Must Demonstrate Openness Regarding Nuclear Potentials – Expert," op. cit.

[78] Madelyn Creedon and Andrew Weber, "Joint Statement for the Record" (Washington, D.C.: Senate Armed Services Committee, March 28, 2012), p. 3, available at https://www.armed-services.senate.gov/imo/media/doc/Creedon-Weber%2003-28-121.pdf; and, James Miller, as quoted in, U.S. House of Representatives, *The Current Status and Future Direction for U.S. Nuclear Weapons Policy and Posture* (Washington, D.C.: Armed Services Committee, Subcommittee on Strategic Forces, November 2, 2011), available at https://www.govinfo.gov/content/pkg/CHRG-112hhrg71527/html/CHRG-112hhrg71527.htm.

[79] Strategic Posture Commission, *America's Strategic Posture -The Final Report of the Congressional Commission on the Strategic Posture of the United States*, op. cit., p. 15.

[80] Pavel Felgenhauer, "Kremlin Overrules Own Defense and Foreign Policy Establishment on Arms Control," *Eurasia Daily Monitor*, Vol. 17, No. 149 (October 22, 2020), available at https://jamestown.org/program/kremlin-overrules-own-defense-and-foreign-policy-establishment-on-arms-control/.

tactical delivery vehicles - about 5,000 to 6,000."[81] This suggests his belief that the Russian non-strategic nuclear stockpile was much larger than even the high end of U.S. government estimates in 2011-2012, i.e., 4,000. Calling for *unilateral* reductions in Russian nuclear weapons is *not* a common occurrence among Russian generals. Major General Dvorkin would not likely have made this statement if it hadn't been necessary to advance his proposal for an agreement limiting the United States and Russia to 5,000-6,000 total strategic and non-strategic nuclear weapons.

Where did the common 2,000 number come from? It is at the low end of the Obama Administration's estimates (2,000-4,000) made public in 2011 and 2012. A 2017 DIA publication *Russia Military Power* actually referenced two sources for the 2,000 number: Dr. Igor Sutyagin, then a fellow at the Royal United Services Institute, and Alexei Arbatov.[82] In both cases, the DIA report did not accurately relate what these two sources actually stated about Russian numbers.

Dr. Sutyagin is a Russian expatriate. His paper referenced in DIA's *Russia Military Power* reflects considerable research and contains much useful information concerning Soviet-era nuclear weapons allocation. However, his analysis appears to be flawed. Most of his numbers do not involve the total Russian nuclear inventory or even active and inactive weapons, but rather *Soviet* nuclear weapons allocation policy.

Dr. Sutyagin claimed to have developed a "new, replicable methodology" for estimating the number of Russian non-strategic nuclear weapons numbers which are based upon "'assignment rules' for nuclear-capable

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[81] "Russian Pundit Argues for Unilateral Tactical Nuclear Weapons Cuts," *BBC Monitoring Former Soviet Union/Interfax-AVN*, April 27, 2011, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=39829322.

[82] DIA, *Russia Military Power*, op. cit., pp. 31, 96.

elements of Russia's land, sea, air and air-defence forces."[83] He said "…Russia maintains a stockpile of approximately 2,000 operationally assigned non-strategic nuclear weapons."[84] *Assignment rules are not the same as inventory levels or, indeed, even active inventory*. What he appears to be describing is the *initial allocation* of non-strategic nuclear weapons to Russian military forces in the event of war or an intense crisis.

Assignment rules reflect both an assessment of requirements and the availability of nuclear weapons. The numbers he generated appear hypothetical and based upon the assumption that procurement decisions are based upon (and, indeed, limited by) *Soviet* assignment rules applied to the 2012 Russian order of battle. This was certainly not the case during the Soviet period when weapons numbers were expanded beyond any reasonable basis. The Soviet Union hardly needed 45,000 *total* nuclear weapons or 20,000 or more non-strategic nuclear weapons.

Dr. Sutyagin argued that his methodology produces the same result if applied to Russia's claimed "…75 percent decrease in Russia's total NSNW [non-strategic nuclear weapons] arsenal between 1991 and 2005."[85] This is *not* the case because his numbers do not relate to the total Soviet inventory as the official Russian statements do. (As will be discussed below, a 75 percent reduction in Russian non-strategic nuclear weapons from Soviet levels results in a much higher number than Dr. Sutyagin's 2,000.) He continued, "The study's conclusion also suggests that Russia may possess a reserve stockpile of approximately 900 NSNW that cannot immediately contribute to a short-

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[83] Igor Sutyagin, *Atomic Accounting: A New Estimate of Russia's Non-Strategic Nuclear Forces* (London: Royal United Services Institute, November 2012), Occasional Paper, p. 2, available at https://static.rusi.org/201211_op_atomic_accounting.pdf.

[84] Loc. cit.

[85] Loc. cit.

notice nuclear exchange, but nor are they awaiting dismantlement."[86] Add this to his "2,000 operationally assigned non-strategic nuclear weapons" and the number adds up to 2,900.[87] *Despite the differing categorizations of these weapons, Dr. Sutyagin's own 2012 paper cited in the DIA report does not support the DIA's estimate of about 2,000 presented in that report* – the number that remains the standard in most Western estimates.

Dr. Sutyagin did not footnote his numbers because this information apparently does not exist in open sources and his numbers appear to be largely hypothetical. He stated he was an "air-defence officer in the Soviet armed forces," and that he "draws heavily upon both the personal experiences and knowledge…"[88] There is no indication he achieved senior rank or served for more than a relatively short time in the Soviet military. He was jailed in Russia for 11 years as a spy[89] (apparently with no basis in fact). *This was the very period in which Putin's nuclear doctrine was developed and implemented. This was also the period in which Putin initiated the use of nuclear threats to advance his imperial agenda.* Sutyagin's personal recollections of the Soviet period would have to be over 20 years old in 2012, reducing the relevance of his speculation about Russian force numbers. While the

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[86] Ibid., p. 4.

[87] In the same year Dr. Sutyagin reportedly "estimated the operational force to be 860–1,040 sub-strategic nuclear warheads, with some 900 additional warheads in service but not operationally assigned." See, Jakob Hedenskog and Carolina Vendil Pallin, eds., *Russian Military Capability in a Ten-Year Perspective – 2013* (Stockholm, SW: Swedish Defense Research Agency, December 2013), p. 35, available at https://www.academia.edu/5474413/Russian_Military_Capability_in_a_Ten_Year_Perspective_2013.

[88] Sutyagin, *Atomic Accounting*, op. cit., p. 7 of PDF.

[89] Ian Black, "Igor Sutyagin is Odd Man Out in Spy Swap Deal," *The Guardian*, August 17, 2010, available at https://www.theguardian.com/world/2010/aug/17/igor-sutyagin-spy-swap.

Soviet legacy is still important in Russia, President Putin has introduced changes in nuclear doctrine that give much greater emphasis to low-yield weapons. If Moscow's military damage requirements remain the same, it likely requires substantially greater nuclear force numbers because low-yield weapons individually have potentially lower lethality against military targets compared to higher-yield nuclear weapons.

Dr. Sutyagin wrote that, "The current NSNW stockpile is only one tenth of that of the Soviet Union at the end of the Cold War, and has declined by around 50 per cent even in the last seven years. These trends parallel the deep reductions in the number of US NSNW warheads over the same period."[90] Again, there is no source for this conclusion. One would *not* expect comparable reductions in NSNWs by Russia because its nuclear doctrine is completely different from that of the United States. In the same year that Dr. Sutyagin published his paper (2012), the U.S. National Intelligence Council stated, "Reducing the role of nuclear weapons in US security strategy is a US objective, while Russia is pursuing new concepts and capabilities for expanding the role of nuclear weapons in its security strategy."[91]

Russia has never claimed more than a 75 percent reduction in non-strategic nuclear weapons from the Soviet Cold War level and Russia reiterated this claim as recently as October 2022.[92] Dr. Sutyagin's calculations are *not* based

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[90] Loc. cit.

[91] National Intelligence Council, *Global Trends 2030: Alternative Worlds* (Washington, D.C.: Director of National Intelligence, December 2012), p. 69, available at http://www.dni.gov/files/documents/GlobalTrends_2030.pdf.

[92] "Statement by Mr. Andrey Belousov, Deputy Head of the Delegation of the Russian Federation at the Tenth Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (Cluster I, Nuclear Disarmament)," Ministry of Foreign Affairs, Russian Federation, August 5, 2022, available at

upon the entire size of the late Soviet non-strategic nuclear stockpile (for which we have good sources), but on "operationally assigned non-strategic nuclear weapons."[93] What he is calculating apparently is the *initial allocation of nuclear weapons to Russian military forces under Soviet policy.* He presents interesting history about Soviet warhead allocation, but the relevance of this information is limited in present day Russia. Dr. Sutyagin must be aware that by the late Soviet period, the total Soviet inventory was vastly in excess of what was required for initial nuclear warhead allocations or even Soviet-style nuclear warfighting.

As noted above, the DIA's *Russia Military Power* also footnoted Alexei Arbatov as a source for its conclusion that Russia had 2,000 non-strategic nuclear weapons. Arbatov's numbers date from 2011-2013 and, as is the case with reference to Sutyagin's work, they don't add up to 2,000 weapons. He wrote that Russia has an:

> …active stockpile of approximately 2,000 NSNW… These include about 650 tactical nuclear air-to-surface missiles and gravity bombs for 120 Tu-22M3 medium-range bombers and 400 Su-24, Su-27IB and Su-34 tactical bombers. In addition, there are about 240 air-to-surface missiles, gravity bombs, and depth charges of the naval aviation comprising 60 Tu-22M3, 60 Su-24, and 60 Il-38 aircraft. More than 530 NSNW are anti-ship, anti-submarine, and anti-aircraft missiles and torpedoes of surface ships and submarines, including up to 240 nuclear long-range SLCMs of

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https://www.mid.ru/ru/foreign_policy/international_safety/1825306/?lang=en; and, "Statement by Deputy Head of the Russian Delegation Mr. Konstantin Vorontsov in the First Committee of the 77th Session of the UNGA at the Thematic Discussion on Nuclear Weapons," Permanent Mission of the Russian Federation to the United Nations, October 17, 2023, available at https://russiaun.ru/en/news/171022_v.

[93] Sutyagin, *Atomic Accounting*, op. cit., p. 2.

> attack submarines. Allegedly, an estimated 630 munitions are assigned to S-300/400 surface to-air and other air defense missile systems. In addition, another 3,400 weapons may be stored as a reserve inventory.[94]

Arbatov's numbers total 2,290. Some 2,290 active nuclear weapons plus a 3,400 warhead reserve inventory adds up to 5,690. Moreover, Arbatov appears not to have included in his count Russian non-strategic warheads that he likely knew violated Russia's arms control commitments. For example, the retention of nuclear artillery shells was contrary to Russian commitments in the Presidential Nuclear Initiatives of 1991-1992,[95] and he did not count any. (This is potentially important because at a seminar held just before the inauguration of President Barack Obama at which this author delivered a paper on Russian nuclear forces, Colonel General [ret.] Viktor Yesin stated that Russia had 1,200 nuclear artillery rounds.) Moreover, Arbatov made contradictory statements in the same time period concerning Russian numbers. In October 2013, Arbatov wrote that estimates of the Russian inventory of non-strategic nuclear weapons range "…from 2,000 to 3,000 *operationally* deployed nuclear weapons, a considerable segment of which can also hit targets in regions adjoining Russia."[96] "Operationally deployed" is *not* the entire

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[94] Alexei Arbatov, "A Russian Perspective on the Challenge of U.S., NATO, and Russian Non-Strategic Nuclear Weapons," chapter in, Steve Andreasen and Isabelle Williams, *Reducing Nuclear Risks in Europe: A Framework for Action* (Washington, D.C.: Nuclear Threat Initiative, 2011), p. 160, available at https://media.nti.org/pdfs/NTI_Framework_full_report.pdf.

[95] Sutyagin, *Atomic Accounting*, op. cit., p. 55; and, "Arbatov Proposes Ways to Implement Tactical Nuclear Weapons Reductions," *Nezavisimoye Voyennoye Obozreniye Online*, May 20, 2011, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=39918974.

[96] "Russia: Arbatov Stresses Negative Consequences of INF Withdrawal for Russia, Disarmament Process," *Nezavisimoye Voyennoye Obozreniye*

Russian inventory; it does not count the weapons in Russian "central" or "national" storage facilities.

In 2009, *ITAR-TASS* reported that Russia probably had 15,000-to-17,000 total nuclear warheads.[97] It did not break down the numbers between strategic and non-strategic nuclear weapons, but such a high estimate implies at least 10,000 or more Russian non-strategic nuclear weapons.

In 2011, Marcel H. Van Herpen, Director of the Cicero Foundation in Paris, concluded that with Putin's new emphasis on tactical nuclear weapons and his "escalate to de-escalate" strategy, Russia could have a much larger tactical nuclear stockpile than even the current high estimates. Using a high estimate of the Soviet Cold War stockpile of tactical nuclear weapons (25,000), he calculated that "… there would still remain 17,000 tactical nuclear warheads in Russia after *the implementation of the PNI*. Additionally, if one would take into account the fact that an unknown portion of warheads included in the PNI had not been destroyed, but centrally stored, then the total number of remaining warheads could still be even higher."[98] While 17,000 non-strategic nuclear weapons probably is too high a number, it is clear that the announced Russian PNI reductions were designed to allow the retention of a very large stockpile while pretending to make large reductions,

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Online, August 2, 2013. (Emphasis added.) Available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=38337431.

[97] "New RF-US Agt To Replace START To Be Concluded Before Year End-FM," *ITAR-TASS*, September 3, 2009, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=32434266.

[98] Marcel H. Van Herpen, *Russia's Embrace of Tactical Nuclear Weapons: Its Negative Impact on U.S. Proposals for Nuclear Arms Reductions* (Maastricht, NE: Cicero Foundation, September 2011) Great Debate Paper, No. 11/04. (Emphasis in original.) Available at https://cicerofoundation.marcbijl.nl/wp-content/uploads/Marcel_H_Van_Herpen_RUSSIA_EMBRACE_OF_TACTICAL_NUCLEAR_WEAPONS.pdf.

and that Russia violated these commitments, particularly with regard to tactical nuclear weapons.[99]

Russia's claimed 75 percent reduction in non-strategic nuclear weapons from the end of the Cold War level is interesting because it has not changed since 2005.[100] This claimed reduction has been made repeatedly in the context of Nuclear Non-Proliferation Treaty (NPT) Review Conferences where there is an incentive to maximize the perception of Russian nuclear weapons reductions, not minimize them. (Indeed, during the August 2022 NPT Review Conference, Russia refrained from making nuclear threats). Because of Viktor Mikhaylov's revelation of a peak of 45,000 Soviet nuclear weapons (which was in 1986), a reasonable estimate of the number of Soviet non-strategic nuclear weapons at the end of the Cold War is possible. Correspondingly, since Mikhaylov's revelation, various public estimates were similar: 20,000-22,000;[101] 22,000;[102]

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[99] U.S. Department of State, *Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments*, 2020, op. cit., p. 24.

[100] Hans M. Kristensen, "Non-Strategic Nuclear Weapons," *Bulletin of the Atomic Scientists*, Vol. 68, Iss. 5 (2012), p. 98.

[101] Dmitry Sudakov, "Russia takes Complete Advantage of Castrated Armed Forces of the West," *Pravda.ru*, November 13, 2014, available at https://english.pravda.ru/russia/129021-russia_usa_nuclear_weapons/.

[102] Arbatov,"A Russian Perspective on the Challenge of U.S., NATO, and Russian Non-Strategic Nuclear Weapons," op. cit., 159; Guy Faulconbridge, "Explainer: What are tactical nuclear weapons and what is Russia's policy?" *Reuters*, March 27, 2023, available at https://www.reuters.com/world/europe/what-are-tactical-nuclear-weapons-what-is-russias-policy-2023-03-25/; Graham Allison, *What Happened to the Soviet Superpower's Nuclear Arsenal? Clues for the Nuclear Security Summit* (Cambridge, MA: Harvard Belfer Center for Science and International Affairs, March 2012), p. 12, available at https://www.belfercenter.org/sites/default/files/legacy/files/3%2014%2012%20Final%20What%20Happened%20to%20Soviet%20Arsenals.pdf; Alexei Arbatov, "Deep Cuts and De-alerting: A Russian Perspective," in Harold Feiveson, ed., *The Nuclear Turning Point: A*

and 23,000.[103] These numbers reflected a reduction from the peak Soviet 1986 number. By then, the Soviets were under economic pressure and their arsenal had grown extraordinarily large. Even the low end of those estimates, 20,000 non-strategic nuclear weapons warheads, if reduced by 75 percent, results in a residual force of 5,000 warheads. Indeed, this is the same number that *Pravda.ru* reported in 2014: "Russia, *according to conservative estimates*, has 5,000 pieces of different classes of TNW [tactical nuclear weapons]—from Iskander warheads to torpedo, aerial and artillery warheads!"[104] A year before the Russians first claimed a 75 percent reduction in non-strategic nuclear weapons, the Center for Arms Control, Energy and Environmental Studies of the Moscow Institute of Physics and Technology reported that Russia had 3,300 to 5,700 operational tactical nuclear weapons, plus up to 10,000 in central storage.[105]

In December 2017, Dr. Philip Karber, President of the Potomac Foundation, stated that roughly half of Russia's

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Blueprint for Deep Cuts and De-Alerting of Nuclear Weapons (Washington, D.C.: Brookings Institution, 1999), p. 320; and, Alexei Arbatov and Vladimir Dvorkin, translated by Natalia Bubnova, *Nuclear Reset: Arms Reduction and Nonproliferation* (Moscow: Carnegie Endowment for International Peace, Carnegie Moscow Center, 2012), p. 208, available at https://carnegieendowment.org/files/nuclear_reset_Book2012_web.pdf.

[103] Mark Landler, "U.S. Resists Push by Allies For Tactical Nuclear Cuts," *The New York Times*, April 22, 2010, available at https://www.nytimes.com/2010/04/23/world/europe/23diplo.html.

[104] Dmitry Sudakov, "Russia Prepares Nuclear Surprise for NATO," *Pravda.ru*, November 12, 2014. (Emphasis added.) Available at https://english.pravda.ru/russia/129015-russia_nato_nuclear_surprise/.

[105] Anatoli Diakov, Eugene Miasnikov and Timur Kadyshev, *Non-Strategic Nuclear Weapons:Problems of Control and Reduction* (Moscow, Russia: Center for Arms Control, Energy and Environmental Studies, Moscow Institute of Physics and Technology, 2004), pp. 15, 17, available at http://armscontrol.ru/pubs/en/NSNW_en_v1b.pdf.

5,000 tactical nuclear weapons have been modernized with new sub-kiloton nuclear warheads for air defense, torpedoes and cruise missiles.[106] His source for this information is a very well-known and very well-connected Russian expert whose name cannot be revealed here because his presentation was under Chatham House rules, which preclude quoting a speaker by name. In a July 2023 report, Karber and Lt. General (ret.) T. Cadieu wrote, "Russia's current TNW [tactical nuclear weapon] inventory consists of 3,000 legacy warheads in long-term secure 'deep storage' and an 'active' posture of 2,050 modern warheads."[107] The modern warheads, which include nuclear artillery, have yields as low as 20 tons and include enhanced radiation weapons.[108]

In April 2023, journalist Stephen Fidler wrote in *The Wall Street Journal*, "Western estimates vary from fewer than 2,000 tactical weapons from Mr. Kristensen and colleagues to double or more that figure."[109] This is one of the few instances in which a major American publication recognized that the FAS numbers are subject to a major upward uncertainty. In May 2, 2021, Mark Episkopos, a national security reporter for *The National Interest*, wrote that, "At around 3,000 to 6,000 units, the Russian Federation possesses the largest tactical nuclear weapons stockpile in the world. These include not only warheads inherited from the Soviet Union but new and potent

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[106] "Russia, China, and the US: Challenges Yet to Come," *London School of Economics and Political Science*, December 11, 2017, available at https://www.lse.ac.uk/ideas/podcasts/karber.

[107] Karber and Cadieu, *Where Goest Ukraine & NATO Strategy?*, op. cit., p. 114.

[108] Ibid., p. 118.

[109] Stephen Fidler, "Why Russia's Tactical Nuclear Weapons Are Key to Its Defense Strategy." *The Wall Street Journal*, April 2, 2023, available at https://www.wsj.com/articles/why-russias-tactical-nuclear-weapons-are-key-to-its-defense-strategy-94c14116.

weapons systems developed in recent years."[110] A March 2021 report by the Congressional Research Service indicated that estimates of Russian non-strategic nuclear weapons ranged from 1,000 to 6,000.[111] The late Dr. Peter Pry stated that the range of uncertainty was between 2,000 and 8,000 weapons.[112]

Russia's retention of nuclear artillery in violation of Moscow's PNI commitment has a potentially significant impact on Russian numbers. The Soviets had nuclear artillery, including the small 152 mm shell.[113] Reports of Russian retention of nuclear artillery are commonplace in the Russian press.[114] In 2004, Russian *MTV* television showed a "new howitzer" that reportedly "could be used to fire low-yield nuclear bombs."[115] In 2010, 2011, 2012 and

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[110] Mark Episkopos, "Why Russia's 3,000 (Or More) Tactical Nuclear Weapons Should Terrify NATO," *The National Interest*, May 30, 2021, available at https://nationalinterest.org/blog/buzz/why-russias-3000-or-more-tactical-nuclear-weapons-should-terrify-nato-186558.

[111] Amy F. Woolf, *Nonstrategic Nuclear Weapons* (Washington, D.C.: Congressional Research Service, March 16, 2021), p. 2 of the PDF, available at https://crsreports.congress.gov/product/pdf/RL/RL32572/42.

[112] Peter Pry, "Russia Could Win World War III in Europe with EMP Nuclear Attack," *The Washington Times*, February 17, 2022, available at https://www.washingtontimes.com/news/2022/feb/17/russia-could-win-world-war-iii-in-europe-with-nucl/.

[113] U.S. Department of Defense, *Soviet Military Power 1983* (Washington, D.C.: U.S. Department of Defense, 1983), p. 40.

[114] "Russia's Severodvinsk Attack Sub to be Armed with New Cruise Missiles," op. cit.; and, Sudakov, "Russia prepares nuclear surprise for NATO," op. cit.

[115] "Russian TV shows howitzer capable of firing low-yield nuclear warheads," *BBC Monitoring Former Soviet Union/Russian NTV*, April 11, 2004, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/101EA4B9F4B4D19E; see also, "Russian Rocket Artillery Profiled," *BBC Monitoring Former Soviet Union*, June 27, 2004, available at

2013, Arbatov stated that the nuclear weapons of ground troops' artillery (and tactical missiles, and mines) still existed.[116] In 2013, former head of the Sarov nuclear weapons laboratory Academician Yevgeniy Avrorin stated that the 152 mm one-kiloton nuclear shell was "widely deployed" with the Russian Army.[117] In August 2016, international security and military journalist Sebastien Roblin, writing in *The National Interest*, stated that a nuclear shell for the Russian 240-mm mortar exists.[118] In 2019, then Assistant Secretary of Defense Dr. James H. Anderson said Russia had nuclear artillery shells.[119] In 2021, Pavel Felgenhauer wrote, "Russia has retained its nonstrategic nuclear arsenal. In the last two decades, it has been expanding it by deploying nuclear field artillery, different land, air and sea-based missiles, nuclear torpedoes and other weapons."[120] In 2021, he also reported the continued

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https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/1037FE975D3C5341.

[116] "Russia: US Proposes Tac Nuc Weapons Reduction Talks After Conclusion of START," *Gazeta.ru,* February 4, 2010, available at https://wnc-eastview-com.mutex.gmu.edu/wnc/article?id=32017474; "Moscow, Washington Must Demonstrate Openness Regarding Nuclear Potentials – Expert," op. cit.; and, "Russia: Arbatov Stresses Negative Consequences of INF Withdrawal for Russia, Disarmament Process," op. cit.

[117] Академик Евгений Николаевич Аврорин: «Наука — это то, что можно сделать, а техническая наука — это то, что нужно сделать»," *Atomic-Energy.ru*, April 10, 2013, available at http://www.atomic-energy.ru/interviews/2013/04/10/41068. (In Russian).

[118] Sebastien Roblin, "The Russian Army's Super 'Gun' Is a City Destroyer," *The National Interest,* August 20, 2016, available at https://nationalinterest.org/feature/the-russian-armys-super-gun-city-destroyer-17416.

[119] Ashley, "Russian and Chinese Nuclear Modernization Trends," op. cit.

[120] Pavel Felgenhauer, "Moscow in Confrontational Mode Reacting to Biden's Inauguration," *Eurasia Daily Monitor*, Vol. 18, Iss.11 (January 21, 2021), available at https://jamestown.org/program/moscow-in-confrontational-mode-reacting-to-bidens-inauguration/.

availability of nuclear artillery to Russian forces deployed near Ukraine. [121]

Nuclear artillery is relatively cheap because it is unnecessary to buy expensive dedicated delivery vehicles for these weapons. Its effectiveness also does not depend upon the covert and illegal acquisition of U.S. computer chips. Russia can build essentially any number of these that it wants. It is noteworthy that at the end of the Cold War even the United States had 1,300 nuclear artillery shells.[122] Today, the United States has zero, in accord with Washington's PNI commitments.

Russia probably is at the beginning stage of a large expansion of its non-strategic nuclear weapons, including for its missile defense systems—which are nuclear-armed. Russia is beginning the deployment of the S-500 Surface-to-Air Missile (SAM) system which will have a major mission of defense against strategic ballistic missiles.[123] Russian press articles regularly cite the S-500's purported capability to intercept ICBMs (in the terminal and midcourse phases)

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[121] Pavel Felgenhauer, "Tensions Escalate in Donbas and on Ukrainian Border," *Eurasia Daily Monitor*, Vol. 18, Iss. 57 (April 8, 2021), available at https://jamestown.org/program/tensions-escalate-in-donbas-and-on-ukrainian-border/.

[122] "President George Bush, The White House, Friday, September 27, 1991 – 8:00 p.m.," *White House*, Press Release, p. 2, available at https://www.esd.whs.mil/Portals/54/Documents/FOID/Reading%20Room/NCB/09-F-0134_President's_Initiative.pdf.

[123] Mark B. Schneider and Peter Huessy, "Russian Deployment of Missile Defenses Hidden in Plain Sight," *The Gatestone Institute*, February 18, 2013, available at http://www.gatestoneinstitute.org/3590/russia-missile-defense; and, Sakshi Tiwari, "Russia To Deploy S-500 'Prometheus' Air Defense Missiles To Defend Moscow As Ukrainian Strikes Become Frequent," *The EurAsian Times*, March 30, 2023, available at https://eurasiantimes.com/russia-to-defend-capital-moscow-with-s-500-prometheus-air-defense-missiles-as-ukrainian/.

as well as satellites and space-based weapons.[124] At least 10 battalions of S-500s reportedly are planned.[125] Russian air defense missile systems appear to have a nuclear surface-to-surface capability.[126] In the 2010 Vostok exercise, Russia reportedly simulated the use of a nuclear-armed S-300s against a ground target.[127] Russia apparently used conventionally armed S-300s against land targets in its war against Ukraine.[128]

While there are some reports that the S-500 will have hit-to-kill capability, this is unlikely with regard to strategic ballistic missiles. There are no reports of the extensive testing of the S-500 against very high-speed ballistic missiles which makes hit-to-kill very unlikely. It is much easier and cheaper to obtain a warhead kill with a very low-yield nuclear warhead.[129] In 2011, General Director of the Almaz-Antey corporation Igor Ashurbeili said that for the

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[124] Chuck Bartles, commentary and compilation, "The S-500 'Prometheus' Air and Missile Defense System is Coming!," *Foreign Military Studies Office, OE Watch*, Vol. 8, Iss. 11 (November 2018), pp. 6-7, available at https://community.apan.org/wg/tradoc-g2/fmso/p/oe-watch-issues.

[125] "Russia: Key directions of State Armaments Programme 2018-2027," *BBC Monitoring Former Soviet Union/Izvestia*, March 6, 2018, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/16A7A43CE853F598.

[126] Pavel Felgenhauer, "Russia Seeks to Impose New ABM Treaty on the US by Developing BMD," *Eurasia Daily Monitor*, Vol. 7, Iss. 136 (July 16, 2010), available at https://jamestown.org/program/russia-seeks-to-impose-new-abm-treaty-on-the-us-by-developing-bmd/.

[127] Loc. cit.

[128] Thomas Newdick, "Russia Now Firing S-300 Surface-To-Air Missiles At Land Targets In Ukraine: Official," *The Drive*, July 8, 2022, available at https://www.thedrive.com/the-war-zone/russia-now-firing-s-300-surface-to-air-missiles-at-land-targets-in-ukraine-official.

[129] Mark B. Schneider, *Russian Lies and Hypocrisy Concerning Missile Defense* (Fairfax, VA: National Institute for Public Policy, April 17, 2018), *Information Series*, Iss. 429, available at https://nipp.org/information_series/schneider-mark-russian-lies-and-hypocrisy-concerning-missile-defense-information-series-no-429/.

interception of ballistic missiles, the S-500 will "mostly" use nuclear warheads."[130] This could result in hundreds or even thousands of additional nuclear weapons if Russia replaces the S-400 system with the S-500 and reloads are taken into account.

Russia has announced the improved S-550 program but has provided no details. *TASS* reports it has passed State trials, is "an absolutely new and unrivalled mobile system of strategic missile defense" and is capable of "…hitting spacecraft, ballistic missile reentry vehicles and hypersonic targets at altitudes of tens of thousands of kilometers."[131] The "50" designator has been applied to improvements of older systems rather than items that are completely new. The claims about its role and capability are similar to those made for the S-500 although the intercept altitude appears implausible. *TASS* had previously reported a 2025 Initial Operational Capability (IOC), which is reasonable.[132] It seems likely that the S-550 is an improvement of the S-500 and may use low-yield nuclear warheads against strategic ballistic missiles.

Repeated statements by the Biden Administration concerning increased Russian emphasis on nuclear weapons in response to Ukraine war expenditures of conventional munitions suggest there may be a further expansion of Russian non-strategic nuclear weapons,

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[130] Pavel Felgenhauer, "Moscow's BMD Cooperation Demands Do Not Seem Serious," *Eurasia Daily Monitor*, Vol. 8, Iss. 111 (June 9, 2011), available at https://jamestown.org/program/moscows-bmd-cooperation-demands-do-not-seem-serious/.

[131] "First S-550 Air Defense Systems Enter Service in Russia — Source," *TASS*, December 28, 2021, available at https://tass.com/defense/1382133.

[132] "S-550, S-500 Systems to Jointly Defend Russia Against Hypersonic Targets – Source," *TASS,* November 21, 2021, available at https://tass.com/defense/1365397.

particularly low-yield nuclear weapons.[133] The official U.S. estimates of Russian non-strategic nuclear forces at 2,000 appear much too low. The irony is that the Biden Administration appears to believe Russian data about New START Treaty compliance, but does not believe Moscow's repeated statements about the size of its non-strategic weapons reductions and, hence, Russia's residual force. This juxtaposition in apparent Biden Administration beliefs is particularly ironic because Russia has greater motivation to misstate its New START Treaty data notifications than it does its reductions in non-strategic nuclear weapons. Five thousand or more Russian non-strategic nuclear weapons is a quite plausible number.

Conclusion

In May 2020, U.S. chief arms control negotiator Ambassador Marshall Billingslea stated, "Russia is modernizing an unconstrained arsenal of thousands of so-called non-strategic nuclear weapons that fall well outside the boundaries of the New START treaty, they're giving them greater accuracy, longer ranges, lower yields, all to fill various war fighting roles."[134]

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[133] The White House, *National Security Strategy* (Washington, D.C.: The White House, October 2022), p. 26, available at https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf; and, Office of the Director for National Intelligence, *Annual Threat Assessment of the U.S. Intelligence Community* (Washington, D.C.: DNI, February 6, 2023), pp. 12, 14, available at https://www.dni.gov/files/ODNI/documents/assessments/ATA-2023-Unclassified-Report.pdf.

[134] "Transcript: Special Presidential Envoy Marshall Billingslea on the Future of Nuclear Arms Control," Hudson Institute, May 22, 2020, available at https://www.hudson.org/national-security-defense/transcript-special-presidential-envoy-marshall-billingslea-on-the-future-of-nuclear-arms-control.

The Russian non-strategic nuclear weapons force reflects a fundamentally different view of the role of nuclear weapons, which Washington must take into account. As Sir Winston Churchill once observed, "No matter how enmeshed a commander becomes in the elaboration of his own thoughts, it is sometimes necessary to take the enemy into account."[135] The same is true with regard to deterrence strategy.

Russia has a major advantage in non-strategic nuclear weapons, probably much larger than what the Pentagon acknowledges publicly. At the lowest credible estimates, the Russian advantage is 10-to-one and at the high estimates it could be as much as 50-to-one. Russia clearly has enough nuclear weapon production capability to deploy and sustain even the highest estimate of its non-strategic nuclear weapons inventory. In 2019, then DIA Director Lt. General Robert P. Ashley observed that, "Russia has improved and expanded its production complex, which has the capacity to process thousands of warheads annually."[136]

The great Russian advantage in the diversity of its non-strategic nuclear weapons and the emergence of a Russian non-strategic nuclear Triad is troubling. The asymmetry in survivability may substantially degrade the U.S. deterrence position. The typical Western belief in "existential nuclear deterrence" (i.e., that the existence of virtually any U.S. nuclear capability essentially guarantees stable deterrence) is divorced from such mundane considerations as survivability, numbers, technical characteristics and the ability to penetrate advanced defenses. This popular view is dangerous; credible deterrence likely requires more than an undemanding

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[135] "Sir Winston Leonard Spencer Churchill Quotes," *Military Quotes*, available at https://www.military-quotes.com/churchill.htm.

[136] Ashley, "Russian and Chinese Nuclear Modernization Trends," op. cit.

"existential deterrent." As then Commander of U.S. Strategic Command General John Hyten observed, "If we do have to respond, we want to respond in kind and not further escalate the conflict out of control."[137] Thanks to the large asymmetry in non-strategic nuclear weapons in Russia's favor, the United States has no credible capability to do so in most scenarios. It cannot be overemphasized that a realistic appraisal of Russian non-strategic nuclear weapons is critical; such an appraisal likely leads directly to the conclusion that the United States and NATO have little capability to respond in kind to a Russian tactical nuclear attack. The implications of this reality should be deeply troubling.

[137] Amanda Macias, "Here's What the US should do if Russia Launches a Nuclear Attack, According to the Top American Nuclear Commander," *CNBC.com*, March 21, 2018, available at https://www.cnbc.com/2018/03/21/heres-what-us-should-do-if-russia-launched-nuclear-attack-gen-hyten.html.

Chapter 7
Summary and Conclusion

Russian nuclear warhead numbers matter. Warhead numbers shape: 1) what type of nuclear strategy and target coverage is possible; 2) the damage expectancy that can be achieved; and, 3) the ability to penetrate or saturate defenses. Equally important, estimates of Russian warhead numbers must shape U.S. deterrence policy considerations, how the United States defines its own standards of nuclear force adequacy, U.S. arms control considerations, and how the United States must prepare for the frequently threatened Russian nuclear employment. These are issues of monumental import, and they are all shaped by Russian warhead numbers and types, and Russian strategy. Yet, the usual public understanding of Russian warhead numbers, including among the supposed experts, and the few sources for that understanding produced by those experts, are wholly inadequate for an informed discussion. Because the public debate on these matters often has a profound impact on U.S. policies—and affects the general congressional understanding of these issues—the minimalist presentation of Russian force numbers and strategy goals frequently reflected in the public discussion must be corrected to the extent possible.

Since President Putin initiated his war of aggression against Ukraine backed by frequent nuclear threats, the issue of the scope of Russia's nuclear capabilities and the possibility that it will initiate the first use of nuclear weapons since World War II, has become a source of grave concern. Putin is certainly a 19th century imperialist.[1] More

[1] Jack Wang, "How Putin's Invasion of Ukraine Connects to 19th-century Russian Imperialism," *UChicago News*, The University of Chicago, March 7, 2022, available at

than any other current world leader, imperialism is central to his domestic and foreign policy objectives. Putin appears to live in an alternate reality resulting from his self-isolation from the rest of the world, as he surrounds himself with advisers and officials who feed his illusions.

Russian Nuclear Strategy and the First Use of Nuclear Weapons

As outlined in his June 2020 decree on nuclear deterrence, Putin's nuclear doctrine entails a threshold for the first use that is much lower than that of the Soviet Union during the Cold War. Conditions for Russian first use of nuclear weapons include: 1) a ballistic missile attack on Russia (launch before it is known whether the attack is nuclear); 2) a response to WMD use (an expansion of the previous formulation of chemical or biological weapons attack); 3) kinetic or cyberattacks on "critical governmental or military sites," the "disruption of which would undermine nuclear forces response actions"; and, 4) aggression against Russia that threatens the "very existence of the state."[2] In addition, the former Chief of the Russian General Staff and Deputy National Security Council Secretary General of the Army (ret.) Yuriy Baluyevskiy has stated that the "conditions for pre-emptive nuclear strikes…is contained in classified policy documents."[3]

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https://news.uchicago.edu/story/putin-invasion-ukraine-russian-empire-19th-century-imperialism-history.

[2] The President of the Russian Federation, "Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence," *MID.ru*, June 8, 2022, available at https://mid.ru/en/foreign_policy/international_safety/1434131/.

[3] "Russia Classifies Information on Pre-emptive Nuclear Strikes – Military," *BBC Monitoring Former Soviet Union/Interfax-AVN*, September 5, 2014, available at

Putin's actions and the language he signed into law in his nuclear deterrence decree have confirmed decades of ominous reports, government and private, regarding Russia's first-use nuclear strategy. Yet, despite Moscow's seemingly incessant explicit nuclear first-use threats, there are those—mainly in the Minimum Deterrence advocacy community—who still seem intent on minimizing or denying Russia's nuclear force advantages and arms control non-compliance, and downplaying or denying Russia's coercive "escalate to de-escalate" nuclear strategy. Their miscast narrative of now-obvious Russian realities seems purposefully obtuse, but it suits their arms control agenda—an agenda that appears more credible if Russia's nuclear capabilities and intentions are understated. In short, their seemingly rose-colored presentation of Russian nuclear capabilities and strategy appears in lockstep with their unwavering arms control activism.

For example, the May 2023 report issued by the Federation of American Scientists (FAS) appears to deny the dangerous implications of the thousands of Russian low-yield nuclear weapons and their relationship to Russia's "escalate to de-escalate" nuclear strategy.[4] It suggests that there has been no Russian "shift toward greater reliance on potential first use of nuclear weapons surrounding a potential low-yield 'escalate-to-deescalate' policy."[5] Amazingly, the FAS report inaccurately attributes this view to the 2018 *Nuclear Posture Review*. In fact, the 2018 *Nuclear Posture Review* said, "Russia's belief that limited nuclear first use, potentially including low-yield weapons, can provide such an advantage is based, in part, on Moscow's

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https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/15028002DA366B30.

[4] Hans M. Kristensen, Matt Korda, and Eliana Reynolds, "Russian Nuclear Weapons, 2023," *Bulletin of the Atomic Scientists*, Vol. 79, No. 3 (2023), p. 178.

[5] Loc. cit.

perception that its greater number and variety of non-strategic nuclear systems provide a coercive advantage in crises and at lower levels of conflict. Recent Russian statements on this evolving nuclear weapons doctrine appear to lower the threshold for Moscow's first-use of nuclear weapons."[6]

Russian nuclear weapons policy has two objectives: 1) to deter the effective use of U.S. conventional strike capabilities to counter Russian aggression via American fear of nuclear escalation; and, 2) to facilitate the actual employment of Russia's nuclear capabilities in a wide variety of circumstances, including nuclear first use, if necessary. Russia frequently engages in nuclear exercises involving the simulated first use of nuclear weapons and, since 2007, has made an increasing number and variety of nuclear threats.

No one knows if Putin will initiate the use of nuclear weapons in the Ukraine conflict. Still, Putin's isolation, paranoia, and ideological commitment to Russian imperialism and aggressiveness are dangerous. Boris Bondarev, a Russian diplomat who resigned in protest over Putin's invasion of Ukraine, says Putin has created a dangerous "fascist state" and if he defeats Ukraine he will go on to attack a NATO state.[7] Apparently Putin has embraced territorial expansion by war under the cover of nuclear threats. In 2015, he declared, "Fifty years ago, I learnt one rule in the streets of Leningrad: if the fight is

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[6] U.S. Department of Defense, *Nuclear Posture Review* (Washington, D.C.: U.S. Department of Defense, 2018), pp. xi-xii, available at https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF.

[7] Boris Bondarev, "The Sources of Russian Misconduct: A Diplomat Defects From the Kremlin," *Foreign Affairs*, October 17, 2022, available at https://www.foreignaffairs.com/russian-federation/sources-russia-misconduct-boris-bondarev.

inevitable, be the first to strike."[8] He is now applying this logic to nuclear warfare as he appears to operate in substantial detachment from reality concerning the nature of the world—at least as reality is defined in Western capitals. His Foreign Ministry is telling the world, "Now we are in the phase of a hot conflict with the United States."[9] According to the Kremlin's Deputy Chairman of the Russian National Security Council (and former President) Dmitri Medvedev, to defend Ukrainian territory seized by force, "…any Russian weapons, including strategic nuclear weapons and weapons based on new principles, could be used for such protection."[10] Hence, understanding the nuclear balance and Putin's perception of his nuclear strengths are national security issues of critical significance.

Credible Information on Russian Nuclear Weapons Capabilities

Since the end of the Cold War, Washington has provided the American people with a very limited amount of information concerning Russian nuclear capabilities that threaten the United States and its allies. This pattern was continued in the Biden Administration's 2022 *Nuclear Posture Review,* which provided much less information than that contained in the 2018 NPR. Furthermore, the Biden Administration took action to reduce the U.S**.** nuclear deterrent and presented arms control as "the most effective,

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[8] Vladimir Putin, "Meeting of the Valdai International Discussion Club," *Kremlin.ru*, October 22, 2015, available at http://en.kremlin.ru/events/president/news/50548.

[9] "Russia, US are in Hot Conflict Phase — Senior Diplomat," *TASS*, April 5, 2023, available at https://tass.com/politics/1599707.

[10] "Russia's Medvedev: New Regions can be Defended with Strategic Nuclear Weapons," *Reuters*, September 22, 2022, available at https://www.reuters.com/world/europe/russias-medvedev-strategic-nuclear-weapons-can-be-used-defend-new-regions-2022-09-22/.

durable and responsible path to reduce the role of nuclear weapons in our strategy and *prevent their use*."[11] To place such confidence in arms control to address the Russian nuclear threat is seemingly to ignore contemporary threat realities.

"Suspension" and Violation of the New START Treaty

Putin illegally suspended the New START Treaty in 2023 (including data notifications) after refusing, in 2022, the U.S. request to resume Treaty-required, on-site inspections that had not taken place since 2020. Based upon statements made by Russian Deputy Foreign Minister Sergei Ryabkov, "suspension" looks remarkably similar to termination. Ryabkov remarked about the increased likelihood of nuclear war[12] and set out impossible conditions for Moscow to even *consider* ending its suspension of the New START Treaty. He said, "Until the United States changes its behavior, until we see signs of common sense in what they are doing in relation to Ukraine ... we see no chance for the decision to suspend New START to be reviewed or re-examined."[13] Russia is asking for what amounts to a complete surrender to its imperial expansion as a condition

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[11] U.S. Department of Defense, *2022 Nuclear Posture Review* (Washington, D.C.: Department of Defense, October 2022), p. 16. (Emphasis added.) Available at https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF.

[12] "Russia says Risk of Nuclear Conflict at Highest Level in Decades," *Reuters*, March 22, 2023, available at https://www.reuters.com/world/europe/russia-says-risk-nuclear-conflict-highest-level-decades-2023-03-22/.

[13] "Russia will not Rejoin Nuclear Treaty Unless U.S. Changes Ukraine Stance - Deputy Foreign Minister," *Reuters*, March 1, 2023, available at https://www.reuters.com/world/europe/russia-will-not-rejoin-nuclear-treaty-unless-us-changes-ukraine-stance-deputy-2023-03-01/.

for complying with the New START Treaty. Ryabkov also said, "This [Treaty suspension] gave us additional possibilities to ensure our own security at a time when the Americans used or tried to use any channel, any window into our military world to collect extra information. That's not going to happen now."[14] New START Treaty on-site inspections have little or nothing to do with Putin's war against Ukraine beyond the political linkage Moscow has asserted. If Russia is still complying with the New START Treaty limits as it claims, there is no way that the New START Treaty's suspension would give Russia "additional possibilities to ensure our own security…" This suggests that Russia is not continuing to observe New START Treaty limits.

"Suspension" and Nuclear Warhead Upload of Russian Strategic Nuclear Missiles

It now appears that when Putin invaded Ukraine, he planned never to resume New START Treaty on-site inspections, which have not occurred for more than three years. Enough time has elapsed for Russia potentially to have uploaded all or nearly all of its strategic nuclear missiles to their optimum desired capability, while the United States is unlikely to know the extent of that uploading. The desired Russian force level may not be to the maximum possible warhead loadings, but it almost certainly would be much higher than the New START Treaty-limited force. Russian decisions concerning weapons loadings will certainly be determined by military goals, not simply achieving maximum possible numbers. Even if the covert uploading of Russian missiles started

[14] "Suspension of New START Opens Door for Russia to Ensure its own Security — Diplomat," *TASS*, April 4, 2023, available at https://tass.com/politics/1599453.

after Putin invaded Ukraine, a substantial segment of the Russian nuclear arsenal (particularly the mobile ICBM force and ballistic missile submarines) could have already been covertly uploaded—as Ryabkov has hinted.

The New START Treaty has a much degraded verification regime when compared to the original START Treaty. As its chief negotiator, former Under Secretary of State Rose Gottemoeller pointed out, "…we discarded the counting rules in favor of confirming declared warheads on the front of missiles *through reciprocal inspections*…"[15] Yet, for more than three years the United States has been unable to verify New START compliance. Absent its on-site inspection provision, the New START Treaty verification regime was actually less extensive than what was in the 1972 SALT I agreement and "fatally flawed" SALT II Treaty. As a result of Moscow's "suspension" of the New START Treaty, the verification regime is *effectively gone.* Hence, there is a substantial and growing upward uncertainty about the number of Russian deployed strategic nuclear warheads. This will increase in the continued absence of inspections, particularly when the new Sarmat heavy ICBM is deployed, supposedly later in 2023. Given these realities, the often-repeated low estimates of Russian nuclear weapons numbers (which still give Russia a significant numerical advantage) appear to be little more than wishful thinking.

The relationship between the collapse of New START verification means and prospective Russian force numbers is obvious. Numbers matter. Indeed, in December 2019, Rose Gottemoeller warned that the United States may lose nuclear parity because, if freed from the New START warhead limit, "…without deploying a single additional

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[15] Rose Gottemoeller, "The New START Verification Regime: How Good Is It?," *Bulletin of the Atomic Scientists*, May 21, 2020. (Emphasis added.) Available at https://thebulletin.org/2020/05/the-new-start-verification-regime-how-good-is-it/.

missile,"[16] Russia, "could readily add several hundred – by some accounts, one thousand – more warheads, to their ICBMs…"[17] Russian "suspension" of the New START Treaty likely has placed Moscow in a position where it can have, and perhaps already has, this number of extra warheads or even more, without U.S. knowledge.

The Federation of American Scientists Reports on Russian Nuclear Weapons

Much of the content of the FAS Russian nuclear weapons reports appears to be driven by its corresponding arms control agenda. A joint report by the FAS and the Natural Resources Defense Council (NRDC), which Hans Kristensen co-authored, described that position as supporting a "minimal" nuclear deterrence posture. It advocated: 1) reducing the U.S. nuclear deterrent to 500 weapons; 2) the complete elimination of the U.S. ballistic missile submarine force; and, 3) reducing the yield of residual U.S. nuclear weapons to three-to-10 kilotons in order to eliminate any U.S. capability against military targets. This was presented as a step toward the elimination of all nuclear weapons.[18] Advocacy of such a deterrent

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[16] Rose Gottemoeller, as quoted in, U.S. Congress, House of Representatives, *The Importance of the New START Treaty* (Washington, D.C.: Committee on Foreign Affairs, December 4, 2019), p. 61, available at https://www.congress.gov/116/meeting/house/110302/documents/CHRG-116hhrg38543.pdf.

[17] Rose Gottemoeller, *The Importance of the New START Treaty* (Washington, D.C.: House of Representatives, Committee on Foreign Affairs, December 4, 2019), p. 2, available at https://www.congress.gov/116/meeting/house/110302/witnesses/HMTG-116-FA00-Wstate-GottemoellerR-20191204.pdf.

[18] Hans M. Kristensen, Robert S. Norris, and Ivan Oelrich, *From Counterforce to Minimal Deterrence: A New Nuclear Policy on the Path Toward Eliminating Nuclear Weapons*, Occasional Paper 19 (Washington,

posture is served by a minimalist estimate of Russian force numbers and nuclear strategy. Yet, there is an obvious need to recognize the apparent linkage between nuclear threat assessments and arms control advocacy.

Thanks to the original START Treaty which gave the United States 15 years of technical data, missile telemetry, cooperative measures to enhance National Technical Means of verification and an extensive on-site inspection verification regime, the United States still has a reasonably good handle on the maximum possible number of nuclear warheads deployed on the *original types of Russian missiles that are known to exist*. However, there is likely a serious issue with the ability of the United States to monitor mobile ICBM deployment because of the omission in the New START Treaty of almost the entire original START Treaty's mobile ICBM verification regime, including mobile ICBM production monitoring.[19] Because the United States has not been permitted to monitor Russian mobile ICBM production since 2009, it likely cannot verify whether the downloaded Russian ballistic missile forces remain downloaded and how many warheads the newly deployed missiles are carrying. The United States probably has even less confidence in the size of the total Russian inventory of nuclear weapons, with most of the uncertainty being on the upside of that inventory. Historically, the United States dramatically underestimated the number of Soviet nuclear weapons. The suggestion in the FAS and SIPRI reports that they can present with precision and confidence the number

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D.C.: Federation of American Scientists and The National Resources Defense Council, April 2009), pp. 41, 43-44, available at https://pubs.fas.org/_docs/occasionalpaper7.pdf.

[19] The New START Working Group, "New START: Potemkin Village Verification," Heritage Foundation, June 24, 2010, available at https://www.heritage.org/arms-control/report/new-start-potemkin-village-verification.

of Russian nuclear warheads of various types lacks credibility.

The Lack of Credible Public Information on Russian Nuclear Capabilities

The United States has left the American people, and likely much of Congress, largely in the dark on the details of the buildup of Russia's nuclear capability, perhaps to justify an unrealistic arms control agenda with President Putin, a "war criminal" as President Biden has called him.[20] The disconnect between the views of Putin as a leader and his suitability as an arms control partner has reached monumental significance. Putin has effectively shut down New START in response to Western support for Ukraine, and China shows zero interest in arms control. Yet, as noted above, the Biden Administration asserts that arms control offers the most effective, durable and responsible path to reduce the role of nuclear weapons and prevent nuclear use. Arms control agreements, particularly in the current situation with no verification regime other than NTM, undercut nuclear threat assessments because of the political component they appear to introduce to the process and the extremely high level of proof deemed necessary to formally announce a treaty violation. The normally complex interagency process of threat assessment appears to be further affected by political considerations, as only the NSC can determine if a Treaty violation has occurred—determinations that may be shaped by political considerations.

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[20] Nikki Carvajal, Jeremy Diamond, and Kylie Atwood, "Biden: ICC's War Crimes Case against Putin is 'Justified,'" *CNN*, March 17, 2023, available at https://www.cnn.com/2023/03/17/politics/biden-putin-war-crimes-ukraine/index.html.

To glean insight into the number and characteristics of Russian strategic nuclear forces, it is necessary to seek multiple other sources of information. Unfortunately, the Western press has failed to address this issue seriously. Only a handful of journalists appear to focus seriously on this vital subject. Instead, the public and Congress get endless repetition of numbers from the FAS that are largely undocumented and should not be taken at face value.

The annual FAS report appears to advance the narrative that the exact number of Russia's nuclear weapons is known (5,977, according to the February 2022 edition, and 5,889 in the May 2023 edition). These numbers are almost entirely undocumented for current systems and those references cited generally are so outdated that they are misleading given Russia's constant nuclear modernization programs. The decline in Russian warhead numbers recorded in the May 2023 edition, while relatively small, is both undocumented and implausible given current events and Russian policy regarding nuclear weapons. It also is directly contrary to the repeated statements by the Biden Administration that the number of Russian nuclear weapons *is increasing*. For example, in December 2022, Secretary of Defense Lloyd Austin stated, "Russia is also modernizing and expanding its nuclear arsenal."[21] The FAS numbers are *not* an estimate of total Russian nuclear warhead numbers the way the United States defines them—active, inactive and weapons awaiting dismantlement—and there is an enormous upward uncertainty with regard to Russia's nuclear warhead stockpile.

The February 2022 and May 2023 FAS reports contain two sets of contradictory numbers. The FAS Russian nuclear forces charts included in the 2022 and 2023 reports

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[21] Idrees Ali, "Russia is Expanding its Nuclear Arsenal, U.S. Defense Secretary Says," *Reuters*, December 9, 2022, available at https://www.reuters.com/world/russia-is-expanding-its-nuclear-arsenal-us-defense-secretary-says-2022-12-09/.

do not depict the total Russian nuclear weapons inventory. The FAS February 2022 estimate of 5,977 Russian nuclear warheads, which continues to be widely repeated in national and global press coverage as the total Russian nuclear weapons inventory, is taken from this chart. Yet, buried in the report is the disclosure that the 2,565 number for Russian strategic nuclear warheads in the 2022 report is *not* the estimated size of the deployed Russian strategic nuclear force but rather, what the authors *inaccurately* claim, is the *maximum upload potential* of Russian strategic nuclear forces.

In fact, the maximum Russian upload potential is much larger than the FAS estimates. In the FAS "Russian nuclear forces" charts, the modernized Sineva and Layner/Liner SLBMs are listed as carrying four warheads, the 1990 START Treaty accountability number for the SS-N-23, upon which they are based. In December 2022, *Sputnik News* reported that the Sineva and Layner/Liner SLBMs "are armed with between 4 and 12 MIRV warheads…"[22] In the FAS February 2022 and May 2023 charts, the new Bulava-30 SLBM is listed at six warheads, the START Treaty accountability number for this missile. Yet, it is frequently reported in the Russian press as being able to carry six-to-10, a point which was reiterated by *Sputnik News* in May 2023.[23] The SS-27 Mod 2/RS-24 Yars ICBM is listed in the FAS charts as capable of carrying four warheads but has slightly more throw-weight than the Bulava-30 and is

[22] "How Many Nuclear Submarines Does Russia Have?," *Sputnik*, December 19, 2022, available at https://sputnikglobe.com/20221205/how-many-nuclear-submarines-does-russia-have-1105034535.html.

[23] "From Avangard to Zircon: How Far Do Russian Missiles Fly?," *Sputnik*, May 13, 2023, available at https://sputnikglobe.com/20230512/from-avangard-to-zircon-how-far-do-russian-missiles-fly-1110296500.html.

frequently reported as being able to carry six-to-10 warheads.[24]

The FAS "Russian nuclear forces, 2022" chart depicts about 500 more warheads than allowed under the New START Treaty,[25] while the May 2023 chart gives Russia 611 more warheads than the New START Treaty limit.[26] This obviously is not what the authors claim is the case in the text of their articles, i.e., that Russia is complying with New START, but it is a byproduct of the strange mislabeling of what the "Russian nuclear forces" charts actually depict. Moreover, maximum upload capability is *not* necessarily the same as the total weapons inventory—which is likely to be higher. Russia's nuclear weapons production capability likely is substantially in excess of what is required to create even the highest estimates of Russian numbers. This has impacted global news reporting concerning the size of Russia's nuclear force.

Russian nuclear upload potential is clearly much higher than these numbers and it is growing. One unknown is whether the Russians have developed and deployed the

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[24] "WATCH: Russian Cutting-edge Nuclear Sub Fires Barrage of FOUR Intercontinental Ballistic Missiles," *RT*, December 3, 2020, available at https://www.rt.com/russia/509510-nuclear-submarine-missile-launch/; "Russian Submarine Successfully Test-fires Bulava Intercontinental Missile," *TASS*, June 26, 2017, available at https://tass.com/defense/953398; "Russia: Bulava missile seen on a par with Topol M for accuracy," *BBC Monitoring Former Soviet Union*, December 7, 2008, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/124F43F5C63B2F30; and, "Russian paper sees latest Bulava missile launch as 'real success'," *BBC Monitoring Former Soviet Union*, June 30, 2011, available at https://infoweb.newsbank.com/apps/news/document-view?p=WORLDNEWS&docref=news/13836B14CC089CB8.

[25] Hans M. Kristensen and Matt Korda, "Russian Nuclear Weapons, 2022," *Bulletin of the Atomic Scientists*, Vol. 78, No. 2 (2022), p. 99.

[26] Ibid., pp. 99-100; and, Kristensen, Korda, and Reynolds, "Russian Nuclear Weapons, 2023," op. cit., p. 175.

reported new "super-lightweight" nuclear missile warhead which would be necessary to put 10 warheads on a Bulava-30 SLBM or the SS-27 Mod 2/RS-24 Yars ICBM. If not, both of these systems would likely be limited to six or possibly seven warheads. Another uncertainty is the reported mix of small and medium yield warheads on the Sineva and the Layner/Liner SLBMs and the Yars-S ICBM. The exact warhead loading is not available in open sources.

The upload of the Sineva and the Layner/Liner to their maximum possible number of warheads does not depend on this lighter warhead since these missiles have a much larger throw-weight than the Bulava-30.[27] While Russia has a very substantial upload potential (which even now may have been at least partially implemented), putting the maximum possible warhead number on its missiles does not necessarily give Moscow its best capabilities since maximum numbers result in lower yields which tend to minimize hard-target kill capability. Russia is unlikely to sacrifice this capability just to get higher numbers. Russia will likely deploy the optimal number of warheads it believes is advantageous and, in many situations, the maximum number will be the best option for meeting its military objectives. In some instances, it may be useful to deploy more warheads even at the penalty of accepting lower yield. Russian decisions regarding the mix of warheads will be made on the basis of military effectiveness rather than simply maximizing the bottom line warhead number. Nevertheless, Russia likely places great importance on the deployment of low-yield and low-yield/low-collateral damage warheads which could be used to initiate their nuclear escalation doctrine—

[27] *START Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms Signed in Moscow July 31, 1991* (Washington, D.C.: U.S. Department of State, October 1991), Supplement No. 5, p. 121.

suggesting a greater number of warheads than otherwise would be the case.

While the FAS reports appear to minimize estimates of Russia's upload capability, because of multiple uncertainties, exact calculations of upload potential using open sources are impossible. The information is simply not available. But the upload number could be up to about 2,000 *and it will grow as the new Sarmat heavy ICBM is deployed*. According to the Russian Defense Ministry "…Sarmat will be able to carry up to 20 warheads of small, medium, and high power classes."[28] It is likely that the limit of 20 warheads reflects attachment points not throw-weight limits, since the missile has an announced throw-weight of 10,000 kilograms. Thus, selection of weapon yield can be based on military utility and does not require a tradeoff of yield for numbers. The number of planned Sarmat heavy ICBMs has been reported in Russia as either 46 launchers or 20 regiments, which translates into at least 120 launchers. This clearly makes no sense if Russia plans to comply with the New START Treaty. This new capability could range from at least approximately 1,000 additional warheads to at least 2,400 additional warheads. Sarmat deployment is supposed to start sometime in 2023.

The FAS reports conclude that Russia has only 200 warheads available for its heavy bombers despite the fact that virtually all estimates, including the FAS reports themselves, conclude that Russian bombers have the *technical capability* to deliver 800 nuclear warheads. It is unclear why FAS counts the maximum upload capability for Russian ICBMs and SLBMs, but does not do so for Russian heavy bombers. The 200 number is not credible.

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[28] "Guaranteed Defeat of Enemy Infrastructure: how the Sarmat Ballistic Missile will Enhance the Combat Potential of the Strategic Missile Forces," *RT*, December 16, 2019, available at https://russian.rt.com/russia/article/698699-sarmat-raketa-rvsn-perevooruzhenie.

Moreover, even the 800 number does not take into account reloads and other types of nuclear weapons these bombers can carry.

James R. Howe, a senior U.S. expert on Russian force numbers in private industry, has done an excellent analysis on the warhead delivery potential of the planned Russian strategic offensive force. This is not quite the same as upload potential (which requires knowledge of the deployed number of warheads prior to upload) but it is close. In September 2019, Howe reported that Russia could have between 2,976 and 6,670 warheads on the nuclear missile force it is building, plus over 800 bomber weapons.[29] This suggests that Russia is *not* planning for an arms control-limited force.

The issue of Russian cheating prior to the end of New START inspections may be separate from the question of upload because the United States is dealing with potential covert capabilities. Cheating is implied by Colonel General Sergei Karakayev's repeated statement that Russia had 400 ICBMs on "combat duty" and his statement about the scope of Russian reductions of its strategic nuclear warheads—which implied that at least 3,300 warheads have been retained. This is about twice the FAS estimate for Russian deployed strategic nuclear warheads. However, reports of long-range nuclear ALCMs on Russian fighters and Backfire bombers could add over 500 additional strategic nuclear warheads to Russian forces. Upload would further add to this number.

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[29] James R. Howe, "Future Russian Strategic Nuclear and Non-Nuclear Forces: 2022," in Stephen J. Blank, ed., *The Russian Military in Contemporary Perspective* (Carlisle, PA: U.S. Army War College, Strategic Studies Institute, September 2019), p. 358, available at https://press.armywarcollege.edu/cgi/viewcontent.cgi?article=1910&context=monographs.

Non-Strategic Nuclear Weapons

There is no doubt that Russia has an arsenal of non-strategic nuclear weapons which is much larger, more diverse and more capable than that of the United States. Russia has apparently retained all the generic types in the Soviet Cold War nuclear arsenal and may even have increased the diversity of its arsenal to include low-yield and low-collateral damage designs. Both the FAS and the U.S. government's assessments of about 2,000 Russian non-strategic nuclear warheads are likely to be far too low. They are inconsistent with the claimed Russian reductions which translate into a residual force of at least 5,000 weapons. Reportedly, over the past two decades, Russia has introduced thousands of low-yield/low-collateral damage non-strategic nuclear weapons into its arsenal, consistent with the direction of Russian nuclear strategy.

There are important Russian and Western assessments of Russia's non-strategic nuclear weapons numbers which range from 3,000 to 10,000 or more weapons. The higher estimates are important because, if correct, they may signal a shift toward substituting a precision low-yield/low-collateral damage nuclear strike for precision conventional strikes, the latter being a capability that Russia appears not to have performed adequately in the Ukraine conflict. The repeated warnings from the Biden Administration that Russia has "increased its reliance on nuclear weapons,"[30] appear to be wholly correct and need to be taken seriously. In fact, some commentators have suggested that a new

[30] Office of the Director for National Intelligence, *Annual Threat Assessment of the U.S. Intelligence Community* (Washington, D.C.: DNI, 2023), p. 14, available at https://www.dni.gov/files/ODNI/documents/assessments/ATA-2023-Unclassified-Report.pdf.

Nuclear Posture Review is needed.[31] The 2022 NPR had some serious flaws and did not account for the current Ukrainian crisis.[32] The United States appears to be operating on the basis of a peacetime nuclear deterrent in the most intense crisis situation since the Cuban missile crisis.

An Arms Control Agenda Connection

The politics of Russian arms control non-compliance needs to be removed from the nuclear threat assessment. The current process virtually guarantees undercounting Russian nuclear weapons because compliance issues appear to impact the information about Russian nuclear weapons numbers made public. For example, all Russian non-strategic nuclear weapons should be in central storage, according to Russia's 1991/1992 PNI commitments. Yet, there is significant evidence that not all of them are in central storage; in fact, there is evidence that Russia has tactical nuclear weapons in Kaliningrad and at Russian air bases.[33] The latest example is the announced deployment of Russian tactical nuclear weapons in Belarus.[34] If there is an

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[31] Robert Peters, "It's Time for a New Nuclear Posture Review," *Real Clear Defense*, April 12, 2023, available at https://www.realcleardefense.com/articles/2023/04/12/its_time_for_a_new_nuclear_posture_review_893258.html.

[32] See the extensive and bipartisan discussions in, Keith B. Payne, ed., *Expert Commentary on the 2022 Nuclear Posture Review*, *Occasional Paper*, Vol. 3, No. 3 (March 2023), available at https://nipp.org/wp-content/uploads/2023/02/OP-Vol.-3-No.-3.pdf.

[33] Mark B. Schneider, "Dealing With Vladimir Putin's Nuclear Crisis – The Case for Maximum Deterrence," *Real Clear Defense*, November 17, 2022, available at https://www.realcleardefense.com/articles/2022/11/17/dealing_with_vladmir_putins_nuclear_crisis__the_case_for_maximum_deterrence_865351.html.

[34] David Ljunggren, "Putin says Moscow to Place Nuclear Weapons in Belarus, US Reacts Cautiously," *Reuters*, March 26, 2023, available at

assumption that all Russian non-strategic nuclear weapons are in central storage then any outside of central storage are near certain not to be counted. Yet, there is scant U.S. government public acknowledgement or discussion of these apparent realities that are important to understanding the nature of the Russian regional nuclear first-use threat.

The low and largely undocumented FAS estimates of Russian nuclear capabilities appear to be aimed at justifying its arms control agenda. Russia is in the process of discarding arms control treaties (New START Treaty and the Conventional Forces in Europe Treaty). With regard to continuing Western pleas for Moscow to return to compliance with New START and to resume negotiations for further agreements, Putin has stated, "…we have more such nuclear weapons than NATO countries. They know about it and never stop trying to persuade us to start nuclear reduction talks. Like hell we will, right? A popular phrase. Because, putting it in the dry language of economic essays, it is our competitive advantage."[35] Yet, a seeming goal of the FAS analyses is to promote the narrative that arms control is effective in controlling the nuclear threat, and that more arms control is needed and available if only the United States will move in that direction—irrespective of the improbability of Russia (or China) accepting new limits or complying with them if agreements were reached. Moscow has demonstrated beyond a doubt that it is a serial violator of the arms control agreements it does sign.

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https://www.reuters.com/world/europe/putin-says-moscow-has-deal-with-belarus-station-nuclear-weapons-there-tass-2023-03-25/.

[35] Vladimir Putin, "Plenary Session of the St. Petersburg International Economic Forum," *Kremlin.ru*, June 16, 2023, available at http://en.kremlin.ru/events/president/news/71445.

Conclusion

It is unclear if the United States can successfully deter Russian nuclear escalation under plausible circumstances if Russia has such a large quantitative and qualitative advantage in nuclear weapons. Moscow's military failures in the Ukraine war could result in it substituting a precision nuclear strike in place of on-going conventional strikes. An extremely outnumbered U.S. non-strategic nuclear deterrent based entirely on fighter aircraft is likely vulnerable to even a small preemptive Russian nuclear strike—and thus possibly inadequate for many plausible regional deterrence missions.[36]

Russia's invasion of Ukraine is far from over and there remains the possibility of Russian nuclear escalation.[37] The critical question is if the United States and its allies can continue to deter that possibility. If the high estimates of Russian nuclear capability are true, Russia has an advantage of several to one. The disparity is particularly great in low-yield nuclear weapons and Russia reportedly has low-collateral damage nuclear weapons as well. In 2021, Pavel Felgenhauer wrote, "Indeed, taking into account non-strategic (tactical) nuclear weapons, which no one has ever verifiably counted, Russia may have more *(maybe twice as many overall) than all the other official or unofficial nuclear powers taken together*."[38] This nuclear imbalance is important

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[36] James R. Howe, "Implications of Russian Development/Deployment of Precision Low Yield/Tailored Effects Nuclear Weapons on Emerging Russian Nuclear Policy, Strategy and Force Structure," 2023, mimeo.

[37] Henry Holloway, "Vladimir Putin is not Afraid to Use Nukes & he could Launch Strike Very Soon, Warns Top British General," *The Sun*, August 7, 2022, available at https://www.the-sun.com/news/5947154/vladimir-putin-nuclear-weapons-ukraine-general/.

[38] Pavel Felgenhauer, "Putin Delivers More Restrained National Address as Moscow Announces Partial Troop Withdrawal," *Eurasia Daily Monitor*, Vol. 18, Iss. 65 (April 22, 2021). (Emphasis added.)

because it almost certainly shapes Russian decision-making regarding nuclear employment. Putin's decision to introduce the use of nuclear weapons potentially could turn on his perception of the scope of Russia's nuclear advantage and options, which involve very large asymmetries in numbers, modernization and force diversity. If Felgenhauer is correct (and he has been correct on many issues over the years), the United States and NATO are in a much more perilous situation than many seem to believe. The uncritical repetition of the FAS likely undercounting of Russian nuclear warhead numbers and suggestion of a relatively benign Russian strategy create a false sense of security that is particularly dangerous under current circumstances.

Misleading FAS numbers concerning Russian nuclear capability can reduce public and congressional support to sustain a credible U.S. nuclear Triad, which badly needs modernization against the unprecedented nuclear threats that the United States and its allies face in a multipolar nuclear world.[39] Under current circumstances, sustaining a credible and effective U.S. nuclear deterrent is critical, and a sober public understanding of the threat is necessary to do so.

Available at https://jamestown.org/program/putin-delivers-more-restrained-national-address-as-moscow-announces-partial-troop-withdrawal/.

[39] See the discussion in, Keith B. Payne and David J. Trachtenberg, *Deterrence in the Emerging Threat Environment: What is Different and Why it Matters, Occasional Paper*, Vol. 2, No. 8 (August 2022), available at https://nipp.org/wp-content/uploads/2022/08/OP-Vol.-2-No.-8.pdf.

About the Author

Dr. Mark B. Schneider is a Senior Analyst with the National Institute for Public Policy. He joined National Institute in September 2004 and specializes in missile defense policy, nuclear weapons, deterrence, strategic forces, and arms control issues.

Before his retirement from the Department of Defense, Dr. Schneider served in senior positions in the Office of Secretary of Defense for Policy including, Principal Director for Forces Policy, Principal Director for Strategic Defense, Space and Verification Policy, Director for Strategic Arms Control Policy and Representative of the Secretary of Defense to the Nuclear Arms Control Implementation Commissions. He also served as a member of the State Department Policy Planning Staff, the Professional Staff of the Senate Select Committee on Intelligence, the Department of Energy, the Energy Research and Development Administration and the Atomic Energy Commission. Prior to his government career, Dr. Schneider served as a policy analyst with the Stanford Research Institute and taught at the University of Southern California.

Dr. Schneider served as a member of the DoD Compliance Review Group. He chaired several working groups of the START and INF Treaty Implementation Commissions (JCIC and SVC) in Geneva, negotiating many implementation agreements with the successor states of the former Soviet Union. He most recently served as Acting Chairman of the U.S.-Russia Working Group on Missile Defense.

Dr. Schneider has been awarded two Presidential Rank Awards of Meritorious Executive in the Senior Executive Service, the Secretary of Defense Distinguished Civilian Service Medal and two Secretary of Defense Meritorious Civilian Service Medals.

Dr. Schneider earned his Ph.D. in history at the University of Southern California and Juris Doctorate from George Washington University. He was admitted to the Bar of Washington DC in 1977 and Maryland in 1978. He is the author of many books and articles on arms control, nuclear deterrence, strategic forces and intelligence issues.

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