

II. Russian nuclear forces

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As of January 2024 the Russian Federation maintained a military stockpile of approximately 4380 nuclear warheads. About 2822 of these were strategic warheads, of which roughly 1710 were deployed on land- and sea-based ballistic missiles and at bomber bases. Russia also possessed approximately 1558 non-strategic (tactical) nuclear warheads, all of which are assessed to be at central storage sites. Although the authors estimate that Russia had a higher number of strategic warheads in January 2024 than in January 2023, the estimated number of non-strategic warheads has been revised downwards based on new assessments, resulting in a net overall decrease in the Russian military stockpile of around 109 warheads compared with the estimate for the previous year. As of January 2024 an additional 1200 retired warheads were awaiting dismantlement (200 fewer than the previous year's estimate, based on assumptions of the current rate of dismantlement), giving Russia a total estimated inventory of approximately 5580 nuclear warheads (see table 7.3, end of section).

These estimates are based on publicly available information about the Russian nuclear arsenal and assessments by the authors. Because of a lack of transparency, estimates and analysis of Russia's nuclear weapon developments come with considerable uncertainty, particularly regarding the country's sizable stockpile of non-strategic nuclear weapons. However, it is possible to formulate a reasonable assessment of the progress of Russia's nuclear modernization by reviewing satellite imagery and other forms of open-source intelligence, official statements, industry publications and state media interviews with Russian government officials.¹

This section details Russia's holdings of strategic and non-strategic air-delivered, land-based and sea-based nuclear weapons. Before doing so, it first considers Russia's compliance with its bilateral arms control obligations and describes the role played by nuclear weapons in Russian military doctrine.

Russian compliance with New START

In February 2023 President Vladimir Putin announced Russia's intention to 'suspend' its participation in the last remaining bilateral strategic arms control treaty between Russia and the United States, the 2010 Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive

¹ Kristensen, H. M. and Korda, M., 'Estimating world nuclear forces: An overview and assessment of sources', SIPRI Commentary, 14 June 2021.

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Arms (New START).² This treaty places a cap on the numbers of Russian and US deployed strategic nuclear forces and allows for on-site inspections to verify compliance.³

Although Putin stated in 2023 that Russia planned to remain within the central limits set by New START, the decision to suspend treaty inspections indefinitely meant that the USA could not verify that Russia remained in compliance with its obligation to deploy no more than 1550 strategic warheads.⁴ Nonetheless, the US assessed that Russia 'likely did not exceed the New START Treaty's deployed warhead limit in 2023'.⁵

The last bilateral data exchanges under the treaty are from September 2022. Russia declared that it had 1549 deployed warheads attributed to 540 strategic launchers, thus remaining under the final warhead limits of New START.⁶ Just as with the USA, many of Russia's strategic delivery systems carry fewer warheads than their maximum capacity in order to meet the New START limits. If Russia chose to no longer comply with the treaty limits, or if the treaty were to expire without a follow-on agreement, Russia (like the USA) could add reserve warheads to missiles and bombers and potentially double its number of deployed strategic nuclear weapons.⁷

The role of nuclear weapons in Russian military doctrine

Russia's official deterrence policy, which was last updated in a decree in 2020, lays out explicit conditions under which it could launch nuclear weapons: (a) the receipt of reliable data on a launch of ballistic missiles attacking the territory of Russia or its allies; (b) the use of nuclear weapons or other types of weapon of mass destruction against Russia or its allies; (c) an attack against Russia's critical governmental or military sites, disruption of which would undermine the nuclear forces; and (d) aggression against Russia with the use of conventional weapons when the very existence of the state is in jeopardy.⁸ This formulation is largely consistent with previous public iterations of

² President of Russia, 'Presidential address to Federal Assembly', 21 Feb. 2023.

³ For a summary and other details of New START see annex A, section III, in this volume. On related developments in 2023 see chapter 8, section I, in this volume.

⁴ 'Russia suspends START arms inspections over US travel curbs', Reuters, 8 Aug. 2022; Atwood, K. and Hansler, J., 'Russia postpones nuclear arms control talks with US, State Department says', CNN, 28 Nov. 2022; and US Department of State, 'Report to Congress on implementation of the New START Treaty', Jan. 2024.

⁵ US Department of State (note 4), p. 6.

⁶ US Department of State, Bureau of Arms Control, Verification and Compliance, 'New START Treaty aggregate numbers of strategic offensive arms', Fact sheet, 1 Sep. 2022.

⁷ Korda, M. and Kristensen, H., 'If arms control collapses, US and Russian strategic nuclear arsenals could double in size', FAS Strategic Security Blog, Federation of American Scientists, 7 Feb. 2023. On the negotiation of the renewal of New START see chapter 8, section I, in this volume.

⁸ Russian Ministry of Foreign Affairs, 'Basic principles of state policy of the Russian Federation on nuclear deterrence', Approved by Russian Presidential Executive Order no. 355, 2 June 2020.

Russian nuclear policy under President Putin, which also shied away from no-first-use policies and negative security assurances.

The Russia–Ukraine war has raised questions about Russia’s nuclear doctrine, and about where, when, how and under what conditions Russia might use nuclear weapons. Several speeches made by President Putin and senior Russian officials and commentators alluding to the potential use of nuclear weapons in the conflict have added to the uncertainty.⁹ For example, in January 2023 Dmitry Medvedev, the former Russian president and current deputy chairman of the Russian Security Council, stated in an interview that ‘defeat of a nuclear power in a conventional war may trigger a nuclear war’. However, use of nuclear weapons in Ukraine would appear to exceed the conditions in the 2020 decree because losing the war in Ukraine would not threaten the existence of the Russian state.¹⁰

Strategic nuclear forces

As of January 2024 Russia had an estimated 2822 warheads assigned for potential use by strategic launchers: heavy bombers, land-based intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs). This is an increase of approximately 149 warheads compared with January 2023 due to fluctuations in the arsenal caused by the deployment of newer ICBMs with multiple independently targetable re-entry vehicles (MIRVs) as well as the introduction of a new nuclear-powered ballistic missile submarine (SSBN).

Aircraft and air-delivered weapons

As of January 2024 the Long-Range Aviation command of the Russian Air Force operated a fleet of approximately 67 operational heavy bombers, comprising 15 Tu-160 (Blackjack) and 52 Tu-95MS (Bear) bombers.¹¹ SIPRI estimates that perhaps only 58 of these are counted as deployed under New START. The maximum possible payload on the bombers is approximately 650 nuclear weapons; however, since some of the bombers were not fully operational, it is assumed here that Russia has not produced this many warheads for its bomber force. SIPRI estimates that weapons exist only for the deployed bomber force, giving a total of approximately 586 warheads. Around 200 of these weapons are probably stored at the two strategic bomber bases:

⁹ See e.g. President of Russia, ‘Address by the president of the Russian Federation’, 24 Feb. 2022; President of Russia, ‘Address by the president of the Russian Federation’, 21 Sep. 2022; and ‘Russia can defend new regions with nuclear weapons: Medvedev’, Al Jazeera, 22 Sep. 2022.

¹⁰ Faulconbridge, G. and Light, F., ‘Putin ally warns NATO of nuclear war if Russia is defeated in Ukraine’, Reuters, 19 Jan. 2023.

¹¹ For the missiles, aircraft and submarines discussed in this section, a designation in parentheses (e.g. Blackjack) following the Russian designation (e.g. Tu-160) is that assigned by the North Atlantic Treaty Organization (NATO).

Engels in Saratov oblast and Ukrainka in Amur oblast. Russia has historically housed all its strategic bombers at these two bases, but commercial satellite imagery revealed that Russia dispersed large numbers of bombers to its Belaya (Irkutsk oblast) and Olenya (Murmansk oblast) airbases during 2023 after Ukraine attacked the Engels airbase in several drone strikes.¹²

Modernization of the bombers—which includes upgrades to their avionics suites, engines and long-range nuclear and conventional cruise missiles—continued throughout 2023 but remained subject to delays.¹³ Both the Tu-160 and the Tu-95 strategic bombers currently carry the Kh-55 (AS-15) air-launched cruise missile (ALCM), but this is being replaced on the upgraded bombers by the new Kh-102 (AS-23B) ALCM. It seems likely that all of the Tu-160s (including at least 10 brand-new Tu-160M2 bombers) and most of the Tu-95s will eventually be upgraded to maintain a bomber force of perhaps 50–60 operational aircraft. These modernized bombers are intended to be a temporary bridge to Russia's next-generation bomber: the PAK-DA, serial production of which is planned to begin in 2028–29.¹⁴ The PAK-DA will also eventually replace all Tu-22M3M (Backfire-C) bombers deployed with non-strategic forces (see below).¹⁵

During a visit by North Korean leader Kim Jong Un to Russia's Knevichi airfield (near the city of Vladivostok) in September 2023, Russia revealed a Tu-160 aircraft equipped with 'novel' Kh-BD cruise missiles, which could be based upon the existing Kh-102. It is unclear, however, whether the new missile had been deployed or whether it was still under development at the end of 2023.¹⁶

Land-based missiles

As of January 2024 the Strategic Rocket Forces (SRF)—the branch of the Russian armed forces that controls land-based ICBMs—consisted of 12 missile divisions grouped into 3 armies, deploying an estimated 329 ICBMs

¹² Tiwari, S., 'After Tu-95 bomber, Russia's Tu-22 M3 Backfire destroyed in Ukraine drone attack—reports', *Eurasian Times*, 21 Aug. 2023.

¹³ President of Russia, 'Meeting with workers of Gorbunov Kazan aviation factory and Tu-160M pilots', 25 Jan. 2018; Ignatyeva, L., 'New Kazan strategic bombardier hits the sky', *Realnoe Vremya*, 11 Jan. 2023; and President of Russia, 'Заседание коллегии Министерства обороны' [Ministry of Defence Board meeting], 21 Dec. 2022.

¹⁴ 'PAK DA demonstrational model to be ready by 2023—Source', TASS, 2 Aug. 2021; 'Russia begins construction of the first PAK DA strategic bomber—Sources', TASS, 26 May 2020; Lavrov, A., Kretsul, R. and Ramm, A., 'ПАКетное соглашение: новейшему бомбардировщику назначили сроки выхода в серию' [PAKage agreement: The latest bomber assigned a deadline for production], *Izvestia*, 14 Jan. 2020; and 'Russia tests engine for next-generation strategic missile-carrying bomber', TASS, 31 Oct. 2022.

¹⁵ 'Russia to test next-generation stealth strategic bomber', TASS, 2 Aug. 2019.

¹⁶ Cook, E., 'What is Kh-BD? Russian Tu-160 bombers armed with new long range missiles', *Newsweek*, 19 Sep. 2023.

of different types and variations (see table 7.3).¹⁷ These ICBMs can carry a maximum of about 1244 warheads, but SIPRI estimates that they have had their warhead load reduced to around 872 warheads to keep Russia below the New START limit for deployed strategic warheads. These ICBMs carry approximately half of Russia's estimated 1710 deployed strategic warheads.

Russia is close to completing the replacement of Soviet-era ICBMs with new types, although this process has taken much longer than expected. By December 2023 around 88 per cent of the ICBM force had reportedly been modernized.¹⁸ The bulk of the modernization programme has focused on the RS-24 Yars (SS-27 Mod 2), a MIRVed version of the RS-12M1/2 Topol-M (SS-27 Mod 1). SIPRI estimates that, as of January 2024, the number of deployed RS-24s had risen to approximately 204 mobile- and silo-based RS-24 missiles, including all six completed mobile divisions (at Barnaul, Irkutsk, Nizhniy Tagil, Novosibirsk, Vypolzovo and Yoshkar-Ola).¹⁹ The rearmament of all of these divisions means that, by the end of 2023, Russia's entire strategic mobile ICBM force had rearmed with post-Soviet era missiles.²⁰

Deployment of silo-based RS-24s continues at Kozelsk, Kaluga oblast, with one regiment of 10 silos completed in 2018 and the second completed in 2020.²¹ The third regiment began combat duty in December 2021 and SIPRI estimates that four of its silos were loaded with missiles by the end of 2023.²² The 60 RS-12M2 Topol-M (SS-27 Mod 1) silos at Tatishchevo, Saratov oblast, will also probably be upgraded to the RS-24.

Russia is in the final stages of rearming its first two regiments of the Soviet-era RS-20V (SS-18 Mod 5 Satan) ICBM at Dombrovsky, Orenburg oblast, with RS-18 (SS-19 Mod 4) missiles equipped with the Avangard hypersonic glide vehicle (HGV) system. The first regiment completed its rearmament in December 2021, while the second reportedly completed its rearmament in December 2023, although satellite imagery indicated that construction had not concluded by the end of the year.²³

¹⁷ One of these ICBM divisions, the 8th Missile Division at Yurya, Kirov oblast, was being modernized alongside the rest of the ICBM force; however, the division's Sirena-M ICBMs are believed to serve as back-up launch code transmitters and therefore have not been armed with nuclear weapons.

¹⁸ Karakaev, S. V., interviewed in *Krasnaya Zvezda*, 'Стратегическая мощь России крепнет' [Russia's strategic power is growing], Dzen News, 16 Dec. 2023.

¹⁹ Karakaev (note 18); and authors' estimates.

²⁰ Karakaev (note 18); and authors' estimates.

²¹ 'Два полка РВСН в 2021 году будут перевооружены на ракетные комплексы "Ярс"' [Two regiments of the Strategic Rocket Forces will be re-equipped with 'Yars' missile systems in 2021], TASS, 21 Dec. 2020; Karakaev, S. V., interviewed in Biryulin, R., Andreev, D. and Reznik, A., 'Ядерный щит России по-прежнему надёжен' [Russia's nuclear shield is still reliable], *Krasnaya Zvezda*, 16 Dec. 2022; and authors' assessment based on analysis of satellite imagery.

²² Karakaev, S. V., interviewed in Biryulin, R. and Andreev, D., 'Беспорный аргумент России' [Russia's indisputable argument], *Krasnaya Zvezda*, 17 Dec. 2021; and authors' estimates.

²³ President of Russia, 'Expanded meeting of the Defence Ministry Board', 21 Dec. 2021; Karakaev (note 18); and authors' estimates.

Russia has also been developing a new ‘heavy’ liquid-fuelled, silo-based ICBM, known as the RS-28 Sarmat (SS-29), as an additional replacement for the RS-20V. Russia is believed to have flight-tested the RS-28 only twice: in April 2022 and in February 2023, with the latter probably being a failed test.²⁴ Nevertheless, satellite imagery and official statements from 2023 suggest that the RS-28 is rapidly approaching deployment.²⁵ The first division to receive RS-28 ICBMs will be the ICBM division at Uzhur, Krasnoyarsk krai.²⁶ Satellite imagery indicates that one regiment’s older RS-20Vs have already been removed to prepare for the incoming RS-28 ICBMs and that construction for at least four silos had been completed by the end of 2023, although it was unclear whether any RS-28 ICBMs had been loaded into those silos.

Several new ICBM programmes, as well as various HGVs that could be fitted on modified ICBMs, appear to be in the early stages of development. These follow-on programmes reportedly include the ‘Yars-M’ (a MIRV-capable ICBM that uses a parallel-staging rocket booster configuration), the ‘Osina-RV’ (a modernized version of the RS-24) and the ‘Kedr’ (a next-generation system intended to replace the RS-24).²⁷

In December 2023 Russia announced plans to conduct seven ICBM flight tests in 2024. However, given that in recent years Russia has launched significantly fewer ICBMs than planned, it may not meet this target.²⁸

Sea-based missiles

As of January 2024 the Russian Navy had a fleet of 12 nuclear-armed SSBNs, made up of 5 Soviet-era Delfin-class or Project 667BDRM (Delta IV) SSBNs and 7 Borei-class or Project 955/955A (Dolgorukiy) SSBNs. A few of these are in overhaul at any given time and not considered fully operational.

Russia plans to replace the 5 remaining Delfin-class SSBNs with new Borei-A (or Project 955A) SSBNs. It probably aims to have a total of 12 Borei-class SSBNs. Half will be assigned to the Northern Fleet (in the Arctic Ocean)

²⁴ President of Russia, ‘Test launch of Sarmat ICBM’, 20 Apr. 2022; and Liebermann, O. and Bertrand, N., ‘US believes Russia had failed intercontinental ballistic missile test around when Biden was in Ukraine’, CNN, 22 Feb. 2023.

²⁵ Korda, M. and Kristensen, H., ‘Upgrade underway for Russian silos to receive new Sarmat ICBM’, FAS Strategic Security Blog, Federation of American Scientists, 19 Oct. 2023; Минобороны России (@mod_russia), Telegram, 7 Oct. 2023, <https://t.me/mod_russia/31220>; and ‘First Sarmat ICBMs regiment to go on combat duty in December 2023–Source’, TASS, 19 Nov. 2023.

²⁶ Karakaev (note 21).

²⁷ Karakaev (note 18); MilitaryRussia.Ru (@militaryrussia.ru), Telegram, 15 May 2023, <<https://t.me/militaryrussiuru/5673>> and <<https://t.me/militaryrussiuru/5674>>; Ryabkov, K., ‘«Ярс-М» и «Осина-РВ». Направления развития стратегического ракетного комплекса’ [‘Yars-M’ and ‘Osina-RV’. Directions of strategic missile complex], TopWar, 18 May 2023; M51.4ever (@M51_4ever), X, 20 Nov. 2023, <https://twitter.com/M51_4ever/status/1725181990062719000>; and Richard, C. A., Commander, US Strategic Command, Statement before the US House of Representatives, Armed Services Committee on Strategic Forces, 1 Mar. 2022.

²⁸ Karakaev (note 18).

and the other half to the Pacific Fleet.²⁹ After years of delays due to technical issues, over the past four years Russia has delivered new Borei-A SSBNs to the navy at an average rate of one per year. One new Borei-A SSBN—*Imperator Alexandr III* (also known as *Emperor Alexander III*)—was delivered to the navy in 2023, with the remainder scheduled for delivery in the late 2020s or early 2030s.³⁰ A new design concept for a follow-on SSBN, known as ‘Arktur’ or ‘Arcturus’, was unveiled in 2022. The new SSBN would be smaller than the current Borei class, have a reduced number of ballistic missiles and, if the design is approved, begin replacing the Borei SSBNs in the late 2030s.³¹

Each of the 12 operational SSBNs can be equipped with 16 ballistic missiles and the Russian SSBN fleet can carry up to 992 warheads.³² However, one or two SSBNs are normally undergoing repairs and maintenance at any given time and are not armed. It is also possible that the warhead load on some missiles has been reduced to meet the total warhead limit under New START. As a result, SIPRI estimates that about 640 of the 992 warheads are deployed. The Delfin SSBNs are thought to carry RSM-54 SLBMs, either the Sineva (SS-N-23 M2) or a modified version, known as Layner (SS-N-23 M3), while the Borei and Borei-A SSBNs carry newer RSM-56 Bulava (SS-N-32) SLBMs.

In 2023 the Russian Navy continued to develop the Poseidon or Status-6 (Kanyon), a long-range, strategic nuclear-powered torpedo intended for deployment on two new types of special-purpose submarine: the K-329 *Belgorod* or Project 09852, which is a converted Antei-class or Project 949A (Oscar II) nuclear-powered guided-missile submarine (SSGN); and the *Khabarovsk* or Project 09851.³³ The Poseidon system was reportedly tested twice in 2023.³⁴

²⁹ ‘Sevmash shipyard ready to continue construction of Borei-A nuclear subs—CEO’, TASS, 16 Mar. 2023.

³⁰ Russian Federation, ‘Ceremony for raising naval flags on nuclear-powered submarines Emperor Alexander III and Krasnoyarsk’, 11 Dec. 2023; and Sevmash, ‘На Севмаше заложили атомные подводные крейсера «Дмитрий Донской» и «Князь Потемкин» [Nuclear-powered submarine cruisers ‘Dmitry Donskoy’ and ‘Prince Potemkin’ laid down at Sevmash], 23 Aug. 2021.

³¹ ‘Атомную подлодку “Арктур” оснастят новым оружием, сообщило КБ “Рубин” [The nuclear submarine ‘Arktur’ will be equipped with new weapons, said CB ‘Rubin’], RIA Novosti, 16 Aug. 2022; and Safranov, S., ‘В конструкторском бюро назвали сроки появления в ВМФ новых атомных подлодок’ [The design bureau announced the timing of the appearance of new nuclear submarines in the Navy], RIA Novosti, 21 June 2023.

³² The Delfin-class SSBNs carry RSM-54 Sineva/Layner (SS-N-23 M2/3) SLBMs, while the Borei and Borei-A SSBNs carry RSM-56 Bulava (SS-N-32) SLBMs. Each RSM-54 can carry up to 4 warheads, while each RSM-56 can carry up to 6 warheads. It is assumed that each RSM-56 has had its warhead load reduced to 4 warheads, to meet New START limits.

³³ Sutton, H. I., ‘Khabarovsk-class-submarine’, *Covert Shores*, 20 Nov. 2020; and Sutton, H. I., ‘Poseidon torpedo’, *Covert Shores*, 22 Feb. 2019.

³⁴ ‘АПЛ “Белгород” завершила бросковые испытания макета торпеды “Посейдон” [The design bureau announced the timing of the appearance of the navy’s new nuclear submarines], TASS, 9 Jan. 2023; and Cook, E., ‘Russia successfully tests secret nuclear-powered “Poseidon” torpedo’, *Newsweek*, 10 June 2023.

The official handover of the *Belgorod* to the Russian fleet took place in July 2022.³⁵ The *Khabarovsk* appeared to be in the final stages of construction at the Sevmash shipyard at the end of 2023.³⁶ One additional special-purpose submarine is scheduled for delivery by 2027, for a total of at least three submarines, each capable of carrying up to six Poseidon torpedoes.³⁷ However, the weapon system is unlikely to be operational for several years.³⁸ Russia is upgrading warhead storage facilities at the Pacific Fleet submarine base in Kamchatka krai, which will house at least two of the special-purpose submarines and their Poseidon weapon systems.³⁹

Non-strategic nuclear forces

Russia's non-strategic nuclear weapons chiefly serve to compensate for perceived conventional inferiority relative to North Atlantic Treaty Organization (NATO) forces; to provide regional (as opposed to intercontinental) deterrence options; and to maintain overall parity with the total US nuclear force level.⁴⁰ There has been considerable debate among Western officials and experts about the role that non-strategic nuclear weapons have in Russian nuclear strategy, including potential first use.⁴¹

The US Defense Intelligence Agency estimated in 2021 that Russia had 1000–2000 non-strategic warheads; this estimate was repeated in a US State Department report to the US Congress in May 2023.⁴² SIPRI estimates that,

³⁵ 'Shipbuilders deliver special-purpose sub with nuclear-powered drones to Russian Navy', TASS, 8 July 2022.

³⁶ 'Submarine force armed with Poseidon torpedoes to come into operation in Kamchatka in 2025', TASS, 3 Apr. 2023.

³⁷ 'First batch of nuclear-armed drones Poseidon manufactured for special-purpose sub Belgorod', TASS, 16 Jan. 2023.

³⁸ 'Вторую подлодку-носитель "Посейдонов" планируют спустить на воду весной–летом 2021 года' [Second 'Poseidon' carrier submarine to be launched in spring–summer 2021], TASS, 6 Nov. 2020.

³⁹ 'Base for Poseidon nuclear super-torpedoes to go on stream in Kamchatka next year—Source', TASS, 27 Mar. 2023; and authors' assessment based on analysis of satellite imagery.

⁴⁰ There is no universally accepted definition of 'tactical', 'non-strategic' or 'theatre' nuclear weapons. These terms generally refer to shorter-range weapons that are not covered by arms control agreements regulating long-range strategic forces.

⁴¹ On this debate see e.g. US Department of Defense, *Nuclear Posture Review 2018* (DOD: Washington, DC, Feb. 2018), p. 30; Kofman, M. and Fink, A. L., 'Escalation management and nuclear employment in Russian military strategy', *War on the Rocks*, 23 June 2020; Oliker, O., 'Moscow's nuclear enigma: What is Russia's arsenal really for?', *Foreign Affairs*, Nov./Dec. 2018; Stowe-Thurston, A., Korda, M. and Kristensen, H. M., 'Putin deepens confusion about Russian nuclear policy', *Russia Matters*, Harvard Kennedy School, 25 Oct. 2018; Tertrais, B., 'Russia's nuclear policy: Worrying for the wrong reasons', *Survival*, vol. 60, no. 2 (Apr. 2018); Ven Bruusgaard, K., 'The myth of Russia's lowered nuclear threshold', *War on the Rocks*, 22 Sep. 2017; and Kaushal, S. and Cranny-Evans, S., 'Russia's nonstrategic nuclear weapons and its views on limited nuclear war', *Royal United Services Institute*, 21 June 2022.

⁴² Berrier, S., Director, US Defense Intelligence Agency, 'Worldwide threat assessment', Statement for the record, US Senate, Armed Services Committee, 26 Apr. 2021; and US 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', May 2023.

as of January 2024, Russia had nearly 1560 warheads assigned for potential use by non-strategic forces—a lower estimate than for January 2023 as a result of a revised assessment by the authors based on modified assumptions. However, this new estimate still comes with a high degree of uncertainty. Most Russian delivery systems for non-strategic nuclear weapons are dual-capable, meaning that they can also deliver conventional warheads. They are intended for use by ships and submarines, aircraft, air- and missile-defence systems, and in army missiles.

Nuclear weapon sharing with Belarus

Russia and Belarus made numerous claims in 2023 about the deployment of non-strategic nuclear weapons to Belarus. President Putin announced in March that Russia had re-equipped 10 Belarusian Su-25 (Frogfoot) aircraft with the ability to deliver nuclear weapons and had transferred dual-capable, road-mobile 9K720 Iskander-M (SS-26) short-range ballistic missiles (SRBMs) to Belarus.⁴³ Training of Russian launch crews was apparently completed by April, and in late December 2023 Belarusian President Alexander Lukashenko stated that Russia had completed its shipments of nuclear weapons to Belarus.⁴⁴ Belarusian railway workers claimed during the latter half of 2023 that ‘Russian tactical nuclear weapons and related equipment’ had entered Belarus through multiple transfers.⁴⁵

Despite these official statements and some possible open-source indicators, there remain several unknowns relating to the status of this deployment. While open sources and satellite imagery imply that these warheads could be stored at a new high-security depot near Asipovichy, Mahilyou oblast, there was no conclusive visual evidence as of January 2024 that Russian nuclear warheads and related personnel were deployed in Belarus.

Navy weapons

The Russian navy is estimated to have over 780 warheads assigned for use by land-attack cruise missiles, anti-ship cruise missiles, anti-submarine rockets, depth bombs, and torpedoes delivered by surface ships, submarines and naval aviation. Recent upgrades include the dual-capable long-range, land-attack Kalibr sea-launched cruise missile (SLCM), also known as the

⁴³ ‘Интервью Владимира Путина Павлу Зарубину’ [Interview with Vladimir Putin to Pavel Zarubin], Smotrim, 25 Mar. 2023.

⁴⁴ ASTRA (@astrapress), Telegram, 4 Apr. 2023, <<https://t.me/astrapress/24412>>; and ‘Belarus leader says Russian nuclear weapons shipments are completed, raising concern in the region’, AP, 25 Dec. 2023.

⁴⁵ Community of Railway Workers of Belarus, ‘Очередной этап ввоза в Беларусь компонентов российского тактического ядерного оружия и связанного с ним оборудования’ [The next stage of the import of components of Russian tactical nuclear weapons and related equipment to Belarus], 12 Sep. 2023; and Community of Railway Workers of Belarus, ‘Порядок ввоза российского ядерного оружия в Беларусь’ [The procedure for the import of Russian nuclear weapons to Belarus], 27 June 2023.

3M14 (SS-N-30A), and the dual-capable 3M55 (SS-N-26) SLCM.⁴⁶ These missiles are replacing Soviet-era missiles and being integrated on numerous types of surface ship and attack submarine.⁴⁷ Among these vessels is the new Project 855/855M Yasen/Yasen-M (Severodvinsk) SSGN, of which four boats are currently operational after the latest—named *Krasnoyarsk*—was commissioned in December 2023. Five more are under construction. The first of these—named *Arkhangelsk*—left the Sevmash shipyard in November 2023 to prepare for its launch and sea trials.⁴⁸ Russia is reportedly considering building three additional Project 855M SSGNs, although this has not been officially confirmed.⁴⁹

Air force weapons

Over 330 non-strategic nuclear weapons are estimated to be assigned to the Russian Air Force for use by Tu-22M3M intermediate-range bombers, Su-24M (Fencer-D) fighter-bombers, Su-34 (Fullback) fighter-bombers and MiG-31K (Foxhound) attack aircraft.⁵⁰ The new Su-57 (Felon) combat aircraft is also dual-capable. Deliveries of the Su-57 to the air force continued in 2023, with 22 aircraft scheduled for delivery by the end of 2024.⁵¹

The MiG-31K is equipped with the new dual-capable 9A-7760 Kinzhal air-launched ballistic missile (ALBM). In 2022 it was operational with the Southern Military District and Northern Fleet and will eventually be integrated into the Western and Central Military Districts by 2024.⁵²

⁴⁶ There is considerable confusion about the designation of what is commonly referred to as the Kalibr missile. The Kalibr name does not refer to a specific missile but to a launcher for a family of weapons that, in addition to the 3M14 (SS-N-30/A) land-attack versions, includes the 3M54 (SS-N-27) anti-ship cruise missile and the 91R anti-submarine missile. For further detail see US Navy, Office of Naval Intelligence (ONI), *The Russian Navy: A Historic Transition* (ONI: Washington, DC, Dec. 2015), pp. 34–35.

⁴⁷ It is important to caution that although a growing number of vessels can launch the dual-capable 3M14, it is uncertain how many of them have been assigned a nuclear role.

⁴⁸ MilitaryRussia.Ru (@DnKornev), X, 24 Jan. 2024, <<https://twitter.com/DnKornev/status/1750366578200178964>>.

⁴⁹ Kornev, D., ‘Спрос с «Ясенья»: что даст флоту строительство новых атомных подлодок’ [Demand from ‘Yasen’: What the construction of new nuclear submarines will give the fleet], *Izvestia*, 26 Nov. 2023; and ‘Источник сообщил, что число АПЛ семейства “Ясень” доведут до 12’ [According to a source, the number of nuclear submarines of the Yasen family will be increased to 12], TASS, 18 Nov. 2023.

⁵⁰ US Department of Defense, ‘US nuclear deterrence policy’, 1 Apr. 2019, p. 3; International Institute for Strategic Studies, *The Military Balance 2021* (Routledge: London, 2021); and authors’ estimates. It is possible that the Su-30SM is also capable of delivering nuclear weapons.

⁵¹ D’Urso, S., ‘First serial production Su-57 Felon delivered to the Russian Aerospace Forces’, *The Aviationist*, 30 Dec. 2020; Rob Lee (@RALee85), Twitter, 3 Feb. 2022, <<https://twitter.com/RALee85/status/1489302156729593869>>; and United Aircraft Corporation (UAC), ‘ОАК передала Минобороны очередную партию серийных самолётов пятого поколения Су-57’ [UAC handed over another batch of fifth-generation Su-57s to the Defence Ministry], 28 Dec. 2022.

⁵² President of Russia (note 23); ‘Russia’s upgraded MiG-31 fighters to provide security for Northern Sea Route’, TASS, 26 Nov. 2021; and Kretsul, R. and Cherepanova, A., ‘Прибавить гиперзвук: еще один военный округ вооружат «Кинжалами»’ [Hypersonic boost: Another military district to be armed with ‘daggers’], *Izvestia*, 7 June 2021.

Conventional Kinzhals have been used against Ukraine.⁵³ President Putin announced in February 2023 that Russia would accelerate mass production of the Kinzhal.⁵⁴

Russia is also fielding the dual-capable Kh-32 (AS-4A) air-to-surface missile, an upgrade of the Kh-22N (AS-4), for use on the Tu-22M3.⁵⁵

Air-, coastal- and missile-defence weapons

Russian air-, coastal- and missile-defence forces are estimated to have been assigned around 345 nuclear warheads, although this estimate comes with a high degree of uncertainty. Most have been assigned for use by dual-capable S-300 (SA-20) and S-400 (SA-21) air-defence forces and the Moscow A-135 missile-defence system. Russian coastal-defence units are believed to have been assigned a small number of nuclear weapons for anti-ship missions. In 2023 a US State Department assessment suggested that Russia continued to use non-strategic nuclear warheads for ‘anti-aircraft’ and ‘anti-ballistic missile systems’.⁵⁶

It is likely that the stock of warheads associated with Russia’s air-, coastal- and missile-defence forces will eventually decrease as conventional air-defences improve—including the Nudol and Aerostat systems under development in 2023—and as legacy warheads are retired.

Army weapons

The Russian Army has an estimated 95 warheads to arm dual-capable 9K720 Iskander-M SRBMs and 9M729 (SSC-8) ground-launched cruise missiles (GLCMs). As of January 2024 the Iskander-M had completely replaced the Tochka (SS-21) SRBM in 12 missile brigades.⁵⁷ The 9M728 (SSC-7) may also have a nuclear capability.

The dual-capable 9M729 GLCM was cited by the USA as its main reason for withdrawing from the 1987 Treaty on the Elimination of Intermediate-range and Shorter-range Missiles (INF Treaty) in 2019.⁵⁸ SIPRI estimates that four or five 9M729 battalions have so far been co-deployed with four or five of the Iskander-M brigades.

⁵³ ‘Shoigu reveals Kinzhal hypersonic missile was used three times during special operation’, TASS, 21 Aug. 2022.

⁵⁴ ‘Russia to continue mass production of Kinzhal hypersonic systems—Putin’, TASS, 22 Feb. 2023.

⁵⁵ US Department of Defense (note 41), p. 8.

⁵⁶ US Department of State (note 42).

⁵⁷ Authors’ assessment based on analysis of satellite imagery and Russian reports.

⁵⁸ US Department of State, Bureau of Arms Control, Verification and Compliance, ‘INF Treaty at a glance’, Fact sheet, 8 Dec. 2017. For a summary and other details of the INF Treaty see annex A, section III, in this volume. See also Topychkanov, P. and Davis, I., ‘Russian-US nuclear arms control and disarmament’, *SIPRI Yearbook 2020*; and Kile, S. N., ‘Russian-US nuclear arms control and disarmament’, *SIPRI Yearbook 2018*.

Table 73. Russian nuclear forces, January 2024

All figures are approximate and some are based on assessments by the authors.

Type/ Russian designation (NATO designation)	No. of launchers	Year first deployed	Range (km) ^a	Warheads x yield	No. of warheads ^b
Strategic nuclear forces	590				2 822^c
<i>Aircraft (bombers)</i>	<i>67^d</i>				<i>586^e</i>
Tu-95MS/M (Bear-H) ^f	52	1984/ 2015	6 500– 10 500	6–14 x 200 kt Kh-55 (AS-15A) or Kh-102 (AS-23B) ALCMs	430 ^g
Tu-160M1/M2 (Blackjack)	15	1987/ 2021	10 500– 13 200	12 x 200 kt Kh-55 or Kh-102 ALCMs, [Kh-BD], bombs	156 ^h
<i>Land-based missiles (ICBMs)</i>	<i>329</i>				<i>1 244ⁱ</i>
RS-20V Voevoda (SS-18 Mod 5 Satan)	34	1988	11 000– 15 000	10 x 500–800 kt ^j	340
Avangard (SS-19 Mod 4) ^k	10	2019	10 000	1 x HGV	10
RS-12M1 Topol-M (SS-27 Mod 1/mobile)	18	2006	10 500	1 x [800 kt]	18
RS-12M2 Topol-M (SS-27 Mod 1/silo)	60	1997	10 500	1 x [800 kt]	60
RS-24 Yars (SS-27 Mod 2/mobile)	180	2010	10 500	[4 x 250 kt] ^l	720
RS-24 Yars (SS-27 Mod 2/silo)	24	2014	10 500	4 x [250 kt]	96
RS-28 Sarmat (SS-29)	..	[2024]	>10 000	[10 x 500 kt]	–
Sirena-M ^m	3	2022	–	Command and control module	–
<i>Sea-based missiles (SLBMs)</i>	<i>12/192ⁿ</i>				<i>992^o</i>
RSM-54 Sineva/Layner (SS-N-23 M2/3) ^p	5/80	2007/ 2014	9 000	4 x 100 kt ^q	320 ^r
RSM-56 Bulava (SS-N-32)	7/112	2012	>8 050	[6 x 100 kt] ^s	672
Non-strategic nuclear forces					1 558^t
<i>Navy weapons</i>	<i>..</i>				<i>784</i>
Submarines/surface ships/naval aircraft	..		Land-attack cruise missiles, sea-launched cruise missiles, anti-submarine weapons, surface-to-air missiles, depth bombs, torpedoes ^u		784
<i>Air force weapons</i>	<i>289</i>				<i>334</i>
Tu-22M3M (Backfire-C)	57	1974	..	2 x ASMs	114
Su-24M/M2 (Fencer-D)	68	1974	..	2 x bombs	68 ^v
Su-34 (Fullback)	122	2006	..	2 x bombs	122 ^v
Su-57 (Felon)	18	[2024]	..	[bombs, ASMs]	18
MiG-31K (Foxhound)	24	2018	..	1 x ALBM	12

Type/ Russian designation (NATO designation)	No. of launchers	Year first deployed	Range (km) ^a	Warheads x yield	No. of warheads ^b
<i>Air, coastal and missile defence</i>	882				345
53T6 (SH-08 Gazelle)	68	1986	30	1 x 10 kt	68
S-300/400 (SA-20/21)	750 ^w	1992/ 2007	..	1 x low kt	250
3M55/P-800 Oniks (SS-N-26 Strobile), 3K55/K300-P Bastion (SSC-5 Stooqe)	56	2015	>400	1 x [10–100 kt]	23
SPU-35V Redut (SSC-1B Sepal)	8 ^x	1973	500	1 x 350 kt	4
<i>Army weapons</i>	170				95
9K720 Iskander-M (SS-26 Stone), 9M728 Iskander-K (SSC-7 Southpaw)	150	2005	500	1 x [10–100 kt]	75 ^y
9M729 (SSC-8 Screwdriver)	20	2016	2 350	1 x [10–100 kt]	20 ^z
Total stockpile					4 380
Deployed strategic warheads					1 710
Reserve warheads					2 670
Strategic					1 112
Non-strategic					1 558
Retired warheads awaiting dismantlement					1 200
Total inventory					5 580

.. = not available or not applicable; – = nil or a negligible value; [] = uncertain SIPRI estimate; ALBM = air-launched ballistic missile; ALCM = air-launched cruise missile; ASM = air-to-surface missile; HGV = hypersonic glide vehicle; kt = kiloton; ICBM = intercontinental ballistic missile; NATO = North Atlantic Treaty Organization; SLBM = submarine-launched ballistic missile.

^a For aircraft, the listed range is for illustrative purposes only; actual mission range will vary according to flight profile, weapon payload and in-flight refuelling.

^b These figures show the total number of warheads estimated to be assigned to nuclear-capable delivery systems. Only some of these warheads have been deployed on missiles and at airbases, as described in the notes below.

^c Of these strategic warheads, c. 1710 were deployed on land- and sea-based ballistic missiles and at bomber bases. The remaining warheads were in central storage. This number differs from the number of deployed strategic warheads counted by the 2010 Russian–United States Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START) because the treaty attributes 1 weapon to each deployed bomber, even though bombers do not carry weapons under normal circumstances. Additionally, the treaty does not count weapons stored at bomber bases and, at any given time, some nuclear-powered ballistic missile submarines (SSBNs) are not fully loaded with warheads and are thus not counted under the treaty. Russia no longer publishes aggregate figures for strategic nuclear forces limited by New START.

^d All of Russia's long-range strategic bombers are nuclear-capable. Of these, only c. 58 are thought to be counted as deployed under New START. Because of ongoing bomber modernization, there is considerable uncertainty about how many bombers are operational.

^e The maximum possible payload on the bombers is estimated to be c. 650 nuclear weapons but, given that only some of the bombers are fully operational, SIPRI estimates that only c. 580 weapons have been assigned to the long-range bomber force. Of these, c. 200 might be deployed and stored at the 2 strategic bomber bases. The remaining weapons are thought to be in central storage facilities.

^f The 1991 Russian-US Strategic Arms Reduction Treaty (START) distinguished between 2 variants of the Tu-95MS: the Tu-95MS6 (Bear-H6), which can carry 6 ALCMs internally, and the Tu-95MS16 (Bear-H16), which can carry an additional 10 ALCMs on wing pylons for a total of 16 ALCMs. However, it is unclear whether the MS16 configuration is still in use or whether the external pylons have been removed, which would effectively turn the MS16s into MS6s. The Tu-95MS is being upgraded to the Tu-95MSM. The upgrade adds 4 pylons, allowing the aircraft to carry 8 Kh-101/102 (AS-23A/B) missiles externally as well as, potentially, 6 Kh-55 (AS-15B) missiles internally, for a total of 14 ALCMs.

^g This estimate assumes that c. 20 of the Tu-95MS aircraft have been upgraded and together can carry up to 280 warheads (see note f), while c. 25 Tu-95MS6s can carry up to 150 warheads. It also assumes that 7 aircraft are in overhaul either for maintenance or for modernization.

^h This estimate assumes that 2 Tu-160 (Blackjack) aircraft are in overhaul either for maintenance or for modernization; the remaining 13 can carry up to 156 warheads.

ⁱ These ICBMs can carry a total of c. 1244 warheads, but SIPRI estimates that they have had their warhead load reduced to c. 872 warheads, with the remaining warheads in storage.

^j It is possible that, as of Jan. 2024, the RS-20Vs (SS-18 Mod 5 Satan) carried only 5 warheads each to meet the New START limit for deployed strategic warheads.

^k The missile uses a modified RS-18 (SS-19 Stiletto) ICBM booster with an HGV payload.

^l It is possible that, as of Jan. 2024, the RS-24s (SS-27 Mod 2) carried only 3 warheads each to meet the New START limit on deployed strategic warheads.

^m The division at Yurya is equipped with the new Sirena-M nuclear command and control missile, which is based on the RS-24 ICBM. The missiles are not nuclear-armed, but rather serve as an emergency launch communication module. They are included in this table because their launchers are counted against the limits permitted under New START.

ⁿ The first figure is the total number of nuclear-powered ballistic missile submarines (SSBNs) in the Russian fleet; the second is the maximum number of missiles that they can carry. Of Russia's 12 operational SSBNs (as of Jan. 2024), 1-2 are in overhaul at any given time and do not carry their assigned nuclear missiles and warheads (see note o).

^o The warhead load on SLBMs is thought to have been reduced for Russia to stay below the New START warhead limit. Additionally, at any given time, 1-2 SSBNs are in overhaul and do not carry nuclear weapons. Therefore, it is estimated here that only c. 640 of the 992 SLBM warheads have been deployed.

^p The current version of the RSM-54 SLBM might be the Layner (SS-N-23 M3), a modification of the previous version—the Sineva (SS-N-23 M2). However, the US Air Force's National Air and Space Intelligence Center (NASIC) did not include the Layner in its 2020 report on ballistic and cruise missile threats, and there is some uncertainty regarding its status and capability.

^q In 2006 US intelligence estimated that the RSM-54 missile could carry up to 10 warheads, but it lowered the estimate to 4 in 2009. The average number of warheads carried on each missile has probably been limited to 4 multiple independently targetable re-entry vehicles (MIRVs) to meet the New START limits.

^r SIPRI estimates that, at any given time, only 256 of these warheads are deployed on 4 operational Delfin-class (Delta IV) submarines, with the fifth boat in overhaul. The actual number may even be lower as 2 boats often undergo maintenance at the same time.

^s It is possible that, as of Jan. 2024, RSM-56 Bulava (SS-N-32) SLBMs carried only 4 warheads each for Russia to meet the New START limit on deployed strategic warheads.

^t According to the Russian government, non-strategic nuclear warheads are not deployed with their delivery systems but are kept in storage facilities. Some storage facilities are near operational bases. It is possible that there are more unreported nuclear-capable non-strategic systems.

^u Only submarines are assumed to be assigned nuclear torpedoes.

^v This estimate assumes that half of the aircraft have a nuclear role.

^w As of Jan. 2024 there were at least 80 S-300/400 (SA-20/21) sites across Russia, each with an average of 12 launchers, each with 2–4 interceptors. Each launcher has several reloads, which are assumed likely to be conventional.

^x It is assumed that all SPU-35V Redut (SSC-1B Sepal) units, except for a single silo-based version in Crimea, had been replaced by the K-300P Bastion (SSC-5 Stooze) by Jan. 2024.

^y This estimate assumes that around half of the dual-capable launchers have a secondary nuclear role. In its 2020 report, NASIC listed the 9M728 (SSC-7 Southpaw) as ‘Conventional, Nuclear Possible’.

^z This estimate assumes that there are 5 9M729 (SSC-8 Screwdriver) battalions, each of which is equipped with 4 launchers. Since each launcher appears to be equipped to carry 4 missiles, this would indicate a total of 80 missiles per battalion (possibly 160 if each battalion has 1 reload missile). However, it is assumed here that each launcher is only assigned an average of 1 nuclear warhead (with the rest being equipped with conventional munitions), for a total of 20 warheads across 5 battalions.

Sources: Russian Ministry of Defence, various press releases; US Department of State, START Treaty Memoranda of Understanding, 1990–July 2009; New START aggregate data releases, various years; US Air Force, National Air and Space Intelligence Center (NASIC), *Ballistic and Cruise Missile Threat 2020* (NASIC: Wright-Patterson Air Force Base, OH, July 2020); US Department of Defense (DOD), *2022 National Defense Strategy of the United States of America* (DOD: Washington, DC, Oct. 2022); US Office of the Deputy Assistant Secretary of Defense for Nuclear Matters, *Nuclear Matters Handbook 2020* (DOD: Washington, DC, Mar. 2020); DOD, various Congressional testimonies; BBC Monitoring; Russian news media; Russian Strategic Nuclear Forces website; International Institute for Strategic Studies, *The Military Balance*, various years; Cochran, T. B. et al., *Nuclear Weapons Databook*, vol. 4, *Soviet Nuclear Weapons* (Harper & Row: New York, 1989); *IHS Jane’s Strategic Weapon Systems*, various issues; US Naval Institute, *Proceedings*, various issues; *Bulletin of the Atomic Scientists*, ‘Nuclear notebook’, various issues; and authors’ estimates.