

II. Russian nuclear forces

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As of January 2017 Russia maintained an arsenal of approximately 4300 nuclear warheads.¹ About 2460 of these are strategic warheads, of which nearly 1950 are deployed on land- and sea-based ballistic missiles and at bomber bases. Russia also possessed approximately 1850 non-strategic (tactical) nuclear warheads, all of which are in central storage. An additional roughly 2700 warheads were retired or awaiting dismantlement, giving a total inventory of approximately 7000 warheads (see table 11.3).

Russia continues to reduce its deployed strategic nuclear force pursuant to implementing the 2010 Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START).² It is expected to reach compliance with the treaty's limits on deployed nuclear delivery systems (land- and sea-based missiles and strategic bombers) and on the warheads attributed to those systems by the February 2018 deadline.³

Russia is in the middle of a long transition from obsolescent Soviet-era forces to newer weapons. Russia has about 150 fewer deployed strategic launchers than the United States, and is trying to maintain rough overall parity by limiting future reductions in the number of launchers and maximizing the number of warheads carried on each of them. Despite a strong commitment to the modernization of its nuclear forces, serious financial constraints, combined with an inefficient defence industry and widespread corruption, are likely to delay or even lead to the cancellation of some programmes.

There has been growing concern in the North Atlantic Treaty Organization (NATO) in recent years that Russia has lowered the threshold for when it might potentially use nuclear weapons. In particular, US and NATO officials have warned that Russia's purported doctrine of nuclear escalation to de-escalate a conventional conflict ('escalate to de-escalate') indicates a greater willingness to use nuclear weapons.⁴ Russia's public military strategy has not undergone a significant change, but Russian officials have made several explicit threats against NATO countries and escalation to the use of tactical nuclear weapons appears to be a frequent part of Russian military exercises.

¹ This section updates the more detailed discussion of Russian nuclear forces in *SIPRI Yearbook 2016*.

² For a summary and other details of New Start see annex A, section III, in this volume.

³ On the New Start numbers see also chapter 12, section I, in this volume.

⁴ Sher, R., US Assistant Secretary of Defense for Strategy, Plans, and Capabilities, Statement before the Senate Armed Services Subcommittee on Strategic Forces, 9 Feb. 2016, p. 3.

Strategic bombers

Russia's Long-range Aviation Command includes approximately 13 Tu-160 (Blackjack), 30 Tu-95MS16 (Bear-H16) and 25 Tu-95MS6 (Bear-H6) bombers. Some of these may not be fully operational. The maximum loading on these bombers is more than 600 nuclear weapons, of which approximately 200 might be stored at the two strategic bomber bases. Modernization of the bombers is well under way. Nearly all of the Tu-160s and a few of the Tu-95s will be upgraded to maintain a bomber force of 50–60 aircraft. The Russian Government has also announced plans to resume production of the Tu-160 to produce up to 50 modified aircraft known as Tu-160M2, starting in 2023.⁵

Land-based ballistic missiles

As of January 2017 Russia's Strategic Rocket Forces (SRF)—the branch of the armed forces that controls land-based intercontinental ballistic missiles (ICBM)—consisted of 12 missile divisions grouped into three armies and deploying an estimated 316 ICBMs of seven different types and variations. The ICBM force carries a little over 1000 warheads, about 60 per cent of Russia's deployed strategic warheads.

Russia's ICBM force is being gradually modernized. Soviet-era missiles, such as the road-mobile RS-12M Topol (SS-25), are being replaced by new systems, albeit not on a one-for-one basis.⁶ The replacement programme, which started in 1997, appears to be progressing more slowly than previously planned. More than half of the force had been upgraded by the end of 2016. All the remaining Soviet-era ICBMs are scheduled to be withdrawn by 2024, three years later than previously announced. In addition to procuring new missiles, the modernization involves substantial reconstruction of silos, launch control centres, garrisons and support facilities.

Russia's current ICBM modernization is dominated by the multiple-warhead version of the RS-12, known as RS-24 Yars (SS-27 Mod 2), which will be fielded in three mobile divisions. The first silo-based RS-24 regiment with 10 missiles is operational at Kozelsk and a second regiment is in the early stages of construction. Russia is developing a third modification of the RS-12M, known as the RS-26 (Yars-M), which will be lighter than the RS-24. The planned deployment of the RS-26 in 2016 was delayed.⁷

⁵ RIA Novosti, [Russian defence ministry started to sign the first contracts for the project Tu-160M2], Aviaport, 17 July 2015 (in Russian).

⁶ Tsvetozda, [Missile system 'Topol' will be removed from service in 2022], 15 Dec. 2016 (in Russian).

⁷ Sputnik News, 'Russia's new ballistic missile can become operational in 2016: SMF Commander', 25 Dec. 2014.

Table 11.3. Russian nuclear forces, January 2017

Type/ Russian designation (NATO designation)	No. of launchers	Year first deployed	Range (km) ^a	Warhead loading	No. of warheads ^b
Strategic offensive forces					2 460^c
<i>Bombers</i>	50/68 ^d				616 ^e
Tu-95MS6 (Bear-H6)	14/25	1981	6 500– 10 500	6 x AS-15A ALCMs, bombs	84
Tu-95MS16 (Bear-H16)	25/30	1981	6 500– 10 500	16 x AS-15A ALCMs, bombs	400
Tu-160 (Blackjack)	11/13	1987	10 500– 13 200	12 x AS-15B ALCMs or AS-16 SRAMs, bombs	132
<i>ICBMs</i>	316				1 076
RS-20V (SS-18 Satan)	46	1992	11 000– 15 000	10 x 500–800 kt	460
RS-18 (SS-19 Stiletto)	20	1980	10 000	6 x 400 kt	120
RS-12M Topol (SS-25 Sickle)	90 ^f	1985	10 500	1 x 800 kt	90
RS-12M2 Topol-M (SS-27/silo)	60	1997	10 500	1 x 800 kt	60
RS-12M1 Topol-M (SS-27)	18	2006	10 500	1 x (800 kt)	18
RS-24 Yars (SS-27 Mod 2)	70	2010	10 500	4 x (100 kt)	280
RS-24 Yars (SS-27 Mod 2/silo)	12	2014	10 500	4 x (100 kt)	48
RS-26 Yars-M (SS-27 Mod 3)	..	(2017)	5 500+	.. x (100 kt)	..
<i>SLBMs</i>	11/176 ^g				768 ^g
RSM-50 Volna (SS-N-18 M1 Stingray)	2/32	1978	6 500	3 x 50 kt	96
RSM-54 Sineva (SS-N-23 M1)	6/96	1986/2007	9 000	4 x 100 kt	384
RSM-56 Bulava (SS-N-32)	3/48	2014	>8 050	6 x (100 kt)	288
Non-strategic forces					-1 850^h
<i>ABM, air/coastal defence</i>	900				-370
53T6 (SH-08, Gazelle)	68	1986	30	1 x 10 kt	68
S-300 (SA-10/20)	800 ⁱ	1980/1992	..	1 x low kt	290
SSC-1B (Sepal)	30	1973	500	1 x 350	15
<i>Air Force weapons</i>	390 ^j				-570
Tu-22M3 (Backfire-C)	120	1974	..	3 x ASM, bombs	300
Su-24M/M2 (Fencer-D)	200	1974	..	2 x bombs	200
Su-34 (Fullback)	68	2006	..	2 x bombs	68
<i>Army weapons</i>	150				-150
Tochka (SS-21 Scarab)	56	1981	120	(1 x 10–100 kt)	56
Iskander-M (SS-26 Stone)	84	2005	300 ^k	(1 x 10–100 kt)	84
.. (SSC-8 GLCM)	8	2016	(2 500)	1 x .. kt	8
<i>Navy weapons</i>					-760
Submarines/surface ships/air			SLCM, ASW, SAM, depth bombs, torpedoes ^l		
Total deployed/assigned warheads					4 300
Reserve and retired warheads awaiting dismantlement					2 700
Total inventory					7 000

.. = not available or not applicable; () = uncertain figure; ABM = anti-ballistic missiles; ALCM = air-launched cruise missile; ASM = air-to-surface missile; ASW = anti-submarine

warfare; GLCM = ground-launched cruise missile; ICBM = intercontinental ballistic missile; kt = kiloton; NATO = North Atlantic Treaty Organization; SAM = surface-to-air missile; SLBM = submarine-launched ballistic missile; SLCM = sea-launched cruise missile; SRAM = short-range attack missile.

^a Aircraft range is for illustrative purposes only; actual mission range will vary according to flight profile and weapon loading.

^b The number shows the total number of warheads, both deployed and in storage, assigned to the delivery systems. All estimates are approximate.

^c Approximately 1950 of these strategic warheads are deployed on land- and sea-based ballistic missiles and at bomber bases. The remaining warheads are in central storage.

^d The first number is the number of bombers estimated to be counted under the New START Treaty. The 2nd number is the total number of bombers in the inventory.

^e Of the 616 weapons estimated to be assigned to long-range bombers, only 200 weapons are thought to be present at the 2 strategic bomber bases. The remaining weapons are in central storage facilities.

^f It is possible that the number of RS-12 missiles is lower, around 72 missiles.

^g Two of the Delta SSBNs are in overhaul at any given time and do not carry their assigned nuclear missiles and warheads.

^h Non-strategic nuclear warheads are not deployed with their delivery systems but kept in a central storage facility, according to the Russian Government.

ⁱ There are at least 80 S-300 sites across Russia, each with an average of 12 launchers, each with 2–4 interceptors. Each launcher has several reloads. The SA-10 has been nearly replaced by the SA-20.

^j The figures show total aircraft but only some of them are thought to have nuclear missions.

^k Although many unofficial sources and news media reports say the SS-26 has a range of nearly 500 km, the US Air Force, National Air and Space Intelligence Center (NASIC) lists the range as 300 km.

^l Only submarines are thought to be assigned nuclear torpedoes.

Sources: Russian Ministry of Defence 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* (NASIC: Wright-Patterson Air Force Base, OH, May 2013); BBC Monitoring; Russian news media; Russian Strategic Nuclear Forces, <<http://www.russianforces.org/>>; International Institute for Strategic Studies, *The Military Balance* (Routledge: London, various issues); Cochran, T. B. et al., *Nuclear Weapons Databook*, vol. 4, *Soviet Nuclear Weapons* (Harper & Row: New York, 1989); *Jane's Strategic Weapon Systems*, various issues; *Proceedings*, US Naval Institute, various issues; 'Nuclear notebook', *Bulletin of the Atomic Scientists*, various issues; and authors' estimates.

Russian defence officials have stated that a rail-based version of the RS-24, known in Russia as 'Barguzin', is in early design development. Despite speculation in early 2016 that the programme might have been delayed or even cancelled due to Russia's financial crisis, an ejection test was reported in November 2016 and its first flight is said to be planned for 2017.⁸

In addition, Russia is developing a new 'heavy' liquid-fuelled, silo-based ICBM, known as the RS-28 (Sarmat, or SS-30), as a replacement for the RS-20V (SS-18). According to the commander of the SRF, the RS-28 will

⁸ Novichkov, N., 'Russian rail-mobile ICBM project set to be axed', *Jane's Defence Weekly*, 7 Feb. 2016; and Interfax, 'Russia completes rail-based missile ejection tests', 22 Nov. 2016, Translation from Russian, BBC Monitoring.

carry 'new types of warheads', including 'manoeuvrable warheads'.⁹ Deployment of the 100-tonne missile was intended to begin around 2020, but the programme appears to have encountered delays.

Russia normally conducts two large-scale exercises with road-mobile ICBMs each year: a winter exercise in January or February and a summer exercise in July or August. The biannual exercises in 2016 involved Topol, Topol-M and RS-24 launchers from nearly all the operational missile divisions, but with launchers deploying further from their bases for longer periods than in previous years. Russian ICBMs also participated in broader strategic exercises along with SSBNs and bombers. These included several test launches of strategic missiles. The exercise held in October 2016 was said to be one of the largest of its kind since the Soviet era.¹⁰

Ballistic missile submarines and sea-launched ballistic missiles

The Russian Navy has a fleet of 11 operational nuclear-armed nuclear-powered ballistic missile submarines (SSBNs). A new class is under construction that will completely replace all Soviet-era SSBNs by the end of the next decade.

The current backbone of the Russian SSBN fleet is made up of six Project 667BDRM Delfin (Delta IV class) submarines assigned to the Northern Fleet. Two old Project 667BDR Kalmar (designated Delta III class by NATO) submarines are currently operational with the Pacific Fleet. They will be decommissioned in the near future. The *Georgiy Pobedonosets* (K-433) conducted a missile test in 2016 and the *Ryazan* (K-44) returned to service after a lengthy overhaul.

The first three of eight Borei class SSBNs (Project 955/A) conducted their first deterrent patrols in 2015 and 2016. The hulls of subsequent Borei class submarines will be of an improved design known as Borei-A (Project 955A). The first of these, *Knyaz Vladimir*, was supposed to have been delivered to the navy in 2016 but this has been delayed until 2018. The remaining four boats are scheduled for delivery between 2018 and 2020.

Each Borei SSBN carries 16 RSM-56 Bulava (SS-N-32) SLBMs. Because the Bulava can carry six warheads, the future fleet of eight Borei SSBNs will be able to carry significantly more warheads than the eight Delta III/IV currently in the fleet. It is rumoured that four more Borei SSBNs have been ordered.¹¹ If true, Russia will have to reduce the warhead loading on its SSBNs to stay within the New START limit for deployed warheads.

⁹ Falichev, O., ['Sarmat' to replace 'Voyevoda'], vpk-news, Dec. 2015 (in Russian); and 'Sarmat ICBM design to end Russian missile troops' dependence on Ukraine', *Rossiyskaya Gazeta*, 2 June 2014, Translation from Russian, BBC Monitoring.

¹⁰ Gertz, B., 'Russia holds large-scale nuclear war games', *Washington Times*, 2 Nov. 2016.

¹¹ Lenta, ['Great Fleet' on the horizon], 23 Jan. 2015 (in Russian).

Non-strategic nuclear weapons

There is considerable uncertainty about the size, composition and location of Russia's non-strategic nuclear weapon inventory. Like the USA, Russia does not provide information about the number and locations of its non-strategic nuclear weapons. The estimate made here is that there are approximately 1850 warheads assigned for potential use by Russian non-strategic forces. Many more Soviet-era non-strategic warheads have been retired and are awaiting dismantlement (see table 11.3).¹²

The most significant naval development is the fielding of a nuclear version of the new long-range, land-attack Kalibr sea-launched cruise missile. While the conventional version (SS-N-30) is deployed widely on ships and submarines, the nuclear version (SS-N-30A) will probably be integrated on a smaller number of front line nuclear-powered attack submarines to replace the SS-N-21. Possible platforms include the Yasen-M class (Project 885M), Project 945 (Sierra), and Project 971 (Akula). At the same time, upgrades to nuclear-capable warships might replace some nuclear weapons with conventional arms.

An estimated 570 weapons are assigned to Tu-22M3 (Backfire) intermediate-range bombers, Su-24M (Fencer-D) fighter-bombers and the new Su-34 (Fullback) fighter-bomber. The Su-34, which will eventually replace the Su-24M, is already being deployed in western military districts and participates in military exercises and operations. Two Tu-22Ms were involved in the simulated nuclear strike exercise against Sweden that NATO says Russia conducted in March 2013.¹³

There is considerable uncertainty about the extent to which Russia still relies on nuclear warheads for air-, coastal- and missile-defence forces.¹⁴ It is estimated that roughly 300 nuclear warheads are in use by the air-defence forces, as well as 68 for the Moscow A-135 missile defence system, which is being upgraded, and a small number by the remaining coastal defence units, giving a total inventory of nearly 400 warheads.

Ground-based non-strategic nuclear forces include the new Iskander-M (SS-26) short-range ballistic missile (SRBM), which is replacing the Tochka (SS-21) SRBM in 10 missile brigades. Deployment started in 2004 and by the

¹² For more information about Russian non-strategic nuclear weapons and methodology see Kristensen, H. M., *Non-strategic Nuclear Weapons*, Federation of American Scientists (FAS) Special Report no. 3 (FAS: Washington, DC, May 2012), pp. 51–65.

¹³ North Atlantic Treaty Organization (NATO), *The Secretary's Annual Report, 2015* (NATO Public Diplomacy Division: Brussels, 2016), p. 19.

¹⁴ Some analysts have suggested that anti-aircraft missiles may no longer have nuclear warheads or that only very few (fewer than 100) have this capability. See Sutyagin, I., *Atomic Accounting: A New Estimate of Russia's Non-strategic Nuclear Forces* (Royal United Services Institute: London, Nov. 2012), pp. 18–25.

end of 2016 the army had received eight Iskander brigades.¹⁵ Reports that the Iskander-M had been permanently deployed to the Kaliningrad oblast were premature. However, several ‘snap exercises’ involving temporary deployment of the missile there occurred in 2014–16.¹⁶ It is estimated that there are approximately 140 warheads assigned to Russian SRBMs.

The USA has accused Russia of violating the 1987 Soviet–US Treaty on the Elimination of Intermediate-Range and Shorter-Range Missiles (INF Treaty) by developing and testing a new ground-launched cruise missile to a range banned by the treaty.¹⁷ Russia has rejected the accusation. The new cruise missile, known as SSC-8 (a modified version of the SSC-7 used on the Iskander system), has been deployed in one garrison and more are planned.¹⁸

¹⁵ Sputnik News, ‘Over 80% of Russian land forces’ missile units already armed with Iskander-M’, 22 Feb. 2017.

¹⁶ Kivimäki, V-P. and Lewis, J., ‘Russia deploys the Iskander to Kaliningrad’, Arms Control Wonk, 11 Dec. 2016.

¹⁷ For a summary and other details of the INF Treaty see annex A, section III, in this volume.

¹⁸ Gordon, M. R., ‘Russia is moving ahead with missile program that violates treaty, US officials say’, *New York Times*, 19 Oct. 2016. On the INF Treaty controversy see chapter 12, section I, in this volume.