

## II. Russian nuclear forces

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As of January 2018, Russia maintained an arsenal of approximately 4350 nuclear warheads. About 2520 of these are strategic warheads, of which nearly 1600 are deployed on land- and sea-based ballistic missiles and at bomber bases. Russia also possessed approximately 1830 non-strategic (tactical) nuclear warheads, all of which are in central storage sites.<sup>1</sup> An estimated additional 2500 warheads were retired or awaiting dismantlement, giving a total inventory of approximately 6850 warheads (see table 6.3). The reduction in Russia's deployed strategic warheads from the estimated total of 1950 in early 2017 was due to its continuing implementation of the 2010 Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START) during 2017.<sup>2</sup>

### Strategic bombers

Russia's Long-range Aviation Command operates a fleet of 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 and others are undergoing various upgrades. The maximum loading on the operational 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 some of the Tu-95s will be upgraded to maintain a bomber force of 50–60 aircraft. The upgraded bombers are capable of carrying the new Kh-102 (AS-23B) nuclear air-launched cruise missile.<sup>3</sup> 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, with serial production starting in 2023.<sup>4</sup> The additional bombers would probably replace many of the old Tu-95 (MS16 and MS6) aircraft and provide a bridge to the future next-generation bomber, known as PAK-DA, which is scheduled to begin fielding in the late 2020s.<sup>5</sup>

<sup>1</sup> For a recent overview of Russia's nuclear weapon storage facilities see Podvig, P. and Serrat, J., 'Lock them up: zero-deployed non-strategic nuclear weapons in Europe', United Nations Institute for Disarmament Research, 2017.

<sup>2</sup> For a summary and other details of New START see annex A, section III, in this volume. On the implementation of New START see chapter 7, section II, in this volume.

<sup>3</sup> Roblin, S., 'The Tu-95 Bear: the 60-year-old Russian bomber America still chases all over the world', *National Interest*, 11 June 2017.

<sup>4</sup> TASS, 'Russia's upgraded Tu-160M2 bomber to remain state-of-the-art for four more decades', 1 Nov. 2017.

<sup>5</sup> TASS, 'Russia to develop first prototype of next-generation strategic bomber by early 2020s', 13 Apr. 2017.

## Land-based ballistic missiles

As of January 2018, Russia's Strategic Rocket Forces—the branch of the armed forces that controls land-based intercontinental ballistic missiles (ICBMs)—consisted of 12 missile divisions grouped into 3 armies and deploying an estimated 318 ICBMs of 7 different types and variations. These ICBMs can carry a total of 1138 warheads but SIPRI estimates that they have been downloaded to carry just under 800 warheads, nearly 50 per cent of Russia's deployed strategic warheads. In contrast to the frequent claims in recent years about a Russian nuclear 'build-up', the US Air Force's National Intelligence and Space Center (NASIC) estimates that 'the number of missiles in the Russian ICBM force will continue to decrease because of arms control agreements, aging missiles, and resource constraints'.<sup>6</sup>

Russia's ICBM force is in the middle of a significant modernization programme to replace all Soviet-era missiles with new types, albeit not on a one-for-one basis. The replacement programme, which started in 1997, appears to be progressing more slowly than planned. About 60 per cent of the force had been upgraded by the end of 2017. All the remaining Soviet-era ICBMs are scheduled to be withdrawn by 2024, three years later than previously announced. In addition to the procurement of new missiles, the modernization involves substantial reconstruction of silos, launch control centres, garrisons and support facilities.<sup>7</sup>

Russia's current ICBM modernization is focused on the multiple-warhead version of the RS-12, known as RS-24 Yars (SS-27 Mod 2). Three mobile divisions have already been completed, with two more in progress, and two more to begin upgrade by 2020. 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.<sup>8</sup> Russia is developing a third modification of the RS-12M, known as the RS-26 Yars-M (SS-X-28), which will be lighter than the RS-24. However, final development and deployment of the RS-26 has been delayed.<sup>9</sup> In addition, Russia is developing a new 'heavy' liquid-fuelled, silo-based ICBM, known as the RS-28 Sarmat (SS-X-29), as a replacement for the RS-20V (SS-18). According to Russia's Deputy Defence Minister, Yuriy Borisov, the RS-28 will carry 'new types of warheads', including

<sup>6</sup> US Air Force, National Air and Space Intelligence Center (NASIC), *Ballistic and Cruise Missile Threat* (NASIC: Wright-Patterson Air Force Base, OH, July 2017), p. 27. On the alleged Russian nuclear 'build-up' see e.g. Gertz, B., 'Russia sharply expanding nuclear arsenal, upgrading underground facilities', *Washington Free Beacon*, 13 Dec. 2017.

<sup>7</sup> Azanov, R., 'Russia's Strategic Missile Forces as its decisive defense', *TASS*, 19 Dec. 2017.

<sup>8</sup> Azanov (note 7); and Andreyev, D. and Zotov, I., [The nuclear shield is reliable], *Krasnaya Zvezda*, 14 Dec. 2017 (in Russian).

<sup>9</sup> Kristensen, H. M., 'Review of NASIC Report 2017: nuclear force developments', *FAS Strategic Security Blog*, Federation of American Scientists, 30 June 2017.

**Table 6.3.** Russian nuclear forces, January 2018

All estimated figures are approximate. Figures may not add up to stated totals due to the conventions of rounding.

Type/ Russian designation (NATO designation)	No. of launchers	Year first deployed	Range (km) <sup>a</sup>	Warhead loading	No. of warheads <sup>b</sup>
<b>Strategic offensive forces</b>					<b>2 520<sup>c</sup></b>
<i>Bombers</i>					<i>616<sup>e</sup></i>
Tu-95MS6 (Bear-H6)	50/68 <sup>d</sup> 14/25	1981	6 500– 10 500	6 x AS-15A or AS-23B ALCMs, bombs	84
Tu-95MS16 (Bear-H16)	25/30	1981	6 500– 10 500	16 x AS-15A or AS-23B ALCMs, bombs	400
Tu-160 (Blackjack)	11/13	1987	10 500– 13 200	12 x AS-15B or AS-23B ALCM, bombs	132
<i>ICBMs</i>					<i>1 138<sup>f</sup></i>
RS-20V (SS-18 Satan)	318 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)	72 <sup>g</sup>	1985	10 500	1 x 800 kt	72
RS-12M2 Topol-M (SS-27 Mod 1/silo)	60	1997	10 500	1 x 800 kt	60
RS-12M1 Topol-M (SS-27 Mod 1/mobile)	18	2006	10 500	1 x (800 kt)	18
RS-24 Yars (SS-27 Mod 2/ mobile)	90	2010	10 500	4 x (100 kt)	360
RS-24 Yars (SS-27 Mod 2/silo)	12	2014	10 500	4 x (100 kt)	48
RS-26 Yars-M (SS-X-28)	..	(2018)	5 500+	MIRV (. . kt)	..
RS-28 Sarmat (SS-X-29)	..	(2020)	10 000+	MIRV (. . kt)	..
<i>SLBMs</i>					<i>768<sup>h</sup></i>
RSM-50 Volna (SS-N-18 M1 Stingray)	11/176 <sup>h</sup> 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
<b>Non-strategic forces</b>					<b>1 830<sup>i</sup></b>
<i>ABM, air/coastal defence</i>					<i>373</i>
53T6 (SH-08, Gazelle)	68	1986	30	1 x 10 kt	68
S-300 (SA-10/20)	800 <sup>j</sup>	1980/1992	..	1 x low kt	290
3M-55 Yakhont (SS-N-26)	20	(2014)	400+	1 x (. . kt)	10
SSC-1B (Sepal)	10	1973	500	1 x 350	5
<i>Air Force weapons<sup>k</sup></i>					<i>498</i>
Tu-22M3 (Backfire-C)	358 100	1974	..	3 x ASM, bombs	250
Su-24M/M2 (Fencer-D)	150	1974	..	2 x bombs	150
Su-34 (Fullback)	98	2006	..	2 x bombs	98
MiG-31K (Foxhound)	10	1983	..	1 x ASM	..
<i>Army weapons</i>					<i>148</i>
Tochka (SS-21 Scarab)	148 12	1981	120	(1 x 10–100 kt)	12

Type/ Russian designation (NATO designation)	No. of launchers	Year first deployed	Range (km) <sup>a</sup>	Warhead loading	No. of warheads <sup>b</sup>
Iskander-M (SS-26 Stone)	120	2005	350 <sup>l</sup>	(1 x 10–100 kt)	120
9M729 (SSC-8)	16	2016	(2 500)	1 x . . kt	16
<i>Navy weapons</i>					810
Submarines/surface ships/air			LACM, SLCM, ASW, SAM, depth bombs, torpedoes <sup>m</sup>		
<b>Total stockpile</b>					<b>4 350</b>
Deployed warheads					1 600 <sup>n</sup>
Reserve warheads					2 750
<b>Retired warheads awaiting dismantlement</b>					<b>2 500</b>
<b>Total inventory</b>					<b>6 850</b>

. . = not available or not applicable; ( ) = uncertain figure; ABM = anti-ballistic missile; ALCM = air-launched cruise missile; ASM = air-to-surface missile; ASW = anti-submarine warfare; ICBM = intercontinental ballistic missile; kt = kiloton; LACM = land-attack cruise missile; MIRV = multiple independently targetable re-entry vehicle; NATO = North Atlantic Treaty Organization; SAM = surface-to-air missile; SLBM = submarine-launched ballistic missile; SLCM = sea-launched cruise missile.

*Note:* The table lists the total number of warheads estimated to be available for the delivery systems. Only some of these are deployed and they do not necessarily correspond to the New START Treaty data counting rules.

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

<sup>b</sup> The number shows the total number of available warheads, both deployed and in storage, assigned to the delivery systems.

<sup>c</sup> Approximately 1600 of these strategic warheads are deployed on land- and sea-based ballistic missiles and at bomber bases. The remaining warheads are in central storage.

<sup>d</sup> The first number is the number of bombers estimated to be counted under the New START Treaty. The second number is the total number of bombers in the inventory. Because of ongoing bomber modernization, there is considerable uncertainty about how many bombers are operational.

<sup>e</sup> 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.

<sup>f</sup> Of the 1138 warheads available for operational ICBMs, nearly 800 are thought to be deployed on the missiles, with the remaining warheads in storage.

<sup>g</sup> The number is uncertain because several SS-25 garrisons are upgrading to the SS-27 Mod 2.

<sup>h</sup> Two of the Delta SSBNs are in overhaul at any given time and do not carry their assigned nuclear missiles and warheads. It is possible that only 1 Delta III is operational.

<sup>i</sup> Non-strategic nuclear warheads are not deployed with their delivery systems but are kept in a central storage facility, according to the Russian Government. Some storage facilities are near operational bases.

<sup>j</sup> 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 almost been replaced by the SA-20.

<sup>k</sup> The numbers show total nuclear-capable aircraft but only some of them are thought to have nuclear missions. Most can carry more than 1 nuclear weapon. Other potential nuclear-capable aircraft include Su-25 Frogfoot and MiG-25 Foxbat.

<sup>l</sup> 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 350 km.

<sup>m</sup> Only submarines are thought to be assigned nuclear torpedoes.

<sup>n</sup> Note that the number is different from the New START Treaty number for deployed warheads because of the treaty's counting rules.

*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* (NASIC: Wright-Patterson Air Force Base, OH, July 2017); BBC Monitoring; Russian news media; Russian Strategic Nuclear Forces website; 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); *IHS 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.

'manoeuvrable warheads'.<sup>10</sup> Test launches of the 200-tonne missile have begun and will be followed by serial production, before eventual deployment in upgraded RS-20V silos in a few years. Production of a rail-based ICBM seems to have been delayed or cancelled.<sup>11</sup>

Russia normally conducts two large-scale exercises with road-mobile ICBMs each year. The biannual exercises in 2017 involved RS-12M Topol (SS-25), RS-12M1 Topol-M (SS-27 Mod 1) and RS-24 mobile launchers from all the operational missile divisions. The launchers were deployed further from their bases and for longer periods than in previous years. Russian ICBMs also participated in broader strategic exercises along with nuclear-powered ballistic missile submarines (SSBNs) and bombers.<sup>12</sup> These included several test launches of strategic missiles, some of which took place around the time of the Zapad-17 exercise in western Russia and Belarus in September 2017.<sup>13</sup>

### **Ballistic missile submarines and sea-launched ballistic missiles**

The Russian Navy has a fleet of 11 deployable nuclear-armed SSBNs. The fleet includes 9 Soviet-era SSBNs and 3 (of a planned total of 8) SSBNs of a new class that will gradually replace the old SSBNs over the next decade. A

<sup>10</sup> Gavrilov, Y., 'Sarmat will fly over pole: Russia designing unique missile', *Rossiyskaya Gazeta*, 2 June 2014. Translation from Russian, BBC Monitoring.

<sup>11</sup> TASS, 'Russia excludes rail-mobile ICBM system from armament, focuses on Sarmat missile', 6 Dec. 2017. For further detail on the planned rail-based ICBM see Kristensen H. M., 'Russian nuclear forces', *SIPRI Yearbook 2017*, p. 423.

<sup>12</sup> See e.g. TASS, 'Some 20 Topol-M, Yars mobile ICBM systems take part in massive Central Russian drills', 28 Mar. 2017; TASS, 'Eleven strategic missile regiments to hold large-scale drills across Russia', 4 Sep. 2017; and TASS, 'Topol ballistic missile test launched from range in Russia's south', 26 Sep. 2017.

<sup>13</sup> For further detail on the Zapad-17 exercise see Johnson, D., 'Zapad 2017 and Euro-Atlantic security', *NATO Review*, 14 Dec. 2017.

former SSBN has been converted to a test-launch platform for submarine-launched ballistic missiles (SLBMs) but it is not nuclear armed.

The current backbone of the Russian SSBN fleet is made up of six Project 667BDRM Delfin (designated Delta IV class by the North Atlantic Treaty Organization, NATO) submarines assigned to the Northern Fleet. Two Project 667BDR Kalmar (Delta III) SSBNs are believed to be operational with the Pacific Fleet, although reports in early 2018 suggested that it is possible that only one of these is still operational.<sup>14</sup> A third Project 667BDR Kalmar SSBN is held in reserve. All three will be decommissioned in the near future.

Three of the new Borei class SSBNs (Project 955/A) are operational: two with the Pacific Fleet and one with the Northern Fleet. Five more of an improved design, known as Borei-A (Project 955A), are under construction and scheduled to enter service between 2018 and 2022. Each Borei class SSBN carries 16 RSM-56 Bulava (SS-N-32) SLBMs. It is possible that Russia will buy four more Borei class SSBNs to maintain an SSBN fleet comparable in size to that of the United States.<sup>15</sup>

### **Non-strategic nuclear weapons**

According to SIPRI data, as of January 2018, Russia had approximately 1830 warheads assigned for potential use by non-strategic forces. Many more Soviet-era non-strategic warheads have been retired and are awaiting dismantlement (see table 6.3).

Russia's large arsenal of non-strategic nuclear weapons chiefly serves to compensate for perceived weaknesses in its conventional forces. There has been considerable debate about the role that non-strategic nuclear weapons have in Russian nuclear strategy, including potential first use.<sup>16</sup> Development of new dual-capable weapons demonstrates that Russia continues to see non-strategic nuclear weapons as important in its military strategy. As targeting accuracy has improved, some weapons have been equipped with warheads with lower yields than they had during the cold war. Others are likely to be replaced with advanced conventional weapons over the next decade.

The most significant naval development is the fielding of a nuclear version of the new long-range, land-attack Kalibr sea-launched cruise missile

<sup>14</sup> The scheduled defuelling was first published by Rosatom and reported on Twitter by @7FBTK. The Rosatom notification is no longer available, but a description is available at the Russianforces.org website. Podvig, P., 'Two Project 667BDR submarines withdrawn from service', Russianforces.org, 14 Mar. 2018.

<sup>15</sup> Bogdanov, K., ['Great Fleet' on the horizon], Lenta, 23 Jan. 2015 (in Russian).

<sup>16</sup> See e.g. Scaparrotti, C. M., 'NATO's military commander concerned about Russia's tactical nuclear weapons in Europe', Atlantic Council, NATO Source, 3 May 2017; and Ven Bruusgaard, K., 'The myths of Russia's lowered nuclear threshold', War on the Rocks, 22 Sep. 2017.

(SLCM), known as the 3M-14 (SS-N-30A).<sup>17</sup> While the conventional version is being fielded on a wide range of ships and submarines, the nuclear version will probably be integrated on front-line nuclear-powered attack submarines to replace the S-10 Granat (SS-N-21 Sampson) SLCM. However, it is possible that the nuclear 3M-14 might also be integrated on some surface ships. It is estimated that there are about 810 warheads for non-strategic naval nuclear weapons, which include land-attack cruise missiles, anti-ship cruise missiles, anti-submarine rockets, depth charges, torpedoes, and naval aviation.

The 3M-55 Yakhont (SS-N-26) SLCM has been included in the estimate of Russia's non-strategic forces for January 2018 because NASIC designates it as 'nuclear possible' and notes that it is used to arm submarines, ships and coastal defence units (see table 6.3).<sup>18</sup> The 3M-55 is replacing the SS-N-9 (P-120), SS-N-12 (P-500) and SS-N-19 (P-700) anti-ship cruise missiles, which are dual-capable.<sup>19</sup>

The Russian Air Force has an estimated 498 weapons for use by Tu-22M3 (Backfire-C) intermediate-range bombers, Su-24M (Fencer-D) fighter-bombers and the new Su-34 (Fullback) fighter-bomber. A new air-to-surface missile (Kh-32) is in development to replace the Kh-22N (AS-4) used on the Tu-22M3. The Air Force also appears close to deploying a hypersonic air-launched ballistic missile, known as the Kh-47M2 Kinzhal.<sup>20</sup>

It is estimated that a total of around 373 nuclear warheads are in use by dual-capable air defence forces, the Moscow A-135 missile defence system and coastal defence units (although only a small number of warheads are assigned to the coastal defence units). All these defensive systems are being modernized.<sup>21</sup>

It is estimated that there are approximately 148 warheads assigned to Russian short-range ballistic missiles (SRBMs) and ground-launched cruise missiles (GLCMs). Ground-based non-strategic nuclear forces include the dual-capable Iskander-M (SS-26) SRBM, which is replacing the Tochka (SS-21) SRBM in 10 or more missile brigades. Deployment started in 2004

<sup>17</sup> There is considerable confusion about the designation of what is commonly referred to as the Kalibr missile. The Kalibr designation is actually not a missile but a family of weapons that, in addition to the 3M-14 (SSN30/A) land-attack versions, includes the 3M-54 (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; and US Air Force, National Air and Space Intelligence Center (note 6), p. 37.

<sup>18</sup> US Air Force, National Air and Space Intelligence Center (note 6), p. 37.

<sup>19</sup> US Navy, Office of Naval Intelligence (note 17), p. 34.

<sup>20</sup> TASS, 'Russian Aerospace Forces test launch Kinzhal hypersonic missile', 11 Mar. 2018.

<sup>21</sup> TASS, 'Russia's missile early warning system helps ward off any threat', 29 June 2017; and Novichkov, N., 'Russian Defence Minister summarises modernisation progress in 2017', *Jane's Defence Weekly*, 4 Jan. 2018.

and, by the end of 2017, the army had received 10 Iskander-M brigades.<sup>22</sup> Facilities in the Kaliningrad oblast were nearing completion at the end of 2017 and were expected to receive the Iskander-M in early 2018.<sup>23</sup> Construction of a missile storage facility, similar to those constructed at other Iskander bases, has yet to be identified in Kaliningrad.

Army non-strategic nuclear weapons also include a new dual-capable GLCM, known as the 9M729 (SSC-8), which is a modified version of the 9M728 (SSC-7) used on the Iskander-M system.<sup>24</sup> According to the USA, the new cruise missile violates the 1987 Soviet–US Treaty on the Elimination of Intermediate-Range and Shorter-Range Missiles (INF Treaty).<sup>25</sup> Russia has rejected the accusation. Unconfirmed reports suggest that the 9M729 has been deployed in at least one garrison and it appears that further deployments are planned.<sup>26</sup>

<sup>22</sup> Interfax, ‘Ten brigade sets of Iskander-M missile systems delivered to Russia’s ground forces: commander’, 22 Dec. 2017.

<sup>23</sup> Blank, S., ‘Baltic build-up’, *Jane’s Intelligence Review*, vol. 29, no. 5 (May 2017), pp. 6–13.

<sup>24</sup> US Department of State, Bureau of Arms Control, Verification and Compliance, ‘INF Treaty: at a glance’, Fact Sheet, 8 Dec. 2017, p. 1.

<sup>25</sup> For a summary and other details of the INF Treaty see annex A, section III, in this volume. On the INF Treaty controversy see chapter 7, section II, in this volume; and Kile, S., ‘Russian–US nuclear arms control and disarmament’, *SIPRI Yearbook 2017*, pp. 477–78.

<sup>26</sup> Gordon, M., ‘Russia deploys missile, violating treaty, and challenging Trump’, *New York Times*, 14 Feb. 2017.