II. Russian nuclear forces

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As of January 2020, Russia maintained a military stockpile of approximately 4315 nuclear warheads—around 15 fewer than the estimate for January 2019.[1] About 2440 of these were offensive strategic warheads, of which roughly 1570 were deployed on land- and sea-based ballistic missiles and at bomber bases. Russia also possessed approximately 1875 non-strategic (tactical) nuclear warheads—a slight increase compared with the estimate for January 2019 due to the fielding of dual-capable non-strategic weapons. All of the non-strategic warheads were in central storage sites.[2] An estimated additional 2060 retired warheads were awaiting dismantlement (110 fewer than the estimate for January 2019), giving a total inventory of approximately 6375 warheads (see table 10.3). As of September 2019, Russia was reported, under the 2010 Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START), to have 1426 deployed warheads attributed to 513 deployed strategic launchers—that is, deployed intercontinental ballistic missiles (ICBMs) deployed submarine-launched ballistic missiles (SLBMs) and deployed heavy bombers.[3] The number of deployed warheads reported under New START differs from the estimate presented here because the treaty attributes one weapon to each deployed bomber—even though bombers do not carry weapons under normal circumstances—and does not count warheads stored at bomber bases.

Strategic bombers

Russia's Long-range Aviation Command operates a fleet of approximately 13 Tu-160 (Blackjack) and 55 Tu-95MS (Bear) bombers.[4] Not all of these are fully operational and some are undergoing various upgrades. The maximum possible loading on the bombers is nearly 750 nuclear weapons but, since only some of the bombers are fully operational, it is estimated that the number of assigned weapons is lower—around 580—of which approximately 200 might be stored at the two strategic bomber bases: Engels in the Saratov oblast and

[1] The data presented in this section is based on assessments by the author.

[2] 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: Geneva, 2017).

[3] US Department of State, Bureau of Arms Control, Verification and Compliance, 'New START Treaty aggregate numbers of strategic offensive arms', Fact Sheet, 1 Sep. 2019. For a summary and other details of New START see annex A, section III, and chapter 11, section I, in this volume.

[4] The Tu-95MS exists in 2 versions: the Tu-95MS16 (Bear-H16) and the Tu-95MS6 (Bear-H6).

Ukrainka in the Amur oblast.[5] An upgrade of the nuclear weapon storage site at Engels is under way.[6]

Modernization of the bombers, which includes upgrades to their avionics suites, engines and long-range nuclear and conventional cruise missiles, is progressing, but at a slower pace than anticipated.[7] The upgraded Tu-95MS is known as the Tu-95MSM and the upgraded Tu-160 is known as the Tu-160M. The upgraded bombers are capable of carrying the new Kh-102 (AS-23B) nuclear air-launched cruise missile (ALCM). Six Tu-95MSMs were delivered in 2019.[8] It seems likely that all of the Tu-160s and most of the Tu-95s will be upgraded to maintain a bomber force of perhaps 50–60 operational aircraft.

The Russian Government has also announced plans to resume production of the Tu-160 to produce up to 50 Tu-160M2s, with serial production starting in the early 2020s.[9] These and the other modernized bombers mentioned above are intended to be only a temporary bridge to Russia's next-generation bomber: the PAK-DA, a subsonic aircraft that looks similar to the flying-wing design of the United States' B-2 bomber. The serial production of the PAK-DA has been delayed and is scheduled to begin in 2027.[10] The PAK-DA will eventually replace all Tu-95s and Tu-160s as well as the Tu-22s that are deployed with non-strategic forces (see below).[11]

Russian strategic bombers carried out operations over the Baltic Sea and the Arctic, Atlantic and Pacific oceans in 2019. The Pacific operations included a joint Russian–Chinese exercise, which led to a serious incident in July involving South Korea. South Korean aircraft fired warning shots when a surveillance aircraft, operating together with Tu-95 bombers, allegedly violated South Korean airspace over islands in the Sea of Japan that are the subject of a territorial dispute.[12] Russian bomber operations in 2019 also included the first-ever visit by two Tu-160s to South Africa.[13]

[5] Podvig, P., 'Strategic aviation', Russian Strategic Nuclear Forces, accessed Jan. 2020.

[6] Kristensen, H. M. and Korda, M., 'Nuclear upgrade at Russian bomber base and storage site', FAS Strategic Security Blog, Federation of American Scientists, 25 Feb. 2019.

[7] Trevithick, J., 'Russia rolls out new Tu-160M2, but are Moscow's bomber ambitions realistic?', The Drive, 16. Nov. 2017.

[8] O'Shaughnessy, T. J. (Gen.), Commander, United States Northern Command and North American Aerospace Defense Command, Statement before the Armed Services Committee, US Senate, 13 Feb. 2020, p. 4.

[9] TASS, [The Russian military will receive four Tu-160M2 bombers by 2023], 30 Jan. 2019 (in Russian).

[10] Lavrov, A., Kretsul, R. and Ramm, A., [Batch agreement: The latest bomber assigned a deadline for production], *Izvestia*, 14 Jan. 2020 (in Russian).

[11] TASS, [Russia to test next-generation stealth strategic bomber], 2 Aug. 2019 (in Russian).

[12] BBC, 'Russia and South Korea spar over airspace "intrusion"', 24 July 2019.

[13] *Moscow Times*, 'Russia sends nuclear-bombers to South Africa in "friendly" visit', 23 Oct. 2019.

Table 10.3. Russian nuclear forces, January 2020

All figures are approximate and are estimates based on assessments by the author. Totals for strategic and non-strategic forces are rounded up to the nearest 5 warheads.

Type/ Russian designation (NATO designation)	No. of launchers	Year first deployed	Range (km)[a]	Warhead loading	No. of warheads[b]
Strategic offensive forces					**2 440**[c]
Bombers	*50/68*[d]				*580*[e]
Tu-95MS/M (Bear-H)[f]	39/55	1981	6 500–10 500	6–16 x AS-15A or AS-23B ALCMs	448
Tu-160/M (Blackjack)	11/13	1987	10 500–13 200	12 x AS-15B or AS-23B ALCMs, bombs	132
ICBMs	*302*				*1 136*[g]
RS-20V (SS-18 Satan)	46	1992	11 000–15 000	10 x 500–800 kt	460
RS-18 (SS-19 Stiletto)	..	1980	10 000	6 x 400 kt	..[h]
Avangard (SS-19 Mod 4)[i]	2	2019	10 000	1 x HGV [400 kt]	2
RS-12M Topol (SS-25 Sickle)	36	1985	10 500	1 x 800 kt	36
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)	126	2010	10 500	4 x [100 kt]	504
RS-24 Yars (SS-27 Mod 2/silo)	14	2014	10 500	4 x [100 kt]	56
RS-28 Sarmat (SS-X-29)	..	[2021]	10 000+	MIRV [. . kt]	..
SLBMs	*10/160*[j]				*720*[j]
RSM-50 Volna (SS-N-18 M1 Stingray)	1/16	1978	6 500	3 x 50 kt	48
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					**1 875**[k]
ABM, air/coastal defence	*1 124*				*382*
53T6 (SH-08, Gazelle)	68	1986	30	1 x 10 kt	68
S-300/400 (SA-20/21)	1 000[l]	1992/2007	..	1 x low kt	290
3M-55 Yakhont (SS-N-26)	48	[2014]	400+	1 x [. . kt]	20
SSC-1B (Sepal)	8	1973	500	1 x 350 kt	4
Air force weapons[m]	*315*				*495*
Tu-22M3 (Backfire-C)	90	1974	..	3 x ASMs, bombs	270
Su-24M/M2 (Fencer-D)	90	1974	..	2 x bombs	90[n]
Su-34 (Fullback)	125	2006	..	2 x bombs	125[n]
Su-57 (Felon)	..	[2020]	..	[bombs, ASM?]	..
MiG-31K (Foxhound)	10	2018	..	1 x ALBM	10
Army weapons	*164*				*90*
Iskander-M (SS-26 Stone)	144	2005	350[o]	[1 x 10–100 kt]	70[p]
9M729 (SSC-8)	20	2016	2 350	1 x [. . kt]	20

Type/ Russian designation (NATO designation)	No. of launchers	Year first deployed	Range (km)[a]	Warhead loading	No. of warheads[b]
Navy weapons					*905*
Submarines/surface ships/air		LACMs, SLCMs, ASWs, SAMs, depth bombs, torpedoes[q]			
Total stockpile					**4 315**
Deployed warheads					1 570[r]
Reserve warheads					2 745[s]
Retired warheads awaiting dismantlement					**2 060**
Total inventory					**6 375**

. . = not available or not applicable; [ ] = uncertain figure; ABM = anti-ballistic missile; ALBM = air-launched ballistic missile; ALCM = air-launched cruise missile; ASM = air-to-surface missile; ASW = anti-submarine weapon; HGV = hypersonic glide vehicle; 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 2010 Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START) data counting rules.

[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 available warheads, both deployed and in storage, assigned to the delivery systems.

[c] Approximately 1570 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 as deployed under New START; 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.

[e] The maximum possible loading on the bombers is nearly 750 nuclear weapons but, since only some of the bombers are fully operational, it is assumed here that only 580 weapons are assigned to the long-range bomber force, of which approximately 200 might be stored at the 2 strategic bomber bases. The remaining weapons are in central storage facilities.

[f] There are 2 types of Tu-95MS aircraft: the Tu-95MS6, which can carry 6 AS-15A missiles internally; and the Tu-95MS16, which can carry an additional 10 AS-15A missiles externally, for a total of 16 missiles. Both types are being modernized. The modernized aircraft (Tu-95MSM) can carry 8 AS-23B missiles externally and possibly 6 internally, for a total of 14 missiles.

[g] These ICBMs can carry a total of 1136 warheads but it is estimated here that they have been downloaded to carry just over 810 warheads, with the remaining warheads in storage.

[h] It is possible that the remaining RS-18s have been retired.

[i] The missile uses a modified RS-18 (SS-19) ICBM booster with an HGV payload.

[j] The Russian Navy has a fleet of 10 operational nuclear-armed nuclear-powered ballistic missile submarines (SSBNs): 6 Delfin class (Delta IV), 1 Kalmar class (Delta III) and 3 Borei class. One or two of the Delta SSBNs are in overhaul at any given time and do not carry their assigned nuclear missiles and warheads. It is estimated here that only about 560 of the 720 warheads are deployed.

[k] According to the Russian Government, non-strategic nuclear warheads are not deployed with their delivery systems but are kept in a central storage facility. Some storage facilities are near operational bases.

[l] There are at least 80 S-300/400 sites across Russia, each with an average of 12 launchers, each with 2–4 interceptors. Each launcher has several reloads.

[m] The subtotal is based on an estimate of the total number of nuclear-capable aircraft. However, only some of them are thought to have nuclear missions. Most can carry more than 1 nuclear weapon. Other potential nuclear-capable aircraft include the Su-25 Frogfoot and the Su-30MK.

[n] The estimate assumes that half of the aircraft have a nuclear role.

[o] Although many unofficial sources and news media reports state that the Iskander-M (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.

[p] The estimate assumes that half of the dual-capable launchers have a secondary nuclear role.

[q] Only submarines are thought to be assigned nuclear torpedoes.

[r] The deployed warhead number in this table differs from the number declared under New START because the treaty attributes 1 warhead per deployed bomber—even though bombers do not carry warheads under normal circumstances—and does not count warheads stored at bomber bases.

[s] Reserve warheads include the 1875 non-strategic warheads in central storage (see note k).

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); US Department of Defense (DOD), *Nuclear Posture Review 2018* (DOD: Arlington, VA, Feb. 2018); US DOD, *Missile Defense Review 2019* (DOD: Arlington, VA, 2019); US Department of Defense, Office of the Deputy Assistant Secretary of Defense for Nuclear Matters (ODASDNM), *Nuclear Matters Handbook 2020* (ODASDNM: Arlington, VA, Mar. 2020); US DOD, various Congressional testimonies; 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; *Bulletin of the Atomic Scientists*, 'Nuclear notebook', various issues; and author's estimates.

Land-based ballistic missiles

As of January 2020, Russia's Strategic Rocket Forces—the branch of the armed forces that controls land-based ICBMs—consisted of 12 missile divisions grouped into 3 armies and deploying an estimated 302 ICBMs of different types and variations (see table 10.3). These ICBMs can carry a total of about 1136 warheads but it is estimated here that they have been downloaded to carry around 810 warheads, approximately 52 per cent of Russia's deployed strategic warheads. This is a slight reduction compared with the estimate for January 2019 and appears to confirm the US Air Force National Intelligence and Space Center's (NASIC) projection from 2017 that 'the number of missiles in the Russian ICBM force will continue to decrease because of arms control agreements, aging missiles, and resource constraints'.[14] It should be noted that, unless Russia and the USA agree to extend or renegotiate New

[14] 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.

START before February 2021, the treaty will expire and the limit on deployed warheads will no longer apply. Should this happen, both Russia and the USA could significantly increase the number of warheads deployed on their ICBMs.[15]

Russia's ICBM force is two-thirds through a significant modernization programme to replace all Soviet-era missiles with new types, albeit not on a one-for-one basis. The modernization also involves substantial reconstruction of silos, launch control centres, garrisons and support facilities.[16] The missile modernization programme, which started two decades ago, appears to be progressing more slowly than previously envisioned. According to Sergey Shoygu, the Russian defence minister, over 76 per cent of the ICBM force had been modernized by the end of 2019.[17] This is significantly lower than the 97 per cent modernization by the end of 2020 planned for in 2014.[18] In January 2020 Colonel General Sergey Karakaev, commander of the Strategic Rocket Forces, stated that the last Soviet-era ICBM would be phased out by 2024.[19] However, this seems unlikely based on an assessment of the probable time frame for replacing the RS-20V (SS-18; see below).

Russia's ICBM modernization is focused on the multiple-warhead version of the RS-12, known as RS-24 Yars (SS-27 Mod 2). Five of seven mobile divisions have already been completed (Irkutsk, Novosibirsk, Tagil, Teykovo and Yoshkar-Ola), with two more in progress (Barnaul and Vypolzovo—sometimes referred to as Bologovsky).[20] The first silo-based RS-24s have been installed at Kozelsk; one regiment of 10 silos is complete and 4 silos of the second regiment are operational, with 6 more under construction as of late 2019.[21] It is possible that a third regiment will be installed at Kozelsk and that at least some of the former RS-18 (SS-19) silos at the Tatishchevo division might also be upgraded to the RS-24.

In December 2019 two missiles equipped with the Avangard hypersonic glide vehicle (HGV) system were installed in former RS-20V silos of the 621st Regiment at Dombarovsky.[22] This missile type uses former RS-18 boosters and has been designated as the SS-19 Mod 4 by the North

[15] For more detail on this issue see chapter 11, section I, in this volume.

[16] See e.g. Kristensen, H. M., 'Russian ICBM upgrade at Kozelsk', FAS Strategic Security Blog, Federation of American Scientists, 5 Sep. 2018.

[17] President of Russia, 'Defence Ministry Board meeting', 24 Dec. 2019.

[18] TRK Petersburg Channel 5, 'Russian TV show announces new ICBM to enter service soon', 21 Apr. 2014, Translation from Russian, BBC Monitoring.

[19] TASS, [What equipment will the Russian army receive in 2020?], 14 Jan. 2020 (in Russian).

[20] Tikhonov, A., [You won't catch them by surprise], *Krasnaya Zvezda*, 28 May 2018 (in Russian); and RIA Novosti, [The commander of the Strategic Missile Forces announced the completion of the rearmament of the Tagil connection], 29 Mar. 2018 (in Russian).

[21] Author's assessment based on observation of satellite imagery.

[22] TASS, 'Russia's 1st two Avangard hypersonic missile systems to assume combat duty—source', 13 Nov. 2019.

Atlantic Treaty Organization (NATO).[23] Russia plans to install a total of two regiments, each with six missiles, at Dombarovsky by 2027.[24]

Russia is also 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. Like its predecessor, the RS-28 is expected to carry a large number of multiple independently targetable re-entry vehicles (possibly as many as 10) but some might be equipped with one or a few Avangard HGVs. After much delay, full-scale flight testing of the RS-28 is scheduled to begin in 2020, with possible first entry into service in 2021—although this would be dependent on a successful flight-test programme.[25] Once cleared for service, deployment of the RS-28 will begin at the Dombarovsky and Uzhur missile divisions where replacement of the RS-20V will probably take most of the 2020s.

Russia normally conducts several large-scale exercises with road-mobile and silo-based ICBMs each year. These include combat patrols for road-mobile regiments, simulated launch exercises for silo-based regiments, and participation in command staff exercises. During 2019, the ICBM forces conducted more than 200 tactical and command staff exercises.[26] Russia carried out five ICBM test launches in 2019.[27]

Ballistic missile submarines and sea-launched ballistic missiles

The Russian Navy has a fleet of 10 operational nuclear-armed nuclear-powered ballistic missile submarines (SSBNs). The fleet includes 6 Soviet-era Delfin class (Project 667BDRM, or Delta IV NATO designation) submarines, 1 Kalmar class (Project 667BDR, or Delta III) submarine, and 3 (of a planned total of 10) Borei class (Project 955/A) submarines. A former Project 941 (Typhoon) SSBN has been converted to a test-launch platform for SLBMs but it is not thought to be nuclear armed.[28]

Two of the Borei class SSBNs are operational with the Pacific Fleet and one with the Northern Fleet. The first of an improved design, known as Borei-A (Project 955A), is fitting out. A further four are under construction and

[23] US Department of Defense (DOD), *Nuclear Posture Review 2018* (DOD: Arlington, VA, Feb. 2018), p. 8; and Kristensen, H. M. and Korda, M., 'Russian nuclear forces, 2019', *Bulletin of the Atomic Scientists*, vol. 75, no. 2 (2019), p. 78.

[24] TASS, [Source: The first Avangard complexes will be on duty in 2019], 29 Oct. 2018 (in Russian).

[25] Safronov, I. and Nikolsky, A., [Tests of the latest Russian nuclear missile start at the beginning of the year], *Vedomosti*, 29 Oct. 2019 (in Russian).

[26] Russian Ministry of Defence, [In 2020, strategic rocketeers plan to conduct more than 200 exercises], 3 Jan. 2020 (in Russian).

[27] Russian Ministry of Defence (note 26).

[28] Saranov, V., [Decommissioning 'Akula': Why Russia abandons the biggest submarines], RIA Novosti, 24 Jan. 2018 (in Russian).

expected to enter service over the next decade.[29] It is likely that Russia aims to maintain an SSBN fleet similar in size to that of the USA.

Each SSBN type is equipped with 16 ballistic missiles and the Russian fleet can carry a total of 720 warheads. 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 loading on some missiles has been reduced to meet the total warhead limit under New START. As a result, it is estimated here that only about 560 of the 720 warheads are deployed.

Non-strategic nuclear weapons

As of January 2020, Russia had an estimated 1875 warheads assigned for potential use by non-strategic forces. These include warheads for ships and submarines, various types of aircraft, air- and missile-defence systems, and army missiles. The US military estimates that 'Russia's overall nuclear stockpile is likely to grow significantly over the next decade—growth driven primarily by a projected increase in Russia's non-strategic nuclear weapons'.[30]

Russia's non-strategic nuclear weapons chiefly serve 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.[31]

Navy weapons

The Russian military service assigned the highest number of non-strategic nuclear weapons is the navy, with about 905 warheads for use by land-attack cruise missiles, anti-ship cruise missiles, anti-submarine rockets, depth bombs, and torpedoes delivered by ships, submarines and naval aviation. Among these weapons, perhaps the most significant is the nuclear version of the long-range, land-attack Kalibr sea-launched cruise missile (SLCM), known as the 3M-14 (SS-N-30A), which has been deployed on numerous

[29] TASS, 'Russia to complete Borei and Yasen series of nuclear-powered submarines in 2023–2024', 27 June 2019.

[30] Richard, C. A., Commander, US Strategic Command, Statement before the Committee on Armed Services, US Senate, 13 Feb. 2020, p. 5.

[31] On the debate about the role of Russian non-strategic nuclear weapons see e.g. US Department of Defense (note 23), p. 30; Oliker, O., 'Moscow's nuclear enigma: What is Russia's arsenal really for?', *Foreign Affairs*, vol. 97, no. 6 (Nov./Dec. 2018); Stowe-Thurston, A., Korda, M., Kristensen, H. M., 'Putin deepens confusion about Russian nuclear policy', Russia Matters, 25 Oct. 2018; Tertrais, B., 'Russia's nuclear policy: Worrying for the wrong reasons', *Survival*, vol. 60, no. 2 (Apr. 2018), pp. 33–44; and Ven Bruusgaard, K., 'The myths of Russia's lowered nuclear threshold', War on the Rocks, 22 Sep. 2017.

types of surface ship and attack submarine.[32] Other notable navy weapons include the 3M-55 (SS-N-26) SLCM and the 3M-22 Tsirkon (SS-NX-33) hypersonic anti-ship missile, which is undergoing final test launches.[33] The navy is also developing the Poseidon (Status-6, or Kanyon NATO designation), a long-range nuclear-powered torpedo, for future deployment on modified submarines.[34]

Air force weapons

The Russian Air Force has nearly 500 nuclear warheads for use by Tu-22M3 (Backfire-C) intermediate-range bombers, Su-24M (Fencer-D) fighter-bombers, Su-34 (Fullback) fighter-bombers and MiG-31K (Foxhound) attack aircraft. The new Su-57 (Felon), also known as PAK-FA, which is in production and scheduled to be deployed in 2020, is also dual capable.[35] The MiG-31K is equipped with the new Kh-47M2 Kinzhal air-launched ballistic missile, and a test launch took place in the Arctic in November 2019.[36] Russia is also developing a new nuclear-capable air-to-surface missile (Kh-32) to replace the Kh-22N (AS-4) used on the Tu-22M3.[37]

Air, coastal and missile defence

The Russian air-, coastal- and missile-defence forces are estimated to have around 380 nuclear warheads for use by dual-capable S-300 and S-400 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). Russia is also developing the S-500 air-defence system that might potentially be dual capable, but there is no publicly available authoritative information confirming a nuclear role.[38]

Army weapons

The Russian Army is thought to have approximately 90 warheads to arm short-range ballistic missiles (SRBMs) and ground-launched cruise missiles (GLCMs). The dual-capable Iskander-M (SS-26) SRBM has now completely

[32] There is considerable confusion about the designation of what is commonly referred to as the Kalibr missile. The Kalibr designation actually refers not to a specific missile but to a family of weapons that, in addition to the 3M-14 (SS-N-30/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 14), p. 37.

[33] TASS, 'Russia plans new trials of Tsirkon hypersonic missile before yearend: Source', 22 Nov. 2019.

[34] Sutton, H. I., 'Poseidon torpedo', Covert Shores, 22 Feb. 2019.

[35] US Department of Defense, Office of the Deputy Assistant Secretary of Defense for Nuclear Matters (ODASDNM), *Nuclear Matters Handbook 2020* (ODASDNM: Arlington, VA, Mar. 2020), p. 3.

[36] TASS, [Sources: Dagger hypersonic missile tests first conducted in Arctic], 30 Nov. 2019 (in Russian).

[37] US Department of Defense (note 23), p. 8.

[38] Podvig, P., 'Missile defense in Russia', Working paper, Federation of American Scientists Project on Nuclear Dynamics in a Multipolar Strategic BMD [ballistic missile defence] World, May 2017.

replaced the Tochka (SS-21) SRBM in 12 missile brigades.[39] The other army dual-capable missile is the 9M729 (SSC-8) GLCM that the USA cited as its main reason for withdrawing from the 1987 Treaty on the Elimination of Intermediate-Range and Shorter-Range Missiles (INF Treaty) in August 2019.[40] It is estimated that five 9M729 battalions have so far been co-deployed with five of the Iskander-M brigades. In 2019 there were press reports that the 9M729 had been deployed to Kamyshlov (Sverdlovsk oblast), Kapustin Yar (Astrakhan oblast), Mozdok (North Ossetia), Shuya (Ivanovo oblast) and Leningrad oblast, presumably at the base in Luga.[41]

[39] Author's assessment based on observation of satellite imagery.

[40] US Department of State, Bureau of Arms Control, Verification and Compliance, 'INF Treaty: At a glance', Fact Sheet, 8 Dec. 2017, p. 1. For a summary and other details of the INF Treaty see annex A, section III, in this volume. See also chapter 11, section I, in this volume; and Kile, S. N., 'Russian–US nuclear arms control and disarmament', *SIPRI Yearbook 2018*, pp. 321–24.

[41] Gutschker, T., 'Russland verfügt über mehr Raketen als bislang bekannt' [America is not planning an arms race], 10 Feb. 2019; and RIA Novosti, [Electronic launches of 9M729 missiles took place in the Leningrad region], 8 Feb. 2019 (in Russian).