



## Russian nuclear forces, 2013

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### Abstract

Russia is in the middle of modernizing its nuclear forces, replacing Soviet-era ballistic missiles with fewer improved missiles. In a decade, almost all Soviet-era weapons will be gone, leaving a smaller but still effective force that will be more mobile than what it replaced. As of early 2013, Russia has a stockpile of approximately 4,500 nuclear warheads, of which roughly 1,800 strategic warheads are deployed on missiles and at bomber bases. Another 700 strategic warheads are in storage, along with 2,000 nonstrategic warheads. There is some uncertainty in these estimates because Russia does not disclose how many nuclear weapons it has and the United States has stopped releasing data supplied by Russia under strategic arms reduction agreements. The authors use public statements made by Russian officials, newspaper articles, observations from commercial satellite images, private conversations with government officials, and analysis of Russian nuclear forces over many years to provide the best available unclassified estimate of Russian nuclear forces.

### Keywords

ICBM, nonstrategic weapons, nuclear forces, Russia, SLBM, Strategic Rocket Forces, strategic weapons, warheads

Russia is in the middle of a comprehensive modernization of its nuclear forces that began more than a decade ago. The upgrade, which involves replacing all Soviet-era ballistic missiles with fewer improved missiles, is now approaching a point at which the number of modern weapons will shortly exceed the number of old ones. In a decade, virtually all of the Soviet-era weapons will be gone. This will leave in place a significantly smaller but effective force that will be more mobile than the one it replaces.

As of March 2013, we estimate that Russia has a military stockpile of approximately 4,500 nuclear warheads, of

which roughly 1,800 strategic warheads are deployed on missiles and at bomber bases.<sup>1</sup> Another 700 strategic warheads are in storage, along with 2,000 nonstrategic warheads. In addition to the military stockpile for operational forces, a large number—we estimate 4,000—of retired but still largely intact warheads await dismantlement (see Table 1).<sup>2</sup>

Unlike Britain, France, and the United States, Russia has not declared how many warheads it possesses in its nuclear stockpile. Moreover, although transparency about Russian strategic nuclear forces is increasing for the US government due to data exchanges and on-site inspections, it is decreasing at

**Table 1. RUSSIAN NUCLEAR FORCES, 2013**

TYPE/NAME	RUSSIAN DESIGNATION	LAUNCHERS	YEAR DEPLOYED	WARHEADS X YIELD (KILOTONS)	TOTAL WARHEADS
<i>Strategic offensive weapons</i>					
<b>ICBMs</b>					
SS-18 M6 Satan	RS-20V	55	1988	10 x 500/800 (MIRV)	550
SS-19 M3 Stiletto	RS-18 (UR-100NUTTH)	35	1980	6 x 400 (MIRV)	210
SS-25 Sickle	RS-12M (Topol)	140	1988	1 x 800	140
SS-27 Mod. 1/mobile	RS-12M1 (Topol-M)	18	2006	1 x 800?	18
SS-27 Mod. 1/silo	RS-12M2 (Topol-M)	60	1997	1 x 800	60
SS-27 Mod. 2/mobile	RS-24 (Yars)	18	2010	4 x 100? (MIRV)	72
SS-27 Mod. 2/silo	RS-24 (Yars)	—	(2013)	4 x 100? (MIRV)	—
<b>SUBTOTAL</b>		<b>326</b>			<b>1,050</b>
<b>SLBMs</b>					
SS-N-18 M1 Stingray	RSM-50	3/48	1978	3 x 50 (MIRV)	144 <sup>1</sup>
SS-N-23 M1	RSM-54 (Sineva)	6/96	2007	4 x 100 (MIRV) <sup>2</sup>	384 <sup>3</sup>
SS-N-32	RSM-56 (Bulava)	1/16	2013	6 x 100 (MIRV)	96
<b>SUBTOTAL</b>		<b>10/160</b>			<b>624<sup>4</sup></b>
<b>Bombers/weapons</b>					
Bear-H6	Tu-95 MS6	29	1984	6 x AS-15A ALCMs, bombs	174
Bear-H16	Tu-95 MS16	30	1984	16 x AS-15A ALCMs, bombs	480
Blackjack	Tu-160	13	1987	12 x AS-15B ALCMs or AS-16 SRAMs, bombs	156
<b>SUBTOTAL</b>		<b>72</b>			<b>810<sup>5</sup></b>
<b>SUBTOTAL STRATEGIC OFFENSIVE FORCES</b>					<b>~2,500<sup>6</sup></b>
<i>Nonstrategic and defensive weapons</i>					
<b>ABM/Air/Coastal defense</b>					
S-300 (SA-10/12/20)		~1,000	1980/2007	1 x low	~340
53T6 Gazelle		68	1986	1 x 10	68 <sup>7</sup>
SSC-1B Sepal		34	1973	1 x 350	~17
<b>Land-based air</b>					
Bombers/fighters (Tu-22M3/Su-24M/Su-34)		~430	1974/2006	ASM, bombs	~730
<b>Ground-based<sup>8</sup></b>					
Short-range ballistic missiles (SS-21/SS-26)		~170	1981/2005	1 x ?	~170
<b>Naval</b>					
Submarines/surface ships/air				SLCM, ASW, SAM, DB, torpedoes	~700
<b>SUBTOTAL NONSTRATEGIC AND DEFENSIVE FORCES</b>					<b>~2,000<sup>9</sup></b>
<b>TOTAL</b>					<b>~4,500<sup>10</sup></b>

1. Only 96 of these warheads are deployed on two of the three Delta IIIs.

2. The Sineva is a modified SS-N-23 and probably carries four MIRVed warheads. US intelligence in 2006 estimated that the missile could carry up to 10 warheads but lowered the estimate to four warheads in 2009.

3. Only 256 of these warheads are deployed on four of the six Delta IVs.

4. Two or three of the 10 SSBNs are in overhaul and do not carry nuclear weapons. As a result, only 448 of the 624 warheads are deployed.

5. The bomber weapons are kept in storage, not deployed on the aircraft. We estimate that only a couple of hundred weapons are present at the two bomber bases, with the remainder in central storage.

6. Only about 1,800 of these warheads are deployed on missiles and at bomber bases. The New START Treaty counts fewer deployed warheads because it does not count weapons stored at bomber bases and because some SSBNs are not fully loaded at any given time.

7. All 32 Gorgon missiles apparently have been removed from the ABM system.

8. NATO's International Military Staff briefed the North Atlantic Council in November 2009 that the Russian Zapad and Ladoga exercises in August and September 2009 included "missile launches, some of which may have simulated the use of tactical nuclear weapons" (Aftenposten, 2011).

9. Numbers may not add up due to rounding. All nonstrategic warheads are in central storage. The 2,000 listed make up the estimated nominal load for nuclear-capable delivery platforms.

10. In addition to these warheads, we estimate that an additional 4,000 retired warheads are awaiting dismantlement, for a total inventory of approximately 8,500 warheads.

ABM: antiballistic missile

ALCM: air-launched cruise missile

AS: air-to-surface

ASM: air-to-surface missile

ASW: antisubmarine weapon

DB: depth bomb

ICBM: intercontinental ballistic missile

MIRV: multiple independently targetable reentry vehicle

SAM: surface-to-air missile

SLBM: submarine-launched ballistic missile

SLCM: sea-launched cruise missile

SRAM: short-range attack missile

the public level for the international arms control community, because Russia does not disclose such information and the US government has stopped releasing aggregate data supplied to it by Russia under strategic arms reduction agreements.<sup>3</sup> As a result, there is some uncertainty in the estimates provided in this Nuclear Notebook. Nevertheless, based on public statements made by Russian officials, newspaper articles, observations from commercial satellite images, private conversations with government officials, and our analysis of Russian nuclear forces over many years, we are confident that this Notebook provides the best unclassified estimate of Russian nuclear forces.

## ICBMs

Russia deploys an estimated 326 intercontinental ballistic missiles (ICBMs) with approximately 1,050 warheads. The ICBMs are organized under the Strategic Rocket Forces (SRF) into three missile armies with a total of 12 divisions, a structure the SRF commander, Colonel-General Sergei Karakayev, says will continue through 2016 and beyond (Interfax-AVN, 2011b).

Over the next decade, Russia's ICBM force is scheduled to undergo significant changes. By 2016, according to Karakayev, SS-18, SS-19, and SS-25 missiles will constitute only about 40 percent of the ICBM force, down from approximately 72 percent in 2011 (Interfax-AVN, 2011a). To meet this goal, over the next four years Russia will have to retire more than half of its ICBM force, mainly mobile SS-25s. By 2021, according to the announced plans, 98 percent of the old missiles will be gone (Interfax AVN, 2011c).

To compensate for the retirement of old missiles, Russia is planning to produce significant numbers of SS-27 Mod. 2 (RS-24) ICBMs. But the current and expected production and deployment rate of new ICBMs is not rapid enough to offset the retirement of the old missiles. Even if Russia manages to deploy an average of 15 new missiles per year—something it has not been able to accomplish over the past two decades—by the early 2020s the ICBM force will likely shrink to around 220 missiles, nearly one-third fewer than today.

## SS-27 (*Topol-M*)

Russia deploys three kinds of SS-27 missiles: the SS-27 Mod. 1, a single-warhead missile that comes in either mobile (RS-12M1) or silo-based (RS-12M2) variants, and the SS-27 Mod. 2 (RS-24), called the Yars in Russia, a mobile missile equipped with multiple independently targetable re-entry vehicles (MIRVs). Deployment of the SS-27 Mod. 1 was completed in 2012 at a total of 78 missiles: 60 silo-based missiles with the 60th Missile Division in Tatishchevo and 18 road-mobile missiles with the 54th Guards Missile Division at Teykovo.

All new Russian ICBM deployments for the foreseeable future will be of MIRVed RS-24 ICBMs. Deployment of the first two regiments with a total of 18 mobile missiles has been completed at the 54th Guards Missile Division at Teykovo, northeast of Moscow. Preparations began in 2012 for three additional missile divisions to receive the RS-24: Initially, silo-based RS-24s will be deployed at the 28th Missile Guards Division at Kozelsk to replace the SS-19s, and then mobile RS-24s will replace SS-25s at the 51st Missile Guards Division at

Irkutsk and the 39th Guards Missile Division at Novosibirsk. Once Irkutsk and Novosibirsk are complete, deployment will follow at the 42nd Missile Division at Nizhniy Tagil, replacing SS-25s currently deployed there. After silo-based RS-24s are installed at Kozelsk, deployment will follow at the 13th Missile Division at Dombrovskiy, replacing the SS-18s currently deployed there (Interfax-AVN, 2012d, 2012e).

Once completed, this transformation will reduce the Russian ICBM force structure from 12 to 7 missile divisions: 3 silo divisions (1 SS-27 Mod. 1 and 2 SS-27 Mod. 2, or RS-24), and 4 mobile divisions (1 SS-27 Mod. 1 and 5 SS-27 Mod. 2, or RS-24). Most significant, replacing mobile, single-warhead SS-25 missiles with mobile, MIRVed RS-24 missiles could increase the portion of mobile ICBM warheads from 15 percent today to approximately 70 percent by 2022.

It is unclear how many warheads each RS-24 carries. A US defense official told us last year that the missile can carry up to six warheads, which would be similar to the loading on the sea-based variant, the Bulava. But the head of the SRF is on record saying the RS-24 can carry up to four warheads (Abdullaev, 2010; Russia Today, 2010), and a Bush administration official stated in 2009 that Russian flight tests had demonstrated the capability to carry three warheads (Gertz, 2009). We are therefore revising our estimate and will count up to four warheads per RS-24.

### *SS-18 (RS-20V)*

The SS-18 is a silo-based, 10-warhead heavy ICBM first deployed in 1988. Approximately 55 SS-18s carry roughly half of Russia's deployed ICBM warheads.

Karakayev stated in 2010 that Russia would extend the service life of the SS-18 to 2026 (RIA-Novosti, 2010), but late in 2012, he said that the SS-18 would remain in service until 2022 (Interfax-AVN, 2012a).

### *SS-19 (RS-18 or UR-100NUTTH)*

The silo-based, six-warhead SS-19 entered service in 1980 and is gradually being retired. Currently, Russia deploys 210 warheads on the 35 SS-19s that remain in service. Karakayev stated in late 2012 that the SS-19 would be fully retired by 2019 (Interfax-AVN, 2012a).

### *SS-25 (RS-12M or Topol)*

Russia has been retiring SS-25 missiles for several years, each year removing between one and three regiments (9 to 27 missiles) from service. Karakayev said late in 2012 that the SS-25 would remain in service until 2019 (Interfax-AVN, 2012a). Russia has approximately 140 operational SS-25 missiles in service, but many—perhaps most—of the 63 missiles at Irkutsk and Novosibirsk are being inactivated to make way for the RS-24.

Russia is developing a new, liquid-fueled, heavy, silo-based ICBM. The missile is included in Russia's arms procurement program through 2020, with a goal of deployment in 2018 (Gorenburg, 2011; VPK News, 2011). Russia will first have to create a liquid-fuel ICBM production line, which it does not currently have, so it is likely that delays will occur. Though the new heavy ICBM is widely assumed to be a replacement for the SS-18, some SS-18s are scheduled to be replaced by the silo-based RS-24.

Russia is adjusting the operations of its mobile ICBMs, with each battalion

spending longer periods deployed away from its garrison. A Russian television crew accompanying the 54th Guards Missile Division at Teykovo on a combat patrol in July 2012, for example, reported that “the time the missile troops remain on combat patrol routes has gone up considerably. From now on, the military have to remain in position at secret locations in the woods for 20 days in a row” (Center TV, 2012). The mobile missile units are also being equipped with a new “modernized engineering support and camouflaging vehicle (MIOM-M)” designed to improve the ability of the missile launchers to remain undetected during alert deployments. This includes providing “concealment and imitation of a missile system in field positions, distortion of tracks of system units immediately after they have been taken [sic], including the rolling on of tracks leading to false positions and objects” (Interfax-AVN, 2013b).

Five ICBMs were test-launched in 2012, and an SRF spokesperson said 11 ICBM launches were scheduled for 2013 (Interfax-AVN, 2013a).

### **SSBNs and SLBMs**

After more than 15 years of design, development, and production, the first of the new Borei-class (or Borey) ballistic missile submarines (SSBNs) entered into service on January 13, 2013. Twenty-five years have passed since the last SSBN was commissioned in Russia. The new SSBN begins the transition from Soviet-era missile submarine designs to a new SSBN class of eight planned boats scheduled to replace the current Delta III and Delta IV models by the early 2020s; the first boat is named *Yuri*

*Dolgoruki*. The current SSBN fleet consists of 10 boats: one Borei, six Delta IVs, and three Delta IIIs. Combined they carry 160 submarine-launched ballistic missiles (SLBMs) with up to 624 warheads.

The Russian navy plans to build up to eight Borei-class (officially known as Project 955) SSBNs, each equipped with 16 SS-N-32 (Bulava) SLBMs that can carry up to six warheads apiece. Initially it appeared that the first Borei SSBN would transit to the Pacific Fleet on the Kamchatka Peninsula to begin the replacement of the Delta IIIs (Itar-Tass, 2008), but the Russian government announced in 2012 that the *Yuri Dolgoruki* would be based in the Northern Fleet. The second boat, the *Alexander Nevsky*, will be based with the Pacific Fleet (rusnavy.com, 2012a).

The *Alexander Nevsky* was launched in 2010 and is undergoing sea trials. It has to conduct a series of missile test-launches before it can be declared operational, possibly by late 2013 or early 2014. The third boat, the *Vladimir Monomakh*, was launched in late 2012 and is expected to become operational after two or three years.

The fourth and subsequent Borei-class SSBNs will be of an improved design known as Borei-II (Project 955A). The first improved Borei, possibly to be named the *Knyaz Vladimir* or *Svyatitel Nikolai*, began construction in July 2012 and is expected to enter service in 2015 to 2017. The keels for the fifth and sixth boats, the *Alexander Suvorov* and *Mikhail Kutuzov*, respectively, will be laid in 2013, and those submarines will probably enter service late in this decade.

There is considerable uncertainty about how the improved Borei SSBN

will be armed. Numerous articles over the past several years have reported that each Borei-II will be equipped with 20 missile tubes, four more than each of the first three boats (Interfax-AVN, 2013a). But in February 2013, a senior defense industry source told RIA-Novosti that the number of tubes would not be increased. “The Project 955A differs significantly from the original Borei (Project 955) but not in the number of missiles carried—there will still be 16 on board” (RIA-Novosti, 2013).

For the next several years, the mainstay of Russia’s SSBN force will continue to be the six third-generation Delta IV SSBNs built between 1985 and 1992, each equipped with 16 SLBMs. All Delta IVs are part of the Northern Fleet and are based at Yagelnaya Bay on the Kola Peninsula. Since 2007, Russia has been upgrading the Delta IVs to carry a modified SS-N-23 SLBM known as the Sineva. Each missile carries up to four warheads. All six boats have now completed an overhaul and conversion to Sineva, but *Verkhoturys* will not be ready until April 2013. The *Yekaterinburg* was damaged by a fire in December 2011 and will not return to service until 2014 at the earliest. As a result, only four of the six Delta IVs are currently operational.

There are also rumors of a modified version of Sineva, called Layner or Liner, that will be deployed on the Delta IVs over the next several years. One unnamed navy general staff official reportedly said that, “while the Sineva can carry four warheads, the Layner will carry 10” (Izvestia, 2012). But another source in the Russian General Staff said that the Layner is not a new missile but a modified Sineva: “It is in fact a Sineva. Only the warhead is new.” The Layner has an improved penetration capability

achieved by, among other things, “a greater number of reentry vehicles (boy-evoy blok) in the warhead [sic]” (Interfax-AVN, 2012b). Instead of more than twice the number of warheads, it seems more likely that the modified payload includes modified warheads and additional penetration aids.

Three Delta III SSBNs remain in service on the Kamchatka Peninsula as part of Russia’s Pacific Fleet. Each boat is equipped with 16 SS-N-18 M1 Stingray (RSM-50) SLBMs with three warheads each. The *Svyatoi Georgii Pobedonosets* collided with a fishing vessel in 2011. Following repairs, it test-launched an SS-N-18 in October 2012.

The Russian navy declared in 2012 that continuous SSBN deterrent patrols would resume by midyear (RIA-Novosti, 2012a). But according to information obtained from the US Navy under the Freedom of Information Act, Russian SSBNs only conducted four to six patrols during all of 2012. The duration of Russian SSBN patrols is not known but is assumed to be considerably shorter than US SSBN patrols, each of which lasts an average of about 70 days. With only five to six operational SSBNs in 2012, the number of Russian patrols may have been insufficient to maintain continuous patrols.

## Strategic bombers

Russia operates two types of nuclear-capable heavy bombers: the Tu-160 Blackjacks and the Tu-95MS Bear H. Both types can carry the nuclear AS-15 Kent (Kh-55) air-launched cruise missile (ALCM)<sup>4</sup> and possibly gravity bombs;<sup>5</sup> the Tu-160 can also carry the nuclear AS-16 Kickback (Kh-15) short-range attack missile.<sup>6</sup> A new long-range

nuclear cruise missile, designated the Kh-102, is under development.

There is growing uncertainty about the number of bombers and their operational status because Russia and the United States no longer disclose the number of aircraft counted under arms control treaties. The final Memorandum of Understanding exchanged under the Strategic Arms Reduction Treaty (START) listed a total of 76 deployed Russian bombers (13 Tu-160s and 63 Tu-95MSs) and 12 additional test bombers, for a total of 88 aircraft as of July 2009 (US State Department, 2009). Four Tu-95MSs reportedly were retired in late 2009 (Podvig, 2009), leaving 72 bombers in service. Since 2009, no official data has been publicly released. Our current estimate is based largely on commercial satellite images, which show that 51 to 54 bombers are typically present at the two strategic bomber bases (Engels and Ukrainka). Another 23 to 26 bombers are typically present at the Ryazan training base, the Kazan production plant, and the Zhukovsky design plant, for a total inventory of 74 to 80 bombers. This number is probably a little high because some of the visible bombers may have been retired and because the satellite images were not all taken on the same day. Nevertheless, by averaging the numbers visible on all of the images we can arrive at a rough estimate of 72 bombers currently in service. In addition to the 51 to 54 deployed bombers normally visible at Engels and Ukrainka, another half a dozen or so aircraft from the bases might be on training flights or temporarily at other bases, for an estimated force of perhaps 60 deployed bombers.

The 60 deployed bombers would only be counted as 60 weapons under the

New START counting rule, but the aircraft could in fact carry a maximum load of 676 weapons (all 72 bombers could carry an estimated 810 weapons). The weapons are not loaded on the bombers under normal circumstances. Most of the weapons have been moved from the bases to central storage facilities, but we estimate that a small number of warheads might be present at Engels and Ukrainka. The nuclear weapons storage facilities at each base appear to be active. Construction has been underway for the past two years on one of the nuclear weapons igloos at Engels Air Base.

Russia has begun design studies of a new strategic bomber that may emerge as a prototype by the early 2020s. The new aircraft, currently referred to as PAK-DA, would replace Tu-160 and Tu-95MS heavy bombers as well as the Tu-22M3 nuclear-capable medium-range bomber (Itar-Tass, 2010; RIA-Novosti, 2009). Although the new bomber would eventually replace all three bombers, Russia is still upgrading the older aircraft (RIA-Novosti, 2012b).

### **Nonstrategic (tactical) weapons**

We estimate that Russia has approximately 2,000 nonstrategic nuclear warheads assigned for delivery by air, navy, and various defensive forces. Russia has stated that it has reduced its number of nonstrategic nuclear warheads by 75 percent since 1991 and that all are in central storage (Russian Federation, 2010), but the statements have not been updated since 2005.<sup>7</sup>

We estimate that Russia's tactical air forces are assigned approximately 730 AS-4 air-to-surface missiles and bombs; Tu-22M3 (Backfire-C) intermediate-range bombers can deliver both the

missiles and bombs, whereas Su-24M (Fencer-D) and Su-34 (Fullback) fighter-bombers deliver bombs only. Russia is modernizing some of its Fencers, but the aircraft will be replaced by Su-34 (Fullback) fighter-bombers; deployment of the Fullback has started at bases in western Russia. It is possible that other types of fighter-bombers also have nuclear capability, but we have not found reliable information to that effect. Although individual weapons and aircraft vary considerably, air-delivered weapons represent the only category of nonstrategic nuclear weapons in which Russia and the United States have comparable numbers and types of armaments; unlike Russia, the United States has eliminated all types of nonstrategic naval nuclear weapons.

The approximately 700 warheads assigned to Russia's naval nonstrategic delivery platforms arm cruise missiles, antisubmarine weapons, anti-air missiles, torpedoes, and depth bombs. Russia's first new Severodvinsk-class (Yasen-class) nuclear-powered attack submarine is conducting sea trials prior to entering operations with the Russian navy, perhaps later this year. The submarine is equipped for nonstrategic nuclear weapons, including antisubmarine rockets, and has eight vertical launch tubes for cruise missiles. In November 2012, the *Severodvinsk* conducted a test-launch of what appeared to be the Caliber (SS-N-30) land-attack cruise missile (rusnavy.com, 2012b). It is possible (but uncertain) that the Caliber is nuclear-capable. Russia's arms-procurement program for 2011 to 2020 indicates that it will build a total of 10 Yasen-class subs (Lenta.ru, 2011).

There are indications that Russia is preparing for the conversion of some primary naval platforms from nuclear

to non-nuclear capability. One example includes plans to convert the Oscar-class guided-missile submarines and Kirov-class guided-missile cruisers from carrying nuclear SS-N-19 cruise missiles to non-nuclear SS-N-26 and SS-N-27 cruise missiles (RIA-Novosti, 2011a, 2012b, 2012c; *World Maritime News*, 2011). According to one report, the Oscar II submarine *Orel* (K-226) will undergo modernization in 2013 to replace the obsolete Granit (SS-N-19) anti-ship cruise missile with the new supersonic Onyx (SS-N-26) (rusnavy.com, 2012c). While the SS-N-19 is nuclear-capable, the SS-N-26 is not.

We estimate that Russia maintains around 430 warheads for air defense, ballistic missile defense, and coastal defense forces. The warheads are used in Gazelle ballistic missile defense interceptors at five sites around Moscow, in parts of the S-300 air defense system, and in the SSC-1B Sepal coastal defense system. The ballistic missile defense system (A-135) is being upgraded, and Russia has begun introducing S-400 air defense regiments (with about eight launchers and 32 missiles each) around Moscow and plans to gradually replace the S-300 system. There is considerable uncertainty about which of the S-300 air defense interceptors (SA-10, SA-12, SA-20) are nuclear-capable, whether the new S-400 also has a nuclear capability, and how many warheads are assigned to each unit.

Despite Russia's declaration in 1991 and 1992 that it would eliminate all ground-launched nonstrategic nuclear warheads, it has not done so (*Afterposten*, 2011). We estimate that approximately 170 warheads are assigned to SS-21 Scarab (Tochka) and SS-26 Stone (Iskander) short-range ballistic missiles.

The SS-21 is gradually being phased out and replaced with the SS-26, which under the 2025 State Armament Plan reportedly will be deployed with all ground troop units (Gavrilov, 2013).

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### Notes

1. New START aggregate data from March 2013 attribute 1,480 warheads on 492 deployed launchers. The number is lower than our estimate because it does not count weapons stored at bomber bases, but instead attributes an artificial number of one weapon per bomber. In reality, Russian bombers can carry six to 16 nuclear weapons each.
2. We estimate that Russia stores its nuclear weapons at 48 permanent storage sites across the country, including about 10 national-level central storage sites (Norris and Kristensen, 2009). Other essential references for following Russian strategic nuclear forces include the general New START aggregate data that the US and Russian governments will release biannually; the Open Source Center (various dates); Pavel Podvig's website on Russian strategic nuclear forces (Podvig, 2012); and the Russia profile maintained by the James Martin Center for Nonproliferation Studies for the Nuclear Threat Initiative (2012).
3. Under New START, Russia releases only three overall aggregate numbers for strategic forces: deployed ballistic missiles and heavy bombers; warheads attributed to those delivery vehicles; and deployed as well as non-deployed delivery vehicles. Under the previous agreement, START, the US State Department made available the full, unclassified breakdown of Russian aggregate numbers, including the number of each type of missile and bomber and their locations. For a copy of the July 2009 START Memorandum of Understanding that includes a specific breakdown of Russian numbers, see Kristensen (2011).
4. The Tu-95MS is equipped with the AS-15A and the Tu-160 with the AS-15B, which has a longer range. Depending on aircraft type, Russian bombers can carry up to 16 weapons; hence, it would be possible for 72 bombers to be loaded with 820 warheads but only be attributed 72 warheads under New START.
5. One well-informed source says that there are no nuclear gravity bombs for the Tu-95MS and Tu-160 aircraft (Podvig, 2005).
6. There are rumors that the AS-16 may have been retired or placed in storage.
7. A US Embassy cable stated in September 2009 that Russia had "3,000–5,000 plus" nonstrategic nuclear weapons (Venik4.com, 2010), a number that comes close to our estimate at the time (Kristensen, 2009). The US principal deputy undersecretary of defense for policy stated in 2011 that Russia was estimated to have 2,000 to 4,000 nonstrategic nuclear weapons (Miller, 2011). We estimate that the number is at the lower end of that range with the rest awaiting dismantlement. For a more in-depth overview of Russian and US nonstrategic nuclear weapons, see Kristensen (2012). Some analysts estimate that Russia has significantly fewer warheads assigned to nonstrategic forces. See, for example, Sutyagin (2012).

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