

# **Russian Nuclear Weapons Modernization: Status, Trends, and Implications**

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## How Many Warheads?

We have all seen the headlines that Russia is building up its nuclear forces or modernizing them in response to the Ukrainian crisis.

How can one characterize Russia's nuclear modernization, and what are some of the implications of it?

### ARGUMENT

**FP** **It's Time to Stop Putin's Nuclear Arms Buildup**

*The Washington Times*

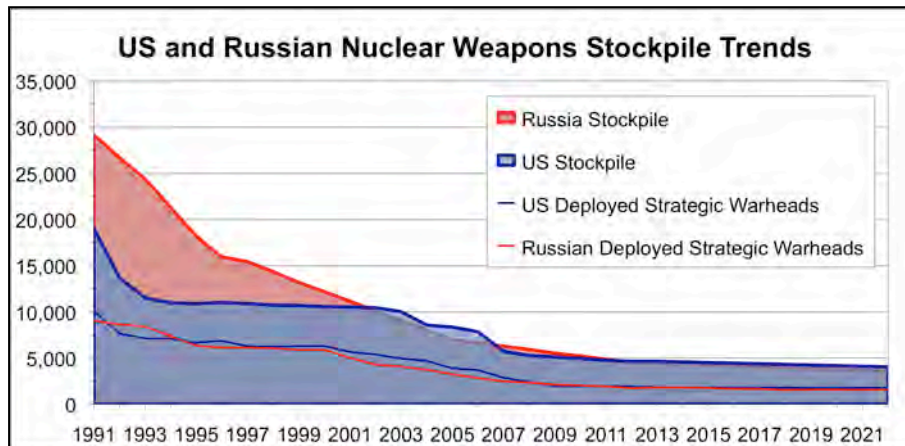
**Inside the Ring: Russia builds up, U.S. down**

**The Moscow Times**

**Russia Overhauls Nuclear Missile Forces as Tensions With West Flare**

HOME SECTIONS SEARCH **NEW YORK POST**  
**Russia developing new nuclear weapons to counter US, NATO**  
 By Associated Press September 10, 2014 | 2:53pm

## First a Little History



More than 125,000 warheads produced since 1945; Peak of 64,500 stockpiled warheads in 1986 (70,300 if including retired warheads)

- US stockpile peaked early (1967)
- Russian stockpile peaked late (1986)

Enormous progress since 1986 peak:

- ~54,000 warhead stockpile reduction
- ~47,000+ warheads dismantled

But roughly 10,000 stockpiled warheads remain (16,300 if also counting retired warheads awaiting dismantlement).

And the pace of reduction is slowing:

US cut only 309 warheads in 2009-2013, compared with 3,287 warheads cut in 2004-2008.

Russia cut an estimated 1,000 warheads in 2009-2013, compared with 2,500 in 2004-2008.

Instead of continuing pace or increasing reductions, US and Russian stockpiles appear to be leveling out for the long haul.

## ICBM Modernization

Gradual phase-out of soviet-era systems and partial replacement with “new” systems by early 2020s.

Replacement began two decades ago.

Oldest “new” are now 17 years old.

Nearly all “new” are modifications of basic SS-27.

Old System	New System	MIRV	First Deployed
SS-18	Sarmat (“heavy” ICBM)	Yes	(2018-2020?)
SS-19	SS-27 Mod 2 (RS-24)	Yes	(2014)
SS-25	SS-27 Mod 1 (Topol-M)	No	1997
	SS-27 Mod 1 (Topol-M)	No	2006
	SS-27 Mod 2 (RS-24)	Yes	2010
	SS-27 Mod 3 (RS-26)	Yes	(2015?)

### Who Says How Much New When?

2014: Modernization of “strategic nuclear forces is going at a faster rate, and, in fact, we will renew not 70 percent of the SNF, but 100 percent.”

*Deputy Prime Minister Dmitry Rogozin, 2014*

2014: “The share of advanced missile systems in Russia’s arsenal will rise to 80 percent by 2016, and replace old models completely by 2021.”

*Defense minister Sergei Shoigu, 2014*

2011: New missiles accounting for about 60 percent by 2016 and total replacement of all ICBM systems by the year 2021.

*SRF Commander Karakayev, 2011*

## Teykovo Modernization

First SS-27 unit (54 Guards Missile Division).

36 TELs for SS-27 Mod 1 (Topol-M) deployed in 4 regiments. Each ICBM single warhead.

Previously with SS-25.

Deployment phase:

2006: SS-27 Mod 1 (Topol-M) operational.  
18 TELs deployed in 2 regiments.

2010: SS-27 Mod 2 (RS-24) operational  
18 TELs deployed in 2 regiments.



Teykovo 1: SS-27 Mod 1 (Topol-M)



Teykovo 4: SS-27 Mod 2 (RS-24)

## Tatishchevo Modernization

Second SS-27 unit (60 Missile Division).

60 SS-27 Mod 1 (Topol-M) deployed in 6 regiments.  
Each ICBM singled warhead.

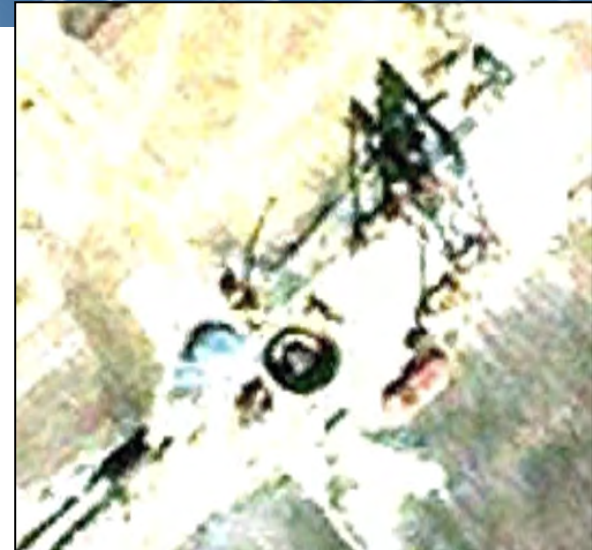
Satellite images show upgrade of silos and launch control centers.

Previously with SS-19 (probably all gone).

Deployment phase:

1997: SS-27 Mod 1 (Topol-M) first operational.

2013: Last of 60 missiles deployed.



Upgrade of silo 61F and Launch Control Center (images 21 Sep 2004 (top); 2 Aug 2005)



## Novosibirsk Modernization

Third SS-27 unit (39 Guards Missile Division).

First regiment with 9 SS-27 Mod 2 (RS-24) placed on “experimental combat duty” in 2013.

Satellite images show upgrade of regiment base and media photos show SS-27 Mod 2 launchers.

Remaining SS-25s are being phased out.



SS-27 Mod 2 TEL under camouflage (top) and upgrade of first of several regiment bases.



## Nizhniy Tagil Modernization

Fourth SS-27 unit (42 Missile Division).

Part of first regiment with 6 SS-27 Mod 2 (RS-24) placed on “experimental combat duty” in 2013.

Satellite images show complete reconstruction of regiment base (bottom) with 9 TEL garages for 3 SS-27 Mod 2 battalions, as well as upgrade of warhead storage and newly arrived camouflaged vehicles at supply base.

Remaining SS-25s being phased out.



Construction of SS-27 Mod 2 base (bottom); camouflaged vehicles at supply base (top left); upgrade to warhead storage (top right). Image: 2 Jun 2014





## Kozelsk Modernization

Fifth SS-27 unit (28 Guards Missile Division).

Deployment of first regiment with 10 SS-27 Mod 2 (RS-24) underway. Might become operational by December 2014.

News media photos show upgrade of silos.

Planned numbers are unknown, but there were 60 SS-19s in 2006 and 60 SS-27s were deployed at Tatishchevo.

Previously with SS-19 (possibly all gone).



Upgrade to SS-27 Mod 2 at Kozelsk missile field in 2012 (bottom) and 2013 (top).



## ICBM Force Structure



## ICBM Modernization

Implications of modernization:

- Reduction of total missiles from 304 to 243;
- Reduction of mobile missiles from 168 to 108; mobile will make up 44% of ICBM compared with 55% today;
- Reduction of deployed warheads from 967 to 801;
- Reduction of MIRV from 772 to 723;
- Reduction of silo MIRV from 640 to 390;
- Increase of mobile MIRV from 132 to 333.

Weapons System	Missiles (2014)	Warheads (2014)	Missiles (2024)	Warheads (2024)
SS-18	46*	460	0	0
SS-19	30	180	0	0
SS-25	117	117	0	0
SS-27 Mod 1 (Topol-M) mobile	18	18	18	18
SS-27 Mod 1 (Topol-M) silo	60	60	60	60
SS-27 Mod 2 (RS-24) mobile	33	132	63	252
SS-27 Mod 2 (RS-24) silo	-	-	60	240
SS-27 Mod 3 (RS-26) mobile	-	-	27	81
Sarmat ("heavy" ICBM)	-	-	15	150
<b>Total</b>	<b>304</b>	<b>967**</b>	<b>243</b>	<b>801**</b>

\* It is possible that an 8<sup>th</sup> regiment is also active for a total of 52 SS-18s with 520 warheads.  
 \*\* Assumes 4 warhead per SS-27 Mod 2 (RS-24) and 3 per SS\_27 Mod 3 (RS-26).

Key: Because Russia cannot keep up with US ICBM numbers and inventory of upload warheads, Russia responds by maximizing warhead loading on its missiles.

## SSBN/SLBM Modernization

Modernization from Delta to Borei:

6 Delta IV, each with 16 SS-N-23 (Sineva modification)

Will likely be replaced by Borei SSBN in 2017-2025

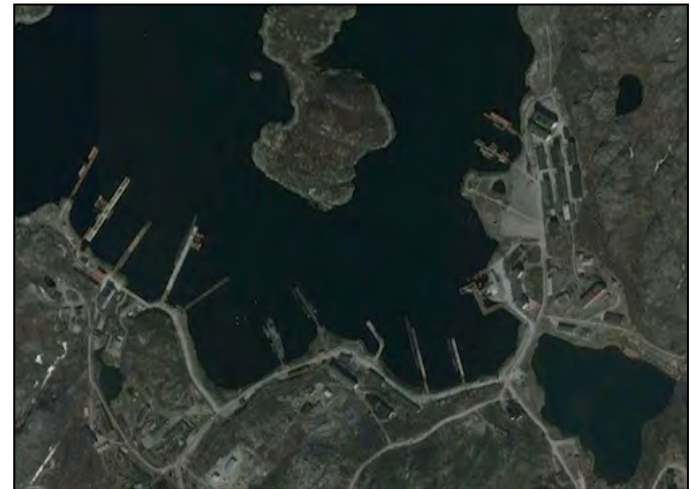
3 Delta III, each with 16 SS-N-18

Will be replaced by Borei SSBN in 2015-?

8 Borei (planned), each with 16 SS-N-32 (Bulava)



A Borei SSBN captured in the Kola Bay on 20 July 2014 with the aircraft carrier Admiral Kuznetsov.



Russia's SSBN fleet is based at Yagelnaya (Gadzhiiyev) on the Kola Peninsula in the Barents Sea (top) and Rybachiy on the Kamchatka Peninsula in the Pacific.



## SSBN/SLBM Modernization

The long voyage to Bulava

After a long and troublesome test flight program beginning in 2005, the SS-N-32 may be getting closer to replacing the SS-N-18 and SS-N-23.

But the challenge is not over yet: even after a successful flight on 10 Sep 2014, the Russian ministry of defense has said five additional successful flights are needed to accept the missile into service.

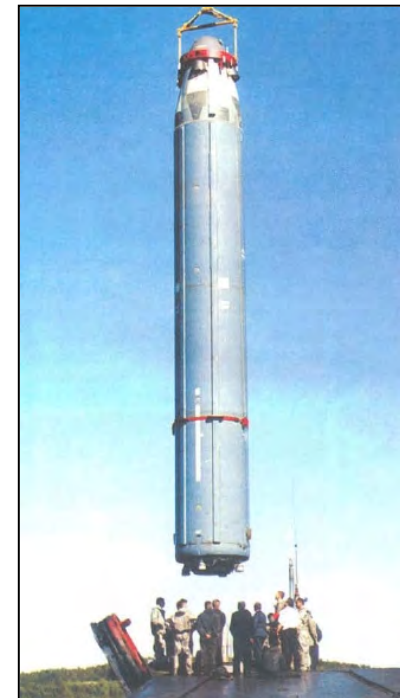
SS-N-18 carries up to 3 MIRV

SS-N-23 carries up to 4 MIRV

SS-N-32 carries up to 6 MIRV



The SS-N-32, Bulava (top), will soon replace the SS-N-18 (bottom left) and the SS-N-23 (Sineva).



## SSBN/SLBM Modernization

### Implications of modernization:

SSBN fleet will remain relatively stable around 8-9 SSBNs.

SLBMs stable at some 144 missiles.

Significant increase in warheads from 528 to 800.

Weapons System	Missiles (2014)	Warheads (2014)	Missiles (2024)	Warheads (2024)
SS-N-18	48*	144	0	0
SS-N-23 (Sineva)	96**	384	32	128
SS-N-32 (Bulava)	-	-	112***	672
<b>Total</b>	<b>144</b>	<b>528</b>	<b>144</b>	<b>800</b>

\* It is possible that only two Delta IIIs with 32 SS-N-18s are operational.  
 \*\* Not all six Delta IVs are operational any given time; normally 1-2 boats are in overhaul.  
 \*\*\* Assume 7 of 8 planned Borei SSBNs have entered service.

## Bomber Modernization

A new subsonic, low-observable long-range bomber (PAK-DA) is under development. A Tupolev design apparently was selected in 2013. Expected deployment in the mid-2020s to replace:

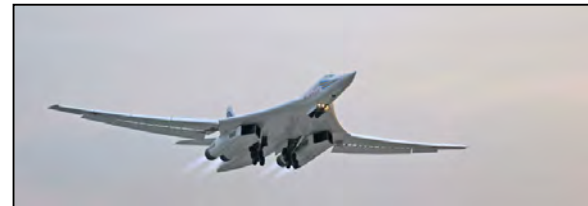
**Tu-95MS (Bear):** roughly 60 left of which perhaps 50 are operational. Carries AS-15B ALCM and bombs. Being upgraded to increase conventional capability.

**Tu-160 (Blackjack):** roughly 15 left of which perhaps 13 are operational. Carries AS-15A ALCM and bombs. Upgrade to increase conventional capability.

**Su-22M3 (Backfire):** Intermediate-range but sometimes considered strategic. Carries AS-4 ALCM and bombs. Being upgraded to increase conventional capability.



A new nuclear ALCM (Kh-102) has been under development for some time, possibly to replace the aging AS-15 on the Tu-95MS and Tu-160 bombers.



PAK-DA bomber  
(subsonic, stealthy)

## Non-Strategic Nuclear Modernization

Weapons System	Remarks
<b>Air Force</b>	
AS-4 ALCM	1967: 47 years old. For Tu-22M3
Bombs	For Tu-22M3, Su-24M, <b>Su-34</b>
<b>Navy</b>	
SS-N-9 (Malakhit)	1969: 45 years old. For ships.
SS-N-12 (Bazalt)	1976: 38 years old. For subs.
SS-N-15 (Vyuga)	1969: 47 years old. For subs/ships.
SS-N-16 (Vodopad)	1981: 33 years old. For subs.
SS-N-19 (Granit)	1980: 34 years old. For ships.
SS-N-21 (Granat)	1987: 27 years old. For subs.
SS-N-22 (Moskit)	1981: 22 years old. For ships.
SS-N-30 (Kalibr) ?	(2015). For subs. <b>Replacing SS-N-21?</b>
Torpedoes (550/650 mm)	For subs.
Depth Bombs	For ASW aircraft and helicopters.
<b>Army</b>	
SS-21 (Tochka)	1981: 33 years old.
SS-26 (Iskander-K)	2005: <b>Replacing SS-21.</b>
<b>Defense</b>	
S-300/A-135/coastal	Nuclear status of newer systems uncertain.

Large leftover warhead inventory of almost entirely Soviet-era weapons.

Reduced by at least 75% since 1991.

Most estimates vary from 1,800 to 2,000 warheads. DOD mentions unofficial estimates of 2,000-4,000

All warheads in central storage; not with/on delivery vehicles.

Of current force, only three types are being modernized. Future plans are unknown.

“The general purpose forces – to include dual-use nonstrategic nuclear forces – will continue to acquire new equipment for the near-term, but deliveries will be small and largely consist of modernized Soviet-era weapons.”

*US Defense Intelligence Agency, 2013*



## Strategic Stability Issues

US Intelligence Community describes Russia's nuclear modernization as ongoing and well-funded but without militarily significant effect on strategic stability.

"We expect Russia's military modernization will lead to a more agile and compact force capable of more modern forms of warfare. A future force will be smaller, but more capable of handling a range of contingencies on Russia's periphery....The general purpose forces will continue to acquire new equipment in the near-term, but **deliveries will be small and largely consist of modernized Soviet-era weapons....**

Russia will **continue to maintain a robust and capable arsenal of strategic and nonstrategic nuclear weapons** for the foreseeable future. To support this policy, the Russian government is making strong investments in its nuclear weapon programs."

*US Defense Intelligence Agency, 2014 (Emphasis added)*

### Russian Modernization Effect on Strategic Stability:

Russia "would **not be able to achieve a militarily significant advantage** by any plausible expansion of its strategic nuclear forces, even in a cheating or breakout scenario under the New START Treaty."

A disarming first strike, "even if significantly above the New START Treaty limits, would have **little to no effects** on the U.S. assured second-strike capabilities that underwrite our strategic deterrence posture."

*DOD (OSD/DIA) report to Congress, 2012  
(Emphasis added)*

## Conclusions

- Russia is in the middle of a decades-long modernization of its strategic nuclear force posture that involves phasing out Soviet-era strategic forces and replacing them on a less-than-one-for-one basis with newer systems. The effects might be (by 2024):
  - There will be fewer total missiles but with slightly more total warheads (still within New START limit, although treaty expires in 2021);
  - The ICBM force will be less mobile but more mobiles will carry MIRV;
  - The future missile force will be more MIRVed than today's force (Russia is compensating for having fewer missiles than the United States by maximizing warhead loading on each missile: bad for strategic stability);
  - The SSBN force will have more warheads than today;
- Russia is also modernizing its non-strategic nuclear forces but to a much lesser degree than strategic forces. Unless new programs are begun, this will likely result in a significant reduction of Russian non-strategic nuclear forces over the next decade-plus.
- There is significant hype and blustering about Russian nuclear modernization in the public debate. The modernization is significant and expensive but not seen as alarming by the U.S. Intelligence Community.
- Russia and the United States need to make additional reduction of their bloated nuclear force postures; the United States should make additional unilateral reductions to attempt to reduce the momentum of Russia's nuclear modernization.