

Ukraine War and Nuclear Risks

Hans M. Kristensen

Director, Nuclear Information project

Federation of American Scientists

hkristensen@fas.org

Briefing to

Arms Control Association webinar on nuclear risks in Ukraine war

October 11, 2022

Russian nuclear forces overview

- Russia has issued nuclear threats during Ukraine war, most recently in the context of protecting annexed regions. Follows threats in 2014 and earlier.
- Military stockpile: Nearly 4,500 warheads (plus 1,500 retired)
- 1,000-2,000 non-strategic warheads (including retired). Estimate significantly lower than 3,000-5,000 warheads DOD referenced in 2009 briefing to NATO.
- Very diverse: air, navy, air/missile-defense, army.
- Categories: Strategic versus non-strategic, but any use would be strategic. Non-strategic are really regional weapons. Better division is long- and shorter-range weapons. Reflects that many of Russia's nuclear scenarios are on their periphery. Plus, without large non-strategic inventory Russia would have significant stockpile disparity with US.

BULLETIN OF THE ATOMIC SCIENTISTS

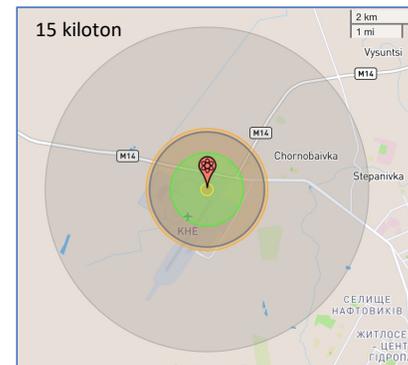
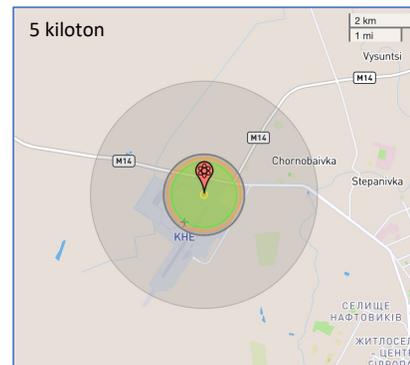
Table 1. Russian nuclear forces, 2022.

Type/name	Russian designation	Launchers	Year deployed	Warheads x yield (kilotons)	Total warheads
Strategic offensive weapons					
ICBMs					
SS-18 Mo Satan	RS-20V	40	1988	10 x 500/800 (MIRV)	400 ^a
SS-19 M3 Stiletto	RS-18 (UR-100NUTTH)	0	1980	6 x 400 (MIRV)	0 ^b
SS-19 M4	? (Avangard)	6	2019	1 x HGV	6
SS-25 Sickle	RS-12M (Topol)	9 ^c	1988	1 x 800	9
SS-27 Mod 1 (mobile)	RS-12M1 (Topol-M)	18	2006	1 x 800 ^d	18
SS-27 Mod 1 (silo)	RS-12M2 (Topol-M)	60	1997	1 x 800	60
SS-27 Mod 2 (mobile)	RS-24 (Yars)	153	2010	4 x 100 ^e (MIRV)	612 ^d
SS-27 Mod 2 (silo)	RS-24 (Yars)	20	2014	4 x 100 ^e (MIRV)	80
SS-X-29 (silo)	RS-28 (Sarmat)	-	(2022)	10 x 500 ^f (MIRV)	-
Subtotal		306			1,185^g
SLBMs					
SS-N-18 M1 Stingray	RSM-50	0/0	1978	3 x 50 (MIRV)	0 ^h
SS-N-23 M2/3	RSM-54 (Sineva/Layner) ⁱ	5/80	2007	4 x 100 (MIRV)	320 ^h
SS-N-32	RSM-56 (Bulava)	5/80	2014	6 x 100 (MIRV)	480 ^h
Subtotal		10/160^h			800^h
Bombers/weapons					
Bear-H6/16	Tu-95M56/	55	1984/	6-16 x AS-15A ALCMs or 14	448
	MS16/MSM		2015	x AS-23B ALC	
Blackjack	Tu-160/M	13	1987/	12 x AS-15B ALCMs or AS-23B	132
			2021	ALCM, bombs	
Subtotal		69^h			580^h
Subtotal strategic offensive forces					
<i>Nonstrategic and defensive weapons</i>					
ABM/Air/Coastal defense					
S-300/S-400 (SA-20/SA-21)		~750	1992/	1 x low	~290
			2007		
S3T6 Gazelle		68	1986	1 x 10	68 ^h
SSC-18 Sepal (Redut)		8 ^h	1973	1 x 350	4
SSC-5 Stooze (SS-N-26) (K-300P/3M-55)		60	2015	(1 x 10) ^h	25
Land-based air					
Bombers/fighters (Tu-22M3(M3M)/Su-24M/ Su-34/MIG-31K)		~300	1974-2018	ASMs, ALBM, bombs	~500
Ground-based					
SS-26 Stone SSM (6K720, Iskander-M)		144	2005	1 x 10-100	70 ^h
SSC-7 Southgaw GLCM (R-500/9M728, Iskander-M) ^h					
SSC-8 Screwdriver GLCM (9M729) ^h		20 ^h	2017	1 x 10-100	20
Naval					
Submarines/surface ships/air				LACM, SLCM, ASW, SAM, DB, torpedoes	~935
Subtotal nonstrategic and defensive forces					~1,912^h
TOTAL					~4,477
Deployed					1,588
Reserve					2,889
Retired warheads awaiting dismantlement					1,500
Total inventory					5,977

ABM = antiballistic missile; ALCM = air-launched cruise missile; AS = air-to-surface; ASM = air-to-surface missile; ASW = anti-submarine weapon; DB = depth bomb; GLCM = ground-launched cruise missile; ICBM = intercontinental ballistic missile; LACM = Land-Attack Cruise 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; SSM = surface-to-surface missile
^hIt is possible that the SS-18s now carry only five warheads each to meet the New START limit for deployed strategic warheads. It is also possible that a fourth regiment at Dombrovskiy is operational.
ⁱIt is thought that all SS-19 ICBMs have been retired, although activities continue at some former regiments.
^jIt is possible that one regiment at Barnaul has not yet completed an upgrade to the SS-27 Mod 1. One additional regiment at Yurya has 9 SS-25 launchers and will upgrade to the SS-27 Mod 2 in 2022; however, the regiment serves a back-up launch transmission function, and is not nuclear-armed, so it is therefore not included in this table.
^kTwo more road-mobile regiments are being upgraded from SS-25 to SS-27 Mod 2. It is possible that the SS-27 Mod 2s now carry only three warheads each to meet the New START limit on deployed strategic warheads.
^lOnly about 812 of these warheads are believed to be deployed. The rest are in storage for potential loading.
^mThe remaining Delta III-class SSBN has been converted to an attack submarine.

Russian nuclear forces overview

- Potential use in Ukraine context would most likely involve shorter-range weapons, fx Iskander SRBM. To have effect on war, Russia would have to use many nuclear weapons.
- Putin decides but military has to cooperate; there is no red button. Strategic are on alert and could be used quickly. Tactical in central storage and would first have to be brought out, transported, and readied.
- Effects depend on target, yield and height of detonation. Fallout depends on yield, height of burst, wind, precipitation. Simple simulations from Nukemap:



NATO nuclear forces overview

- US/NATO has so far not wanted to react with explicit nuclear counter-threats. But today NATO Secretary General Stoltenberg explicitly included references to upcoming Steadfast Noon nuclear exercise and Nuclear Planning Group meeting in remarks rejecting Putin's threats.
- US relies less on non-strategic nuclear weapons and have much better conventional capabilities.
- US forward-deployed non-strategic nuclear weapons in Europe serve as symbol of US commitment. Military utility is limited but not zero. Modernization with F-35A and B61-12 will enhance capability.
- To the extent nuclear is needed, US relies more on strategic bombers. Moreover, with B61-12, the full range of low-range capabilities will be added to US strategic bombers and tactical fighter-bombers.

Our message is clear.
NATO stands with Ukraine.
For as long as it takes.

President Putin started this war.
He must end it.
By withdrawing his forces from Ukraine.

And President Lukashenko should stop the complicity of Belarus in this illegal conflict.

On Thursday, I will chair a regular meeting of the Nuclear Planning Group.
The fundamental purpose of NATO's nuclear deterrence has always been to preserve peace, prevent coercion and deter aggression.

Next week, NATO will hold its long-planned deterrence exercise, Steadfast Noon.
This is routine training, which happens every year.
To keep our deterrent safe, secure and effective.

President Putin's veiled nuclear threats are dangerous and irresponsible.
Russia knows that a nuclear war cannot be won and must never be fought.

We are closely monitoring Russia's nuclear forces.
We have not seen any changes in Russia's posture.
But we remain vigilant.

NATO Secretary General Stoltenberg statement, October 11, 2022