

Modernization of the Russian Strategic Forces

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Outline

- Current status
 - New START limits
 - Strategic and non-strategic weapons
- Strategic modernization programs
 - Strategic bombers
 - Submarines
 - Ballistic missiles
 - Early-warning

Current status

- New START accountable warheads and launchers (as of 1 March 2014)
 - 1512 deployed warheads
 - 498 deployed launchers
 - 906 deployed and non-deployed launchers

- Estimated actual numbers (as of January 2014)
 - 490 deployed launchers
 - 1700 deployed warheads

Strategic triad

	Launchers	Warheads
ICBMs	311	1078
SLBMs	112	416
Bombers	66	~200
TOTAL STRATEGIC	490	1700
Non-strategic warheads (in centralized storage)		~2000
Retired warheads in dismantlement queue		~3500
TOTAL		~8000*

* Source: Hans Kristensen, Russian Nuclear Forces, 2014

Bombers

- Tu-95MS (Bear H)
 - Nuclear ALCMs
 - Produced in 1984-1994
 - To stay in service until 2025-2035?
- Tu-160 (Blackjack)
 - Nuclear and non-nuclear ALCMs, bombs
 - Produced in 1987-2007
 - To stay in service until 2025?
- PAK DA
 - Under development since 2011
 - Subsonic?
 - To enter service after 2025?

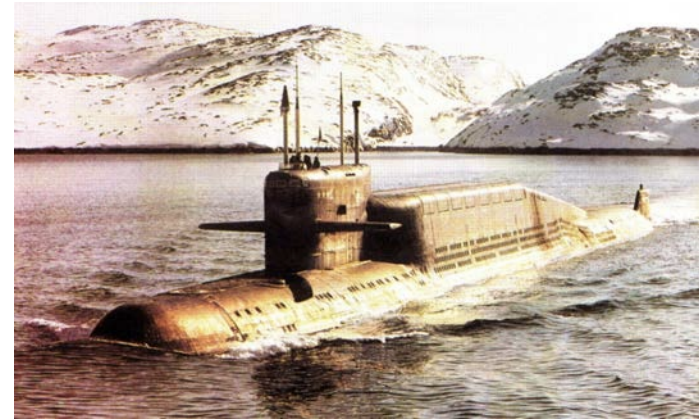


Photos: russianplanes.net

Submarines and SLBMs

- Project 667BDR (Delta III)
 - Built in 1980-1984
 - 1 submarine (+3 being retired)
 - 16 R-29R SLBMs (3 warheads)

- Project 667BDRM (Delta IV)
 - Built in 1985-1991, completed overhaul
 - 6 submarines
 - 16 R-29RM SLBMs
 - Sineva: 4 warheads, 2004-2013
 - Limer: 4-10 warheads, 2014-



Photos: fleetphoto.ru, Oleg Kuleshov

New submarines and SLBMs

- Project 955 Borey
 - 2 submarines accepted for service
 - Yuri Dolgorukiy (Dec 2012)
 - Alexandr Nevskiy (Dec 2013)
 - 2 under construction
 - Vladimir Monomakh (sea trials)
 - Knyaz Vladimir (in dock)
 - Total of 8 submarines by 2020
 - 16 Bulava SLBMs (6 warheads)

- Bulava SLBM
 - 20 tests (2005-2013), 10 successful
 - 6 tests expected in 2014



Photos: Sevmash, militaryrussia.ru

ICBMs

- ICBM force
 - About 1100 out of 1700 warheads
 - About 750 warheads on old MIRVed ICBMs

- Old ICBMs
 - R-36M2 (SS-18)
 - Produced in 1988-1992, to stay until 2022
 - 52 silo-based missiles, 10 warheads
 - UR-100NUTTH (SS-19)
 - Produced in 1979-1984, to stay until 2019
 - ~40 silo-based missiles, 6 warheads
 - Topol (SS-25)
 - Produced in 1985-1992, being withdrawn
 - About 100 road-mobile missiles, single-warhead

New ICBMs: Topol-M (SS-27)

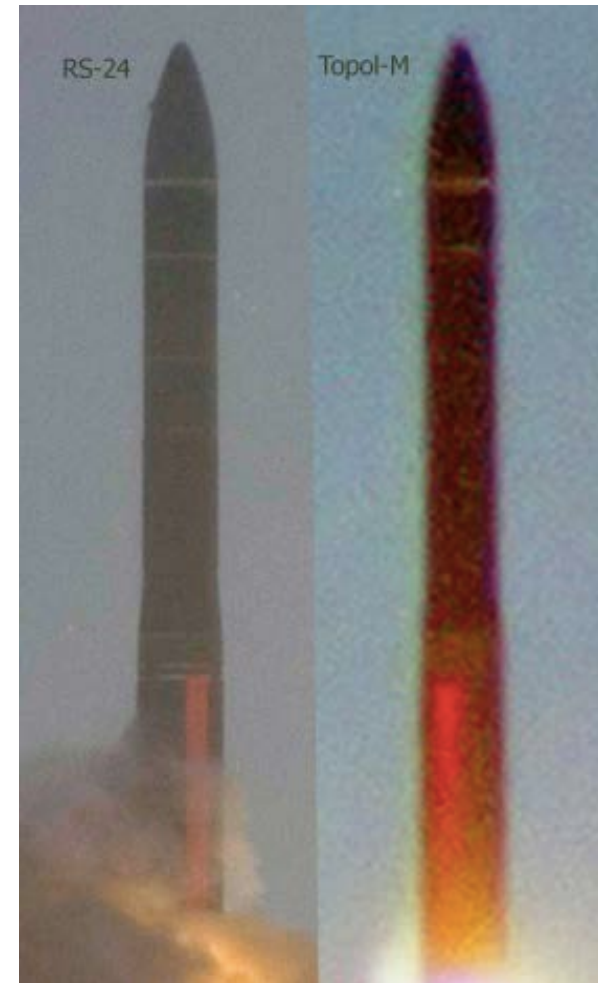


- Development started in late 1980s
- Single-warhead missile
- Silo- and road-mobile versions
- Deployment: 1997 (silo), 2006 (mobile)
- 2014: 60 silo, 18 mobile missiles



New ICBMs: RS-24 Yars

- MIRVed version of Topol-M
- 4 to 6 warheads
- Deployment: 2010 (mobile), 2014 (silo)
- Deployment plans
 - 2014: 33 deployed ICBMs
 - Total of 60-100 missiles to be deployed?
- SS-18 replacement?
 - Throw-weight is 1.2 tonnes vs. 8.8 tonnes



New ICBMs: Sarmat "heavy" ICBM

- Old "heavy" missile: R-36M2/SS-18
 - Launch weight 211 tonnes
 - Throw-weight: 8.8 tonnes
 - 10x800 kt warheads
 - 38 warheads considered at some point in the 1970s
 - Guided warhead tested in 1990
 - Hardened silos
- New "heavy" missile: Sarmat
 - Liquid fuel
 - Launch weight "considerably more than 100 tonnes"
 - Throw-weight more than 4.5 tonnes?
 - Deployment expected in 2018-2020

New ICBMs: Boost-glide system?

- Early development
 - Albatross system in 1987-1991
 - Flight tests in 1990, 2001?
- “Hypersonic warhead” test in Feb 2004
 - SS-19 from Baykonur to Kamchatka
 - Partially successful?
- “Hypersonic vehicle” test in Sep 2013
 - SS-19 from Dombarovskiy?
 - Failure
- Project 4202
 - Major construction in Dombarovskiy
- Production to begin in 2015?



Photo: panoramio.com

New ICBMs: Rail-mobile missile

- Old rail-mobile missile: RT-23UTTH/SS-24

- Launch weight 104.5 tonnes
- Length 23 m
- 10 warheads
- 36 missiles in 1990 (+56 in silos)



- New rail-mobile missile

- Based on Bulava?
 - Launch weight 37 tonnes, length 12 m
- Rejected earlier, but considered again in 2013
- Decision to be made in 2014

New ICBM/IRBM: RS-26 Rubezh

- “Intercontinental range” test in May 2012
 - From Plesetsk to Kamchatka – 5,800 km
 - Needed 5,500 km to qualify as ICBM
 - Tested with one warhead
- “Intermediate-range” tests
 - From Kapustin Yar to Sary-Shagan – 2,000 km
 - With multiple (reportedly 3) warheads
- IRBM based on RS-24?
 - TEL+missile:
 - 80 tonnes vs. 120 tonnes for RS-24
 - First two stages of RS-24?
 - Similar to Temp-2S/SS-16 and Pioneer/SS-20



Photo: rcforum.ru, militaryrussia.ru

INF Treaty compliance issues

- RS-26 Rubezh
 - INF Treaty prohibits missiles with 500-5500 km range
 - But RS-26 will be counted as ICBM under New START

- Ground-launched cruise missile
 - US: Tests began in 2008, not yet deployed
 - Probably not Iskander
 - INF Treaty prohibits GLCMs with 500-5500 km range
 - No good definition of GLCM range in the treaty
 - Likely a test of SLCM from ground launcher

Modernization of the triad

- Bombers
 - PAK DA
- Submarines and SLBMs
 - Project 667BDRM subs + Sineva and Liner R-29RM missiles
 - Project 955 submarines + Bulava SLBM
- ICBMs
 - Topol-M/RS-24 Yars
 - Sarmat "heavy" ICBM
 - RS-26 Rubezh IRBM/ICBM
 - Project 4202?
 - Rail-mobile ICBM?

Ukrainian factor

- Yuzhmash/Yuzhnoye DB (Dnepropetrovsk)
 - Designed and built R-36M2/SS-18 ICBM
 - Participates in the life extension program

- Khartron (Kharkov)
 - Guidance systems
 - UR-100NUTTH ICBM
 - 71Kh6/US-KMO GEO early-warning satellites
 - Project 4202

Early-warning system: Radars

- Radars in Ukraine, Azerbaijan no longer used
- Radars in Belarus, Kazakhstan to be replaced
- New radars are built in Russia

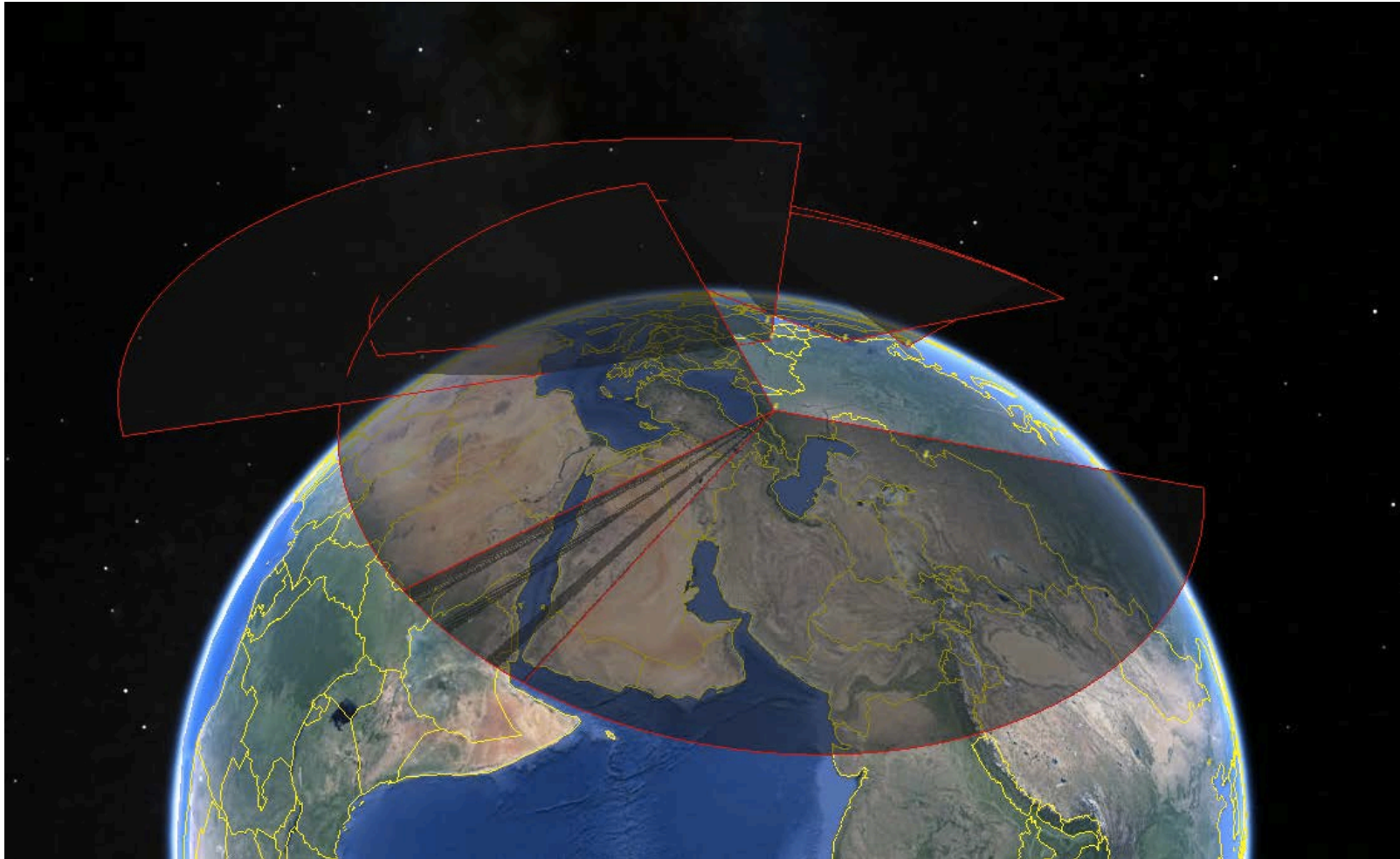


Voronezh-D

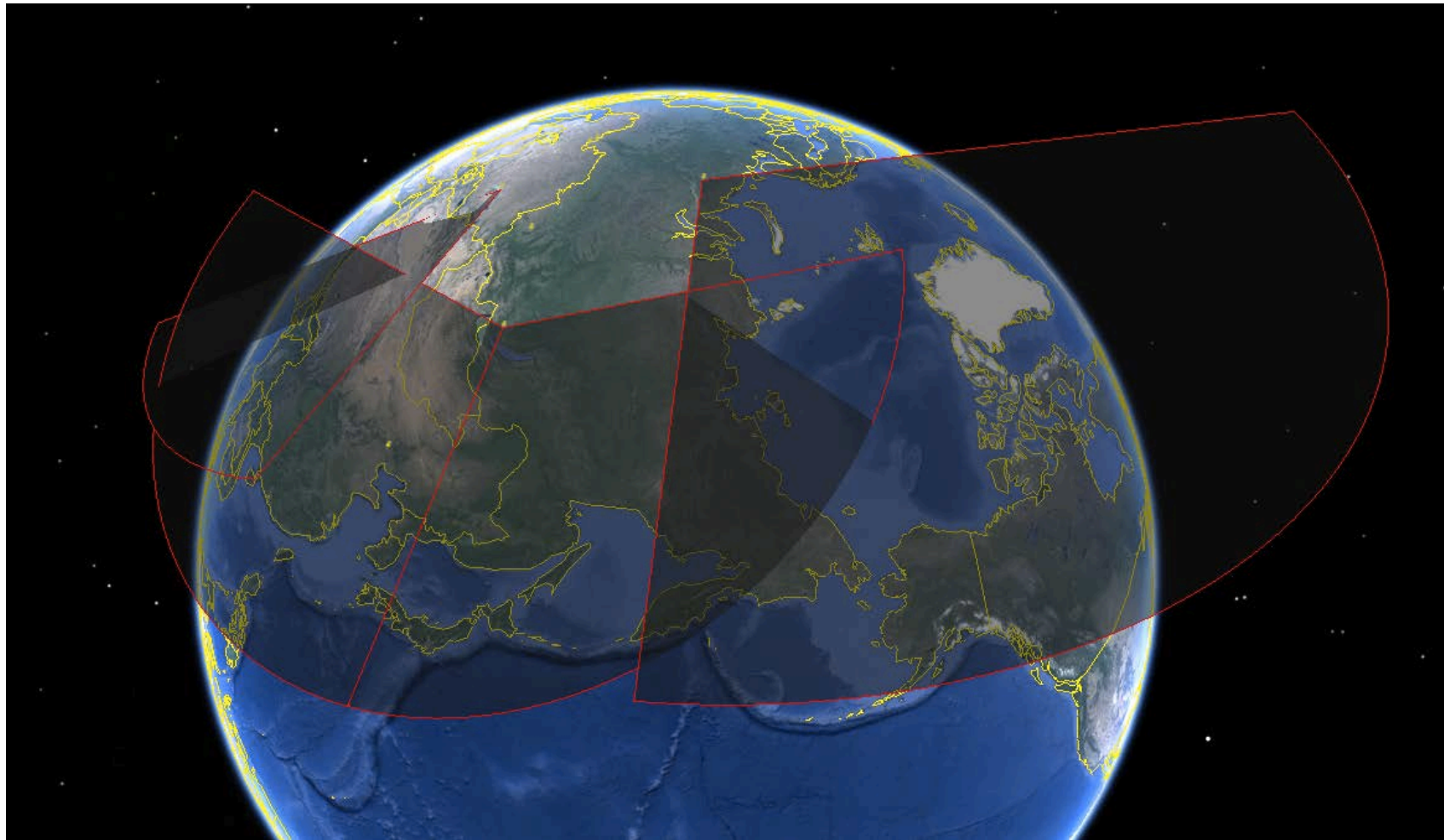


Voronezh-DM

Early-warning radars: West



Early-warning radars: East



Early-warning satellites

- Highly-elliptical orbits
 - US-KS/Oko system, 73D6 satellites
 - Limited to the U.S. territory
 - Up to 9 satellites in the constellation
 - 2014: 2 operational satellites provide 12 hours/day coverage
- Geostationary satellites
 - US-KMO system, 71Kh6 satellites
 - Look-down capability
 - 2014: 1 satellite at 166 East
- New system (EKS)
 - Under development



Photo: novosti-kosmonavtiki.ru

Prospects for nuclear reductions

- State Armament Program 2011-2020
 - Total: 19 trillion RUR (\$650 billion)
 - Strategic triad: ~\$70 billion
- Arms control
 - New START ends in February 2021
 - Linkage to missile defense, multilateral disarmament, conventional precision weapons
 - Few incentives to reduce the numbers
 - But still some interest in bilateral arms control