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The State of Nuclear Dangers: Nuclear Reductions, Modernizations and Operations

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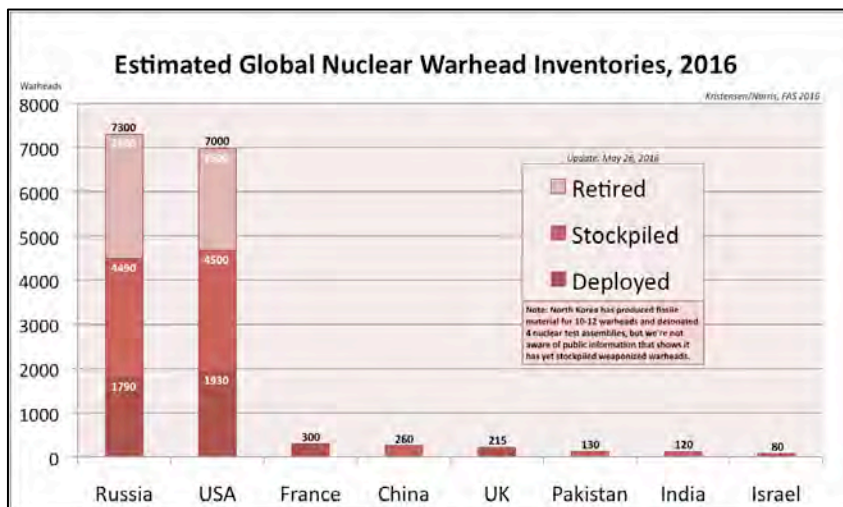
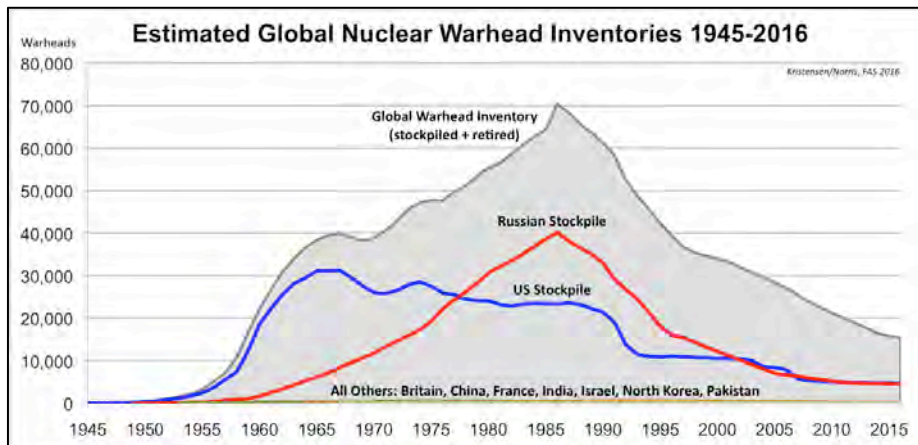
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Overview

- Nuclear Reductions: Status and Trends
- Worldwide Nuclear Modernization Programs
- Nuclear Operations

Nuclear Reductions and Trends



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 reductions since 1986 peak:

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

~10,000 warheads in stockpiles (~15,000 if counting retired warheads awaiting dismantlement)

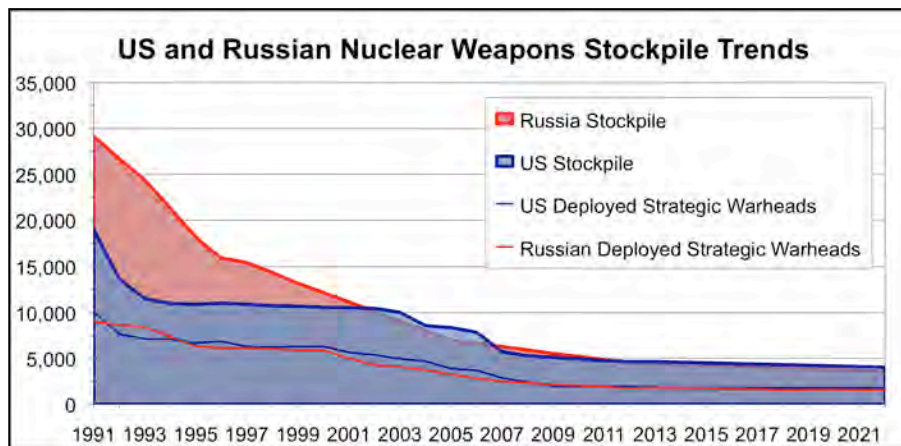
US and Russia possess 90% of global inventory (94% if counting retired warheads); **each has more than 4 times more warheads than rest of world combined**; 15 times more than third-largest stockpile (France)

Decreasing: US, Russia, Britain

Increasing: China, Pakistan, India, North Korea

Steady: France, (Israel)

Nuclear Reductions and Trends



With more than 90% of world inventory, US and Russia have special responsibility to reduce

Reduction of deployed strategic warheads from some 23,000 in 1989 to 3,700 in 2016 (New START counts 3,163)

Readiness level of remaining strategic forces is high: about 1,800 warheads on prompt alert

No official de-alerting, but significant reduction of overall alert numbers: heavy bombers de-alerted, US ICBMs and SLBMs downloaded, non-strategic forces de-alerted

Trend: pace of reductions is slowing

US cut only 400 warheads in 2010-2014, compared with 3,500 warheads cut in 2005-2009

Russia cut an estimated 1,100 warheads in 2010-2014, compared with 2,600 in 2005-2009

Instead of continuing pace or increasing reductions, US and Russian stockpiles appear to be leveling out for the long haul; new emphasis on modernization

New initiatives needed to prevent stalling of arms control

Nuclear Reductions and Trends

Large disparity in deployed strategic launchers fuels asymmetric postures (Russia: MIRV, US: launchers)

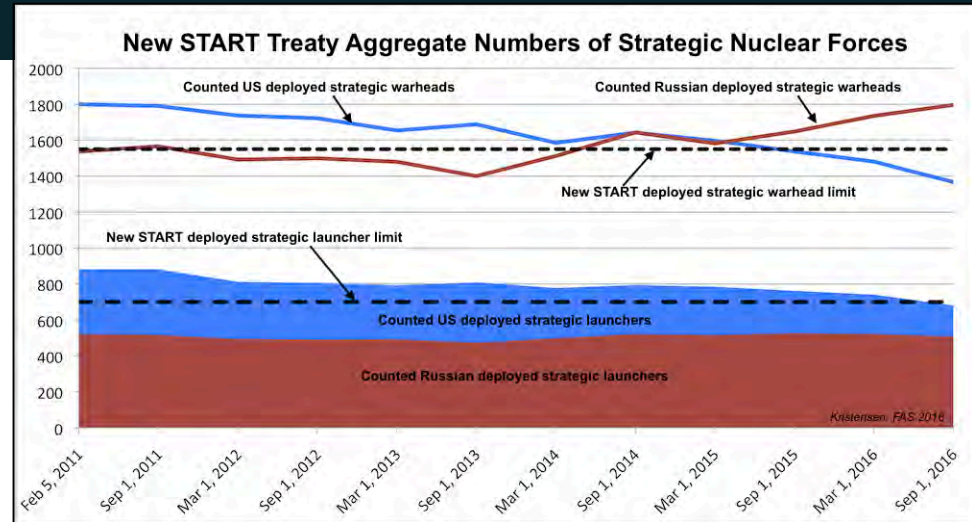
Russian increase of deployed warheads since 2013 gives impression that Russia is not demonstrating good faith and fuels uncertainty about intensions after New START expires in 2021

US retention of large warhead upload capacity and “warm” ICBM silos, especially when seen together with advanced conventional weapons and growing missile defense, seen as destabilizing

Overall modernizations deepen East-West crisis by fueling suspicion and worst-case scenario planning on both sides

Russian INF violation puts treaty future in doubt and poisons atmosphere for other treaties

Efforts to increase transparency and reduce non-strategic weapons has stalled



Russian increase of deployed strategic warheads looks bad and sends the wrong signal, but is not militarily significant:

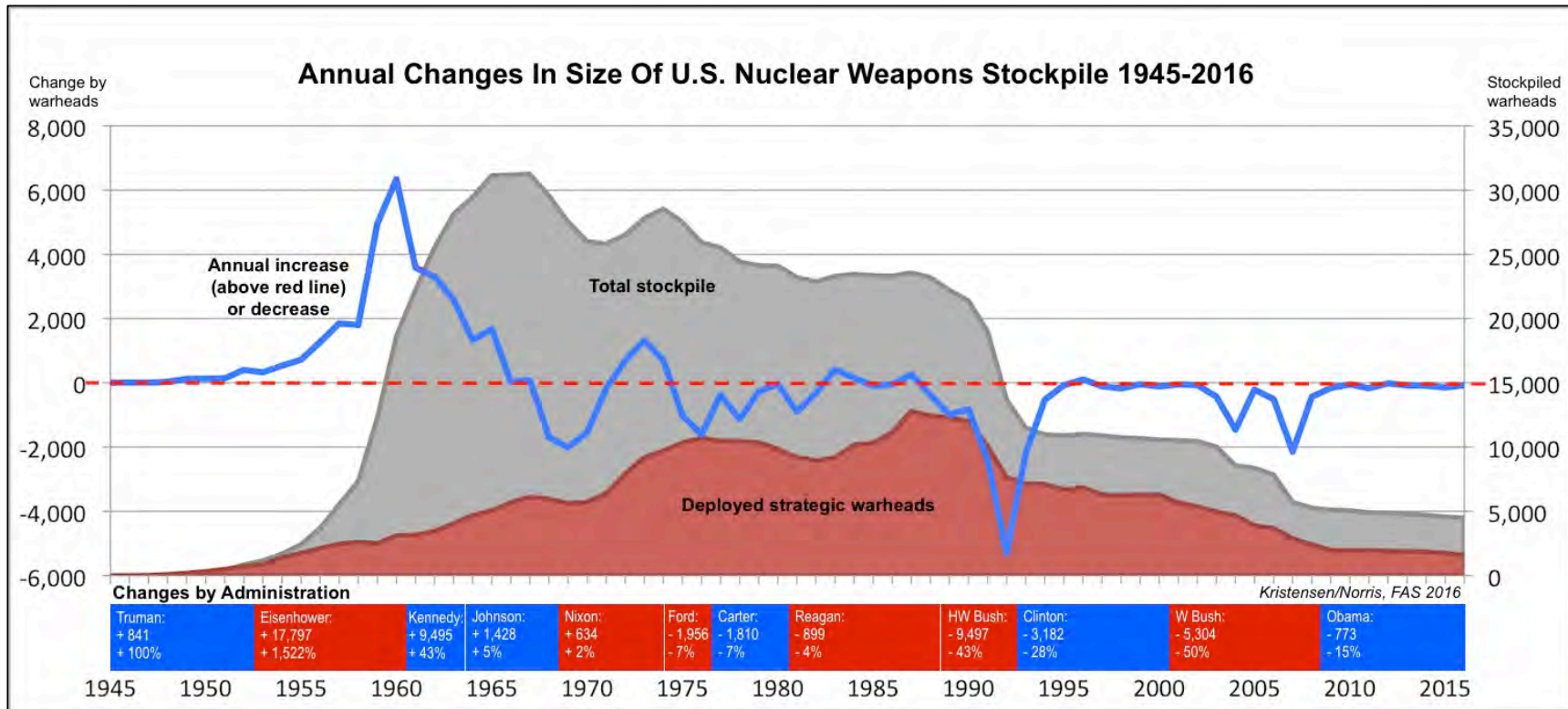
Even if Russia deployed additional strategic warheads to conduct a disarming first strike, *even significantly above the New START Treaty limits*, it “would have *little to no effects* on the U.S. assured second-strike capabilities that underwrite our strategic deterrence posture.”

The “Russian Federation...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...*”

DOD, Report on the Strategic Nuclear Forces of the Russian Federation, 2012

Nuclear Reductions and Trends: United States

The Obama Administration has reduced stockpile the least of any post-Cold War US administration



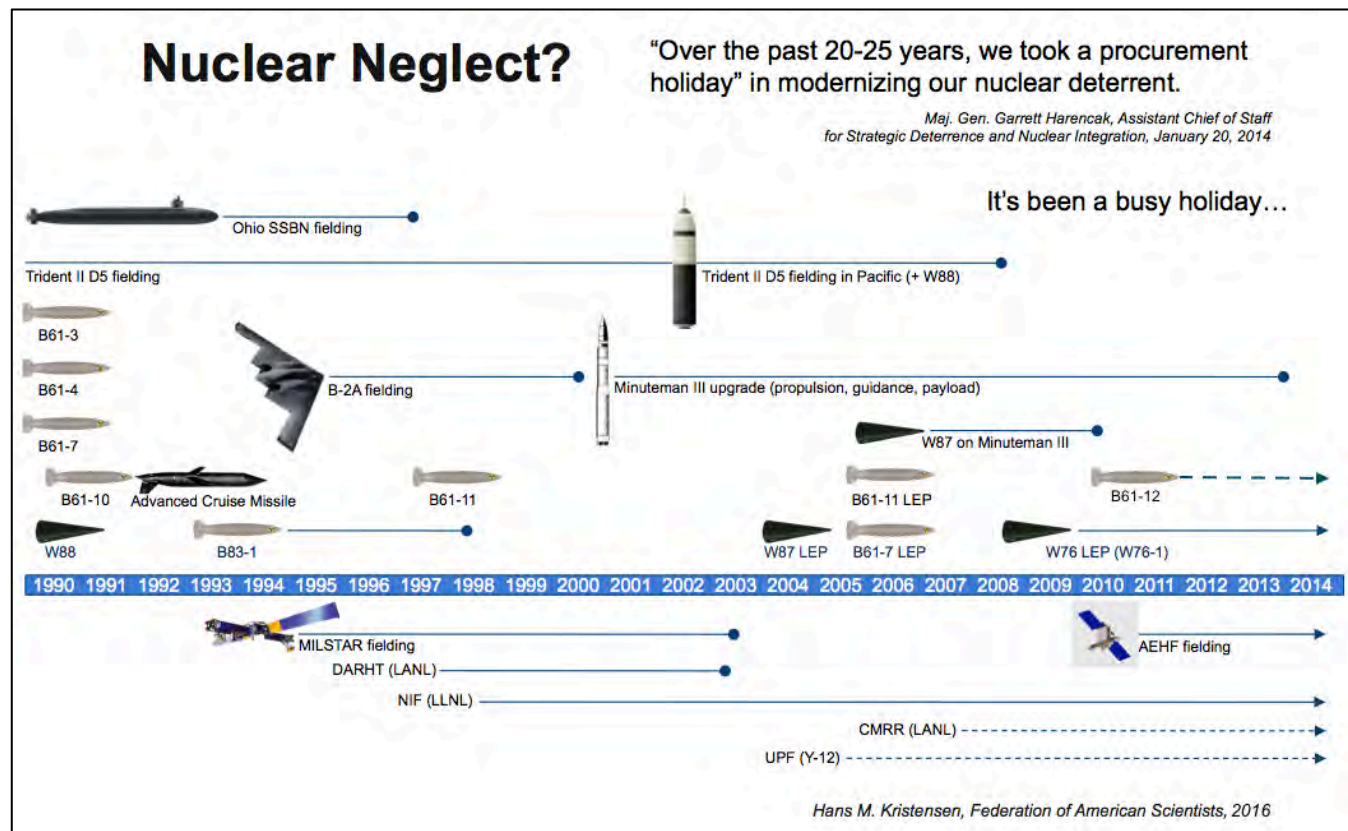
Modernization: United States

It is often said that the United States has had a “procurement holiday” on nuclear forces since the Cold War

And that “everyone is modernizing but the United States”

And that “Russia is building warheads while the United States can’t”

Well...



Modernization: Russia

ICBM

- SS-27 Mod 2 (mobile): replacing SS-25s at Novosibirsk, Tagil, Yoshkar-Ola
- SS-27 Mod 2 (silo): replacing SS-19s at Kozelsk
- SS-27 Mod 2 (rail): envisioned but uncertain
- RS-26 (compact SS-27): to replace SS-25s at Irkutsk and Vypolzovo
- RS-28 (Sarmat): to replace SS-28s at Dombarovsky and Uzhur



SSBN / SLBM

- SS-N-23 SLBM life-extension (Sineva/Layner) in Delta IV SSBN
- Borei SSBN: 8 planned (possibly 10-12)
- SS-N-32 (Bulava): fielding



Bombers

- Upgrades of some Tu-160 (Blackjack) and Tu-95 (Bear)
- New bomber (PAK PA) in development
- Nuclear ALCM (Kh-102) in development



Tactical

- Tu-22M (Backfire) upgrade underway
- Su-34 (Fullback) fielding (replacing Su-24)
- Yasen (Sverodvinsk) SSGN fielding
- SLCM (SS-N-30A, Kalibr) fielding
- GLCM test-launched (not deployed)
- SSM (SS-26, Iskander-M) fielding (replacing SS-21)
- SAM (S-400/SA-21) fielding (nuclear?)
- ABM (A-135) upgrade planned

Russia is **reducing** its arsenal

Modernization: United States

ICBM

- Minuteman III life-extension completing
- Warhead fuzes/interoperable warhead planned
- GBSD (ICBM replacement) in development

SSBN / SLBM

- Trident II D5 SLBM life-extension production
- SSBN replacement development (12 planned)
- Enhanced W76-1 warhead life-extension deploying
- W88-1 warhead life-extension development

Bombers

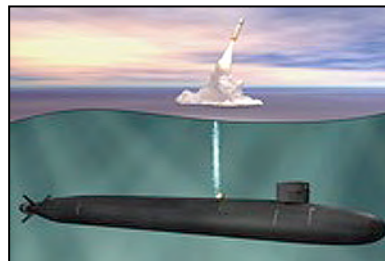
- Upgrade of B-2 and B-52 underway
- B-21 next-generation bomber in development
- B61-12 guided standoff bomb in development
- LRSO (ALCM replacement) in development

Tactical

- F-35A nuclear capability in development
- B61-12 guided standoff bomb in development

Infrastructure

- Uranium Processing Facility (secondaries) construction
- Plutonium production facilities (primaries) construction
- Warhead surveillance/simulation facilities upgrades



The United States is **reducing** its arsenal

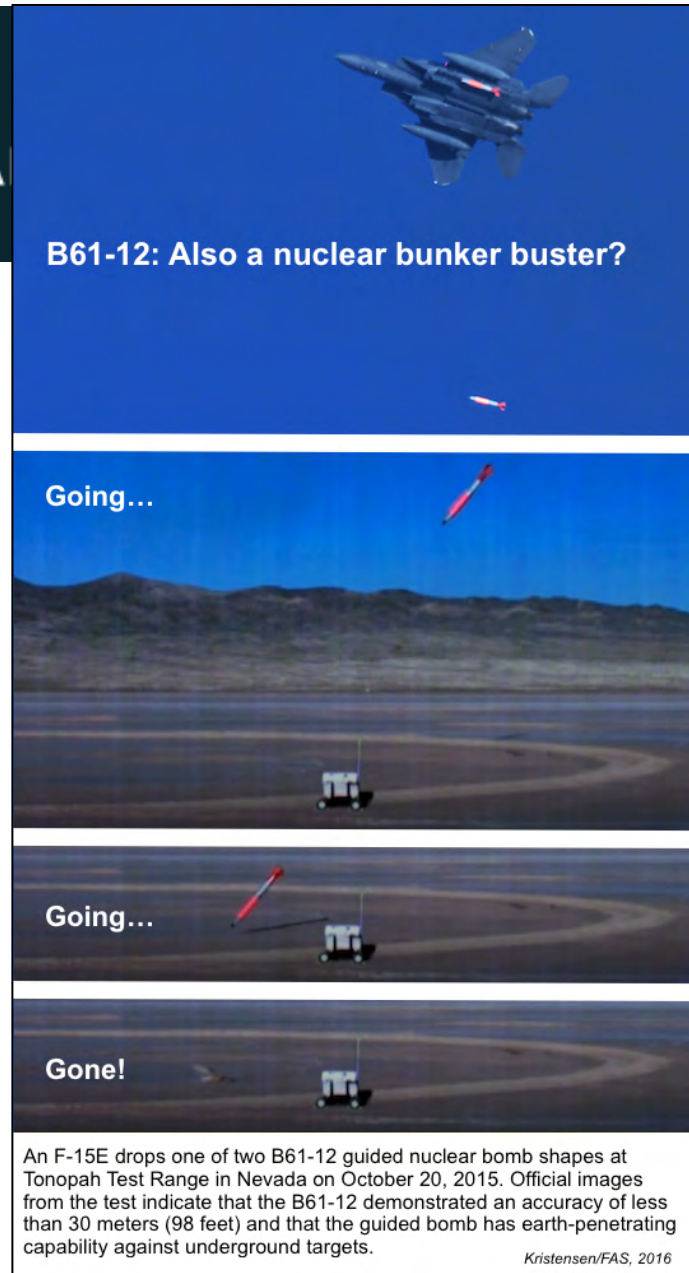
Modernization: US/NATO

- Modification of B61 bomb from “dumb” bomb to guided, standoff B61-12 with guided tail kit assembly that increases targeting accuracy and efficiency: one type can cover all bomb missions (tactical as well as strategic)*
- B61-12 integration on B-2, B-21, F-15E, F-16, F-35A, Tornado
- B61-12 First Production Unit in 2020; stockpiling from 2024
- B61-12 cost \$8-\$10 billion: more than a decade worth of European Reassurance Initiatives
- The B61-12 will replace B61-3, (B61-4), B61-7, B61-10, B83

* Note: New digital aircraft (B-2, B-21, F-15E, F-35A) will be able to use tail kit for guided employment; older analog aircraft (Tornado, F-16) will use ballistic employment.

“The Air Force tail kit will provide the B61-12 with a measure of improved accuracy **to give the same military capability as the higher yield bombs it replaces.**”

Brian BcKeon, OSD, July 28, 2016 (emphasis added)



Modernization: China

ICBM / MRBM

- DF-31A (CSS-10 Mod 2) fielding
- DF-5B (CSS-4 Mod 2) with MIRV
- DF-26 introduced
- New mobile ICBM test-launching
- Development of new mobile ICBM capable of delivering MIRV



SSBN / SLBM

- Jin (Type-094) SSBN fielding (4-5 expected)
- JL-2 (CSS-N-14) SLBM in development
- Type-096 SSBN possibly in development



Cruise Missiles:

- ALCM (CJ-20 on H-6 bomber) in development*
- GLCM (DH-10/CJ-10) fielding**

* Listed in 2013 AFGSC briefing.

** Listed by NASIC as “conventional or nuclear,” the same designation as the Russian nuclear-capable AS-4 Kitchen ALCM.



China is **increasing** its arsenal

Modernization: France

SSBN / SLBM

- TNO warhead on M51.2 SLBM.
- M51.3 SLBM development.

Bombers

- Rafale K3 to replace Mirage 2000N at Istres Air Base.
- Next-generation ALCM in development.

Infrastructure

- Megajoule at CESTA development.
- Airix/Epure hydrodynamic test center at Valduc development (partly Joint French-UK warhead surveillance testing center).



France is not increasing or reducing its arsenal



Modernization: Britain

SSBN / SLBM

- SSBN (Vanguard replacement) in development (4 planned).
- SLBM (Trident II D5LE) in development (USA).
- Mk4A/W76-1 type warhead fielding.

Infrastructure

- Joint UK-French warhead surveillance testing technology center development.



Britain is **reducing** its arsenal

Modernization: Pakistan

MRBM / SRBM

- Shaheen III MRBM (Hatf-6) in development
- Shaheen II MRBM (Hatf-6) fielding
- NASR SRBM (Hatf-9) in development
- Abdali SRBM (Hatf-2) in development*

Cruise Missiles

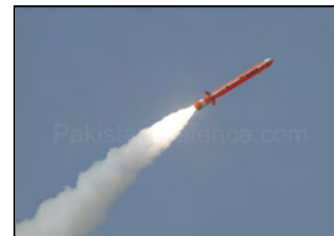
- GLCM (Babur/Hatf-7) in development
- ALCM (Ra'ad/Hatf-8 on Mirage) in development
- SLCM (naval version of Babur) in development?

Infrastructure

- Khushab-IV reactor #4 construction
- Uranium enrichment facility upgrade

Pakistan is increasing its arsenal

* Listed by Pakistani ISPR but not by 2013 NASIC report



Pakistan is **increasing** its arsenal

Modernization: India

ICBM / IRBM / MRBM

- Agni VI ICBM development (MIRV?)
- Agni V ICBM in development
- Agni IV IRBM in development
- Agni III IRBM fielding

SSBN / SLBM

- Arihant SSBN development (3+ expected).
- K-15/K-4 SLBM development.
- Dhanush SLBM fielding.

Cruise Missiles

- GLCM (Nirbhay) development*

Infrastructure

- One plutonium production reactor developing.
- Breeder reactors?

* Reported by news media but not listed in 2013 NASIC report.

India is **increasing** its arsenal



Modernization: Israel

IRBM

- Jericho III IRBM development?

SSG / SLBM

- Dolphin SSG fielding
- SLCM (Popeye Turbo/Harpoon) rumored*

Bomber

- F-35A acquisition



* Reported by news media but denied by officials. US public intelligence reports omit references to Israeli nuclear forces

Israel **might be increasing** its arsenal

Modernization: North Korea

ICBM / IRBM / MRBM

- No Dong MRBM fielding
- Musudan IRBM in development
- Hwasong-13 (KN-08) ICBM in development (fielding?)
- Taepo Dong 2 SLV/ICBM in development

SSBN/SLBM

- SSBN/SLBM in early development

Cruise Missiles

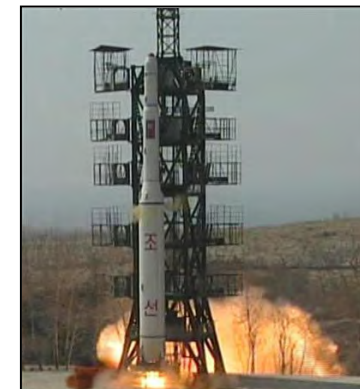
- KN-09 coastal defense cruise missile in development ?**

Infrastructure

- Yongbyon plutonium production reactor re-start
- Uranium enrichment production construction

* Despite five underground nuclear tests, there is no known public evidence that North Korea has miniaturized its test devices sufficiently for delivery by ballistic missiles. Aircraft are more likely to have militarized warheads.

** Listed by 2013 AFGSC briefing but not in 2013 NASIC report. 2014 update of AFGSC does not list KN-09.



North Korea is **increasing** its arsenal

Nuclear Operations: Russia

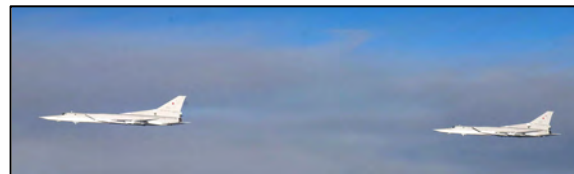
Long-range bomber flights have resumed since 2004 and since 2012 increased sharply along with non-strategic nuclear-capable fighter-bombers closer to NATO countries; “snap” exercises increasing in frequency, size, visibility; occasional explicit nuclear threats issued by officials.

Nuclear strategy similar to US but more emphasis on non-strategic weapons and early/first use.

May not always be explicit nuclear signal, but is normally seen as a possible nuclear signal



Baltic Sea: Su-24 fighter-bomber intercept



Baltic Sea: Tu-22M bombers reportedly simulated nuclear strike against Sweden in 2013



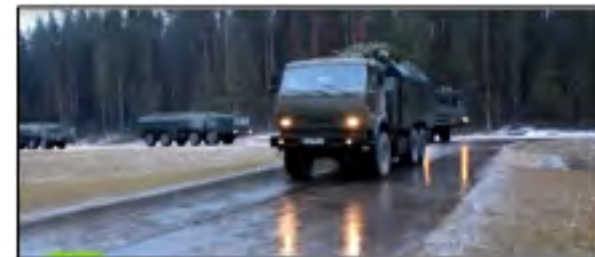
Televised ICBM/SLBM launches



North Sea: Tu-95 bomber intercept



Baltic Sea: SS-N-22 SLCM loading



Luga: SS-26 return from Kaliningrad deployment

Nuclear Operations: United States

Long-range bombers integrated more prominently into EUCOM strike planning; Cold War-like bomber strike exercises over North Pole and North Sea into Baltic Sea; exercises in Eastern Europe increasing in frequency, size, visibility; fighter-bomber rotational deployments and exercises in Baltic States, Poland, Sweden; occasional SSBN port visits to Scotland

2013 nuclear strategy reaffirmed counterforce posture, rejected minimum deterrence



F-16 deployments to Estonia, Poland, Sweden



B-52, B-2 deployment to United Kingdom



B-52 over Latvia



B-52s over BALTOPS exercise



SSBN visit to Scotland

Nuclear Operations

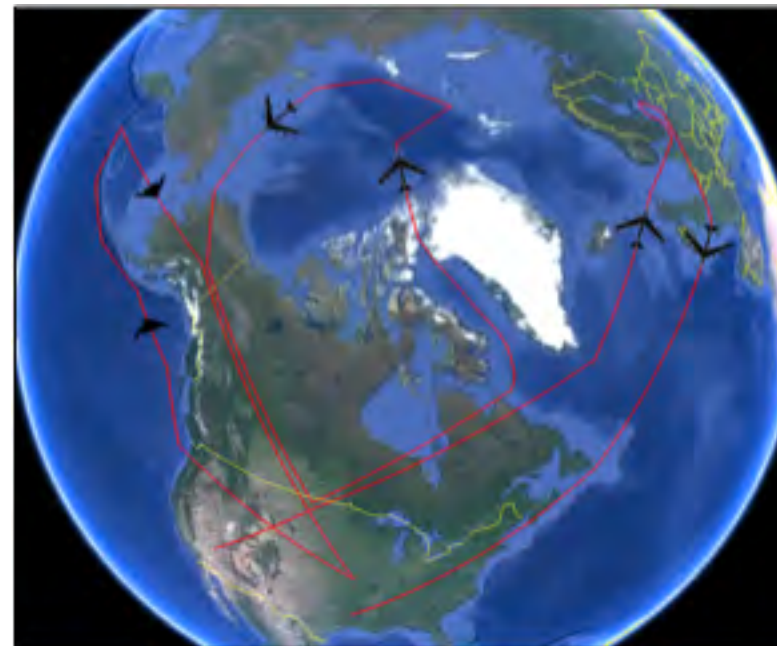
Perhaps the most significant change in US operations has been the resumption of bomber strike exercises over the Northern Hemisphere

As part of “maintaining the U.S. nuclear deterrent with NATO” to provide the “supreme guarantee of the security of the Allies,” US European Command “has forged a link between STRATCOM Bomber Assurance and Deterrence missions to NATO regional exercises.”

General Philip Breedlove, SACEUR, February 2015



Exercise Polar Growl on April 1, 2015 saw deployment of four B-52s over the North Pole and North Sea. The bombers went all the way to their launch points for air-launched cruise missiles.



Exercise Polar Roar on August 1, 2016 saw deployment of six bombers (4 B-52 and 2 B-2) over the North Pacific, North Pole, North Sea, and Baltic Sea. The deterrence exercise required 24 tankers.

QUESTIONS?

Additional information and resources from FAS Nuclear Information Project:

FAS Status of World Nuclear Forces Overview

<https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/>

FAS Nuclear Notebook Series (Column in Bulletin of the Atomic Scientists):

<http://thebulletin.org/search/feature-type/nuclear-notebook>

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