

All three Powers of the “Great triangle”, United States, Russia, and China modernizing their all three legs of their strategic Triad

All three Powers of the “Great triangle” of the Asia-Pacific region formed by the United States, Russia, and China are upgrading and modernizing, all of the three legs of their strategic triad to provide a strong deterrent against different perceived adversary threats. The “Great Triangle” is particularly important in both geopolitical and military-strategic terms. The strategic arsenals and military programs of the two traditional superpowers and the steady buildup of the nuclear and missile capabilities of China, the newly emergent superpower of the twenty-first century, give global significance to the Great Triangle they form,” said Alexei Arbatov and Vladimir Dvorkin of Carnegie Moscow Center – Carnegie Endowment for International Peace.

The strategic triad is formed by nuclear-powered ballistic missile submarines (SSBNs), land-based intercontinental ballistic missiles (ICBMs) and land-based long-range bombers. The triad gives the commander in chief the possibility to use different types of weapons for the appropriate strike: ICBMs allow for a long-range strike launched from a controlled or friendly environment. SLBMs, launched from submarines, allow for a greater chance of survival from a first strike, giving the commander a second-strike capability. Strategic bombers have greater flexibility in their deployment and weaponry.

The total nuclear warheads declined marginally from a total of approximately 15,395 nuclear weapons in 2016 compared with

15,850 in early 2015, according to Stockholm International Peace Research Institute (SIPRI)'s 2016 annual nuclear forces data, which highlights the current trends and developments in world nuclear arsenals. The decrease in the overall number of nuclear weapons in the world is due mainly to Russia and the USA—which together still account for more than 93% of all nuclear weapons—further reducing their inventories of strategic nuclear weapons.

Nine states—the United States, Russia, the United Kingdom, France, China, India, Pakistan, Israel and North Korea possessed approximately 4,120 operationally deployed nuclear weapons at the start of 2016. However, none of the nuclear weapon-possessing states are prepared to give up their nuclear arsenals for the foreseeable future.

The other nuclear weapon-possessing states have much smaller arsenals, but have all either begun to deploy new nuclear weapon delivery systems or announced their intention to do so. China appears to be gradually increasing its nuclear forces as it modernizes the arsenal. India and Pakistan are both expanding their nuclear weapon stockpiles and missile delivery capabilities. North Korea is estimated to have enough fissile material for approximately 10 nuclear warheads. However, it is unclear whether North Korea has produced or deployed operational weapons.

“Despite the ongoing reduction in the number of weapons, the prospects for genuine progress towards nuclear disarmament remain gloomy,” comments Shannon Kile, Head of the SIPRI Nuclear Weapons Project. “All the nuclear weapon-possessing states continue to prioritize nuclear deterrence as the cornerstone of their national security strategies.”

New START and Current Balance

The major powers are also complying with New START that came into force in February 2011. Under the treaty deployed strategic nuclear warheads, those meant to travel long distances, in Russia and the United States are capped at 1,550 each by Feb 2018. It also limits the number of deployed and non-deployed intercontinental ballistic missile (ICBM) launchers, submarine-launched ballistic missile (SLBM) launchers, and heavy bombers equipped for nuclear armaments to 800. The treaty allows for satellite and remote monitoring, as well as 18 on-site inspections per year to verify limits.

Therefore, despite the implementation of the bilateral Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START) since 2011, the pace of their reductions remains slow.

According to data exchanged under New START, as of October 1, 2014 the United States had 1,642 deployed strategic warheads, compared to 1,643 for Russia. The number of deployed ICBMs, SLBMs and strategic bombers for the United States was 794, compared to 528 for Russia. According to SIPRI Report as on 2016, the deployed warheads have increased to 1930 of USA and 1790 of Russia.

While US and Russia have parity in deployed strategic warheads, U.S. military holds a substantial numerical advantage in the number of deployed strategic delivery vehicles. "These numbers conceal an additional area of U.S. advantage. The U.S. military has "downloaded" all of its ICBMs and most, if not all, of its SLBMs. As a result, the missiles carry fewer warheads than their maximum loadings," says Steven Pifer

The Trident D-5 SLBM can carry eight warheads. Under New START, the Trident D-5s carry an average of only four to five warheads. All Minuteman III ICBMs have been downloaded to

carry a single warhead, even though two-thirds of them could carry three. "The U.S. military also maintains a large number of non-deployed nuclear warheads in storage. If New START were to break down, the United States could add hundreds of nuclear warheads—well over 1,000—to its strategic ballistic missile force. The Russian strategic ballistic missile force has nowhere near the capacity to match that", says says Steven Pifer.

However the Russians have between 2,000-6,000 tactical, or theater, nuclear weapons while the United States deploys 500 such weapons – all in the NATO European Theater. Retired Admiral Richard Mies, the former Commander of the United States Strategic Command, says of the imbalance between the U.S. and Russian nuclear warhead stockpiles: "They reflect a growing disparity in total warheads because of the large Russian advantage in small, short range tactical nuclear warheads that are not subject to any arms control limits.

Nuclear Modernization

At the same time, both Russia and the USA have extensive and expensive nuclear modernization programmes under way. The USA, for example, plans to spend \$348 billion during 2015–24 on maintaining and comprehensively updating its nuclear forces. Some estimates suggest that the USA's nuclear weapon modernization programme may cost up to \$1 trillion over the next 30 years.

US Strategic Triad Modernization

The drivers for U.S. strategic modernization are uncertainty of Iranian or a North Korean nuclear capability and fears of a rapidly developing capability of nuclear China and Russia.

While currently US enjoy large advantage in its strategic arsenal, The Heritage Foundation's "2015 Index of U.S. Military Strength" evaluated the health of the U.S. nuclear complex according to nine categories. In four of those categories—warhead modernization, delivery systems modernization, nuclear weapons complex and nuclear test readiness—the complex was rated as "weak" (the second worst rating possible).

One of the main factors behind these low scores is sequestration. Its "automatic pilot" budget regimen threatens sustained and predictable funding—a major problem for addressing issues within the nuclear complex, says Michaela Dodge. "Another major factor contributing to lower scores are the government's conflicting policies regarding the nuclear complex. We say we care about the nuclear force and the complex that supports it, yet manpower and resources available to execute the nuclear mission have been steadily declining until recently."

The Obama administration is planning a three-decade-long plan costing more than \$1 trillion, with \$350 billion in the first decade alone, notwithstanding President Obama's dream of a "global zero" future without nuclear weapons.

Minuteman 3 missile and Ground-Based Strategic Deterrent

The major upgrades are up gradation of the support systems of the Minuteman 3 missile in the short term, and its eventual replacement program, the Ground-Based Strategic Deterrent.

The US Air Force (USAF) has successfully test-fired an unarmed Minuteman III intercontinental ballistic missile (ICBM) in April 2017 equipped with a single test re-entry vehicle. The Boeing-built Minuteman III is a ground-based strategic

deterrent designed to replace the USAF's LGM-30G Minuteman III ICBM weapon system. Expected to enter service in 2027, the missile will remain in service until 2075.

The service expects to spend \$62.3 billion over 30 years on 642 missiles, 400 of which would be operationally deployed, according to an Arms Control Association review of internal Air Force documents. Plans also call for new ground control stations, new command and control systems and replacing the flight system.

USAF calls for tenders for its LRSO and GBSD missile weapon systems

The US Air Force (USAF) has awarded two separate contracts, totalling \$1.8bn, to Lockheed Martin and Raytheon to develop design concepts and technologies for the service's new long-range standoff (LRSO) weapon. USAF secretary Heather Wilson said: "This weapon will modernise the air-based leg of the nuclear triad." "Deterrence works if our adversaries know that we can hold, at risk, things they value. This weapon will enhance our ability to do so, and we must modernise it cost-effectively."

The US Air Force (USAF) earlier called for bids from potential suppliers for its long-range standoff (LRSO) nuclear cruise missile and ground based strategic deterrent (GBSD) intercontinental ballistic missile weapon system programmes. The USAF will begin fielding LRSO by 2030, with plans to install GBSD in the late 2020s.

The LRSO weapon system is said to be a cost-effective force multiplier for B-52, B-2 Spirit and B-21 aircraft. USAF Nuclear Weapons Center commander major general Scott Jansson said: "LRSO is a critical element of the United States' nuclear deterrence strategy. "Releasing this solicitation is a

critical step toward affordably recapitalising the aging air leg of the nuclear triad.”

USAF Global Strike Command commander general Robin Rand said: “The LRSO will be a reliable, flexible, long-ranging, and survivable weapon system to complement the nuclear triad. “LRSO will ensure the bomber force can continue to hold high-value targets at risk in an evolving threat environment, to include targets within an area-denial environment.

The new GBSO weapon system will be in compliance with existing national requirements and it has the adaptability and flexibility to affordably address changing technology and threat environments through 2075.

The Next-Generation Bomber LRS-B, replacing the more than quarter century old B-52 and B-2 spirit fleet of nuclear-capable bombers.

Navy Ohio Replacement (SSBN) Ballistic Missile Submarine Program

The U.S. Navy is beginning work on the successor to its 14 Ohio-class ballistic missile submarines, the SSBN(X) with an estimated cost of \$6-8 billion each. Ohio-class SSBNs are designed to each carry 24 SLBMs, although by 2018, four SLBM launch tubes on each boat are to be deactivated, and the number of SLBMs that can be carried by each boat consequently is to be reduced to 20, so that the number of operational launchers and warheads in the U.S. force will comply with strategic nuclear arms control limits.

The USA aims to begin construction of the new SSBN in 2021, and have the new type enter service with the fleet in 2031. A total of 12 boats would be produced, with the last boat expected to leave service around 2085.

U.S. develops “super-fuze” under its Nuclear Force modernization

Under its Nuclear modernization program US has developed a “super-fuze” device that by making small adjustment to the height of warhead explosion results in revolutionary increase in lethality of U.S. submarine-launched ballistic missiles, according to the report in the 1 March issue of the Bulletin of the Atomic Scientists (BAS). The targeting change is part of the nuclear stockpile stewardship plan that began a decade ago and is aimed at maintaining the U.S. nuclear deterrent without the need to develop and test new weapons.

“Shortly before a warhead arrives at its target, the superfuze uses radar to gauge the distance remaining on the ballistic path, taking into account any drift off track. The old technology set the detonation at a fixed height at or near the ground; course errors could shift the center of the blast away from the target (see diagram). But the new system adjusts the detonation altitude so that the blast is triggered at a higher point to keep it in the target’s so-called “lethal volume.” Within this zone, the authors say, a 100-kiloton warhead will destroy a hardened structure with 86% certainty”. The public has “completely missed [the superfuze’s] revolutionary impact on military capabilities,” reports Eliot Marshall, a science journalist in Washington, D.C.

The BAS authors calculate that by the end of 2016, U.S. weapon facilities had already produced roughly 1200 of a planned 1600 W76s armed with the superfuze. Of these, they say, “about 506” are now deployed on ballistic missile submarines. They estimate that potentially 272 such warheads, with two sent against each target, could eliminate “all 136 Russian silo-based ICBMs [intercontinental ballistic missiles].” US submarine-based missiles can carry multiple warheads, so hundreds of others, now in storage, could be added to the submarine-based missile force, making it all the more lethal.

The increased capability of the US submarine force will likely be seen as even more threatening because Russia does not have a functioning space-based infrared early warning system but relies primarily on ground-based early warning radars to detect a US missile attack, writes Hans M. Kristensen director of the Nuclear Information Project with the Federation of American Scientists (FAS) in Washington, DC. Since these radars cannot see over the horizon, Russia has less than half as much early-warning time as the United States. (The United States has about 30 minutes, Russia 15 minutes or less.)

Northrop Grumman Long Range Strike Bomber (LRSB)

Northrop Grumman had won its bid to be the builder of the Long Range Strike Bomber (LRSB), the Air Force's replacement for its aging B-52 and B-1 bomber fleets. The initial \$21 billion contract could end up bringing Northrop \$80 billion over the next decade. The Air Force plans to procure 100 of the bombers, which will be the backbone of America's strategic strike and deterrence capabilities.

The announcement marks an important step in the Pentagon's broader plan to modernize all three "legs" of the U.S. nuclear triad – long-range bombers, subs and land-based intercontinental ballistic missiles.

"Building this bomber is a strategic investment in the next 50 years, and represents our aggressive commitment to a strong and balanced force," Secretary of Defense Ash Carter said in pre-announcement remarks at the Pentagon. "It demonstrates our commitment to our allies and our determination to potential adversaries, making it crystal clear that the United States will continue to retain the ability to project power throughout the globe long into the future."

Russia Modernization

Russian nuclear strategy has been relatively consistent over the past decade. The most recent version, approved by Putin in December 2014, states that Russia “shall reserve for itself the right to employ nuclear weapons in response to the use against it and/or its allies of nuclear and other kinds of weapons of mass destruction, as well as in the case of aggression against the Russian Federation with use of conventional weapons when the state’s very existence has been threatened,”

Russia planned to spend 101 billion rubles on nuclear modernization program from 2013 to 2015, partly in response to the development of a global missile-defense system by the Americans. The current Russia NATO confrontation over Crimea, Ukraine or Baltic States is also driving it to spending billions of dollars on modernizing its strategic arsenal.

In contrast to the United States, Russian strategic forces are now in the middle of their modernization cycle. Though the Kremlin is modernizing aging systems in each leg of their triad, the Russian arsenal will remain markedly less capable than its American counterpart for the foreseeable future

Over the next decade, all Soviet-era ICBMs (SS-18, SS-19, and SS-25) will be retired, the navy’s Delta III SSBN and its SS-N-18 missiles will be retired, and some of the Delta IV SSBNs will probably be retired as well.

Topol-M intercontinental ballistic missiles

Large number of Russia’s strategic warheads sit atop SS-18,

SS-19 and SS-25 ICBMs, all of which are scheduled to be retired by 2020.

It is replacing all its Soviet-era's ICBMs, with a more modern force of Topol-M intercontinental ballistic missiles, and developing newer road-mobile RS-24 Yars ballistic missiles. They have also begun manufacturing its new Sarmat ICBM, according to the analysts.

The Borei-class submarines will replace Delta-class submarines, all of which were built prior to 1991

Russia's sea-based nuclear deterrent had relied on Delta 4 submarines, New 4th generation Borei-class submarines are now entering the fleet, eight new-generation boats are planned.

Currently, there are three 667BDR Kal'mar (Delta-III) submarines, with liquid-fueled R-29R (SS-N-18, NATO classification "Stingray") SLBMs; six 667BDRM Dolphin (Delta IV) submarines, equipped with the most advanced liquid-fueled R-29RMU2.1 Liner and 29RMU2 Sineva (SS-N-23 Skiff under the NATO classification) SLBMs; and three new-generation Project 955 Borei submarines in service.

Currently, there are three Boreis in service; by 2021 they will already be eight, with the newest five built in a modernized variant, with lower noisiness.

Admiral Chirkov added that the design of 5th generation submarines has begun within the framework of the 2050 Shipbuilding Program. These future boats will be stealthy, and have improved C3, automated reconnaissance and "collision avoidance" systems, and better weapons, according to him.

PAK-DA strategic Bombers

PAK DA (Advanced Long-Range Aviation Complex) is the new bomber that Russia plans to field starting in 2023, being designed to replace all three bombers currently in service with the Russian long-range aviation, including the Tu-22M3 long-range bomber and the Tu-95 and Tu-160 (aka the White Swan) strategic bombers.

It will have a flying wing design. Russia plans to develop and build PAK-DA a subsonic stealthy flying wing aircraft with advanced electronic warfare systems and able to carry new nuclear-capable long-range cruise missiles. A 2016 report mentioned that the PAK DA was expected to have a range of 6,740 nautical miles. It will also be able to carry 30 tons of weapons from air-to-surface and air-to-air missiles as well as conventional and smart-guided bombs.

“It is impossible to build a missile-carrying bomber invisible to radars and supersonic at the same time. This is why focus is placed on stealth capabilities. The PAK DA will carry AI-guided missiles with a range of up to 7,000 km. Such a missile can analyze the aerial and radio-radar situation and determine its direction, altitude and speed. We’re already working on such missiles,” Bondarev was quoted as saying by the Russian newspaper Rossiskaya Gazeta.

However many analysts believe the Russian industry lacks technology and resources to produce the PAK-DA, the next generation strategic bomber as it lacks operational next generation stealth and AESA radar technology.

“That makes it even stranger that Putin is wasting enormous sums of money on maintaining a large nuclear arsenal instead of focusing on modernizing Russia’s conventional forces, as well as using arms control to try to reduce NATO’s nuclear and

conventional forces. That would actually improved Russia's security," observes Hans M. Kristensen in FAS article.

China Modernization

China focused on ensuring the survivability of its secure retaliatory strike capability has a nuclear weapons modernization program under way. It is estimated that China has approximately 260 warheads in its stockpile for delivery by nearly 150 land-based ballistic missiles, aircraft, and an emerging ballistic submarine fleet.

China is modernizing and deploying road-mobile the DF-31A ICBM, according to DOD report.

"China has deployed new intercontinental ballistic missiles in response to Washington stationing components of its missile defense system in Japan and South Korea," the lecturer at the Plekhanov Russia University of Economics said. "The United States has said that its missile defense system in the Asia-Pacific region is solely aimed against North Korea, but it is in fact designed to counter Russia and China's nuclear missile potential."

The DF-41 is a three-stage solid-fueled intercontinental ballistic missile reported to have a maximum range of up to 15,000 kilometers (more than 9320 miles) and a top speed of Mach 25 (19,030 mph). It is said to be capable of carrying up to 10 multiple independently targetable reentry vehicle (MIRVs). Its launch preparation time is estimated to be between 3 to 5 minutes.

China's ICBM force is still fairly small (60 at most, by

published U.S. Department of Defense estimates) and may be forced to rely on some older systems for maintaining a credible deterrent while also diversifying its delivery options.

The silo-based DF-5 family, unlike the mobile DF-31 or DF-41 ICBM families, is not a survivable missile family. While the DF-31s and -41s can move, making targeting difficult. The Chinese Dong Feng-5 (DF, East Wind,) family of missiles is undergoing significant modernization, mainly involving an upgrade to an operational Multiple Independent Reentry Vehicle (MIRV) system. DF-5B, a new liquid-fueled ICBM designed to strike targets anywhere on Earth carrying four to six warheads, expected to be deployed in the next two years. Adding a credible MIRV component to a nuclear arsenal typically multiplies the perceived threat emanating from even a small arsenal, adding to its deterrent value.

Type 094 Jin-class nuclear ballistic missile submarines (SSBN)

China's already deployed and future Type 094 Jin-class nuclear ballistic missile submarines (SSBN), once they are equipped as planned with JL-2 submarine launched ballistic missiles, will for the first time enable Chinese SSBNs to target parts of the United States. The Type 094s displace about 11,000 tons submerged, and carry 12 JL-2 submarine launched ballistic missiles (SLBMs), capable of launching a nuclear warhead some 7,500 kilometers.

The Type 094A differs from the Type 094 in the former's curved conning tower and a retractable towed array sonar mounted atop its upper tailfin. The array makes it easier for the sub to listen for threats.

The Type 094A, which was first seen in November 2016, is also far quieter than the noisier Type 094.

Jin-class shall be augmented with its next-generation SSBN (Type 096) over the next decade. Reports vary widely on the design parameters and expected deployment dates, but it will undoubtedly be larger, quieter, and carry more missiles with more warheads.

It was also rumored the Type 096 will carry 24 submarine launched ballistic missiles (SLBMs) compared to 12 in the Type 094. These SLBMs for the Type 096 might either be the Julang-3 (JL-3) or the JL-2A. JL-3 has an estimated but unconfirmed range of 12,000 kilometers, which, if accurate will place most of the continental United States within range of this SLBM. JL-2A has a range of 11,200-kilometers, also sufficient to hit the U.S. from the South China Sea.

Russian military expert Vasily Kashin believes the South China Sea is the only place where the Type 094A can fire its SLBMs at the USA in relative safety. The main base for China's fleet of ballistic missile submarines is Hainan Island on the South China Sea.

H-6 Strategic Bomber

PLAAF's H-6 fleet, the H-6K version is the most modern and is China's premier strategic bomber. Fu Qianshao said, "In the past, our bombers could only deliver airdropped bombs and so were unable to conduct precision attacks, but the H-6K, with the adoption of some of our most advanced aeronautic technologies, is able to carry and launch air-to-surface cruise missiles and anti-ship missiles, which means it can take out multiple targets on the ground or at sea within one mission".

He added "The PLA has defined its air force as a strategic force and pledged to obtain offensive capability for it. An air force with strategic aspirations must be able to perform

long-range precision strike operations, so the H-6K is undoubtedly a valuable asset to the PLA Air Force.”

Chinese DH-10 ground-launched land-attack cruise missile, CJ-20 air-launched cruise missile has been described as dual-capable nuclear cruise missiles.

Currently, estimates of China’s nuclear forces are little more than a guessing game among China “experts.” As China expert and former top Department of Defense official Michael Pillsbury warned recently, China is hiding its hegemonic ambitions while steadily modernizing its nuclear forces.

Experts have advised pressurizing China for transparency in its nuclear expenditures, nuclear force structure and nuclear deterrent policies and its participation in future Russian-American strategic nuclear arms control talks.

Conclusion

This process of modernization is triggering what John Mecklin, the editor of The Bulletin of Atomic Scientists, calls a “different kind of arms race.” “It’s one in which technological advance is the race,” Mecklin told the BBC. “Nuclear countries are trying to make sure that the other nuclear countries don’t get some sort of technological edge.”

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