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How Nuclear-Weapon States Parties to the Non-proliferation Treaty Understand Nuclear Disarmament

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Abstract Disarmament measures included in the Non-proliferation Treaty (NPT) are, for most of the nuclear-weapon states, an objective to be reached in a very long-term. Based on this position, the current nuclear-weapon states parties to the NPT believe that they do not have to show, at this stage, the necessary political will to begin the nuclear disarmament process at the multilateral level and under international supervision, as requested so many times by the international community on the basis of article VI of the NPT. For this reason, all of them are in the process of modernising their nuclear weapons arsenals, ignoring their commitments and obligations as NPT states parties.

Keywords Nuclear weapons · Nuclear disarmament · Nuclear non-proliferation · Nuclear-weapon states · NPT

The Nuclear Non-Proliferation Treaty (NPT)

The NPT entered into force in 1970 and is structured on the following three main pillars:

- Nuclear disarmament[1];
- Non-proliferation of nuclear weapons and other nuclear explosive devices;
- International cooperation in the peaceful use of nuclear energy.

[1]Nuclear disarmament under the NPT means, to quote the treaty's preamble, the 'liquidation' of all existing stockpiles of nuclear weapons and their 'elimination from national arsenals' as well as 'the means of their delivery'. In other words, nuclear disarmament is an end state, the culmination of a process or processes eliminating nuclear arms, not just the process itself (Borrie and Caughley 2014).

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Two groups of states can be clearly identified within the NPT. The first group, composed mainly by the nuclear-weapon states recognised as such by the international community, that is to say, China, France, the Russian Federation (Russia), United States of America (U.S.), and the United Kingdom (UK), considers that the main pillar of the NPT is the one related to the non-proliferation of nuclear weapons and other nuclear explosive devices. For this reason, to this specific pillar should be given the maximum priority by all of the NPT states parties (U.S. Department of State, www.state.gov). For most of the countries belonging to this group, the most important activity to be supported by them is to impede the access to a nuclear weapon by any other country. This group of countries is considered to be the first wave of nuclear proliferation.[2] In these five countries the view is common that nuclear weapons in their possession somehow are tolerable, while such weapons in the hands of other states are viewed as extremely dangerous for the international peace and security. The possession of nuclear weapons by this group of countries ensure international stability and security. For many government this statement is totally unacceptable.

The amount of nuclear weapons in the possession of these five countries are shown in Table 1.

Disarmament measures included in the NPT are, for most of the nuclear-weapon states, an objective to be reached in a very long-term. Based on this position, all nuclear-weapon states parties to the NPT believe that they do not have to show, at this stage, the necessary political will to begin the nuclear disarmament process at the multilateral level and under international supervision, as requested so many times by the international community on the basis of article VI of the treaty.

It is evident that this group of states enjoys certain privileges considered by many other countries as completely discriminatory and unacceptable in the light of the international law and the equality of states. The discriminatory character of the NPT is, in the opinion of many experts, diplomats and politicians of different countries, one of the main causes of the difficulties that this treaty is now facing, putting in danger, not only the so-called "*non-proliferation of nuclear weapons and other nuclear explosive devices regime*", but also international peace and security. Explanations by the nuclear-weapon states that the nuclear weapons in their possession are indispensable to defend their sovereignty and to enhance their security are not the best way to convince other sovereign states to renounce to have this type of weapons for the same purpose.

The second group of states, compose by all non-nuclear- weapon states parties to the NPT, considers that the three pillars on which the treaty is based have the same priority and, therefore, it is indispensable to continue adopting specific measures to further strength the non-proliferation of nuclear weapons regime. For this group of states, the adoption of concrete and effective measures to accelerate the process of nuclear disarmament at the multilateral level and under strict international supervision is an important task that should be carried out as soon as possible by all nuclear-weapon states, without exception. For this group of states, it is equally important not only to impede the horizontal proliferation of nuclear weapons and other nuclear explosive

[2] The second group of states include Ukraine, Belarus, South Africa and Kazakhstan, all of them now non-nuclear-weapon states parties. The third group of states included Israel, India, Pakistan and DPRK, all of them in possession of nuclear weapons and outside of the NPT.

Table 1 Status of world nuclear forces in 2015

Country	Deployed strategic	Deployed non-strategic	Reserve/Non deployed	Military stockpile	Total inventory
Russia	1780[a]	0[b]	2720[c]	4500	7500[d]
United States	1900[e]	180[f]	2620[g]	4700[h]	7200[i]
France	290[j]	n.a.	10[j]	300	300
China	0[k]	?[k]	250	250	250[k]
United Kingdom	150[l]	n.a.	65	215	215[l]
Total[q]	4120	180	5665	9695	15,465

Source: Federation of American Scientists

Note: All numbers are approximate estimates, and the nuclear appendix in the SIPRI Yearbook. See also status and 10-year projection of U.S. and Russian forces. Additional reports are published on the FAS Strategic Security Blog. Unlike those publications, this table is updated continuously as new information becomes available. Current update: April 28, 2015

[a] This number is higher than the aggregate data under the New START treaty because this table also counts bomber weapons at bomber bases as deployed

[b] All are declared to be in central storage. Several thousand retired non-strategic warheads are awaiting dismantlement

[c] Includes all non-strategic warheads, strategic warheads assigned to delivery systems in overhaul, and most bomber weapons

[d] In addition to the 4500 in the military stockpile, an estimated 3000 retired warheads are estimated to be awaiting dismantlement. Details are scarce, but we estimate that Russia is dismantling 500–1000 retired warheads per year

[e] This number is higher than the aggregate data released under the New START data because this table also counts bomber weapons on bomber bases as deployed

[f] Approximately 180 B61 bombs are deployed in Europe at six bases in five countries (Belgium, Germany, Italy, Netherlands and Turkey)

[g] Non-deployed reserve includes an estimated 2320 strategic and 300 non-strategic warheads in central storage

[h] The U.S. government declared in April 2015 that its stockpile included 4717 warheads as of September 2014. Since then, a small number of warheads are thought to have been retired

[i] In addition to the roughly 4700 warheads in the military stockpile, the US government in April 2015 announced that approximately 2500 retired warheads are awaiting dismantlement. In addition, close to 20,000 plutonium cores (pits) and some 5000 Canned Assemblies (secondaries) from dismantled warheads are in storage at the Pantex Plant in Texas and Y-12 plant in Tennessee

[j] Only weapons for France's single aircraft carrier are not considered deployed, although it is possible that warhead loadings on some submarines missiles have been reduced

[k] China is thought to have "several hundred warheads," far less than the 1600–3000 that have been suggested by some. None of the warheads are thought to be fully deployed, but kept in storage under central control. The existence of a Chinese non-strategic nuclear arsenal is uncertain. The Chinese arsenal is increasing with production of new warheads for DF-31/31A and JL-2 missiles

[l] The number of warheads on each submarine is being lowered from 48 to 40, and may already have been completed. This will lower the number of "operationally available" warheads from 160 to 120. By the mid-2020s, the stockpile will be reduced to "not more than 180."

devices", but also the so-called "*vertical proliferation of this type of weapons*", that is to say, the proliferation of nuclear weapons and other nuclear explosive devices within the nuclear-weapon states themselves.

In summary, the non-nuclear-weapon states parties to the NPT have formally renounced to the possession, production or acquisition of nuclear weapons, as well as

of any other nuclear explosive device, in the understanding that all nuclear-weapon states parties to the NPT will fulfil their international commitments and obligations under this treaty, particularly the implementation of article VI in the shortest period.

The non-proliferation of nuclear weapons is vital, but it is not sufficient. Nuclear non-proliferation and nuclear disarmament are two sides of the same coin and both must be energetically pursued. The primary tool for controlling nuclear weapons, the NPT, risks falling apart, with the increase in the number of nuclear-weapons states, particularly nuclear-weapon states non-parties to the NPT. The NPT is a legally binding agreement, which relies on a fine balance between the commitments assumed by the five nuclear-weapon states and the non-nuclear-weapon states parties. The heart of the treaty is that the latter will not develop nuclear weapons in return for which the nuclear-weapon states will reduce and eventually eliminate their nuclear weapons. After 45 years of the entrance into force of the NPT this has not happened, and for what is going to be demonstrated in the following paragraphs, this is something that is not going to happen in the coming decades.

Approximately 15,700 nuclear weapons are still on the planet, around 10,300 active, and the massive, long-term plans that nuclear-weapon states have in place strongly suggested that they have no intention of giving up their nuclear weapons anytime soon. All this makes it reasonable to ask: Is the international arms-control regime an outdated charade? The international mood, it is fair to assume, is unlikely to be upbeat. Why? From political and military perspective, there are five major objectives that different states alternatively assign to nuclear weapons:

- Maintaining prestige and status internationally (all NPT nuclear-weapon states);
- Preventing a nuclear attack (all NPT nuclear-weapon states);
- Deterring and countering an attack with the use of other types of weapons and armed forces (relevant for six nuclear-weapons states and not relevant for China and—with reservations—for the U.S. and India);
- Security guarantees and influence on the allies (adopted by Russia, the U.S., the UK and France);
- A bargaining chip when negotiating other issues with other countries (Russia) (Kaliadine et al. 2011).

In the following paragraphs the position of the nuclear –weapon states parties to the NPT are presented.

How Nuclear-Weapon States Parties to the NPT are Fulfilling Their International Commitments

The NPT not only allows five states to keep provisionally nuclear weapons in their military arsenals, but it expressly prohibits the remaining signatories from possessing this type of weapons. It is impossible to have a more discriminatory international treaty. So far, and on the opinion of a number of states, this arrangement has worked reasonably well, even considering that the treaty reflects the interest of the nuclear-weapon states parties to the NPT. Only a very limited number of non-nuclear-weapon states parties have been charged with developing a clandestine nuclear military weapon program, while the remaining states

parties have fulfilled all of their obligations and commitments with the treaty. On the other hand, none of the five nuclear-weapon states parties to the NPT have fulfilled completely their commitments and obligations with the treaty and no negotiations at multilateral level has started with the aim of removing all nuclear weapons in their possession. At the height of the Cold War in the mid-1980s, for example, six countries (the five nuclear-weapons states recognised as such by the international community, as well as Israel) had more than 70,000 nuclear weapons; today, nine countries (including India, Pakistan, and North Korea) possess about 10,300 warheads active, with another 6000 in reserve, but intact weapons in storage, awaiting dismantlement, for a total 15,700 warheads. The U.S. and Russia have more than 90 % of those weapons (Mecklin 2015).

United States

The U.S. is one of the two nuclear-weapon states parties to the NPT with the greatest nuclear arsenals among all nuclear-weapon states parties.

Nuclear Forces and its Modernisation

According to Kristensen and Norris (2013) and the Federation of American Scientists (2015), the US Defence Department maintains a stockpile of an estimated 4500 nuclear warheads (4650 warheads in 2013) for delivery by more than 800 ballistic missiles and aircraft. Compared with last year, that is a reduction of approximately 150 warheads due to the retirement of W80-0 warheads for the Tomahawk land-attack cruise missile, and a reduction of roughly 610 warheads compared with September 2009 inventory of warheads, when the U.S. announced that the Defence Department's stockpile contained 5113 warheads.

The current stockpile includes an estimated 2080 operational warheads, of which approximately 1600 strategic warheads are deployed on ballistic missiles (1152 on sea-launched ballistic missiles (SLBMs) and 450 on intercontinental ballistic missiles (ICBMs)), roughly 300 strategic warheads are located at bomber bases in the U.S., and 180 non-strategic warheads are deployed in Europe.[3] The remaining 2680 warheads are in storage as a so-called "hedge against technical or geopolitical surprises". In addition to

[3] In the early decades of the Cold War, the U.S. and NATO made arrangements to bury what were known as "atomic demolition munitions" (in essence, nuclear mines) at key points in West Germany, to be detonated if Warsaw Pact forces ever invaded. Although this plan, if enacted, might have slowed the enemy advance, it also almost certainly would have turned vast West German territories into radioactive wastelands littered with corpses and smouldering buildings—the stuff of hellish alternative- history scenarios. The West viewed such tactical nukes—NATO fielded 7000 to 8000 of these shorter-range, smaller-yield weapons for most of the Cold War—as tripwires in anticipation of the Soviet Union's own plans for its thousands of tactical weapons. That is to say, the forward positioning of these nuclear weapons was a signal: If the Soviet Union invaded Europe, confrontation would escalate quickly to the nuclear realm, and the United States would intervene.

With the end of the Cold War and the reduced risk of a Russian invasion, NATO eliminated almost all its tactical nuclear weapons in Europe. Today, five NATO countries—Belgium, the Netherlands, Germany, Italy, and Turkey—are widely believed to host 180 US-owned nuclear bombs at their air bases. These weapons, variants of the B61 warhead, a stalwart of the American thermonuclear arsenal since the late 1960s, are viewed by some security experts as provocative anachronisms. The critics argue that strategic missiles and bombers posted in the United States and the UK, along with missiles on nuclear submarines, provide more than enough deterrence against any Russian aggression.

the warheads in the US stockpile, approximately 2340 retired, but still intact, warheads are in storage and await dismantlement, for a total inventory of roughly 7200 warheads.

In the most recent New START data exchange, the U.S. declared 806 deployed ICBMs, SLBMs, and heavy bombers and 1722 accountable deployed warheads. The report also listed the total of 1034 deployed and non-deployed launchers[4] (see Table 2).

The US nuclear forces are in the process of modernising all of its existing strategic delivery systems and refurbishing the warheads they carry to last for the next 20–30 years or more. These systems are in many cases being completely rebuilt with essentially all new parts. This effort includes, according to the Arms Control Association, the following:

- Modernised Strategic Delivery Systems: US nuclear delivery systems are undergoing continual modernisation, including complete rebuilds of the Minuteman III ICBM and Trident II SLBM. The service life of Trident *Ohio*-class ballistic missile submarines is being extended. Additionally, a new submarine, the SSBNX, which will replace the existing *Ohio*-class ballistic missile submarines, is undergoing development and is expected to cost about US$100 billion, according to the Congressional Budget Office. The B-2 strategic bomber, a relatively new system, is being upgraded, as is the B-52H bomber.

- Intercontinental Ballistic Missiles (ICBMs). The US Air Force currently deploys 450 Minuteman III ICBMs located at F.E. Warren Air Force Base, Wyoming; Malmstrom Air Force Base, Montana; and Minot Air Force Base, North Dakota. A US$7 billion life extension program is underway to keep the ICBMs safe, secure and reliable through 2030 (Simpson 2009). This modernisation program has resulted in an essentially new missile, expanded targeting options, and improved accuracy and survivability. The US Air Force is currently exploring whether to extend the service of the Minuteman III missile or to field a new system. The US Air Force is also conducting an analysis of alternatives to determine if a new ICBM will be needed. A new missile and rebuilt warhead could cost US$10 billion over the next 10 years (Congressional Budget 2013b). The US Air Force is upgrading the Minuteman's nuclear warheads by partially replacing older W78 warheads with newer and more powerful W87 warheads, formerly deployed on the now-retired MX Peacekeeper ICBMs.
- Submarine-Launched Ballistic Missiles (SLBMs) and Submarines. The US Navy currently deploys 288 Trident II D5 SLBMs on 12 *Ohio*-class ballistic missile submarines (SSBNs) based out of Bangor, Washington (7 boats) and Kings Bay, Georgia (5 boats). The *Ohio*-class submarines have a service life of 42 years; two twenty year cycles with a two-year mid-life nuclear refueling. The total fleet includes 14 boats; due to the refueling process, only 12 SSBNs are available for deployment at any given time. The *Ohio*-class SSBNs were first deployed in 1981, and will reach the end of their services at a rate of approximately one boat per year between 2027 and 2040. The Navy plans to replace

[4] The number of warheads on deployed ICBMs and SLBMs are estimates; other numbers are taken from the official US report.

Table 2 Status of the US nuclear forces in 2015

Type/Designation	No.	Year deployed	Warheads x yield (kilotons)	Deployed
ICBMs				
LGM-30G minuteman III				
Mk-12A	200	1979	1 W78 × 335 (MIRV)	200
Mk-21/SERV	250	2006[a]	1 W78 × 300	250
Total	450			450[b]
SLBMs				
UGM-133A Trident	288[c]			
Mk-4		1992	4 W76 × 100 (MIRV)	168
Mk-4A		2008	4 W76-1 × 100 (MIRV)	600
Mk-5		1990	4 W88 × 455 (MIRV)	384
Total	288			1152
Bombers				
B-52H strafortress	93/44[d]	1961	ALCM/W80-1 x5-150	200
B-2A spirit	20/16	1994	B61-7/-11, B83-1	100
Total	113/60			300[e]
Nonstrategic forces				
B61-3, −4 bombs	n/a	1979	0.3–170	180[f]
Total				180
Total deployed				~2080[g]
Reserve				~2680
Total stockpile				~4760
Awaiting dismantlement				~2340
Total inventory				~7100

[a] The W87 was initially deployed on the MX/Peacekeeper in 1980

[b] It is possible that 20–30 of the 450 missiles have been inactivated as part of implementing the New START Treaty

[c] Two additional submarines with 48 missile tubes (total) are normally in overhaul and not available for deployment. They are not assigned nuclear weapons. Sometimes more than two submarines are in overhaul

[d] The first figure is the aircraft inventory, including those used for training, testing, and backup; the second is the primary mission aircraft inventory–the number of operational aircraft–as signed for nuclear and/or conventional missions

[e] The pool of bombs and cruise missiles allows for multiple loading possibilities depending on the mission. The Air Force has 52B ALCMs, of which an estimated 200 are deployed at Minot AFB. Although B-52Hs can also carry B61-7 and B83-1 bombs, gravity bombs are only planned for delivery by the B-2 s

[f] These are deployed in Europe. Another 300 bombs are in storage in the United States, for a total inventory of 500 non-strategic bombs

[g] The US government does not count spares as operational warheads. We have included them in the reserve

ALCM air-launched cruise missiles

ICBM intercontinental ballistic missile

LGM silo-launched ground-attack missile

MIRV multiple independently targetable reentry vehicle

SERV security-enhanced reentry vehicle

SLCM sea-launched cruise missile

SLBM submarine-launched ballistic missile
UGM uderwater-launched ground attack missile

each retiring boat, starting in 2031, with a new class of ballistic missile submarine, referred to as the SSBNX or the *Ohio*-class replacement (O'Rourke 2011). The US Navy originally planned to begin using the replacement boats in 2029, but in 2012 the Pentagon announced a two-year delay in the SSBNX program. This would push back completion of the first SSBNX to 2031. The FY 2014 budget was funded at US$1.1 billion for the SSBNX. The US Navy ultimately wants 12 boats with the lead boat costing US$13.3 billion and each subsequent boat US$7 billion for a total procurement cost of about US$85 billion, according to the Congressional Budget Office (2012). Research, development and evaluation of the SSBNX will cost an additional US$10–15 billion, for a project total of about US$100 billion. The US Navy anticipates lower costs. The total lifecycle cost of the SSBNX program is estimated at US$347 billion (O'Rourke 2011). The US Navy will field 10 ballistic missile submarines between 2030 and 2040. Each *Ohio*-class submarine serves as a launch platform for up to 24 SLBMs loaded with up to eight warheads each. Under the New START treaty, by 2018 the US Navy plans to deploy 20 SLBMs on each *Ohio*-class submarine rather than the full 24. This will result in a total of 240 deployed SLBMs. The SSNBX will carry up to 16 SLBMs, for a maximum of 192 deployed SLBMs when the fleet is fully converted to the SSBNX in 2040.

First deployed in 1990, the force of Trident II D5 missiles has been routinely tested and evaluated. It is currently being modernised to last until 2042 (Johnson et al. 2009). In 2008, a total of 12 life-extended variants of the D5 were purchased; 24 D5s will be purchased in the following years. The D5 SLBMs are armed with approximately 768 W76 and 384 W88 warheads. In 2009, NNSA began delivery of the W76-1, a refurbished version of the W76 that extends its service life for an additional 30 years. This US$4 billion program will run through 2018, delivering up to 2000 W76-1 warheads (Report to Congress, 2010). It is important to highlight that with the rebuilt Trident D5 missile in service to 2042, the W76-1's life extended to 2040–2050, the relatively new W88 in service, and a new class of SSBNs lasting into the 2070s, the US Navy's Trident Fleet will be kept robust and modern, well into the 21st century.

- Strategic Bombers. The US Air Force currently deploys 18 B-2 Spirit bombers at Whiteman Air Force Base in Missouri, and 76 B-52H bombers at Minot Air Force Base, North Dakota, and Barksdale Air Force Base, Louisiana, that can be equipped for nuclear missions. In 2008, the US Air Force created a designated bomber squadron at Minot Air Force Base to focus on the nuclear mission (Woolf 2011). Although all 76 B-52Hs will remain nuclear capable, this squadron will focus on the nuclear mission by running a greater number of nuclear training exercises and missions. The squadron began its operations in 2010 and is comprised of 22 B-52Hs. The US Air Force is developing a new long range penetrating bomber with nuclear capabilities. The 2012 Aircraft Procurement Plan anticipates a procurement of 80–100 bombers at an estimated per unit cost of US$550 million, for a total of US$40–60 billion. The 2006 Quadrennial Defense Review initially called for procurement of the bomber by 2018. The Pentagon's FY 2014 budget is US$359 million for research and

development of the bomber. The US Air Force plans to spend US$32.1 billion over the next 10 years on research and development for the new bomber (Congressional Budget 2013a). The Air Force continually modernises the B-2 fleet and is expected to last through 2058. The B-2 carries the B61 and B83 strategic bombs. The B61 has several mods, 3, 4, 7, 10, and 11. B61-3 and B61-4 are non-strategic weapons deployed in Europe for NATO aircraft as part of the US's extended nuclear commitment. The B61-7 and B61-11 are strategic weapons deployed on the B-2. The B-52H fleet, first deployed in 1961, has an on-going modification program, beginning in 1989, incorporating updates to the global positioning system, updating the weapons capabilities to accommodate a full array of advanced weapons developed after the procurement of the B-52H, and modifying the heavy stores adapter beams to allow the B-52H to carry up to 2000 pound munitions and a total of 70,000 pounds of mixed ordnance armaments. The 2010 NPR states that some B-52Hs will be converted to a conventional-only role. The 1251 Report indicates that the US Air Force plans to retain at least some B-52Hs for the nuclear mission through 2035. This time frame could be extended, as the modernisation programs for the B-52H will keep it in service into the 2040s. The B-52H carries the air-launched cruise missile (ALCM), first deployed in 1981. Each ALCM carries a W80-1 warhead, first produced in 1982. NNSA is requesting US$46 million for work on the W80 in FY 2013. In 2006, the United States had 1142 ALCMS. According to a statement made by Major General Roger Burg, the ALCM fleet would be reduced to 528 and consolidated at Minor Air Force Base. The US Air Force is currently researching a replacement for the ALCM, the Long Range Standoff missile, or LRSO. The US Air Force plans for initial production of the new cruise missile around 2025, if it decides to move forward with the LRSO.

Undoubtedly, the data included in the above paragraphs make very clear that the US government has no intention to support the beginning of multilateral nuclear disarmament efforts at least until 2070. On the basis of the above information, it is almost impossible to believe that the U.S. has the intention to destroy all nuclear weapons before that year.

Disarmament Measures

Under the New START treaty that entered into force on 5 February 2011, the U.S. and Russia agreed to reduce their deployed strategic warheads to no more than 1550 each; to deploy no more than 700 ICBMs, SLBMs and heavy bombers, and to limit ICBM launchers, SLBM launchers and heavy bombers to no more than 800 whether deployed or not (Inventory of International Nonproliferation Organizations and Regimes). Once the reductions are completed, the U.S. and Russian strategic nuclear arsenal will be at its smallest since the 1950s (Kennedy 2012). In addition, the U.S. had:

- Dismantled 9952 nuclear warheads from FY 1994 through 2013 (US Department of Defense) and more than 13,000 warheads since 1988 (US Department of State);

- Reduced by 84 % the largest US stockpile of 31,255 warheads in 1967 to the current stockpile of 5000 operational and reserved warheads (US Department of Defense, and Kristensen and Norris 2012);
- Reduced operationally-deployed strategic nuclear weapons from approximately 10,000 in 1991 to 1800 as of 5 February 2011 (US Department of State, Kristensen 2012);
- Unilaterally reduced non-strategic warheads by 90 % from 1967 to 2009 (Kennedy 2012);
- Eliminated more than 1000 launchers for strategic ballistic missiles, 350 heavy bombers and 28 ballistic missile submarines (Promoting disarmament US State Department);
- Completed W79 Artillery-Fired Atomic Projectile dismantlement in 2003 (Wilkes 2003);
- Completed W56 warhead dismantlement in 2006 (Press Release NNSA 2006);
- Completed retirement of remaining nuclear Tomahawk land-attack cruise missiles (TLAM/Ns) and their W80-0 warheads. The US inventory of non-strategic nuclear weapons now includes only B61 gravity bombs (Kristensen and Norris 2014).

The Russian Federation

Russia is one of the two nuclear-weapon states parties to the NPT with the greatest nuclear arsenals among all nuclear-weapon states. The other state is the U.S.

Nuclear Forces and its Modernisation

According to the Federation of American Scientists (2015), Russia had in 2015 a total of 7500 nuclear warheads. There is some uncertainty about the number of operationally deployed ICBM warheads. Some missiles are known to carry a single warhead (SS-25 Topol and SS-27 Topol-M) while the SS-19 carries six, and the SS-18 carries 10. The RS-24 Yars is believed to be deployed with six warheads each. However, 20 SS-19 at one of the missile bases probably had their warheads removed at the time Russia submitted its latest report, as these ICBMs are being withdrawn from service to be replaced by new missiles. If this is the case, then Russia would have had 1032 deployed ICBM warheads, according to UNIDIR sources.

In addition to the deployed ICBMs, Russia has a substantial number of non-deployed ICBM launchers. These include more than 120 silos for the SS-18 and SS-19 that are preserved for potential future deployment of new ICBMs, about 90 road-mobile ICBMs at conversion and elimination facilities, and approximately 45 silos and mobile launchers that are used for training or are located at test ranges. When these numbers are taken into account, it could be estimated that Russia has a total of about 570 ICBM launchers, deployed and non-deployed.

The Russian ballistic missile submarine fleet includes submarines of four types that could be equipped with four different types of SLBMs. The SLBMs declared operational under New START treaty are the RSM-50 (R-29R, SS-N-18), RSM-52 (R-39, SS-N-20), RSM-54 (R-29RM, SS-N-23), and RSM-56 (Bulava). Not all of these missiles are currently deployed—the SS-N-20 has been withdrawn from service, while Bulava is a new missile that has not yet entered service.

The SLBMs that are currently in service are deployed on submarines of two types, three *Delta III* submarines that can carry 16 R-29R each, and six *Delta IV* submarines that can be equipped with 16 R-29RM. In September 2012, two *Delta IV* submarines were in overhaul, so their launchers did not contain deployed missiles. This means that at the time of the most recent data exchange Russia had 112 deployed SLBMs. The R-29R and R-29RM can carry three and four nuclear warheads, respectively, so 400 deployed SLBM warheads would be counted against the respective New START limit.

The non-deployed SLBM launchers that would be accounted for under New START treaty include the 32 launchers on the two *Delta IV* submarines in overhaul, as well as the 60 launchers on older *Typhoon* submarines, which have been withdrawn from service (two submarines are awaiting elimination and one has been converted for SLBM tests). Russia also has two new submarines of the *Borey* -class, each of which will carry 16 Bulava missiles. Since this missile has not been accepted for service yet, the launchers on the two *Borey* -class submarines, most likely do not contain missiles and, therefore, should be counted as non-deployed. Taking into account the two test SLBM launchers that Russia declared in the data exchanges, there are 126 non-deployed SLBM launchers; so, Russia has a total of 238 SLBM launchers, deployed and non-deployed.

Russia declared two types of heavy bombers that are subject to the New START limitations—the Tu-95MS and Tu-160. These bombers can carry long-range nuclear air-launched cruise missiles as well as gravity bombs. In 2009, Russia declared 13 operational Tu-160 and 63 Tu-95MS. Since then, some aircraft have been withdrawn from service and others were transferred out of the operational force for repair or modernisation. As a result, it is estimated that in September 2012, Russia had 67 heavy bombers that were counted as deployed—11 Tu-160 and 56 Tu-95MS (See Table 3).

According to the New START treaty, Russia will have, by 2018, a total of 700 deployed ICBMs, deployed SLBMs, and deployed heavy bombers equipped for nuclear armaments; 1550 nuclear warheads on deployed ICBMs, deployed SLBMs, and deployed heavy bombers equipped for nuclear armaments (each such heavy bomber is counted as one warhead toward this limit); and 800 deployed and non-deployed ICBM launchers, SLBM launchers, and heavy bombers equipped for nuclear armaments.[5]

According to Kristensen and Norris (2015), and despite the commitments adopted at the 2010 NPT Review Conference, Russia intends to phase out and replace all its Soviet-era nuclear systems in the next decade. Based on the plan adopted by Russia, the government is developing three new land-based missiles, including an SS-27 ICBM modified so it can carry multiple warheads that can be aimed at different targets, thereby expanding the lethality of each missile. Its SLBMs are also set to be modernised, with eight new submarines that reportedly will be able to launch 16

[5] New START reporting explicitly lists five types of Russian land-based ballistic missiles that are considered operational under the treaty—RS-12 M (also known as SS-25 or Topol), RS-12 M2 (SS-27 or Topol-M), RS-18 (SS-19 or UR-100 NUTTH), RS-20 (SS-18 or R-36 M2), and RS-24 (Yars). These missiles are deployed at 12 ICBM bases that are operated by the Strategic Rocket Forces. An analysis of open-source information suggests that Russia has 312 deployed ICBMs.

Table 3 Status of Russian nuclear forces in 2015

Type/Name	Russian designation	Launchers	Year deployed	Warheads x yield (kilotons)	Total warheads
Strategic offensive weapons					
ICBMs					
SS-18 M6 Satan	RS-20V	46	1988	10 × 500/800 (MIRV)	460
SS-19 M3 Stiletto	RS-18 (UR-100NUTTH)	30	1980	6 × 400 (MIRV)	180
SS-25 Sickle	RS-12 M (Topol)	99	1988	1 × 800	99[a]
SS-27 Mod. 1 (mobile)	RS-12 M1 (Topol-M)	18	2006	1 × 800?	18
SS-27 Mod. 1 (silo)	RS-12 M2 (Topol-M)	60	1997	1 × 800	60
SS-27 Mod. 2 (mobile)	RS-24 (Yars)	54	2010	4 × 100? (MIRV)	216
SS-27 Mod. 2 (silo)	RS-24 (Yars)	4	2014	4 × 100? (MIRV)	16
SS-27 Mod. ? (mobile)	RS-26 (Yars-M)	–	(2016)	3 × 100? (MIRV)	–
SS-27 Mod. ? (rail)	Barguzin	–	(2019)	4 × 100? (MIRV)	–
"heavy" ICBM 2 (silo)	Sarmat	–	(2020)	10 × 100? (MIRV)	–
Subtotal		311			1049
SLBMs					
SS-N-18 M1 Stingray	RSM-50	2/32	1978	3 × 50 (MIRV)	94
SS-N-23 M1	RSM-54 (Sineva)	6/96	2007	4 × 100 (MIRV)[b]	384[c]
SS-N-32	RSM-54 (Bulava)	2/32	2014	6 × 100 (MIRV)	192
Subtotal		10/160			672[d]
Bombers/weapons					
Bear-H6	Tu-95 MS6	29	1984	6 × AS-15A ALCMs, bombs	174
Bear-H16	Tu-95 MS16	30	1984	16 × AS-15A ALCMs, bombs	480
Blackjack	Tu-160	13	1987	12 × AS-15B ALCMs or AS-16 SRAMS, bombs	156
Subtotal		72			810[e]
Subtotal strategic offensive forces					~2500[f]
Nonstrategic and defensive weapons					
ABM/Air/Coastal defense					
S-300 (SA-10/12/20)		~1000	1980/2007	1 × low	~340
53 T6 Gazelle		68	1986	1 × 10	68[g]
SSC-1B Sepal		34	1973	1 × 350	~17
Land-based air					
Bombers/fighters (Tu-22 M3/Su-24 M/Su-34)		~430	1974/2006	ASM, bombs	~650

Table 3 (continued)

Type/Name	Russian designation	Launchers	Year deployed	Warheads x yield (kilotons)	Total warheads
Ground-based[h]					
Short-range ballistic missiles (SS-21/SS-26)		~140	1981/ 2005	1 × ?	~140
GLCM		?	(2014)	1 × ?	?
Naval					
Submarines/surface ships/air				SLCM, ASW, SAM, DB, torpedoes	~730
Subtotal nonstrategic and defensive forces					~2000[i]
Total					~4500[j]

Source: Federation of American Scientists

[a] It is possible that (but unknown if) more of these SS-25 regiments at bases undergoing upgrade to RS-24 have been inactivated

[b] The Sineva is a modified SS-N-23 and probably carries four MIRVed warheads. US intelligence in 2006 estimated that the missile could carry up to 10 warheads, but lowered the estimate to four warheads in 2009

[c] Only 256 of these warheads are displayed on four of the six Delta IVs

[d] Two or three of the 10 SSBNs are in overhaul and do not carry nuclear weapons. As a result, only 416 of the 528 warheads are deployed

[e] The bomber weapons are kept in storage, not deployed on the aircraft. We estimate that only a couple hundred weapons are present at the two bomber bases, with the remainder in central storage

[f] Only about 1780 of these warheads are deployed on missiles and at bomber bases. The New START Treaty counts fewer deployed warheads because it does not count weapons stored at bomber bases and because some SSBNs are not fully loaded at any given time

[g] All 32 Gorgon missiles apparently have been removed from the ABM system

[h] NATO's International Military Staff briefed the North Atlantic Council in November 2009 that the Russian Zapad and Ladoga exercises in August and September 2009 included "missile launches, some of which may have simulated the use of tactical nuclear weapons" (Aftenposten, 2011)

[i] Numbers may not add up due to rounding. All non-strategic warheads are in central storage. The 2000 listed make up the estimated nominal load for nuclear capable delivery platforms

[j] In addition to these warheads, we estimate that an additional 3200 retired warheads are awaiting dismantlement, for a total inventory of nearly 7500 warheads

ABM intercontinental ballistic missile

ALCM air-launched cruise missile

AS air to surface

ASM air to surface missile

ASW antisubmarine weapon

DB depth bomb

GLCM ground-launched cruise missile

ICBM intercontinental ballistic missile

MIRV multiple independently targetable reentry vehicle

SAM surface to air missile

SLBM submarine-launched cruise missile

SLCM sea-launched cruise missile

SRAM short-ranged attack missile

missiles, each capable of carrying up to six independently targetable warheads—again increasing the number of targets that can be attacked. On the other hand, the Russian bomber force is also being upgraded, with plans for a relatively slow but super-stealth flying wing, known as the PAK-DA, apparently going forward. A new nuclear-capable cruise missile, long in development, appears to be nearing operational status; the new Iskander-M SS-26 short-range tactical nuclear missile—a mobile system with two missiles per carrier—is being rolled out, and the Su-34 Fullback fighter-bomber is replacing 1970s-era planes as a platform for tactical nuclear strikes. Meanwhile, a nuclear-powered guided-missile attack submarine is about to enter service, along with a long-range cruise missile that may have a nuclear capability. Production of nuclear warheads for these systems continues.

It is important to highlight that some of the Russia's efforts in the process of modernising its nuclear forces could significantly alter warhead designs, which would raise questions about whether Russia might seek to test the upgrades, in breach of the moratorium on testing. This freeze is central to the international arms-control regime, but the CTBT treaty that enforce this moratorium has not yet entered into force, after so many years of being adopted by the United Nations. Currently, four countries that are not parties to the NPT—India, Israel, North Korea, and Pakistan—have nuclear weapons. A resumption of testing by any of the five nuclear-weapon states parties to the NPT, and the delay in the beginning of the negotiations for the destruction of all nuclear weapons by all nuclear-weapon states as foreseen in article VI of the NPT, could result in more countries trying to produce a nuclear weapon, test it and then deploying it in the future. In short, the modernisation programs in the U.S., Russia, and in other nuclear-weapon states, threaten to open the door to a new arms race, particularly nuclear arms race—and an ever-increasing number of nuclear-weapon states.

In any case, the above modernisation program makes clear the intention of the Russian Federation to continue to have nuclear weapons as the main type of weapon to ensure the security of the country, the rejection of any possible attack to Russia and the weapon that gives stability at international level, ignoring the commitments adopted in the past two NPT Review Conferences, and its obligations assumed under article VI of the NPT.

Disarmament Measures

Since 1987, Russia has adopted several measures in order to move forwards nuclear disarmament, particularly through bilateral negotiations with the U.S. The first step towards nuclear disarmament was the conclusion of the Treaty on the Elimination of the Intermediate-range and Shorter-range Missiles (the INF Treaty) signed on 8 December 1987. The INF treaty made it possible to eliminate the whole class of nuclear weapons. Pursuant to its provisions, 1846 ground-launched intermediate-range (1000–5500 km) and shorter-range (500–1000 km) ballistic and cruise missiles and 825 launchers of such missiles were completely eliminated. In the aggregate, over 3000 nuclear re-entry vehicles of total capacity of over 500,000 kilotons have been deactivated. The INF treaty is still in force today. It remains an important factor of maintaining international security and strategic stability. As a follow-up to the INF treaty, Russia proposed to develop a universal legally binding arrangement on complete elimination of such weapons in all states. The implementation of such an initiative

would give a new impetus to ensuring global and regional stability. However, this initiative has not been accepted by any other nuclear-weapon state.

The entry into force, on 5 December 1994, of the Treaty on the Reduction and Limitation of Strategic Offensive Arms (the START treaty) opened a new page of coordinated and verifiable reductions of strategic offensive arms of the U.S. and Russia. According to the START treaty, Russia was obliged to reduce the number of strategic nuclear delivery vehicles to 1600 units and the number of accountable warheads to the limit of 6000 units. These obligations have been met fully and before the deadlines. As of the check date of 5 December 2001, the aggregate number of deployed strategic arms (ICBMs, SLBMs and heavy bombers) was reduced to 1136 units and the number of accountable warheads—to 5518 units. Not only the U.S. and Russia, but also Belarus, Kazakhstan and Ukraine were parties to the START treaty.

The Moscow Treaty on the Strategic Offensive Reductions concluded by the U.S. and Russia in 2002 became another contribution to nuclear disarmament. In accordance with its provisions, by 31 December 2012, the U.S. and Russia undertook to reduce the limits of their strategic nuclear warheads to 1700–2200 units, i.e., approximately to one third of the aggregate limit provided for in the START treaty. These obligations have been fulfilled. Along with strategic nuclear weapons, Russia has significantly reduced the number of its non-strategic nuclear weapons. Now the non-strategic nuclear potential of Russia does not exceed 25 % of the amount possessed by the former USSR in 1991. At the same time, all Russia's non-strategic nuclear weapons are no longer deployed. They are located exclusively within the national territory and mostly in centralized storage facilities with the highest security regime. Russia have repeatedly called on the other countries possessing non-strategic weapons to take them to their territories, eliminate all pieces of infrastructure created abroad for rapid deployment of such weapons and cease training with participation of non-nuclear states. Undoubtedly, such steps would be helpful in strengthening international security and stability. They would also be helpful in cleaning up the ways to further reduction and limitation of nuclear arsenals. However, no actions have been adopted to implement such initiative.

Signature, on 8 April 2010 in Prague, of the Treaty between the U.S. and the Russian Federation on Measures for the Further Reduction and Limitation of Strategic Offensive Arms was a very important event in the field of nuclear disarmament. The treaty replaced both the START, which had expired on 4 December 2009, and the 2002 Moscow Treaty on Strategic Offensive Reductions. According to the new treaty, each party shall reduce and limit its strategic offensive weapons, so that seven years after the entry into force of the treaty and thereafter, their aggregate numbers, do not exceed:

- A total of 700, for deployed ICBMs, SLBMs, and heavy bombers;
- A total of 1550, for warheads thereof;
- A total of 800, for deployed and non-deployed ICBM and SLBM launchers, as well as heavy bombers;
- The parties agreed to cut their aggregate number of warheads (the “ceiling” under SORT—2200 warheads) by two thirds and reduce the aggregate number of strategic delivery vehicles (the “ceiling” under SORT—1600 delivery vehicles; no limit for delivery vehicles under the SORT) by more than a half. At present, the U.S. and Russia are working according to a plan for implementation of the treaty.

Russia is ready to continue to move forward towards verifiable and irreversible reductions of nuclear weapons in accordance with its obligations under Article VI of the NPT if other nuclear-weapon states are ready to do the same, particularly the U.S. At the same time, Russia is confident that such measures should be taken stage by stage in order to achieve the ultimate goal that is overall and complete disarmament. This goal can be achieved only by using a comprehensive approach while preserving strategic stability, complying with the principle of equal and indivisible security for all and ensuring, inter alia, the following international conditions:

- Continued nuclear disarmament of all states with nuclear capabilities, and their gradual involvement in the efforts made in this field already by the U.S. and Russia;
- Prevention of placement of weapons in the outer space;
- Provision of guarantees of the absence of recoverable nuclear capabilities in all nuclear-weapon states;
- Inadmissibility of building-up conventional compensatory potential in order to compensate the elimination of a category of nuclear weapons;
- Elimination of quantity and quality imbalances in conventional weapons alongside with the resolution of other international problems, including settlement of regional conflicts;
- Entry into force of the CTBT;
- Reliable viability of key multilateral disarmament and non-proliferation tools.

For the time being, and taking into account the current international political situation, Russia is not considering any discussion with the U.S. for further bilateral reduction in the level of nuclear weapons foresee in the New START treaty. In addition, the Russian government does not consider that exist today the minimum conditions to begin any formal discussion towards a possible negotiation, at the multilateral level, for the elimination of all nuclear weapons in all nuclear-weapon states. This position ignores the commitments assumed by the Russian government in the past two NPT Review Conferences and its international obligations under article VI of the NPT, putting in danger the future sustainability of this treaty.

On the contrary, the current efforts in the modernisation of the Russian nuclear forces mentioned above make very clear the intention of the government to keep nuclear weapons in the military arsenals of the Russian armed forces during the next decades.

France

France's involvement in the development of a nuclear weapon program began in the 1950s. Why France decided to become a nuclear-weapons state? There are two main reasons for that: Security and prestige.

Nuclear Forces and its Modernisation

France's nuclear force today includes both air and sea-based components that are maintained at a level deemed sufficient to the strategic context. Its sea-based deterrent

comprises four *Le Triomphant*-class nuclear submarines with domestically manufactured submarine launched ballistic missiles (SLBMs) that carry up to six warheads (Norris and Kristensen 2009). The strategic submarine fleet is based on France's Atlantic coast at Ile Longue, Bretagne, and is configured to the minimum level required to maintain a continuous-at-sea presence, according to France's Military Doctrine.

France completed the modernisation of its strategic submarine fleet in 2010, with the entry into service of the fourth nuclear submarine "*Le Terrible*". Although the first three submarines carry the older M45 SLBM, the fourth is fitted with the new longer-range M51, which carries the same TN75 warhead as the M45 (Tertrais 2009). However, from 2010 the M51 SLBM is due to be armed with the new TNO nuclear warhead (Norris and Kristensen 2009).

France's air-based deterrent includes four air squadrons at four separate bases. The land-based squadrons—located at Istres, Luxeuil-les-Bains and Saint-Dizier - comprise 60 Mirage aircraft that carry the ASMP short-range attack missile, which is armed with a thermonuclear warhead that is reported to have a selectable yield of 20, 90, or 300 kilotons, according to UNIDIR sources. In the future, the ASMP-A will be fitted with the new warhead used on the M51.2 from around 2015. One further squadron is located at the Toulon naval base, where 24 Super-Etendard aircraft (also carrying the ASMP air-to-land missile) are deployed in the Charles de Gaulle aircraft carrier (International Institute of Strategic Studies, 2009).

France claims that it requires an air-based leg- in addition to its strategic submarine fleet because the Trident D-5 missile used by the British navy is more accurate than the M45 and M51. As a result of this greater accuracy, the UK is able to rely on its sea-based deterrent alone, whereas France requires a more flexible deterrent (Tertrais 2009). The air-based leg gives France this flexibility (see Table 4).

France is also engaged in the process of replacing its Mirage 2000 N and Super-Etendard aircraft with the new Rafale F3 fighter jet (Reif 2009 and Tran, 2009). A successor to the ASMP air-to-ground missile, the improved ASMP Ameliore, has also entered service and will be fitted with the new TNA warhead (Norris and Kristensen 2009). Both the new TNO and TNA warheads were tested in France's final round of nuclear testing in September 1996.

To ensure the safety and viability of their nuclear weapons stockpiles - while adhering to the CTBT - France and the UK signed a bilateral agreement in November 2010 that will allow for cooperation in this area (Declaration on Defence and Security Cooperation, 2010). According to this declaration, joint activities will involve the construction of a simulation facility in Valduc, France, where scientists from both countries will conduct work on the safety and security of their respective countries warheads. A joint Technology Development Centre will also be established in Aldermaston, UK, to develop simulation technology for the centre in Vaduz. The cost of the construction of the Valduc facility is to be split equally between France and the UK (BBC news, 2010).

Disarmament Measures

In 1996, the former French President Jacques Chirac introduced a number of reforms to France's nuclear forces, including scaling back the strategic submarine fleet from five

Table 4 France nuclear forces

	ICBMs	SLBMs	Heavy bombers	Total
Deployed ICBMs, deployed SLBMs, and deployed heavy bombers	–	48	–	48
Warheads on deployed ICBMs, on deployed SLBMs, and nuclear warheads counted for deployed heavy bombers	–	288	–	288
Deployed and non-deployed launchers of ICBMs, deployed and non-deployed launchers of SLBMs, and deployed and non-deployed heavy bombers	–	64	–	64

Source: UNIDIR (Project on Transparency and Accountability in Nuclear Disarmament)

vessels to four (in 1991 France reduced its fleet of *Le Redoutable*-class SSBNs from six boats to five after the lead vessel, *Le Redoutable,* was decommissioned), withdrawing aging Mirage IVP bombers from service, and dismantling the Plateau d'Albion land-based ballistic missile site. It is important to highlight that the decision of the French government to disband Plateau d'Albion is significant as France became the only state until today to have designed, developed and dismantled its land-based nuclear missiles (Speech of President Jacques Chirac 2006b).

In March 2008, former President Sarkozy delivered a speech in Cherbourg at the launching of the fourth vessel of France's new fleet of strategic nuclear submarines, *Le Terrible*. In the speech, former President Sarkozy further scaled down the country's air-based leg by announcing that the "number of nuclear weapons, missiles and aircraft will be reduced by one-third." As a result of this reduction, former President Sarkozy also announced that the country would have no more than 300 nuclear warheads in total. This declaration of total (as opposed to operational) warheads represent a high-level of French transparency with regards to its nuclear weapons arsenal (President Nicolas Sarkoz 2008; Speech of President Jacques Chirac 2006a).

Historically, France has adopted a conservative approach towards nuclear disarmament with its leaders avoiding public statements on the issue. This can be seen today in the more cautious approach taken by French officials in comparison to their British and American counterparts (Tertrais 2008). Such conservatism can be explained by the strong link that exists between the possession of nuclear weapons and feelings of national independence, something that is reflected in a general public that is relatively pro-nuclear. While French opinion polls on this subject are rare, one conducted by the Department of Defence in 2006 found that 61 % of the population believe France requires nuclear weapons in order to defend herself.

As a result, French politicians have been less forthcoming in emphasising the country's willingness to join nuclear disarmament negotiations at the appropriate time. This is partly due to them being unconvinced that disarmament will result in increased security to the country. Although former President Sarkozy's Cherbourg speech did address the disarmament subject directly, something that marks a subtle change in French policy, it also urged caution and reinforced the message that France will continue to maintain its nuclear weapons at a level of strict sufficiency. While it is true that this is not significantly different from the British policy of minimum deterrence, the emphasis that France places on maintenance as opposed to a willingness to engage, continues to create

some ambiguity over France's position. Nevertheless, France has set out some practical steps towards disarmament that were alluded to by former President Sarkozy in both the Cherbourg speech and a letter that was sent by France to the UN Secretary General under its six-month presidency of the European Union in 2008. These steps include the universal ratification of the CTBT, the transparent dismantlement of all nuclear testing facilities, and a moratorium on the production of fissile material.

An important part of France's approach to nuclear disarmament is that it emphasises the multidimensional character of Article VI of the NPT and consistently links both nuclear and conventional disarmament (Tertrais 2009). This linkage was referred to in the Cherbourg speech as former President Sarkozy stated that the agenda he laid out was an attempt to place us "on the path towards nuclear disarmament and general and complete disarmament." This position was also re-emphasised in former President Sarkozy's 2008 letter to Ban Ki-moon.

France deserves recognition for the arms reductions it has made, as well as the transparent manner in which it has dismantled the fissile material production facilities at Marcoule and Pierrelatte. In an unprecedented move in September 2008, French authorities organized a tour of these facilities for member state representatives to the Conference on Disarmament (Joint Communiqué of the Ministry of Foreign Affairs and Ministry of Defense (2008)). This policy demonstrates both France's commitment to its 1996 decision to cease producing fissile materials for nuclear weapons, and its support for a verifiable fissile material Cut-off Treaty.

Nevertheless, it is important to emphasise that France will continue to base its security and defence in the possession and possible used in nuclear weapons under special circumstances, ignoring France's commitments and obligations with article VI of the NPT. The modernisation of nuclear forces confirms this statement.

United Kingdom

The UK is the nuclear-weapon state party to the NPT with the lowest number of nuclear warheads in their nuclear arsenals and all of them deployed in four submarines.

Nuclear Forces and its Modernisation

According to UNIDIR sources, the UK maintains a solely sea-based nuclear force, which includes Trident II ballistic missiles deployed on four *Vanguard*-class submarines. The UK is the only nuclear-weapon state party to the NPT that has only one type of nuclear weapon system. The missiles deployed on the submarines are leased from the U.S. under a sharing arrangement that gives the UK access to a common pool of missiles. The range of Trident II qualifies it as an SLBM under the New START definition (the U.S. explicitly reported Trident II as an SLBM that is covered by the New START limits).

Each of the four *Vanguard*-class submarines—*Vanguard*, *Victorious*, *Vigilant*, and *Vengeance*— can carry 16 SLBMs, giving the UK the capability of deploying 64 SLBMs. However, one of the submarines is normally undergoing overhaul at any given time, so the actual number of deployed missiles would be no more than 48. Under the missile-sharing agreement with the U.S., the UK has access to 58 missiles from the pool; as of the end of 2012, a total of 10 of these missiles had been used in flight tests.

To determine the number of deployed SLBMs that would be reported under a New START-type data exchange, it is necessary to take into account that, as of 1 September 2012, one of the submarines (*Vengeance*) was in overhaul, so it did not have any deployed SLBMs on board. Another submarine, *Vigilant*, which completed its overhaul earlier in 2012, was undergoing preparation for deployment that ended with a live test fire on 23 October 2012. Given this timing, *Vigilant* most likely did not have missiles on-board on 1 September 2012. The other two UK submarines, most likely had missiles loaded in their launch tubes, so it could be assumed that the UK would report 24 deployed SLBMs.

There is also some uncertainty about the number of deployed warheads. In 2010, the UK government declared that each submarine is equipped with no more than 48 warheads and made a commitment to reduce this number in the future. In 2011, the Minister of Defence announced that "at least one of the *Vanguard*- class ballistic missile submarines (SSBN) now carries a maximum of 40 nuclear warheads". This would have to be in reference either to *Vanguard* or to *Victorious*, both of which had completed their scheduled overhauls by that time. Therefore, with one of these submarines carrying a maximum of 48 warheads and one carrying a maximum of 40, this would amount to 88 deployed warheads on 1 September 2012.

The total number of SLBM launchers that the UK would report under a New START-type data exchange would include all 64 launch tubes on its four submarines, regardless of whether or not they contain a missile.

To summarise, if the UK would report the 1 September 2012 aggregate data as required under New START treaty, it would list 24 deployed SLBMs, 88 deployed warheads, and 64 deployed and non-deployed SLBM launchers. Table 5 below provides a breakdown of the aggregate data. It should be noted that the numbers for deployed SLBMs and warheads are upper-bound estimates. The actual number could be lower.

Disarmament Measures

In 2010, Britain announced its plans to reduce its stockpile to 180 warheads by the mid-2020s, but it is currently bringing out a new class of ballistic missile submarines to replace older submarines scheduled for retirement, starting in 2024.

Table 5 UK nuclear forces 2012

	ICBMs	SLBMs	Heavy bombers	Total
Deployed ICBMs, deployed SLBMs, and deployed heavy bombers	–	24	–	24
Warheads on deployed ICBMs, on deployed SLBMs, and nuclear warheads counted for deployed heavy bombers	–	88	–	88
Deployed and non-deployed launchers of ICBMs, deployed and non-deployed launchers of SLBMs, and deployed and non-deployed heavy bombers	–	64	–	64

Source: UNIDIR (Project on Transparency and Accountability in Nuclear Disarmament)

China

China began developing nuclear weapons in the late 1950s, with substantial Soviet assistance. According to the Federation of American Scientists, before 1960 direct Soviet military assistance had included the provision of advisors and a vast variety of equipment. When Sino-Soviet relations cooled in the late 1950s and early 1960s, the former Soviet Union withheld plans and data for an atomic bomb, abrogated the agreement on transferring defence technology, and began the withdrawal of Soviet advisers in 1960. Despite the termination of Soviet assistance, China committed itself to continue nuclear weapons development to break "the superpowers' monopoly on nuclear weapons," to ensure Chinese security against the former Soviet Union and U.S. threats, and to increase Chinese prestige and power internationally.

It is important to highlight that among the five permanent members of the United Nations Security Council, China officially communicates the least about the size, status and capabilities of its nuclear forces. Indeed, although some uncertainty remains, the other permanent members give public approximations of the size and characteristics of their deployed arsenal. However, China is working very actively in the preparation of a methodology to be used by the five permanent members of the UNSC for the provision of accurate information on their nuclear weapon arsenal.

Nuclear Forces and its Modernisation

The modernisation of China's nuclear forces is the way that the government selected for addressing its small nuclear arsenal compared with the nuclear arsenals of the other NPT states parties. The pace of the modernisation of the Chinese nuclear forces is slow and for this reason these forces are still the least developed of the five permanent members of the UNSC. However, their survivability and destructiveness is growing steadily, slowly enabling China to reach a capacity of assured retaliation it has been seeking for so long. In this process, the introduction of the DF-31A and DF-41 ICBMs and the development of a ballistic missile submarine (SSBN) force have been and will be particularly critical.

The increasing size of Beijing's nuclear forces makes it statistically harder to destroy entirely in a first strike. Indeed, the number of Chinese missiles able to reach the continental U.S. has increased to around 40 today, a number that is expected by the US intelligence community to grow to around 100 in the mid-2020s. Although US intelligence often exaggerates in the past the Chinese threat, it is clear that the number of ICBMs will increase in the foreseeable future. Additionally, the replacement of the silo-based and liquid-fuelled DF-5A ICBM with the solid-fuelled and mobile DF-31A ICBM since 2006, a process that is still ongoing, critically reduces the preparation time of missiles that could now theoretically be launched immediately, if the warheads were already fitted, which means that they are no longer vulnerable during a prolonged preparation process. Moreover, the mobility of the DF-31A makes it much more difficult to attack as its location can be changed quickly. Finally, the DF-31 introduces new countermeasures and capacities that would help it evade a US missile defence shield. This capacity will probably be increased by the hypothetical DF-41, which might include multiple independent re-entry vehicles (MIRV). Finally, the slow and difficult development of China's SSBN/SLBM force is a process that has progressively

given the country an assured second strike capability because of the relative undetectability of nuclear submarines (see Table 6).

Similarly, the ongoing modernisation and evolution of China's nuclear arsenal also increases its destructive power. The number of Chinese missiles will not catch up with the U.S. or Russia nuclear arsenals in terms of absolute numbers of warheads, but it would be increasingly capable of inflicting tremendous and unacceptable damage upon

Table 6 China's nuclear forces in 2013

Type	NATO designation	Number of launchers	Year deployed	Range (kilometers)	Warhead x yield (kilotons)	Number of warheads
Land-based ballistic missiles						
DF-3A	CSS-2	~8	1971	3000		~8
DF-4	CSS-3	~12	1980	5500+		~12
DF-5A	CSS-4	~100[a]	1981	13,000+		~20
DF-15	CSS-6	~80[b]	1990	600		?
DF-21		~8	1991	2150		~80
DF-31		~20	2006	7000+		~8
DF-31A		~20	2007	11,000+		~20
Subtotal		248				~148[c]
Submarine-launched ballistic missiles[d]						
JL-1	CSS-NX-3	(12)	1986	1000+	1 × 200–300	n.a.
JL-2	CSS-NX-14	(36)	(2013)	7000+	1 × 200–300?	n.a.
Subtotal:		(48)				*n.a*
Aircraft[e]						
H-6	B-6	~20	1965	3100+	1 × bomb	~20
Fighters	?	?	?	–	1 × bomb	~20
Cruise missiles[f]						
DH-10	CJ-10	~250	2006?	1500?	1 × ?	?
DH-20	CJ-20?	?	?	?	1 × ?	?
Total						~190[g]

Source: Federation of American Scientists

[a] The CIA concluded in 1993 that China "almost certainly" had developed a warhead for the DF-15

[b] This table only counts nuclear versions DF-21 (CSS-5 Mod 1) and DF-21A (CSS-5 Mod 2), each of which has fewer than 50 launchers deployed. The conventional DF-21C and DF-21D are not counted

[c] The missile and warhead inventory may be larger than the number of launchers, some of which can be reused to fire additional missiles

[d] Neither the JL-1 nor the JL-2-SLBM is fully operational, although warheads probably are available. The JL-2 is under development

[e] China is thought to have a small stockpile of nuclear bombs with yields between 10 kilotons and 3 megatons. Figures are for only those aircraft that are estimated to have a secondary nuclear mission. Aircraft range is equivalent to combat radius, which for some H-6 bombers can be extended with air refueling

[f] US Air Force intelligence lists the ground-launched DH-10 land-attack cruise missile as "conventional or nuclear" US Air Force Global Strike Command also lists the air-launched CJ-20 ALCM as nuclear-capable, but it is unclear whether that is a coordinated intelligence assessment

[g] An estimated 60 additional warheads include those produced for SLBMs and other awaiting dismantlement, for a total inventory of approximately 250 warheads

the U.S. This in turn would increase the credibility of Chinese nuclear deterrence by establishing what resembles mutual assured vulnerability and destruction.

Overall, China's ongoing modernisation of its nuclear forces is clearly addressing the shortcomings of its deterrent, which provided some of the incentives for the adoption of a policy of nuclear secrecy. However, the removal of some of the fundamental drivers behind the adoption of a policy does not necessarily mean this policy will be scrapped anytime soon. The pace of China's nuclear modernisation is slow and so is the removal of the drivers that lie behind the adoption of nuclear secrecy. Other reasons for secrecy linked to culture or Chinese diplomatic stance might keep in place incentives to retain as much information as possible about the deterrent.

Still, there is a hope that China, freed of the fear of a disarming first strike and assured of its capacity to deter other nuclear powers, might feel sufficiently assured about the security of its arsenal to communicate more openly in the medium and long-terms about the status, capacities and programmed evolution of its nuclear forces. This would represent a first step towards creating opportunities for clarification and dialogue about China's capabilities and intentions and thus help reduce misperceptions and maybe suspicion. More openness on China's side might then open up more space for the adoption and implementation of new confidence-building measures and lay the ground for future arms control discussions involving all NPT nuclear-weapon states, particularly to begin a multilateral process for nuclear disarmament in which all nuclear-weapon states will be involved.

Based on the above information it can be stated that China is not at this stage in favour of the adoption of any unilateral or bilateral measures in the field of nuclear disarmament and will participate in future multilateral nuclear disarmament efforts, if all nuclear-weapon states are involved.

Conclusions

On the basis of the information given, it is easier to conclude that there are no real possibilities to begin multilateral negotiations that lead to nuclear disarmament at least during the coming decades. For this reason, all efforts to eliminate nuclear weapons within that period will not materialise, unless nuclear-weapon states feel that the collapse of the NPT is imminent and a significant non-nuclear weapon states with the capabilities to produce a nuclear weapons will decide to withdraw from the NPT, if these negotiations do not start in a short period of time.

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