



# ASSURING DESTRUCTION FOREVER: 2018 EDITION

WOMEN'S INTERNATIONAL LEAGUE FOR  
**PEACE & FREEDOM**





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# Introduction

At many points over the last several months, the possibility of nuclear weapons use has seemed greater than it had in a very long time. Between an increase in missile and warhead testing by the Democratic People's Republic of Korea (DPRK),<sup>1</sup> threats of use and aggressive rhetoric between DPRK and the United States,<sup>2</sup> a missile scare in Hawaii,<sup>3</sup> and wavering commitment to the Joint Comprehensive Plan of Action,<sup>4</sup> the world has experienced a collective wake-up call that nuclear weapons are not a threat from past but a very real part of our present.

Against this backdrop there is another factor that may not have pierced public conscience in the same way but has longer term and even more significant implications. This is the continued—and now in many cases heightened—development and/or “modernisation” of nuclear arsenals by the nuclear armed countries. At the start of 2018 the United States unveiled a new Nuclear Posture Review that proposes not only massive increases in spending on nuclear weapon modernisation but expands the circumstances under which the US might consider the use of nuclear weapons and calls for the development of new, more “usable” nuclear weapons capabilities.<sup>5</sup> Meanwhile, most other nuclear-armed states continue to pursue modernisation programmes initiated in previous years, spurred on by each other's ambitions. Such programmes are not about merely the safety or security of nuclear arsenals, but to provide new capabilities to the weapon systems and extend their lives. Many new facets of these systems are digital, exposing nuclear weapon programmes to

new vulnerabilities including through hacking and the use of malware.<sup>6</sup>

Modernisation policies and plans are incompatible with international law. Article VI of the nuclear Non-Proliferation Treaty (NPT) obligates states parties to “undertake to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament.” Nuclear-armed states claim that reductions in their arsenals are indicative of progress toward disarmament, yet they are simultaneously investing billions of dollars into modernisation and upgrades in what can be described as a qualitative arms race. They, and all other NPT states parties that support the perpetuation of dangerous “nuclear deterrence” doctrines, are also in breach of their commitments to reduce the status of nuclear weapons in security strategies.

A bright spot on the landscape is the adoption in 2017 of the Treaty on the Prohibition of Nuclear Weapons (TPNW) by the majority of the world's countries.<sup>7</sup> The TPNW prohibits the use, threat of use, and possession of nuclear weapons, and sets out a process by which states with such weapons can join and eliminate their arsenals. Through its provisions on development and testing, the Treaty can help to impede modernisation programmes and help to facilitate and compel the elimination of nuclear weapons and complement the nuclear NPT.

Significantly, it recognises that any use of nuclear

weapons would be contrary to international humanitarian law. The overwhelming support for the Treaty from non-nuclear-armed countries is in part due to frustration about double speak and false promises to disarm, vis-à-vis modernisation and development plans such as outlined in this report.

This publication is a summary update of a study Reaching Critical Will initiated in 2012, funded by the Ministry of Foreign Affairs of Austria, on the

nuclear weapon modernisation programmes of the nuclear-armed states. Country experts author each chapter. Updates of the executive summary were released in 2013 and 2014, and a revised edition of the full study was published in 2015. An update to that was issued in 2017. Those editions can be found at [www.reachingcriticalwill.org](http://www.reachingcriticalwill.org).

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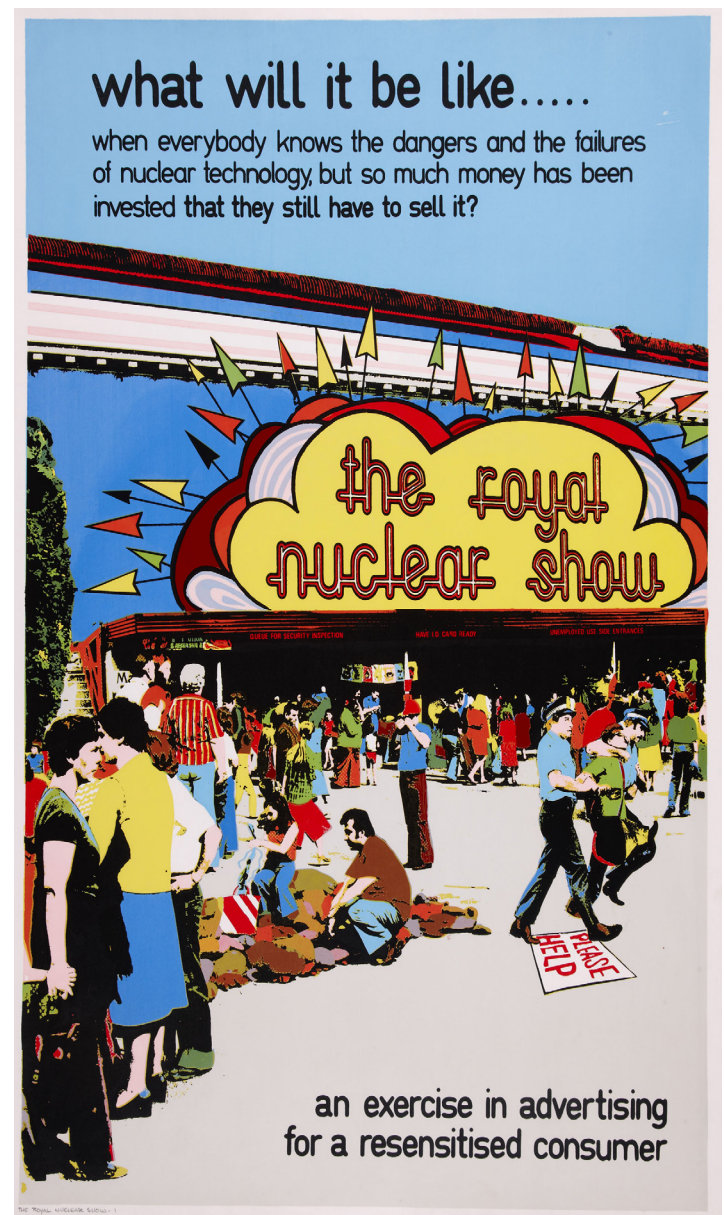


Photo: "What will it be like?" by Toni Robertson 1981.



# China

As of its 2015 defence white paper, China has maintained a no-first-use doctrine for nuclear weapons. However, its modernisation programme “is adding significant new capabilities” to its nuclear forces.<sup>1</sup> The white paper asserts that China will “press forward with independent innovations in weaponry and equipment by reliance on science and technology, enhance the safety, reliability and effectiveness of missile systems, and ... strengthen its capabilities for strategic deterrence and nuclear counterattack, and medium- and long-range precision strikes.”<sup>2</sup> US “missile defence” plans have reportedly been a driving force for China’s nuclear weapon modernisation, as some Chinese officials are concerned that even a limited “missile defence” system could neutralise China’s nuclear force. For example, China has begun to equip its silo-based missiles with the capability to carry multiple warheads.<sup>3</sup>

## Current status

There are various estimates on the size of China’s nuclear arsenal. The Federation of American Scientists (FAS) estimates that China has a total stockpile of approximately 260 nuclear warheads for delivery by about 150 land-based ballistic missiles, 48 sea-based ballistic missiles, and bombers. FAS also estimates that China’s intercontinental ballistic missile force is continuing to grow slowly.<sup>4</sup>

## Development and “modernisation”

The 2015 white paper explains that China is

continuing to “optimise its nuclear force structure, improve strategic early warning, command and control, missile penetration, rapid reaction, and survivability, and protection.” Its modernisation programme began in the 1990s and includes transitioning from liquid-fueled slow-launching missiles to solid-fuel, quicker-launching road-mobile missiles, to make the force more “useable”.

In recent years, China has been phasing out its older missiles, the DF-3A and DF-4, and replacing them with new ones (DF-21 and DF31).<sup>5</sup> It may also be developing a new road-mobile intercontinental ballistic missile, the DF-41, possibly capable of carrying multiple independently targetable re-entry vehicles (MIRVs).<sup>6</sup>

China has also recently sped up the modernisation of its sea-based strategic force, replacing its first generation ballistic nuclear missile-carrying submarines (SSBNs).<sup>7</sup> Some analysts have also argued that China is currently modernising its sea-based strategic force in order to secure a second-strike force.<sup>8</sup> FAS reports that it is not known how many SSBNs China is planning to build, but that the Jin-class submarines are designed to carry a new JL-2 ballistic missile, which has not yet been tested to its full range (7000km).<sup>9</sup>

## Budget

It is difficult to estimate the cost of China’s nuclear weapon force; however, assuming that China consistently maintains 5 percent of its overall military expenditure for its nuclear

weapons programme,<sup>10</sup> China would have spent approximately US \$8.7 billion on its nuclear programme in 2016 (assuming an overall budget of US \$173 billion).<sup>11</sup> According to a new report in Jane's, China's military spending is on course to nearly double between 2010-2020, to US \$233 billion by 2020.<sup>12</sup>

There is scant public debate about nuclear weapons in China. After US President Obama outlined his "vision" of a nuclear weapon free world, an online survey conducted by the People's Daily newspaper indicated that 51 percent of respondents wanted nuclear disarmament while 49 percent did not.<sup>13</sup>

## Perspective

China is one of the least transparent of the nuclear-armed states. China contends the opacity of its force posture can serve to enhance the "deterrence effect" of its smaller nuclear force.

*The original chapter and this update is written by Hui Zhang, a Senior Research Associate at the Project on Managing the Atom in the Belfer Center for Science and International Affairs at Harvard University's John F. Kennedy School of Government.*

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# France

France spends around one third of its defence budget on maintaining and modernising nuclear forces. Like all of the other nuclear-armed states, France is in the middle of a broad modernisation of its nuclear forces involving submarines, aircraft, missiles, warheads, and production facilities. Studies of next-generation weapon systems have begun. Having reduced its air-delivered nuclear forces by one-third in 2008, France does not appear to have plans to reduce its nuclear forces for the foreseeable future. The Macron government has continued the nuclear policy of the Hollande government, which rejected further cuts, and reaffirmed the existing nuclear posture.

## Current status

France possesses approximately 300 nuclear warheads, approximately 290 of that are deployed, or operationally available for deployment on short notice. Its delivery vehicles consist of approximately 50 aircraft that are assigned a total of 54 cruise missiles; and 48 ballistic missiles for four nuclear-powered ballistic missile submarines (at least two of which are always fully operational) equipped with nuclear-armed long-range ballistic missiles.<sup>1</sup> Former president François Hollande stated in February 2015 that the stockpile included 300 warheads.<sup>2</sup>

## Development and “modernisation”

France is upgrading its M51.1 sea-launched ballistic missile that was first deployed on its missile submarines in 2010 with the new M51.2.

The new missile has longer range and carries a new nuclear and more powerful 150-kilotons warhead known as the TNO (Tête Nucléaire Océanique). The M51.2 became operational on the *Triumphant* in 2016 following a successful launch in the Atlantic Ocean. The remaining three submarines, which are equipped with the M51.1 missile with the 100-kilotons TN-75 warhead, will be upgraded over the next several years. Some missiles have reduced warhead loading for limited attack options.

France is also working on a third upgrade of the M51, known as M51.3, with improved accuracy and penetration capability against advanced missile defence systems, that is scheduled to become operational in the mid-2020s.<sup>3</sup> The upgraded missile is expected to arm a new class of ballistic missile submarines, known as SNLE 3G, to replace the current *Triumphant*-class in the 2030s.<sup>4</sup>

France's 54 nuclear medium-range ASMP-A (air-sol moyenne portée-améliorée) cruise missiles are assigned to two fighter-bomber squadrons: the La Fayette squadron at Istres Air Base with Mirage 2000N; and the Gascogne squadron at Saint Dizier Air Base with Rafale F3. The Mirage 2000N will be replaced in the nuclear role by Rafale F3 in September 2018. The ASMP-A is equipped with the 300-kiloton TNA (Tête Nucléaire Aéroportée) warhead. France has begun concept studies for a next-generation air-launched cruise missile, tentatively known as ASN4G.<sup>5</sup> Long-range nuclear cruise missile strikes are supported by



C-135 refuelling tankers based at Avord Air Base, which in 2018 will begin upgrade to the new Phoénix-class Airbus tankers.

## Budget

Estimates vary as to how much France spends on its nuclear weapons. The French government has indicated that it spends approximately US \$4.6 billion on its nuclear forces each year,<sup>6</sup> or about five percent.<sup>7</sup> Other sources suggests it spends spends US\$ 3.6 billion annually.<sup>8</sup> However, due to increasing costs of the modernisation programme, it is estimated that by 2025 that budget will have nearly doubled to US \$6 billion.<sup>9</sup>

## Perspective

Despite France's obligation to pursue negotiations toward nuclear disarmament, then-president Hollande declared in 2015 that, "the time of the nuclear deterrent is not a thing of the past. There can be no question of lowering our guard, including in that area."<sup>10</sup> Moreover, Hollande said it is French policy that, "If the level of other arsenals, particularly those of Russia and the United States, were to fall one day to a few hundred weapons, France would respond accordingly, as it always has. But today, that scenario is still a long way off."<sup>11</sup> These statements have been reaffirmed by the Macron government alongside assurances that, "France has not given up on the goal of disarmament, including nuclear disarmament."<sup>12</sup> Nonetheless, despite reductions after the end of the Cold War,

there seems to be no concrete plans to reduce forces further. That fact, combined with plans to modernised French nuclear forces further, appear to be in conflict with France's obligations under the nuclear Non-Proliferation Treaty (NPT) to negotiate disarmament.

*The original chapter and this update is written by Hans Kristensen, Director of the Nuclear Information Project at the Federation of American Scientists.*

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Photo: ICAN campaign stunt, New York, 2017 © International Campaign to Abolish Nuclear Weapons.



# India

India continues to develop a triad of nuclear delivery systems that have an increasing capacity to deliver destruction to greater distances. In recent years, the country's political elite has also expanded their military ambitions. Despite a stated national commitment to a policy that involves no-first-use of nuclear weapons, there is some evidence that operational doctrines might call for first use of nuclear weapons under some circumstances and some of the additions to the country's nuclear arsenal will allow for quick launch of weapons.<sup>1</sup>

## Current status

India is estimated to have 120–130 nuclear warheads,<sup>2</sup> and to have produced approximately 580 kilograms of weapon-grade plutonium.<sup>3</sup> There is also a stockpile of highly enriched uranium, but it is generally believed that this is intended primarily for use as fuel in nuclear submarines. Currently, the nuclear warheads may be delivered by either three or four squadrons of nuclear-capable fighter-bombers purchased from Europe several decades ago; four types of land-based ballistic missiles with ranges estimated to be from 350 km to 3200 kilometers; and one sea-based ballistic missile.<sup>4</sup> However, there are several more delivery vehicles under development.

## Development and “modernisation”

India has been increasing the diversity, range, and sophistication of its nuclear delivery vehicles. These can be used to target Pakistan and China, as the long term aim seems to be to demonstrate

inter-continental ballistic missile (ICBM) capability. This has involved multiple tests of different missiles, sometimes in rapid succession.<sup>5</sup> A ballistic missile defence system is also under development, and there have been a number of tests of interceptor missiles.<sup>6</sup> The system has been under development since 1995, when the government bought S-300 surface-to-air missiles to protect New Delhi and other cities.<sup>7</sup> The programme has missed many deadlines, including one for “initial systems deployment by 2013”,<sup>8</sup> and in 2017 the Ministry of Defence directed the state-owned Defence Research and Development Organisation to urgently submit a final induction strategy and timeline for the BMD system.<sup>9</sup>

The longest-range missile tested by India is the three-stage, 5,000-kilometer range Agni-V. India most recently test-fired the Agni-V in January 2018, reportedly to its full range.<sup>10</sup> Though there have been many reports that a longer-range missile called Agni-VI, armed with multiple warheads, would be tested by 2017,<sup>11</sup> so far that has not happened.

Perhaps the most important operational characteristic of the Agni-V is that it can be fired from a canister.<sup>12</sup> Keeping missiles inside a tube (or canister) makes for easier transportation, and allows the missile to be launched from relatively unprepared locations.<sup>13</sup> Because the Agni missile uses solid fuel, only limited preparation needs to be carried out before launching it. Both these factors allow for rapid launch of the missile.

These preparations suggest the possibility that a third condition for a rapid launch—nuclear warheads mated on top of the missile—may also be met or be under consideration. Because the “de-mating of warheads and delivery systems” has been considered a step for India to “support its NFU [No First Use] commitment”<sup>14</sup>, the deployment of a canisterised missile could presage a transition to a posture that is no longer committed to a No First Use policy.

Other missiles under development that could complicate the command and control of nuclear weapons are submarine launched missiles. Of these, the longest range one is the K-4, a 3500-kilometer range submarine-launched ballistic missile. The K-4 has undergone a series of tests but the last one in December 2017 was a failure.<sup>15</sup> The K-4 is to be fired from India’s first nuclear submarine, Arihant. India has also other naval nuclear capable missiles, including the 350-kilometer range surface-launched Dhanush, which was tested in February 2018.<sup>16</sup>

India is also expanding its fleet of nuclear submarines. In addition to the Arihant nuclear submarine that has been commissioned, a second one is reportedly close to launch for tests.<sup>17</sup> Two larger nuclear submarines are under construction and there are plans for even larger sized ones that can launch more missiles.<sup>18</sup>

## Budget

The expansion of India’s nuclear and missile arsenals is part of a larger military build-up

and consistently-increasing military spending. However, there is no reliable public estimate on nuclear weapon spending in India. In February 2018, India overtook the United Kingdom to become the country with the fifth largest expenditure on defence.<sup>19</sup>

## Perspective

The elite in India has largely supported the country’s nuclear development and modernisation activities. Much of the discussion about India’s nuclear arsenal in mainstream media and in official statements involves exultation about joining an exclusive group of countries with massive destructive capabilities. A growing influence in the rapid expansion of India’s military capabilities is competition with China on multiple spheres, including an expanding military role in the Indian Ocean, whose latest manifestation is India’s plan to construct a military base in the Seychelles.<sup>20</sup> The long-standing military confrontation with Pakistan, and the complex relationships that the United States has with India, China, and Pakistan also complicate this picture.

Although Indian officials talk about the importance of disarmament, it has been largely hypocritical and primarily focused on measures that would have no impact on India’s own programs. India did not sign the Treaty on the Prohibition of Nuclear Weapons adopted at the United Nations in July 2017. The official explanation said that while India was committed to “the goal of a nuclear weapon free world” it “believes that this goal can be achieved through a step-by-step process

underwritten by a universal commitment and an agreed global and non-discriminatory multilateral framework".<sup>21</sup>

*The original chapter and this update is written by MV Ramana, Simons Chair in Disarmament, Global and Human Security at the Liu Institute for Global Issues at the University of British Columbia.*

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# Israel

Israel's general practice of opacity means there is no publicly accessible national doctrine on nuclear weapons. Far more is known about its approach to modernisation in the most general of terms, and in the military context, than about its approach to nuclear weapons policy or strategy. Whatever factual information is publicly available relies on sources outside of Israel.

## Current status

Estimates about the size of Israel's nuclear arsenal are based on the power capacity of the nuclear reactor near Dimona. Experts and analysts outside of Israel estimate that Israel's current nuclear force ranges from 60–80 weapons at the low end to over 400 at the high end. The most recently cited figure is 80 warheads.<sup>1</sup> It is estimated that Israel could have produced approximately 840kg of weapons-grade plutonium.<sup>2</sup> Estimates of highly enriched uranium (HEU) production are even more difficult to make, though public information suggests Israel has a uranium enrichment programme.<sup>3</sup> A recent estimate has assumed Israel possesses approximately 300kg of HEU.<sup>4</sup>

It is assumed that Israel has a triad of delivery systems: land, air, and sea. The country is believed to have deployed a cumulative total of 100 Jericho-I (500 km range) and Jericho-II (1,500 km range) ballistic missiles, both of which are nuclear capable as well as mobile by land or rail. The range of the Jericho-II and its 1,000 kg payload "make it well suited for nuclear delivery."<sup>5</sup> Israel has been developing a new ballistic missile,

the Jericho-III, which is believed to have a maximum range of 4,000–6,500km.<sup>6</sup> Foreign sources reported a test of the missile in 2013.<sup>7</sup> More recent information is difficult to find though some media reports have suggested the Jericho-III is operational.<sup>8</sup> The Israeli navy possesses five submarines, three Dolphins and two Dolphin AIP, built by ThyssenKrupp AG Germany. A new Dolphin AIP is scheduled to join the fleet in 2019, but now the deal (and a deal for three new submarines in addition) is pending investigation of corruption in Israel (file 3000).<sup>9</sup>

It is estimated that the Dolphin Submarines are equipped with Popeye Turbo sub-marine launched cruise missiles (SLCM) that can be armed with nuclear warheads and can reach the range of 1,500 km. The submarines are described in the Israeli media as Israel's second strike.<sup>10</sup>

## Development and "modernisation"

In light of current and planned nuclear capabilities, it seems that Israel is continuing to "enhance" its triad of delivery systems. Nuclear weapons modernisation is related to modernisation activities in the security sector generally, including in areas of information, advanced, and outer space technologies.

## Budget

There is no reliable public estimate on nuclear weapon spending in Israel. Global Zero and civil society organisations estimate it could be in the range of US \$1.9 billion.<sup>11</sup>

## Perspective

The policy of opacity entails a nuclear weapons capability, which “everyone knows” about (domestically and internationally) but there is an umbrella of secrecy concerning the physical and doctrinal elements of this capability. The secrecy surrounding Israel’s nuclear programme has taken on a life of its own at the domestic level with Israelis practicing self-censorship on a wide range of nuclear issues. At the same time, a discourse does exist at the academic level and increasingly in the media, driven in large part by debate over Iran’s nuclear programme, and the existence of a small anti-nuclear campaign in Israel.<sup>13</sup> This discourse relies primarily on foreign sources. Historically, public opinion polls have indicated support for the nuclear option though a new survey has indicated that 65 percent of Israelis would prefer a nuclear weapon free Middle East to the current situation.

*The original chapter upon was written by Merav Datan, an international lawyer, former adjunct professor at Rutgers Law School, and former director of WILPF’s New York office. Updates by Sharon Dolev.*

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# Pakistan

Pakistan may have about 140 nuclear warheads and is expanding its stockpile of warheads, delivery systems, and fissile materials. A key driver for this expansion is Pakistan's adoption of a nuclear posture of "full-spectrum deterrence." Another driver is demands from each of its three different military services for nuclear weapons: Pakistan is intent on deploying land, air, and sea-based nuclear weapon delivery capabilities. There also is institutional pressure from the fissile material and delivery system production complexes, which have been making major investments in recent years. The government has sought to create a positive public image of the nuclear weapons programme by linking it to national pride and identity, and as a way to avert a possible fifth war with India.

## Current status

As of early 2018, based on the rate of growth in past years, Pakistan may have about 140 nuclear warheads and this stockpile could increase to 220–250 warheads by 2025.<sup>1</sup> About one quarter of these weapons are assigned as bombs to aircraft and the others are assigned as missiles of various kinds. This arsenal includes early weapons based on highly enriched uranium (HEU) and a growing fraction of lighter and more compact plutonium-based weapons. Its estimated stockpile of HEU and plutonium is significantly larger, and already could be sufficient for perhaps 200–300 weapons.<sup>2</sup>

Pakistan has fielded short-range (60–1000km) and

ballistic missiles, as well as ground-launched and air-launched cruise missiles (with ranges from 350–700km) that are capable of delivering a nuclear warhead. It also uses F-16 and Mirage aircraft as nuclear bombers. Pakistan may seek to make its Chinese-supplied JF-17 fighter jets nuclear-capable.

Each military service has a Strategic Forces Command responsible for nuclear missions. The Army Strategic Force Command manages the land-based nuclear-armed ballistic and cruise missiles. The Air Force Strategic Command is responsible for the nuclear armed aircraft, which have both nuclear bombs and nuclear-armed cruise missiles. The Naval Strategic Force Command manages the developing sea-leg of Pakistan's emerging triad of nuclear forces.

## Development and "modernisation"

Pakistan has been adding to its ability to produce plutonium for nuclear weapons, which will enable it to support a potentially larger arsenal in coming years if it also invests in additional delivery systems. This expansion will be made possible by the three-fold growth in plutonium production capacity since 2010. Pakistan now has four plutonium production reactors, the newest of which began operating in 2015. New missile systems are also expected to move from development to deployment. Its road-mobile ballistic missiles have been in development and expansion over the past decade. Pakistan's longest-range ballistic missile, the Shaheen-3, with a range claimed to be 2750km, was tested

twice in 2015. In January 2017, Pakistan tested the Ababeel missile, which it said is capable of carrying multiple independently targeted reentry vehicles (MIRVs), and a range of 2200km.<sup>3</sup> Pakistan also carried out the first test from an “underwater mobile platform” of a “nuclear-capable submarine-launched cruise missile”, Babur-III, with a reported range reported of 450km.<sup>4</sup>

The overall development of Pakistan’s nuclear forces is being managed by the country’s Strategic Plans Division under a policy of seeking “full-spectrum deterrence.” According to Khalid Kidwai, the former head of Strategic Plans Division, this policy envisages Pakistan having “nuclear weapons in all three categories—strategic, operational and tactical, with full range coverage of the large Indian land mass and its outlying territories” and that the goal was to have the “liberty of choosing from a full spectrum of targets, notwithstanding Ballistic Missile Defence, to include counter-value, counter-force, and battlefield” targets.<sup>5</sup>

## Budget

There is almost no information about the funding of Pakistan’s nuclear weapons programme. It is clear that a significant fraction of Pakistan’s financial resources go to its nuclear weapons, but that this cost is not a large share of its overall military spending. Assuming that, like overall military spending, nuclear weapons spending has kept pace with increases in gross domestic

product, Pakistan may spend as much as US \$1-4 billion a year on nuclear weapons.<sup>6</sup> At the same time, Pakistan continues to rely on extensive bilateral and international economic aid, currently from about 15 countries and international agencies, amounting to about US \$10 billion per year, to meet basic human needs and improve living standards.<sup>7</sup>

## Perspective

Pakistan is expanding its nuclear arsenal in size and capabilities. To prevent international and public pressure to limit its ambitious nuclear weapons development goals, Pakistan has blocked negotiations of a fissile material cut-off treaty at the Conference on Disarmament which would ban the production of plutonium and HEU for nuclear weapons purposes. Along with open-ended and expansive nuclear posture of full spectrum deterrence, demands for nuclear weapons are driven by the armed forces and the nuclear weapons production complex. A broader long-term geopolitical concern driving Pakistan’s nuclear programme is the US policy of cultivating a stronger strategic relationship with India to counter the rise of China. This may tie the future of Pakistan and India’s nuclear weapons to the emerging contest between the United States and China.

*The original chapter and this update is written by Zia Mian, director of the Project on Peace and Security in South Asia and co-director of the Program on Science and Global Security at Princeton University.*



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Photo: A 21 kiloton underwater nuclear weapon effects test, known as Operation CROSSROADS (Event Baker), conducted at Bikini Atoll in 1946.

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# Russia

Russia is undertaking a thorough modernisation of its armed forces that is supposed to replace its Soviet-built arsenals with modern weapons.<sup>1</sup>

Russia's modernisation plans indicate that it is determined to maintain parity with the United States in terms of number of warheads and delivery systems. Its nuclear weapon modernisation programme and military exercises seem to be both motivated by and further drive military spending, nuclear modernisation, and military exercises by Western Europe and the United States.

## Current status

According to the Federation of American Scientists' (FAS) Nuclear Notebook, in 2017 Russia was estimated to have a military stockpile of roughly 4,300 nuclear warheads assigned for use by long-range strategic launchers and shorter-range tactical nuclear forces. Of these, roughly 1,950 strategic warheads are deployed on ballistic missiles and at heavy bomber bases, while another 500 strategic warheads are in storage along with some 1,850 nonstrategic warheads. In addition to the military stockpile for operational forces, a large number of retired but still largely intact warheads await dismantlement, for a total inventory of around 7,000 warheads. Russia deploys about 316 ICBMs; a fleet of nine operational SSBNs that carry 144 SLBMs; and 60–70 nuclear-capable heavy bombers.<sup>2</sup>

The Federation of American Scientists (FAS) notes that these numbers are different than those reported under the New START Treaty “because

that treaty has special counting rules and only includes certain categories.” In February 2018 Russia announced that it fulfilled its New START obligations reducing the number of operational warheads accounted by the treaty to 1444 and the number of deployed launchers to 527.<sup>3</sup>

## Development and “modernisation”

However, Russia is also continuing its nuclear modernisation programme apace. In terms of its intercontinental ballistic missiles (ICBMs), the current focus is the SS-27 Mod 2 (RS-24 or Yars), which carries up to four multiple independently targetable reentry vehicles (MIRVs). The missile, which is deployed in silos and on road-mobile launchers, is expected to become the main ICBM in Russia's strategic force after 2020.

Russia is also developing a “heavy” silo-based ICBM known as Sarmat, which is intended to replace the SS-18 (R-36M2) silo-based missile as the latter is reaching the end of its operational life. The Sarmat missile is at the early stages of development, having had its first ejection test in December 2017. The current plan calls for Sarmat deployment to begin after 2020, although this date is likely to be pushed back. The missile would probably carry up to 10 warheads.<sup>4</sup>

In the naval leg of the strategic triad Russia will in the short term maintain the fleet of six Delta IV (Project 667BDRM) SSBNs—which are currently the mainstay of Russia's nuclear submarine force. Submarines of this class are undergoing overhaul

and are upgraded to carry a modified R-29RM SLBM. These missiles may carry up to ten warheads (although they are currently deployed with four). Eventually the Delta IV submarines as well as older Delta III (Project 667BDR) SSBNs will be replaced by a new class of Borei (Project 955) SSBNs currently under construction. These modern submarines, which carry Bulava missiles, will maintain the role of the submarine fleet as a key component of the Russian nuclear forces. Three Borei submarines are already in service with five more at different stages of construction. Russia is considering a new series of submarines after construction the eight Borei ships is completed. Russia's navy is also the predominant deployer of nonstrategic nuclear weapons. Its modernisation programme includes work on nuclear attack submarines and nuclear-capable cruise missiles.<sup>5</sup>

Russia's bomber and cruise missile fleet is also being modernised. A new long-range nuclear cruise missile, the KH-102, is being fielded; and the Tu-160 and Tu-95MS bombers are being modernised and are also changing operational status. Russia has plans to begin production of the Tu-160M2 strategic bombers, which would be an upgrade of the Tu-160; a next-generation bomber, the PAK-DA, is also in development.<sup>6</sup>

In 2018 Russia revealed publicly a number of programmes that were described as development of strategic systems designed to counter the deployment of US missile defense. One of these programmes is the Sarmat heavy ICBM. The missile was described as having the capability

to carry a large number of nuclear warheads and penetration aids. Sarmat would also carry the Avangard hypersonic boost-glide vehicle that is designed to penetrate missile defenses by flying within the atmosphere.

The announcement also unveiled a number of non-traditional systems. One is a nuclear-powered cruise missile that is supposed to have an almost unlimited range and can evade missile defense by flying at low altitudes. Others were underwater autonomous vehicles, also nuclear-powered and nuclear-armed, that could deliver retaliatory strike at very long range. Even though these systems seem to be still in development, they could probably enter service in the next decade or so.

## Budget

Modernisation of Russia's nuclear arsenal is part of a broader rearmament programme that is estimated to spend about US\$700 billion on various military systems in 2011–2020. About 10 percent of these funds are being spent on strategic force modernisation.<sup>7</sup> Financial constraints have affected the scale of these plans to some extent, though the rearmament effort appears to have strong support of the political leadership and public, so significant cuts to the modernisation programme are unlikely. This situation may change if the political environment in Russia would allow an open discussion of government spending priorities and the role of nuclear weapons in the national security policy, but so far this discussion has been very limited. In 2017 Russia approved a new long-term

rearmament programme for the period of 2018-2027. This programme, initially estimated to cost as much as 56 trillion rubles, was eventually scaled down to 19 billion rubles.<sup>8</sup>

## Perspective

Russia's position on nuclear weapons is directly linked to a number of security concerns, such as US ballistic missile defence, US advantage in terms of conventional weapon systems, NATO expansion, and in the long run, China's position in the region.<sup>9</sup> Public opinion in Russia tends to support the nuclear status of the country—according to a poll conducted in 2006, 76 percent of all the respondents believed that Russia “needs nuclear weapons.”<sup>10</sup> At the same time, a 2016 poll showed that about 78 percent of respondents believe that Russia should not use nuclear weapons first in a conflict with NATO and 80 percent believe that a nuclear war will lead to a

global catastrophe.<sup>11</sup> More than half of the population considers nuclear weapons to be the main guarantee of the security of the country and about 30 percent of respondents believe that nuclear weapons play an important, although not a decisive, role. To a large extent, the lack of critical assessment of the role of nuclear weapons is a result of the lack of an open and informed discussion of national security priorities and policies that would involve independent voices. While there are non-governmental research organisations that are involved in the discussion of defence policies, there are no independent public organisations that would have nuclear weapons related issues on the agenda.

*The original chapter and this update is written by Pavel Podvig, director and principal investigator for the Russian strategic nuclear forces project (russianforces.org).*

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# United Kingdom

While the UK has been in the nuclear arms business from the start, resistance has been ongoing and articulate from the outset, both politically by the Campaign for Nuclear Disarmament (CND) and also through direct action, notably in Scotland and at Greenham. 2018 marks the 60th anniversary of CND and its iconic peace symbol utilising the letters of the semaphore alphabet for letters “n” and “d” to stand for peace. In Scotland, opposition to the nuclear weapons based there is a significant factor in its ongoing constitutional crisis. In the rest of the UK, the debate is at its fiercest within the divided UK Labour Party, where hope rests on change of policy. Labour was in government when the UK first acquired nuclear weapons and more recently, the Labour decision to renew Trident confirmed the UK’s intention to retain nuclear weapons indefinitely, contrary to legal obligations, as noted in the 2017 edition of this publication.

## Current status

The UK has 120 operationally available nuclear warheads. This is part of a larger stockpile of between 180 and 225 warheads. The Ministry of Defence has indicated that it will reduce the overall stockpile to 180 warheads by the mid-2020s. There are four Vanguard class submarines, three of which are normally armed. Each armed submarine carries eight Trident D5 missiles and a total of 40 nuclear warheads.<sup>1</sup> Observations of warhead convoy movements undertaken by the citizen activist group UK Nukewatch suggest that warheads are gradually being removed from service at a rate of around three warheads per

year to meet this stockpile reduction target.<sup>2</sup>

## Development and “modernisation”

The decision of the UK Parliament in July 2016 to renew Trident means that the Vanguard-class submarines, which are currently slated to leave service by the early 2030s (significantly beyond the design life)<sup>3</sup>, will be replaced. Renewal was opposed by the Scottish National Party, the Liberal Democrats, and some Labour members of parliament.<sup>4</sup> The successor submarine, now known as “Dreadnought,” entered the design phase in 2011 and the first submarine is currently under construction and expected to enter into service in the early 2030s and remain active until the 2060s.<sup>5</sup> The new vessels will each have 12 missile tubes, leaving open the possibility of increasing the number of missiles carried.<sup>6</sup> The submarines will be powered by a new third generation pressurised water reactor (PWR3), which is being developed with US support.

The current Trident warhead contains a mixture of UK and US elements. For example, the high explosive in the warhead contains EDC37, a British explosive, rather than the American equivalent, PBX9501 yet three key components are supplied from the US.<sup>7</sup> This warhead is being upgraded to a new Mk4A specification, which will be in service until the 2040s. The modernised warhead will have a new arming, fusing, and firing system, which will enhance its capability and make it more effective against hardened targets. Further evidence from Nukewatch UK, based on warhead convoy monitoring, suggests that



production of the Mk4A warhead has commenced and that upgraded warheads have been delivered to the Royal Navy for entry into service.<sup>8</sup>

In 2019 the UK is due to make a decision on the production of a new warhead, which would replace the Mk4A. The Atomic Weapons Establishment is conducting research into new components for a future warhead. The Ministry of Defence has indicated that a replacement warhead “is not required until at least the late 2030s, possibly later.”<sup>9</sup>

A US-led life extension programme is extending the life of the D5 Trident weapon system. This involves updating all the Trident sub-systems: launcher, navigation, fire control, guidance, missile, and re-entry. The US will supply the UK, which is participating in the programme, with upgraded Trident D5LE missiles and with modernised fire control and navigation systems.<sup>10</sup> This will only sustain the missile until the early 2040's, thus the UK government has acknowledged that, “investment in a replacement ballistic missile would eventually be needed.”<sup>11</sup>

## Budget

Replacing the Trident submarines is expected to cost £31 billion.<sup>12</sup> Another £10 billion has been put aside to cover any extra costs or spending over the estimate.<sup>13</sup> In addition, extending the life of the current Trident missiles into the early 2040s will cost around £350 million.<sup>14</sup>

Keeping the current Trident submarines in operation until the early 2030s, a period significantly longer than planned when they were first built, is also expected to cost between £1.2 and £1.4 billion.<sup>15</sup> The annual operating costs of

Trident are expected to be about £2 billion, about six percent of the defence budget.<sup>16</sup>

Almost the UK's entire infrastructure for deploying, developing, and building nuclear weapons is being rebuilt or refurbished at the following costs:

- £1.3 billion—upgrade the base at Faslane.
- £300 million—new facilities at BAE Systems, Barrow-in-Furness (where submarines will be built).
- £1.5 billion—Core Production facility, Rolls-Royce, Derby (PWR3 reactor components will be produced).
- Nuclear Warhead Capability Sustainment Programme upgrade at the Atomic Weapons Establishment, Aldermaston.<sup>17</sup>
- New joint Anglo-French hydrodynamic research facilities for warhead research work under construction in France under the auspices of Project Teutates.<sup>18</sup>

In addition, a further £20 billion will be spent on operating and rebuilding the Atomic Weapons Establishment over the period 2000-2025,<sup>19</sup> and to date over £100 million has been spent to explore options for a potential future warhead, and to inform the decision on whether to refurbish or replace the existing warhead.<sup>20</sup>

The programme is already crippling the Ministry of Defence's (MoD) budget and the UK government is considering shifting the cost to the Treasury.<sup>21</sup> There are indications that the project is being badly managed,<sup>22</sup> due in part to dependence on “single source” providers. In November 2017, the MoD was accused of deliberately suppressing safety concerns about Trident after censoring the Defence Nuclear Safety Regulator's report.<sup>23</sup>



Graphic by Carlos Vigil

## Perspective

The UK's extensive modernisation programmes are an indication of the country's intention to retain nuclear weapons indefinitely, contrary to legal obligations that already exist, even before the Treaty on the Prohibition of Nuclear Weapons (TPNW) enters into force. Mohammed Bedjaoui, who presided over the International Court of Justice (ICJ) when it gave its 1996 opinion,<sup>24</sup> on the illegality of nuclear weapons, said that a nuclear attack by a system like the UK's Trident force would be illegal in all circumstances.<sup>25</sup> The UK's collaborations with the US and French programmes are, at the very least, contrary to the spirit of the nuclear Non-Proliferation Treaty (NPT). The UK did not participate in negotiations on the TPNW and the current government has categorically stated that it will not sign the Treaty.<sup>26</sup>

The UK Labour party and the Conservative party both support replacing the current Trident submarines with a similar system and the Liberal Democrats have a similar approach. The Scottish National Party is opposed to Trident and to its replacement.

Concern about the safety and sustainability of the UK's nuclear arsenal is heightened and in addition to questions being raised about the major gaps in transparency, there has been increased public debate over the cost of renewing Trident as social service spending is being cut.

Following the 2014 revelation that radioactivity had been discovered in the cooling water of a test reactor at Dounreay in Scotland,<sup>27</sup> concerns that a similar leak might develop in the reactors of in-service submarines led to a £120 million unscheduled second refit for HMS Vanguard, the oldest of the Trident submarines and a question remains as to whether second refits will be required for the other three. In 2016, William McNeilly, the "Trident whistle-blower", reported alarming safety shortfalls within the submarines themselves.<sup>28</sup> A missile malfunctioned during a test off the coast of Florida in June 2016 and this information appeared to have been concealed ahead of the vote in UK parliament on whether or not to renew the UK's Trident missile system in July 2016.<sup>29</sup> During 2017 the Ministry of Defence refused to publish the annual report of the Defence Nuclear Safety Regulator, and redacted all information about nuclear safety from the annual report of the Defence Safety Agency, raising further concerns that there are serious safety challenges, as well as doubts about the UK's commitment to openness and transparency in its nuclear weapons programme.<sup>30</sup> A review of the costs of the defence equipment programme conducted by the National Audit Office concluded that the programme was not affordable, and highlighted concerns that nuclear-related project costs could destabilise the entire plan. The report revealed that the costs of the Dreadnought programme had risen by £575.5 million over the 2016-17 financial year.<sup>31</sup>

Opposition to nuclear weapons in Scotland, where the UK's nuclear weapons are based, continues to have a significant impact on UK politics even though Scotland did not vote for independence in 2014. The Scottish Labour Party is now opposed to Trident renewal<sup>32</sup> and its leader is committed to working for the UK to sign the TPNW. The Scottish Parliament has cross party support for the TPNW and opposition to Trident Renewal, and may be able to pass legislation that supports some aspects of the TPNW. The present Scottish Government maintains that an independent Scotland would demand the removal of all nuclear weapons and introduce a constitutional ban. Removing Trident from Scotland would be likely to leave the UK without any nuclear weapons, because of the severe difficulties of relocating Trident.

The unpopularity of Brexit in Scotland and the disregard of Scottish agency in the negotiations of its terms is increasing the constitutional crisis and sharpening the possibility of a second referendum on independence. The debate over Scottish independence and the UK's nuclear weapons remains highly relevant to the future of the Trident programme.

*The original chapter upon which these updates are based was written by John Ainslie, who was coordinator of the Scottish Campaign for Nuclear Disarmament until his untimely death in 2016. Some of the updates included in this chapter are from one of his last research publications, The Trident Shambles. Updates have been compiled by Janet Fenton, Scottish CND, with thanks to Ray Acheson and Peter Burt from NIS.*

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# United States

Nuclear weapons that are not retired will be maintained. If retained, sooner or later they must also be modernised or replaced, involving great expense and entailing decades of political commitment, for which massive institutional and ideological investments are necessary.

All the forces in government and US society necessary to produce these investments are now fully mobilised, as part of a surging militarism that assumes American global exceptionalism and dominance even as it fears weakness and decline. There is no significant opposition as yet.

The proposed breadth of nuclear modernisation, and the doctrines and practice of aggressive war it supports, are incompatible with stable coexistence and human development. The international community must come to grips with this fact before it is too late.

## Current status

As of 30 September 2017 the declared US nuclear weapons stockpile consisted of 3,822 warheads and bombs, of which an estimated 1,800 were “deployed” and 2,022 were “in reserve”.<sup>1</sup> For bombs and cruise missiles, the deployment of which is not counted in any treaty, these two categories are somewhat arbitrary, which can easily lead to a misunderstanding of the numbers of these weapons actually available immediately or within a short time.<sup>2</sup>

There are in addition to all these about 2,700

“retired but intact” warheads and bombs,<sup>3</sup> or roughly 6,500 US warheads and bombs in all.

The US currently deploys nuclear warheads on submarine-launched ballistic missiles (SLBMs), silo-based missiles, also known as the Ground-Based Strategic Deterrent, (GBSD), and on air-launched cruise missiles (ALCMs). The US also deploys five kinds of nuclear gravity bombs, which to deliver require overflying enemy territory. There are four distinct delivery modes, more than implied by the usual “triad” moniker. A future sea-launched cruise missile (SLCM) would make five basing and delivery modes.

The GBSD consists of 400 deployed Minuteman III missiles with one W78 or one W87 warhead each, with 50 empty silos kept in warm standby. At least one-half of these 400 (or 450) missiles could be upgraded to carry three W78 warheads.<sup>4</sup> Explosive yields are 335 kilotons (kt) for the W78 and 300 kt (or 475 kt) for the W87.

There are 280 Trident D5 ballistic missile tubes on 14 Ohio-class submarines, two of which are typically in refueling overhaul. The 20 D5 missiles on each boat can each carry up to 8 W76 or W88 warheads (100 and 455 kt, respectively). Each boat now carries an estimated 90 warheads for a total of 1,080 warheads on 12 active boats. There are roughly 384 higher-yield W88s available.

There are 528 nuclear ALCMs available for 42 nuclear-capable B-52s, each of which can carry up to 20 ALCMs.<sup>6</sup> These missiles carry the



adjustable-yield W80-1 warhead (5-150 kt). In 2007 there were 1,806 W80-1 warheads and 289 W80-0s extant. It is likely that most of the former at least, if not both variants, are still available for further modification into W80-4 warheads for the Long Range Stand Off (LRSO) ALCM and potentially the new SLCM as well. There is apparently no dearth of W80-type warheads for future cruise missiles.

Strategic gravity bombs (the B61-7, the B61-11 earth penetrator, and the B83-1) are assigned to the stealthy B-2A bomber, with available yields of 340 kt for the B61-7/11 and from the low kiloton range up to 1,200 kt for the B83-1. Unless some have been dismantled in the last decade there could be more than 450 strategic B61-7/11s, many, or possibly all, of which have through a life-extension program and as many as 600 B83s, at least half of which have been through a life-extension upgrade to become B83-1s.<sup>8</sup>

There are at least 300 so-called “tactical” or “sub-strategic” B61-3 and B61-4 gravity bombs,<sup>9</sup> with yields from 0.3 to 170 kt if all the original yields are still available. An estimated 150 are based at six European bases: in Germany (Buechel); Italy (Aviano and Ghedi); the Netherlands (Volkel); Belgium (Kleine Brogel); and Turkey (Incirlik). These bombs are available for delivery by F-15E, F-16, Tornado, and eventually F-35A aircraft. The air forces of the above countries, with the possible exception of Turkey, have agreed to carry out nuclear strike missions with US bombs.<sup>10</sup>

## Development and “modernisation”

The present comprehensive nuclear modernisation began under President Obama in late 2010, when a broad political consensus came together for upgrading or replacing every kind of nuclear warhead, bomb, and delivery system in the US arsenal along with the specialized production facilities needed for warheads, as a condition for ratification of the New START treaty with Russia. This program is described in detail in previous editions of this book.<sup>11</sup>

Virtually all opposition to the treaty deal that cemented the modernisation program came from the political right, a political configuration that has endured. There is no significant opposition to the complete modernisation of US nuclear weapons in Congress or US civil society today.<sup>12</sup> Since by 2030 some US delivery systems will begin to “age out,” the only alternative to modernisation in some form is retiring the weapon systems in question. So far this has proven too high a political hurdle.

As modernisation commitments matured, Department of Energy (DOE) budgets for warhead design and production rose to unprecedented heights,<sup>13</sup> embedding the new consensus in long-lasting programs. Department of Defense (DoD) procurements for new bombers, missiles, and submarines began.<sup>14</sup>

By the time Obama left office, he had retired fewer warheads than any other post-Cold War president.<sup>15</sup> Relations with Russia, the US's only peer nuclear competitor, had deteriorated to depths not seen since the Cold War. They have since continued to deteriorate. Warhead dismantlement under Obama continued at the slow pace set by G.W. Bush, much slower than that of Bill Clinton.<sup>16</sup> Future dismantlement was made partly contingent on the operation of as-yet unbuilt new factories. For reasons discussed below, dismantlement should be elevated as a measure of disarmament, rather than remain an afterthought, as at present.<sup>17</sup>

All-inclusive modernisation continues under Trump. In addition to the Obama program, the February 2018 Nuclear Posture Review (NPR) proposes to modify a small number of existing Trident SLBM warheads to become low-yield ("primary" explosive only) versions in the 2019-2021 timeframe by replacing their fusion component with inert materials, as is already done for test flights. These missiles and warheads will presumably be counted as "strategic" under New START, if that treaty continues, or under any successive treaty.

In the longer run and at much greater cost, this administration seeks a new "treaty-compliant" SLCMs, which it may argue is not a strategic weapon under current or future treaties. The variable-yield 1.2 megaton B83-1 bomb, previously slated for retirement in the early 2020s, is to be retained "until a suitable replacement is

identified."<sup>18</sup> Construction of specialised warhead factories is being heavily prioritised.<sup>19</sup>

These programmes, like all others, must be authorised by Congress, and they must be funded annually in order to be realised. There is some congressional resistance to the two new weapons (but not to the Obama consensus supporting comprehensive modernisation of the existing arsenal)<sup>20</sup> which may or may not be successful in the present climate of hysteria about Russia.

Modernisation is giving US ballistic missile warheads much greater accuracy and dramatically more hard-target kill capability, making them much more threatening—especially when fired at relatively short ranges from submarines with depressed trajectories that have relatively low visibility from ground-based radars.<sup>21</sup> All US ballistic missiles will soon have burst-height compensating fuzes, greatly increasing the number of possible hard targets that can be addressed by the same number of missiles, liberating others for additional targets or subsequent salvos.

In the case of gravity bombs, the highly-accurate B61-12, now in engineering development, is designed to be delivered by Dual-Capable Aircraft (DCA) including the stealthy F-35A, allowing much lower yields with less collateral damage and therefore an expanded potential target set relative to existing bombs.<sup>22</sup> Aircraft flying from forward bases have short flight times to targets, further increasing the threat.

The stealthy B-21 “Spirit” heavy bomber, of which the Air Force expects to buy at least 80, is expected to bring new penetrating capability for bomber missions, augmenting and eventually replacing the B-2, of which “only” 18 are available for nuclear missions, as well as the non-penetrating B-52.

The proposed LRSO, now in early design, is to be a stealthy ALCM with a variable-yield warhead, able to approach and fly within target countries at low altitude along non-predictable paths, from many possible launch points.

These and other weapon-specific modernisations are being leveraged by forward basing and by improvements in target acquisition and in command and control—as well as by the steady accretion of forward-based missile defense capabilities on land and at sea. These capabilities are in turn leveraged by non-nuclear strike forces on land and sea, in the air and in space, in cyberspace, as well as in finance and in the rapidly-evolving informational and propaganda domains.

As noted above, the only alternatives to modernisation are a) the timely retirement of individual launch platforms (e.g. the oldest submarines first), b) entire weapons and weapon systems (e.g. Minuteman III, existing ALCMs), or c) units within a class of weapon (e.g. modernising only some of a particular warhead or bomb). In principle there is also d) limiting the degree of modernisation. In practice however, significant

new capabilities usually can be added at little or no marginal cost once the decision to modernise has been made.

The goals of US nuclear modernisation are more than just maintaining an adequate nuclear deterrent to protect the US from any conceivable nuclear adversary, which arguably would require at most a small number of ballistic missile submarines.<sup>23</sup>

The US has formal or tacit “extended” nuclear deterrence agreements with 30 non-nuclear-weapon-state allies.<sup>24</sup> To appear “credible,” extended deterrence must involve theatre-based nuclear war plans, and not “mutual assured destruction” (MAD) involving the US itself. For these regional nuclear war plans to be credible, a nuclear or other devastating strategic attack on the US “homeland” must be reliably deterred even in the circumstance of enemy defeat.

The Trump Administration NPR continues longstanding US nuclear weapons policies (notably, not forswearing first strike), but wraps them in newly bellicose rhetoric in the context of a “hard power” approach to national security that subordinates diplomacy to military dominance. Disarmament aspirations are contemptuously dismissed. Further progress in arms control is “difficult to envision.” The NPR candidly points out that “detering nuclear attack is not the sole purpose of nuclear weapons.”

Instead those purposes include “achievement of U.S. objectives if deterrence fails” – which is to say, victory using nuclear arms. Use of nuclear weapons would be, the NPR claims, compliant with humanitarian law.<sup>25</sup>

The new NPR would create additional low-yield nuclear weapons based at sea (to avoid reliance on foreign bases) to counter a perceived threat to US forces and allies from Russian tactical nuclear weapons.<sup>26</sup> There is also concern that China is “challenging traditional US military superiority in the Western Pacific.” Existing Ohio-class submarines would be the launch platform for the low-yield Trident weapon. Virginia-class submarines and/or surface ships would carry the nuclear SLCM.

The political-military-propaganda context vis-a-vis Russia and to a lesser extent China have changed drastically since Obama’s 2010 NPR. Both of these states now challenge assumptions of US dominance in their near-abroad—or as the NPR imperiously puts it, “they seek to substantially revise the post-Cold War international order and norms of behaviour.”<sup>27</sup> The authors of the NPR look to nuclear weapons provide an aegis of protective threat over US and allied forces, to aid in retaining and expanding US influence over the world’s sources of wealth and power.<sup>28</sup>

By merely existing and continuing to develop as sovereign states, Russia and China are inherently rivals to US power under this formulation, setting the stage for the present confrontation.

It would be a mistake to imagine that with a different person in the White House, the specifically nuclear dangers described above would abate for long. As veteran nuclear writer Fred Kaplan describes:

“The shuddering thing about this document is that it reflects the views of officers and civilians, deep inside the Pentagon, who have been thinking about nuclear policy for decades. In other words, its premises and logic precede Trump; they have been woven into America’s nuclear-war machine for a very long time.”<sup>29</sup>

The intersection of rising great power competition, looming resource shortages, and the long-standing nuclear “premises and logic” of which Kaplan speaks are among the factors bringing humanity to the brink of unimaginable catastrophe.

## Budget

The US modernisation program is vast. It is expected to cost, along with maintaining and deploying nuclear weapons, at least US \$1.2 trillion over 30 years.<sup>30</sup> Current US nuclear weapons expenditures, about US \$30 billion per year before planned modernisation increases, already exceed the total military expenditures of all but ten countries.<sup>31</sup>

In 2014, the 30-year cost of US nuclear weapons and their modernisation was independently estimated at US \$1 trillion in 2014 dollars, not including cost overruns.<sup>32</sup> Three years later and prior to the new NPR, the 30-year cost of

deploying and modernising US nuclear forces was estimated by the Congressional Budget Office (CBO) to have risen to US \$1.2 trillion in 2017 dollars, an average of \$41.4 billion per year (US \$10,525 per US household) over 30 years. CBO's estimate includes modest estimated cost overruns but not the Department of Energy (DOE)'s ever-growing environmental liabilities, which currently exceed one-half trillion dollars.<sup>33</sup>

In February of 2018, the Trump Administration requested a 19 percent increase in DOE warhead spending for fiscal year (FY) 2019, a jump not seen since 1962. DoD nuclear spending increases will also rise dramatically next year.

US nuclear weapons expenses are a small but influential fraction of planned overall defence outlays, which in the absence of dramatic reform can be reasonably expected to reach US \$27 trillion over the same 30-year period. Looking just at next year, President Trump has requested US \$886 billion for defence accounts, which is US \$7,508 per US household or US \$2,717 per capita, and a 13 percent increase over current levels.<sup>34</sup>

We cannot properly understand, nor can we successfully address, the challenge of nuclear modernisation without squarely facing the tremendous imbalance in security posed by US military spending overall. The US now spends more per capita on its "defense" than the total income available to almost half the people in the world.<sup>35</sup> US defence expenditures—US\$1.7 million per minute—exceed the combined military

spending of the next eight biggest military spenders (most of which are US allies), as well as the combined military expenses of the entire rest of the world not counting these top nine.<sup>36</sup>

The huge cost of US nuclear modernisation is often justified to potential critics as being relatively small in comparison to overall US military spending, which is true as far as it goes. Nuclear weapons currently comprise 4 percent of defense spending, a fraction expected to rise to about 6 percent of total defense spending during the peak nuclear modernisation years in the mid-2020s.

## Perspective

To be relevant and effective, the nuclear disarmament community cannot avert its eyes from the uniquely enormous force projection capability of the US, as Mikhail Gorbachev has warned.<sup>37</sup> While the US and Russia possess 93 percent of the world's nuclear weapons<sup>38</sup> and both are modernising their forces, the security situations of the two countries are very different. The US has ten times the military budget of the Russian Federation, and has many other well-practiced ways to exert national power.<sup>39</sup> The US maintains a global garrison of nearly 800 US military bases in more than 70 countries; a great many of which are in Eurasia near Russia.<sup>40</sup>

Given a seeming lack of significant domestic constraint, it is frankly critical for the continued existence of humanity that US allies and



and trading partners fully embrace a restraining role at this time.

To reverse the present nuclear arms race, and to prevent nuclear war and further proliferation, we must acknowledge the total threat faced by countries, not just the threat from nuclear weapons. Given its huge military superiority and its global reach, its overwhelmingly superior power projection capability overall, and its leading or dominant role in most international institutions, the US must lead in reductions of both nuclear and conventional arms, and must be pressed by

the international community to do so, for its own sake as well as for the security and survival of the world.

*The original chapter and this update has been written by Greg Mello, executive director of the Los Alamos Study Group.*



Photo: International Campaign to Abolish Nuclear Weapons, 2010.



## Notes

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2. Kristensen and Norris (op. cit.) estimate that there are 300 "deployed" bomber weapons, but in addition to these an unknown (but significant) portion of the estimated 680 "reserve" bomber weapons could also be deployed in a matter of days. All "reserve" warheads and bombs are deployable on varying timescales on existing launchers, in theory nearly doubling deployments after accounting for spares
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6. Ibid.
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18. OSD, op. cit.
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25. OSD op. cit. pp. i, vii, xvii, 21, 23.
26. The NPR does not understand, or deliberately misrepresents, Russian policy. See for example Olga Oliker and Andrey Baklitskiy, "The Nuclear Posture Review and Russian 'De-Escalation': A Dangerous Solution to a Nonexistent Problem," War on the Rocks, 20 February 2018, <https://warontherocks.com/2018/02/nuclear-posture-review-russian-de-escalation-dangerous-solution-nonexistent-problem/>.
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31. Stockholm International Peace Research Institute (SIPRI), <https://www.sipri.org/databases/milex>. These ten countries are the USA, China, Russia, Saudi Arabia, India, France, UK, Japan, Germany, and South Korea. Planned US nuclear weapons expenditures exceed the combined military expenses of the 89 countries with the smallest overall military budgets.

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## Reaching Critical Will

Reaching Critical Will is the disarmament programme of the Women's International League for Peace and Freedom, the oldest women's peace organisation in the world. Reaching Critical Will works for disarmament and for an end to war and violence. It also investigates and exposes patriarchal and gendered aspects of weapons and war.

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