



# STILL ASSURING DESTRUCTION FOREVER

An update to the 2012 report **Assuring destruction forever:**  
**Nuclear weapon modernization around the world**



Reaching Critical Will

A PROGRAMME OF THE  
WOMEN'S INTERNATIONAL LEAGUE FOR  
**PEACE & FREEDOM**





# Index

Introduction .....	4
China .....	6
France.....	8
India .....	10
Israel .....	12
Pakistan .....	14
Russian Federation.....	16
United Kingdom .....	18
United States .....	20
About the authors .....	26

# Introduction

**Ray Acheson**

China, the Democratic People's Republic of Korea, France, India, Israel, Pakistan, Russia, the United Kingdom, and the United States—the nuclear weapon possessors—possess approximately 17,300 nuclear weapons.<sup>1</sup> They have spent approximately one hundred billion USD on their nuclear programmes and are preparing to spend an estimated one trillion USD on nuclear weapons over the next decade.<sup>2</sup> All of these states are engaged in programmes to modernize their nuclear weapons, delivery systems, and/or related infrastructure.

None are engaged in concrete disarmament processes. France and the UK have “capped” their arsenals and Russia and the US have minimally reduced their deployed weapons under the New Strategic Arms Reduction Treaty. However, their simultaneous plans for and investment in modernization undermines the idea that these governments are actively pursuing disarmament.

In short, the programmes and policies of the nuclear weapon possessors are designed to perpetuate their possession of these weapons into the indefinite future.

At the same time, the world is suffering from economic, environmental, and security

crises. Both so-called “developed” and “developing” countries are facing challenges to provide adequately for their populations—financially, socially, politically, or ecologically.

Given the inequalities of economic globalization and the policies of international institutions that serve to entrench these inequalities, many countries continue to struggle to meet their objectives related to poverty, education, health, and more. Projections indicate that by 2015 about one billion people will be living on an income of less than US\$1.25 per day, the World Bank's measure of extreme poverty.<sup>3</sup> 22,000 children die each day due to poverty.<sup>4</sup> Nearly 870 million people suffered from chronic malnutrition in 2010–2012.<sup>5</sup>

Armed conflicts are rife around the world and civilians are the overwhelming majority of those dead, wounded, destroyed, displaced, or made destitute. Several wars, interventions, and occupations are occurring simultaneously. Fossil fuels are running out and their continued use has undermined any attempts to meet political goals to mitigate climate change.

The so-called “international community” has no sustainable policies or commitments for dealing with these challenges. But a small number of states have decided that in the midst of crisis, they will retain nuclear weapons for “security”. They use these weapons as political tools to manipulate international relations. They say they are for “national security” when in reality their use would be catastrophic for everyone, everywhere, resulting in extreme poverty, hunger, and mortality rates around the world. The money spent on nuclear weapons not only detracts from the resources available to tackle the converging ecological, economic, and energy crises, but also reinforces the institutions that benefit from weapons and war.

In 2012, Reaching Critical Will published the first report on global nuclear weapon modernization, entitled *Assuring destruction forever*. Non-governmental researchers and analysts, leading and knowledgeable experts about nuclear weapons programmes and policies, provided information on the plans of China (Hui Zhang), France (Hans Kristensen), India (M.V. Ramana), Israel (Merav Datan), Pakistan (Zia Mian), Russia (Pavel Podvig), the United Kingdom (John Ainslie), and the United States (Andrew Lichterman).<sup>6</sup>

This briefing paper provides an update of the summaries of each of the countries covered by the 2012 report. A full account of each country’s nuclear weapon programmes can still be found in the 2012 report at [www.reachingcriticalwill.org](http://www.reachingcriticalwill.org).

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# China

Hui Zhang

## Current status

Estimates suggest China currently has approximately 170 nuclear warheads including approximately 110 operationally deployed nuclear missiles, approximately 60 warheads stored for its submarine launched ballistic missiles, and bombers. Each of those nuclear ballistic missiles carries a single warhead, which are normally separated from the missiles.<sup>1</sup> China has not declared publicly that it has ended the production of highly enriched uranium (HEU) and plutonium for nuclear weapons, though it is believed that China stopped production of HEU in 1987 and plutonium by 1990. China's military inventory would be about  $16 \pm 4$  tons of weapon-grade HEU and  $1.8 \pm 0.5$  tons of weapon-grade plutonium.<sup>2</sup>

## Modernization

China is concerned with maintaining what it sees as a "limited" and "effective" nuclear arsenal and its modernization programme has focused on increasing the "survivability" of its land-based strategic missiles. It is reportedly phasing out its older missiles and replacing them with new ones in order to increase their range and sophistication.<sup>3</sup> It is expected that after this is accomplished, China will speed up the modernization of its sea-based strategic force. China has been reported to be replacing its first generation ballistic nuclear missile-carrying submarines.<sup>4</sup> US missile "defence" plans will be a major

driving force for China's nuclear weapon modernization, as some Chinese officials are concerned that even a limited missile "defence" system could neutralize China's nuclear force.

## Economics

It is difficult to estimate the cost of China's nuclear weapon force, however, assuming that China consistently maintains 5% of its overall military expenditure for its nuclear weapons programme, China would have spent between US\$4.5 and \$9 billion on its nuclear programme in 2011.<sup>5</sup> A recent report by Global Zero estimates that China's nuclear cost to be \$7.6 billion in 2011.<sup>6</sup>

## International law

China has signed but not ratified the Comprehensive Test Ban Treaty (CTBT). Most estimates assume China will ratify the CTBT only after the United States does. China officially supports the commencement of negotiations of a fissile materials cut-off treaty (FMCT) at the Conference on Disarmament, but US plans to develop its missile "defence" capabilities will likely affect China's willingness to participate in FMCT negotiations. If China remains concerned about US missile "defence," it would need more fissile materials to fuel additional ICBMs.

In terms of disarmament, China is bound by article VI of the NPT to negotiate the elimination of its arsenal, though has consistently demanded the US and Russia reduce their arsenals first.

## Public discourse

China is one of the least transparent of the nuclear weapon states though in theory it might increase transparency if it develops more confidence about the survivability of its nuclear force. 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% of respondents wanted nuclear disarmament while 49% did not.<sup>7</sup>

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# France

Hans Kristensen

## Current status

France possesses approximately 300 nuclear warheads, approximately 290 of which are deployed or operationally available for deployment on short notice.<sup>1</sup> Its delivery vehicles consist of approximately 40 aircraft assigned to a total of 40 cruise missiles; and four nuclear-powered ballistic missile submarines (at least two of which are always fully operational) equipped with nuclear-armed long-range ballistic missiles.<sup>2</sup> France is no longer thought to be producing fissile materials for nuclear weapons. It is believed to have an estimated 6 tons of plutonium and 26 tons of HEU.<sup>3</sup>

## Modernization

France is the middle of a broad modernization of its nuclear forces involving submarines, aircraft, missiles, warheads, and production facilities that will continue for another decade. The modernization programme will ensure that it can maintain its capability until at least the 2030s.<sup>4</sup>

## Economics

The French government has indicated that it spends approximately US\$4.6 billion on its nuclear forces each year,<sup>5</sup> though a recent report from Global Zero estimates that the total cost for 2011 was approximately \$6 billion.<sup>6</sup> The government announced in November 2011 that the deficit would have

to be cut by 20% in 2012 with half of the savings coming from spending cuts,<sup>7</sup> but the nuclear weapons budget will reportedly only see a 1.3% decrease.<sup>8</sup>

## International law

Officials indicate that France will reject calls for nuclear reductions in the near term, which, especially when considered in context with its substantial nuclear modernization, is in conflict with France's obligations under the NPT to negotiate disarmament.

## Public discourse

There is scant debate in France over the composition or cost of its nuclear forces.



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# India

M.V. Ramana

## Current status

India is estimated to have 80–100 nuclear warheads.<sup>1</sup> It is also developing a range of delivery vehicles, including land- and sea-based missiles, bombers, and submarines. There are no official estimates of the size of India's stockpile of fissile materials, though it is known that India produces both HEU for its nuclear submarines and plutonium for weapons. India is estimated to have a stockpile of  $0.54 \pm 0.18$  tons of weapon-grade plutonium by the end of 2012.<sup>2</sup> There has been speculation that India has used reactor-grade plutonium in its nuclear weapons, in which case, the nuclear arsenal could potentially be much larger: as of the end of 2012, between 4.3 to 5.1 tons of reactor-grade plutonium is estimated to have been separated from its power reactors.<sup>3</sup> Its fast breeder reactor programme also provides another potential source of producing weapon-grade plutonium; however, construction of the first Prototype Fast Breeder Reactor has experienced a series of delays and it is now expected to be commissioned only in late 2014 or early 2015, about five years after the initial projection.<sup>4</sup>

## Modernization

The primary focus of modernization has been on increasing the diversity, range, and sophistication of nuclear delivery vehicles. In April 2012, India conducted its first test of Agni-V, with a range of over 5,000 km, and in January 2013, it conducted its first

publicly announced test of Submarine-Launched Ballistic Missile with a range of 700 km.<sup>5</sup> Based on official reports and tests, it appears that India is aiming to have all legs of its nuclear triad operational later in 2013. There are also plans to expand the nuclear weapons and missile production complex as well as the capacity to enrich uranium.

## Economics

The expansion of India's nuclear and missile arsenals are 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. Historically, the nuclear and defence research establishments have wielded considerable social, political, and economic power. They have been joined in recent decades by government laboratories, public sector and private companies, and universities, to form a burgeoning and powerful military-industrial complex.

## International law

Since the 1974 nuclear test, the Indian government's focus in arms control diplomacy has been to resist signing onto any international treaties that impose any obligations on its nuclear arsenal. This allows the government to maintain that it is a responsible member of the international

community because it has not breached any agreement. It also interprets this as meaning there are no legal constraints on any modernization activities that may affect the quantity or quality of its nuclear weapons. However, its activities may not be in complete concordance with international law; the 1996 advisory opinion of the International Court of Justice maintained that the obligation for disarmament is not restricted to signatories of the NPT.

enthusiasm for India to become a bonafide nuclear weapon power that can exercise its military might in the region. While the government continues to promote the 1988 Rajiv Gandhi plan for nuclear disarmament, this is somewhat hypocritical when viewed in the light of its ongoing modernization plans.

## Public discourse

Over the years, the idea that India has a right to possess nuclear weapons has become widely shared across much of the political spectrum. While nuclear weapons used to be seen as a “necessary evil,” there is no more

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# Israel

Merav Datan

## Current status

Estimates about the size of the arsenal are based on the power capacity of the nuclear reactor near Dimona. Experts estimate that Israel's current nuclear force ranges from 60–80 weapons at the low end<sup>1</sup> to over 400 at the high end.<sup>2</sup> The most frequently cited figure is 100–200 warheads.<sup>3</sup> It is assumed that Israel has a triad of delivery systems: land, air, and sea. It is estimated that by the end of 2003, Israel could have produced approximately 510–650 kg of weapons-grade plutonium. Estimates of HEU production are even more difficult to make though public information suggests Israel has a uranium enrichment programme.<sup>4</sup>

## Modernization

In November 2005, Israel reportedly signed a contract worth US\$1.17 billion with Germany for the construction of two more submarines, with the first one to be completed by 2012.<sup>5</sup> In light of current and planned nuclear capabilities, it seems that the country is continuing to “enhance” its triad of delivery systems.<sup>6</sup> Nuclear weapons modernization is related to modernization activities in the security sector generally, including in areas of information technology, advanced military technology, and outer space technology.

## Economics

There is no reliable public estimate on nuclear weapon spending in Israel.

## International law

Israel has signed but not ratified the CTBT. It is party to a number of non proliferation-related agreements, on the basis of which it projects itself domestically and internationally as a responsible non-proliferant. Israel has not signed or ratified the NPT and interprets this as meaning it is not bound by the article VI disarmament obligation.

## Public discourse

The policy of opacity entails a nuclear weapons capability about which “everyone knows” (domestically and internationally) and an umbrella of secrecy covering 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 driving in large part by debate over Iran's nuclear programme. 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% of Israelis would prefer a nuclear weapon free Middle East to the current situation.<sup>7</sup>



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# Pakistan

Zia Mian

## Current status

Pakistan is currently estimated to have 90–110 nuclear weapons.<sup>1</sup> It has a number of short-range, medium, and longer-range road-mobile ballistic surface-to-surface missiles in various stages of development. It has developed a second generation of ballistic missile systems over the past five years. It is estimated that Pakistan could have a stockpile of 2750 kg of weapon-grade HEU and may be producing about 150 kg of HEU per year. Estimates suggest Pakistan has produced a total of about 140 kg of plutonium.<sup>2</sup>

## Modernization

Pakistan has been rapidly developing and expanding its nuclear arsenal, increasing its capacity to produce plutonium, and testing and deploying a diverse array of nuclear-capable ballistic and cruise missiles. Pakistan is moving from an arsenal based wholly on HEU to greater reliance on lighter and more compact plutonium-based weapons, which is made possible by a rapid expansion in plutonium production capacity. Pakistan is also moving from aircraft-delivered nuclear bombs to nucleararmed ballistic and cruise missiles and from liquid-fueled to solid-fueled mediumrange missile. Pakistan also has a growing nuclear weapons research, development, and production infrastructure. A long-term concern now driving Pakistan's nuclear programme is the US policy of countering

the rise of China by cultivating a stronger strategic relationship with India. This may tie the future of Pakistan and India's nuclear weapons to the emerging contest between the United States and China.

## Economics

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. Estimates indicate that Pakistan spends about US\$2.5 billion a year on nuclear weapons. Despite extensive foreign military assistance, Pakistan's effort to sustain its conventional and nuclear military programmes has come at increasingly great cost to the effort to meet basic human needs and improve living standards. The 2011 budget increased military spending by over Rs. 50 billion but cut social and economic development by Rs. 100 billion.

## International law

Pakistan is not a signatory to the NPT nor has it signed the CTBT and it appears to recognize no legal obligation to restrain or end its nuclear weapons and missile programme.

The government has, however, said it supports negotiation of a nuclear weapons convention. Pakistan has blocked negotiations of an FMCT at the Conference on Disarmament arguing that it would only further entrench asymmetries between the nuclear weapon possessors. It has indicated it would support talks if were granted an exemption on nuclear trade from the Nuclear Suppliers Group as India has been.

## Public discourse

The government has sought to create a positive image of the nuclear weapons programme, often by linking it to national pride and identity. Pakistan's major political parties publicly support the nuclear weapons programme. The central thrust of most public debate about Pakistan's nuclear weapons is the struggle with India. Pakistan's nuclear weapons are widely seen as a response to India's.

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# Russian Federation

Pavel Podvig

## Current status

Russia is estimated to have about 11,000 nuclear weapons: 2430 strategic and about 2000 non-strategic warheads that are considered operationally deployed; and about 3000 strategic and up to 3300 nonstrategic warheads awaiting dismantlement.<sup>1</sup> Russia's delivery vehicles include about 310 operationally deployed ballistic missiles of five different types that carry about 1000 warheads; nine submarines carrying 16 SLBMs each (in addition, two submarines are about to enter the force); and 67 heavy bombers capable of carrying as many as 800 air-launched cruise missiles.<sup>2</sup> Russia is estimated to have about 700±120 tons of HEU and 128±8 tons of weapon-grade plutonium (plus 50 tons of reactor-grade plutonium).<sup>3</sup>

## Modernization

Russia's modernization plans indicate that it is determined to maintain parity with the United States in terms of number of warheads and delivery systems. Most of the currently operational ICBMs are being retired but new multiple-warheads missiles are being deployed to replace them. One new solid-propellant ICBM is undergoing flight tests.<sup>4</sup> The government also made a commitment to development of a new multiple-warhead liquid-fuel ICBM, which is supposed to be ready for deployment in 2016 although development will likely

take longer.<sup>5</sup> There are no plans to extend modernization of the strategic fleet beyond the planned construction of eight Project 955 and Project 955A submarines. In the next few years, Russia will continue an overhaul of its current strategic bomber fleet and start work on a new-generation strategic bomber.<sup>6</sup>

## Economics

Modernization of the nuclear arsenal is part of a broader rearmament programme that is expected to spend about US\$600 billion on various military systems in 2011–2020. About 10% of these funds will be spent on strategic force modernization.<sup>7</sup> Financial constraints could affect the scale of these plans, though the rearmament effort appears to have strong support of the political leadership and public, so significant cuts to the modernization programme are unlikely. This situation may change if 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.

## International law

Official documents of the Russian government do not question Russia's right

to possess nuclear weapons, though they also recognize its responsibilities as an NPT nuclear weapon state including to pursue a world free of nuclear weapons as a means of achieving security for all. Official policy assumes the right of first use of nuclear weapons, though the policy has a limited range of scenarios under which this would be considered. Both Russia and the United States consider their bilateral arsenal reductions to contribute toward the goal of article VI of the NPT.

## Public discourse

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>8</sup> More than half of the population consider 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 organizations that are involved in the discussion of defence policies, there are no independent public organizations that would have nuclear weapons related issues on the agenda.

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# United Kingdom

John Ainslie

## Current status

In September 2010, the UK government announced that it had “not more than 225” Trident nuclear warheads and that this would be reduced to “not more than 180” by the mid 2020s.<sup>1</sup> The UK’s only delivery system is the Trident D5 missile. Until 2010 each of the two or three armed Vanguard class submarines carried around 12 operational D5 missiles. This will be reduced to 8 missiles per submarine over the next few years.<sup>2</sup> It is estimated that the UK has produced over 3.5 tons of weapon-grade plutonium and that it has acquired from the United States 21–22 tons of HEU and has produced 4–5 tons itself.<sup>3</sup>

## Modernization

The UK is upgrading its current warheads in conjunction with the United States. Between 2015 and 2020 the UK will decide on the development of a new nuclear warhead. US modernization of the D5 missile system will apply equally to the missiles on British submarines. There is an expanding programme to develop a new submarine, to replace the Vanguard class.<sup>4</sup> The formal decision on whether to build the new vessels is due in 2016. Facilities at the Atomic Weapons Establishment (AWE) are being upgraded and annual expenditure at AWE has doubled to £1 billion per year.<sup>5</sup>

## Economics

Annual expenditure on the UK nuclear weapons programme, which was £2.1 billion in 2010/11, is due to increase over the decade. Meanwhile, public expenditure will be cut by 5.3% between 2011/12 and 2016/17. Ministers from the two Coalition parties in the UK government have publicly disagreed over whether to cut welfare benefits or Trident.<sup>6</sup> In accordance with current plans, in 2021, 35% of the MOD’s core budget for capital expenditure will be spent on the Trident replacement.<sup>7</sup>

## International law

The UK government plan is not to keep nuclear weapons for a short period of a few years, pending multilateral progress on disarmament, but to introduce a new system that can remain in service until 2067.<sup>8</sup> This implies that the UK government thinks it can continue indefinitely to retain and modernize its nuclear forces.

## Public discourse

Political support for the Trident replacement plan has declined since the start of the project in 2007. One of the major UK political parties argues that the original proposal is no longer affordable.<sup>9</sup> A second party is reviewing its policy.<sup>10</sup> Two former Defence Ministers have spoken out against

the current posture of keeping one Trident submarine at sea at all times.<sup>11</sup> A third has described the replacement plan as “nonsense”.<sup>12</sup> The Trident force operates from Faslane in Scotland. On 20 March 2013 the Scottish Parliament voted to reject the Trident nuclear weapon system.<sup>13</sup> On 18 September 2014 a referendum will be held on Scottish independence. The Scottish National Party has proposed that

the constitution of an independent Scotland would include a ban on nuclear weapons.<sup>14</sup>

Furthermore, some public discourse acknowledges that retention of nuclear weapons suggests a willingness to use those weapons. A recent study found that an attack on Moscow from one UK submarine could result in 5.4 million fatalities.<sup>15</sup>

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# United States

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## Current status

Independent estimates place the total number of nuclear weapons in the active US stockpile at 4650.<sup>1</sup> These estimates indicate it also has approximately 3000 “retired” warheads, an unknown number of which are being maintained for possible reactivation. The US currently reports 1722 strategic nuclear weapons as deployed on ICBMs, SLBMs, and heavy bombers.<sup>2</sup> This does not include warheads that are in the stockpile that could be carried by delivery systems not defined as deployed. The US is estimated to have 450 Minuteman III ICBM’s carrying 500 warheads with the capacity for additional warheads to be uploaded, 14 Trident missile submarines each with 24 launch tubes for the Trident D5 submarine launched ballistic missile with 1152 warheads deployed, and 94 nuclear capable strategic bombers, 18 B2’s and 76 B52Hs.<sup>3</sup> Independent estimates indicate the US stockpile has 500 non-strategic weapons with about 200 deployed at air bases in NATO countries in Europe.<sup>4</sup> In addition, the US maintains and stores thousands of plutonium pits from dismantled nuclear weapons, some of which may be reused.<sup>5</sup> The US has produced approximately 850 tons of HEU and 85 tons of weapon-grade plutonium.<sup>6</sup>

## Modernization

The US government is officially committed to modernizing its nuclear bombs and warheads; the submarines, missiles, and aircraft that carry them; and the laboratories and plants that design, maintain, and manufacture nuclear weapons. US policy and budget documents all manifest an intent to keep some thousands of nuclear weapons in service for the foreseeable future, together with the capability to bring stored weapons back into service and to design and manufacture new weapons should they be desired. The US also has been engaged for more than a decade in efforts aimed at taking advantage of improvements in the accuracy of long range missiles and re-entry vehicles to develop the means to deliver non-nuclear weapons anywhere on earth in short order. A recent Air Force solicitation for next-generation land-based nuclear missiles, for example, called for nuclear missile concepts that could share components with non-nuclear “prompt global strike” systems, asked contractors to explore new basing modes including mobile missiles, and stated that proposed replacement systems should “provide or enable new capabilities.”<sup>7</sup> Furthermore, the US is refurbishing and upgrading many of the facilities where nuclear weapons are designed, tested, and manufactured, and is expanding its capacity to produce tritium (a relatively short-lived radioactive isotope used to boost the yield in nuclear weapons) using a commercial reactor.<sup>8</sup>

## Economics

US nuclear weapons, the associated systems for fighting nuclear wars, and the factories and laboratories to design, produce, and maintain these weapons all are owned, managed, and operated by an interlocking network of public agencies and private corporations. These in turn are part of a military-industrial-political complex of unprecedented size and power, a social phenomenon still so new and large that it remains incompletely understood. The fiscal year 2012 US military budget, including nuclear weapons spending, totaled about US\$650 billion, which is about 43% of global military spending.<sup>9</sup> It is difficult to calculate total annual US spending on nuclear weapons in a consistent manner. Although most budgetary information directly related to nuclear weapons programmes is not classified, it is spread across many programs administered by different agencies and is not cumulatively tracked or reported. At the time of the Fiscal Year 2012 President's Budget Request submitted to Congress in early February 2011, the administration anticipated spending approximately \$88 billion for bombs and warheads and supporting infrastructure and about \$125 billion for delivery systems over a ten year period.<sup>10</sup> Independent estimates of total US spending for nuclear weapons and related programmes place the number even higher, at \$31 billion or more annually.<sup>11</sup>

Nuclear weapons programmes of the National Nuclear Security Administration are proposed to increase 4.1% according to comparison of budget categories used for the first time in the FY2013 budget request submitted to Congress. If consistent sets of budget lines are compared, the increase in weapons activities is 7.5% from the FY2013 continuing resolution enacted into law in March 2013. It should be noted that budgets enacted both via the continuing resolution and for FY2014 will be subject to reductions due to the sequester, unless legislation is enacted altering the sequestration requirements imposed by the Budget Control Act of 2011.<sup>12</sup>

With legislative processes paralyzed by the intramural partisan games of the powerful, the US budget process has been replaced by a series of complicated ad hoc funding mechanisms. So far, funding for nuclear weapons programmes has been relatively protected from the general austerity trend, with budgets flat or showing smaller reductions than non-military and lower priority military programs.

The main obstacle to US nuclear weapons modernization plans may be the erosion of the ability of the US military-industrial complex to complete ever-more complex manufacturing and industrial projects. Work on a major plutonium facility on which about \$1 billion already had been spent



was postponed for at least five years after costs ballooned to six times or more original estimates, and the project appears unlikely to be resumed. Construction of a new Uranium Processing Facility continues, but its costs also have increased nearly sevenfold, and its completion date has been delayed by eleven years.<sup>13</sup> Costs to replace the B61 family of nuclear gravity bombs with an upgraded, more accurate version also have spiraled out of control, as have the costs of the F-35 Joint Strike Fighter, a stealth attack aircraft slated to be the future delivery platform for the new B61-12.<sup>14</sup> With estimated total present and future programme costs approaching \$400 billion, the F-35 is the costliest weapons system ever.

The combination of rapidly growing costs and declining performance likely are the product of several related factors. The largely private and semi-privatized arms manufacturing industry has been operating for more than half a century with vast, unaccountable political power, and in the post 9-11 decade in a climate where military budgets expanded rapidly with even less oversight than before. Broader trends, including a decline of democracy and a stark polarization of wealth, have allowed an unfettered play of corporate interests that has hollowed out the US domestic industrial base and expanded opportunities for collusive dealing in a military contracting world dominated by a small number of extraordinarily powerful



organizations. In the United States today, the most effective forces for arms control may be financial corruption and concomitant institutional decline.

## International law

More than four decades after the United States signed and ratified the NPT, it retains a nuclear arsenal large enough to end civilization in short order. None of its recent bilateral reduction agreements with Russia fundamentally change the character of nuclear weapon deployments. The US has signed but not ratified the CTBT; ratification was rejected by the US Senate in 1999 even after a bargain was made to modernize its nuclear weapons infrastructure in exchange for ratification. The Obama administration has stated that CTBT ratification “remains a top priority for the United States.”<sup>15</sup> If the past is any guide, an attempt to obtain consent for ratification from the Senate is likely to be accompanied by new programmatic and funding commitments to the nuclear weapons establishment. At the conclusion of the 2000 NPT Review Conference, the US agreed that a no-backtracking “principle of irreversibility” applies to nuclear disarmament. Yet endless modernization of the research laboratories and factories necessary to design and produce nuclear weapons is inherently incompatible with any “principle of irreversibility” in regard to disarmament. Doing so with the express intention of being able to re-arm, to permanently hold open the potential to reconstitute large nuclear arsenals throughout the course of disarmament, also is inconsistent with an “unequivocal undertaking” to eliminate nuclear arsenals. The US announced its withdrawal from the Anti-Ballistic Missile

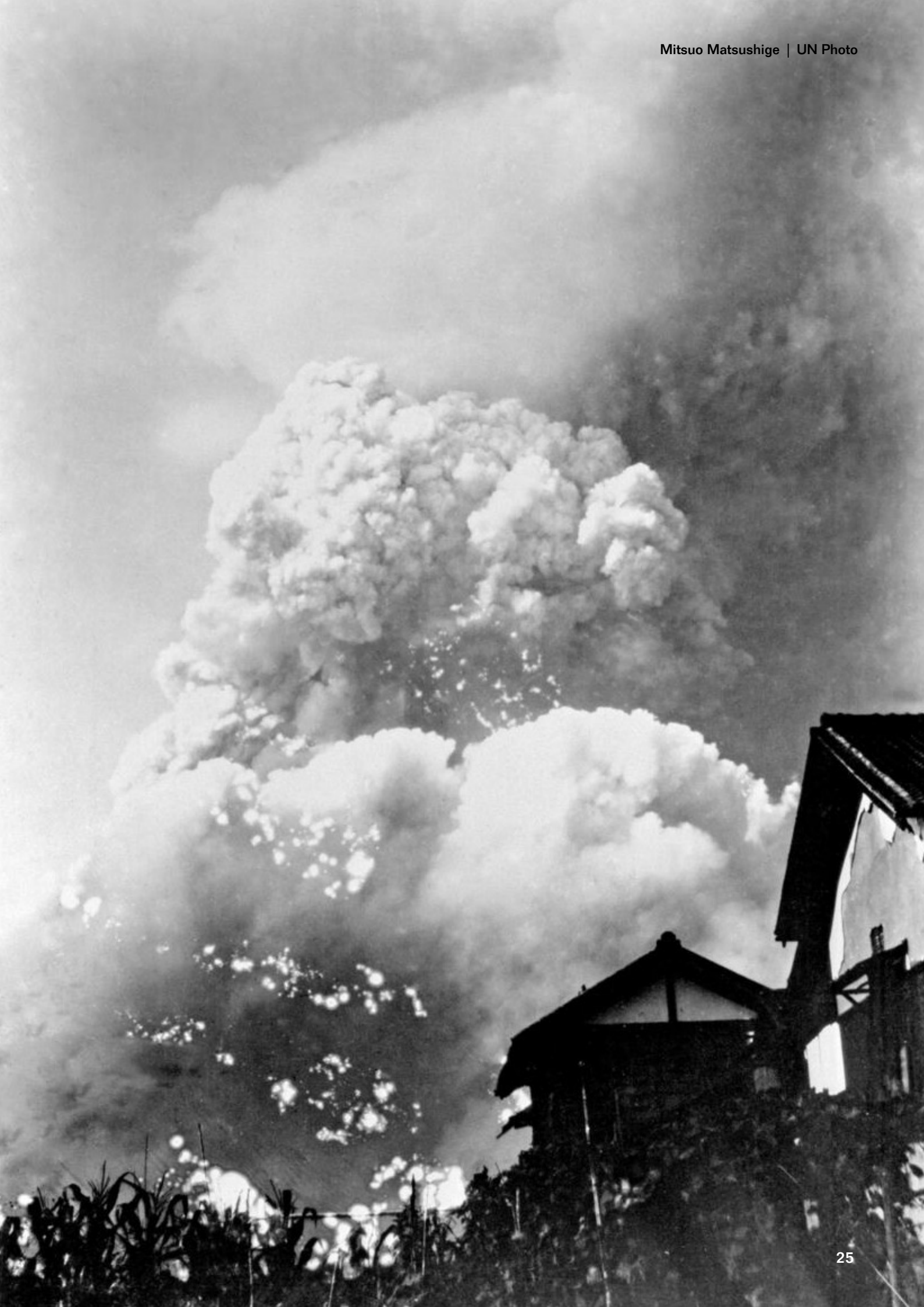
Treaty in 2001; continuing US development and deployment of ballistic missile defence systems is a serious impediment to further disarmament progress.

## Public discourse

In the broader populace, there is little debate about US nuclear weapons policies or spending. Thirty years on from the outpouring of disarmament sentiment that brought a million people out to protest in New York City’s Central Park, little is left in the way of a disarmament movement in the United States. What remains is a scattering of organizations, some more towards the “arms control” end of the spectrum that always were part of the political mainstream and some that are institutionalized remnants of disarmament movements past. The former always have pursued a remedial and incrementalist politics. The absence of a disarmament movement has made progress on any more ambitious abolition agenda unlikely. It also has left few alternative spaces that support discussion of the broader social change that might be needed to help foster meaningful disarmament progress. What public discussion there is about US nuclear weapons policy is dominated by specialists and is skewed towards drumming up fear of nuclear weapons coming into the possession of non-nuclear weapon states or non-state actors rather than pointing to the very real dangers posed by nuclear weapons held as central elements of national security policies in the hands of the world’s most powerful states. In the United States, disarmament remains an abstract aspiration; the pursuit of global military dominance backed by constantly modernized nuclear weapons remains the concrete reality.

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Reaching Critical Will is the disarmament programme of the Women's International League for Peace and Freedom (WILPF), the oldest women's peace organisation in the world.

Reaching Critical Will works for disarmament and arms control of many different weapon systems, the reduction of global military spending and militarism, and the investigation of gendered aspects of the impact of weapons and of disarmament processes. It produces research studies, reports, statements, fact sheets, and other publications on key issues relevant to disarmament, arms control, and militarism.

This updated study explores the ongoing and planned nuclear weapon modernisation programmes in China, the Democratic People's Republic of Korea, France, India, Israel, Pakistan, Russia, the United Kingdom, and the United States.

Non-governmental researchers and analysts provide information on each country's modernisation programmes, plans, and budgets while its introduction reflects on the costs of nuclear weapons spending in the context of the COVID-19 pandemic.



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