Topic Page: Nuclear warfare

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Summary Article: **nuclear warfare**
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War involving the use of nuclear weapons. Only two nuclear weapons have ever been detonated in warfare: both in August 1945 by the United States against Japan. They helped bring about the surrender of Japan and end World War II. But these bombs, which had one-tenth the explosive force of modern nuclear bombs, claimed over 200,000 Japanese lives. The immediate destructive effects and the longer-term environmental, climatic and health damage from radiation fallout, meant that the 'nuclear option' became seen as a last resort in warfare. As development of the technology continued during an 'arms race' between the USA and USSR during the Cold War, a stage was reached from the 1960s in which the two superpowers had sufficient nuclear weapons to destroy each other and make much of the planet uninhabitable. This led to the military doctrine of mutually assured destruction (MAD) under which neither side could risk launching a nuclear attack as they were likely to be destroyed themselves by a retaliatory strike. The cost of the arms race and concerns that nuclear war might break out through miscalculation or errors, led to a series of nuclear arms reduction agreements from the late 1960s, as well as (abortive) efforts to develop defence systems against nuclear weapons. Nevertheless, the worldwide total of nuclear weapons stood at around 50,000 in 1990, and the number of countries possessing nuclear weapons stood officially at five – USA, USSR, UK, France, and China; South Africa developed nuclear weapons in the 1980s but gave them up voluntarily in 1991. India and Pakistan exploded nuclear devices in 1998 and North Korea in 2006, while Israel is believed to have nuclear capability and Iran to be close to achieving it. Despite the increase in the number of nuclear states, a succession of disarmament agreements between the USA and Russia led to the total number of operational nuclear warheads in the world falling to less than 6,000 by 2012, with most still held by the two main nuclear powers.

Atom bomb Nuclear-weapons research began in Britain in 1940, but was transferred to the USA after it entered World War II. The research programme, known as the Manhattan Project, was directed by J Robert Oppenheimer. The original nuclear weapon, the atom bomb, relied on use of a chemical explosion to trigger a chain reaction. The first test explosion was at Alamogordo, New Mexico, on 16 July 1945; the first use in war was by the USA in World War II against Japan on 6 August 1945, over Hiroshima and three days later at Nagasaki. Over 200,000 Japanese died from these bombs: a half from radiation sickness and flash burns and a half from injuries and illness. A half died on the day of the explosion and others within four months. There were also longer health impacts on the surviving population in the areas, including raised rates of leukemia and cancers.

Use of the atom bomb By the beginning of 1945 it was clear that Japan could not win the war in the Pacific, although neither its political nor military leaders were prepared to admit defeat. Between March and June US forces took the islands of Iwo Jima and Okinawa against fierce resistance from their Japanese defenders, and carried out huge firebombing raids on major Japanese cities.

On 26 July the Allied Powers issued the Potsdam Proclamation, calling on Japan to surrender

unconditionally or face complete destruction. When no response was received, the new US president, Harry S Truman, decided to use the atom bomb against Japan in preference to launching a conventional ground invasion that would have risked many more US lives. Between 100,000 and 240,000 people are thought to have been killed by the bombs in the Japanese cities of Hiroshima and Nagasaki, and the death toll continued to rise in the following decades. The additional threat of defeat and occupation by Soviet forces, following the USSR's declaration of war on Japan on 8 August, persuaded the Japanese government to accept the Allied demand for an unconditional surrender on 14 August. See also Japan: history 1941–45.

After the experience of World War II, the threat of nuclear war, the theory of deterrence, and the issue of disarmament became key features of the Cold War 1949–89.

Hydrogen bomb A much more powerful weapon than the atom bomb, the hydrogen bomb relies on the release of thermonuclear energy by the condensation of hydrogen nuclei to helium nuclei (as happens in the Sun). The first detonation was at Enewetak Atoll in the Pacific Ocean in 1952 by the USA.

Neutron bomb or enhanced radiation weapon (ERW) The neutron or ERW bomb is a very small hydrogen bomb that has relatively high radiation but relatively low blast, designed to kill (in up to six days) by a brief neutron radiation wave that leaves buildings and weaponry intact.

Nuclear methods of attack Methods used now include aircraft bombs, missiles (long- or short-range, surface-to-surface, air-to-surface, and surface-to-air), depth charges, and high-powered landmines (‘atomic demolition munitions’) to destroy bridges and roads.

The major subjects of disarmament negotiations are **intercontinental ballistic missiles** (ICBMs), which have from 1968 been equipped with clusters of warheads (which can be directed to individual targets) and are known as multiple independently targetable re-entry vehicles (MIRVs). The 1980s US-designed MX (Peacekeeper) carries up to ten warheads in each missile. Each missile has a range of about 6,400 km/4,000 mi, and eight MIRVs (each nuclear-armed) capable of hitting eight separate targets within about 240 km/150 mi of the central aiming point.

Nuclear methods of defence Methods include **antiballistic missile** (ABM) Earth-based systems with two types of missile, one short-range with high acceleration, and one comparatively long-range for interception above the atmosphere; and the **Strategic Defense Initiative** (announced by the USA in 1983 to be operative from 2000, but cancelled in 1993; popularly known as the ‘Star Wars’ programme) in which ‘directed energy weapons’ firing laser beams would be mounted on space stations, and by burning holes in incoming missiles would either collapse them or detonate their fuel tanks.

In 1989 the UK agreed to purchase submarine-launched Trident missiles from the USA. The Trident system entered service within the Royal Navy in the mid-1990s. In 2006, the UK government announced plans for new replacement Trident submarines so that the UK would maintain its nuclear capability until the 2040s.

Nuclear proliferation during the Cold War The USA had not informed the USSR, its wartime ally, of its possession of the atomic bomb, and this lack of openness contributed to the build up of the Cold War. After World War II the USSR developed its own nuclear technology, and nuclear weapons formed part of the arsenals of the two Cold War superpowers. Both sides claimed that their missiles were only held as defence, and both operated a ‘no first strike’ policy, meaning that they would only use the

weapons if the other side fired first. Antinuclear protesters, apart from condemning the disastrous effects of nuclear warfare, argued that the holding of nuclear weapons was futile, as neither side would actually use them.

After 1945 the USSR and USA engaged in a nuclear arms race, and the numbers, power, and range of their nuclear arsenals steadily increased. Each side stockpiled thousands of missiles to counter possible attack – enough to destroy the world many times over. By the 1960s nuclear force had become widespread; Britain and France developed nuclear capability, US nuclear missiles were deployed in Germany, and Soviet weapons were stationed in the Warsaw Pact countries of the Eastern bloc. The climate of fear and mistrust that dominated the Cold War in the 1950s and 1960s was intensified by the nuclear capabilities of the opposing sides.

East and West moved to the brink of nuclear war during the Cuban Missile Crisis in 1961, when the USSR attempted to place nuclear weapons on the Caribbean island of Cuba, putting US cities in range of Soviet nuclear attack. However, after a tense stand off, the USSR withdrew its missiles from the island. Nuclear weapons remained at the forefront of Cold War tensions in the 1960s, and in 1968 both East and West began to deploy ICBMs. Since these missiles could travel thousands of kilometres and deliver a number of warheads to different targets, the location of nuclear launch sites close to the enemy was no longer required.

Arms reduction and disarmament In 1969 the Strategic Arms Limitation Talks (SALT) marked the beginning of the long, slow process towards arms reduction and nuclear disarmament. During the 1970s the SALT conferences aimed to slow the rate of increase in the numbers of nuclear weapons held by the superpowers, although both sides continued to build up their nuclear stockpiles and the talks continued until 1979. The talks on arms reduction coincided with détente, a period when relations between East and West generally improved. Two SALT treaties were signed, and the threat of nuclear war appeared to subside as the superpowers sought ways to co-exist.

The SALT meetings were followed by the Strategic Arms Reduction Talks (START), a phase in peace discussions dealing with disarmament that began in 1983. By this time the USA was developing its SDI, which aimed to destroy incoming missiles as they passed through the atmosphere. Initially SDI appeared to raise tensions between the USA and the USSR as it threatened to make Soviet missiles obsolete. However, the combination of Soviet economic weakness, friendlier relations between US president Ronald Reagan and Soviet leader Mikhail Gorbachev, and the strength of antinuclear groups in the West, allowed for a series of breakthroughs on nuclear weapons disarmament in the 1980s. In 1987 the USA and USSR signed the Intermediate Nuclear Forces Treaty (INF), which reduced the countries' nuclear arsenals by some 2,000 (4% of the total). The late 1980s saw the concept of long-term nuclear disarmament as achievable and desirable. The collapse of the USSR 1989–91 coincided with the signing of the first START treaty (1991), which agreed a 30% reduction in strategic nuclear weapons systems. START II, signed in 1993 and ratified by the US Senate in 1996 and Russia in 2000, allowed for significant reductions in the number of long-range ICBMs.

In 2002 the USA and Russia signed a Strategic Offensive Reductions Treaty (SORT), to limit operationally deployed warheads to 2,200 for each country. It was ratified and came into force in 2003. It was then superseded by a New START treaty signed in 2010, which was ratified in 2011. This reduced further the number of nuclear warheads each country was allowed to 1,500 by 2018 and the number of deployed launchers to 700 each.

Impact of nuclear weapons in the Cold War The development and deployment of strategic nuclear weapons systems played a key role in the Cold War. The nuclear arsenals of the superpowers guaranteed their security against the enemy, as both sides felt safe from attack. However, the consequent race towards new technology heightened the tensions of the Cold War and the costs of development were enormous. The breakthrough of the SALT conferences in the 1970s, along with détente, allowed the arms race to slow. Defenders of nuclear weapons argue that they maintained peace during the 45 years of the Cold War by making warfare between the superpowers impossible – neither side could have actually won. Opponents argue that the possession of such massive nuclear stockpiles by the superpowers prolonged the antagonism of the Cold War and brought the world close to destruction.

Nuclear weapons proliferation continued in the 1990s, and the number of nuclear powers increased – India and Pakistan exploded nuclear devices in 1998 and North Korea in 2006. Israel is suspected of possessing a nuclear stockpile, while Iran is believed to be close to developing nuclear weapons.

Political thinking on nuclear warfare Following the break-up of the USSR, Belarus, Ukraine, and Kazakhstan declared they would abandon nuclear weapons under the 1991 Minsk Agreement, which created the Commonwealth of Independent States.

In July 1996, the International Court of Justice declared that the use of nuclear weapons was contrary to the established rules of war. The court set important limitations on the use or threat of such weapons, although it stopped short of an outright ban. This was the first time the International Court of Justice had been asked to rule on the legality of any weapon. Although the court has no mechanisms to enforce its judgement, the ruling was in tune with the latest developments in military thinking, and had been keenly awaited by antinuclear groups and the five official nuclear powers since a large majority of the UN General Assembly had requested it in December 1994.

In September 2009 the UN Security Council adopted a resolution (1887) calling for the creation of ‘conditions for a world without nuclear weapons’.

Terrorism In May 2001, the United Nations Terrorism Prevention Branch estimated that as many as 130 terrorist groups could pose a nuclear threat, due to the increase in the smuggling of radioactive material. In the first three months of 2001 alone there were 20 confirmed incidents of nuclear smuggling, including thefts from Germany, Mexico, Romania, and South Africa.

documents

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