

Facts about Trident

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Britain's Trident nuclear weapon system consists of four components: missiles, warheads, submarines and support infrastructure.

▶ The submarines

The delivery platform for the Trident missile is the *Vanguard*-class nuclear-powered ballistic missile submarine, built by Vickers Shipbuilding and Engineering Limited (now owned by BAE Systems) at Barrow-in-Furness. Beginning in 1993, four *Vanguard*-class boats were commissioned: the *Vanguard*, the *Victorious*, the *Vigilant*, and the *Vengeance*. Each submarine has a crew of approximately 140 and is based at Her Majesty's Navy Base (HMNB) Clyde at Faslane in Scotland.



HMS *Vanguard*

▶ The missiles

Each submarine can carry 16 Trident II (D5) submarine-launched ballistic missiles (SLBMs). The missiles were designed in the United States by Lockheed-Martin. They have a range of approximately 4,600 miles and are accurate to within 90 metres. Britain bought 58 missiles as part of a larger collective pool at King's Bay, Georgia – home to many of America's *Ohio*-class submarines that employ Trident missiles as well. It has 50 left after test-firings. The missile was first deployed by the U.S. Navy in 1990.



Trident missile test flight

The United States has initiated a life extension programme to increase the service life of the missiles from 30 to 45 years. Trident missiles will be fully withdrawn from service in 2042. Britain is also participating in this programme.

Each Trident missile can deliver 12 independently-targeted warheads, giving each *Vanguard*-class submarine the capability to deploy 192 warheads. In practice it is British Government policy to deploy no more than 48 warheads per submarine and probably around 12 missiles per submarine with 3-4 warhead each. Trident missiles are not serviced in the UK but are returned to the United States Strategic Weapons Facility Atlantic, at Kings Bay in Georgia, for periodic refurbishing.

▶ The warheads

The warheads carried by the Trident missiles are manufactured and designed in the UK by the Atomic Weapons Establishment. They are closely based on the 100 kiloton American W-76 warhead design used for the U.S. Trident fleet. By comparison, the bomb that destroyed Hiroshima was approximately 14kt.

The UK has modified some of its warheads to provide a “sub-strategic” capability with a yield of about 10 kilotons. A few missiles on each submarine are probably armed with a single ‘sub-strategic’ warhead. In 2006 the UK reduced its stockpile of warheads to 160.



U.S. W-76 warheads



Support infrastructure

HMNB Clyde: Home to the Faslane submarine base and the Royal Naval Armaments Depot Coulport. Faslane is home to the *Vanguard* submarine fleet and the smaller *Swiftsure* nuclear-powered attack submarines. Warheads and missiles are stored at Coulport for loading and unloading on to the *Vanguard* submarines.

Atomic Weapons Establishment (AWE) Aldermaston and Burghfield: Aldermaston is the centre for British nuclear warheads design, testing and production. It is owned by the Ministry of Defence but is contractor operated by a consortium on SERCO, BNFL and Lockheed Martin. Burghfield is responsible for the final assembly of warheads, their in-service maintenance and their eventual decommissioning. After assembly warheads are transported to Coulport by road.

HMNB Devonport: The *Vanguard* submarines undergo a major 2-year refitting and refuelling at Devonport in Plymouth during their service life.

Rolls Royce: The nuclear power plants and nuclear fuel rods that drive the *Vanguard* submarines are designed and manufactured at Rolls Royce’s Raynesway plant in Derbyshire.

BAE Systems: The *Vanguard* submarines and the proposed successor submarines are built at BAE Systems shipyard at Barrow-in-Furness, the UK’s largest shipyard. Barrow is currently building the new *Astute*-class nuclear-powered attack submarine.

Ministry of Defence: Nuclear policy planning and targeting functions are carried out by the Ministry of Defence’s Director Chemical, Biological, Radiological and Nuclear Policy in the policy department and the Strategic Targeting Centre in London. *Vanguard* submarines are controlled through the Royal Navy’s Commander-in-Chief Fleet operational HQ in Northwood supported by MOD’s Strategic Systems Executive in Bath.



AWE Aldermaston



Faslane submarine base

A doctrine Of 'minimum deterrence'

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▶ 'Minimum deterrence'

British nuclear posture is described by the Government as 'minimum deterrence' based on much lower levels of nuclear weapons than those of America and the Soviet Union/Russia. It is based on the ability to inflict massive devastation upon an opponent with minimum nuclear force. Since the end of the Cold War Britain has reduced its arsenal from approximately 400 to 160 warheads and has reduced to one nuclear weapon system in Trident.

The Government states that its posture of minimum deterrence requires one of the four *Vanguard* submarines to be at sea on operational duty at any time and fully armed with up to 48 nuclear warheads. Some of these warheads will be of 'sub-strategic' yield. The warheads are not pre-targeted and usually require several days 'notice to fire', although this could be considerably reduced in a crisis. The Government says this posture requires weapons of global range that are invulnerable to a surprise pre-emptive attack.

The Government says that it would only use nuclear weapons in "extreme circumstances of self-defence" but it does not rule out using nuclear weapons first in a crisis.

▶ What are British nuclear weapons for?

The Government assigns a number of roles to British nuclear forces:

- Deter acts of aggression against vital interests.
- Insure against the re-emergence of major strategic military threats.
- Prevent nuclear coercion, particularly by nuclear armed 'rogue' states.
- Preserve peace and stability in Europe and support Euro-Atlantic collective security.
- Deter state-sponsored nuclear terrorism.
- Provide an independent centre of nuclear decision-making in NATO.
- Enable intervention against nuclear-armed states to maintain regional and global security.

▶ Other nuclear weapon states

Britain is one of nine states that are known or thought to possess nuclear weapons:

Country	Total warheads	Country	Total warheads
America	9,600 (5,700 deployed)	Israel	100-200
Russia	15,000 (5,700 deployed)	India	50-60
France	350	Pakistan	60-70
China	200	North Korea (suspected)	2-10

Trident and America

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Since the 1960s Britain's nuclear forces have been heavily dependent on the United States. This continues today.

▶ **Trident system**

Trident missiles are purchased directly from America. Trident was acquired from America under the 1963 Polaris Sales Agreement as amended for Trident (Polaris was the previous submarine-based nuclear weapon system purchased from America). Trident missiles are test fired from British submarines near Cape Canaveral under American supervision. Britain also received substantial design assistance with its Vanguard submarines. The UK's Trident warhead is based on America's Trident warhead design and was developed through the Joint Atomic Information Exchange Group. It was tested at America's Nevada test Site. Important components of UK warheads are bought off-the-shelf from America. There are U.S.-UK Joint Working Groups on a wide range of nuclear-related topics, including all aspects of nuclear warhead development.

▶ **Mutual Defence Agreement**

The UK enjoys substantial nuclear weapons cooperation with America under the terms of the 1958 Mutual Defence Agreement. The agreement allows cooperation on defence planning, delivery systems, training, some intelligence sharing, and military nuclear reactors and provides for the transfer of special nuclear materials (plutonium or highly enriched uranium), components, and equipment.

▶ **Nuclear targeting**

British warheads can be integrated into American nuclear war plans and there is a UK Liaison Cell at the headquarters of U.S. Strategic Command (STRATCOM) responsible for American plans. America also supplies important aspects of nuclear targeting data to UK submarines and the Royal Navy uses American software for target planning and data processing. American officers are stationed at the Permanent Joint Headquarters at Northwood from where UK submarine operations are controlled in order to coordinate British and American Trident submarine operations. Under the Polaris Sales Agreement UK nuclear forces are formally "committed to NATO and targeted in accordance with Alliance policy and strategic concepts under plans made by the Supreme Allied Command Europe (SACEUR)". NATO's Nuclear Planning System is linked to STRATCOM and probably MOD and is dominated by U.S. nuclear planning.



Trident decision timeline

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▶ 2006 White Paper

In December 2006 the Labour Government presented its decision to replace the current Trident nuclear weapon system when it reaches the end of its service life in a White Paper on *The Future of the United Kingdom's Nuclear Deterrent*, effectively opting to retain nuclear weapons well into the 2050s. A decision was said to be needed in 2007 because the submarines carrying the missiles are aging and need to be replaced if Britain is to continue to deploy the Trident missile over the long-term. The Government says it will take 17 years to design and building new submarines.



▶ 2007 vote in Parliament

In March 2007 Parliament voted on the Government's motion to begin the process of procuring new submariners for the Trident missile. The motion had two key components:

To take a decision in principle on whether to replace Trident and therefore begin a process to design, build and commission replacement submarines to carry the Trident missiles.
To take further steps towards meeting the UK's disarmament responsibilities under Article VI of the Nuclear Non-Proliferation Treaty (NPT).

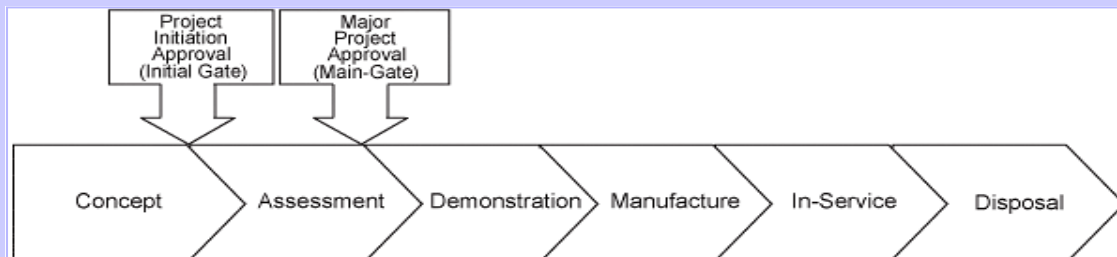
This decision also authorised British participation in the U.S. Navy's Trident II (D5) life extension (D5LE) programme to extend the service life of the current Trident missile fleet.

The Government made three important assurances to MPs:

- There will be renewed efforts to secure measures pursuant to nuclear disarmament under Article VI of the NPT, in particular to bring about negotiations on a Fissile Material Cut-off Treaty (FMCT) to end production of fissile materials for use in nuclear weapons.
- The replacement system will not involve any upgrading or expansion of current nuclear capability.
- The decision in to authorise research and design on a new fleet of submarines will not bind a future government or parliament to that decision and that there will opportunities in the future for Parliament to revisit the decision.

▶ The 'CADMID' cycle

The Ministry of Defence will procure the new submarines according to its CADMID cycle of Concept, Assessment, Demonstration, Manufacture, In-service, Disposal. The vote in March 2007 authorised the first 'Concept' phase.



Source: 2007 edition of MOD's UK Defence Statistics

Two crucial forthcoming decisions are:

Initial Gate decision: The 'Assessment' phase will begin following an 'initial gate' decision in 2009-2010 when approximately 15% of the £15-20 billion procurement costs will be committed.

Main Gate decision: The 'Demonstration' phase will begin following a 'main gate' decision. The Government has said that it is highly likely further parliamentary approval will be sought at this stage. A contract to build the first submarine can be expected around 2016 – the 'Manufacture' phase.

▶ Future key decisions

Future decisions will be needed on:

Size of the Trident force: Whether to build three or four submarines and how many missiles each submarine will carry.

New warheads: Whether to refurbish or replace the current warhead (this decision will be needed in the next parliament).

A new missile: Decisions will be needed on a successor to the current Trident II (D5) missile. The Government has sought assurances from America that the missile the U.S. Navy builds to replace Trident will be compatible with the new submarines the UK plans to build, but this is not guaranteed.

*The Government's formal position set out to MPs strongly suggests that the deal on Trident replacement is **not done** and that Parliament will have a major opportunity to reassess UK nuclear weapons policy and requirements around this 2012-2014 main gate decision.*

Constraints on British nuclear policy

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British nuclear policy is constrained by a number of agreements, rulings and treaties.

▶ **Nuclear Non-Proliferation Treaty (NPT)**

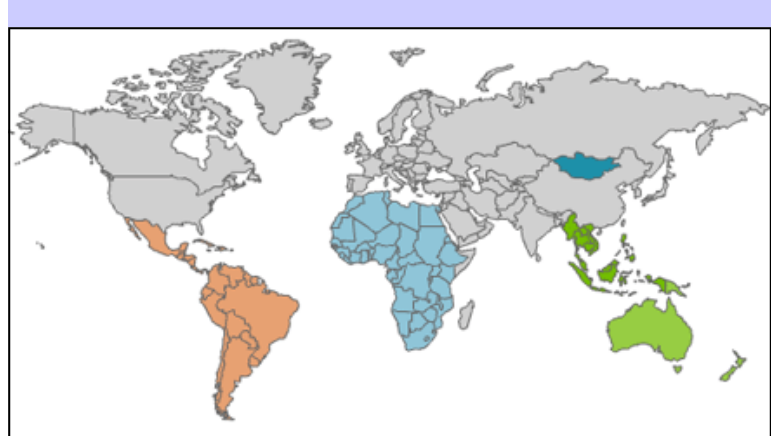
The NPT was negotiated in 1968. It acknowledged the existence of five states that had tested nuclear weapons (Britain, America, the Soviet Union, France and China). It called on these nuclear weapon states to work towards nuclear disarmament, not help any other country acquire nuclear weapons and to assist other countries in developing nuclear technologies for civilian purposes, such as nuclear power reactors. In return the non-nuclear weapon states agreed not to acquire nuclear weapons and to also work towards nuclear disarmament with the nuclear weapon states. At the 2000 NPT Review Conference Britain agreed to an “unequivocal undertaking by the nuclear weapon states to accomplish the total elimination of their nuclear arsenals leading to nuclear disarmament”.

▶ **Comprehensive Test Ban Treaty (CTBT)**

The CTBT was negotiated in 1996. Britain ratified the treaty in 1998. It prohibits any explosive nuclear tests but testing nuclear warhead components is still permitted. The nuclear weapon states have developed extensive scientific facilities to simulate nuclear tests in the absence of physical testing.

▶ **Nuclear weapon free zones (NWFZ).**

There are five NWFZ covering Africa, Latin America, South-East Asia, the South Pacific and Central Asia. Mongolia has also formally declared itself a NWFZ. Britain has ratified protocols to the zones in Africa, Latin America and the South Pacific. In doing to Britain agrees not to deploy or use or threaten to use nuclear weapons in these geographic areas. Agreement has yet to be reached on a protocol to the 1996 treaty covering South-East Asia and the 2007 treaty covering Central Asia.



Nuclear weapon-free zones (does not show Central Asian NWFZ) Source: International Panel on Fissile Materials website

► **Negative Security Assurances (NSAs).**

In 1978 and again in 1995 Britain and the other nuclear weapon states issued a 'negative security assurance' to non-nuclear weapon states. This says that Britain "will not use nuclear weapons against non-nuclear-weapon States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons except in the case of an invasion or any other attack on the United Kingdom, its dependent territories, its armed forces or other troops, its allies or on a State towards which it has a security commitment, carried out or sustained by such a non-nuclear-weapon State in association or alliance with a nuclear-weapon State". This assurance does not apply to states that are in 'material breach' of their own non-proliferation obligations under the NPT.

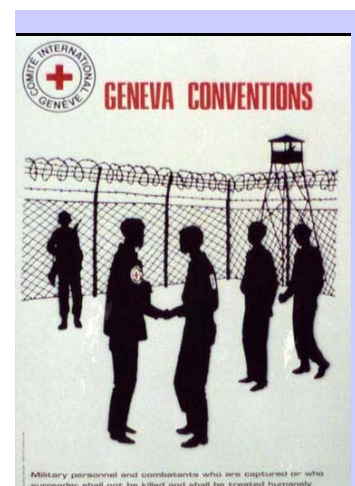
► **1996 International Court of Justice Advisory Opinion.**

Article 51 of the United Nations Charter permits the use of force for individual or collective self-defence.

In 1996 the ICJ issued an Advisory Opinion on the "Legality of the Threat or Use of Nuclear Weapons". The Court stated that the rules of humanitarian law applicable in armed conflict are fundamental and constitute intransgressible principles of international customary law. Customary international law states that use of force must comply with the requirements of the law applicable in armed conflict, in particular the principles and rules of humanitarian law. The ICJ has confirmed that it is a well-established rule of customary international law that a use of force in self-defence must be proportional to the armed attack and necessary to respond to it.

The Court concluded that "the threat or use of nuclear weapons would generally be contrary to the rules of international law applicable in armed conflict, and in particular the principles and rules of humanitarian law" but it could not "conclude definitively whether the threat or use of nuclear weapons would be lawful or unlawful in an extreme circumstance of self-defence, in which the very survival of a State would be at stake".

The British government accepted this Opinion and does not dispute that intentional humanitarian law applies to nuclear weapons. The 1949 Geneva Conventions and their 1977 Additional Protocol form the core of intentional humanitarian law and have been ratified by the UK. It has repeatedly stated that it would only consider use of nuclear weapons in "extreme circumstances of self-defence". Use of nuclear weapons would therefore only be legal if their use constituted a proportionate response to aggressive actions, was a necessary response to an attack discriminated between combatants and non-combatants and did not cause unnecessary suffering.



Geneva Convention poster.
Source: Library of Congress

Trident and Scotland

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▶ Scottish National Party

On May 3, 2007 the Scottish National Party gained a majority in the Scottish Parliament. The SNP and the majority of Scottish MPs are committed to a nuclear weapon-free Scotland.

On June 14, 2007 the Scottish Parliament voted overwhelmingly against the British Government's decision to replace Trident by a vote of 71 to 16 with 39 abstentions. Opinion polls show a majority of Scots opposed to Trident.

The Scottish Parliament currently has no say in national defence matters, a subject that was 'reserved' in the devolution settlement set out in the 1998 Scotland Act.



Alex Salmond, MSP, leader of the SNP

▶ The future of the Union

If the UK replaces Trident with a new fleet of submarines to carry the nuclear missiles they will continue to be based in Scotland at the Clyde Naval Base at Faslane. If the planned new submarines have a design lifetime of 30 years then nuclear-armed submarines will continue to operate out of Faslane well into the 2050s.

It is far from certain that Scotland will remain part of the Union through the life of the current and replacement Trident system or that the British Government will be able to resist nationalist pressure from the Scottish Executive and Scottish Parliament to end the operation of the Trident submarine fleet from Faslane. The SNP recently declared its intention to use powers devolved to the Scottish Executive to stymie Trident replacement by mounting environmental, transport, planning, and legal obstacles. SNP leader Alex Salmond has vowed to ban the transportation of nuclear weapons on Scottish soil.



Trident warhead convoy
Source: NukeWatch UK

If the British Government were no longer able to operate the Trident submarine fleet from Scotland it would have to relocate the facilities dedicated to the Trident programme at the Clyde Naval Base at substantial financial and political cost. The most obvious alternative location is Devonport in Plymouth.

Want to know more?

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▶ Visit these websites:

Bradford University: www.brad.ac.uk/acad/bdrc/nuclear/trident/trident.html

GlobalSecurity.org: www.globalsecurity.org/wmd/world/uk/index.html

Acronym Institute: www.acronym.org.uk/uk/index.htm#britain

WMD Awareness Programme: www.comeclean.org.uk/bt_information.php

▶ Read these reports online:

[Trident: The Deal Isn't Done - Serious Questions Remain Unanswered](#)

Nick Ritchie, University of Bradford, December 2007.

[The Future of the UK's Strategic Nuclear Deterrent: the White Paper](#)

House of Commons Defence Committee, The Stationary Office, March 2007.

[The Future of the United Kingdom's Nuclear Deterrent](#)

Ministry of Defence and Foreign & Commonwealth Office, Command Paper 6994, December 2006.

[The United Kingdom's Independent Strategic Deterrent: Observations on the 2006 White Paper and Issues for the Parliamentary Debate](#)

Michael Codner, Lee Willet and Gavin Ireland, Royal United Services Institute, Whitehall Report 1-07, March 2007.

[The Future of the UK's Strategic Nuclear Deterrent: the Manufacturing and Skills Base](#)

House of Commons Defence Committee, The Stationary Office, December 2006.

[Worse than Irrelevant - British Nuclear Weapons in the 21st Century](#)

Acronym Institute for Disarmament Diplomacy, London, October 2006.

[The Future of the UK's Strategic Nuclear Deterrent: the Strategic Context](#)

House of Commons Defence Committee, The Stationary Office, June 2006.

[The Future of Britain's Nuclear Weapons: Experts Reframe the Debate](#)

Frank Barnaby and Ken Booth (eds), Oxford Research Group, March 2006.

[The Future of the British Bomb](#)

John Ainslie, WMD Awareness Programme, October 2005.

[Secrecy and Dependence: The UK Trident System in the 21st Century](#)

Mark Bromley and Nicola Butler, BASIC, November 2001.