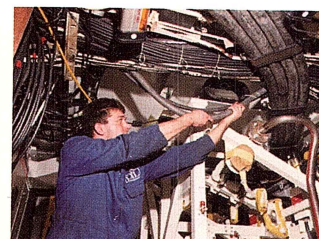




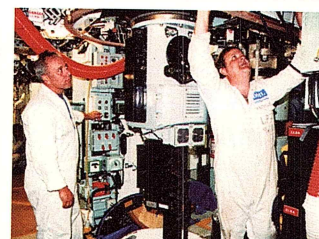
# Supporting the Trident System

## HM Naval Base, Clyde

Submarine basing and maintenance. Key skills include: engineers, mechanics, technical staff, safety expertise. Currently employs around 6,500.



● Faslane



## BAE Systems Submarines, Barrow-in-Furness

Submarine design and build. Key skills include: naval architects, designers, engineers, mechanics. Currently employs around 3,500 people.

● Barrow-in-Furness

## Rolls Royce Submarines, Derby

Submarine nuclear reactor plants. Key skills include: nuclear specific design, engineers, mechanics. Currently employs around 900.

● Derby

## Devonport Management Limited, Devonport

Submarine refit, maintenance and disposal. Key skills include: mechanics, electricians, fabricators, logistics engineers. Currently employs around 5,200.

● Devonport

● Aldermaston

## Atomic Weapons Establishment, Aldermaston

Nuclear weapon research, development and safety. Key skills include: scientists, engineers, technicians. Currently employs around 4,000.



# Disarmament and Non-proliferation

The UK is committed to working towards a safer world in which there is no need for nuclear weapons. This requires progress in the fields of both non-proliferation and nuclear disarmament.

## UK Nuclear Disarmament

- We continue to support the disarmament obligations set out in Article VI of the Nuclear Non-Proliferation Treaty (NPT) which says:

*"Each of the parties to the Treaty undertakes 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, and on a treaty on general and complete disarmament under strict and effective international control."*

- We also remain fully committed to the obligations contained in the Decisions and Final Document at the NPT Review Conferences in 1995 and 2000, including the "13 Practical Steps" towards the implementation of Article VI agreed in 2000. These are available at: <http://disarmament.un.org/wmd/npt/2000FD.pdf>.
- We have an excellent record in meeting these obligations. Over the past decade we have:
  - withdrawn and dismantled our maritime tactical nuclear capability and the RAF's WE177 freefall bomb;
  - significantly reduced the operational status of our nuclear weapons system. Normally, only one Trident submarine is on deterrent patrol at any one time. It has a maximum of 48 warheads on board, and is normally on several days 'notice to fire'. Its missiles are not targeted at any country;
  - reduced our maximum number of operationally available warheads to fewer than 160. Since coming to power in 1997, we have reduced the maximum number of operationally available warheads by nearly half;
  - not conducted a nuclear test explosion since 1991. We ratified the Comprehensive Nuclear Test Ban Treaty in 1998;
  - ceased production of fissile material for nuclear weapons and other nuclear explosive devices. We support the proposal for a Fissile Material Cut-Off Treaty and call for the immediate start of negotiations in the Conference on Disarmament in Geneva;
  - increased our transparency with regard to our fissile material holdings. We have produced historical records of our defence holdings of both plutonium and highly enriched uranium;
  - pursued a programme to develop UK expertise in verifying the reduction and elimination of nuclear weapons internationally. The aim of the study has been to examine and trial potential methodologies which could be used in a future nuclear disarmament regime.



# Summary: Maintaining the UK's Nuclear Deterrent

## Why do we need to take a decision now?

- The life of the Vanguard-class submarines can only be extended by about five years. Even with that life extension, they will start leaving service in the early 2020s and it will take around 17 years to develop a replacement.
- Unless we start work on a replacement now, we will be unable to maintain a continuous nuclear deterrent capability from the mid-2020s.
- Currently, we know of no state that has both a nuclear capability and the ability and intent to use it against our vital interests. But there are risks that capability and intent will become dangerously aligned over the period 2020 to 2050.
- We need to maintain a minimum nuclear deterrent to ensure future generations are properly insured against these risks. Now is not the time to abandon the protection which our nuclear deterrent provides.

## Why do we want to retain a nuclear deterrent?

- It is a fundamental responsibility of Government to provide for the security of the UK and its citizens now and for the future.
- The UK has maintained a nuclear deterrent since 1956, which has made a substantial contribution to peace and stability in Europe and beyond.
- The future is uncertain: accurately predicting events over the period 2020 to 2050 is extremely hard.
- There are worrying trends: nuclear proliferation continues; large nuclear arsenals remain, and some are being enlarged and modernised; and there is a potential risk from state-sponsored terrorists armed with nuclear weapons.
- Our nuclear forces must be credible if they are to be an effective deterrent. They must be invulnerable to attack, fully operationally independent, and have the range to cover all potential threats.
- A submarine is the most cost effective solution. Other options are much less effective and are at least as expensive.
- Ballistic missiles are more capable than cruise missiles in terms of range, payload and invulnerability. Retaining the Trident D5 missile is far cheaper than developing any new delivery system.
- We will maintain continuous at sea deterrent patrolling to ensure our deterrent remains fully credible. We currently need four submarines to maintain one continuously on patrol. We will investigate fully whether there is scope to make sufficiently radical changes to the design of the new submarines, and their operating, manning, training and support arrangements, to enable us to maintain continuous deterrent patrols with



# International Legal Obligations

## Summary

- The UK's retention of a nuclear deterrent is fully consistent with our international legal obligations.
- The Nuclear Non-Proliferation Treaty (NPT) recognises the UK's status as a nuclear weapon State. The NPT remains the principal source of international legal obligation relating to the possession of nuclear weapons. We are fully compliant with all our NPT obligations.
- The NPT does not establish any timetable for nuclear disarmament. Nor does it prohibit maintenance or renewal of existing capabilities. Renewing the current Trident system is fully consistent with the NPT and with all our international legal obligations.
- The use of nuclear weapons is governed by the same principles of law that govern the use of other weapons, namely principles of international humanitarian law. In 1996, the International Court of Justice delivered an Advisory Opinion which confirmed that the use, or threat of use, of nuclear weapons is subject to the laws of armed conflict, and rejected the argument that such use would necessarily be unlawful in all circumstances.
- The threshold for the legitimate use of nuclear weapons is clearly a high one. We would only consider using nuclear weapons in self-defence (including the defence of our NATO allies), and even then only in extreme circumstances. The legality of any such use would depend upon the circumstances and the application of the general rules of international law, including those regulating the use of force and the conduct of hostilities.
- We will continue to press for multilateral negotiations towards mutual, balanced and

verifiable reductions in nuclear weapons and to work towards total elimination of our own nuclear arsenal and all others.

## The Nuclear Non-Proliferation Treaty (NPT)

- The UK is recognised as a nuclear weapon State under the NPT. It is therefore entirely lawful for the UK to possess nuclear weapons.
- The NPT was signed on 1 July 1968. It defined 'nuclear weapon State' as applying to all states which had manufactured and exploded a nuclear weapon or other nuclear explosive device before 1 January 1967. In addition to the UK, this is limited to China, France, Russia and the US.
- Recognition as a nuclear weapon State under the NPT comes with certain obligations including:

**Article I** states that each nuclear weapon State Party to the Treaty "*undertakes not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly, or indirectly; and not in any way to assist, encourage, or induce any non nuclear weapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices*".

**Article IV** refers to the inalienable right of all Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes in conformity with Articles I and II of the Treaty. All Parties must also facilitate and have the right to receive exchanges of equipment, materials and



# The Current System

## The Submarines

- The UK's deterrent force comprises four Ships Submersible Ballistic Nuclear (SSBNs): HMS VANGUARD, VICTORIOUS, VIGILANT and VENGEANCE. The first was ordered in 1986 and built at Barrow-in-Furness. The first submarine commenced contractor sea trials in 1992 (the point at which its 25 year design life began) and the initial UK Trident deterrent patrol began in December 1994. Full introduction into service was completed to schedule with HMS VENGEANCE's first patrol in February 2001. At 16,000 tonnes, these are the largest submarines built in the UK; each vessel is 150 metres long, 13 metres in diameter and carries a crew of around 150 officers and ratings. Vanguard-class submarines are powered by a Rolls Royce designed and built pressurised water reactor. The UK's SSBN fleet is based at HM Naval Base, Clyde at Faslane.

## The Missiles

- The Trident D5 missile is a three stage solid fuel ballistic missile. Standing 13 metres high and weighing 60 tonnes, it has a range of over 4,000 nautical miles. The range of the missile is a great strength of the system as it allows the submarine carrying it to hide in millions of square miles of ocean, while remaining in reach of potential targets. Royal Navy nuclear-powered ballistic missile submarines carry up to 48 nuclear warheads on a maximum of 16 missiles.
- The 1963 Polaris Sales Agreement between the United Kingdom and the United States was amended in 1982 to establish a unique system of 'mingled

asset' ownership and management for Trident missiles. Those to be loaded in UK submarines are randomly selected from the stockpile at the US Navy Trident facility in Kings Bay, Georgia. The submarines then go to the Royal Naval Armaments Depot at Coulport near Faslane in Scotland where the missiles are fitted with warheads that are designed and manufactured in the UK at the Atomic Weapons Establishment (AWE), Aldermaston.

- The life extended Trident D5 missile is assessed to be capable of meeting our requirements of delivering assured deterrence until the early 2040s.

## The Mission

- In a posture known as Continuous At Sea Deterrence (CASD), one submarine, armed with up to 16 Trident missiles and up to 48 warheads, is always on deterrent patrol 24 hours a day, 365 days a year. The notice to fire has been increased to several days since the Cold War ended and the missiles are not targeted at any country. The 300th UK deterrent patrol will be completed during 2007. These deterrent patrols continue to demand the highest standards of stealth, safety and technical reliability.
- The professionalism of the Royal Navy submarine crews stands alongside more obvious technological achievements as a key component in fulfilling the deterrent mission. Unable to contact their families no matter what domestic crisis may occur in their absence, they deliver the peacetime safety and operational credibility to make deterrence work.



# The History of the UK's Nuclear Weapons Programme

## Start of the UK's nuclear weapons programme

- The United Kingdom's nuclear weapons programme had its origins in the Second World War. In 1941, the then Prime Minister, Winston Churchill, authorised the development of an atomic bomb following a report that showed it was scientifically feasible. UK work on developing a nuclear weapon progressed only slowly, leading in 1943 to an agreement between Churchill and US President Roosevelt that the British work should be subsumed into a larger joint effort – the Manhattan Project.
- Wartime UK-US nuclear collaboration was brought to an end by the 1946 US Energy Act (the McMahon Act), following which, in 1947, the Attlee Government decided to resume an independent UK programme to develop an atomic weapon. The UK successfully tested its first atomic bomb in October 1952.

## Thermonuclear era and the UK-US Mutual Defence Agreement

- In 1952, the Americans successfully tested a thermonuclear weapon ("H-bomb"), which was much more powerful than the earlier atomic weapons. The Soviet Union followed suit in 1954. Consequently, in the same year, the Cabinet committed the UK to developing a thermonuclear weapon. The UK's first successful detonations of such

weapons occurred during the Grapple series of trials at Malden and Christmas Islands in the Pacific Ocean during 1957 and 1958.

- In 1958, after modification of the 1946 McMahon Act, bilateral UK-US nuclear collaboration was resumed and the Agreement for the Co-operation on Uses of Atomic Energy for Mutual Defence Purposes ("Mutual Defence Agreement" or MDA) was signed. The MDA became, and remains, the cornerstone of UK-US co-operation on nuclear defence issues. It was renewed in 2004 for a further period of ten years.

## Air-launched nuclear weapons

- Britain's first operational nuclear weapon was the Blue Danube free-fall bomb, which was carried by the V-bombers (Valiant, Victor and Vulcan) of the RAF's strategic bomber force from 1956.
- A succession of air-launched nuclear weapons was developed during the late 1950s and early 1960s. Yellow Sun Mk.2 was the UK's first operational thermonuclear weapon and was in service from 1961 to 1969. Blue Steel was the UK's first nuclear missile (operational from 1962 to 1969), launched from a V-bomber. However, Blue Steel had operational constraints and its further development was cancelled in 1961 in favour of participating in the US's Skybolt programme to develop an air-launched stand-off missile.
- The last of the UK's air-launched nuclear weapons was the WE177 free-fall bomb, which entered service in 1966 and was finally withdrawn in 1998.

a fleet of only three. A final decision on submarine numbers will be taken when we know more about their detailed design.

## What will this cost?

- Our initial estimate is that the procurement cost will be in the region of £15-20 billion (at today's prices) for four submarines and the associated equipment and infrastructure. The costs will become clearer as we engage in further detailed discussions with industry.
- It is not possible to be sure what the size of the defence budget will be over the timescales involved but the procurement costs are likely on average to be the equivalent of around 3% of the current defence budget over the main period of expenditure.
- The investment required to maintain our deterrent will not come at the expense of the conventional capabilities our armed forces need.

## International obligations

- Retaining our current nuclear deterrent capability is fully consistent with our international obligations.
- We will continue to work towards a safer world in which there is no requirement for nuclear weapons.
- We have an excellent record of meeting our commitments under the Nuclear Non-Proliferation Treaty (NPT). We are the only nuclear weapon State recognised under the NPT to have a deterrent based on a single platform, delivery system and warhead design, and have already significantly reduced the scale and readiness of our Trident system.
- We have now decided to reduce the number of operationally available nuclear warheads to less than 160, a cut of 20% compared to the previously declared maximum.
- We have reduced the upper limit on our operationally available nuclear warheads by nearly half since 1997.

## What decisions have been taken?

- We have decided to:
  - maintain our current Trident-based nuclear deterrent by procuring a new class of submarines;
  - participate in the US life extension programme for the Trident D5 missile;
  - make a further 20% reduction in our warhead stockpile.
- Decisions on whether and how we may need to refurbish or replace the current warhead are likely to be necessary in the next Parliament. A final decision on submarine numbers will be taken when we know more about their detailed design.

## Conclusion

We are committed to retaining our nuclear deterrent capability to provide effective deterrence, while setting an example, where possible, by reducing our nuclear capability and working multilaterally for nuclear disarmament and to counter nuclear proliferation. We believe this is the right balance between our commitment to a world in which there is no place for nuclear weapons and our responsibilities to protect the current and future citizens of the UK.

# Non-proliferation

- The UK has pursued a comprehensive multilateral strategy to strengthen legally binding obligations on states to tighten export controls, combat supply chains and prevent old or unused materials from falling into the wrong hands. These efforts include:
  - **International Atomic Energy Agency (IAEA):** The UK is working closely with the IAEA to develop assurances of supply for nuclear fuel, which provide energy security without the need for proliferation of sensitive enrichment technology.
  - **Iran/IAEA:** Since 2003, the UK, France and Germany have been leading international diplomatic efforts to convince Iran fully to co-operate with the IAEA over international concerns about its nuclear programme.
  - **Middle East WMD Free Zone:** The UK continues to support the creation of an effective and verifiable chemical, biological, radiological and nuclear free zone in the Middle East.
  - **UNSCR 1540:** The UK was one of the leading proponents of UN Security Council Resolution 1540 which established legally-binding obligations on all UN Member States to take steps to combat proliferation of weapons of mass destruction.
  - **Libya/AQ Khan:** The UK played a key role in the process that led to Libya's announcement, in December 2003, that it would eliminate its chemical, biological and nuclear programmes and limit its missile projects. This process contributed to the discovery and dismantling of the proliferation activities being pursued by the AQ Khan network.
  - **Proliferation Security Initiative (PSI):** The UK has been involved actively in driving forward the PSI, which aims to prevent the acquisition and development of chemical, biological, radiological and nuclear (CBRN) weapons by states of concern and non-state actors.
- **Export Control Regimes:** The UK is a leading and active member of the Nuclear Suppliers Group, the Australia Group, the Missile Technology Control Regime and the Zangger Committee - arrangements which aim to minimise the risk of assisting CBRN and ballistic missile proliferation through more effective national level export licensing measures.
- **G8 Global Partnership Co-operative Threat Reduction:** The UK has committed up to \$750 million over ten years to this work and currently supports projects to help dismantle old Russian nuclear submarines, dispose of 34 tonnes of plutonium in Russia, destroy Russia's stocks of chemical weapons (a total of 40,000 tonnes) and create new employment for former Soviet weapons scientists.
- **Global Initiative to Combat Nuclear Terrorism (GICNT):** The UK is an Initial Partner Nation of the GICNT, unveiled by the US and Russian Presidents in July this year. The initiative calls for co-operation in efforts directed at, among other things, improving control of nuclear materials, and detecting and suppressing illicit trafficking of such materials.
- **Norwegian 7 Country Initiative:** The UK is an active member of the 7 Country Initiative, which aims to foster fresh thinking on how we can take forward the three pillars of the NPT – access to nuclear technology for exclusively peaceful purposes, non-proliferation and disarmament.
- **Chemical Weapons Convention (CWC)/Biological and Toxin Weapons Convention:** We are working with the EU to encourage and help all countries accede to both treaties and fully to implement their obligations. In the last 5 years, over 20 additional countries have joined the CWC.



scientific and technological information for the peaceful uses of nuclear energy.

**Article V** states that all Parties must ensure that potential benefits from any peaceful applications of nuclear explosions will be made available to non-nuclear weapon States on a non-discriminatory basis.

**Article VI** requires all Parties 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, and on a treaty on general and complete disarmament under strict and effective international control.*"

- The UK is fully compliant with the above Articles and all its other obligations under the NPT.
- In addition to these obligations, the UK also supports the further measures that were adopted at the 1995 NPT Review and Extension Conference, and in the outcome document from the 2000 NPT Review Conference to take forward the implementation of the Treaty. These include the "13 Practical Steps for systematic and progressive efforts to implement Article VI". These are available at: <http://disarmament.un.org/wmd/npt/2000FD.pdf>

## UK Support for the NPT and for Disarmament

- The UK fully complies with its obligations under Article VI of the NPT. The UK shares the goal of a world free from nuclear weapons. We continue to press for multilateral negotiations towards mutual, balanced and verifiable reductions in nuclear weapons.
- The UK continues to support the disarmament measures contained in the "13 Practical Steps", and has an excellent record on meeting the priorities they set out:

- the UK stands by its **unequivocal undertaking to accomplish the total elimination of its nuclear arsenal**. The number of nuclear weapons in the world has considerably decreased since the NPT came into force and the UK's contribution to this reduction, by way of the disarmament measures we have taken and plan to take, as set out in the White Paper, is significant;
- the UK has become increasingly **transparent** with regards to its nuclear weapons holdings;
- the **operational status** of our nuclear weapon system has been **significantly reduced**;
- the **UK has not conducted a nuclear test explosion**, or any other nuclear explosion, **since 1991**. We ratified the Comprehensive Nuclear Test Ban Treaty in 1998 and continue to push for its early entry into force;
- the UK made it clear in 1995 that we had **ceased the production of fissile material** for nuclear weapons and other nuclear explosive devices. We also continue to press for the immediate commencement of negotiations on a Fissile Material Cut-Off Treaty at the Conference on Disarmament in Geneva.

- Renewing the Trident system does not reverse or undermine the positive steps outlined above. It is simply about **maintaining no more than the very minimum nuclear capability judged necessary for our security**, whilst we pursue the right security conditions for complete, multilateral disarmament.

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1980 Trident I (C4) ordered

1982 Trident II (D5) ordered



1986 HMS VANGUARD ordered

1987 HMS VICTORIOUS ordered



1990 HMS VIGILANT ordered; first US operational Trident II (D5) SSBN (USS TENNESSEE)

1992 HMS VENGEANCE ordered

1992 HMS VANGUARD commenced contractor sea trials (start of 25 year design life)

1994 HMS VANGUARD – first UK Trident II (D5) missile launch and first UK Trident II (D5) deterrent patrol

1994 HMS VICTORIOUS commenced contractor sea trials

1996 HMS VIGILANT commenced contractor sea trials

1999 HMS VENGEANCE commenced contractor sea trials

2002 HMS VANGUARD commenced long overhaul period and refuelling at Devonport

2005 HMS VANGUARD rejoined the Fleet, HMS VICTORIOUS commenced long overhaul period and refuelling at Devonport

2007 300<sup>th</sup> UK SSBN deterrent patrol

## The path to Polaris

- In the mid-1950s, largely as a result of concerns about the vulnerability of the V-bombers to Soviet air defences, the UK commenced development of the Blue Streak ground-launched, intermediate range ballistic missile. However, in 1960 this programme was cancelled, mainly because of concerns at the potential vulnerability of a silo-based missile system to a pre-emptive strike.
- In 1962, the Kennedy administration cancelled the Skybolt programme, which the UK had joined in 1961, due to cost overruns and delays to the planned in-service date. The UK was therefore left with a nuclear deterrent of diminishing credibility based on the V-bomber force, and with no replacement under development.
- This situation was resolved when Prime Minister MacMillan and President Kennedy concluded the Nassau Agreement in 1962, in which the US undertook to make the Polaris missile system available to the UK. The agreement was formalised in 1963 with signature of the Polaris Sales Agreement.

## Submarine-based deterrent

- The Polaris submarine-launched ballistic missile system entered service with the Royal Navy in 1968 and the V-bombers were withdrawn from the nuclear role in 1969. 16 Polaris missiles were carried by each of four Resolution-class nuclear-powered submarines, which were designed and built in the UK. The warheads were also designed and built in the UK and initially comprised a modified version of the WE177 device. This was replaced in 1982 by the Chevaline warhead, which was designed to address concerns about the increasing vulnerability of the Polaris system.
- In 1980, the Government announced its decision to procure the Trident C4 missile system to replace the ageing Polaris system, and then in 1982 to procure instead the D5 variant of the Trident missile because of its increased capabilities and the long-term financial savings resulting from operating the same missile as the US Navy. From 1994 onwards, four UK-designed and built Vanguard-class submarines carrying the Trident missiles progressively replaced the Resolution-class submarines. The Polaris era ended at a ceremony on 28 August 1996 at Faslane to mark the decommissioning of the last Resolution-class submarine, REPULSE.