HOUSE OF COMMONS LIBRARY

BRIEFING PAPER

Number 7353, 12 July 2016

Replacing the UK's 'Trident' Nuclear Deterrent

By Claire Mills

Inside:

Contents

Summary

In 2007 the Government, endorsed by a Parliamentary vote, began a programme to maintain the UK's nuclear deterrent beyond the early 2030s. Under this programme the current Vanguard class ballistic missile submarines will be replaced (the Successor programme); while the UK will also participate in the current US service-life extension programme for the Trident II D5 missile, which will enable this missile to be deployed aboard the new submarines until the early 2040s.

Nearly a decade later a decision on taking the Successor programme forward into the manufacture phase is due to be taken. The Government has confirmed that it will seek the approval of Parliament for this decision on 18 July 2016.

What is Trident?

Trident is the colloquial term used for the UK nuclear deterrent. The deterrent as a whole, however, comprises three main elements and has a vast supporting infrastructure:

- Four Vanguard class submarines (SSBN) which maintain continuous at-sea deterrence (CASD), meaning that one vessel is always on patrol (Operation *Relentless*).
- The Trident II D5 ballistic missile. The UK has title to 58 missile bodies, which are held in a communal pool at the Strategic Weapons Facility at the Kings Bay Submarine Base in Georgia, USA. Maintenance and in-service support of the missiles is undertaken at Kings Bay at periodic intervals.
- Nuclear warhead. The infrastructure for building and maintaining the UK's nuclear stockpile is located at two government-owned, contractor-operated Atomic Weapons Establishment (AWE) sites at Aldermaston and Burghfield in Berkshire.

The deterrent is based in western Scotland at HM Naval Base Clyde. The submarines are based at Faslane and the warheads are stored, processed and maintained at the Royal Naval Armaments Depot at Coulport. In-service maintenance of the Vanguard class is conducted at Faslane; while deep maintenance/refit is conducted at HM Naval Base Devonport in Plymouth.

Decision making on the use of British nuclear weapons is a sovereign matter for the UK. There is no requirement to gain the approval of the United States or other NATO allies for their use and only the Prime Minister can authorise an instruction to fire.

By the time of the 1998 Strategic Defence Review (SDR) the majority of costs associated with procuring Trident had been spent. The SDR put total acquisition expenditure on the Trident programme at £12.52 billion, which equates to £18.35 billion in 2015-16 prices.

The decision to acquire Trident was announced in a Statement to the House in July 1980. A parliamentary debate, and vote, endorsing the Government's decision was held in March 1981.

From the decision in 1980 it took 14 years to complete the acquisition of the Trident capability with the first Vanguard class submarine entering service in December 1994.

UK nuclear policy

The UK is signatory to a number of treaties and agreements relating to nuclear weapons and their delivery systems which confer several obligations on the UK with respect to its nuclear policies. The most significant are the disarmament obligations stated in Article VI of the *Treaty on the Non-Proliferation on Nuclear Weapons* (NPT). Under that article the five recognised nuclear weapon states are permitted to possess nuclear weapons, but only if they commit themselves to the principles of nuclear arms control and eventual disarmament.

In 1996, the International Court of Justice also issued a non-binding advisory opinion on the legality of the threat or use of nuclear weapons. That advisory opinion concluded that "There exists an obligation to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament in all its aspects under strict and effective international control".

Successive Governments have insisted that the UK's nuclear deterrent is fully consistent with all of the UK's international legal obligations. They have also expressed the belief that the current programme to replace the nuclear deterrent is compatible with the UK's obligations under the NPT, arguing that the treaty contains no prohibition on updating existing weapons systems and gives no explicit timeframe for nuclear disarmament.

The UK has taken a number of steps since the end of the Cold War in support of the NPT. It has withdrawn all other nuclear weapons systems except for Trident; made changes to the operational status of the deterrent and been increasingly transparent about its nuclear inventory. By the mid-2020s the UK will have achieved a 65% reduction in the size of its overall nuclear stockpile, making it the smallest of all the NPT nuclear weapon states.

The 2015 Strategic Defence and Security Review (SDSR 15) confirmed that the "UK will not use, or threaten to use, nuclear weapons against any non-nuclear weapon state party to the NPT". This assurance does not apply, however, to any state in material breach of the NPT. The UK also maintains a position of ambiguity on the precise details of when, how and at what scale the UK may consider the use of its nuclear weapons capability, although the Government has stated that nuclear weapons would only be used in extreme circumstances of self-defence.

Replacing the UK's nuclear deterrent

The Labour Government's 2006 White Paper, *The Future of the United Kingdom's Nuclear Deterrent* concluded that the international security environment does not justify complete UK nuclear disarmament and that, in terms of both cost and capability, retaining the submarine-based Trident system would provide the most effective deterrent.

The decision was therefore taken to maintain the UK's existing nuclear capability by replacing the Vanguard class submarines (SSBN) and participating in the current US service-life extension programme for the Trident II D5 missile.

A debate and vote in the House of Commons on the general principle of whether the UK should retain a strategic nuclear deterrent beyond the life of the current system was held on 14 March 2007. That motion was passed on division by 409 to 161 votes.

Although commonly referred to as "the renewal or replacement of Trident", the Successor programme, is about the design, development and manufacture of a new class of four submarines. A Common Missile Compartment for the SSBN, which will house the current Trident strategic weapons system, is being developed in conjunction with the United States. Replacement of the Trident II D5 missile itself is not part of the Successor programme. Under changes introduced in the 2015 SDSR, the first SSBN is now expected to enter service in the early 2030s.

Decisions on a replacement warhead have been deferred until later this decade and it is expected that "no new significant infrastructure will be required to support the Successor submarines".

The Successor programme is currently in a five-year assessment phase. Several long-lead items, including the specialised steel for the first submarine, have been purchased as part of assessment phase work. Manufacture of the submarines will not take place, however, until after parliamentary approval is given for the programme to go ahead.

The 2015 SDSR confirmed that the costs of design and manufacture of a class of four SSBN, including inflation over the life of the programme, would be £31 billion, an increase of £6 billion on estimates set down in the programme's Initial Gate report in 2011. A £10 billion contingency will also be set aside. Spread over 35 years, this represents 0.2% of Government spending.

The Concept Phase of the programme had an allocated spend of £905 million, while the Assessment Phase, to 2016, now has an allocated budget of £3.9 billion. The years of peak expenditure are expected to be principally 2018 through to the mid/late 2030s, as the programme moves into full production.

Once the new nuclear deterrent submarine comes into service the annual in-service costs are expected to continue at approximately 6% of the defence budget. Under the current defence budget 6% of spending equates to approximately £2.1 billion per year. As part of the 2015 CSR settlement, that figure is expected to rise to £2.38 billion by 2020/2021.

Calculating overall in-service costs, however, is fraught with difficulty as assumptions have to be made about the state of the British economy and projected levels of defence spending over the next 50-60 years.

In line with convention, the Successor programme will be funded from the MOD's core equipment procurement budget.

Many believe the MOD's assessment of cost to be under-estimated and that the true cost of replacing the nuclear deterrent will be much higher. CND's most recent estimate in May 2016 has suggested that the cost of the replacement programme will be £205 billion, although this is over the 30-year life of the system and takes into consideration other potential costs, such as the cost of decommissioning. It also bases its in-service cost calculations on figures previously presented by Crispin Blunt MP, which made a number of assumptions about GDP growth over the next 50 years and that defence spending will continue to meet the NATO 2% of GDP target over this same period.

BAE Systems, Babcock International and Rolls Royce are the Tier One industrial partners in this project. As with previous SSBN, the submarine will be built by BAE Systems in Barrow-in-Furness and the PWR3 propulsion system will be built by Rolls Royce at Raynesway, Derby. The MOD has stated that maintaining and sustaining the UK's nuclear deterrent supports over 30,000 UK jobs. Approximately 2,200 people across the MOD and all three companies are currently working on the Successor programme, of whom over 50% are engineers and designers. Jobs are expected to peak at 6,000 during the entire build phase and involve an estimated 850 British companies in the supply chain.

As one of the largest government investment programmes going forward, the 2015 SDSR announced that new organisational and managerial arrangements for the UK's defence nuclear enterprise as a whole, and for delivering the Successor programme specifically, will be established. A new team within the MOD, headed by a commercial specialist, will oversee all aspects of the nuclear enterprise; while a new delivery body will be established in order to deliver the procurement and in-service support of all nuclear submarines, including Successor.

The 2015 SDSR also announced that new commercial arrangements would be put in place that will see the programme subject to several stages of investment, instead of the traditional single 'Main Gate' approach which entails a single investment decision. The next phase of the programme, which SDSR 15 refers to as "risk reduction and demonstration" will begin later in 2016.

The Government has stated that there will be a debate and a vote on "the principle of continuous at-sea deterrence and our plans for Successor" on 18 July 2016.

Arguments for and against replacement

The UK's status as a nuclear weapons state has always been a matter of contention and the current debate on renewal has, at its heart, all of the same fundamental arguments.

On the one hand there are those, including the Government, who advocate the UK remaining a nuclear power, in some form or another, citing the uncertainty of the strategic environment over the next 50 years. On the other, there are those who advocate disarmament and the move toward the UK becoming a non-nuclear weapon state.

Disarmament advocates argue that the UK's nuclear deterrent should not be renewed on one or more of the following grounds:

- Traditional notions of deterrence are no longer credible against non-state actors like al-Qaeda or more recently ISIS/Daesh; or in an age of 'hybrid'/asymmetric warfare in which cyber attacks and drone operations are increasingly becoming the norm. Proponents of this view also argue that the evolution and increasing use of underwater drone technologies and cyber capabilities could render submarine-based nuclear systems obsolete at some point in the future, and highly likely within the lifetime of Successor.
- Dispensing with nuclear weapons would serve as a positive example for other states to follow; would bolster the NPT regime and would enhance the UK's authority and standing internationally.
- In a period of financial austerity the money to be spent on a Trident replacement would be better spent on either improving the UK's conventional military capabilities, in particular counter-terrorist and drone capabilities, or being put to greater use within the NHS or addressing issues such as environmental concerns, poverty, disease and debt.
- Replacing the nuclear deterrent would breach customary international law and the UK's disarmament obligations under Article VI of the NPT.
- Retaining a nuclear deterrent should be condemned on moral grounds

Advocates of retaining the British nuclear deterrent predominantly argue that, while there is currently no direct threat to the UK, there is no way of predicting with any confidence the strategic environment over the next 40-50 years. Specifically:

- The existence of non-state actors and rogue states with the intent and capability to develop weapons of mass destruction, coupled with the threat posed by the proliferation of nuclear knowledge and technology, make it imperative that nuclear weapons be retained.
- In the coming decades a potential threat may emerge from an existing nuclear power that combines both the capability and intent to strike the UK. Some point to the growing military and economic power of China or the risk of future instability as a result of Russian adventurism.
- There can be no guarantee that other aspiring nuclear weapon states or rogue states with nuclear intentions, such as North Korea, would give up their arsenals or plans purely because the UK has foregone its nuclear deterrent capability.

To supporters, the deterrent therefore represents the ultimate security guarantee for the UK and they believe that the cost of retaining it is comparatively small when compared with the strategic risks of disarmament. Many have also refuted the suggestion that any savings achieved from abandoning the replacement programme would be available for the MOD to spend on conventional capabilities. Instead they have argued that such monies would more likely be repatriated by the Treasury.

Alternatives to a like-for-like replacement

If one sets aside the argument for unilateral disarmament and accepts the assumption that the UK should remain a nuclear power, there are several schools of thought on alternatives to a like-for-like replacement.

Many view the replacement programme as a unique opportunity either to further the UK's disarmament obligations or to make cost savings by pursuing other options. Such options include adopting a reduced nuclear posture (i.e. abandoning continuous at-sea deterrence); converting the existing system/replacement SSBN to a 'dual use' role; or the procurement of an entirely different system based either on a cruise missile system or an air-launched free-fall bomb.

Beyond that, there are also those who advocate the concept of a 'virtual arsenal' or threshold status for the UK whereby the UK disarms but retains the ability to reconstitute a nuclear capability within a matter of months or years, should it become in the national interest to do so.

The merits of any of these options are shaped by two fundamental premises:

- The level of strategic risk one is prepared to take.
- The financial burden one is willing to commit to.

As part of the Conservative/Liberal Democrat Coalition Agreement in May 2010 it was agreed that, while the programme would be scrutinised for value for money within the framework of the Strategic Defence and Security Review, the Liberal Democrats could continue to make the case for alternatives.

An unclassified version of the Trident Alternatives Review was subsequently published on 16 July 2013. While the review examined a number of alternative systems and postures, it concluded that, within the timeframe under consideration, an SSBN operating a continuous at-sea deterrent posture offered the UK the highest level of assurance that can be attained with a single deterrent system.

However the review went on to highlight that "there are alternative non-continuous postures that could be adopted", although "none of these alternative systems and postures offers the same degree of resilience as the current posture of continuous at-sea deterrence, nor could they guarantee a prompt response in all circumstances". The report also noted that any change to the UK's deterrent system and/or posture could impact on the UK's wider national interests and relations with allies.

Although supported by the Liberal Democrats, the review was met with widespread criticism from elsewhere across the House. Concern was largely expressed over the review's suggestion that the UK could adopt a 'part time' deterrent, which many Members argued provided no deterrent capability at all, and the lack of consideration given in the report to the UK's submarine manufacturing capabilities. A number of MPs even suggested that the outcome of the review had undermined the Liberal Democrats' case for arguing for alternatives in the first place. Advocates for disarmament went even further to criticise the total

absence from the review of the other alternative for the UK: unilateral disarmament.

Outside Parliament the Trident Alternatives Review met with equally mixed views. Questions were raised about the risks of adopting a non-continuous deterrent posture and whether moving forces to a higher readiness level during a crisis could be sustained with just a small fleet of submarines; whether breaks in patrolling could prompt a pre-emptive strike against inactive forces; and what effect an escalation in patrolling during a crisis could have on an adversary and whether it could in fact escalate a crisis as opposed to de-escalating one.

Public opinion on Trident

Pollsters do not routinely ask questions about Trident in political opinion polls. Questions about Trident tend to be included in opinion polls only at times when the nuclear deterrent is a subject of public debate, or when newspapers, political parties, or campaign groups specifically commission polls on the subject.

Because of the infrequency and variability of opinion poll questions on Trident it is hard to measure trends in the level of support for and opposition to Trident over time. Nevertheless, a review of the available opinion poll evidence does suggest that, broadly speaking, the British public is divided on the question of whether Trident should be renewed. However, the public's views on Trident are nuanced and their responses to public opinion polls are sensitive to the wording and framing of the question they are asked.

1. Background

In 2007 the Government, endorsed by a Parliamentary vote, began a programme to maintain the UK's nuclear deterrent beyond the early 2030s. Under this programme the current Vanguard class ballistic missile submarines will be replaced (the Successor programme); while the UK will also participate in the current US service-life extension programme for the Trident II D5 missile, which will enable this missile to be deployed aboard the new submarines until the early 2040s.

Nearly a decade later a decision on taking the Successor programme forward into the manufacture phase is due to be taken. The Government is expected to seek the approval of Parliament for this decision on 18 July 2016.

The nuclear debate is a vast topic for discussion. The intention of this paper is not to examine every aspect of that nuclear debate, or to outline every conceivable position or opinion on this subject. This paper is intended as a guide to the key points and issues that are pertinent to the forthcoming decision on moving forward with the replacement programme.

This paper updates and replaces all previous House of Commons Library briefing papers on this subject dating back to 2006. More notably it replaces previous versions of this paper published in October 2015, January 2016, March 2016 and June 2016. It is also part of a wider Library briefing series on nuclear weapons:

- CBP7634, *Nuclear weapons: disarmament and non-proliferation regimes*
- CBP7566, *Nuclear weapons – country comparisons*
- CBP4079, *The French nuclear deterrent*
- CBP7542, *Defence nuclear convoys*
- SN07028, *Conference on the humanitarian impact of nuclear weapons* , December 2014
- SN03147, *UK-USA Mutual Defence Agreement,* October 2014

A paper entitled *Obama's nuclear legacy*, is planned for publication in early 2017.

2. What is Trident?

Summary

The UK's nuclear deterrent, commonly referred to as Trident, is comprised of three main elements:

- Four Vanguard class submarines (SSBN) which maintain continuous at-sea deterrence (CASD), meaning that one vessel is always on patrol (Operation *Relentless*).
- The Trident II D5 ballistic missile. The UK has title to 58 missile bodies, which are held in a communal pool at the Strategic Weapons Facility at the Kings Bay Submarine Base in Georgia, USA. Maintenance and in-service support of the missiles is undertaken at Kings Bay at periodic intervals.
- Nuclear warhead. The infrastructure for building and maintaining the UK's nuclear stockpile is located at two government-owned, contractor-operated Atomic Weapons Establishment (AWE) sites at Aldermaston and Burghfield in Berkshire.

The deterrent is based in western Scotland at HM Naval Base Clyde. The submarines are based at Faslane and the warheads are stored, processed and maintained at the Royal Naval Armaments Depot at Coulport. In-service maintenance of the Vanguard class is conducted at Faslane; while deep maintenance/refit is conducted at HM Naval Base Devonport in Plymouth.

Decision making on the use of British nuclear weapons is a sovereign matter for the UK. There is no requirement to gain the approval of the United States or other NATO allies for their use and only the Prime Minister can authorise an instruction to fire.

By the time of the 1998 Strategic Defence Review (SDR) the majority of costs associated with procuring Trident had been spent. The SDR put total acquisition expenditure on the Trident programme at £12.52 billion, which equates to £18.35 billion in 2015/16 prices.

The decision to acquire Trident was announced in a Statement to the House in July 1980. A parliamentary debate, and vote, endorsing the Government's decision was held in March 1981.

From the decision in 1980 it took 14 years to complete the acquisition of the Trident capability with the first Vanguard class submarine entering service in December 1994.

Trident is the colloquial term used for the UK nuclear deterrent. The deterrent as a whole, however, comprises several elements and has a vast supporting infrastructure.

2.1 Component parts

Since 1998 the UK nuclear deterrent has consisted solely of the submarine-based Trident system which has three main component parts:

- The platform – a fleet of four Vanguard class nuclear-powered submarines (SSBN).
- The Trident II D5 missile.
- The warhead.

Vanguard class SSBN

Purpose-built at Barrow-in-Furness, the Vanguard class was designed solely as a nuclear-powered ballistic missile carrier. As such it differed greatly from its predecessor, the Resolution class 'Polaris' submarine, whose design was adapted at the time from the existing Valiant class submarine. Despite having a smaller complement of personnel, the Vanguard class vessels were larger than the Polaris submarine in order to accommodate the Trident II D5 missile. They also incorporated several improvements from the previous submarines, including a new custom-designed nuclear-powered propulsion system, based on the second-generation Pressurised Water Reactor (PWR2), manufactured by Rolls Royce at Raynesway, Derby; and a new tactical weapon system for self-defence purposes, including a new submarine command system.

Each submarine has 16 independently controlled missile tubes, which makes the Vanguard class technically capable of carrying 192 warheads per vessel.[1] However, under limits imposed in the 1998 Strategic Defence Review (SDR) and the 2010 Strategic Defence and Security Review (SDSR), each submarine now only deploys with eight operational missiles and no more than 40 nuclear warheads.[2] The submarine also has four torpedo tubes capable of firing conventional Spearfish torpedoes.

The first Vanguard class submarine (HMS *Vanguard*) entered service in December 1994, with the last of the class of four (HMS *Vengeance*) entering service in February 2001.[3]

In February 2002 a Long Overhaul Period (Refuel) (LOP (R)) programme for the Vanguard class submarines began, including the incorporation of a new reactor core (Core H) which was intended to eliminate the need for further reactor fuelling before the end of the service life of the submarine.[4] However in March 2014 the Government took the decision to refuel the nuclear reactor in HMS *Vanguard* for a second time since it entered service, during its planned deep maintenance period which began in December 2015. The decision was taken after low levels of radioactivity were detected in the cooling system of the prototype core which is operated at the Naval Reactor Test Establishment at Dounreay.

The MOD referred to the decision to refuel HMS *Vanguard* as a precautionary measure, emphasising the need to undertake this work at the next available opportunity, rather than waiting to see if the core needs to be replaced at a later date. To do so would potentially mean putting *Vanguard* into a period of unscheduled deep maintenance which would have implications for maintaining continuous at-sea deterrence.[5] The Government has also emphasised that it will "increase

---

1 Each Trident-II D5 missile is capable of carrying 12 warheads.
2 See UK Nuclear Policy
3 HMS *Victorious* entered service in December 1995 and HMS *Vigilant* entered service in June 1998.
4 HMS *Vanguard was* the first to undertake the refit programme and re-entered operational service at the beginning of 2006. The last of the class, HMS Vengeance entered the LOP (R) refit programme in 2012 and re-entered service in December 2015.
5 HC Deb 6 March 2014, c1077

our confidence that Vanguard will be able to operate effectively and safely until the planned fleet of Successor submarines begins to be delivered from 2028".[6]

A decision on whether to refuel the next oldest Vanguard class submarine, HMS *Victorious*, does not need to be made until 2018. However, the MOD has stated that it will "take the necessary steps to keep open the option of refuelling Victorious. That will involve investment at Devonport and at the reactor plant at Raynesway in Derby to preserve our ability to conduct nuclear refuelling".[7]

Trident II D5 missile

The Trident II D5 missile system, which is manufactured in the US by Lockheed Martin, is a three-stage solid-fuel inertially-guided rocket approximately 13m long, nearly 2m in diameter and weighing 60 tonnes. It has a range of between 6,500km and 12,000km, dependent upon payload, and its accuracy is measured in metres.[8] Each missile is technically capable of carrying up to 12 warheads, although restrictions imposed under the 2010 Strategic Defence and Security Review (see above) mean that each missile is believed to carry, on average, five apiece.

The missile is ejected from the submarine by high-pressure gas and only when it reaches the surface does the first rocket stage automatically fire. The missile's own inertial guidance system then takes over. After the third rocket motor has separated, the warhead carrier takes a star sighting to confirm the missile's position and then manoeuvres to a point at which the warheads can be released to free-fall onto their targets. Each missile has a MIRV (multiple independently targetable re-entry vehicle) capability which enables it to engage multiple targets simultaneously.

The UK had originally intended to purchase 65 Trident missile bodies, but this was reduced to 58 by the Labour Government in 1998.[9] The UK has title to these 58 missile bodies, which are held in a communal pool at the Strategic Weapons Facility at the Kings Bay Submarine Base in Georgia, USA.[10] Maintenance and in-service support of the missiles is undertaken at Kings Bay at periodic intervals, normally after a submarine has been through refit. This arrangement was considered to

---

6 HC Deb 6 March 2014, c1077. As a result of the 2015 SDSR the first successor submarine will now enter service in the early 2030s (see section 4.2)

7 ibid

8 The precision of ballistic missiles is measured by what is known as the circular error probability or CEP, which is the radius of the circle within which half the strikes would impact. The CEP for Trident is reported to be around 90 metres: thus, each warhead would impact within 90 meters of the target point with a probability of 50%.

9 In July 1998 the Government announced six missiles had been test fired as part of the work-up of the submarines, with a further eight to be test-fired over the life of the Trident programme. A further four missiles were to be held as a "processing margin". Some of the seven missiles not purchased by the Government were required as in-service spares, while the remainder were to be sold back to the US. (HC Deb 30 July 1998, c448-9w)

10 Because of the pooling arrangements, a missile that is deployed on a US submarine may later deploy on a British submarine and vice versa.

be the most cost effective as the UK has not had to construct its own servicing facilities.[11]

Warhead

According to the Ministry of Defence, the Mk4 warhead on the Trident II D5 missile is of British design and built at the Atomic Weapons Establishment (AWE) at Aldermaston. Public information about it is scarce, although it is believed to be closely related to the American W76 warhead, a thermonuclear warhead in the 80-100 kiloton range deployed by the US on its Trident missiles.[12] Certain non-nuclear components are procured from the US on cost effectiveness grounds. These include the arming, fusing and firing system, neutron initiators and gas transfer system.[13]

The warheads undergo regular maintenance and refurbishment at AWE Aldermaston when components with a shorter lifespan are replaced. The US-designed Mk4A arming, fusing and firing system, for example, is currently being introduced into the UK warhead by AWE in order to replace existing components which are becoming obsolete. In its March 2011 report, *Labs Accomplishments*, Sandia National Laboratories reportedly performed the first UK trials test of the W76-1 warhead, which incorporates the new Mk4A.[14] In June 2016 the MOD sought to highlight that this is not a new warhead and "does not change the destructive power of the weapon".[15]

At present the UK has 225 nuclear warheads in its active stockpile. Under changes announced in the 2010 SDSR that stockpile will be reduced to no more than 180 warheads by the mid-2020s. Of that present stockpile, 120 are operationally available warheads.[16]

2.2 Supporting Infrastructure

The nuclear deterrent is based in western Scotland at HM Naval Base Clyde. The submarines are based at Faslane and the warheads are stored, processed and maintained a few miles away at the Royal Naval Armaments Depot at Coulport. In-service maintenance and support for the SSBN fleet is conducted at Faslane.

In 2012 the MOD entered into a 15-year contract with ABL Alliance to provide elements of support to the Trident strategic weapon system at Coulport and the Strategic Weapons Support Building at Faslane. ABL is a consortium of AWE plc, Babcock and Lockheed Martin.[17]

---

11 Commodore Tim Hare, Royal Navy (retired) suggested in evidence to the Defence Committee that the arrangement had saved the UK in the region of £3.8 billion. Defence Committee, *The Future of the UK's Strategic Nuclear Deterrent: the Strategic Context*, HC 986, Session 2005-06, Ev. 34

12 Center for Defense Information (CDI) Nuclear Weapons Database, http://www.cdi.org/issues/nukef&f/database/uknukes.html

13 HC Deb 2 December 2009, c911W

14 http://www.sandia.gov/LabNews/ln03-25-11/labnews03-25-11.pdf

15 Defence in the media, 8 June 2016

16 Changes to the UK nuclear stockpile are summarised in section 3.

17 MOD press release, 27 July 2012

HMNB Clyde is managed under a long-term partnership arrangement involving the MOD and Babcock. The base currently employs approximately 6,800 personnel, of which approximately half are civilian posts.

In response to a Freedom of Information request in 2012 the MOD revealed that 520 jobs at HMNB Clyde are directly reliant upon Trident.[18] In answer to a Parliamentary Question on 19 October 2015, however, the MOD suggested that "Civilian and Service personnel are not assigned to positions easily identified as supporting the Trident Programme. The information requested is not held centrally and could only be provided at disproportionate cost".[19]

While in-service maintenance is conducted at Faslane, deep maintenance/refits of the SSBN fleet are conducted at HM Naval Base Devonport in Plymouth.[20] Devonport is also responsible for decommissioning nuclear-powered submarines, including the SSBN fleet, at the end of their service lives. Devonport dockyard is also run by Babcock International and employs approximately 2,500 personnel across the whole base.[21]

There are also several conventional military assets assigned to the deterrent in a force protection role. In answer to a Parliamentary Question in 2007 the MOD identified those assets as follows:

> In addition to the four Vanguard-class submarines, all of which are dedicated to Military Task 1.2—Nuclear Deterrence—the current planned force elements assigned to support nuclear deterrence are shown in the following table [...]

Force element	*Committed*[1)]	*Contingent*[2)]
Attack submarines	0	2
Destroyers and frigates	0	1
Minewarfare vessels	1	3
Royal fleet auxiliary vessels	0	1
Survey vessels	1	0
Merlin ASW helicopters	0	5

18 FOI request 28-08-2012-155240-002, 22 October 2012. The MOD
19 PQ10759, 19 October 2015
20 Devonport is responsible for the refit and maintenance of both the SSBN and SSN fleets.
21 Devonport Management Limited operates the site. Babcock acquired the shareholding of DML in 2007.

Maritime and reconnaissance aircraft	0	8

(1) Force elements committed to the military task as their primary role
(2) Force elements held contingent are assigned to a number of tasks and are not planned routinely to deploy in support of the deterrent.

> We do not routinely calculate the operating cost of specific committed or contingent force elements in support of the deterrent, and such estimates are necessarily illustrative, given the differing cost of varied operating patterns. A broad order estimate, however, of the annual operating costs of committed conventional force elements would be around £25-30 million.
>
> A similar estimate for contingent conventional force elements would be around £250-300 million, although this is the estimated cost of generating these force elements for a range of tasks and it is not the cost of support to the deterrent.[22]

In response to a similar question in June 2016 regarding the cost safeguarding the nuclear deterrent, the MOD stated, however:

> The Department does not cost the safeguarding and security of individual capabilities. Given the multi-layered make up of security arrangements protecting the deterrent, overlapping with those of wider defence personnel and capabilities, identifying accurate costs could be achieved only at disproportionate cost.[23]

The protection of the nuclear deterrent was also discussed, at some length, during a Westminster Hall debate on maritime surveillance in February 2013.

Atomic Weapons Establishment (AWE)

The infrastructure for building and maintaining the UK's nuclear stockpile is located at two government-owned, contractor-operated Atomic Weapons Establishment (AWE) sites at Aldermaston and Burghfield in Berkshire. While the sites and facilities remain in Government ownership, the MOD has a 25-year contract with AWE Management Ltd for the management and day-to-day operation of both sites until 2025.[24]

In March 2016 the MOD announced that, following a review of the AWE contract, an improved contract had been negotiated with AWE Management Ltd that "promotes greater risk sharing between the MOD and AWEML, with performance incentives as well as penalties if targets are not met".[25]

AWE Management Ltd is an equal partnership consortium of the US-based Jacobs Engineering Group, the US defence company Lockheed

22 HC Deb 8 March 2007, c2130W
23 PQ40417, *Trident*, 21 June 2016
24 The contract was awarded in 2000 for an initial period of 10 years, although that contract was extended in 2003 to 25 years.
25 Ministry of Defence press release, 31 March 2016

Martin and the UK-based Serco group.[26] Approximately 4,000 personnel are employed at AWE Aldermaston.

In July 2005 the Government announced a new programme of investment for the AWE under the Nuclear Warhead Capability Sustainment Programme. Specific programmes within that include the development of a new laser facility, known as ORION, and a replacement hydrodynamics testing facility. The new facilities are required to ensure the safety and reliability of the existing stockpile and to ensure the UK has the capacity, if required, to develop a replacement warhead in the future.[27]

2.3 Continuous at-sea deterrence (CASD)

Since 1969 the UK has maintained continuous at-sea deterrence (CASD), meaning that there is one submarine on deterrent patrol at any one time on Operation *Relentless*.

Each boat carries eight missiles and a total of 40 warheads. Unlike the hair-trigger alert system of the Cold War, the missiles are "detargeted", meaning that no target coordinates are pre-programmed into the system. Normally, the readiness to fire is measured in days, rather than minutes, although that is considered more of a political gesture than an operational constraint and the time could be shortened again if required during a crisis period.

2.4 Operational independence

Decision making on the use of British nuclear weapons is a sovereign matter for the UK. There is no requirement to gain the approval of the United States or other NATO allies for their use and only the Prime Minister can authorise an instruction to fire.

In the event that the use of UK nuclear weapons was being contemplated for NATO purposes "procedures exist to allow all NATO allies… to express views on what was being proposed. The final decision on whether or not to use nuclear weapons in such circumstances, and if so how, would, however, be made by the nuclear power concerned".[28]

In operational terms the Government insists the system is not dependent on the United States. The Trident II D5 missile uses a star-sight aided inertial guidance system which does not rely on outside inputs, such as the US global positioning satellite system (GPS). The Vanguard class submarine itself is also capable of operating without reference to the GPS system. It has its own navigation sub-systems which allow the submarine independently to determine its position, depth, direction and speed. That information, along with the target data, is transmitted from the submarine to the missile using the submarine's own strategic weapons system. Any instruction to fire

Decision-making on the use of British nuclear weapons is a sovereign matter for the UK.

There is no requirement to gain the approval of the United States or other NATO allies for their use and only the Prime Minister can authorise an instruction to fire.

---

26 British Nuclear Fuels Ltd sold its stake in AWE Management Ltd to Jacobs Engineering in December 2008. Jacobs is a major contractor in the US Department of Energy's nuclear weapons establishment.

27 HC Deb 19 July 2005, c59WS

28 MOD, Freedom of Information request 21-06-2005-094719-001, 19 July 2005

would be transmitted to the submarine using UK codes and UK communications equipment.

However, it has been argued that the UK does have a level of dependence on the US when it comes to procurement and support, because the Trident missile system is manufactured, maintained and supported in the US. In a March 2006 briefing the campaign group Greenpeace argued:

> It is difficult to conceive of any situation in which a Prime Minister would fire Trident without prior US approval. The USA would see such an act as cutting across its self-declared prerogative as the world's policeman, and would almost certainly make the UK pay a high price for its presumption. The fact that the UK is completely technically dependent on the USA for the maintenance of its Trident system […] means that one way the USA could show its displeasure would be to cut off the technical support needed for the UK to continue to send Trident to sea.[29]

Others dispute this view. Commodore Tim Hare, Royal Navy (retired), said in evidence to the Defence Committee in March 2006 that:

> operationally the system is completely independent of the United States. Any decision to launch missiles is a sovereign decision taken by the UK and does not involve anybody else. I have read talk in the press about the Americans having some technical golden key. That is just not right; they do not. […] the only engagement with the United States that we have now, and which we have had for a very long time, relates to the design authority for the missile and supporting launcher, fire control and navigational sub-systems that are housed in the Vanguard-class submarines. […]
>
> Certainly, it would be difficult if the United States withdrew its design authority and logistics support for the missiles, fire control launcher and navigational sub-systems. Eventually, it would cause some difficulty, but I argue that that would take quite a long time.[30]

He also added that the UK was in no way dependent on the US for the process of targeting the missiles.[31]

In response to the Defence Select Committee's subsequent report on *The Future of the UK's Strategic Nuclear Deterrent* the MOD stated:

> In terms of the current system, as we have made clear on many occasions, the UK Trident system is **fully** operationally independent of the US or any other state. Decision-making and use of the system remains entirely sovereign to the UK. Only the Prime Minister can authorise the use of the UK's nuclear deterrent, even if the missiles are to be fired as part of a NATO response. The instruction to fire would be transmitted to the submarine using entirely UK codes and UK equipment. All the command and control procedures are totally independent. The Vanguard-class submarines can readily operate without the Global Positioning by Satellite (GPS) system and the Trident D5 missile does not use GPS at all: it has an inertial guidance system. We would require no lesser degree of operational independence for

---

29 Greenpeace, *Why Britain should stop deploying Trident,* March 2006

30 Defence Committee, *The Future of the UK's Strategic Nuclear Deterrent: the Strategic Context*, HC 986, Session 2005-06, Ev.35-36

31 ibid

> any successor system should the Government decide to replace Trident.[32]

By comparison, France has retained complete independence of its nuclear deterrent in procurement and maintenance terms, but at a greater financial cost. Historically France's nuclear weapons programme has taken up approximately 10% of the total French defence budget annually.[33] In 2015 the International Institute for Strategic Studies estimated that the French nuclear deterrent costs, on average, €3.5 billion per year, or 11% of the defence budget.[34] In comparison the UK's deterrent costs between 5% and 6% of the annual defence budget (see below).[35]

2.5 Cost of procuring and operating Trident

A decision to replace the Polaris nuclear deterrent system with Trident was made in July 1980, under the terms of the Polaris sales agreement 1963, as amended for Trident (Treaty Series 086/1980) and (Treaty Series 008/1983).

Acquisition costs

The then Defence Secretary Francis Pym made a statement to the House on the replacement of the UK's Polaris strategic nuclear deterrent system with Trident. In that statement he confirmed that the capital cost of procuring Trident would be taken out of the existing defence budget, in line with convention. He commented:

> We estimate the capital cost of a four-boat force, at today's prices, as up to £5 billion, spread over 15 years. We expect rather over half of the expenditure to fall in the 1980s. We intend to accommodate this within the defence budget in the normal way, alongside our other major force improvements […]
>
> Regarding the high cost, in the basic sense it is a very large sum of money indeed, but we have to look at it also in the context of what we are trying to achieve with our allies in securing peace. We have between us managed to achieve this in Europe for 35 years, and our strategic deterrent has uniquely made more than a contribution to it.
>
> Of course there will be an effect on other weapons systems, but that is true of any weapons system. For instance, even the Tornado system—more expensive than the Polaris successor system that I have just announced—has its effect on other weapons systems. They all interact. But the provision of the strategic deterrent has always been part of normal defence budgeting. It is a weapons system, like any other weapons system – ships, tanks, or whatever it may be. Within the defence budget

Total acquisition expenditure on the Trident programme was £12.52 billion, which equates to £18.35 billion in 2015/16 prices.

Annual in-service costs range between 5% and 6% of the defence budget. This equates to approximately £2.1 billion per annum based on current defence expenditure.

---

32 Defence Committee, *The Future of the UK's Strategic Nuclear Deterrent: the Strategic Context: Government Response to the Committee's Eighth report of Session 2005-06,* HC 1558, Session 2005-06, p.5

33 Robert S. Norris and Hans M. Kristensen, 'French nuclear forces, 2005', NRDC: Nuclear Notebook, July/August 2005

34 "France's nuclear conservatism", Strategic Comments, February 2015

35 Further information on the French nuclear deterrent, including its force structure, procurement and support and level of independence is available in Library briefing paper CBP4079, *The French Nuclear Deterrent*

> this can and will be accommodated in the same way as Polaris was accommodated 10 to 20 years ago...
>
> Overall this expensive weapons system will take between 3 per cent and 4 per cent over the 15-year period, but at its peak years it will be about 5 per cent of the whole defence budget and 8 per cent of the equipment part of the budget.[36]

Further questions about the cost were raised during the debate on procuring Trident in March 1981. Then Defence Secretary, John Nott, reiterated in that debate:

> The strategic deterrent has been an integral part of the British defence budget under all Governments up to now. Trident is not an addition to that budget.[37]

Mr Nott rejected suggestions, however, that the money spent on Trident would create additional pressure on resources, arguing that those pressures already existed, adding:

> The removal of £5 billion out of a total 15-year equipment programme, as I said of between £80 billion and £90 billion—would not remove the resource problem, but it would certainly remove a central feature of our postwar deterrent capability and—with respect to the doubters—I do not think that we should come out of the strategic independent deterrent capability on the ground of cost.[38]

In 1982, and following on from a decision to procure the Trident II D5 missile instead of the Trident I C4 variant, the capital costs of procuring and maintaining Trident were estimated to be £7.5 billion (1981 prices).[39]

By the time of the 1998 Strategic Defence Review (SDR) the majority of costs associated with procuring Trident had been spent. The SDR subsequently put total acquisition expenditure on the Trident programme at £12.52 billion, which equates to £18.35 billion in 2015/16 prices.[40]

However, it should be noted that this did not represent a doubling of costs on the Trident programme. Once inflation over the period 1980-1998 is accounted for, according to the Treasury's GDP deflator £5 billion in 1980 was worth approximately £12.02 billion in 1998.

The programme was delivered well within budget, a point that the Defence Select Committee made in its final report on the Trident acquisition programme in 1994, and was acknowledged by the Government in its response to that report:

> The Government welcomes the Committee's recognition that the trident programme continues to make good progress, with total estimated costs falling again this year and the submarine programme as a whole remaining well within budget (paragraph 2).[41]

---

36 HC Deb 15 July 1980, c1236- 1251
37 HC Deb 03 March 1981 vol 1000 cc216
38 HC Deb 03 March 1981 vol 1000 cc144
39 HC Deb 11 March 1982, c976
40 Ministry of Defence, *The Strategic Defence Review Supporting Essays,* July 1998
41 Defence Committee, *Government replies to the sixth, seventh and eighth reports*

Annual maintenance and running costs

After Trident became operational in 1994, annual expenditure for capital and running costs, including the costs for the Atomic Weapons Establishment, ranged between 3% and 4.5% of the annual defence budget.[42]

In 2005-06 those in-service costs rose to approximately 5% - 6% of the defence budget. According to the MOD that increase in maintenance costs was due primarily to the programme of additional investment in sustaining key skills and facilities at the Atomic Weapons Establishment, as announced by the Defence Secretary in July 2005.[43]

In-service costs for the nuclear deterrent are expected to remain at 5-6% of the defence budget. Based on the current defence budget, as set out in the 2015 Comprehensive Spending Review settlement, those costs, to 2020/2021, are therefore expected to be:

MoD Budget, and estimated Trident operational spending, 2015 - 2021

	MoD Total DEL	Estimated Trident operational costs	£ billion
		5%	6%
2015/16	34.3	1.72	2.06
2016/17	35.0	1.93	2.10
2017/18	36.0	1.98	2.16
2018/19	37.0	2.04	2.22
2019/20	38.1	2.10	2.29
2020/21	39.6	2.18	2.38

Source: MoD, HoC Library Calculations

Under the Polaris Sales Agreement, as amended, the UK pays the US Department of Defense an annual contribution towards the overall cost of the Strategic Weapons Facility at Kings Bay. This contribution, which includes maintenance work, is based on the UK's share of the overall Trident II D5 missile inventory and historically has equated to £12 million per annum.[44]

2.6 Scrutiny of the Trident decision

On 24 January 1980 a Government-led debate was held in the House of Commons on the general issue of nuclear deterrence. During that debate the Secretary of State for Defence, Francis Pym, laid the groundwork for a future decision on the eventual replacement of the Polaris nuclear deterrent. He commented:

> … for a variety of technical and operational reasons, we cannot sensibly or responsibly plan on its continuance much into the 1990s. We intend to ensure that our strategic deterrent remains

42 HC Deb 3 July 2006 c713w
43 The Nuclear Warhead Capability Sustainment Programme.
44 PQ 227194, *Trident Missiles,* 19 March 2015

> effective for a long time thereafter. Knowing how long it takes to design and procure new strategic forces of the complexity now needed or, indeed, any complicated weapon system, we must decide before long about Polaris's ultimate replacement […]
>
> I ask the House to support us in these views and to support the deterrent strategy that has won for Europe a peace that has endured now for 35 years. Of all the responsibilities of this or any Government, peace and the safety of the nation are at the top. If there is to be a Division at the conclusion of our debate, I ask the House to make clear in its vote its wholehearted endorsement of our discharge of that responsibility.[45]

The decision to procure Trident was subsequently announced to the House in a statement in July 1980. To accompany that statement the MOD published a document setting out the Government's justification for its choice of system to replace Polaris.[46] As part of that assessment, general considerations underpinning the Trident decision were set out,[47] along with the differing choices of launch platforms and delivery systems that had been evaluated.

In responding to that statement the then Shadow Defence Secretary, William Rodgers, criticised the Government for the manner in which the decision had been announced and also stated that the Labour Opposition would not approve it:

> We have asked, first, for a full and informed debate, which has not taken place. That is not only the view of the Opposition, and not only the view in the House. Secondly, some time ago we asked specifically for a Green Paper, and the right hon. Gentleman refused us that. Thirdly, at this moment a Select Committee is considering some important issues relating to this decision on behalf of the whole House. There are those who will say that it could be a contempt of the House for the Secretary of State to make an announcement of this sort before the Select Committee and the House have had the opportunity to discuss the matter.
>
> Irrespective of arguments about what may or may not have happened in the past, in today's circumstances an announcement of this sort, made in this way, falls far below the standards that the Government should set on such issues. In those circumstances, many hon. Members are deeply sceptical about the decision. We believe that the case for buying Trident has not been made, and we cannot approve it.[48]

Responding to that criticism Defence Secretary Francis Pym stated:

> The way in which the Government have considered this important matter and announced their decision to the House is wholly in accordance with our parliamentary and constitutional practice. It is for the Government to come to their conclusions and then to present them to and defend them in the House.

---

45 HC Deb 24 January 1980, c682 and 685

46 *The Future United Kingdom Strategic Nuclear Deterrent Force*, Defence Open Government Document 80/23

47 These included the intended role of the UK deterrent force, readiness and vulnerability issues, timescales and co-operation with the US in terms of procurement and maintenance.

48 HC Deb 15 July 1980, c1237

> We arranged a debate in January. The right hon. Gentleman said that it was not adequate. But it was on our initiative, and I set out a fundamental description of the rationale of the nuclear deterrent strategy. I think that it was a useful occasion as a preliminary to the decision that I have announced today.[49]

Following continual calls for a debate on the Trident decision the Leader of the House indicated during business questions on 22 January 1981 that he hoped "that it will be possible in the course of a few weeks to arrange a debate on the Government's decision to replace Polaris with Trident in due course. A general debate on defence will have to wait for the White Paper later".[50]

A Government-led debate, and vote, seeking endorsement of the Government's decision to maintain the strategic nuclear deterrent, and the choice of Trident to replace Polaris, was subsequently held on 3 March 1981.[51] That debate was on the substantive motion:

> That this House endorses the Government's decision to maintain a strategic nuclear deterrent and the choice of the Trident missile system as the successor to the Polaris force.[52]

That motion was approved by 316 to 248 votes.[53]

After detailed consideration the decision was taken in March 1982 to acquire the Trident II D5 missile from the US, instead of the Trident I C4 variant as originally envisaged. This decision was announced in a statement to the House on 11 March 1982.[54] Again, a memorandum setting out the reasons behind that decision was published by the MOD.[55]

A debate, and vote, on this change of policy was held on 29 March 1982. That debate was on the motion:

> That this House endorses the Government's decision to maintain a strategic nuclear deterrent and to choose the Trident H (D5) missile system as the successor to the Polaris force.

An amendment presented by the Labour opposition which sought to "condemn the decision to purchase the Trident nuclear system"[56] was defeated on division by 215 – 301 votes.[57]

The main motion was subsequently approved by 297 – 248 votes.[58]

In 1983 the Public Accounts Committee recommended that Parliament should "be kept fully informed on Trident developments, progress and

---

49 Ibid, c1238
50 HC Deb 22 January 1981, c431
51 The decision to procure Trident was also the subject of a Liberal Democrat debate on 4 August 1980. It was not on a substantive motion and there was no vote.
52 HC Deb 3 March 1981, c137. The subsequent debate can be found at c138-219.
53 Division No.89, Session 1980-1981
54 The exchange of letters between the UK and US were published as Cm8517, Session 1981-82
55 *The United Kingdom Trident programme,* Defence Open Government Document 82/1. A copy is available from the International Affairs and Defence Section of the Commons Library.
56 HC Deb 29 March 1982, c30
57 Division No. 108, Session 1981-82
58 Division No. 109, Session 1981-82

costs at regular intervals throughout the life of the programme".[59] This recommendation was endorsed by the Defence Committee in a report in July 1985.[60] Consequently, between 1986 and 1995 the Defence Committee conducted annual evidence sessions on the progress of the Trident programme. The basis for the Committee's discussions was an annual report presented by the MOD and which appeared as written evidence in the Committee's subsequent reports.[61]

During the 1980s the Public Accounts Committee and the National Audit Office also periodically examined the costs and management of the Trident programme.[62]

A further MOD document was published in January 1987[63] reiterating all of the decisions that had been taken with regard to the Trident system. It was published in response to suggestions that other systems would have been more appropriate and cost effective for the UK than Trident.

From the decision in 1980 it took 14 years to complete the acquisition of the Trident capability with the first Vanguard class submarine entering service in December 1994.

Box 1: History of UK nuclear weapons development: suggested reading

- Commons Library Briefing Paper RP06/53, *The future of the British nuclear deterrent*, November 2006, Section I
- Ministry of Defence, "The History of the UK's Nuclear Weapons Programme", *Fact Sheet 5 of the The Future of the United Kingdom's Nuclear Deterrent,* Cm6994, December 2006
- Center for Strategic and International Studies, *US-UK Nuclear Cooperation after 50 Years,* 2008
- Peter Hennessy, *Cabinets and the Bomb*, The British Academy, 2007

59 Committee of Public Accounts, Nineteenth Report, HC 348, Session 1983-84

60 Defence Committee, *The Trident Programme,* HC 479, Session 1984-85

61 Defence Committee, *Progress of the Trident Programme*, HC 297, Session 1993-94 sets out a list of those reports in its Annex. The committee published a further, and final, report in July 1995 (HC 350, Session 1994-95).

62 Committee of Public Accounts, *The United Kingdom Trident Programme,* HC 348, Session 1983-84 ; National Audit office, *Ministry of Defence: Trident project,* HC287, Session 1983-84; National Audit Office, *Ministry of Defence Trident Project,* HC 237, Session 1984-85; National Audit Office, *Ministry of Defence and Property Services Agency: Control and Management of the Trident Programme,* HC 27, Session 1987-88; Committee of Public Accounts, *The Torpedo Programme and Design and Procurement of Warships: Control and Management of the Trident Programme,* HC 189-i, Session 1987-88; Committee of Public Accounts, *Ministry of Defence: Nuclear Research and Support Services,* HC 415, Session 1990-91.

63 *Trident and the Alternatives,* Defence Open Government Document 87/01

3. UK Nuclear Policy

Summary

The UK is signatory to a number of treaties and agreements relating to nuclear weapons and their delivery systems which confer several obligations on the UK with respect to its nuclear policies. The most significant are the disarmament obligations stated in Article VI of the *Treaty on the Non-Proliferation on Nuclear Weapons* (NPT). Under that article the five recognised nuclear weapon states are permitted to possess nuclear weapons, but only if they commit themselves to the principles of nuclear arms control and eventual disarmament.

In 1996, the International Court of Justice also issued a non-binding advisory opinion on the legality of the threat or use of nuclear weapons. That advisory opinion concluded that "There exists an obligation to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament in all its aspects under strict and effective international control".

Successive Governments have insisted that the UK's nuclear deterrent is fully consistent with all of the UK's international legal obligations. They have also expressed the belief that the current programme to replace the nuclear deterrent is compatible with the UK's obligations under the NPT, arguing that the treaty contains no prohibition on updating existing weapons systems and gives no explicit timeframe for nuclear disarmament.

The UK has taken a number of steps since the end of the Cold War in support of the NPT. It has withdrawn all other nuclear weapons systems except for Trident; made changes to the operational status of the deterrent and been increasingly transparent about its nuclear inventory. By the mid-2020s the UK will have achieved a 65% reduction in the size of its overall nuclear stockpile, making it the smallest of all the NPT nuclear weapon states.

The 2015 Strategic Defence and Security Review (SDSR 15) confirmed that the "UK will not use, or threaten to use, nuclear weapons against any non-nuclear weapon state party to the NPT". This assurance does not apply, however, to any state in material breach of the NPT. The UK also maintains a position of ambiguity on the precise details of when, how and at what scale the UK may consider the use of its nuclear weapons capability, although the Government has stated that nuclear weapons would only be used in extreme circumstances of self-defence.

3.1 Disarmament obligations

The UK is a signatory to several treaties and agreements relating to nuclear weapons and their delivery systems, which confer obligations on the UK with respect to its nuclear policies (see Box 2: Other relevant treaties and agreements).[64] The most significant are the UK's obligations under the *Treaty on the Non-Proliferation of Nuclear Weapons 1968* (NPT), in particular the commitments to disarmament which are embodied in Article VI of that treaty.[65]

[64] Further detail on each of these agreements is also available in Library briefing paper CBP7634, *Nuclear Weapons: disarmament and non-proliferation regimes*

[65] The full text of the NPT is available at http://www.state.gov/www/global/arms/treaties/npt1.html

Nuclear Non-Proliferation Treaty (NPT)

The cornerstone of the international disarmament and non-proliferation agenda, the NPT has near universality with 191 States Parties.[66] India, Pakistan, and Israel are all outside of the NPT framework and are regarded as *de facto* nuclear weapons states. North Korea renounced the treaty in 2003 and some disagreement remains as to North Korea's status.[67]

Article VI, NPT

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.

The objective of the treaty is to prevent the spread of nuclear weapons and weapons-related technology, further the goal of nuclear disarmament, and promote cooperation in the peaceful uses of nuclear energy. Significantly, the treaty represents the only binding commitment in a multilateral treaty to the goal of disarmament by the five recognised nuclear weapon states.

At the heart of the treaty is an implicit bargain between the five recognised nuclear weapon states and the other, non-nuclear weapon states. Under the terms of the treaty, the non-nuclear weapon states are able to access peaceful nuclear technology but pledge to forego the acquisition of nuclear weapons. A safeguards system under the auspices of the International Atomic Energy Agency (IAEA)[68] is used to verify compliance and to prevent the diversion of fissile material for use in a weapons programme. In return, the five recognised nuclear weapon states are permitted to possess nuclear weapons, but only if they commit themselves, under Article VI, to the principles of nuclear arms control and eventual disarmament.

However, there has been longstanding dissatisfaction among non-nuclear weapon states at the perceived lack of progress made in achieving the aims of Article VI. This prompted extensive debate at the NPT Review and Extension Conference in May 1995, which agreed an indefinite extension to the treaty[69] on the condition that the nuclear weapon states "reaffirm their commitment, as stated in Article VI, to pursue in good faith negotiations on effective measures to nuclear disarmament", and agreed a programme of action that included concluding a Comprehensive Test Ban Treaty, progressing towards a

---

66 States Parties to the NPT. Under the NPT the United States, Russia, China, France and the UK are recognised nuclear weapon states.

67 In announcing its intention to withdraw from the NPT in 2003, North Korea backdated its mandatory three month withdrawal notification to 1993 when it first threatened to withdraw from the treaty. A number of countries argued that the correct withdrawal procedures were not followed and that the country is therefore still bound by its provisions and needs to be brought back into compliance. The British Government in its document *the Road to 2010* discusses North Korea's obligations as a State Party to the NPT, while the Final Report of the Preparatory Committee for the 2010 Review Conference acknowledges the uncertainty over North Korea's status (p.48).

68 The IAEA was established as a specialised agency of the United Nations in 1957. It has three main responsibilities: to act as the world's nuclear inspectorate and verify that safeguarded material and activities are not diverted to weapons programmes; to help countries upgrade their nuclear safety and security protocols and help countries exploit peaceful applications of nuclear science and technology. While it is not party to the NPT, it is entrusted with key roles and responsibilities under it. Further detail on the IAEA safeguards system is available in Library briefing paper CBP7634, *Nuclear Weapons: disarmament and non-proliferation regimes*

69 The treaty was originally agreed for a period of 25 years.

ban on the production of fissile material for nuclear weapons, and pursuing systematic and progressive efforts to reduce nuclear weapons globally.[70] These commitments were seen by many of the non-nuclear weapons states as critical to securing their continued support for the Treaty.

Since the 1995 conference consensus between the nuclear and the non-nuclear weapon states on how to achieve global nuclear disarmament and strengthen non-proliferation has been problematic. Article VI of the NPT was reinforced at the conclusion of the 2000 NPT Review Conference when the Nuclear Weapons States gave:

> An unequivocal undertaking […] to accomplish the total elimination of their nuclear arsenals leading to nuclear disarmament to which all States parties are committed under Article VI.[71]

That commitment was reiterated again at the Review Conference in 2010.[72] However, the question of whether the nuclear weapon states have sufficiently fulfilled the requirements of Article VI continues to be contentious. The NPT was never intended to allow for the possession of nuclear weapons indefinitely and while there have been notable nuclear reductions over the years by all five nuclear weapons states, those same states have also been accused of undermining any political commitments to disarmament by simultaneously undertaking extensive modernisation programmes of their respective nuclear forces.[73] Indeed, several observers contend that replacement of the UK's nuclear deterrent constitutes a material breach of Article VI of the NPT (see Arguments for and against replacement).

The recent failure of the 2015 NPT Review Conference to agree a final document, in part due to the inability of the five nuclear weapons states to agree firm commitments towards nuclear disarmament,[74] has only served to reiterate this belief that the nuclear weapon states are failing in their NPT obligations.[75] As Austria, on behalf of 49 States, commented in a closing statement to the conference:

> The exchanges of views that we have witnessed during this review cycle demonstrate that there is a wide divide that presents itself in many fundamental aspects of what nuclear disarmament should mean. There is a reality gap, a credibility gap, a confidence gap and a moral gap.

---

70 'Principles and Objectives for Nuclear Non-Proliferation and Disarmament', *Decision Paper from the NPT Review and Extension Conference*, 17 April - 12 May 1995

71 Para 15, Point 6, 'Final Document Issued by 2000 Review Conference', 20 May 2000

72 The outcomes of that conference are set out in more detail in Library briefing paper RP10-42, *Progress towards nuclear disarmament*, June 2010

73 See for example "Slowing nuclear weapons reductions and endless nuclear weapons modernizations", *Bulletin of the Atomic Scientists,* Vol.70 (4), 2014

74 See "Is there a future for the NPT?", *Arms Control Today,* July/August 2015

75 This perceived lack of progress has also been the catalyst for the increasing focus by many non-nuclear states, the UN, NGOs and civil society stakeholders on the humanitarian consequences of nuclear weapons. This issue is examined in more detail in Library briefing paper SN/IA/7028, *Conference on the Humanitarian Impact of Nuclear Weapons,* December 2014

Beatrice Fihn, writing in *Arms Control Today* in July 2015, summed up the view of many that:

> The failure to agree on an outcome document, coupled with the lack of implementation of the "action plan" that was a key part of the agreed outcome from the 2010 review conference, has seriously undermined the belief that the NPT can be a credible path toward disarmament. Throughout the four weeks, it was made clear that the nuclear-weapon states are not interested in making any new commitments to disarmament.[76]

She went on to comment, however:

> Although a failure to achieve a consensus document does not in itself threaten the NPT, it might reduce the faith many governments, international organizations, and civil society organizations have in the treaty's review process as an effective way of making progress on nuclear disarmament. It is time to pursue the objectives of the NPT in other settings.[77]

Box 2: Other relevant treaties and agreements

Comprehensive Test Ban Treaty (CTBT)

The UK has maintained a moratorium on nuclear testing since 1991 and it ratified the Comprehensive Nuclear Test Ban Treaty (CTBT) in April 1998. The Treaty has yet to enter into force as it is still awaiting ratification by the US and China, but the UK has said it will maintain its moratorium on testing. The implication of the Government's decision to ratify the CTBT is that it believes the UK can maintain the safety and reliability of its weapons through computer modelling and sub-critical tests (whereby components are tested without causing a full nuclear explosion).

Controls on Ballistic Missiles

The Missile Technology Control Regime (MTCR) relates primarily to technology transfer and inhibiting the proliferation of ballistic missile capabilities. It imposes a strong presumption to deny transfer of missiles between member states, but the Government holds that there is an exemption for transfers between NATO states.[78]

Hague Code of Conduct

The Hague Code of Conduct (HCOC), which was established in 2002, is not an export control regime, but is a voluntary code of conduct intended to complement the MTCR. It seeks mainly to increase the transparency of missile capabilities and ensure advance notification of testing. In addition, it includes an undertaking by member states to reduce, where possible, national holdings of ballistic missiles.

Nuclear Weapons Free Zones

As a consequence of its ratification of the Protocols to the nuclear weapons free zones in Latin America, Africa, the South Pacific, and Central Asia, the UK has given an undertaking not to test or station nuclear weapons on territories within the zones. The UK has not yet signed the Protocol establishing a nuclear weapons free zone in South East Asia.

Advisory opinion of the International Court of Justice – 1996

There has long been disagreement over the extent to which international humanitarian law might be used as a basis for nuclear

---

76 Beatrice Fihn, "A new humanitarian era: prohibiting the unacceptable", *Arms Control Today,* July/August 2015

77 ibid

78 Memorandum submitted by the Ministry of Defence, Annex A (Possible Constraints on future UK decision-making on any replacement for Trident), 19 January 2006

disarmament.[79] Disarmament advocates generally hold the view that a literal interpretation of existing agreements (such as the *Geneva Conventions* and their *Additional Protocols*, and the *Inhumane Weapons Convention*) render any use of nuclear weapons unlawful. The nuclear weapon states have largely argued that it is more helpful to use international law to bolster the restrictions on nuclear weapon possession which have been reached by negotiation, such as the *Non-Proliferation Treaty*, the *Intermediate Nuclear Forces Treaty*, the START treaties and the partial test ban treaties.

Against this background, and following a long campaign by a group of international NGOs to have nuclear weapons declared illegal,[80] the International Court of Justice agreed to give an advisory opinion to the UN General Assembly on the question: "Is the threat or use of nuclear weapons in any circumstance permitted under international law?".

In 1996 the International Court of Justice issued a non-binding advisory opinion on the legality of the threat or use of nuclear weapons. The Court concluded that the threat or use 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 added that it could not conclude definitively whether the threat or use "would be lawful or unlawful in an extreme circumstance of self-defence, in which the very survival of a State would be at stake". However, it did unanimously conclude that:

> There exists an obligation to pursue in good faith and *bring to a conclusion* negotiations leading to nuclear disarmament in all its aspects under strict and effective international control [emphasis added].[81]

Marshall Islands v. United Kingdom

In April 2014 the Marshall Islands instituted ICJ proceedings against the UK, with respect to *Obligations concerning Negotiations relating to Cessation of the Nuclear Arms Race and to Nuclear Disarmament*. The case is not an attempt to re-open the question of the legality of nuclear weapons, as set out in 1996, but on the failure of the UK as a nuclear weapon state under the NPT, to fulfil its obligations as enshrined under article VI of that treaty and customary international law.

Parallel applications were also filed by the Marshall Islands against the other NPT nuclear weapon states, India, Pakistan, Israel and North Korea, although all of those states, with the exception of the UK, India and Pakistan have declined to accept the jurisdiction of the ICJ in this matter.

---

79 For an introduction to International Humanitarian Law (IHL), including the concepts of proportionality and discrimination, see Library briefing paper CBP7429, *International Humanitarian Law: a primer*, 8 January 2016

80 For the background to this campaign see M. Moore, "World Court says mostly no to nuclear weapons", *The Bulletin of Atomic Scientists*, September/October 1996

81 ICJ case summary, ' Legality of the Threat or Use of Nuclear Weapons', Advisory Opinion of 8 July 1996, 2(F), http://www.icj-cij.org/icjwww/idecisions/isummaries/iunanaummary960708.htm

In its application instituting proceedings against the UK, the Marshall Islands stated that:

> More than four decades after signing and ratifying the NPT, the UK maintains and continuously modernises its nuclear arsenal.
>
> The UK has not pursued in good faith negotiations to cease the nuclear arms race at an early date through comprehensive nuclear disarmament or other measures, and instead is taking actions to improve its nuclear weapons system and to maintain it for the indefinite future.
>
> Similarly, the UK has not fulfilled its obligations to pursue in good faith negotiations leading to nuclear disarmament in all its aspects under strict and effective international control and instead has opposed the efforts of the great majority of States to initiate such negotiations […]
>
> Further, the obligations of a State to perform its legal obligations in good faith, whether arising under a treaty or pursuant to customary international law, is itself a legal obligation which the UK has breached.[82]

The UK presented its preliminary objections to the case in a written submission in June 2015. It did not address the merits of the Marshall Islands claims but argued that there is no justiciable dispute between the Marshall Islands and the United Kingdom; and that "in any event, any judgment of the Court would be incapable of effective application and that therefore the Court should decline to exercise jurisdiction in this case".[83]

A series of hearings were held in March 2016 in which the UK presented its preliminary objections to the case.

The Court adjourned on 16 March 2016 to begin its deliberations on this issue of justiciability. The Court's judgement on the preliminary objections will be delivered at a public sitting, at a date that has yet to be announced.

3.2 The UK's position on disarmament

Successive Governments have insisted that the UK's nuclear deterrent is fully consistent with all of the UK's international legal obligations.

They have also expressed the belief that the current programme to replace the UK's SSBN fleet and upgrade the Trident missile (see below), is compatible with the UK's obligations under the NPT, arguing that the treaty contains no prohibition on updating existing weapons systems and gives no explicit timeframe for nuclear disarmament.[84]

Successive Governments have also highlighted the number of steps that the UK has taken in support of the NPT and specifically with respect to

---

82 International Court of Justice, *Application instituting proceedings against the United Kingdom*, 24 April 2014

83 International Court of Justice, *Obligations concerning negotiations relating to the cessation of the nuclear arms race and to nuclear disarmament (Marshall Islands v. the United Kingdom): Preliminary Objections of the United Kingdom of Great Britain and Northern Ireland*, June 2015

84 For example HM Government, *The Future of the United Kingdom's Nuclear Deterrent*, Cm 6994, December 2006, para. 2-10

its obligations under Article VI. Since the end of the Cold War the UK has significantly down-sized its nuclear arsenal. It has withdrawn all other nuclear weapons systems except for Trident, making it the only declared nuclear weapon state to reduce its nuclear capability to a single deterrent system. It has made changes to the operational status of the deterrent and has been increasingly transparent about the size of the UK's nuclear arsenal. By the mid-2020s the UK's overall stockpile is scheduled to be fewer than 180 warheads, a 65% reduction on Cold War levels, making the UK the smallest of the nuclear weapons states.

In January 2013 the then Government suggested that sustainable nuclear disarmament could only be achieved through a multilateral process. In answer to a Parliamentary Question an FCO Minister commented:

> In order for the UK to offer to include its small number of nuclear weapons in multilateral disarmament negotiations there would first need to be further reductions in the much larger nuclear weapons stockpiles held by other states and greater assurances that no new major threats will emerge that could threaten the UK or its vital interests. The UK is focused on building the international environment that will make this possible.[85]

At the conclusion of the 2015 NPT Review Conference the UK Ambassador to the Conference on Disarmament, Dr Matthew Rowland, reiterated the UK's "undiminished" commitment to the NPT, and the UK's obligations under it, including with respect to Article VI.[86] The Government also sought to highlight that, in the absence of any substantive outcomes at the 2015 conference, "the action plan agreed at the 2010 review conference remains valid as a comprehensive roadmap for all NPT states to follow to take forwards action on disarmament, non-proliferation and peaceful use of nuclear technology, as do the agreements from 2000 and 1995. The UK will continue to pursue this roadmap, working closely with our partners in the NPT.[87]

Box 3: The UK's track record on disarmament since the end of the Cold War

- At its Cold War peak the UK nuclear stockpile consisted of approximately 520 nuclear warheads.
- Following the end of the Cold War a review of the UK's nuclear posture resulted in the RAF's WE-177 free-fall bombs being phased out, and the capability of the Royal Navy's surface ships to carry or deploy nuclear weapons being dismantled. By 1998 the deterrent had been reduced to one single system: Trident. The total stockpile was reduced by approximately 20% and the number of operationally available warheads fell from around 400 during the 1980s to 300.
- The 1998 Strategic Defence Review announced a one third reduction in the number of operationally available warheads, to fewer than 200. The total stockpile was estimated at 280. The number of warheads carried on board an SSBN on deterrent patrol was reduced to 48, from a previous ceiling of 96.[88] The deterrent patrol cycle was also reduced to one SSBN on patrol at

85 HC Deb 18 January 2013, c998W
86 Statement by Ambassador Matthew Rowland, UK Permanent Representative to the Conference on Disarmament in Geneva, at the UN 2015 Review Conference of the Treaty on Non-Proliferation of Nuclear Weapons, 22 May 2015
87 HC Deb 1 June 2015, c9-10WS
88 Figures from the *Strategic Defence Review: Supporting Essays*, July 1998

any one time. The missiles on board were 'de-targeted', while the 'notice to fire' period was increased from just a few minutes, to a notice period measured in days.[89]

- The 2006 White Paper on the *Future of the Nuclear Deterrent* reduced the stockpile to fewer than 160 operationally available warheads.
- In 2010 official information on the size of the UK's overall nuclear stockpile (225 warheads) was published for the first time.
- The 2010 Strategic Defence and Security Review announced that the number of operational launch tubes on the current Vanguard class would be reduced from 12 to 8 and the maximum number of warheads deployed on board would be reduced to 40.[90] It also announced a reduction in the number of operationally available warheads, to 120;[91] while the overall stockpile would be no more than 180 by the mid-2020s. Once that reduction has been achieved, the UK nuclear stockpile will have been reduced by 65% since the end of the Cold War. All of these decisions were reiterated in the 2015 SDSR.

3.3 Declaratory policy

In May 2010 the then Foreign Secretary, William Hague, announced that the UK's declaratory policy, i.e. the UK's position on no first use, would be re-examined as part of that year's SDSR.[92]

The 2010 SDSR confirmed that the "UK would not use or threaten to use nuclear weapons against non-nuclear weapon states parties to the NPT". This assurance would not apply, however, to any state in material breach of the NPT. The SDSR also stated:

> We also note that while there is currently no direct threat to the UK, or its vital interests from states developing capabilities in other weapons of mass destruction, for example, chemical and biological, we reserve the right to review this assurance if the future threat, development and proliferation of these weapons make it necessary.[93]

The language was similar to that used by the US in its 2010 *Nuclear Posture Review*. While offering negative security assurances to the NPT non-nuclear weapon states, it effectively leaves options open with regards to states such as North Korea, which is deemed to be in contravention of its NPT obligations.[94]

The 2010 SDSR also maintained a position of ambiguity on the precise details of when, how and at what scale the UK may consider the use of its nuclear weapons capability. However, as also stated in the 1998 Strategic Defence Review, the SDSR reiterated that the UK would only use nuclear weapons in extreme circumstances of self-defence.

---

89 This reduction in alert status was essentially a political and operational matter rather than a technical issue: the system itself could still be brought rapidly to readiness at a time of crisis, if a political decision were taken to do so.

90 Those reductions were achieved by January 2015 (Nuclear Deterrent: Written Statement, HCWS210, 20 January 2015)

91 ibid

92 HC Deb 26 May 2010, c181-182

93 SDSR Fact Sheet 10: Trident Value for Money Review

94 Prior to the 2015 nuclear agreement Iran had also been considered to be in contravention of its NPT obligations. However, the new deal agreed now provides a means of resolution with regard to this debate. Library briefing paper CBP 7178, *The Lausanne Accord with Iran*, examines the Iran nuclear agreement in greater detail.

Both of these positions were reiterated in the 2015 SDSR.[95]

[95] Further detail on the contents of the 2015 SDSR is available in Commons Briefing Paper, CBP7462, *The 2015 Strategic Defence and Security Review,* 22 January 2016

4. Replacing the UK's nuclear deterrent

Summary

The Labour Government's 2006 White Paper, *The Future of the United Kingdom's Nuclear Deterrent* concluded that the international security environment does not justify complete UK nuclear disarmament and that, in terms of both cost and capability, retaining the submarine-based Trident system would provide the most effective deterrent.

The decision was therefore taken to maintain the UK's existing nuclear capability by replacing the Vanguard class submarines (SSBN) and participating in the current US service-life extension programme for the Trident II D5 missile.

A debate and vote in the House of Commons on the general principle of whether the UK should retain a strategic nuclear deterrent beyond the life of the current system was held on 14 March 2007. That motion was passed on division by 409 to 161 votes.

Although commonly referred to as "the renewal or replacement of Trident", the Successor programme, is about the design, development and manufacture of a new class of four submarines. A Common Missile Compartment for the SSBN, which will house the current Trident strategic weapons system, is being developed in conjunction with the United States. Replacement of the Trident II D5 missile itself is not part of the Successor programme. Under changes introduced in the 2015 SDSR, the first SSBN is now expected to enter service in the early 2030s.

Decisions on a replacement warhead have been deferred until later this decade and it is expected that "no new significant infrastructure will be required to support the Successor submarines".

The Successor programme is currently in a five-year assessment phase. Several long-lead items, including the specialised steel for the first submarine, have been purchased as part of assessment phase work. Manufacture of the submarines will not take place, however, until parliamentary approval is given for the programme to go ahead.

The 2015 SDSR confirmed that the costs of design and manufacture of a class of four SSBN, including inflation over the life of the programme, would be £31 billion, an increase of £6 billion on estimates set down in the programme's Initial Gate report in 2011. A £10 billion contingency will also be set aside. Spread over 35 years, this represents 0.2% of Government spending.

The Concept Phase of the programme had an allocated spend of £905 million, while the Assessment Phase, to 2016, now has an allocated budget of £3.9 billion. The years of peak expenditure are expected to be principally 2018 through to the mid/late 2030s, as the programme moves into full production.

Once the new nuclear deterrent submarine comes into service the annual in-service costs are expected to continue at approximately 6% of the defence budget. Under the current defence budget 6% of spending equates to approximately £2.1 billion per year. As part of the 2015 CSR settlement, that figure is expected to rise to £2.38 billion by 2020/2021.

Calculating overall in-service costs, however, is fraught with difficulty as assumptions have to be made about the state of the British economy and projected levels of defence spending over the next 50-60 years.

In line with convention, the Successor programme will be funded from the MOD's core equipment procurement budget.

Many believe the MOD's assessment of cost to be under-estimated and that the true cost of replacing the nuclear deterrent will be much higher. CND's most recent estimate in May 2016 has suggested that the cost of the replacement programme will be £205 billion, although this is over the 30-year life of the system and takes into consideration other potential costs, such as the cost of decommissioning. It also bases its in-service cost calculations on figures previously presented by Crispin Blunt MP, which made a number of assumptions about GDP growth over the next 50 years and that defence spending will continue to meet the NATO 2% of GDP target over this same period.

BAE Systems, Babcock International and Rolls Royce are the Tier One industrial partners in this project. As with previous SSBN, the submarine will be built by BAE Systems in Barrow-in-Furness and the PWR3 propulsion system will be built by Rolls Royce at Raynesway, Derby. The MOD has stated that maintaining and sustaining the UK's nuclear deterrent supports over 30,000 UK jobs. Approximately 2,200 people across the MOD and all three companies are currently working on the Successor programme, of whom over 50% are engineers and designers. Jobs are expected to peak at 6,000 during the entire build phase and involve an estimated 850 British companies in the supply chain.

As one of the largest government investment programmes going forward, the 2015 SDSR announced that new organisational and managerial arrangements for the UK's defence nuclear enterprise as a whole, and for delivering the Successor programme specifically, will be established. A new team within the MOD, headed by a commercial specialist, will oversee all aspects of the nuclear enterprise; while a new delivery body will be established in order to deliver the procurement and in-service support of all nuclear submarines, including Successor.

The 2015 SDSR also announced that new commercial arrangements would be put in place that will see the programme subject to several stages of investment, instead of the traditional single 'Main Gate' approach which entails a single investment decision. The next phase of the programme, which SDSR 15 refers to as "risk reduction and demonstration" will begin later in 2016.

The Government has stated that there will be a debate and a vote on "the principle of continuous at-sea deterrence and our plans for Successor" on 18 July 2016.

4.1 Policy behind renewal

Political debate over the replacement of the UK's nuclear deterrent began in earnest in December 2006 with the publication of the Labour Government's White Paper, *The Future of the United Kingdom's Nuclear Deterrent*.

The decisions set out in that paper were based on the premise that it is not possible to accurately predict the global security environment over the next 20 to 50 years and that the emergence of a direct nuclear threat to the UK's strategic interests at some point in the future cannot be ruled out. Equally, the paper emphasised the risk that some countries may in future seek to sponsor nuclear terrorism from within their own borders. The paper's strategic conclusion therefore was that the

international security environment does not justify complete UK nuclear disarmament:

> In view of the continued existence of large nuclear arsenals, the possibility of further proliferation of nuclear weapons in combination with the risk of increased international instability and tension, we believe that a nuclear deterrent is likely to remain an important element of our national security in the 2020s and beyond.
>
> We have therefore decided to make the minimum investment required to sustain this capability over that period. We judge that this continues to be a price worth paying.

Consequently the White Paper examined options, solutions and costs. The paper concluded, however, that in terms of both cost and capability retaining the submarine-based Trident system would provide the most effective deterrent. Therefore the decision was taken to maintain the UK's existing nuclear capability by replacing the Vanguard class submarines[96] and participate in the current US service-life extension programme for the Trident II D5 missile which will enable this missile to be deployed aboard the new submarines until the early 2040s.[97]

The cost of the renewal project was estimated in the White Paper to be £15 - £20 billion, including £11 - £14 billion for a class of four SSBN, £2 - £3 billion for the warhead and £2 - £3 billion for associated infrastructure.

Renewing the UK's minimum nuclear deterrent was considered to be fully consistent with the UK's international obligations, mainly under the *Nuclear Non-Proliferation Treaty* (NPT).

A debate and vote in the House of Commons on the general principle of whether the UK should retain a strategic nuclear deterrent beyond the life of the current system was subsequently held on 14 March 2007. That debate was on the Government motion:

> That this House supports the Government's decisions, as set out in the White Paper The Future of the United Kingdom's Nuclear Deterrent (Cm 6994), to take the steps necessary to maintain the UK's minimum strategic nuclear deterrent beyond the life of the existing system and to take further steps towards meeting the UK's disarmament responsibilities under Article VI of the Non-Proliferation Treaty.

That motion was passed on division by 409 to 161 votes.[98]

Impact of the 2010 Coalition Government and the Strategic Defence and Security Review

Prior to the May 2010 general election, each of the main political parties committed to undertake a strategic defence review should they take

---

96 A final decision on the number of submarine platforms to be procured would be taken at a later date once more detailed information on their design became available.

97 The White Paper also noted that a decision on participating in any US programme to develop a successor to the Trident II D5 missile would not be necessary until the 2020s.

98 Division No.78, 2006-07 Session

office, including a wholesale examination of future defence procurement programmes. However, both the Conservatives and Labour announced the intention to exclude the Trident replacement programme from that assessment; a decision which the Liberal Democrats called "illogical" and "a complete mockery of the whole [defence review] exercise".[99] Instead the Liberal Democrats called for an immediate review of the programme and an examination of alternatives.[100]

Under the May 2010 Conservative/Liberal Democrat Coalition Agreement, Lib Dem opposition to the like-for-like replacement of Trident was dropped, although the new Coalition Government announced that the programme would be scrutinised for value for money within the framework of the forthcoming SDSR,[101] and that the Liberal Democrats could continue to make the case for alternatives (see

The Trident Alternatives Review).

That value for money review concluded over summer 2010 and its recommendations were considered by the National Security Council as part of the SDSR process. In line with expectations, the SDSR concluded that the UK strategic nuclear deterrent would be retained as a key element of Future Force 2020.[102] However, the SDSR also concluded that minimum effective deterrence could also be achieved with a smaller nuclear weapons capability, thereby achieving cost savings.

In addition to the changes to the size of the UK's nuclear arsenal and its deployed capability (see Box 3: The UK's track record on disarmament), the SDSR updated a number of the assumptions in the 2006 White Paper:

- The main investment decision on the programme (Main Gate) would be delayed until 2016.[103]
- The service life of the Vanguard class submarines would be further extended, with the first of the replacement class expected to enter service in 2028.[104]

---

99 "Liberal Democrats call for immediate review of UK Trident policy", *The Guardian,* 2 April 2010

100 Those alternatives were set out in greater detail in a Lib Dem policy document published in April 2010 entitled, Policy Options for the Future of the United Kingdom's Nuclear Weapons. The option of either a nuclear-armed Astute or the establishment of a virtual arsenal are also examined in Library Research Paper RP06/53, *The Future of the British Nuclear Deterrent,* 3 November 2006

101 That review was intended to be a thorough assessment of the costs and the timetable of the programme, including the costs of extending the Vanguard class beyond the already planned five-year extension and any savings that could be made by changes to the UK's nuclear posture (HC Deb 5 July 2010, c3). It was made clear that alternatives to a submarine-based system would not be considered as part of that value for money review.

102 Future Force 2020 is the force structure that the MOD envisages for the Armed Forces by 2020. It was established in the 2010 SDSR and is currently being implemented.

103 Main Gate was initially earmarked for 2012-14.

104 This involves a service-life extension of nine years, if an original 25-year lifespan is assumed. HMS Vanguard entered service in 1994 and would have left service in 2019 (or 2024 if assuming a 30-year life span). The final vessel of the fleet (HMS *Vengeance*) entered service in 2001 and therefore decommissioning dates were 2026 or 2031 respectively. This decision also brought the Successor programme

- Continuous at-sea deterrence (CASD) would be maintained.
- The new SSBN would deploy with eight *operational* missile tubes, instead of the planned 12.[105]
- The transition to a replacement warhead would not be required until at least the late 2030s. Therefore a decision on a replacement warhead would be deferred until 2019.[106]

2015 Strategic Defence and Security Review

The 2015 SDSR reiterated the position set out in 2010: the UK's commitment to a minimum nuclear deterrent, assigned to the defence of NATO, and delivered by a fleet of four SSBN operating a continuous at-sea deterrent. Submarines on patrol would deploy with eight operational Trident missiles and carry no more than 40 nuclear warheads. The UK's nuclear stockpile would also remain as previously set out: no more than 120 operationally available warheads and an overall stockpile of no more than 180 by the mid-2020s.

In line with previous defence reviews, SDSR 15 also maintained a position of ambiguity on the precise details of when, how and at what scale the UK may consider the use of its nuclear weapons capability, although it reiterated that the UK would only use nuclear weapons in extreme circumstances of self-defence. It also re-emphasised the declaratory policy set out in 2010, confirming that "the UK will not use, or threaten to use, nuclear weapons against non-nuclear weapon state party to the Treaty on the Non-Proliferation of Nuclear Weapons". This assurance would not apply, however, to any state in material breach of the NPT.

It also made a number of changes to the Successor programme:

- As one of the largest Government investment programmes going forward, new organisational and managerial arrangements for the UK's defence nuclear enterprise as a whole, and for delivering the Successor programme specifically, will be established. A new team within the MOD, headed by a commercial specialist, will oversee all aspects of the nuclear enterprise; while a new delivery body will be established in order to deliver the procurement and in-service support of all nuclear submarines, including Successor.
- New commercial arrangements will be put in place between Government and industry that will see the programme subject to several stages of investment, instead of the traditional single 'Main gate' approach.
- The next phase of the programme, which SDSR 15 refers to as "risk reduction and demonstration" will begin in 2016.
- The first SSBN will now enter service in the early 2030s, as opposed to 2028 as set out in the 2010 SDSR. This is the third

largely into line with the US programme to replace its existing Ohio-class SSBN, from 2027 onwards.

105 The design of the missile compartment of the new SSBN will comprise 12 tubes but only 8 will be operational. The remaining missile tubes will be configured with ballast in order to enable the submarine to dive.

106 The MOD has suggested that approximately 17 years from an initial procurement decision would be required to develop any replacement warhead for the Trident II D5 missile, and commence production (*2014 Update to Parliament*)

> time the in-service life of the Vanguard class has been extended and will now result in an overall lifespan of the Vanguard class of approximately 37-38 years.[107]

The 2015 SDSR also updated the overall expected costs of the Successor programme (see section 4.2 below).

There has been a deal of speculation among the media and other commentators that the Treasury has been looking to bring the new delivery body that is envisaged, under the remit of the Treasury.[108] The justification for doing so has reportedly been the historical failure of the MOD to manage such large and complex projects such as this, with subsequent equipment being delivered several years late and vastly over budget. The most comparable programme is the Astute class submarine which is currently £1.4 billion over budget and several years late.[109]

In a Parliamentary debate on 24 November 2015, however, Minister for Defence Procurement, Philip Dunne, refuted suggestions that the Treasury would assume oversight of the Successor programme:

> On the governance of implementing a delivery organisation to make sure we deliver the Successor programme on time and to budget over the years to come, I can confirm that this will remain subject to oversight by the MOD […]
>
> As the Prime Minister and the Secretary of State have made clear, this will be reporting through the MOD structures to the Secretary of State, and of course the Treasury will take its interest in the delivery of major programmes as it does in all our category A programmes, of which this will obviously be the largest.[110]

This was confirmed by the MOD at the beginning of December. Options regarding the form that the new delivery body will take are still under consideration, with decisions expected to be announced later this year.[111] In the meantime that MOD has consistently stated that "the MOD will remain in control of the Successor submarine programme".[112]

Questions have also been raised about the risks of extending the in-service life of the Vanguard class for a third time. In response to recent Parliamentary Questions on the issue of service-life extension, the MOD suggested:

> As set out in the 2010 Strategic Defence and Security Review, we have assessed that we can safely manage and maintain the Vanguard boats until Successor submarines are introduced into service in the early 2030s.[113]

The 2010 SDSR in fact stated:

> We have reviewed the scope to extend the life of the existing Vanguard class submarines and have concluded that, with

---

107 The first time was in the 2006 White Paper when the service life of the submarine was extended from 25 to 30 years. The second was in the 2010 SDSR. See footnote 104.

108 See for example: "George Osborne issues Treasury ultimatum over Trident", *The Daily Telegraph,* 12 November 2015

109 National Audit office, *Major Projects Report 2015*, HC488-II, October 2015

110 HC Deb 24 November 2015, c1254

111 PQ HL6953, 21 March 2016

112 PQ HL3927, 3 December 2015

113 PQHL3929

> sufficient investment, we can safely operate them into the late 2020s and early 2030s. This affords us the opportunity to adjust the build programme of the replacement submarines to match, reducing cost in the short-term with the aim of delivering the first new submarine in 2028.[114]

Bringing the first submarine of its class into service in the early 2030s, as opposed to 2028, will add at least another 3 years onto its service life, making a total service life of at least 37 years. Former First Sea Lord, Admiral Lord West, has recently expressed concerns over the "fragility" of the deterrent fleet given that their service lives have been extended for so long.[115]

4.2 The Successor programme

Although commonly referred to as "the renewal or replacement of Trident", the Successor programme is about the design, development and manufacture of a new class of four submarines (SSBN).[116] The submarine was initially earmarked to have a service life of "at least 25-years".[117] However, in its latest factsheet on the Successor programme, the MOD has stated that the submarine will "have a lifespan of at least 30 years". The first SSBN is now expected to enter service in the early 2030s. The MOD has refused to be drawn on specific dates stating that "detailed planning assumptions for Service Entry are classified".[118]

A Common Missile Compartment (CMC) for the SSBN, which will house the current Trident strategic weapons system, is being developed in conjunction with the United States.[119]

Replacement of the Trident II D5 missile itself is not part of the Successor programme. The UK is currently participating in the US' Trident II D5 life extension programme which will see the missile remain in service until the 2060s.[120]

With respect to the wider deterrent programme, decisions on a replacement warhead have been deferred until later this decade and in 2013 the MOD confirmed that "no new significant infrastructure will be required to support the Successor submarines". It suggested that any investment is "forecast to be limited to the modification of existing

---

114 HM Government, Securing Britain in an age of uncertainty, CM7948, October 2010, p.39

115 See "Nuclear fleet is too fragile says former Navy Chief", *The Times,* 12 November 2015

116 There had been considerable debate over whether it would be possible to procure three boats, and still maintain CASD. The intention had been to make a decision on the size of the fleet at Main Gate. However, in April 2015 Michael Fallon stated in a speech at RUSI that a Conservative government would commit to the procurement of a 4-boat fleet. That position was reiterated in PQ6841, *Trident,* 20 July 2015

117 *The Future of the United Kingdom's Deterrent,* Cm6994, December 2006, p.31

118 PQ24643, *Trident Submarines,* 1 February 2016

119 The design for the Successor submarine's common missile compartment (CMC) is being delivered under the 1963 Polaris Sales Agreement (PSA), as amended (HL Deb 11 February 2013, c92WA)

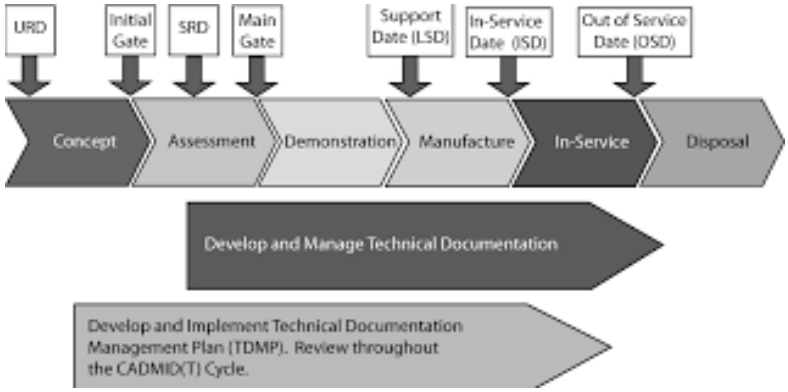
120 PQ35764, *Trident,* 4 May 2016

infrastructure to accommodate the differences between the Vanguard and Successor designs".[121]

What stage is the programme at?

The conventional procurement of defence equipment in the UK is largely conducted in accordance with the generic CADMID cycle.[122]

Box 4: The CADMID cycle



Source: JSP 886, *Defence Logistics Support Chain Manual*

There are two main decision points within the cycle. Initial Gate assesses the feasibility of the programme going forward, including making decisions on broad design parameters and ordering any long lead items that may be required. Approval by the MOD's internal Investment Approvals Board is required at this point before funds can be released for the assessment phase. Approval at Initial Gate does not, however, commit the MOD to approval later on in the programme at Main Gate, which is the point when the main investment decision on a programme is taken.

As outlined above, however, the 2015 SDSR announced that "due to the scale and complexity" the Successor programme will now be subject to several stages of investment, as opposed to the traditional approach which entails one single Main Gate and one single investment decision.[123]

The Successor programme is currently in a five-year assessment phase. The next phase of the programme, which SDSR 15 refers to as "risk reduction and demonstration" will begin in 2016. At present there is no indication of what future phases will entail, or when they might be implemented. In answer to a Parliamentary Question on 1 February

---

121 A programme of works at the submarine construction yard in Barrow, for example, has been prepared in order to provide capacity to accommodate the Successor submarine, which is larger than the Astute or Vanguard class.

122 There are exceptions to this cycle such as the acquisition of Urgent Operational Requirements.

123 The Queen Elizabeth aircraft carriers have also been procured in this way.

2016 Defence Procurement Minister, Philip Dunne stated that "options for the subsequent investment stages, including scope, time and cost are currently under consideration".[124]

Brief summary of the programme thus far

Concept Phase

Following the vote in the House in March 2007 work began immediately on the concept phase of the programme. In October 2007 the MOD opened a Future Submarine Integrated Project Team (IPT) office at Barrow-in-Furness to work in collaboration with the MOD's IPT office at Defence Equipment and Support in Abbey Wood.

During that phase the MOD and its Tier One industrial partners (BAE Systems, Babcock Marine and Rolls Royce) focused primarily on developing the principal design parameters for the new class of submarine and its associated propulsion system.

The IPT also examined potential solutions for the manning, training and infrastructure of the future nuclear deterrent. Other work focused on gathering information in relation to the potential refurbishment or replacement of the UK's nuclear warhead.

In December 2009 the MOD confirmed that an Initial Gate decision on the Successor programme had been delayed in order to thoroughly assess the technical options available. Further delays were the result of the value for money review held as part of the 2010 SDSR.

Initial Gate

Initial Gate was approved on 14 April 2011[125] and announced to Parliament on 18 May, in conjunction with the publication of the *Submarine Initial Gate Parliamentary Report*. That report highlighted a number of key decisions that had flowed out of the concept phase:

- A number of systems from the Astute-class submarine have been incorporated into the design of the successor submarine, although the report does not specify exactly what those systems are. The 'pull through' of technology is expected to reduce both costs and design and delivery risk for the new platform, while also ensuring commonality in the training and maintenance regimes for the UK's nuclear submarine fleet.
- The new Pressurised Water Reactor 3 (PWR3) has been chosen as the propulsion system for the successor platform. It is considered easier to operate than the current system (PWR2), has a longer in-service life, will require less time in upkeep and maintenance and has lower through-life maintenance costs because of its longer service life.[126]
- Work with the US on a Common Missile Compartment would remain ongoing to evaluate how best to incorporate the UK's requirement for eight operational missiles, against a baseline design for the CMC which currently involves a 12 missile tube

[124] PQ24644, *Trident Submarines,* 1 February 2016
[125] National Audit Office, *Major Projects Report 2014*, HC941-II, January 2015, p.222
[126] A submarine with the PWR3 has been estimated at £50m more expensive to procure and operate than the current design incorporating the PWR2. However, it is estimated to be cheaper in the longer term due to its extended in-service life.

> unit. It was recognised that the cost of the CMC would be minimised by keeping as much of the design as possible in common with the US.[127]

Going forward, the report envisaged:

- Design maturity of around 70% being achieved by the end of the assessment phase so that manufacture can commence after Main Gate without the need for redesign, which would introduce delays and increased cost into the programme.
- Incorporating into the design, at an acceptable level of risk, several components in which technological improvements have been planned, including communications, tactical weapon systems, batteries and structural materials.
- Establishing an Integrated Programme Management Team (IPMT) to oversee the work schedule, costs and risks of the programme and to manage the relationship between the MOD and its main industry partners.
- A decision on a final fleet of three or four boats would be taken at Main Gate.
- Around £8m would be spent between 2011 and 2014 to study, in detail, the requirement for investment in the UK's nuclear deterrent infrastructure.

The Initial Gate business case also outlined several 'long lead' items that would be procured as part of the assessment phase, including the steel for the hull of the first replacement submarine. In response to questions in February 2011 the MOD confirmed that this was necessary "due to the length of time needed for the mill run" and "in order not to put at risk the in-service date".[128] In March 2011 Defence Minister, Peter Luff, also stated:

> I am told that we bought the oak for HMS Victory 15 years in advance of building it. This is par for the course in major procurement programmes; there is nothing unusual about it at all.
>
> It is quite simply not true to say that large parts of the build programme will have been completed by main gate, nor is it true to say that we will be locked into contracts and that we will have spent so much that we will have to build the boats when we get to main gate. There is nothing in the current programme that will prevent us from making choices in 2016 about what deterrent capability we want or how many boats we might order.[129]

Contracts for other long lead items, including items relating to the propulsion system, were also expected to be placed during the assessment phase. However, it was made clear as part of the Initial Gate business case that no long lead items would be procured for the fourth boat as a decision on the size of the eventual fleet was initially not due to be taken until 2016.

---

127 In answer to a Parliamentary question in November 2014 the MOD revealed that the Successor SSBN will be based on a 12-tube missile compartment, but it will only be configured with eight operational missiles. Tubes that are not configured with missiles will be configured with ballast cans in order to enable the submarine to dive (PQ215791, *Nuclear submarines,* 27 November 2014)

128 HC Deb 16 February 2011, c805W

129 HC Deb 1 March 2011, c66WH

Following publication of the Initial Gate report there was much debate about the lack of parliamentary involvement in taking the programme forward at that point. Many Members of Parliament, and other commentators, felt that Parliament should have been given the opportunity to debate the issue, while others went one step further and suggested that parliament should have been given a vote on approving the next phase of the programme. However, during a Westminster Hall debate in March 2011 Peter Luff confirmed:

> What of the calls for scrutiny of the initial gate business case? Parliament does not routinely review internal Ministry of Defence business cases and I have not yet heard a convincing argument that suggests that this programme should be any different. The initial gate business case is not a grand strategic assessment; that happened in 2006 with the White Paper and the vote in the House of Commons in 2007. The initial gate business case is a technical assessment that presents design choices and programme analysis that is reviewed and agreed by technical, financial and procurement experts in MOD, Treasury and Cabinet Office.[130]

At the publication of the Initial Gate report the Government committed to providing an annual report to Parliament on the progress of the programme going forward. Annual notes are also submitted to the MOD's Investment Approvals Committee and HM Treasury.[131]

Assessment Phase Progress

The objectives of the Assessment Phase are to:

> Refine the design of the Successor submarine; develop detailed cost estimates; and develop a procurement strategy such that the main investment decision can be made in 2016 with confidence that the boats can be built in the timescale required, to meet the essential requirements, and within the available budget.[132]

The assessment phase was subsequently divided into several stages of work, largely focused on the design of the Successor platform:

- Stage One – to decide and understand the specifications of each system and component of the Successor submarine. The main outcome would be the system drawings and technical specifications necessary for the purchase of equipment provided by companies outside of the three Industrial partners on this programme.
- Stage Two – Consideration of how the various sub-systems and components would be incorporated into the overall submarine design.
- Stage Three – detailed technical drawings for the submarine would be produced.

Since May 2012 a number of contracts have been awarded to the main industrial partners on this project (BAE Systems, Rolls Royce and Babcock) in order to deliver on each of these stages:

- In May 2012 framework contracts were awarded to BAE Systems, Babcock and Rolls Royce. These contracts cover the period up to

---

130 HC Deb 1 March 2011, c66WH
131 NAO, *Major Projects Report*, HC941-II, January 2015, p.223
132 MOD, *Update to Parliament 2013*

Main Gate and provide an overarching structure under which rolling waves of work packages have been established. That first set of work packages, and covering the first 18 months of work on the assessment phase, were also announced. The largest contract was awarded to BAE Systems for work on the overall design of the submarine. A contract was awarded to Babcock for part of the in-service support package, while a further contract was awarded to Rolls Royce for work on the integration of the reactor design.[133]

- In October 2012 the second set of work packages was announced and covered a further 18 months of design work for BAE Systems and Babcock.[134]
- In December 2013 two further contracts were awarded to BAE Systems to begin work on some initial items, such as structural fittings, electrical equipment, castings and forgings.[135]
- In June 2012 a separate Core Production Capability contract was agreed with Rolls Royce for the production of the reactor cores for the Successor submarines. However, the actual manufacture of the core for the first boat of the fleet will not commence until after Main Gate.[136] In February 2013 a separate submarine propulsion contract was also awarded to Rolls Royce to deliver and maintain the UK's nuclear propulsion capability for submarines, which will include both the Astute[137] and the Successor deterrent submarine.
- In October 2014 an $83.8m contract was awarded to General Dynamics for the continuing development of the collaborative Common Missile Compartment. The contract provides funding for 17 missile tubes: four for the US submarine programme, one for a US shore test facility and 12 missile tubes for the UK Successor programme.
- In March 2015 BAE, Babcock were awarded further contracts for detailed design work.
- In February 2016 the MOD announced a further £201 million contract to BAE Systems to complete the assessment phase. The funding will enable BAE to develop the design of the submarine, including the layout of equipment and systems, and to develop manufacturing processes, including the production of early prototypes, ahead of the next phase of the programme.

Separately, the MOD also announced in May 2012 its commitment to continue investing £1 billion a year in facilities at the Atomic Weapons Establishment under the Nuclear Warhead Capability Sustainment Programme, which has been underway with AWE Management Ltd since 1995. This agreement does not relate to any replacement warhead programme but is considered necessary "to ensure we can maintain our existing nuclear warhead in service for as long as necessary, and to

133 Ministry of Defence press release, 22 May 2012
134 Ministry of Defence press release, 29 October 2012
135 "New investment in Successor submarines", *Ministry of Defence new story,* 16 December 2013
136 Ministry of Defence, *The United Kingdom's Future Nuclear Deterrent: 2012 Update to Parliament,* December 2012
137 Astute is the new class of attack submarines that are currently being introduced into service to replace the Trafalgar-class submarines.

ensure we retain the capability to design and manufacture a replacement warhead should that be necessary".[138]

The programme was reviewed by the Major Projects Authority in February 2014 and by the Major Projects Review Group in March 2014. According to the MOD's last update to Parliament in December 2014:

> The review concluded that the design of the submarine was progressing satisfactorily and suggested areas where further work would be beneficial ahead of a Main Gate business case to explore how the programme's organisational, commercial and financial arrangements could be optimised. This exploratory work is now in hand and will inform the Main Gate Business Case in 2016.[139]

Box 5: Suggested reading: annual updates to Parliament

- Ministry of Defence, *The United Kingdom's Future Nuclear Deterrent: 2012 Update to Parliament*
- Ministry of Defence, *The United Kingdom's Future Nuclear Deterrent: 2013 Update to Parliament*
- Ministry of Defence, *The United Kingdom's Future Nuclear Deterrent, 2014 Update to Parliament*

How much will it cost and who will pay for it?

The 2015 SDSR updated the overall expected costs of the Successor programme.

Acquisition Costs

The expected overall cost for the manufacture of four SSBN will be £31 billion, an increase of £6 billion on estimates set down in the programme's Initial Gate report in 2011 (at outturn prices). This cost estimate includes all costs associated with acquisition including feasibility studies, design, assessment, demonstration and manufacture (including the US-UK Common Missile Compartment project).[140] It also includes investment in new facilities at BAE Systems in Barrow.[141]

The new cost estimate also accounts for expected defence inflation over the life of the programme.[142]

A contingency of £10 billion will also be set aside. This contingency represents approximately 35% of the submarine cost to completion and according to the MOD "is a prudent estimate based on past experience of large, complex projects, such as the 2012 Olympics".[143] However there is no guarantee whether all, or any, of this money will be spent. If

---

138 HC Deb 14 May 2012, c21WS. The costs of AWE, including the Nuclear Warhead Capability Sustainment programme are included in the annual running costs of the nuclear deterrent.

139 Ministry of Defence, *The United Kingdom's Future Nuclear Deterrent: 2014 Update to Parliament*, December 2014

140 HC Deb 4 June 2009, c627W

141 In 2013 the MOD confirmed that "no new significant infrastructure will be required to support the Successor submarines" and that any investment is "forecast to be limited to the modification of existing infrastructure to accommodate the differences between the Vanguard and Successor designs" (*2013 Update to Parliament*)

142 Defence inflation is often one of the largest sources of additional costs on a procurement programme.

143 PQ24652, *Trident Submarines: Finance,* 2 February 2016

it were then it would provide an upper-end estimate of acquisition of £41 billion.

The MOD has stated that "the revised cost and schedule reflect the greater understanding we now have about the detailed design of the submarines and their manufacture".[144]

The years of peak expenditure are expected to be principally 2018 through to the mid/late 2030s, as the programme moves into full production.

In-Service costs

Once the new nuclear deterrent submarine comes into service, the in-service costs of the UK's nuclear deterrent, including the costs of the Atomic Weapons Establishment and the Nuclear Warhead Sustainment Capability Programme, basing, decommissioning and disposals, are expected to be around 6% of the defence budget.[145] Based on the current defence budget, that figure is approximately £2.1 billion per year, rising to £2.38 billion by 2020/21 in line with increases to the defence budget as set out under the 2015 Comprehensive Spending Review.

However, calculating the ***overall*** expected in-service cost of Successor is difficult and this paper does not attempt to do so, for the following reason.

Successor is due to enter service in the early 2030s and will have a lifespan of *at least* 30 years. Therefore, in order to make any sort of calculation of overall in-service costs one must make a number of predictions or assumptions about when Successor will enter service, how long it will remain in service and the level of defence spending over the next 50-60 years.

For example, is it reasonable to assume that the defence budget will continue to meet the NATO target of 2% of GDP over this period?[146] If that remains the case how is the UK's economy predicted to grow or shrink during this time? Is it also reasonable to assume that what constitute 'in-service costs' will also remain the same and therefore require 6% of the defence budget to be allocated to it?

Depending upon the methodology one uses to calculate in-service costs, it is possible to end up with significantly different figures. For example:

1 Under the current CSR settlement, the defence budget in 2020/21 will be £39.6 billion. 6% of that budget will be £2.38 billion.

   If one assumes that the defence budget will remain relatively static to 2060/2061 (therefore covering a 30 year lifespan of a system that enters service in approximately 2031), and assumes that the in-service costs will continue to represent 6% of that

144 HM Government, *National Security Strategy and Strategic Defence and Security Review 2015*, Cm9161, November 2015, p.34
145 HL328 , *Trident submarines,* 6 June 2016
146 The government has committed to spend 2% of GDP on defence until the end of this decade, but defence spending beyond that is unclear.

budget, then total in-service costs for Successor between 2031 and 2061 will be approximately £71.4 billion.

2 If one uses real-term GDP growth forecasts (for example, the Office for Budget Responsibility which in March 2016 predicted real GDP growth of approx. 2.5% annually), and assumes defence spending will continue at 2% of GDP and that in-service costs of Successor will remain at 6% of the defence budget, then spending until 2065 would be as follows:

LONG TERM GDP FORECAST, NATO 2% DEFENCE BUGET, TRIDENT COST 6% OF DEFENCE BUDGET

ALL FIGURES IN £ BILLION

YEAR	REAL GDP FORECAST	REAL GDP GROWTH %	DEFENCE BUDGET 2% GDP	TRIDENT 6% DEFENCE BUDGET
2015/16	1797.9	2.4	36.0	2.2
2016/17	1834.5	2.0	36.7	2.2
2017/18	1875.3	2.2	37.5	2.3
2018/19	1914.8	2.1	38.3	2.3
2019/20	1954.1	2.1	39.1	2.3
2020/21	1996.2	2.2	39.9	2.4
2021/22	2,044.1	2.4	40.9	2.5
2022/23	2,093.2	2.4	41.9	2.5
2023/24	2,143.4	2.4	42.9	2.6
2024/25	2,194.8	2.5	43.9	2.6
2025/26	2,249.7	2.5	45.0	2.7
2026/27	2,306.0	2.5	46.1	2.8
2027/28	2,363.6	2.5	47.3	2.8
2028/29	2,422.7	2.5	48.5	2.9
2029/30	2,483.3	2.5	49.7	3.0
2030/31	2,545.3	2.5	50.9	3.1
2031/32	2,609.0	2.5	52.2	3.1
2032/33	2,674.2	2.5	53.5	3.2
2033/34	2,741.1	2.5	54.8	3.3
2034/35	2,809.6	2.6	56.2	3.4
2035/36	2,882.6	2.5	57.7	3.5
2036/37	2,954.7	2.5	59.1	3.5
2037/38	3,028.6	2.5	60.6	3.6
2038/39	3,104.3	2.5	62.1	3.7
2039/40	3,181.9	2.5	63.6	3.8
2040/41	3,261.4	2.5	65.2	3.9
2041/42	3,343.0	2.5	66.9	4.0
2042/43	3,426.5	2.5	68.5	4.1
2043/44	3,512.2	2.5	70.2	4.2
2044/45	3,600.0	2.5	72.0	4.3
2045/46	3,690.0	2.5	73.8	4.4
2046/47	3,782.3	2.6	75.6	4.5
2047/48	3,880.6	2.5	77.6	4.7
2048/49	3,977.6	2.5	79.6	4.8
2049/50	4,077.1	2.5	81.5	4.9
2050/51	4,179.0	2.5	83.6	5.0
2051/52	4,283.5	2.4	85.7	5.1
2052/53	4,386.3	2.4	87.7	5.3
2053/54	4,491.5	2.4	89.8	5.4
2054/55	4,599.3	2.4	92.0	5.5
2055/56	4,709.7	2.4	94.2	5.7
2056/57	4,822.8	2.4	96.5	5.8
2057/58	4,938.5	2.4	98.8	5.9
2058/59	5,057.0	2.5	101.1	6.1
2059/60	5,183.4	2.5	103.7	6.2
2060/61	5,313.0	2.6	106.3	6.4
2061/62	5,451.2	2.6	109.0	6.5
2062/63	5,592.9	2.6	111.9	6.7
2063/64	5,738.3	2.6	114.8	6.9
2064/65	5,887.5	2.5	117.8	7.1
2065/66	6,034.7		120.7	7.2

SOURCES:

OBR FISCAL SUSTAINABILITY REPORT JUNE 2015 (SUPPLEMENTARY TABLE 1.2)

OBR ECONOMIC AND FISCAL OUTLOOK March 2016 (SUPPLEMENTARY TABLE 1.1)

147

147 Long term estimates of GDP growth may not be reliable. They may change over time in response to unforeseen economic activity - nationally and internationally. The figures presented here should therefore only be used a guide to orders of magnitude.

> Using the same timeframe as the previous calculation (2031-2061), in-service costs would subsequently total approximately £140.5 billion over this period.

Arguably this need to make predictions and assumptions is the reason why so many cost estimates for the deterrent exist (see Alternative cost estimates).

Additional Costs

In addition to the acquisition and in-service costs, the MOD also outlined that there would be some preparatory and enabling costs associated with extending the existing deterrent and developing future systems:

- Trident II D5 Life Extension Programme – the UK is participating in this US-led programme, which will extend the life of the Trident missile to the early 2060s. The expected cost to the UK is £250 million.
- Extension of the Vanguard class – the 2010 decision to keep the Vanguard class in service for a further four years to 2028 was expected to incur additional costs of approximately £1.2 - £1.4 billion.[148] However, savings achieved from the Submarine Enterprise Performance Programme (SEPP) were also expected to be used to offset that additional expenditure.[149] In November 2015 the MOD confirmed that the marginal costs of a further extension to the life of the Vanguard class "would be contained within the existing running cost of the deterrent".[150]

The announcement on 31 August 2015 of £500 million of investment for HM Naval Base Clyde, over a ten-year period, is not part of the Successor programme. It is part of the MOD's ongoing programme of work to establish a submarine centre of excellence at HM Naval Base Clyde once the entire Royal Navy submarine fleet is based there from 2020.[151] According to an MOD official:

> The £500M infrastructure investment for HMNB Clyde is part of a planned programme of work needed to update the facilities at the naval base to support all Royal Navy submarines. The work is related to obsolescence management and to bring facilities up to the latest standards needed to ensure the naval base can operate safely and securely, meeting the needs of a 21st century Submarine fleet.[152]

The figures used here are the result of a combination between two separate GDP forecasts (short and long term) which were calculated at different times and which considered different time-frames
Growth forecasts can be influenced by demographic changes such as increased population sizes and immigration. The real GDP growth figures presented here does not take into account extremes in demographic changes.
All figures here are in real terms. Inflation is taken into consideration.
2015/16 starting GDP figure is taken from OBR fiscal sustainability report.
GDP real growth estimate taken from OBR economic and fiscal outlook.

148 HC Deb 8 November 2010, c5
149 SDSR Briefing Pack: Trident V4M: Q&A, 2010
150 PQ17622, *Trident submarines*, 30 November 2015
151 HM Government, *Scotland Analysis*, Cm 8714, p.32
152 Private correspondence with the author.

What has been spent so far?

By the next stage of the programme, due to begin in 2016, the MOD is expected to have spent approximately £4.8 billion on the Successor programme.

The Concept Phase of the Successor programme had an allocated spend of £905 million, including:

- Boat and propulsion work - £309 million
- Common Missile Compartment - £283 million
- US high steam generators and technology - £59 million
- Extension to the concept phase - £254 million.[153]

The Assessment Phase, to 2016, had an allocated budget of £3.3 billion.[154] However, the 2015 SDSR indicated that a further £600 million will be invested in the current assessment phase which will now total £3.9 billion and include further design work, the purchase of several long lead items for the fourth submarine, facilities at BAE Systems in Barrow and the nuclear propulsion programme. That additional funding was confirmed on 3 March 2016.[155]

Spending within the assessment phase has focused on the following areas:

- **Framework contracts and Work Packages** – As outlined above, in May 2012 framework contracts were awarded to BAE Systems, Babcock and Rolls Royce. These provide an overarching structure under which rolling waves of work packages have been established:
  - First set of work packages (May 2012) - £350 million in total. BAE Systems - £328 million for work on the overall design of the submarine. Babcock - £15 million for part of the in-service support package and Rolls Royce - £4 million for work on the integration of the reactor design.[156]
  - Second wave (October 2012) - £350 million in total. £315 million for BAE Systems and £38 million for Babcock.[157]
  - Third wave (March 2015) - £285 million for further design work in order to mature the design so as to begin construction in 2016. BAE's share of that package of work was £257 million, Babcock - £22 million and Rolls Royce - £6 million.[158]
  - Fourth wave (February 2016) - the MOD announced a further £201 million contract to BAE Systems to complete the assessment phase.
- **Common Missile Compartment** – The overall cost to the UK over the financial years 2011-12 to 2015-16 have been estimated

153 HC Deb 28 February 2011, c82W
154 The five-year Assessment Phase began in 2011 and is due to conclude in early 2016. Initially it had an allocated budget of £3 billion, which was agreed at Initial Gate in May 2011. With Treasury agreement, a further £261 million was brought into the Assessment Phase from elsewhere in the programme in December 2014. This is not additional funding and therefore does not increase the overall cost of the programme.
155 HCWS576, *Successor submarine assessment phase,* 3 March 2016
156 Ministry of Defence press release, 22 May 2012
157 Ministry of Defence press release, 29 October 2012
158 MOD press release, 11 March 2015

at £103 million. The MOD also confirmed that it had agreed to pay 12.5% of all non-recurring expenditure on design activities.[159]

In October 2014 a contract was awarded to General Dynamics for the continuing development of the CMC. That contract provides funding for 17 missile tubes; four for the US submarine programme, one for a US shore test facility and 12 missile tubes for the UK Successor programme. The 12 UK missile tubes' share of that specific contract is estimated at $59 million (approximately £37 million).[160]

In December 2014 the MOD confirmed that "costs beyond the first 17 tubes have yet to be agreed, and it would prejudice commercial interests to estimate costs at this stage. The Ministry of Defence is not planning to commit to further missile tubes prior to Main Gate in 2016".[161]

- **Long lead items** – Initially £588 million was approved for the purchase of long lead items prior to Main Gate.[162] As outlined above, a proportion of the additional £600 million assigned to the assessment phase budget as a result of SDSR15 will also be utilised for the purchase of long lead items for the fourth submarine.

  The MOD has justified the purchase of specified long lead items as essential if the in-service date of the Successor is not be put at risk.[163] Such long lead items include:

  — Elements of the PWR3 nuclear propulsion system
  — Main boat systems (computer systems, hydraulic systems and atmospheric systems, the generators and the communications systems)
  — Missile tube items (as part of the CMC project)
  — Weapons handling and launch system
  — Structural fittings, electrical equipment, castings and forgings.[164]
  — Specialised high-grade steel for the first boat

  By the end of March 2014 £230 million had been committed to long lead items.[165] Up to March 2016 further orders are expected to include:

  — Additional PWR3 components

---

159 HC Deb 20 June 2011, c41W
160 PQ 215809 [Trident Missiles], 4 December 2014
161 Nuclear Submarines, PQ215790, 2 December 2014
162 £533 million approved at Initial Gate. A further £55 million for long lead items was approved in December 2014.
163 HC Deb 16 February 2011, c805W
164 In December 2013 BAE was awarded two contracts worth £79 million for these items ("New investment in Successor submarines", *Ministry of Defence new story,* 16 December 2013)
165 A Parliamentary Question in January 2014 provides a useful summary of the contracts that had been let by that point in the programme.

- Main lubrication oil pumps
- Main feed flexible couplings
- Main shaft bearing
- Hull fittings
- Pressure plate and stiffeners
- Turbo generators
- Main engines and condensers
- Electrical distribution components
- Fibre optic components[166]

- **Infrastructure** – In December 2014 £206 million of funding was announced for the upgrade of facilities at the submarine construction yard in Barrow.[167] In March 2016 a further £225 million for Barrow was announced. The MOD stated that "that investment will ensure the submarines are built with maximum efficiency".[168]

Who will pay for it?

In line with convention, the Trident Successor programme will be funded from the MOD's core equipment procurement budget.[169]

According to the 2015 MOD Equipment Plan approximately one quarter (£43 billion) of total committed MOD spending on equipment over the next ten years will be on submarine and deterrent systems; an increase of £3 billion from the 2014 Equipment Plan.[170]

However, those overall costs cover the entire submarine enterprise, including support to all in-service submarines, the delivery of the Astute class SSN, the Successor programme and the costs associated with the nuclear weapons capability sustainment programme (including the operation, maintenance and upgrade of AWE). It also does not take into account the savings that are expected to be achieved under the Submarine Enterprise Performance Programme. The £3 billion increase is due to the inclusion in the 2015 Plan of the 2024-25 financial year

166 MOD, *2014 Update to Parliament*
167 This money is part of the £261 million that was 're-profiled' into the assessment phase in December 2014.
168 MOD press release, 3 March 2016
169 In 2007 a disagreement erupted between the MOD and the Treasury over the funding of the capital costs of the Successor programme. The MOD suggested that the capital costs of procuring the nuclear deterrent had, in the past, been borne by the Treasury, a position which the Treasury refuted. The argument centred round an increase to the defence budget which was announced as part of the 2007 Comprehensive Spending Review. The CSR settlement suggested that the increase would allow the MOD "to make provision for the maintenance of the nuclear deterrent", which some commentators considered to be a commitment to fund the capital costs of the project. However, the MOD confirmed in November 2007 that while additional funding had been provided to the MOD budget, spending on the Successor programme would come from within the core equipment budget.
170 Malcolm Chalmers of RUSI has suggested that this could rise to one third of the overall equipment spend if unallocated spending and contingency provisions are attached to the Successor programme at any point in the future. See: "Towards the UK's Nuclear Century", *RUSI Journal*, December 2013

"which includes a proportionately higher element of the Successor programme".[171]

Spending on the Successor submarine programme alone represents approximately 9% of the MOD's committed equipment plan up to 2016/17.[172]

How much would it cost to decommission the nuclear deterrent?

The specific costs associated with decommissioning the existing nuclear programme is set out in the MOD's 2014-15 Annual Report and Accounts. In that report the MOD suggests that the decommissioning of facilities; the treatment, storage, and disposal of nuclear waste arising from operations at Rosyth and Devonport dockyards and at Atomic Weapons Establishment sites; and the decommissioning of operational nuclear submarines would be in the region of £3.99 billion.

It is worth noting, however, that these costs also include the decommissioning of the nuclear-powered SSN fleet and it is unclear whether the costs include the current SSBN fleet. In a Parliamentary Question on 23 October 2015 the MOD suggested that the disposal of the SSBN at the end of their service life would be part of the in-service costs of the nuclear deterrent.[173]

Comparison to other Government spending[174]

In a speech on 21 October 2015 Defence Secretary Michael Fallon said of the Successor programme:

> It is a project that is around nearly twice the budget of Crossrail. It is around three times the budget of the London Olympics.
>
> Spread across the 30 year life of the new boats, this represents an annual insurance premium of around 0.13 per cent of total Government spending.[175]

London 2012 cost a total of £8.92 billion.[176] Michael Fallon also suggested in November 2015 that High Speed Two will cost £50 billion in total.[177]

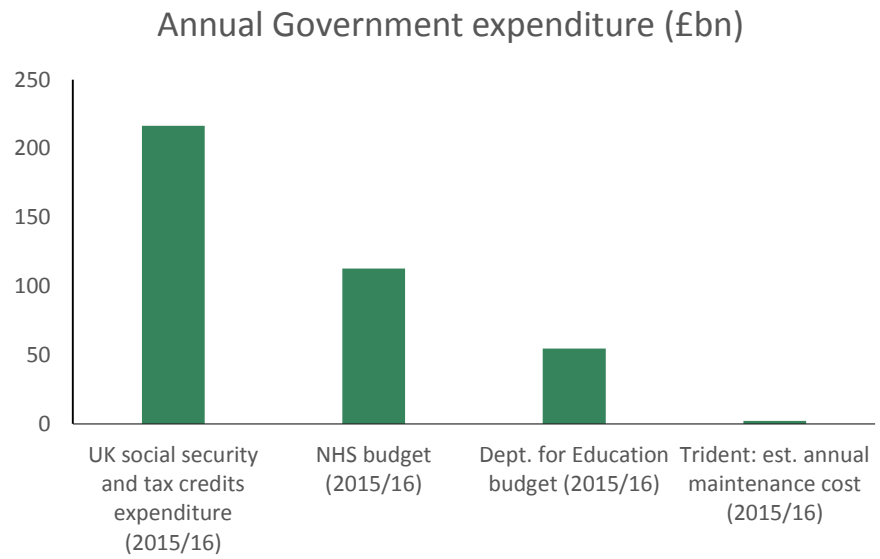
With respect to departmental spending, the in-service costs of the nuclear deterrent (presently £2.1 billion per annum) is most often compared to the benefits bill, or the average weekly spend of the NHS.

In 2015-16, for example, the cost of maintaining the nuclear deterrent was 1% of total Government expenditure on UK social security and tax credits expenditure in that year.

---

171 MOD, Defence Equipment Plan 2015, p.19
172 HC Deb 1 March 2013, c719W
173 PQ1251, *Trident*, 23 October 2015
174 With thanks to Rob Page and Richard Cracknell in the Social and General Statistic Section of the House of Commons Library.
175 Speech to a reception of the Keep Our Future Afloat Campaign, House of Commons, 21 October 2015
176 Department of Culture, Media and Sport, *London 2012 Quarterly Report*, October 2012
177 HC Deb 24 November 2015, c1212

Chart 1: Annual Government expenditure (£ billion)



Sources: Spending Review 2015; DWP Benefit Expenditure and Caseload tables March 2016. Trident maintenance cost estimated at 6% of the UK's defence budget.

Alternatively, £2.1 billion a year is roughly equivalent to what is spent currently on the Attendance Allowance, or Carers Allowance, or Winter Fuel Payments (each of which are around £2 – £2.5 billion per year).

According to the OBR's July 2015 Economic and Fiscal Outlook, The amount spent on the day-to-day running costs of the NHS[178] in 2015/16 was £111.5 billion. This equates to £2.2 billion per week.

The latest Treasury outturn data for the total spending on "health" in the UK in 2014-15 puts spending at £134.1 billion – equivalent to £2.57 billion per week.[179]

Alternative cost estimates

Since the replacement programme began in 2007 there have been a number of alternative cost estimates published. One common theme among those different cost estimates is the general belief that the MOD's assessment of cost is under-estimated and that the true cost of replacing the nuclear deterrent will be much higher. Some groups, such as CND and Greenpeace, have sought to highlight the cost of replacing the deterrent over the 30-year period that it will remain in service. Others have pointed to the history of cost overruns in major defence procurement programmes and the impact that defence inflation and exchange rates can have on a long-running projects.

At a time of financial constraints and pressure on the defence budget, several commentators have called for cheaper options to be pursued; while others have argued that the UK should move toward disarmament. Many have suggested that the money committed to

[178] The Resource Departmental Expenditure Limit
[179] HM Treasury *Public Expenditure Statistical Analysis* August 2015 Table 4.1

Trident would be better spent on improving the UK's conventional military capabilities. Others have suggested that this level of expenditure could be put to greater use within the NHS or addressing issues such as environmental concerns, poverty, disease and debt.

Advocates of replacing the nuclear deterrent have, in contrast, argued that as the ultimate guarantor of the country's security, the price is comparatively small when compared to the risks involved in renouncing nuclear weapons.[180] One view is that, as nuclear weapons are primarily a political rather than a military tool, the cost of replacing Trident should be paid for by the Government as a whole, and not taken from the defence budget.[181]

Many have also refuted the suggestion that any savings achieved from abandoning the replacement programme would be available for the MOD spend on conventional capabilities. Instead they have argued that such monies would more likely be repatriated by the Treasury.

Campaign for Nuclear Disarmament

In its March 2014 report *People not Trident-the economic case against Trident replacement* CND suggested that the cost of replacing the deterrent, *over its lifetime,* would be in the region of £100 billion.

In May 2016 CND published its updated cost assessment of the Trident replacement programme. It suggests that the total cost of the programme, over its lifetime, is now in the region of £205 billion. This figure includes:

- SSBN procurement - £31 billion
- Contingency fund - £10 billion
- Missile extension programme - £350 million (uprated from 2006 to take account of inflation)
- Replacement warheads - £4 billion
- Infrastructure costs - £4 billion
- In-service costs - £142 billion
- Conventional forces assigned to support Trident - £1 billion
- Decommissioning - £13 billion.

It is worth noting that this figure assumes that the full contingency fund of £10 billion will be used. It also includes infrastructure costs that the MOD outlined as a potential cost in 2006. However, in its 2013 *Update to Parliament* the MOD indicated that there would be no substantial infrastructure costs associated with the replacement programme. In-service costs are also based on figures provided by Crispin Blunt MP in 2015 which assumes that the defence budget will remain at 2% of GDP, and that GDP will grow at approximately 2.5% each year (see below).

---

180 See memorandum submitted by Dr Colin S Gray to the Defence Committee, *The Future of the UK's Strategic Nuclear Deterrent: the Strategic Context*, HC 986, Session 2005-06, Ev.80-81

181 ibid, memorandum submitted by Dr Lee Willett, Ev.66-71

Crispin Blunt MP and Reuters

In an article on 25 October 2015 the Reuters news agency suggested that the total lifetime cost of the Trident replacement, up to 2060, would be approximately £167 billion. It reportedly based its calculations on the same methodology used by Crispin Blunt MP who has suggested that the lifetime cost of Trident will be £176 billion.

Both calculations are based on the assumption that defence spending will remain at 2% of GDP until 2060;[182] that annual in-service costs of the nuclear deterrent will remain at 6% of the defence budget and on IMF GDP growth forecasts for this period of approximately 2.5% each year.

Greenpeace

In its 2009 report, *In the firing line*, the campaign group suggested that the capital costs of procuring Trident would amount to £34 billion once VAT, exchange rates and the cost of renewing the Trident II D5 missile, had been factored in. The cost, over the lifetime of the system, it estimates would amount to £97bn.[183]

Toby Fenwick, Centre Forum

In a 2012 report, *Dropping the Bomb*, Toby Fenwick suggested:

> Not only is the Trident replacement likely to cost between £25bn and £33bn in capital costs alone, the probable profile of the spend between 2019 and 2029 suggests that Trident replacement will consume an average of between 20.3 per cent and 31.7 per cent of the MoD's *total* capital budget. Worse, this will occur just at the time that the MoD will be replacing key conventional capabilities for the Royal Navy, British Army and the RAF, setting the stage for a decade-long MoD budget crisis in the 2020s […]
>
> reallocating 80 per cent of Trident's capital spending could fund substantial elements of the MoD's Future Force 2020 proposals which are otherwise likely to be unaffordable. Further, the opportunity exists to use the savings to reprieve some capabilities…[184]

In a further Centre Forum report in February 2015 Toby Fenwick revised the recommendations made in that 2012 report and concluded that the UK should retire the Trident-based system and move toward a free-fall nuclear capability deployed on the UK's Joint Strike Fighter, which is due to enter service in the next few years. The cost of such a system, he suggests, would be in the region of £16.7 billion. Working to the assumption that the Successor programme will cost "up to £33.1bn by 2032" and "a through life cost of approximately £109bn" he argues that the move to a free-fall capability would save £4.8- £13.1 billion to reinvest in conventional capabilities.[185]

---

[182] The government has committed to spend 2% of GDP on defence until the end of this decade, but defence spending beyond that is unclear.
[183] Greenpeace, *In the Firing Line*, 2009
[184] Centre Forum, *Dropping the Bomb*, 2012
[185] Centre Forum, *Retiring Trident*, February 2015

Dr Nick Ritchie

In a report in January 2011 he stated "History suggests that the government's procurement figure is likely to be too low because of the impact of defence inflation. Alternative estimates suggest a procurement figure of £30-£35 billion for the Trident replacement system".[186]

In a report in 2012 Dr Ritchie provided further details on his assessment of the true costs of Trident replacement:

> The costs of staying in the nuclear weapons business are therefore considerable. They include the cost of new ballistic missile submarines (estimated at £11-14 billion in 2006), new infrastructure (£2-3 billion), a new or refurbished warhead stockpile (£2-3 billion), buy-in to a new US submarine-launched ballistic missile programme (likely to be in the range of £2-4 billion based on the original Trident programme), participation in the Trident II (D5) missile life extension programme (£250 million); continued investment in AWE (£4 billion since 2005 and counting), a life extension programme for the current Vanguard-class submarines (£1.3 billion), conventional protection forces (£25-30 million per annum), Trident submarine and missile running costs (£800 million per annum), AWE running costs (around £400 million per annum excluding capital investment). This paints a far more realistic picture of the financial burden of remaining a nuclear weapon state based on data from the original Trident replacement programme budget statements, government answers to parliamentary questions, and government statements and reports. It does include additional decommissioned costs beyond those apparently accounted for current estimates of in-service costs, any cost for development of the PWR3 reactor, or any 'miscellaneous' or 'contingency' expenditure in the Trident replacement programme budget. It represents a significant financial commitment that MoD will struggle to afford over the next two parliaments.
>
> Whilst the government can 'afford' to spend such sums (it can cut funding elsewhere or increase government debt to fund public expenditure) the costs will be drawn from MoD's budget with significant and inescapable opportunity costs. But a broader question is whether this level of public expenditure is warranted as the UK faces long-term and painful economic restructuring to reduce its structural deficit and given the thin strategic rationales for remaining in the nuclear weapons business. Many think not, and this sentiment is a key driver of resistance to the Trident replacement programme.[187]

In April 2016 Dr Ritchie, in collaboration with BASIC, published a briefing entitled *Feeding the Monster* which attempts to chart the evolution of costs related to the Trident replacement programme. Although it doesn't provide an overall total cost estimate going forward that report supported Dr Ritchie's earlier conclusions of 2011 that the 2006 estimates put forward by the Government would be too low due to the impact of defence inflation. It also concluded that:

---

186 Dr Nick Ritchie, *Replacing Trident: Background briefing for Parliamentarians*, January 2011

187 Dr Nick Ritchie, *Rethinking Trident replacement,* January 2012

> It would be heroic indeed to expect the project to stay roughly within the current public estimates released in November 2015, even with the addition of the £10bn contingency. This leaves parliament and the public with the question of „how much is enough?"[188]

The Trident Commission

In its concluding report the independent Trident Commission made the following comments:

> The Commission is aware of a number of headline figure estimates for the costs of renewing the Trident system over the lifetime of the project, but we believe the numbers are involved are difficult to attach meaning to because most take no account of the time at which such spending is projected and the discount factors involved.
>
> The current plans to construct and deploy four replacement SSBN submarines with missiles and warheads over the period 2016 to 2062 have a spending profile [which] amounts to an equivalent annual cost… of £2.9bn in 2012 figures, or 9.4% of the defence budget. In the 2020s the actual annual cash cost will be a good deal higher that this (reaching a peak of almost £4bn a year in the mid-2020s, in 2012 prices), and later, once the investments have been made, will be lower, around £2bn in 2012 prices.[189]

With respect to the argument that the money spent on Trident could be diverted to conventional capabilities, the Commission's report noted that "doubts have been expressed within the Commission, however, as to whether the Treasury would allow redirection of these resources to other defence projects were there to be a decision not to proceed on this project".[190]

Jobs and industry

BAE Systems, Babcock International and Rolls Royce are the Tier One industrial partners in this project.

As with previous SSBN, the submarine will be built by BAE Systems in Barrow-in-Furness and the PWR3 propulsion system will be built by Rolls Royce at Raynesway, Derby. The MOD confirmed in April 2016 that responsibility for sourcing the steel for the construction of Successor will lay with the prime contractor, BAE Systems.[191]

The MOD has stated that "maintaining and sustaining the UK's nuclear deterrent supports over 30,000 UK jobs and makes a significant contribution to the UK economy".[192] In November 2015 the Defence Secretary, Michael Fallon, also sought to make the point that:

> The Successor programme is a national endeavour, involving thousands of people and hundreds of firms right across our country, including in Scotland. Our state-of-the-art submarines require skills that keep our Royal Navy and our country at the

---

188 Dr Nick Ritchie, *Feeding the Monster: Escalating Capital Costs for the Trident Successor Programme*, 19 April 2016
189 The Trident Commission, *Concluding Report*, July 2014
190 The Trident Commission, *Concluding Report*, July 2014
191 PQ33828, *Trident submarines: iron and steel,* 18 April 2016
192 MOD, Successor Submarine Programme Factsheet, January 2016

> cutting edge, and they will inspire the next generation of engineers, software developers and designers.[193]

Approximately 2,200 people across the MOD and all three companies are currently working on the Successor programme, of whom over 50% are engineers and designers.[194] The Ministry of Defence estimates in its *2013 Update to Parliament* that jobs on the Successor programme will peak at 6,000 during the build phase from 2016 to the late 2020s and involve an estimated 850 British companies in the supply chain.[195]

Philip Dunne, Minister of State for Defence Procurement, said in 2012 "should the Successor programme achieve Main Gate approval, and proceed to production, it will sustain thousands of jobs across the UK submarine industry, including businesses at all levels of the submarine supply chain."[196]

The *2014 Update to Parliament* also outlines:

> Work done to date has identified over 850 potential suppliers across the UK. This underlines the fact that the nuclear deterrent represents a significant national undertaking, which is drawing on cutting edge capabilities, innovation, design and engineering skills available in the UK, and is providing employment opportunities and development prospects for a substantial number of apprentices, trainees and graduates in a wide range of technical and other disciplines.

In his submission to the BASIC Trident Commission, Professor Keith Hartley assessed the industrial implications of the Trident replacement programme. He suggested that if both construction and in-service support of the nuclear deterrent are taken into consideration:

> A Trident replacement will support almost 26,000 jobs over its life-cycle (based on four boats and including some 1,850 Navy personnel jobs). The totals comprise the following employment numbers:

BAE at Barrow-in-Furness:	6,045
BAE suppliers:	5,017
AWE:	4,500
AWE suppliers:	4,500
Devonport:	1,590
Devonport suppliers:	1,590
Operations and support:	2,700
TOTAL	25,942

However, he went on to caution that this estimate of employment would be at the upper-end of the scale and makes no allowance for

---

193 HC Deb 24 November 2015, c1211

194 Ministry of Defence, The United Kingdom's future nuclear deterrent: 2014 update to Parliament, 16 December 2014

195 Ministry of Defence, The United Kingdom's future nuclear deterrent: 2013 update to Parliament, 16 December 2013. The Keep Our Future Afloat Campaign estimates that there are approximately 1,200 companies in the overall submarine industry supply chain, covering most of the UK. Approximately 50% of the prime contract for a nuclear powered submarine is contracted to the supply chain.

196 HC Deb 18 September 2012 c617W

issues such as improvements in labour productivity. Equally he argued that cancelling the Trident programme would not necessarily result in an equal number of job losses as many companies would seek alternative markets or contracts, particularly in the supply chain. Direct job losses, he argued, would be more likely to affect BAE, Rolls Royce, AWE and Devonport.[197]

The link between jobs and replacing Trident has, however, been disputed by CND and the Scottish Trade Unions Congress. A 2007 report by CND *Trident and employment: the UK's industrial and technological network for nuclear weapons* argued that:

> Replacing Trident, at a cost to the British public of at least £76 billion over the system's lifetime, represents a very poor rate of return in terms of generating jobs. The report finds that if you started with a blank slate and wanted to make such a multi-billion pound investment of public money to maximise employment, the last thing you would do is build nuclear weapons.
>
> A decision not to replace Trident could be the catalyst for a stronger, diversified economy in those few localities with a residual dependency on nuclear weapons work.

This emphasis on defence diversification was also the subject of an April 2015 report by CND and the STUC entitled *Trident and Jobs: the case for a Scottish Defence Diversification Agency*. That report argued in favour of a Scottish Defence Diversification Agency to plan and resource the diversification of jobs away from military programmes such as Trident and promote a greener Scottish economy.

This notion of defence diversification is also one that Labour Leader Jeremy Corbyn has promoted as part of his argument for moving toward disarmament.[198] In his plan for *Defence Diversification*, published in August 2015, he stated:

> I am committed to ensure that in transitioning away from nuclear weapons, we do so in a way that protects the jobs and skills of those who currently work on Trident, and in the defence sector more widely. This will help grow the British economy.

The Scottish GMB, however, has stated that "the successor programme going ahead is welcome as it is crucial to jobs in Scotland" and has suggested that any notions of defence diversification are "based on Alice-in-Wonderland politics promising pie in the sky alternative jobs for workers who are vital to our national security".[199]

4.3 When will there be a Parliamentary vote?

Successive Governments since 2007 have made clear that the appropriate form of scrutiny at Main Gate, including any debate and

---

197 Professor Keith Hartley, *Defence Industrial Issues: Employment, Skills, Technology and Regional Impacts,* Discussion Paper No.2 of the BASIC Trident Commission, 2012

198 *Defence Diversification*, August 2015

199 GMB Trident Successor Programme Conference, 25 February 2016

vote in the House, would be for the Government of the day to determine.[200]

Main Gate has long been earmarked for 2016. Although the Government indicated in the 2015 SDSR that the Successor programme will no longer be subject to the traditional 'Main Gate' process, it also made clear that a decision on moving the programme forward would still be taken in 2016 and Parliament would have a role. It stated that the MOD "will hold a debate in Parliament on the principle of Continuous At Sea Deterrence and our plans for Successor". It did not specifically commit to a vote, although David Cameron stated in Parliament during a subsequent debate on the SDSR that "we will be moving ahead with the four submarines and at the appropriate moment we will hold a vote in this House".[201]

Despite the absence of a clear timetable, senior government sources had been reported to be keen to settle the 'Trident question' before the Scottish Parliament elections in May 2016. However following the announcement of the EU referendum on 23 June 2016, it was increasingly reported that the Government was keen to delay a parliamentary vote on renewing Trident until after that date. An article in *The Guardian* suggested that "the Prime Minister believes that the referendum campaign […] will complicate efforts to build a strong national consensus over the £31bn renewal of the nuclear deterrent". Several commentators accused the Government, however, of "playing politics" with the nuclear deterrent, suggesting that any delay was merely to exploit divisions within the Labour party over the nuclear weapons programme.[202]

In the aftermath of the EU referendum there had been considerable speculation over whether a vote on Trident would be held before the summer recess, or whether it would be delayed until later in the year.[203] However, at the NATO summit in Warsaw on 9 July David Cameron announced that a parliamentary vote on the nuclear deterrent and the commitment to maintaining continuous at-sea deterrence would take place on Monday 18 July 2016, prior to the summer recess. He stated:

> We must invest in the ultimate insurance policy of all – our nuclear deterrent.
>
> So today I can announce that we will hold a Parliamentary vote on 18 July to confirm MPs support for the renewal of a full fleet of four nuclear submarines capable of providing around-the-clock cover.

---

200 This point was made in both the *Government Response to the Defence Select Committee report on the Trident White Paper* in May 2007 (HC 551, Session 2006-07) and during the debate in the House on 14 March 2007. In March 2011 the MOD stated that "it will be for the next Government to make decisions about scrutinising the main gate decision" (HC Deb 1 March 2011, c68WH)

201 HC Deb 23 November 2015, c1057

202 "Trident vote to be delayed by David Cameron until after EU referendum", *The Guardian,* 11 February 2016

203 Initial expectations were that a new Prime Minister would be appointed in September 2016 and that a vote on Trident renewal could be delayed until after that appointment.

> The nuclear deterrent remains essential in my view – not just to Britain's security but – as our allies have acknowledged here today – to the overall security of the Alliance.[204]

For comparison, it is worth noting other 'category A' defence acquisition programmes such as the aircraft carrier or Lightning II/Joint Strike Fighter have not been subject to parliamentary approval at Main Gate.

SDSR 15 also confirmed that annual reports on the progress of the Successor programme will continue to be provided to Parliament.

Previous Parliamentary Votes

The decision to replace the UK's strategic nuclear deterrent has been the subject of three previous votes in the House, although only one has been initiated by the Government. The most recent votes in 2015 have frequently been referred to by the Government as indicative of current, and widespread, parliamentary support for the successor programme. In June 2015 Secretary of State Michael Fallon stated that "This House voted on the renewal of Trident with an overwhelming majority back in January—I think the largest majority for some years".[205]

March 2007

A debate and vote in the House of Commons on the general principle of whether the UK should retain a strategic nuclear deterrent beyond the life of the current system was subsequently held on 14 March 2007. That debate was on the Government motion:

> That this House supports the Government's decisions, as set out in the White Paper The Future of the United Kingdom's Nuclear Deterrent (Cm 6994), to take the steps necessary to maintain the UK's minimum strategic nuclear deterrent beyond the life of the existing system and to take further steps towards meeting the UK's disarmament responsibilities under Article VI of the Non-Proliferation Treaty.

That motion was passed on division by 409 to 161 votes.[206]

January 2015

In January 2015 a vote was held on the SNP motion "That this House believes that Trident should not be renewed".

That motion was defeated on division by a vote of 35 to 364.

November 2015

The SNP again used an Opposition Day debate on 24 November 2015 to move the motion "that this House believes that Trident should not be renewed."

The motion was defeated on division by 330 to 64 votes.

---

[204] NATO Summit: PM's Press Conference, 9 July 2016
[205] HC Deb 8 June 2015, c904
[206] Division No.78, 2006-07 Session

Position of the main parties

The majority of Conservative MPs, including Theresa May,[207] support the renewal of Trident and therefore the Government is widely expected to win any parliamentary vote. However, there will be little room for error. The Conservative Government only has a majority of 12, while potential opposition to Trident is significant. The SNP (56 MPs) campaigned on an anti-Trident platform; while the election of Jeremy Corbyn, a longstanding opponent of the nuclear deterrent, as Leader of the Opposition has cast doubt over the official position of the Labour party on this issue.

In January 2015 the then Shadow Defence Secretary, Vernon Coaker, had set out the party's position thus:

> Labour is clear. Let me say this unequivocally: our position, in an increasingly uncertain and unstable world, is that it is right for the UK to maintain a credible, minimum independent nuclear deterrent based on a continuous at-sea posture. It is right to want to deliver that deterrent in the most capable and cost-effective way, and in a way that best contributes to global security. It is right, therefore, to want to examine all the UK's military capabilities, including nuclear, as part of the next strategic defence and security review, and to state that we would require a clear body of evidence for us to change our view that continuous at-sea deterrence provides the most credible and cost-efficient form of deterrent.[208]

However, in August 2015 Mr Corbyn signalled at a CND event that "if he were Prime Minster he would not replace the Trident nuclear weapons system and would transition away from nuclear weapons entirely".[209] At the 2015 Labour Party Conference he once again set out his opposition to nuclear weapons:

> I've made my own position on one issue clear. And I believe I have a mandate from my election on it.
>
> I don't believe £100 billion on a new generation of nuclear weapons taking up a quarter of our defence budget is the right way forward.
>
> I believe Britain should honour our obligations under the Non Proliferation Treaty and lead in making progress on international nuclear disarmament.[210]

A few days later he stated that he would not "push the nuclear button" if he were Prime Minister; comments that drew criticism from a number of his shadow cabinet colleagues, who have openly expressed their support for replacing Trident.[211] In an interview with Andrew Marr on 20 September 2015 Shadow Foreign Secretary Hilary Benn stated:

---

207 "Trident replacement: Theresa May calls for Commons vote", *BBC News Online,* 5 July 2016

208 HC Deb 20 January 2015, c146

209 "Corbyn to set out plans for nuclear disarmament 70 years after Hiroshima", *The Guardian,* 6 August 2015. Indeed, a month earlier, and after he had declared his candidacy for the Labour leadership, Mr Corbyn was the primary sponsor of EDM 280 which called for plans to replace Trident to be cancelled.

210 Speech by Jeremy Corbyn to the Labour Party Annual Conference 2015

211 See "Jeremy Corbyn row after 'I'd not fire nuclear weapons' comment", *BBC News Online,* 30 September 2015

> My view is that we need to maintain an independent nuclear deterrent. I share with Jeremy the wish to see a world that is free of nuclear weapons, but I don't believe for one second if Britain were to give up its deterrent any other of the nuclear states would give theirs up. And secondly, Andrew, the truth is we live in a differently dangerous world now and we need a continuous at-sea deterrent. We need to do it in the most cost-effective way.[212]

Deputy Labour Leader, Tom Watson, has also been very open about his support for the nuclear deterrent and commented during an interview on BBC Radio 5 Live that "Jeremy seeks to persuade us – I seek to persuade him too".[213]

The Labour Party is currently undertaking a defence review, which will examine the party's position on Trident. The appointment of Trident opponents Emily Thornberry, and subsequently Clive Lewis, to the shadow defence portfolio is expected to strengthen Mr Corbyn's position on this issue.

However, the interim report that was expected to be published before the end of June has now been postponed following the outcome of the EU referendum. Emily Thornberry reportedly stated that it would now "make sense for the Labour party to have a pause and reflection in its review of defence policy to assess the impact of Brexit".[214] Other commentators have argued that, in light of the current problems facing the labour leadership, "it is important that the Labour party sticks together and is united at this time – this is not the time to have a divisive debate on defence policy".[215]

The review is now expected to be published over the summer and its conclusions are likely to be discussed at the Labour Party Conference in the autumn.

In the meantime the official position of the Labour party in the forthcoming vote, as set out in its 2015 election manifesto, will be one of support, despite the personal view of the Labour leader. Speaking on Radio 4's *Westminster Hour* on 10 July 2016 Shadow Defence Secretary, Clive Lewis, confirmed that Labour MPs would be given a free vote.

In early June 2016 an interim report on Trident renewal was also published by Labour's backbench defence committee, chaired by John Woodcock MP and Baroness Christine Crawley. Commentators suggested that that report was intended to pre-empt the conclusions of the official Labour defence review on this issue,[216] as it concluded:

> There has been no substantial change in the circumstances surrounding the deterrent since the 2015 Labour election manifesto and its annual conference later that year reaffirmed the party's commitment to replace the UK's Vanguard submarine

---

212 The Andrew Marr Show, 20 September 2015
213 See "Jeremy Corbyn happy for Labour to have a difference of opinion over Trident", *The Guardian,* 27 September 2015
214 "Emily Thornberry to delay Trident review after Brexit vote", *PoliticsHome,* 24 June 2016
215 ibid
216 "Labour MPs to put pressure on Corbyn with rival Trident report", *The Guardian,* 7 June 2016

> fleet. Renewal by completing the current programme to build four successor submarines to maintain continuous at-sea deterrence continues to offer the maximum security and value for money. Other options either compromise UK security or add to cost. Many alternatives do both. The recommendation of this report is that Labour maintains its existing policy of supporting renewal in the upcoming vote.[217]

Trade union support for Trident renewal is also mixed which has led commentators to question the likelihood of achieving a change of policy at the Labour party conference in the autumn.[218] Two of the largest unions in the UK, Unite and GMB, support the renewal of Trident on the basis of the jobs that it supports. Sir Paul Kenny, the leader of the GMB, said prior to the 2015 Labour Party Conference:

> We won't be supporting the scrapping of Trident for a whole variety of reasons, not least of which nobody can come up with how we're going to deal with the tens of thousands, maybe hundreds of thousands of people who rely on that defence industry's jobs.[219]

In January 2016 he went on to warn that "if anybody thinks that unions like the GMB are going to go quietly into the night while tens of thousands of our members' jobs are literally swannied away by rhetoric then they have got another shot coming".[220]

Len McCluskey, General Secretary of Unite, stated during a visit to Barrow shipyard in 2013 that:

> This region's contribution to our nation's naval past stretches back some 125 years but there must also be a bright future ahead with the second largest shipyard in Europe right here in Cumbria. Building submarines is critical to retain tens of thousands of highly skilled jobs and is fundamental to the survival of Barrow, which is heavily reliant on the industry for employment.
>
> The skills of this workforce and the contribution they make to this region and our country are exceptional so it is important that there is commitment right across the political parties to retain our world-leading technological advantage in submarine design and build by delivering the replacement for the Vanguard to Barrow.[221]

He reiterated those comments during the 2015 Labour Party Conference.[222]

Hugh Scullion, General Secretary of the Confederation of Shipbuilding and Engineering Unions, was quoted in *The Independent* in 2013 as

---

217 *'Trident' renewal vote: separating fact from fiction*, June 2016
218 "Trident vote to be delayed by David Cameron until after EU referendum", *The Guardian,* 11 February 2016
219 "One word from Jeremy Corbyn and a fragile truce over Trident deterrent is blown apart", *The Telegraph,* 30 September 2015
220 "Union gets tough on Trident jobs as Corbyn is hit by resignation", *The Daily Telegraph,* 12 January 2016
221 "Barrow's industrial future is bright, says Union's general secretary", *News and Star,* 11 March 2013
222 "Corbyn facing Trident defeat at Union hands", *Sky News,* 27 September 2015

suggesting "If a decision is taken not to replace Trident, highly-skilled jobs will disappear and we will never get them back again".[223]

In its March 2015 national newsletter Prospect also outlined its ongoing support for Trident renewal.

However, Unison leader, Dave Prentis, has said that his union would back Mr Corbyn's position, adding that it was wrong to prioritise a £20 billion nuclear deterrent when vital services were stretched.

The Scottish Trade Unions Conference also reaffirmed its opposition to Trident at its April 2015 Congress, stating:

> That this Congress reaffirms its opposition to Trident and resolves to work together with Scottish CND and the Scrap Trident Coalition to win a vote against Trident in the UK Parliament in 2016.[224]

Box 6: Trident renewal: 2015 election manifesto commitments

Conservatives: We will retain the Trident continuous at sea nuclear deterrent to provide the ultimate guarantee of our safety and build the new fleet of four Successor Ballistic Missile Submarines – securing thousands of highly-skilled engineering jobs in the UK.

Labour: Labour remains committed to a minimum, credible, independent nuclear capability, delivered through a Continuous At-Sea Deterrent. We will actively work to increase momentum on global multilateral disarmament efforts and negotiations, and look at further reductions in global stockpiles and the numbers of weapons.

SNP: We will oppose plans for a new generation of Trident nuclear weapons and seek to build an alliance in the House of Commons against Trident renewal. We will vote for the £100 billion that the Westminster parties plan to spend on Trident renewal to be invested instead in better childcare, education and the NHS.

DUP: The United Kingdom must retain its own strong, independent defence policy with sufficient resources dedicated to each of the Services and the retention of an independent nuclear deterrent.

Liberal Democrats: Step down the nuclear ladder by procuring fewer Vanguard successor submarines and moving from continuous at sea deterrence to a contingency posture of regular patrols, enabling a surge to armed patrols when the international security context makes this appropriate. This would help us to fulfil our Nuclear Non-Proliferation Treaty commitments and reduce the UK nuclear warhead stockpile.

Plaid Cymru: We oppose the wasteful and unnecessary replacement of Trident that is anticipated to cost in excess of £100bn in its lifetime but can never be used in conventional warfare. We also oppose the relocation of nuclear weapons to Welsh waters, as suggested by Labour's leader in Wales'.

Social Democratic and Labour Party: The SDLP has voted against the replacement of the UK's nuclear weapons system and in favour of redirecting the money spent on this into health, education and welfare.

UUP: Support the renewal of Trident in order to maintain our independent nuclear deterrent;

Greens: Save a massive £100 billion over the next 30 years by cancelling Trident replacement and decommissioning existing nuclear forces and facilities.

UKIP: Faced with rogue states such as North Korea and Iran, which have developed advanced nuclear capabilities, UKIP does not believe now is the time to be talking about or proposing nuclear disarmament and we support Trident renewal.

---

223 "Unions warn Ed Miliband scrapping Trident will cost 13,000 jobs", *Independent,* 4 April 2013

224 STUC Annual Congress 2015 decisions booklet

5. Arguments for and against replacement

Summary

The UK's status as a nuclear weapons state has always been a matter of contention and the current debate on renewal has, at its heart, all of the same fundamental arguments.

On the one hand there are those, including the Government, who advocate the UK remaining a nuclear power, in some form or another, citing the uncertainty of the strategic environment over the next 50 years. On the other, there are those who advocate disarmament and the move toward the UK becoming a non-nuclear weapon state.

Disarmament advocates argue that the UK's nuclear deterrent should not be renewed on one or more of the following grounds:

- Traditional notions of deterrence are no longer credible against non-state actors like al-Qaeda or more recently ISIS/Daesh; or in an age of 'hybrid'/asymmetric warfare in which cyber attacks and drone operations are increasingly becoming the norm. Proponents of this view also argue that the evolution and increasing use of underwater drone technologies and cyber capabilities could render submarine-based nuclear systems obsolete at some point in the future, and highly likely within the lifetime of Successor.
- Dispensing with nuclear weapons would serve as a positive example for other states to follow; would bolster the NPT regime and would enhance the UK's authority and standing internationally.
- In a period of financial austerity the money to be spent on a Trident replacement would be better spent on either improving the UK's conventional military capabilities, in particular counter-terrorist and drone capabilities, or being put to greater use within the NHS or addressing issues such as environmental concerns, poverty, disease and debt.
- Replacing the nuclear deterrent would breach customary international law and the UK's disarmament obligations under Article VI of the NPT.
- Retaining a nuclear deterrent should be condemned on moral grounds

Advocates of retaining the British nuclear deterrent predominantly argue that, while there is currently no direct threat to the UK, there is no way of predicting with any confidence the strategic environment over the next 40-50 years. Specifically:

- The existence of rogue states with the intent and capability to develop weapons of mass destruction, coupled with the threat posed by the proliferation of nuclear knowledge and technology, make it imperative that nuclear weapons be retained.
- In the coming decades a potential threat may emerge from an existing nuclear power that combines both the capability and intent to strike the UK. Some point to the growing military and economic power of China or the risk of future instability as a result of Russian adventurism.
- There can be no guarantee that other aspiring nuclear weapon states or rogue states with nuclear intentions, such as North Korea, would give up their arsenals or plans purely because the UK has foregone its nuclear deterrent capability.

To supporters the deterrent therefore represents the ultimate security guarantee for the UK and they believe that the cost of retaining it is comparatively small when compared with the

strategic risks of disarmament. Many have also refuted the suggestion that any savings achieved from abandoning the replacement programme would be available for the MOD to spend on conventional capabilities. Instead they have argued that such monies would more likely be repatriated by the Treasury.

The arguments surrounding the UK's status as a nuclear power were well rehearsed in, and around, the House of Commons debate in March 2007. On the one hand there are those, including the Government,[225] who advocate the UK remaining a nuclear power, in some form or another, citing the uncertainty of the strategic environment over the next 50 years. On the other, there are those who advocate disarmament and the move toward the UK becoming a non-nuclear weapon state.

5.1 The arguments against

Following the collapse of the Soviet Union some analysts argued that nuclear deterrence was no longer relevant to the changed circumstances of the post-Cold War era.[226] The ideological confrontation between the US and NATO and the Soviet Union and the Warsaw Pact countries that had necessitated and exacerbated a policy of deterrence was over. Multi-faceted intra-state tension and conflict was becoming the norm, with the emergence of non-state actors as a defining force in international relations. Maintaining nuclear weapons in light of these emerging trends was considered by some, therefore, to be unnecessary.

This argument continues to be advocated over two decades later, and more so since the events of 11 September 2001. Opponents of maintaining a nuclear capability have argued that traditional notions of deterrence are no longer credible against non-state actors like al-Qaeda or more recently ISIS/Daesh; or in an age of 'hybrid'/asymmetric warfare in which cyber attacks and drone operations are increasingly becoming the norm. Against such concepts of warfare, nuclear weapons are increasingly considered to have no deterrent value.

Proponents of this view also argue that the evolution and increasing use of underwater drone technologies and cyber capabilities could render submarine-based nuclear systems obsolete at some point in the future, and highly likely within the lifetime of Successor. The next generation of unmanned underwater vehicles (UUV), in particular, are expected to be advanced enough, and cheap enough to procure in great numbers, that they will put at risk an SSBN's ability to operate undetected.[227] A

[225] See, for example, David Cameron "We need a nuclear deterrent more than ever", *The Daily Telegraph,* 3 April 2013 and Michael Fallon's speech to the Policy Exchange on 23 March 2016.

[226] Some question whether the British arsenal has ever served a useful purpose, even at the height of the Cold War, arguing that it was too small to influence Soviet decision making. See T Milne, H Beach, J L Finney, R S Pease, J Rotblat, *An End to UK Nuclear Weapons*, British Pugwash Group, 2002, p.13.

[227] See for example, Paul Ingram, "Will Trident still work in the future". To counter this argument several analysts have pointed to the fact that while improvements in submarine detection are inevitable, those same improvements will also likely enable

number of commentators have also questioned the ability of SSBN to counter any cyber-attack on its operational or command and control systems.[228]

Those favouring UK disarmament also argue that dispensing with nuclear weapons would serve as a positive example for other states to follow and would bolster the UK's authority and standing internationally. While it is improbable that UK disarmament would persuade countries such as Pakistan, India, Israel or North Korea to dispense with nuclear weapons, it could be argued that UK leadership on this issue would provide a boost to the Nuclear Non-Proliferation Treaty, which many suggest is faltering, and would encourage other states to sign up to the strengthened International Atomic Energy Agency safeguards regime.[229]

Disarmament advocates also argue that replacing the nuclear deterrent would breach customary international law and the UK's obligations under Article VI of the NPT (see Disarmament obligations). In December 2005 Rabinder Singh QC and Professor Christine Chinkin of Matrix Chambers provided a legal opinion for the conflict-resolution NGO, Peace Rights, on whether a Trident replacement would breach customary international law and Article VI of the NPT. In their opinion:

> (1) The use of the Trident system would breach customary international law, in particular because it would infringe the "intransgressible" requirement that a distinction must be drawn between combatants and non-combatants.
>
> (2) The replacement of Trident is likely to constitute a breach of article VI of the NPT.
>
> (3) Such a breach would be a material breach of that treaty.[230]

In particular, they argued that:

> The linkage between the principles of non-proliferation and the obligation to negotiate towards disarmament shown by the negotiation history [of the NPT at the five yearly review

---

a new generation of sophisticated counter-detection technologies. See for example Center for Strategic and Budgetary Assessment, *The emerging era in undersea warfare* , 2015. Others, such as former Defence Secretaries Lord Hutton and Lord Robertson, have questioned the credibility of the claims, arguing instead that even future generations of UUV will not possess the sensors or range necessary to allow them to track SSBN in the open ocean, or indeed that technologies will have advanced enough to be able to geo-locate an SSBN deep in the ocean in the first place.

228 See for example "A primer on Trident's cyber vulnerabilities", BASIC Briefing, March 2016 and "Trident could be vulnerable to cyber attack", The Guardian, 24 November 2015. Critics of this argument have pointed out that submarines, by design, operate in isolation and that Trident is "air gapped" from the internet which contributes to its cyber resilience. The MOD also dedicates "considerable resource to horizon scanning to assess the threats from emerging capabilities and will apply any necessary mitigations throughout the lifetime of both the Vanguard Class and the future Successor Class of nuclear deterrent submarines, to combat these future challenges" (PQ 37663, 25 May 2016).

229 The IAEA Additional Protocol serves to bind countries into the NPT by making it more difficult for them to develop a covert weapons programme and break out from the Treaty in the future.

230 'The Maintenance and Possible Replacement of the Trident Nuclear Missile System', Joint Opinion of Rabinder Singh QC and Professor Christine Chinkin of Matrix Chambers, 19 December 2005,

> conferences] indicate that Article VI is a provision 'essential to the accomplishment of the object or purpose of the treaty.' The non-nuclear weapon states required commitments from the nuclear weapon states as part of their willingness to accept non-nuclear status under the NPT and failure to comply with article VI thus, in our view, constitutes material breach.[231]

Others take the view that retaining a nuclear deterrent should be condemned on moral grounds, or argue that, in a period of financial austerity the money to be spent on a Trident replacement would be better spent on either improving the UK's conventional military capabilities, in particular counter-terrorist and drone capabilities, or being put to greater use within the NHS or addressing issues such as environmental concerns, poverty, disease and debt.

5.2 The arguments for

Advocates of retaining the British nuclear deterrent take a different position regarding the utility of nuclear weapons in the security environment of the twenty-first century. They argue that the deterrent continues to have a crucial role in guaranteeing national security, and believe that deterrence as a concept remains viable, although it should be revised to take account of potential adversaries. In particular, they argue that the existence of non-state actors and rogue states with the intent and capability to develop weapons of mass destruction, coupled with the threat posed by the proliferation of knowledge and technology, make it imperative that nuclear weapons be retained. Some also question the view that in the coming decades there will be no potential threat from an existing major nuclear power that combines both the capability and intent to strike the UK. Some point to the growing military and economic power of China or the risk of future instability as a result of Russian adventurism. Indeed in his latest speech to the Policy Exchange in March 2016 the Defence Secretary, Michael Fallon, highlighted recent Russia behaviour, which he called "more aggressive, more authoritarian and more nationalist", as a cause for concern.[232]

Supporters of this position also point out that there can be no guarantee that other nuclear weapon states or rogue states with nuclear intentions, such as North Korea, would give up their arsenals or plans purely because the UK has foregone its nuclear deterrent capability. Indeed, the nuclear reductions made by the UK over the last decade (See The UK's position on disarmament) has not resulted in reciprocation by nuclear-capable states India, Pakistan, Israel or North Korea. Both Russia and China are also committed to extensive programmes to modernise their nuclear forces. As the late Sir Michael Quinlan, a former Permanent Under-Secretary of State at the Ministry of Defence, noted in a memorandum to the Defence Committee in March 2006:

---

231 'The Maintenance and Possible Replacement of the Trident Nuclear Missile System', Joint Opinion of Rabinder Singh QC and Professor Christine Chinkin of Matrix Chambers, 19 December 2005

232 Michael Fallon's speech to the Policy Exchange on 23 March 2016.

> There is neither evidence nor likelihood that all the other four recognised nuclear-weapon states (to say nothing of non-recognised ones) will be willing to abandon their armouries in the foreseeable future. It would be wholly unreasonable to interpret Article VI [of the NPT] as imposing unilateral and total obligations upon the UK regardless of what others do.[233]

As a result advocates of retaining the nuclear deterrent have argued that the cost of doing so is comparatively small when compared with the strategic risks of disarmament. As David Cameron noted in April 2013:

> Our current nuclear weapons capability costs on average around 5-6 per cent of the current defence budget. That is less than 1.5% per cent of our annual benefits bill. And the successor submarines are, on average, expected to cost the same once they have entered service. It is a price which I, and all my predecessors since Clement Attlee, have felt is worth paying to keep this country safe".[234]

One view is that, as nuclear weapons are primarily a political rather than a military tool, the cost of replacing Trident should be paid for by the Government as a whole, and not taken from the defence budget.[235]

Many have also refuted the suggestion that any savings achieved from abandoning the replacement programme would be available for the MOD to spend on conventional capabilities. Instead they have argued that such monies would more likely be repatriated by the Treasury.

5.3 Expert views

Opinions on the UK as a nuclear power and whether it should continue along this path, or pursue unilateral disarmament, are extensive. The intention of the following section is not to summarise all of those arguments or present every single point of view. It is to highlight some of the views of prominent commentators and direct the reader to further reading material.

Former Secretaries of State and Military Chiefs

In a letter to *The Times* in April 2015, 20 prominent figures including two former Secretaries of State and seven former military chiefs called on the Prime Minister to renew the nuclear deterrent, suggesting that not to do so would be "irresponsible folly". As former First Sea Lord, Lord West, reiterated in the House of Lords, that letter suggested that:

> In an uncertain world where some powers are now displaying a worrying faith in nuclear weapons as an instrument of policy and influence, it would be … irresponsible folly to abandon Britain's own independent deterrent. That fact … encapsulates the enormity of the … Main Gate decision … for the security and ultimately the survival of our nation.[236]

---

233 Memorandum submitted to the Defence Committee by Sir Michael Quinlan, SND 76, 12 March 2006, http://www.parliament.the-stationery-office.co.uk/pa/cm200506/cmselect/cmdfence/uc986-i/ucm0502.htm

234 David Cameron, "We need a nuclear deterrent more than ever", *The Daily Telegraph,* 8 April 2013

235 ibid, memorandum submitted by Dr Lee Willett, Ev.66-71

236 HL Deb 28 May 2015, c121

Former Chief of the Defence Staff Sir Jock Stirrup has also argued that downgrading the nuclear deterrent would make "no strategic sense at all".[237]

In contrast, in a letter to *The Times* in January 2009,[238] and again in April 2010, a number of other retired senior military officers, including the former Chief of the Defence Staff, Field Marshal Lord Bramall, suggested that the replacement of Trident would be a waste of money in the current strategic climate and that those funds would be much better spent funding the UK's conventional forces.

Lord Bramall, in particular, reiterated that point many times during his time in the House of Lords, most notably during his final speech in January 2013:

> The first question, from a military point of view, is whether we still need the successor to Trident which the Government presently seem to have in mind. Will it be able to go on doing the job it is supposed to do under any relevant circumstances? To this I believe the answer is unquestionably no. For all practical purposes it has not and, indeed, would not deter any of the threats and challenges—now more economic than military—likely to face this country in the foreseeable or even longer-term future. It has not stopped any terrorist outrage in this country nor, despite America's omnipotent deterrent, did it prevent the very traumatic 9/11. It did not stop the Argentines trying to take over the Falklands, nor did any nuclear deterrent stop Saddam Hussein marching into Kuwait or firing missiles into Israel. Nor indeed, in a now intensely globalised and interlocked world, could our deterrent ever conceivably be used—not even after a serious hostile incident which it had presumably failed to deter—without making the whole situation in the world infinitely worse for ourselves as well as for everybody else.
>
> […] I see no reason why these circumstances should change, because conflict is moving inexorably in an entirely different direction. Indeed, even that often-quoted justification for such a status symbol—a seat at the top table—has worn a bit thin, with prestige and influence more likely to be achieved by economic strength, wise counsel and peacemaking than by an ability to destroy en masse. Against that background, this country does not need and really cannot afford the very large extra expenditure needed to set up and maintain an ever ready, invulnerable successor to Trident, particularly when all the really usable and frequently needed forces and agencies, so vital for the real security of our country, are still deprived of the resources they require.[239]

The Trident Commission

An independent, cross party inquiry set up by the BASIC think-tank and led by a number of senior politicians examined the UK's nuclear weapons policy and the issue of Trident renewal in a report published in

---

[237] "Head of Armed Forces sounds alarm on downgrading Trident". *The Financial Times,* 16 September 2010

[238] "UK does not need a nuclear deterrent: Letters to the Editor", *The Times,* 16 January 2009

[239] HL Deb 24 January 2013, c1229-1230

July 2014. The Trident Commission concluded the UK should retain nuclear weapons on the basis that:

> If there is more than a negligible chance that the possession of nuclear weapons might play a decisive future role in the defence of the United Kingdom and its allies, in preventing nuclear blackmail, or in affecting the wider security context within which the UK sits, then they should be retained.

See Expert Views: The Trident Commission for further comments on alternative postures and potential costs

Campaign for Nuclear Disarmament

In a 2013 report *The Real Alternative: what the government's Trident Alternatives review isn't telling you*, CND called the omission of the 'non replacement' option from both the 2010 SDSR and the Trident Alternatives Review "an abdication of responsibility by the British Government". Instead it argued that abandoning the replacement programme was a "credible option which offers serious strategic and economic benefits" including:

- Improved national security – through greater budgetary flexibility within the MOD.
- Improved global security – through a strengthening of the non-proliferation regime and de-escalation of international tensions.
- Vast economic savings – of more than £100 billion over the lifetime of the Successor programme, releasing resources for effective security spending, as well as a range of other public spending priorities.
- Adherence to legal obligations under the NPT
- Moral and diplomatic leadership in global multilateral disarmament initiatives.

Labour's Backbench Defence Committee

In early June 2016 Labour's backbench defence committee published an interim report into what it regards as the main issues surrounding the forthcoming Trident vote. Entitled *'Trident' renewal vote: separating fact from fiction,* part of its brief is to dispel "common myths about the UK's independent nuclear deterrent". That report concluded:

> There has been no substantial change in the circumstances surrounding the deterrent since the 2015 Labour election manifesto and its annual conference later that year reaffirmed the party's commitment to replace the UK's Vanguard submarine fleet. Renewal by completing the current programme to build four successor submarines to maintain continuous at-sea deterrence continues to offer the maximum security and value for money. Other options either compromise UK security or add to cost. Many alternatives do both. The recommendation of this report is that Labour maintains its existing policy of supporting renewal in the upcoming vote.[240]

A final report is expected to be published before any vote in the House of Commons.

---

240 *'Trident' renewal vote: separating fact from fiction,* June 2016

Church of England

In a letter published prior to the 2015 general election, entitled *Who is my neighbour?* the Bishops of the Church of England, stated:

> Shifts in the global strategic realities mean that the traditional arguments for nuclear deterrence need re-examining. The presence of such destructive capacity pulls against any international sense of shared community. But such is the talismanic power of nuclear weaponry that few politicians seem willing to trust the electorate with a real debate about the military capacity we need in the world of today.

Roman Catholic Church

In an address to the UN General Assembly in September 2015 Pope Francis commented:

> An ethics and a law based on the threat of mutual destruction – and possibly the destruction of all mankind – are self-contradictory and an affront to the entire framework of the United Nations, which would end up as "nations united by fear and distrust". There is urgent need to work for a world free of nuclear weapons, in full application of the non-proliferation Treaty, in letter and spirit, with the goal of a complete prohibition of these weapons.

General Sir Hugh Beach (ret'd)

Writing in the February 2009 edition of *RUSI Journal,* Hugh Beach argued that the Government's commitment to maintain the nuclear deterrent without impacting on the conventional needs of the armed forces is "over the longer term… clearly undeliverable". He went on to note that "in no other area of military provision is the justification of a general insurance against the unforeseen accepted".[241]

Dr Ian Kearns, Co-Founder and Director of the European Leadership Network (ELN)

In 2013 he commented in an article in *The Financial Times* that:

> Britain is becoming a country that clings to its deterrent but has no serious defence strategy to go with it. We have weakened our conventional forces and we have no political will to spend more on defence. At the same time, our government leaders have not reduced their strategic ambition. It makes no sense.[242]

In a separate, but related, article co-authored with former Defence Secretary, Des Browne, in February 2013 he also went on to state:

> Their [the Government's] approach will demonstrate to the international community that we intend to keep nuclear weapons on permanent deployment for decades while seeking to deny those weapons to everyone else. In the process, it will destroy any chance of building the broad-based international support required for a stronger non-proliferation and nuclear security regime.[243]

---

241 Hugh Beach, "Trident: white elephant or black hole?", *RUSI Journal,* February 2009
242 "The price of deterrence", *The Financial Times*, 10 January 2013
243 "Trident is no longer key to Britain's security", *The Daily Telegraph,* 5 February 2013

Dr Julian Lewis MP

A longstanding supporter of the nuclear deterrent, in an essay "Nuclear disarmament versus peace in the 21st century" in 2006 Dr Lewis set out his arguments for retaining nuclear weapons. He concluded:

> The onset of armed conflicts is inherently unpredictable. This is why it makes sense to keep in being an army, a navy and an air force during long periods of peace. The same applies *a fortiori* to the nuclear deterrent […]
>
> The purpose of the British nuclear deterrent remains what it has always been: to minimize the prospect of the United Kingdom being attacked by mass-destruction weapons. It is not a panacea and it is not designed to forestall every type of threat. Nevertheless, the threat which it is designed to counter is so overwhelming that no other form of military capability could manage to avert it. The possession of the deterrent may be unpleasant, but it is an unpleasant necessity, the purpose of which lies not in its actual use but in its nature as the ultimate 'stalemate weapon' – and, in the nuclear age, stalemate is the most reliable source of security available to us all.

Dr Phillip Webber, Chair of Scientists for Global Responsibility

In a winter 2016 briefing entitled *Trident, deterrence and UK security* Dr Webber argues that given the extent of the US and Russian nuclear arsenals, the UK's nuclear arsenal is irrelevant in deterrence terms but the UK's role in disarmament efforts could be very significant. In his view, "the responsible and enlightened course of action for the UK" would be to take a leading role in reducing the risk of nuclear conflict by:

1 Taking Trident nuclear submarines off patrol.

2 Placing warheads in storage

3 Cancelling the replacement of the Trident submarines

4 Actively supporting an active UN/multilateral process for a global nuclear ban.

Box 7: The arguments for and against: additional reading

- Ministry of Defence Policy Paper, *UK nuclear deterrence: what you need to know,* 24 March 2016
- David Hambling, *The inescapable net: unmanned systems in anti-submarine warfare*, BASIC, March 2016
- Aleem Datoo and Paul Ingram, *A Primer on Trident's Cyber Vulnerabilities,* March 2016
- Dr Andrew Futter, *Is Trident safe from cyber attack?,* February 2016
- "Trident is old technology: the brave new world of cyber warfare", *The Guardian,* 16 January 2016
- Ministerial Comment, "Why the UK needs to maintain an independent nuclear deterrent", 24 November 2015
- William Walker, "Trident's replacement and the survival of the United Kingdom", *Survival,* October/November 2015
- John Burroughs and Peter Weiss, "Legal gap or compliance gap?", *Arms Control Today,* October 2015

- Campaign for Nuclear Disarmament, *People not Trident: the economic case against Trident replacement*, March 2014
- Nuclear Education Trust, *The UK's National Defence Needs and International Nuclear Disarmament Responsibilities*, February 2014
- Dr Ian Kearns, "Beyond the United Kingdom: trends in the other nuclear armed states", *Discussion Paper 1 of the Trident Commission*, 2013
- Professor John Simpson, "Deterrence, Disarmament, Non-Proliferation and UK Trident", *Discussion Paper 4 of the Trident Commission*, 2013
- Scottish Campaign for Nuclear Disarmament, *Disarming Trident*, June 2012
- Jeremy Stocker, "The United Kingdom and Nuclear Deterrence", *Adelphi Paper 386,* International Institute for Strategic Studies, February 2007
- Defence Select Committee, *The Future of the UK's Strategic Nuclear Deterrent: The White Paper*, HC 225-I, Session 2006-07
- Defence Select Committee, *The Future of the UK's Strategic Nuclear Deterrent: the Strategic Context,* HC 986, Session 2005-06
- Dr Julian Lewis, "Nuclear disarmament versus peace in the 21st century", *RUSI Journal,* April 2006
- "Legality of nuclear deterrence", *RUSI Defence Systems*, spring 2006

6. Are there alternatives to a like-for-like replacement?

Summary

If one sets aside the argument for unilateral disarmament and accepts the assumption that the UK should remain a nuclear power, there are several schools of thought on alternatives to a like-for-like replacement.

Many view the replacement programme as a unique opportunity to either further the UK's disarmament obligations or to make cost savings by pursuing other options. Such options include adopting a reduced nuclear posture (i.e. abandoning continuous at-sea deterrence); converting the existing system/replacement SSBN to a 'dual use' role; or the procurement of an entirely different system based either on a cruise missile system or an air-launched free-fall bomb.

Beyond that, there are also those who advocate the concept of a 'virtual arsenal' or threshold status for the UK, whereby the UK disarms but retains the ability to reconstitute a nuclear capability within a matter of months or years, should it become in the national interest to do so.

The merits of any of these options are shaped by two fundamental premises:

- The level of strategic risk one is prepared to take.
- The financial burden one is willing to commit to.

As part of the Conservative/Liberal Democrat Coalition Agreement in May 2010 it was agreed that, while the programme would be scrutinised for value for money within the framework of the Strategic Defence and Security Review, the Liberal Democrats could continue to make the case for alternatives.

An unclassified version of the Trident Alternatives Review was subsequently published on 16 July 2013. While the review examined a number of alternative systems and postures, it concluded that, within the timeframe under consideration, an SSBN operating a continuous at-sea deterrent posture offered the UK the highest level of assurance that can be attained with a single deterrent system.

However the review went on to highlight that "there are alternative non-continuous postures that could be adopted", although "none of these alternative systems and postures offers the same degree of resilience as the current posture of continuous at-sea deterrence, nor could they guarantee a prompt response in all circumstances". The report also noted that any change to the UK's deterrent system and/or posture could impact on the UK's wider national interests and relations with allies.

Although supported by the Liberal Democrats, the review was met with widespread criticism from elsewhere across the House. Concern was largely expressed over the review's suggestion that the UK could adopt a 'part time' deterrent, which many Members argued provided no deterrent capability at all, and the lack of consideration given in the report to the UK's submarine manufacturing capabilities. A number of MPs even suggested that the outcome of the review had undermined the Liberal Democrats' case for arguing for alternatives in the first place. Advocates for disarmament went even further to criticise the total absence from the review of the other alternative for the UK: unilateral disarmament.

Outside Parliament the Trident Alternatives Review met with equally mixed views. Questions were raised about the risks of adopting a non-continuous deterrent posture and whether moving forces to a higher readiness level during a crisis could be sustained with just a small fleet of submarines; whether breaks in patrolling could prompt a pre-emptive strike against inactive forces; and what effect an escalation in patrolling during a crisis could have on an adversary and whether it could in fact escalate a crisis as opposed to de-escalating one.

If one sets aside the argument for unilateral disarmament and accepts the assumption that the UK should remain a nuclear power, there are several schools of thought on alternatives to a like-for-like replacement.

Indeed, many view the replacement programme as a unique opportunity to either further the UK's disarmament obligations under the NPT or to make cost savings by pursuing other options that involve either a reduced nuclear posture (i.e. abandoning continuous at-sea deterrence), converting the existing system/ replacement submarine to a 'dual-use' role[244] or the procurement of an entirely different system. Beyond that are those who advocate the concept of a 'virtual arsenal' or threshold status for the UK, whereby the UK disarms but retains the ability to reconstitute a nuclear capability within a matter of months or years, should it become in the national interest to do so. [245] The Labour frontbench recently alluded to this as the "Japanese option" as Japan is widely considered to be a threshold state as a consequence of its advanced civilian nuclear programme.[246] Arguably, however, it is difficult to make direct comparisons as Japan has never had a nuclear weapons programme from which it has consciously made the choice to disarm. Neither does it have the military assets capable of delivering a nuclear weapon (SSBN or aircraft).[247]

The merits of any of these options are shaped by two fundamental premises:

5 The level of strategic risk one is prepared to take.

6 The financial burden one is willing to commit to.

[244] A dual role submarine or aircraft would have both a conventional and nuclear strike capability.

[245] The UK would need to retain its civilian nuclear facilities, its stockpile of fissile material and its technical and industrial capacity.

[246] A number of states with advanced civilian nuclear power programmes are believed to have the technical capacity and the nuclear fuel cycle technology to develop a nuclear weapon programme within a comparatively short space of time. All that would be required is the political decision to do so. Japan, a non-nuclear state within the NPT, has a significant stockpile of safeguarded fissile material and is often cited as an example of a threshold state. Estimates range from 6-24 months for the length of time it might take Japan to build an operational nuclear capability if it so wished.

[247] Indeed, Japanese public opinion is staunchly anti-nuclear and since the 1960s Japan has retained a policy of non-possession, non-production and non-introduction of nuclear weapons. Since the early 1950s Japan's security has also been guaranteed by the US-Japan security treaty, thereby negating the need for Japan to pursue its own nuclear weapons programme. Every Japanese Prime Minister since the 1960s has publicly reaffirmed the three non-nuclear principles and Japan has become one of the most vocal advocates of nuclear disarmament and non-proliferation.

- **Air-launched capability**

An air-launched capability, like the current submarine-based system, would have the strategic benefit of flexibility, rapid deployability and stealth. However, achieving these advantages would require either the procurement of a new aircraft, along the lines of the US Air Force's B-2 Spirit stealth bomber,[248] or adapting existing aircraft to deliver a nuclear warhead (See Toby Fenwick's arguments below for example). Either option would require the costly conversion of the UK's warheads, while considerable investment would also have to be made in associated infrastructure in the UK. An air-launched capability would be more vulnerable to pre-emptive attack, while overseas basing when necessary and over-flight rights for most operations would also have to be secured, which would pose both diplomatic problems and raise questions over the sovereignty of the UK's deterrent.

- **Ground-based capability**

A ground-based capability, on the other hand, is considered to offer few advantages over either of the other two options. A nuclear deterrent based in the UK would require a significant level of infrastructure investment and lead to disputes over its location. Furthermore, in order to overcome the limitations that would inevitably be imposed upon the global reach of the deterrent, the UK would be required to develop, or procure in partnership, an Intercontinental Ballistic Missile (ICBM) capability. Like the air-launched capability, a ground based system would also be more vulnerable to pre-emptive attack.[249]

- **Reduced nuclear posture or dual-use SSBN**

Maintaining a submarine-based deterrent, albeit at a reduced posture, is widely argued to offer cost savings and would demonstrate a commitment toward disarmament. However, any potential cost savings have been questioned given that the SSBN fleet needs to be replaced, which will cost £31 billion, excluding in-service costs. The savings to be made from a three, as opposed to four-boat fleet are also considered to be minimal, as a significant proportion of costs in any procurement programme are incurred at the beginning of the manufacturing cycle.

Many analysts have also argued that operating a smaller SSBN fleet, or at a reduced posture would also come at greater strategic risk as continuous at-sea deterrence could not be guaranteed. Adopting this stance could also create the risk of crisis escalation if it proved necessary to sail a Trident submarine during a period of rising tension.[250] This concern has also been raised within the context of converting the existing and/or replacement SSBN to a dual-purpose role.

---

248 More information on this capability is available from the US Air Force at: http://www.af.mil/factsheets/factsheet.asp?fsID=82

249 These ideas are examined in greater detail by Lee Willetts, "questions for the debate on the future UK strategic deterrent", *RUSI Journal,* December 2005

250 *Strategic Defence Review: Supporting Essays*, July 1998, Supporting Essay Five: Deterrence, Arms Control and Proliferation, p.5-5, para.13.

- **Threshold status/virtual arsenal**

Advocates of a virtual arsenal argue that keeping such a capability would help insure the UK against the emergence of direct strategic threats to its national security in the coming decades. However, reconstituting a nuclear weapons programme virtually from scratch would be difficult politically and would require time and considerable investment. Any timeline for reconstituting a British nuclear deterrent could be shortened if key personnel and skills were retained at AWE Aldermaston. However, retaining the AWE, and therefore the necessary technical capacity and skills base, would come at a cost.[251]

Opponents of adopting such a posture have also pointed to the fact that reconstituting a dormant nuclear weapons programme in a time of crisis could be view as escalatory.

Were the UK to give up its nuclear weapons unilaterally, absent a broader international process of disarmament, its status within the NPT would also have to be reclassified. If the UK moved toward non-nuclear weapon status it would have to expand the IAEA's safeguards coverage to all its nuclear sites and either melt down all weapon-grade fissile material, as South Africa did in the early 1990s, or place it under safeguards. As a non-nuclear weapon state, any subsequent attempt to reconstitute a nuclear weapon capability would arguably require British withdrawal from the NPT, as set out under Article X of the Treaty. At present there are no mandatory penalties imposed on a state that withdraws, although there is growing pressure for withdrawal to be made more difficult and costly. The political fallout of withdrawal from the NPT would also be considerable, both nationally and internationally.

6.1 The Trident Alternatives Review

The Liberal Democrats have long argued for alternative solutions to a like-for-like replacement to be examined.

Consequently, as part of the Conservative/Liberal Democrat Coalition Agreement in May 2010 it was agreed that the programme would be scrutinised for value for money within the framework of the 2010 SDSR (See Policy behind renewal) and that the Liberal Democrats could continue to make the case for alternatives.

In May 2011 the MOD confirmed that, in order to assist the Liberal Democrats in making the case for alternatives, a study into the costs, feasibility and credibility of alternative systems and postures would be undertaken.

That review was led by the Cabinet Office, with Ministerial oversight provided by the then Chief Secretary to the Treasury, Danny Alexander.

---

[251] Some believe that, in the event of UK disarmament, the focus of work at Aldermaston could be switched completely from supporting the British nuclear arsenal to developing defensive measures against nuclear weapons and engaging in verification work to assist the enforcement and verification of international treaties, such as the Comprehensive Nuclear Test Ban Treaty (CTBT) (see T Milne, H Beach, J L Finney, R S Pease, J Rotblat, 'An End to UK Nuclear Weapons', British Pugwash Group, 2002)

The terms of reference for the review were limited to the following questions:

a. Are there credible alternatives to a submarine-based deterrent?

b. Are there credible submarine-based alternatives to the current proposal, such as a modified Astute-class submarine using cruise missiles?

c. Are there alternative nuclear postures, for example non-continuous at sea deterrence, which could maintain the credibility of the UK's nuclear deterrent?

The assessment was expected to examine how any alternatives could be delivered, the feasibility, cost, industrial implications and the level of associated risk.

An unclassified version of the Trident Alternatives Review was subsequently published on 16 July 2013. In summary, the main alternatives[252] considered were:

Platforms/Systems

- Nuclear-tipped cruise missiles deployed either aboard a submarine, surface ship or aircraft, possibly in a dual-purpose role (i.e. with both conventional and nuclear strike capability).
- Air-launched free fall nuclear bombs deployed aboard a fast jet fleet.
- Of the submarine options considered, in addition to the current SSBN, were a nuclear-armed hunter-killer submarine (SSN), based on either a modified Astute or a new design, or a variant of the current SSBN that could fire either cruise or ballistic missiles.
- The review also briefly examined the potential for silo-based ballistic missiles, although this option was discounted as the review progressed.

Posture

- Adopting a posture of focused deterrence which would entail maintaining a nuclear deterrent for a specific period and against a specific adversary. At all other times the deterrent could adopt a reduced readiness level.
- Adopting a posture of sustained deterrence, whereby deployment of some deterrent capability would be maintained but at reduced alert.
- Adopting a posture of responsive deterrence, whereby deployment of some deterrent capability would be maintained, albeit with gaps between deployments. The frequency and length of a deployment would be irregular in order to avoid adversaries predicting when gaps may occur.
- Adopting a posture of preserved deterrence whereby no deterrent platforms would regularly be deployed but the UK would maintain the ability to deploy if necessary.

[252] The TAR reportedly started out with a list of more than 700 possible options. The report itself sets out a number of options which were discounted as the review progressed.

In the subsequent debate in the House of Commons on 17 July 2013 Danny Alexander confirmed that all of these postures would be "designed to allow us to surge back to the so-called focused deterrence, which would sustain a continuous posture in response to our needs".[253]

On the issue of alternative platforms and systems, the review made the following points:

- Of the maritime cruise missile options, submarines are the least vulnerable platform, although they would still be vulnerable to attack upon launch of a missile as they would be required to operate relatively close to an adversary's territory.
- Aircraft deployed with cruise missiles would also be vulnerable to attack prior to launch if an adversary retained the ability to target their location (either deployed aboard a carrier or at an airbase). The review acknowledged that some states already have this capability, while others may develop it as ballistic missile technologies and satellite targeting systems proliferate.
- Cruise missiles have additional potential constraints: their limited range means there may be geographic areas that the UK, if it was acting alone, could not reach. If forward basing were required it could require third party agreement, thereby placing a degree of uncertainty over the UK's sovereign ability to use its deterrent. Missile defence capabilities are also likely to improve and proliferate. The report concluded that "maintaining the same level of assurance that the UK deterrent can overcome an adversary's defences is therefore likely to be harder with a cruise missile based system".[254]
- The design and development of a warhead capable of being integrated into a cruise missile or free-fall bomb would be the critical challenge. Moving to an alternative to the current Trident missile would add technical, financial and schedule risk to the programme. It was considered that delivery of a warhead capability integrated into a cruise missile could not be delivered, without risk, for some 24 years, around 2040. On that basis the UK would be required to procure a small capability (a two-boat fleet), based upon the current SSBN, in order to bridge the gap between the out-of-service date for the current Vanguard-class SSBN and the delivery of an alternative cruise missile based system.
- Cost estimates for the development, procurement and in-service support of a new system (platforms, missiles, warheads and any requisite infrastructure), in addition to the procurement of a 'gap' capability, compared to an SSBN fleet of either 3 or 4 boats, were considerably higher. The cost driver for all non-Trident based options was identified as the development of a new warhead and the need to provide a two-boat SSBN fleet to fill the gap between capabilities. The report noted that "it is the need for these 2 Successor SSBNs that makes the cost of the alternatives more expensive overall than a 3 or 4 boat Successor SSBN fleet".[255]

---

[253] HC Deb 17 July 2013, c1220
[254] Trident Alternatives Review, p.6
[255] *Trident Alternatives Review*, p.8

- The report also noted that all alternative options would also require the UK to order additional conventional submarines in order to avoid the loss of sovereign submarine manufacturing capability in the future.
- A dual-capable submarine fleet would also be more expensive as a larger fleet would be required in order to perform the equivalent range of conventional and deterrent tasks. The review concluded that a fleet of between 10 and 18 SSN would be required, as opposed to the current fleet of 4 SSBN and 7 SSN.

On that basis the review identified that an SSBN operating a continuous at-sea deterrent posture offered the UK the highest level of assurance that can be attained with a single deterrent system.

However, while acknowledging that there are no real alternatives to the current SSBN platform within the timeframe under consideration, the review went on to highlight that "there are alternative non-continuous postures (akin to how we operate conventional military assets) that could be adopted, including by a fleet of SSBNs, which would aim to be at reduced readiness only when the UK assess the threat of a no-notice pre-emptive attack to be low". On the basis of a non-continuous posture, the future SSBN fleet could also consist of fewer platforms. However, the report also stated that "none of these alternative systems and postures offers the same degree of resilience as the current posture of continuous at sea deterrence, nor could they guarantee a prompt response in all circumstances".[256]

The report also noted that any change to the UK's deterrent system and/or posture could impact on the UK's wider national interests and relations with allies.

In presenting the report to Parliament the Prime Minister stated that the review was "designed at the outset to be a neutral, factual review of options" but also went on to confirm that:

> Government policy remains as set out in the strategic defence and security review. We will maintain a continuous deterrent and are proceeding with the programme to build a new fleet of ballistic missile submarines"[257]

Danny Alexander opened a Commons debate on the Trident Alternatives Review on 17 July 2013. In that opening statement he acknowledged that a replacement system based upon the current Trident system offered the most cost effective option for the timeframe under consideration. However, he also sought to reiterate that the review had demonstrated that several credible alternatives to the UK's current approach to nuclear deterrence were available, including abandoning the policy of continuous deterrence and operating a fleet of fewer submarines. He commented:

> The review presents a much greater opportunity for change and the consideration of alternative postures, and that in turn presents the possibility of maintaining our nuclear deterrent capability with fewer submarines. This is where the real opportunity resides for

256 Ibid, p.10
257 HC Deb 16 July 2013, c90WS

> making long-term savings, for recalibrating our policy to the requirements of our age, and [...] for contributing to nuclear disarmament [...]
>
> The reality is that in the current circumstances, and for the foreseeable future, the ultimate guarantee does not need to sit on a hair trigger. We can afford to go much further in de-alerting our nuclear deterrent. The option of non-continuous deterrence does not threaten current security, and by changing postures we can reduce cost at the same time. For example, ending CASD and procuring one fewer successor submarine would make a saving of about £4 billion over the life of the system.
>
> I believe that as large numbers of nuclear weapons remain and the risk of proliferation continues, it is right that the UK retains a nuclear capability for as long as the global security situation makes that necessary. But I also believe that that capability should be scaled and deployed to meet the threat we face now, and held as a contingency to deal with the threats we may face in the future. We should seek to balance the costs of this insurance policy against the other needs of defence and, indeed, other priorities across government.[258]

Responses to the review

Although supported by the Liberal Democrats, the review was met with widespread criticism from elsewhere across the House. Concern was largely expressed over the review's suggestion that the UK could adopt a 'part time' deterrent, which many Members argued provided no deterrent capability at all, and the lack of consideration given in the report to the UK's submarine manufacturing capabilities. Others criticised the length of time taken to conduct the review, and the cost incurred to the taxpayer, when it presented no conclusions or recommendations. A number of MPs even suggested that the outcome of the review had undermined the Liberal Democrats' case for arguing for alternatives in the first place.[259] Advocates for disarmament went even further to criticise the total absence from the review of the other alternative for the UK: unilateral disarmament.

Responding for the Opposition, then Shadow Defence Minister, Kevan Jones, stated:

> Many Labour Members have waited anxiously to see the report's conclusion but, 26 months later, the review to make the case for the alternatives, which had the full weight of the Government's resources behind it, presents us with no conclusions, makes no recommendations and does not even support adopting any of the alternatives put forward by the Chief Secretary. Only the Liberal Democrats could envisage an alternatives review that rejects all the alternatives [...]
>
> The Chief Secretary's suggestion would not only make the UK more vulnerable, but lead to a situation where we would not possess first strike or even second-strike capabilities. It would also be a significant escalatory factor if the UK stepped up its armed

---

258 HC Deb 17 July 2013, c1220-1227

259 See "Trident: no need for like-for-like replacement, says Danny Alexander", *The Guardian,* 22 January 2013 for a summary of the Liberal Democrats original position on the alternatives review.

> CASD posture. It is simply not credible and it is also very dangerous.[260]

Former Conservative Defence Secretary Liam Fox also picked up on this latter point:

> What are the Liberal Democrats saying with this policy? They are saying that we would abandon CASD, but deploy at times of increased international tension. What does any Member think would happen to international tension if we deployed a nuclear system that was not otherwise deployed? That would be a crazy foreign policy. I have to say to my Liberal Democrat colleagues that it is all very well to talk about stepping down the ladder, but if the bottom of the ladder is hanging off a cliff, that is not exactly a sensible manoeuvre.[261]

He went on to note:

> On cost, the Chief Secretary said that they would save £4 billion over the lifetime of the programme—£4 billion over a 34 to 50-year period. That £4 billion is the equivalent to less than two weeks' spending on the national health service, or six days of what we spend on pensions and welfare. This is supposed to be value for money. For that infinitesimally small saving over a 50-year period, they would abandon a crucial element of our national security—a very interesting definition of value for money [...]
>
> The crucial question to be asked by anyone who wants to dismantle or diminish the CASD posture is: what will the world look like in 30, 40 or 50 years? It is all very well to say, "The risk assessments says that at the moment it's okay", but we do not know what the risk assessments will be in the future, and it is not our job to play roulette with the security of future generations in our country. We are being offered 50 years of protection from nuclear blackmail for the people of our country. There are those who say that £20 billion or more of capital costs is too much for 50 years' protection from nuclear blackmail, but that it was all right to spend £9.5 billion for six weeks for the Olympics. We need to get our priorities right in this country and recognise what is important in the longer term.[262]

Former Labour Defence Secretary Bob Ainsworth also agreed with the assessments regarding escalation in a time of crisis:

> There is no such thing as a non-credible or a less-credible deterrent. There can be no such thing as a part-time deterrent. To be a deterrent, something has to deter. Doing anything less than deter stops a nuclear deterrent from being a deterrent at all. It turns it into what? Potentially, at times of crisis, it turns into an invitation; it most certainly turns it from a deterrent into a weapon. If we look at what underpins the White Paper— and as the previous speaker clearly stated—we seen that such a weapon would be dangerous to deploy. How, when and in what circumstances would it be put to sea? How would we disguise, at a time of rising tension, that we were doing that? It would be dangerous to deploy and difficult to sustain. It is all right to say that if we have three boats, we could, for a time in some circumstances, up our level of deterrent and go back to continuous-at-sea deterrence. Yes, we could do that for a while if

---

260 HC Deb 17 July 2013, c1228 and 1232
261 Ibid, c1235
262 HC Deb 17 July 2013, c1236

> we got ahead of the crisis, stepped back to CASD, deployed a boat at sea and kept it at sea throughout that time. But with three boats, for how long could we do that?[263]

Madeleine Moon and Bernard Jenkin also went on to note the importance of the UK deterrent to NATO. Mr Jenkin commented:

> Our continuous-at-sea deterrence is an important contribution to NATO. It is a pay-back to the United States for being the ultimate guarantor of European security. We should not imagine for a minute that if we started downgrading our deterrent, the United States would remain as interested as it is now in maintaining security in Europe, with all the benefit for this country.[264]

In responding to some of these criticisms the Liberal Democrat Sir Nick Harvey argued:

> ...the principal reason why alternative systems were found not to be viable was not—as some have suggested—because they were not technically viable. In contrast, it was because the length of time such alternatives would take, and the amount of money it would involve to equip a warhead to an alternative system, would make such alternatives prohibitive in the medium term. That is the expert view of those tasked with looking at the matter. If that is the conclusion to which they have come, I for one would not seek to question it and we must accept it [...]
>
> we must consider the threat we might face in 20, 30 or 40 years' time, so we must therefore ensure that we have a nuclear deterrent in 20, 30 or 40 years' time that is capable of deterring the threat that we might face at that point. My point is simply that the threat we face today is not the same as it was at the height of the cold war [...] The idea that the nuclear capability has a deterrent effect at all only by being patrolled 24/7 is clearly absurd. All the rest of our capability has a deterrent effect against a variety of aggressors in a variety of scenarios and we do not see the need to exercise any of it on a 24/7 basis [...]
>
> It simply is not the case that in order to get a deterrent effect from our military capability we have to patrol it all the time. That is absolute nonsense. The British, the French and the Americans have a posture of continuous-at-sea deterrence; the Russians and Chinese do not. The Indians and the Pakistanis take each other's nuclear weapons perfectly seriously, but that does not mean they patrol with them the whole time. It is complete nonsense to say we have to do it on that basis.[265]

For disarmament advocates, however, the biggest criticism of the review was its failure to take into account the further option of unilateral disarmament. In the debate Caroline Lucas (Green Party) commented:

> On the review's comprehensive nature, does the right hon. Gentleman not agree that a review that fails even to consider the option of not replacing Trident at all and having no nuclear submarines is ultimately flawed? Decades after the cold war and in the midst of austerity, the key question that has to be asked is whether Britain needs a nuclear submarine system that will cost us £100 billion over the next 30 years...

---

263 Ibid, c1237
264 Ibid, c1243
265 HC Deb 17 July 2013, c1238-40

> It is deeply worrying and, indeed, the height of irresponsibility that both the 2010 strategic defence and security review and this review of an alternative to Trident have not explored the full range of options. The Prime Minister trumpeted the review as "neutral" and "factual", but I would argue that it is biased and empty of essential facts.[266]

Jeremy Corbyn also agreed with this view:

> The review that the Liberal Democrats have asked for and that was no doubt produced at enormous expense is not a discussion of the alternatives. It is a discussion of weaponry and, in part, of perceptions of security and risk, but it is not a discussion of the alternative to Trident and nuclear weapons, which is not to have them at all and instead to aspire to a nuclear-free world...
>
> Let us look for alternatives such as nuclear weapon-free zones, supporting a non-proliferation treaty, or a conference of middle eastern states to bring about a nuclear weapon-free middle east. The review is not an alternative document but one that leads us down the road of nuclear proliferation and danger.[267]

Outside Parliament the Trident Alternatives Review met with equally mixed views. An analysis by RUSI raised a number of questions about the risks of adopting a non-continuous deterrent posture. It asked whether moving forces to a higher readiness level during a crisis could be sustained with just a small fleet of submarines; whether breaks in patrolling could prompt a pre-emptive strike against inactive forces; and what effect an escalation in patrolling during a crisis could have on an adversary and whether it could in fact escalate a crisis as opposed to de-escalating one. The report went on to note:

> There are no entirely objective answers to these questions, and the confidence held in a non-continuous deterrent may ultimately depend more upon gut feeling than speculations about future threats. In this case, the balance between the risks of a non-continuous posture and the financial rewards offered by a smaller fleet of submarines may play an important role in determining the future of the UK's nuclear forces up to 2016 and beyond. The Conservative party has already drawn upon this to argue that abandoning permanent patrols would be a 'huge gamble' for a 'tiny saving'.[268]

Paul Ingram, Executive Director of BASIC, also suggested that the review had a number of limitations as a result of issues that it had not sought to address, namely: the non-nuclear option and whether the UK should have a nuclear weapons capability at all; the evolving nature of the security environment and whether nuclear deterrence continues to have relevance; and the international politics surrounding the broader non-proliferation agenda. He went on to suggest that options for pooling nuclear assets with NATO partners should be explored, which would realise substantial cost savings, and that reducing patrols is "exactly what we need today, something that is flexible and appropriate to the threats we face... Britain needs to be in a position to offer something on

---

266 ibid, c1220 and 1253
267 ibid, c1258-9
268 Hugh Chalmers, "The risks and rewards of alternative approaches to trident", *RUSI Analysis,* 23 July 2013

the global table of disarmament, and this requires a greater level of flexibility than many seem willing to contemplate".

He also questioned the assumption that alternative systems should be ruled out on the basis of the length of time it would take the UK to develop a new warhead for a cruise missile. He stated:

> If the nuclear deterrent really is the national asset that many claim, these lead-times could surely be reduced significantly. They compare unfavourably with the widespread estimates of Iran's capabilities to field a nuclear weapon in months from scratch and without allies. The Americans have shared much of their Trident warhead specifications with us, are they really unwilling to share the development of their future air-launched cruise missile with us?[269]

The Campaign for Nuclear Disarmament, while welcoming the suggestion to move away from continuous deterrence and reduce the number of SSBN, also argued that the review was "fundamentally flawed" as it failed "to consider a future without nuclear weapons for the UK" and that ahead of 2016, "the full disarmament option must also be on the table".[270]

Peter Burt of the Nuclear Information Service expressed the view that "by taking Trident off permanent patrol, the UK now has an opportunity to make a decisive move which could dramatically boost our international status as a global leader and, as the US's closest ally, signal our firm support for the President Obama's international arms control agenda".[271]

However, in a letter to the Editor of *The Daily Telegraph* a number of former Labour and Conservative Secretaries of State for Defence and two former Defence Chiefs, expressed the opposing view:

> We firmly believe that we should not water down the strategic deterrent that has been the cornerstone of our national security for the past 45 years. Britain's continuous at-sea deterrent is vital to ensuring this country has the ultimate defence and the means to deter any current or potential aggressor.
>
> In an uncertain world in which the number of nuclear weapons remains high and some states are increasing their holdings, we should not take risks with our security by downgrading to a part-time deterrent.
>
> We cannot possibly foresee what threats will develop over the next 30 years. Reducing our submarine-based Trident capability would weaken our national security for the sake of a very small fraction of the defence budget. It is our view that if Britain is to remain a leading global power with strong defences, nothing less than a continuous at-sea deterrent will do.[272]

---

269 Paul Ingram, "Commentary on the UK Trident Alternatives Review", BASIC, 16 July 2013

270 http://www.cnduk.org/cnd-media/item/1708-cnd-slams-fundamentally-flawed-trident-alternatives-review

271 "24/7 nuclear shield is in doubt as alternatives to Trident are examined", *The Observer,* 14 July 2013. For further detail on Obama's arms control agenda see Library Briefing Paper RP10/42, *Progress towards nuclear disarmament*, June 2010

272 "Letter to the Editor: Britain open to attack if Trident is abandoned", *The Daily Telegraph,* 15 July 2013

6.2 Expert views

Opinions on alternative solutions, and indeed whether to pursue them, are vast. Of late, many commentators have called for Trident to be re-examined as part of the 2015 Strategic Defence and Security Review.[273]

The following summarises some of the views that have been expressed on those **potential alternatives**. Views on whether the UK should remain a nuclear power, are set out above (See Expert views).

The Trident Commission

The Trident Commission expressed its opposition to proposals to develop alternative platforms and delivery systems, with new warheads "simply on the basis of possible but speculative cost savings." It went on to argue that "whilst dual-use systems have the benefit of adaptability to circumstances, we have serious concerns about their capacity to increase strategic ambiguity, which would both complicate arms control and cause confusion in crises". [274]

On the issue of cost the Commission stated:

> We are conscious that our conclusion…must be weighed against the considerable cost of renewing and operating Trident, a cost that is a rising proportion of the defence budget […]
>
> However, we believe that cost must be of secondary importance to the judgement of whether forsaking the UK's nuclear deterrent capability could open the country to future strategic risk.[275]

The Commission was, however, divided on the issue of continuous at-sea deterrence and whether the UK should independently take steps to relax this posture:

> Some of us believe that CASD should be maintained for the foreseeable future and that we must wait for improvement in the security environment, specifically a reversal of the current trends in the modernisation of nuclear arsenals elsewhere and stronger indications of a matching intent to disarm. Some of us believe that the strategic environment today, which does not involve a current or near foreseeable strategic military threat to the UK and its vital interests, enables us to drop continuous patrolling and retain instead the capacity to increase patrols should crisis threaten.
>
> There is in any case an opportunity to initiate a full conversation with the United States and France on the conditions that would allow the allied nuclear weapon states to consider close coordination of their continuous patrolling posture.[276]

Paul Ingram, Executive Director, BASIC

His views on the 2013 Trident Alternatives Review are set out above. More recently he has suggested that the review should be re-opened as part of the forthcoming SDSR. Specifically he has expressed the view that:

---

273 See House of Commons Debate on Trident Renewal, 20 January 2015 and the debate on the Defence and Security Review, 2 March 2015.
274 "Trident Commission: Concluding Report", *BASIC,* 1 July 2014, p7
275 Ibid, p.6
276 "Trident Commission: Concluding Report", *BASIC,* 1 July 2014, p.8

> The decision to protect Trident spend whilst overall defence spending is slashed makes no military sense and damages the UK's ability to influence global outcomes […] alternatives offer major savings and by investing in dual-capable equipment could protect conventional capabilities […]
>
> The Nuclear Non-proliferation Treaty (NPT) is in trouble, and the recognised nuclear weapon states, including the UK, need to take steps to build greater global confidence in their commitments to disarmament.
>
> UK conventional capabilities are haemorrhaging, and are of far more importance to overall Alliance deterrence and defence capabilities, to broader US interests and to longer-term transatlantic relations and US commitment […] An independent nuclear deterrent ultimately based upon the idea that the UK cannot trust the United States for its strategic security undermines Alliance cohesion. Investment justified not on independence of action but on contribution to burden-sharing has a better chance of being received by our closest allies in the longer term.[277]

A discussion of the options surrounding the replacement of Trident is set out in more detail in the March 2015 briefing paper, A Memo to the next Prime Minister.

Toby Fenwick, Centre Forum

The February 2011 Centre Forum report Retiring Trident argued that "the UK can achieve deterrence with a considerably less capable nuclear weapons system, saving money and contributing to long term multilateral disarmament". The report argues that an air, as opposed to submarine, launched capability based upon a free-fall bomb deployed aboard the Joint Strike Fighter, would still provide a credible minimum nuclear deterrent, at less cost than the current SSBN replacement programme. Specifically the report suggests that moving toward this alternative nuclear force, along with the procurement of several associated conventional capabilities, such as additional conventionally-armed submarines and airborne early warning aircraft,[278] would incur a capital cost of approximately £16.7 billion.

The report concludes that:

> In implementing this package, the UK would be contributing to existing NATO nuclear burden-sharing arrangements, enhancing its conventional capabilities, and take a concrete step down the nuclear ladder and towards future nuclear disarmament as the international situation allows, in accordance with the UK's nuclear non-proliferation treaty obligations.[279]

Dr Nick Ritchie, Lecturer in International Security, University of York

Dr Nick Ritchie has also suggested in a series of reports published over the last few years, that in light of the current economic climate the potential for reducing the costs should be a major motivation for the Government to consider, at the very least, pursuing other options that would involve reducing both the size and operational status of the UK

---

277 BASIC response to the report, Retiring Trident, 16 February 2015
278 A full list of associated capabilities is set out on p.5 of that report
279 Centre Forum, Retiring Trident, February 2015, p.6

nuclear deterrent. In a 2010 report, *Continuity/Change: Rethinking Options for Trident Replacement*, he noted:

> British security (and the exchequer) does not require a 'Rolls Royce' nuclear system. If the coalition government continues to insist that terminating the Trident replacement process and relinquishing Britain's nuclear weapons capability is strategically and politically out of bounds then at the very least it should seriously explore some of [the] options for reducing the size and readiness of the future Trident system and demonstrate genuine international leadership and a 'disarmament laboratory' ethic by stepping back from continuous alert, further reducing the nuclear arsenal and reducing costs in the process.[280]

The potential options examined in that report include a 'Trident lite' replacement programme that adheres to the concept of minimum deterrence; a 'reduced readiness' downsized programme that ends CASD; a flexible, dual-use 'hybrid' submarine programme with both conventional and nuclear capabilities that also ends CASD and a nuclear armed cruise missile capability aboard either a current or new attack submarine.[281]

In an article for *Arms Control Today* in October 2013 Dr Ritchie continued to argue for a move away from CASD:

> Reducing the readiness of nuclear forces, or de-alerting, is part of a package of measures long advocated by non-nuclear-weapon states to diminish the role of nuclear weapons. Ending continuous at-sea deterrence in the UK and adopting a "reduced readiness" posture would constitute an important qualitative change in nuclear posture and a crucial next step in reducing the value of nuclear weapons […]
>
> A posture that abandons continuous at-sea deterrence would all but eliminate any intention to use nuclear weapons first in a crisis. Such a posture would reinforce political and legal commitments to non-nuclear-weapon states and provide a degree of strategic reassurance to other possessors of nuclear weapons that the UK is confident that it is not going to face a nuclear attack and therefore can scale back its reliance on nuclear weapons. It would signify an important "de-coupling" of nuclear weapons from the broad, day-to-day calculus of national security by demonstrating that the UK is prepared to learn to live without nuclear weapons operationally deployed at sea on a permanent basis as a precursor to learning to live without nuclear weapons at all.[282]

Malcolm Chalmers, Royal United Services Institute

In his December 2013 article "Towards the UK's nuclear century" Malcolm Chalmers explores several of the alternatives that have been raised. In his concluding remarks, however, he suggests that the UK remains committed to maintaining a nuclear deterrent into the future:

> The path dependency of history means that the UK nuclear force is likely to survive through to its 100th birthday, at least in the absence of a radical transformation (and denuclearisation) of the international security environment. This does not mean that the

---

280 Dr Nick Ritchie, *Continuity/Change: Rethinking Options for Trident Replacement*, June 2010
281 Ibid, p.94
282 Dr Nick Ritchie, "Trident tribulations", *Arms Control Today,* October 2013

> UK will keep nuclear weapons as long as any other country possesses them. It does mean that the process of wider disarmament would have to go a lot further before the balance of the UK's political debate could fundamentally shift in a non-nuclear direction.

Dr Lee Willett, Associate Fellow, Royal United Services Institute

In a briefing for RUSI in July 2010 entitled "Debating the deterrent: why the cruise missile option does not add up" Dr Lee Willett questioned whether cost savings could actually be achieved from pursuing alternative options such as the development of a new submarine-launched nuclear-armed cruise missile. At the heart of his argument was the fact that this would be an entirely new system for the UK requiring significant new technological developments, and one which neither the US nor France are developing. As such the UK would be required to solely fund both the up-front development costs of a new system, including a nuclear warhead capable of being deployed on a cruise missile, and the extensive infrastructure that would be required to support it. He concludes that the UK "would be faced with developing and paying for a new cruise missile, nuclear warhead and supporting infrastructure, alongside addressing a raft of safety legislation which would be borne out of the development of a new system. The costs of doing so would be astronomical".[283]

Box 8: Alternative solutions: additional reading

- Kevan Jones MP, *Assessing an F-35-based nuclear deterrent,* April 2016
- Tim Street, "The UK's nuclear future: options between rearmament and disarmament", *Oxford Research Group Briefing,* March 2016
- Trident Commission, *Background Papers to the Concluding Report*, July 2014. Paper No.4 by Dr Ian Davis examines the concept of threshold status in more detail.
- Hugh Beach, "The UK's nuclear deterrent", *RUSI Journal,* 8 May 2014
- Hugh Chalmers, A Disturbance in the Force: Debating Continuous At-Sea Deterrence, RUSI Occasional Paper, January 2014
- Written submissions to the Trident Commission, 2013-14
- Hugh Chalmers, The Risks and Rewards of alternative approaches to Trident, RUSI Analysis, 23 July 2013
- Nuclear Education Trust, *Trident Alternatives Review and the Future of Barrow*, December 2012
- Malcolm Chalmers, *Continuous At-Sea Deterrence: costs and alternatives*, July 2010
- Dr Nick Ritchie, *Stepping Down the Ladder: Options for Trident on a Path to Zero*, University of Bradford's Department of Peace Studies, May 2009

[283] Dr Lee Willett, "Debating the Deterrent: Why the Cruise Missile Option Does not add Up", *RUSI Briefing,* July 2010

7. Public Opinion[284]

Broadly speaking, the British public is divided on the question of whether Trident should be renewed. However, the public's views on Trident are nuanced and their responses to public opinion polls are sensitive to the wording and framing of the question they are asked.

Pollsters have note routinely asked questions about Trident in political opinion polls in recent years. Questions about Trident tend to be included in opinion polls at times when the nuclear deterrent is a subject of public debate, or when newspapers, political parties, or campaign groups specifically commission polls on the subject.

Because of the infrequency and variability of opinion poll questions on Trident it would not be meaningful to aggregate the results of different polls into a single table. For the same reason it is also hard to measure trends in the level of support for and opposition to Trident over time. Nevertheless, a review of the available opinion poll evidence does suggest some tentative conclusions.

The following analysis is based on 14 opinion polls conducted during the last decade all asking whether the UK should continue to use Trident in some way. They comprise polls from a range of polling organisations that are members of the British Polling Council.[285]

The polls are shown below in chronological order, from the most recent to the least recent poll. The full question is shown along with the response categories offered. The sample size for the poll and a link to the original source is provided beneath each chart.

Of the 14 polls, four offered respondents a binary choice between keeping and scrapping Trident. In three of these polls more respondents were in favour of scrapping Trident than keeping it. However, the most recent of these polls, which asked this question in November 2015, found 51% in favour of renewing Trident and 24% opposed.

Another poll offered a binary choice between keeping Trident and choosing a cheaper nuclear alternative, and in this poll more respondents supported a cheaper nuclear alternative.

Six polls offered a three or four-way choice between keeping/expanding Trident, choosing a cheaper nuclear deterrent, and scrapping Trident altogether. In these polls, the combined categories of those supporting some form of nuclear deterrent were larger than the categories preferring no nuclear deterrent at all.

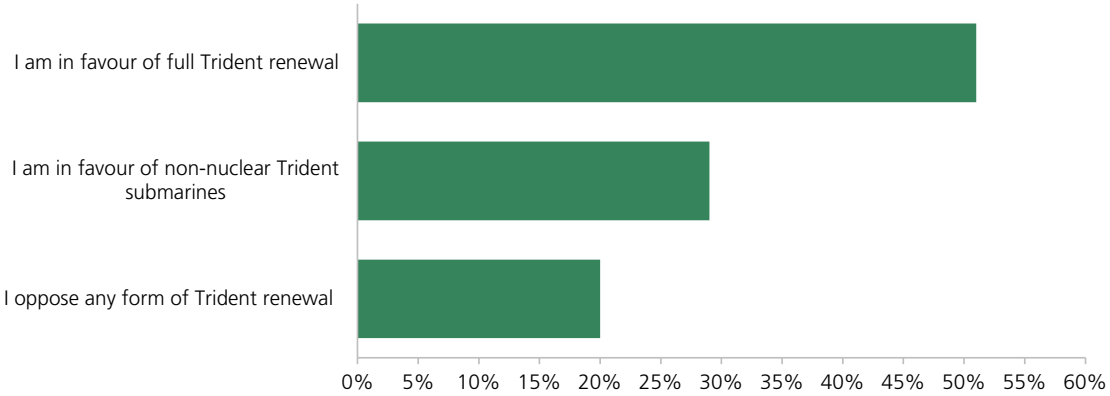
---

[284] Contribution by Oliver Hawkins, Social and General Statistics Section, House of Commons Library

[285] Every effort has been taken to identify relevant opinion polls, and no opinion poll on Trident conducted by a BPC member during this period has been intentionally excluded, but it is possible some polls asking about Trident have not been identified. The polls shown here should therefore be treated as indicative of polling results, but the list of polls may not be comprehensive.

ORB – Independent, 21 Jan 2016

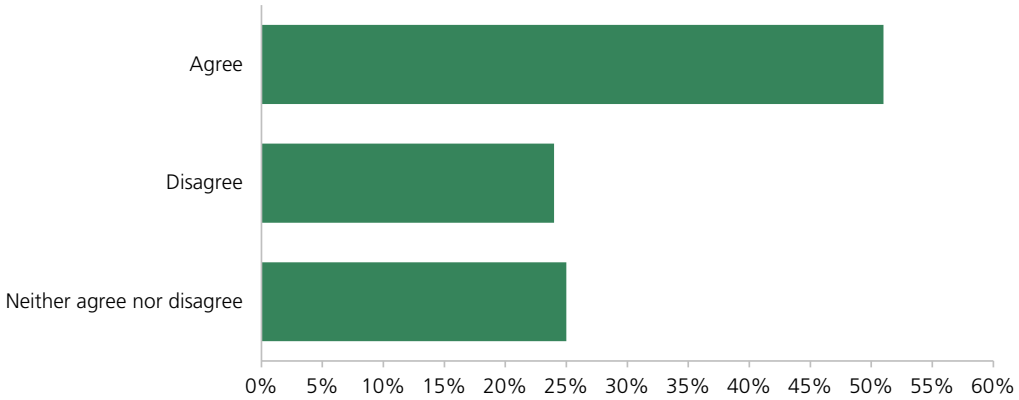
The government is planning to renew the Trident submarine nuclear missile deterrent, while Jeremy Corbyn has suggested the possibility of retaining the Trident submarines without nuclear weapons. Are you in favour of the renewal of fully nuclear Trident missile systems, retaining the Trident submarines without nuclear weapons, or do you oppose retaining any form of Trident submarines?



Poll details: 2,015 respondents, ORB – independent 21 Jan 2016

YouGov – Election Data, 23 Nov 2015

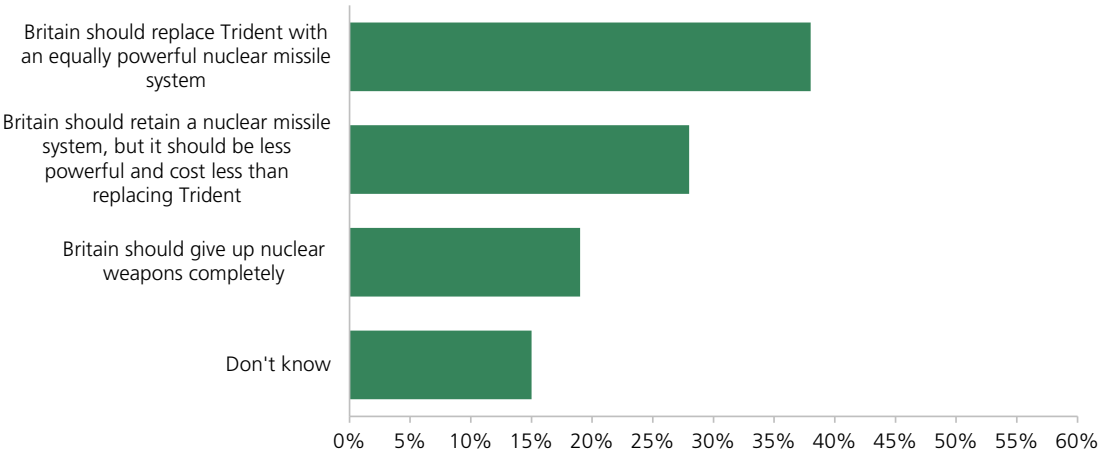
The renewal of the Trident nuclear submarine is estimated to cost up to £100bn over its lifetime and is an essential part of our national defence that should be renewed.



Poll details: 7,412 respondents, YouGov – Election Data 23 Nov 2015

YouGov – The Times, 11 Apr 2015

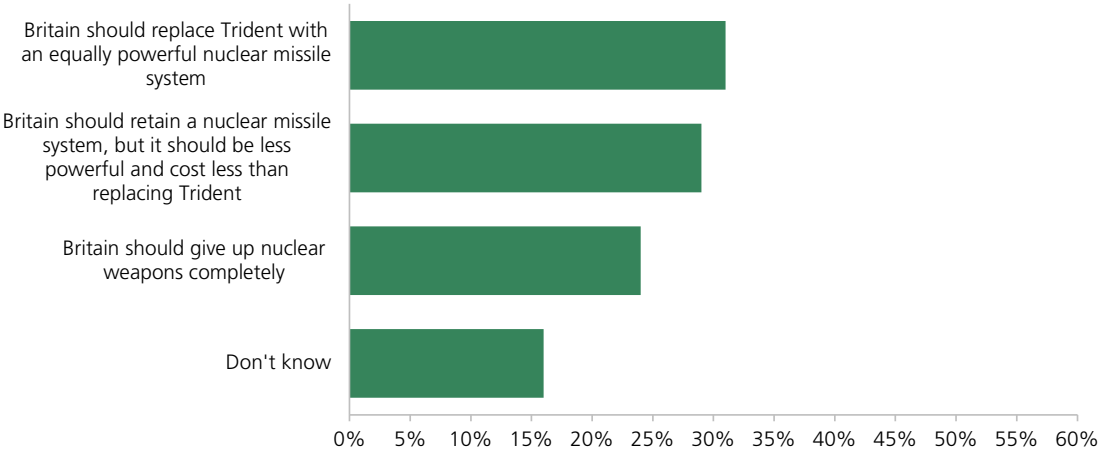
Britain's current system of submarine launched nuclear weapons, known as Trident, is coming to the end of its useful life and will soon have to be scrapped or replaced. What do you think Britain should do when Trident reaches the end of its useful life?



Poll details: 1,887 respondents, YouGov – The Times 11 Apr 2015

YouGov – The Times, 13 Mar 2015

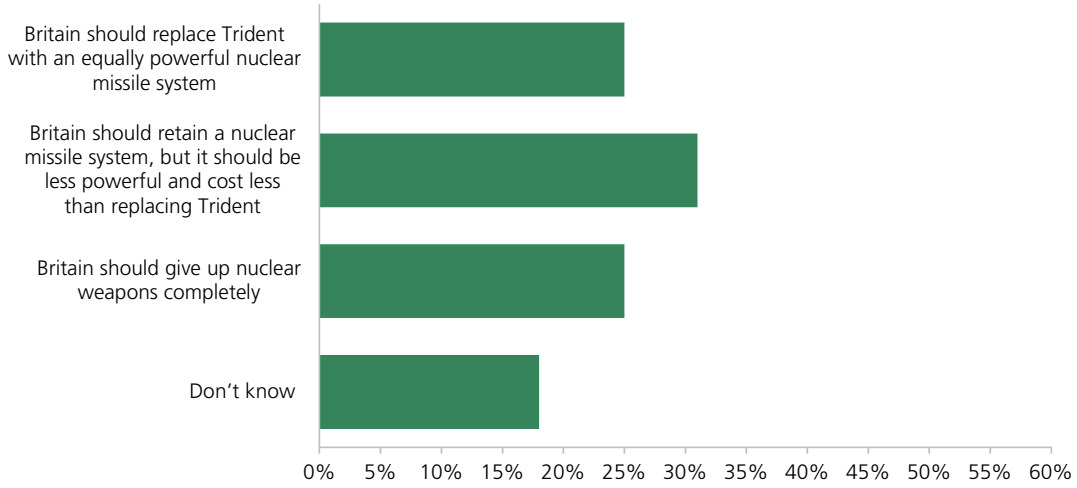
Britain's current system of submarine launched nuclear weapons, known as Trident, is coming to the end of its useful life and will soon have to be scrapped or replaced. What do you think Britain should do when Trident reaches the end of its useful life?



Poll details: 1,669 respondents, YouGov – The Times 13 Mar 2015

YouGov – The Times, 26 Jan 2015

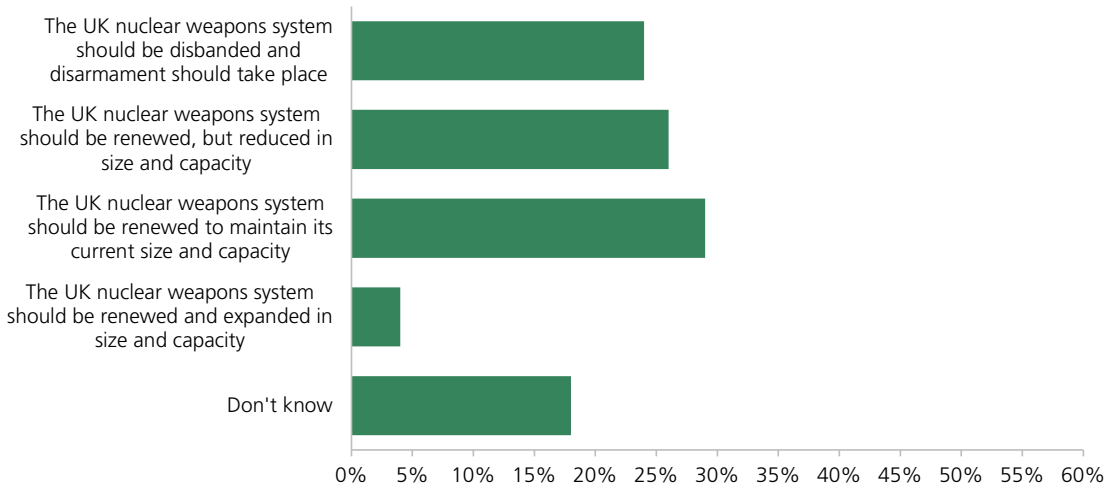
The UK has a nuclear weapon system called Trident, which replaced our previous system in the 1990s. Trident consists of our submarines containing missiles and warheads. One submarine patrols the sea at all times. The current generation of submarines will begin to end their working lives sometime in the 2020s. After reading the explanation above, what do you think the UK government should be doing with regards to its current nuclear weapon system?



Poll details: 1,656 respondents, YouGov – The Times 26 Jan 2015

ComRes – WMD Awareness, 2 Feb 2014

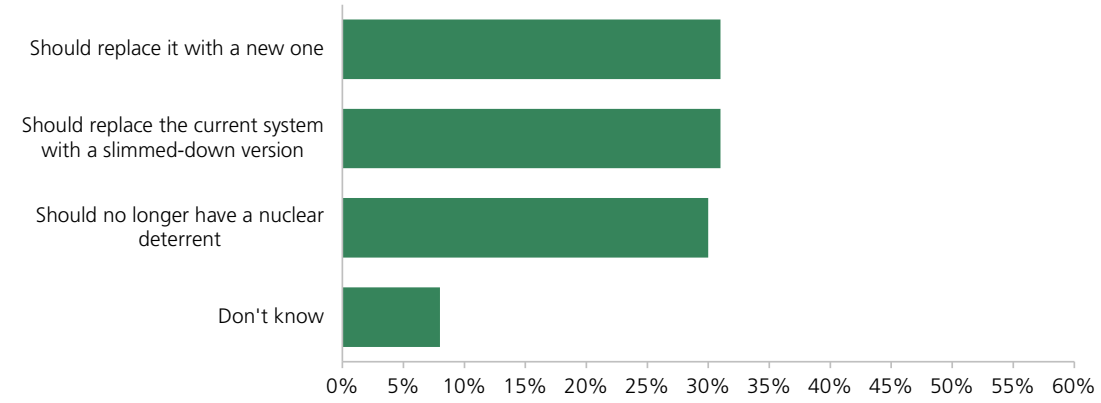
The UK has a nuclear weapon system called Trident, which replaced our previous system in the 1990s. Trident consists of our submarines containing missiles and warheads. One submarine patrols the sea at all times. The current generation of submarines will begin to end their working lives sometime in the 2020s. After reading the explanation above, what do you think the UK government should be doing with regards to its current nuclear weapon system?



4,207 respondents, ComRes – WMD Awareness, 2 Feb 2014

ICM – The Guardian, 14 Jul 2013

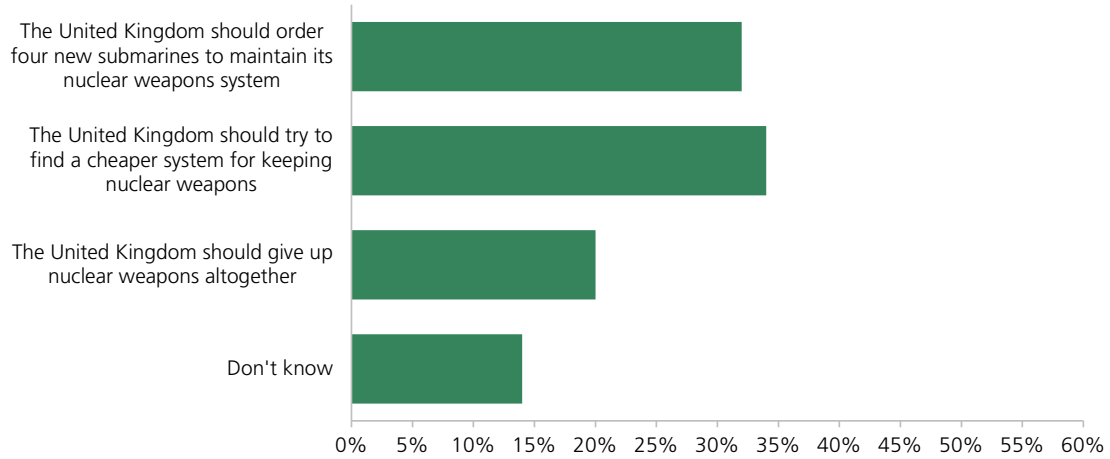
You may have seen or heard that the government is considering plans to replace Britain's nuclear weapons system, Trident, which is coming to the end of its operational lifetime. Do you think Britain should replace the nuclear weapons system with a new one, should replace the current system with a slimmed-down version, or should it no longer have any nuclear deterrent?



1,003 respondents, ICM – The Guardian, 14 Jul 2013

YouGov – Public Administration Select Committee, 24 Apr 2013

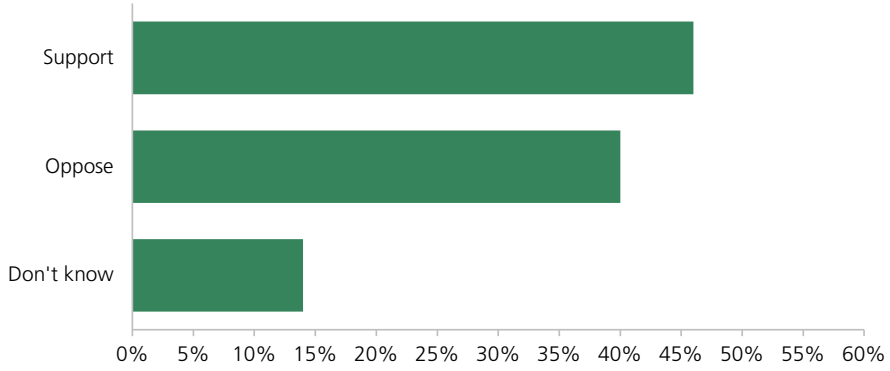
The United Kingdom has a sea-based nuclear weapons system using four submarines, which are reaching the end of their life. Some people say the government should order four new submarines over the next ten years to maintain the United Kingdom's current nuclear weapons system. Other people say the United Kingdom should try to find a cheaper system for keeping nuclear weapons. Some say we should give up nuclear weapons altogether. Which of the following statements comes closest to your view?



1,997 respondents, YouGov– Public Administration Select Committee, 24 Apr 2013

ICM – The Sunday Telegraph, 23 Apr 2010

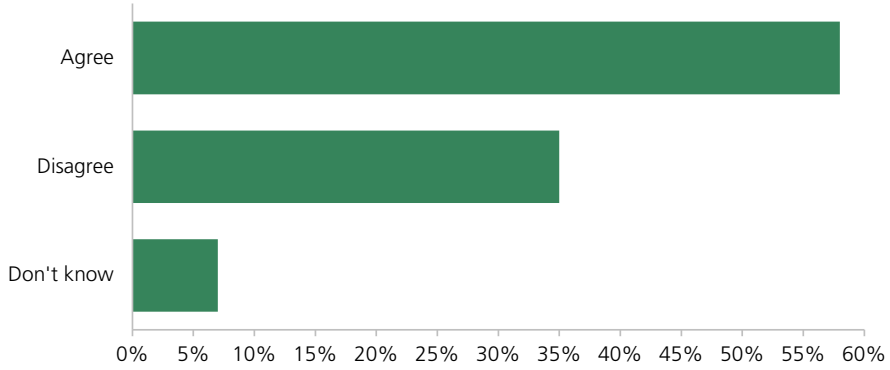
Would you support or oppose Britain scrapping its independent nuclear deterrent, Trident, in favour of a cheaper nuclear alternative?



1,020 respondents, ICM – The Sunday Telegraph, 23 Apr 2010

ComRes – The Independent, 6 Sep 2009

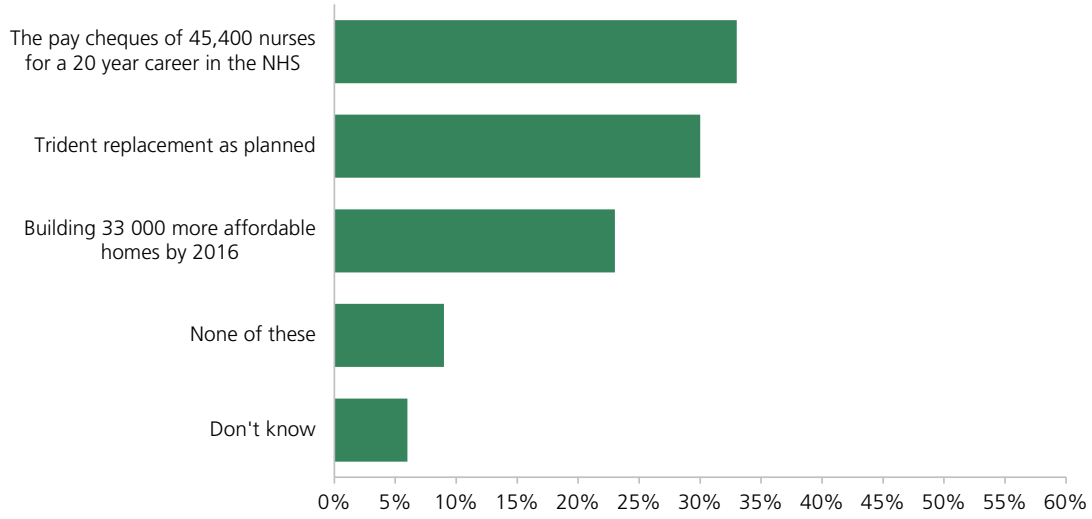
Given the state of the country's finances, the Government should scrap the Trident nuclear missile system.



1,001 respondents, ComRes – The Independent, 6 Sep 2009

YouGov – People Magazine, 23 Jul 2009

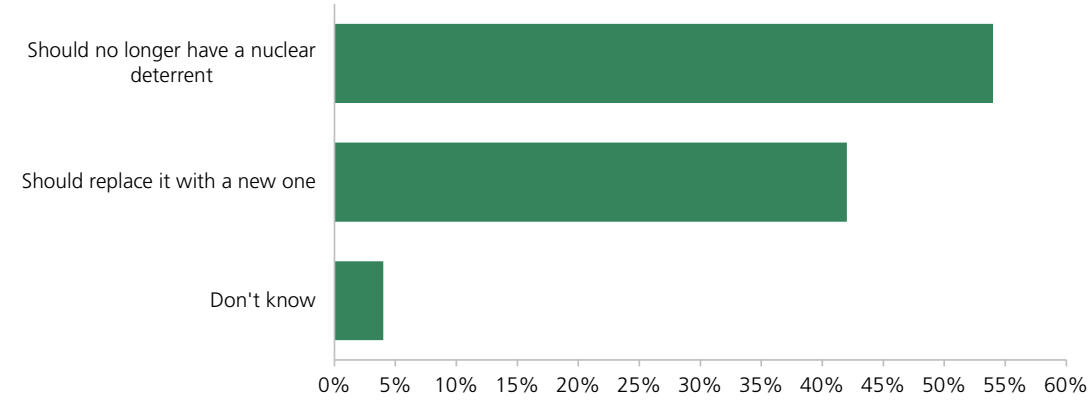
A replacement for the Trident defence missile system to protect Britain against nuclear attack is likely to cost around £20 billion. Do you think the money should be spent on?



2,218 respondents, YouGov – People Magazine, 23 Jul 2009

ICM – The Guardian, 11 Jul 2009

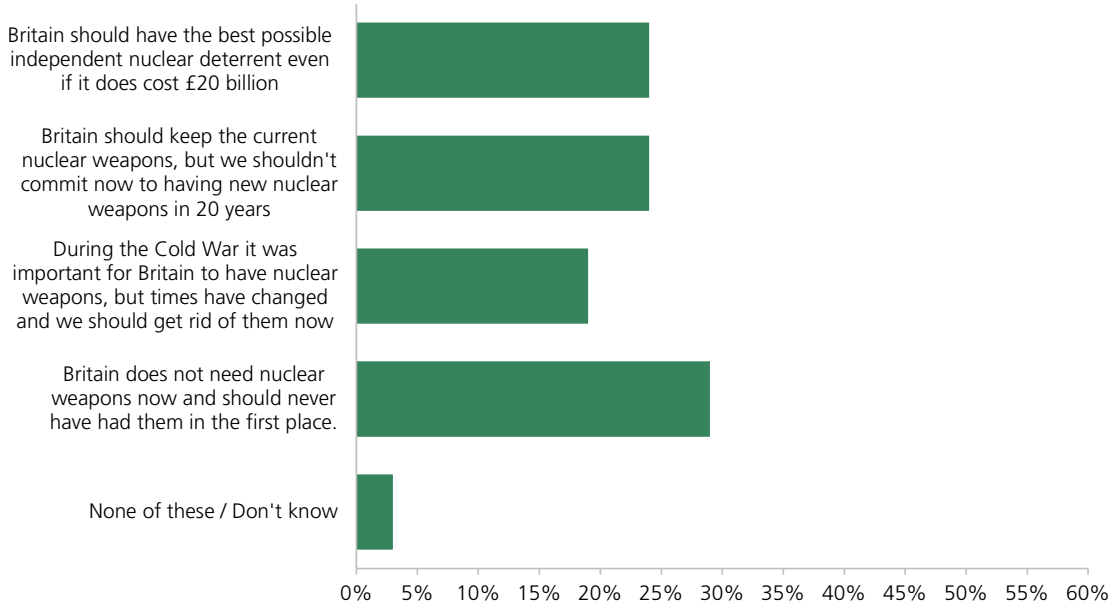
You may have seen or heard that the government is considering plans to replace Britain's nuclear weapons system, Trident, which is coming to the end of its operational life. Do you think Britain should replace the nuclear weapons system with a new one or should it no longer have any nuclear deterrent?



1,000 respondents, ICM – The Guardian, 11 Jul 2009

Populus – More 4 News, 22 Feb 2007

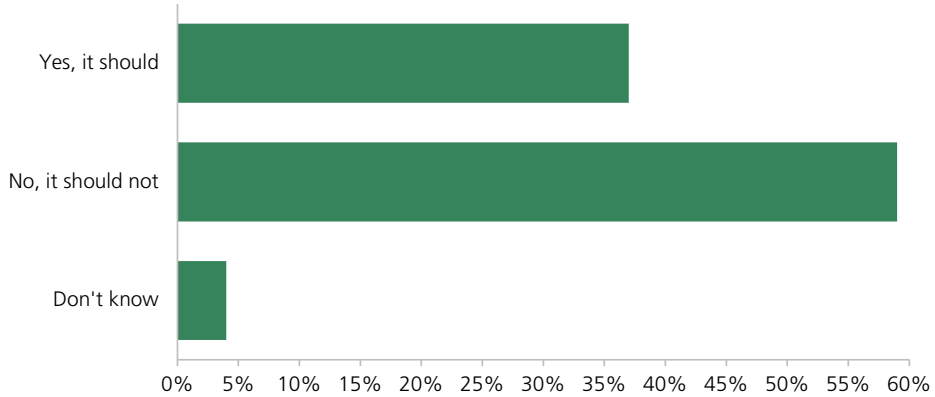
The government is currently considering whether to replace Britain's Trident nuclear weapons system. The government estimates that this would cost around £20 billion and they claim we need to decide now in order to still have nuclear weapons in 20 years time. Which of the following statements comes closest to your view?



1,006 respondents, Populus – More 4 News, 22 Feb 2007

ICM – CND, 27 Jun 2006

The UK's Trident nuclear weapons are now ageing and will become unusable in about 20 years time. This means that for the UK to maintain effective nuclear weaponry the government needs to decide soon on whether to develop a replacement. The total cost of replacing Trident missiles, submarines and base facilities is likely to be around £25 billion. This is the equivalent of building around 1,000 new schools at current prices. On balance do you think the UK should replace its nuclear weapons or not?



1,036 respondents, ICM – CND, 27 Jun 2006

BRIEFING PAPER
Number 7353, 12 July 2016