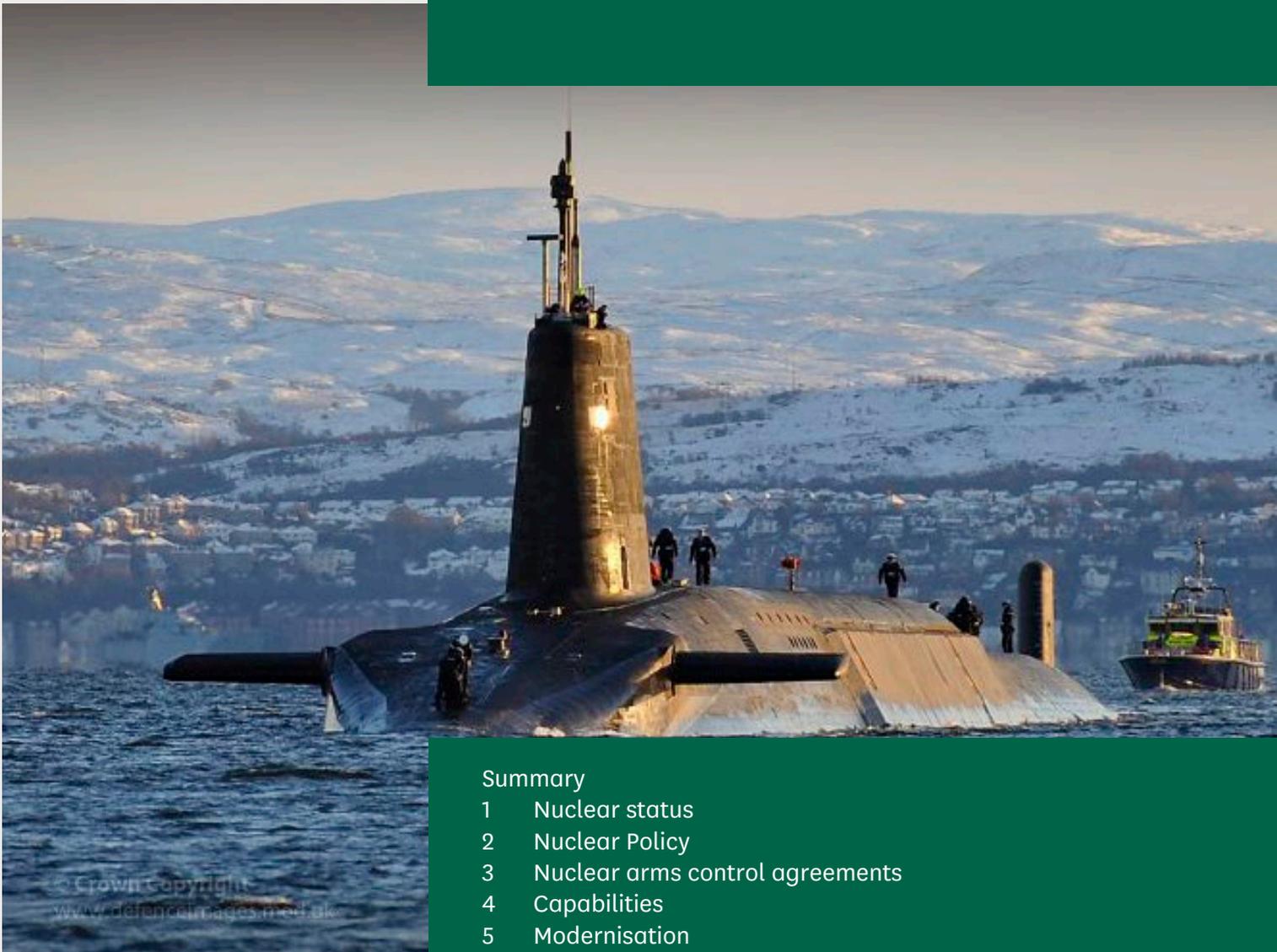


Research Briefing

28 July 2022

By Claire Mills

# Nuclear weapons at a glance: United Kingdom



## Summary

- 1 Nuclear status
- 2 Nuclear Policy
- 3 Nuclear arms control agreements
- 4 Capabilities
- 5 Modernisation

### Image Credits

[HMS Vanguard](#) by [Defence Imagery](#). Licensed under [CC BY-NC-ND-2.0](#).

### Disclaimer

The Commons Library does not intend the information in our research publications and briefings to address the specific circumstances of any particular individual. We have published it to support the work of MPs. You should not rely upon it as legal or professional advice, or as a substitute for it. We do not accept any liability whatsoever for any errors, omissions or misstatements contained herein. You should consult a suitably qualified professional if you require specific advice or information. Read our briefing '[Legal help: where to go and how to pay](#)' for further information about sources of legal advice and help. This information is provided subject to the conditions of the Open Parliament Licence.

### Sources and subscriptions for MPs and staff

We try to use sources in our research that everyone can access, but sometimes only information that exists behind a paywall or via a subscription is available. We provide access to many online subscriptions to MPs and parliamentary staff, please contact [hoclibraryonline@parliament.uk](mailto:hoclibraryonline@parliament.uk) or visit [commonslibrary.parliament.uk/resources](https://commonslibrary.parliament.uk/resources) for more information.

### Feedback

Every effort is made to ensure that the information contained in these publicly available briefings is correct at the time of publication. Readers should be aware however that briefings are not necessarily updated to reflect subsequent changes.

If you have any comments on our briefings please email [papers@parliament.uk](mailto:papers@parliament.uk). Please note that authors are not always able to engage in discussions with members of the public who express opinions about the content of our research, although we will carefully consider and correct any factual errors.

You can read our feedback and complaints policy and our editorial policy at [commonslibrary.parliament.uk](https://commonslibrary.parliament.uk). If you have general questions about the work of the House of Commons email [hcenquiries@parliament.uk](mailto:hcenquiries@parliament.uk).

# Contents

<b>Summary</b>	<b>4</b>
<b>1 Nuclear status</b>	<b>6</b>
<b>2 Nuclear Policy</b>	<b>7</b>
2.1 Declaratory Policy	7
<b>3 Nuclear arms control agreements</b>	<b>9</b>
3.1 Position on disarmament	9
Impact of the 2021 Integrated Review	10
<b>4 Capabilities</b>	<b>12</b>
4.1 Stockpile	12
4.2 Fissile material	13
4.3 Delivery system	13
4.4 Infrastructure	13
<b>5 Modernisation</b>	<b>15</b>
5.1 Dreadnought programme	15
5.2 Warhead replacement programme	15
5.3 Nuclear warhead capability sustainment programme	16

## Summary

The UK has been a nuclear weapon state since 1952. It is one of the five officially recognised nuclear states under the Nuclear Non-Proliferation Treaty (NPT).

The UK adopts a posture of minimal credible nuclear deterrence, assigned to the defence of NATO. The UK does not have a policy of 'no-first use'.

Since the end of the Cold War, the UK has taken a number of disarmament steps in support of the NPT. It has withdrawn all other nuclear weapons systems except for its submarine-launched Trident system. It has made changes to the operational status of the deterrent and been increasingly transparent about its nuclear inventory.

Under commitments outlined in the 2010 SDSR, the UK was expected to have achieved, by the mid-2020s, a 65% reduction in the size of its overall nuclear stockpile since the height of the Cold War.

However, the 2021 Integrated Review announced that the 2010 commitments could no longer be met due to the current security environment. As such, it announced that the cap on the nuclear stockpile will now be raised and that information on operational stockpile, deployed missiles and deployed warheads would no longer be made available. Both decisions have led many to question the Government's commitment to disarmament.

- Nuclear stockpile – Currently 225 warheads.
- Under the 2021 Integrated Review the cap on the UK's nuclear stockpile, will increase to no more than 260 warheads, a 40% increase on previous commitments.
- The UK is the only nuclear weapon state that has reduced to a single deterrent system.
- Operates continuous at-sea deterrence (CASD).

The programme to replace the UK's nuclear deterrent has been [underway since 2006](#). It involves the replacement of the Vanguard class submarines (SSBN) with a new Dreadnought class of SSBN from the early 2030s.

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

The estimated cost of the design and manufacture of a class of four SSBN is £31 billion, including inflation over the life of the programme. A £10 billion contingency has also been set aside.

The UK is also participating in the current US service-life extension programme for the Trident II D5 missile.

In February 2020 the Government confirmed that a programme to replace the UK's Mk4 nuclear warhead was also underway.

This short paper is intended as an introduction to the UK's nuclear weapons policies and programmes. It is part of a series of country profiles which are available on the [House of Commons Library website](#).

# 1 Nuclear status

The UK first tested a nuclear explosive device in October 1952, becoming the third state to develop nuclear weapons after the United States and the Soviet Union.

Under the Nuclear Non-Proliferation Treaty (NPT) a nuclear weapon state is defined as one that manufactured and exploded a nuclear weapon, or other nuclear explosive device, prior to 1 January 1967.

Alongside the other permanent members of the UN Security Council (the P5), the UK is, therefore, one of the five officially recognised nuclear weapon states under the NPT.

---

## 2 Nuclear Policy

The UK adopts a posture of minimal credible nuclear deterrence, assigned to the defence of NATO.

### 2.1 Declaratory Policy

The UK does not have a policy of “no-first use”, deeming such a posture to be incompatible with NATO’s doctrine of deterrence.

The Government’s [Integrated Review of Security, Defence, Development and Foreign Policy](#), published on 16 March 2021, reaffirmed the UK’s longstanding 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.

It did confirm, however, that nuclear weapons would only be used in “extreme circumstances of self-defence” and that the UK “will not use, or threaten to use, nuclear weapons against any non-nuclear weapon state party to the NPT”.<sup>1</sup> This assurance does not apply, however, to any state in material breach of the NPT.

In a shift from previous declaratory policy set out in the [2015 Strategic Defence and Security Review](#), the Integrated Review does, however, make two significant changes:

1. To extend the UK’s position of deliberate ambiguity, the review confirms that the UK will no longer provide public figures on the UK’s operational stockpile,<sup>2</sup> deployed warheads and deployed missile numbers.<sup>3</sup> In doing so, the review states:

This ambiguity complicates the calculations of potential aggressors, reduces the risk of deliberate nuclear use by those seeking a first-strike advantage, and contributes to strategic stability.<sup>4</sup>

---

<sup>1</sup> HM Government, [Global Britain in a competitive age](#), CP403, p.77

<sup>2</sup> As opposed to total stockpile numbers.

<sup>3</sup> The 2010 SDSR reduced the number of operational launch tubes of the Vanguard class SSBN from 12 to 8 (each submarine has 16 independently controlled missile tubes in total) and reduced the maximum number of deployed warheads onboard from 48 to 40. Each Trident missile is capable of carrying 12 warheads apiece, although the limitations imposed in 2010 suggests that each missile carries, on average, five. The Government has never confirmed the ratio of warheads to missiles.

<sup>4</sup> HM Government, [Global Britain in a competitive age](#), CP403, p.77

2. Security assurances extended to other countries by the UK are now also subject to review “if the future threat of weapons of mass destruction, such as chemical and biological capabilities, or emerging technologies that could have a comparable impact, makes it necessary”.<sup>5</sup>

The inclusion of “emerging technologies” is new language<sup>6</sup> in the Integrated Review that has prompted some commentators to speculate that nuclear weapons could be used in response to a cyber-attack on the UK.<sup>7</sup>

Reaction to these changes is examined in [Integrated Review 2021: Increasing the cap on the UK’s nuclear stockpile](#), House of Commons Library.

---

<sup>5</sup> HM Government, [Global Britain in a competitive age](#), CP403, p.77

<sup>6</sup> The [2015 SDSR](#) only refers to WMD, such as chemical and biological capabilities, para 4.69

<sup>7</sup> See for example: The Guardian, [“UK could use Trident to counter cyber-attack”](#), 16 March 2021

## 3 Nuclear arms control agreements

As one of the recognised nuclear weapon states under the NPT, the UK has a legal obligation to pursue disarmament “in good faith” under Article VI of that treaty.

The UK signed the Comprehensive Test Ban Treaty in 1996 and ratified it in 1998. Although the CTBT is yet to enter force, the UK abides by its commitments and has maintained a moratorium on nuclear testing. The UK also supports negotiation of a fissile material cut-off treaty.

The UK has not signed the [Treaty on the Prohibition of Nuclear Weapons](#).

### 3.1 Position on disarmament

Since the end of the Cold War, the UK has taken a number of disarmament steps in support of the NPT. It has withdrawn all other nuclear weapons systems except for Trident. It has also made changes to the operational status of the deterrent and been increasingly transparent about its nuclear inventory. Those reductions make the UK the smallest of the NPT nuclear weapon states.

#### **Box 1: 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 an estimated 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.<sup>8</sup> The deterrent patrol cycle was also reduced to one SSBN on patrol at any one time. The missiles on board were ‘de-targeted’, while the ‘notice to fire’ period was increased from a few minutes to a notice period measured in days.<sup>9</sup>

- The 2006 White Paper on the [Future of the Nuclear Deterrent](#) reduced the stockpile to fewer than 160 operationally available warheads. It also announced a corresponding 20% reduction in the overall warhead stockpile. The total nuclear stockpile was therefore estimated to have been reduced from 280 to 225 warheads.
- In 2010 The Government published official information on the size of the UK’s overall nuclear stockpile for the first time, confirming that the UK held 225 warheads.
- The 2010 [Strategic Defence and Security Review \(PDF\)](#) 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.<sup>10</sup> It also announced a reduction in the number of operationally available warheads, to 120; while the overall stockpile would be no more than 180 by the mid-2020s. Once that reduction had been achieved, the UK nuclear stockpile would have been reduced by 65% since the end of the Cold War.
- All of the decisions set out in 2010 were reiterated in the 2015 SDSR.

## Impact of the 2021 Integrated Review

Under commitments outlined in the 2010 and 2015 SDSR, the UK was expected to have achieved, by the mid-2020s, a 65% reduction in the size of its overall nuclear stockpile since the height of the Cold War.

However, the 2021 Integrated Review announced that the 2010 commitments could no longer be met due to the current security environment. As such, it announced that the cap on the nuclear stockpile would be increased to no more than 260 warheads, an increase of just over 40% on the 2010

---

<sup>8</sup> Figures from the Strategic Defence Review: Supporting Essays, July 1998

<sup>9</sup> 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.

<sup>10</sup> Those reductions were achieved by January 2015 (Nuclear Deterrent: Written Statement, HCWS210, 20 January 2015)

commitment. That decision has subsequently raised questions over the Government's commitment to disarmament.

Indeed, in the Integrated Review the Government confirms its “long-term goal of a world without nuclear weapons” and that it is “committed to full implementation of the NPT in all its aspects, including nuclear disarmament, non-proliferation, and the peaceful uses of nuclear energy...” However, in doing so, the Government also stresses that it takes into account “the prevailing security environment”.<sup>11</sup>

The review also reiterates the Government's view that the NPT is the only forum through which multilateral disarmament can be achieved and that “no credible alternative route to nuclear disarmament” exists. Presumably a reference to the [Treaty on the Prohibition of Nuclear Weapons](#), which the UK opposes.

In the past successive British Governments have also insisted that the UK's nuclear deterrent, and the replacement programme (see below), is fully consistent with all the UK's international legal obligations. While Article VI of the NPT commits signatory states to eventual disarmament, the Government argues that it contains no prohibition on updating existing weapons systems and gives no explicit timeframe for nuclear disarmament. In its National Report to the 2022 NPT Review Conference, the Government states:

Maintaining the UK's nuclear deterrent capability at a minimum credible level, taking into account the international environment, is fully consistent with our international legal obligations, including those under article VI of the NPT.<sup>12</sup>

In January 2022 the five recognised nuclear weapon states (the P5) also issued a statement in which they affirmed that “a nuclear war cannot be won and must never be fought” and that nuclear weapons “should serve defensive purposes, deter aggression, and prevent war”.<sup>13</sup>

---

<sup>11</sup> HM Government, [Global Britain in a competitive age](#), CP403, p.78

<sup>12</sup> Written Statement, [Treaty on the Non-proliferation of nuclear weapons: UK national report](#), 1 November 2021

<sup>13</sup> [Joint Statement of the Leaders of the Five Nuclear Weapon States](#), 3 January 2022

## 4

# Capabilities

## 2 Composition of the UK's nuclear deterrent

The UK's nuclear deterrent has three main elements:

- Four Vanguard-class submarines (SSBN), maintaining continuous at sea deterrence (CASD)
- Trident II D5 missile, deployed aboard the submarine, which is held in a communal pool with the US
- Mk4/A nuclear warhead deployed on the Trident II D5.

The deterrent also has a vast supporting infrastructure.

### 4.1

## Stockpile

At present the UK stockpile is estimated at 225 warheads.

As outlined above, the 2021 Integrated Review confirmed that the cap on the UK's stockpile will now be raised to no more than 260 warheads. This is an increase of just over 40% (80 warheads) on the 2010 commitment of no more than 180 warheads by the mid-2020s. The review does not state how many of those 260 warheads will be operationally available, in line with the new policy of not disclosing such data (see above).<sup>14</sup>

A stockpile of no more than 260 warheads will keep the UK with the smallest inventory of the recognised nuclear weapon states.<sup>15</sup> However, the UK will join China in being the only members of the P5 that are quantitatively increasing their nuclear stockpiles.<sup>16</sup>

<sup>14</sup> Under the 2010 SDSR commitments no more than 120 warheads would be operationally available.

<sup>15</sup> In comparison, France has 290, China – 320, Russia – 6,375 and the United States – 5,800

<sup>16</sup> As opposed to arguably qualitatively increasing their nuclear arsenals through the modernisation of ageing capabilities. All of the nuclear weapon states are pursuing modernisation agendas. See [CBP9069. Nuclear weapons at a glance](#), House of Commons Library, January 2021

Reaction to these changes is examined in [Integrated Review 2021: Increasing the cap on the UK's nuclear stockpile](#), House of Commons Library.

## 4.2 Fissile material

The UK ceased production of fissile material for weapons production in 1995. According to the latest report of the [International Panel on Fissile Materials](#) it does, however, retain a fissile material stockpile of 22 metric tons of highly enriched uranium (HEU) and 3.2 metric tons of plutonium for weapons purposes.<sup>17</sup>

In 2013 the MOD confirmed that “once processed, the material from dismantled warheads is returned to the MOD nuclear material stockpile. It is not government policy to place this material under international safeguards”.<sup>18</sup>

## 4.3 Delivery system

Since 1998 the UK's nuclear deterrent has been based solely on the Trident weapons system, which is deployed aboard the Vanguard class submarine. Since [April 1969 the UK has operated a continuous at-sea deterrent](#).

Under the nuclear policies set out in the 2010 SDSR, submarines on patrol deployed with eight operational Trident missiles and carried no more than 40 nuclear warheads. The 2021 Integrated Review announced, however, that information on deployed missiles and deployed warheads would no longer be provided (see above).

The UK is the only recognised nuclear weapon state that has reduced to a single deterrent system.

## 4.4 Infrastructure

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.

---

<sup>17</sup> According to the International Panel on Fissile Materials, a second generation boosted warhead would require 12kg of HEU or 4-5kg of plutonium. The amount of fissile material in a warhead can be reduced, and their yield increased, by using tritium to ‘boost’ the fission process.

<sup>18</sup> HC Deb 21 January 2013, c70W

Devonport is also responsible for decommissioning nuclear-powered submarines, including the SSBN fleet, at the end of their service lives.

HMNB Clyde is managed under a long-term partnership arrangement involving the MOD and Babcock. Devonport dockyard is also run by Babcock International.

In 2012 the MOD entered into a 15-year contract with ABL Alliance<sup>19</sup> to provide elements of support to the Trident strategic weapon system at Coulport and the Strategic Weapons Support Building at Faslane.<sup>20</sup>

The UK's nuclear warheads are manufactured and maintained at two Atomic Weapons Establishment (AWE) sites at Aldermaston and Burghfield in Berkshire. In November 2020 the MOD announced that AWE would be brought back under direct Government ownership after more than 25 years under a Government-owned, contractor-operated (GoCo) model.<sup>21</sup>

More detailed information on the composition of the nuclear deterrent is available in:

- [Replacing the UK's 'Trident' nuclear deterrent](#), House of Commons Library, July 2016
- [UK-USA Mutual Defence Agreement](#), House of Commons Library, October 2014

---

<sup>19</sup> A consortium of AWE plc, Babcock and Lockheed Martin.

<sup>20</sup> [MOD press release](#), 27 July 2012

<sup>21</sup> [Written Ministerial Statement \(HCWS544\)](#), 2 November 2020. While the sites and facilities remained in Government ownership, the MOD had a contract with AWE Management Ltd for the management and day-to-day operation of both sites until 2025.

---

## 5 Modernisation

### 5.1 Dreadnought programme

The programme to replace the UK's nuclear deterrent has been [underway since 2006](#). It involves the replacement of the Vanguard class submarines (SSBN) with a new Dreadnought class of SSBN.

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

The UK is also participating in the current US service-life extension programme for the Trident II D5 missile, which will extend the life of the missile, potentially out to the 2060s.<sup>22</sup>

Under changes introduced in the 2015 Strategic Defence and Security Review (SDSR), the first Dreadnought SSBN is now expected to enter service in the early 2030s and will have a service life of at least 30 years.

The estimated cost of the design and manufacture of a class of four SSBN is £31 billion, including inflation over the life of the programme. A £10 billion contingency has also been set aside.

### 5.2 Warhead replacement programme

In February 2020 the Government confirmed that a programme to replace the UK's nuclear warhead was also underway. Transition to the new warhead, which will be compatible with the Trident missile system, is expected from the late 2030s onwards.

---

<sup>22</sup> The US is also planning a second life extension programme for the Trident II D5 which will extend its life to the mid-2080s, in line with the expected in-service life of the US Columbia class SSBN (US Government Accountability Office, [Weapon systems annual assessment \(PDF\)](#), June 2022, p.179)

## 5.3

# Nuclear warhead capability sustainment programme

In July 2005 the Government announced a new programme of investment for the AWE under the Nuclear Warhead Capability Sustainment Programme (NWCSP). Over a period of 20 years, and at an estimated cost of £20 billion, the NWCSP aims to sustain key nuclear skills, technological capability and deliver improved infrastructure to ensure the safety and reliability of the current nuclear stockpile.

As part of the NWCSP, AWE is currently refurbishing the UK warhead to replace obsolete components and incorporate the US-designed Mk4A arming, fusing and firing system. In June 2016 the MOD highlighted that this refurbishment did not equate to a new warhead and “does not change the destructive power of the weapon”.<sup>23</sup>

The work of the NWCSP will underpin the warhead replacement programme.

The UK-French Teutates project on nuclear stockpile stewardship also forms part of the NWCSP.<sup>24</sup>

The projects being undertaken through the NWCSP are funded as part of the annual in-service costs of the nuclear deterrent,<sup>25</sup> which currently stand at 6% of the defence budget. In 2022/23 that equates to £2.8 billion.<sup>26</sup>

The modernisation programme is examined in more detail in the following House of Commons Library papers:

- [Replacing the UK’s nuclear deterrent: progress of the Dreadnought class](#)
- [Replacing the UK’s nuclear deterrent: the long-awaited warhead decision](#)
- [The cost of the UK’s strategic nuclear deterrent](#)

---

<sup>23</sup> Ministry of Defence, [Defence in the media](#), 8 June 2016

<sup>24</sup> House of Commons Library, [The French Nuclear Deterrent](#), examines the Teutates project and the 2010 UK-French nuclear treaty in greater detail.

<sup>25</sup> HL328, Trident submarines, 6 June 2016 and HC deb 11 November 2010, c450W

<sup>26</sup> The costs of the nuclear deterrent are examined in greater detail in [Library Briefing CBP8166. The costs of the UK’s strategic nuclear deterrent](#)

The House of Commons Library is a research and information service based in the UK Parliament. Our impartial analysis, statistical research and resources help MPs and their staff scrutinise legislation, develop policy, and support constituents.

Our published material is available to everyone on [commonslibrary.parliament.uk](https://commonslibrary.parliament.uk).

Get our latest research delivered straight to your inbox. Subscribe at [commonslibrary.parliament.uk/subscribe](https://commonslibrary.parliament.uk/subscribe) or scan the code below:



 [commonslibrary.parliament.uk](https://commonslibrary.parliament.uk)

 [@commonslibrary](https://twitter.com/commonslibrary)