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Armaments, Disarmament and International Security

British nuclear forces

SHANNON N. KILE AND HANS M. KRISTENSEN



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III. British nuclear forces

SHANNON N. KILE AND HANS M. KRISTENSEN

The United Kingdom's nuclear deterrent consists exclusively of a sea-based component: Vanguard class Trident nuclear-powered ballistic missile submarines (SSBNs) armed with Trident II (designated D5) submarine-launched ballistic missiles (SLBMs) and associated warheads, and their support infrastructure. The UK possesses an arsenal of about 160 operational nuclear warheads that are available for use by a fleet of four Trident SSBNs based at Faslane, Scotland (see table 6.4). The UK leases 58 Trident II (D5) SLBMs from the United States Navy under a system of 'mingled asset ownership'.

Each Vanguard class SSBN is equipped with 16 Trident II missiles carrying up to 48 warheads. The warhead is similar to the US W76 warhead; it has been upgraded with the US-produced arming, fusing and firing system for the Trident II's Mk-4A re-entry vehicle, which improves the accuracy of the missile and increases its ability to destroy hardened targets.¹ While each Trident II missile can carry three warheads, it is believed that a number of them are deployed with only one warhead, possibly with a reduced explosive yield. This reflects a decision by the British Ministry of Defence (MOD) in 1998 to give a 'sub-strategic', or limited-strike, role to the Trident fleet, with the intention of enhancing the flexibility of nuclear targeting options—specifically, 'an option for a limited strike that would not automatically lead to a full scale nuclear exchange'.² An addendum in 2002 extended the role of nuclear weapons to include deterring 'leaders of states of concern and terrorist organisations'.³

In a posture known as Continuous At-Sea Deterrence (CASD), one British SSBN is on patrol at all times.⁴ While the second and third SSBNs can be put to sea rapidly, the fourth would take longer because of its cycle of extensive overhaul and maintenance. Since the end of the cold war, the SSBN on patrol has been kept at a level of reduced readiness with its missiles de-targeted and a 'notice to fire' measured in days.⁵

¹ According to some reports, the UK is procuring the US-produced W76-1 warhead for its Trident missiles. Kristensen, H. M., 'British submarines to receive upgraded US nuclear warhead', Strategic Security Blog, Federation of American Scientists, 1 Apr. 2011, <<http://blogs.fas.org/security/2011/04/britishw76-1/>>.

² British Ministry of Defence, *The Strategic Defence Review: Modern Forces for the Modern World*, Cm 3999 (The Stationery Office: London, July 1998), para. 63.

³ British Ministry of Defence, *The Strategic Defence Review: A New Chapter*, Cm 5566, vol. 1 (Stationery Office: London, July 2002), para. 21.

⁴ British Ministry of Defence and British Foreign and Commonwealth Office, *The Future of the United Kingdom's Nuclear Deterrent*, Cm 6994 (Stationery Office: London, Dec. 2006), p. 27.

⁵ British Ministry of Defence and British Foreign and Commonwealth Office (note 4), p. 13.

Table 6.4. British nuclear forces, January 2013

Type	Designation	No. deployed	Year first deployed	Range (km) ^a	Warheads x yield	Warheads in stockpile
<i>Submarine-launched ballistic missiles</i>						
D5	Trident II	48	1994	>7 400	1–3 x 100 kilotons	225 ^b

^a Range is for illustrative purposes only; actual mission range will vary according to flight profile and weapon loading.

^b Fewer than 160 warheads are operationally available, c. 144 to arm 48 missiles on 3 of 4 nuclear-powered ballistic missile submarines (SSBNs). Only 1 SSBN is on patrol at any time, with up to 48 warheads.

Sources: British Ministry of Defence, white papers, press releases and website, <<https://www.gov.uk/government/organisations/ministry-of-defence>>; British House of Commons, *Hansard*, various issues; Norris, R. S. et al., *Nuclear Weapons Databook*, vol. 5, *British, French, and Chinese Nuclear Weapons* (Westview: Boulder, CO, 1994), p. 9; 'Nuclear notebook', *Bulletin of the Atomic Scientists*, various issues; and authors' estimates.

On 23 October 2012 the submarine HMS *Vigilant* successfully test-fired a Trident II SLBM in the Atlantic Ocean off the coast of Florida. The test was part of a demonstration and shakedown operation (DASO) for HMS *Vigilant's* return to service following a three-year mid-life overhaul and reactor refuelling period. It was the British Royal Navy's first flight test of a Trident missile since 2009 and its 10th overall.⁶

In the 2010 Strategic Defence and Security Review (SDSR) the British Government made a commitment to retain a continuous submarine-based nuclear deterrent force for the indefinite future.⁷ The MOD currently plans to replace the four Vanguard class SSBNs, which will reach the end of their service lives from 2024, with new submarines equipped with modified Trident II (D5) SLBMs at an estimated initial cost of £20 billion (\$37 billion) at 2006 prices.⁸ As a cost-saving measure they will have a smaller missile compartment equipped with 8 launch tubes carrying no more than 40 warheads.⁹ The SDSR deferred the 'main gate' decision—on when the detailed acquisition plans, design and number of the successor submarines are to be finalized—until 2016. In 2011 the MOD announced the completion of the 'initial gate' phase setting out the broad design parameters for the new SSBN class.¹⁰ In June 2012 it awarded a £1 billion (\$1.6 billion) contract for

⁶ British House of Commons, Written Answers to Questions, *Hansard*, 19 Nov. 2012, Column 238W; and 'Royal Navy conducts test firing of Trident missile', Nuclear Information Service, 3 Nov. 2012, <<http://www.nuclearinfo.org/article/uk-trident/royal-navy-conducts-test-firing-trident-missile>>.

⁷ British Ministry of Defence, *Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, Cm 7948 (Stationery Office: London, Oct. 2010), paras 3.8–3.9.

⁸ British Ministry of Defence (note 7), para. 3.10.

⁹ British Ministry of Defence (note 7), paras 3.11–3.12, 3.14.

¹⁰ British Ministry of Defence (MOD), *The United Kingdom's Future Nuclear Deterrent: The Submarine Initial Gate Parliamentary Report* (MOD: London, May 2011), p. 4.

refurbishing the plant that will build nuclear reactors for the next generation of attack and ballistic missile submarines.¹¹

The cost of the proposed plan to replace the existing Trident fleet with a 'like for like' system has drawn criticism from the Liberal Democrat party, the smaller of the two parties in the current governing coalition. As part of its coalition deal with the Conservative party in 2010, it demanded a formal review of 'credible and compelling' nuclear deterrence alternatives.¹² Potential alternatives under consideration include acquiring nuclear cruise missiles or a multi-role submarine, or abandoning the CASD posture.¹³ While the report of the Trident Alternatives Review is due in June 2013, critics have pointed out that it will be difficult to halt the successor submarine replacement programme given the amount of investment already made.¹⁴ If the programme is given final approval, the new submarine is expected to enter service beginning in 2028.

The 2010 SDR revealed plans for cutting the size of the British nuclear arsenal. The stockpile of operational nuclear warheads will be reduced from fewer than 160 at present to no more than 120, of which 40 will be on patrol at any given time. Likewise, the overall size of the nuclear stockpile, including non-deployed weapons, will decrease from the current 225 warheads to 'not more than 180 by the mid 2020s'.¹⁵

¹¹ Watts, N., 'Coalition faces split over Trident nuclear replacement', *The Guardian*, 17 June 2012.

¹² Hopkins, N., 'Trident: no need for like-for-like replacement, says Danny Alexander', *The Guardian*, 23 Jan. 2013.

¹³ Lehrke, D. L., 'Deterrent dilemma: UK examines its nuclear options', *Jane's Intelligence Review*, Aug. 2012, pp. 49–53.

¹⁴ 'Minister Danny Alexander dismisses Trident replacement', BBC News, 23 Jan. 2013, <<http://www.bbc.co.uk/news/uk-politics-21155000>>; and Hopkins, N. and Norton-Taylor, R., 'New Trident nukes seem certain despite Lib Dem concerns', Guardian Defence and Security Blog, 22 June 2012, <<http://www.guardian.co.uk/uk/defence-and-security-blog/2012/jun/22/trident-nuclear-weapons>>.

¹⁵ British Ministry of Defence (note 7), para. 3.11.