

III. British nuclear forces

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As of January 2018, the British nuclear stockpile consisted of approximately 215 warheads (see table 6.4). In its 2015 Strategic Defence and Security Review (SDSR), the British Government reaffirmed its plans to cut the size of the nuclear arsenal. The number of operationally available nuclear warheads has been reduced to no more than 120. The overall size of the nuclear stockpile, including non-deployed warheads, will decrease to no more than 180 by the mid-2020s.¹

The British nuclear deterrent consists exclusively of a sea-based component: four Vanguard class Trident nuclear-powered ballistic missile submarines (SSBNs).² In a posture known as continuous at-sea deterrent, one British SSBN is on patrol at all times.³ While the second and third SSBNs can be put to sea rapidly, the fourth would take longer because of the cycle of extensive overhaul and maintenance. In September 2017, the British Ministry of Defence (MOD) marked the 350th nuclear deterrence patrol conducted by Royal Navy submarines since 1969.⁴

The Vanguard class SSBNs can each be armed with up to 16 UGM-133 Trident II (D5) submarine-launched ballistic missiles (SLBMs). The United Kingdom does not own the missiles but leases them from a pool of 58 Trident SLBMs shared with the United States Navy. Under limits set out in the 2010 SDSR, when on patrol, the submarines are armed with no more than 8 operational missiles with a total of 40 nuclear warheads.⁵ The missiles are kept on a reduced operational alert status and would require several days' notice to be able to fire.⁶

In January 2017 the Trident programme became the centre of controversy when a newspaper revealed that the British Government had not publicly disclosed the failed test launch of a Trident SLBM the previous summer, shortly before a vote in the British House of Commons on the Trident submarine successor programme (see below).⁷ US officials confirmed that a missile test fired in June 2016 at a US test range off the Florida coast had

¹ British Government, *National Security Strategy and Strategic Defence and Security Review 2015: A Secure and Prosperous United Kingdom*, Cm 9161 (Stationery Office: London, Nov. 2015), para. 4.66.

² *HMS Vanguard* entered service in Dec. 1994, while the last in class, *HMS Vengeance*, entered service in Feb. 2001. Mills, C. and Dempsey, N., 'Replacing the UK's nuclear deterrent: progress of the Dreadnought class', Briefing Paper 8010, House of Commons Library, 19 June 2017, p. 7.

³ British Government (note 1), para. 4.65.

⁴ British Royal Navy, 'UK marks 350th UK deterrent patrol', Press release, 29 Sep. 2017.

⁵ British Ministry of Defence, *Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, Cm 7948 (Stationery Office: London, Oct. 2010), pp. 5, 38.

⁶ British Ministry of Defence, 'UK nuclear deterrent', Fact sheet, updated 24 Mar. 2016, p. 1.

⁷ *Sunday Times*, 'Nuclear cover-up', 22 Jan. 2017.

deviated from its programmed course and crashed into the sea.⁸ The MOD declined to comment on the cause of the failure, which marked its first unsuccessful Trident missile flight test.⁹ The UK had previously conducted successful flight tests in 2000, 2005, 2009 and 2012.

The Trident submarine successor programme

In 2016 the House of Commons approved by a large majority a motion supporting the government's commitment to a 'like-for-like' replacement of the current Vanguard class SSBNs with four new SSBNs.¹⁰ While recognizing that the UK's nuclear deterrent would 'remain essential to the UK's security today as it has for over 60 years', the motion did not give final approval for the new submarine programme. In order to control costs, the government had previously announced that approval of the investment would be made in stages rather than as a single 'main gate' decision.¹¹

The new class of SSBN, which has been named Dreadnought, will carry the new life-extended Trident II D5LE SLBMs but will have a missile compartment that holds 12 missile launch tubes, a reduction from the 16 carried by the Vanguard class. As a cost-saving measure, a common missile compartment is being designed in cooperation with the US Navy that will also equip the latter's new Columbia class SSBNs.¹² The replacement of the Trident II (D5) missile is not part of the Dreadnought development and acquisition programme. However, the UK is participating in the US Navy's current programme to extend the service life of the Trident II (D5) missile to the early 2060s.¹³

The Dreadnought submarines were originally expected to begin to enter into service by 2028 but are now expected to enter into service in the early 2030s. The delay was part of the extended development and acquisition programme announced in the 2015 SDSR. The service life of the Vanguard class SSBNs was commensurately extended.¹⁴

⁸ Star, B. and Masters, J., 'US official confirms Trident missile failure', CNN, 23 Jan. 2017.

⁹ Kuenssberg, L., 'Trident: defence secretary refuses to give test missile details', BBC News, 23 Jan. 2017; and MacAskill, E., 'How did the Trident test fail and what did Theresa May know?', *The Guardian*, 23 Jan. 2017.

¹⁰ British Parliament, House of Commons, 'UK's nuclear deterrent', *House of Commons Hansard*, col. 559, vol. 613, 18 July 2016; and Kuenssberg, L., 'MPs vote to renew Trident weapons system', BBC News, 19 July 2016.

¹¹ British Government (note 1), para. 4.75.

¹² British Ministry of Defence, 'The United Kingdom's future nuclear deterrent: the Dreadnought programme', 2017 Update to Parliament, 20 Dec. 2017; Allison, G., 'A guide to the Dreadnought class nuclear submarine', UK Defence Journal, 3 Jan. 2018; and US Navy, 'United States Navy: fact file: Trident II (D5) missile', 11 May 2017.

¹³ Mills, C. and Brooke-Holland, L., 'The costs of the UK strategic nuclear deterrent', Briefing Paper 08166, House of Commons Library, 8 Dec. 2017, p. 9.

¹⁴ Mills and Dempsey (note 2).

Table 6.4. British nuclear forces, January 2018

Type	Designation	No. deployed	Year first deployed	Range (km) ^a	Warheads x yield	No. of warheads
<i>Submarine-launched ballistic missiles^b</i>						
D5	Trident II	48	1994	>7 400	1–3 x 100 kt ^c	215 ^d

kt = kilotons.

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

^b The operational nuclear-powered ballistic missile submarines (SSBNs) carry a reduced loading of no more than 8 Trident II missiles and 40 nuclear warheads. One submarine is on patrol at any given time.

^c The British warhead is called the Holbrook, a modified version of the United States' W76-1 warhead, with a lower-yield option.

^d Of the estimated 215 warheads currently in the stockpile, 120 are operationally available. The process to reduce the stockpile to 180 warheads by the mid-2020s is under way.

Sources: British Ministry of Defence, white papers, press releases and website; British House of Commons, *Hansard*, various issues; 'Nuclear notebook', *Bulletin of the Atomic Scientists*, various issues; and authors' estimates.

The 2015 SDSR also postponed the replacement of the current British-manufactured Holbrook warhead for the Trident II missiles, at least until the late 2030s.¹⁵ A decision on a new warhead is planned for the current parliament, and work continues on developing replacement options.¹⁶ In the meantime, the British Atomic Weapons Establishment (AWE) has begun a programme to improve the performance and extend the life of the current Trident warhead—which is modelled on the US W76-1 warhead and incorporated into the US-produced Mk4A re-entry vehicle—in collaboration with US nuclear weapon laboratories.¹⁷

The MOD has estimated the cost of the Dreadnought programme to be £31 billion (\$47.4 billion), including defence inflation over the life of the programme. It has set aside a further contingency of £10 billion (\$15.3 billion) to cover possible increases.¹⁸ In its 2017 update to parliament, the MOD confirmed that the programme remained within budget, and that £4.3 billion

¹⁵ British Government (note 1), paras 4.72, 4.76.

¹⁶ Mills and Dempsey (note 2), p. 3; and British Ministry of Defence (note 12).

¹⁷ Nuclear Information Service, 'AWE: past, present, and possibilities for the future', June 2016, pp. 26–28.

¹⁸ British Government (note 1), para. 4.76.

(\$5.5 billion) had been spent so far on the design and early manufacture phases.¹⁹ However, there were reports during the year of significant cost overruns related to the submarine's next-generation nuclear reactor propulsion plant.²⁰ As the year ended, concerns were raised in parliament about the impact of the Trident successor programme on the affordability of the MOD's overall equipment plan.²¹

¹⁹ British Ministry of Defence (note 12).

²⁰ Hookham, M. and Ripley, T., "Red alert" over Trident reactor costs', *Sunday Times*, 23 July 2017.

²¹ MacAskill, E., 'Trident may be removed from MoD budget, MPs told', *The Guardian*, 18 Dec. 2017; and Haynes, D., 'Defence cuts: take expensive Trident out of MoD budget, Hammond urged', *Sunday Times*, 25 Nov. 2017.