



# Brexit and the UK's Uncertain Nuclear Future

## Tim Street

### Summary

The British public's decision to leave the European Union has, in several ways, heightened the already significant costs and risks of replacing the UK's Trident nuclear weapons system with the next-generation Successor programme consisting of four nuclear-powered submarines armed with nuclear-tipped ballistic missiles (SSBNs). Yet despite the various questions surrounding the UK's nuclear future, the political commitment of the government, and much of Labour, to nuclearism would appear to remain particularly strong and resilient.

This is partly because, at a time of national turbulence, the government is unlikely to voluntarily divest itself of such a symbol of political power. It was thus not surprising to see Theresa May—prior to becoming Britain's new Prime Minister—indicate her strong **support** for Successor, arguing that there should be parliamentary approval for the programme before the Commons' summer break and that 'we should get on with getting it built'.<sup>[1]</sup> A Parliamentary debate and vote on the Successor nuclear weapons programme has now been set for Monday 18 July. However, such manoeuvrings are more about political theatre than providing space for democratic deliberation and control, as shown by the fact that around £4 billion has already been spent on Successor's assessment phase.<sup>[2]</sup>

It is increasingly possible that a quick, easy parliamentary victory for the new government on Successor— helping May to look strong on defence, unite her party and highlighting Labour divisions—will backfire in the medium term. This is because several underlying constitutional, economic, industrial and political factors, some of which have not previously received the public discussion they

#### Latest

**An Update on the Security Policy Change Programme**

**Chances for Peace in the Third Decade**

**A Story of ORG: Oliver Ramsbotham**

**A Story of ORG: Gabrielle Rifkind**

#### Most read

**The Role of Youth in Peacebuilding: Challenges and Opportunities**

**Making Bad Economies: The Poverty of Mexican Drug**

deserve, could, following the referendum, develop and interact in ways that dramatically increase the costs and risks of Successor.

Seeing as there has not been a substantial parliamentary debate on the nuclear question for almost a decade, MPs must be able to explore the key issues in a considered and thorough way. Rather than making a final decision on Trident replacement now, it is in the interests of both the new Prime Minister and the country that it be kept open to review until after the House of Commons' summer recess. This is necessary so that government, parliament and the country at large can have appropriate opportunity to assess the United Kingdom's changed strategic position and its impact on Successor in order to make an informed judgment about the best way forward.

### **Future cost drivers for Successor**

Given the relatively low political salience of nuclear weapons for the public—at the same time as there being significant support for disarmament—during a period of austerity the issue of cost has been one of the most visible aspects of the nuclear debate. Changes in the understanding of the costs and risks of nuclear weapons by opinion-formers, the public and decision-makers, will therefore likely have an important impact on how the future debate unfolds.

However, estimating the cost of Trident replacement today remains particularly difficult given the various complex factors involved. Even the government has found it difficult—publicly at least—to provide a figure, with the MoD responding to an FOI request from Reuters earlier this year by stating that it 'does not hold a cost forecast for the whole capability'.<sup>[3]</sup> Whilst acknowledging the difficulties in estimating a cost for Successor, it is important to consider what some of the

## **Cartels**

---

## **ORG's Vision**

---

## **Remote Warfare: Lessons Learned from Contemporary Theatres**

key drivers of cost escalation—particularly for submarine acquisition—might be if current plans continue through into production.

The government has already had to increase its own (probably conservative) estimates for submarine build costs alone to £31 billion, with an additional £10 billion contingency. In-service operating costs are roughly estimated to add another £142 billion over 32 years.[4] These represent only some of the build and operation cost estimates, however. CND has thus calculated that Trident replacement will cost at least £205 billion.[5]

Yet even this figure does not fully reflect the wider costs of the UK remaining a nuclear weapon state (NWS). Whilst there is not space to consider fully how this might be estimated here, it is important to note that an, often overlooked, associated cost of the UK remaining a NWS is the need to secure the long-term viability of a nuclear-powered submarine construction industry, to build both Successor and the envisaged Maritime Underwater Future Capability. Maintaining a constantly engaged skilled workforce means that the £9.6 billion cost of the Astute-class attack submarines should also be considered when estimating the cost of the UK remaining a NWS with Trident. Moreover, it is logical to consider the conventional portion of the UK's £36 billion military budget as the foundations and structure necessary to make Trident politically credible and sustain the UK's NWS status.[6]

Returning to Successor, as Professor Keith Hartley has observed, 'future cost escalation' for the programme is 'a certainty'.[7] The track record of modern military procurement provides ample supporting evidence for this claim. For example, as Margaret Hodge MP, former chair of the Commons Public Accounts Committee highlighted in 2013, between 2000 and 2012 the cost of the MoD's sixty-nine largest projects 'ballooned by £11bn' with 'independent analysis in

2009' finding that 'final project costs were typically 40% higher than the ministry's initial forecasts'.<sup>[8]</sup> Similar cost over-runs and schedule slippages for military and naval procurement have been experienced in recent years in both France and the US.<sup>[9]</sup> Whilst we must acknowledge the difficulties in estimating a cost for Successor, it is therefore important to consider what some of the key drivers of cost escalation—particularly for submarine acquisition—might be if current plans continue through into production. The list below highlights some of these factors and, where relevant, the impact that the vote to leave the EU may have on them.

### **i) Delays, complications or budget problems with the US nuclear modernisation programme**

The US is pursuing its own, hugely costly, nuclear modernisation programme, covering, as Amy Woolf notes, 'programs to modernize and replace all U.S. nuclear delivery systems—the submarines, missiles, and bombers—while the Department of Energy plans to refurbish the nuclear warheads carried by those delivery systems'.<sup>[10]</sup> UK Successor will be based in part on US submarine designs, including a common missile compartment (CMC), so that efforts have been made to bring the two nation's replacement programmes in line.<sup>[11]</sup> In addition, the 1958 Mutual Defence Agreement enables the UK and US 'nuclear warhead communities' to 'collaborate on all aspects of nuclear deterrence including nuclear warhead design and manufacture,' so that future developments in the US will likely impact on the UK's own warhead programme.<sup>[12]</sup>

As Professor Malcolm Chalmers has therefore noted:

**“ pressure on the US’s defence budget is increasing the possibility that its own SSBN replacement programme is delayed, and with it the US’s requirement for CMC completion. Sequestration is also restricting the Pentagon’s ability to alter programme scheduling to suit UK requirements. Both in relation to the submarine and warhead programmes, US decision-makers may simply not take UK concerns into account within their own complex decision making calculus. The result could be further complications for UK planners.[13] ”**

Following the EU referendum the depreciation of sterling will place major pressure on projected defence procurement and maintenance budgets, including the Successor programme. Weaker growth and an anticipated economic contraction will also likely undermine budgetary plans and overall defence spending commitments over the medium term.[14]

## **ii) Increased design complexity owing to strategic and/or technological developments**

Successor has been described as the most technologically advanced and stealthy submarine ever produced by the UK. The design of the submarines will evolve according to changes in perceived military needs and threats—including cyber-attack, underwater vulnerabilities and anti-submarine warfare—e.g. from China and Russia. For example, as defence analyst Richard Sterk observes, since Astute was designed, ‘the operational scenarios in which U.K. Royal Navy submarines are expected to operate have changed significantly. Operations in the littoral are becoming far more commonplace, and commensurately there is less emphasis on deepwater anti-submarine warfare’.[15]

Changes in strategic priorities, e.g. the US’s Asia pivot, focusing on China and the Indo-Pacific littoral, could thus impact on the design for the common missile compartment which the UK is developing and paying for alongside the US.[16] In addition, Nick Ritchie and other analysts have suggested that the UK may prefer to develop a capability combining conventional and nuclear roles, such as ‘a flexible dual-capable SSBN/SSGN’.[17] Increased design complexity driven by strategic and/or technological developments may thus contribute to cost escalation.

### **iii) Competition for nuclear skills**

The Coalition government highlighted in *Sustaining Our Nuclear Skills*—its 2015 addendum to the Nuclear Industrial Strategy—that it had ‘initiated an ambitious programme to construct up to five or even more civil nuclear plants by 2030, while at the same time carrying out a large programme of decommissioning work. Over almost the same period, the Ministry of Defence (MOD) will develop the Successor submarine class’.[18] As Tom McKane, former Director General for Strategy and Director General for Security Policy at the MoD, explained earlier this year, the ‘massive’ challenge of building Successor has thus been

‘exacerbated’ by ‘having to recruit, in order to replace the ageing workforce, at the same time as the UK is preparing to place orders for new phase of civil nuclear power stations’. McKane points out that the civil sector is also ‘able to outbid the defense industry in the competition for scarce highly trained personnel’ so that whilst the government is seeking to develop the requisite engineering skills and apprenticeships ‘the benefits of such initiatives do not appear overnight’.[19]

Moreover as *Sustaining Our Nuclear Skills* notes, the shortage of skilled workers for nuclear projects will ‘create competition for specialist skills, pushing up labour prices. This threatens to increase the cost of critical national projects and potentially raise the UK’s reliance on foreign expertise for civil projects. It will raise particular challenges for defence, where security considerations require UK nationals’.[20] Overall, whilst, as Professor Keith Hartley notes, the taxpayer-funded MoD could outbid the civil sector, ‘the result is either skill shortages and programme delays and/or further rising costs’.[21]

In response to the potential skills shortage, recent reports suggest that the MoD has taken exceptional measures to mitigate risk. For example, the Financial Times reported in July 2015 that the Royal Navy was ‘offering a one-off bonus of up to £24,000 to retain nuclear engineers, fearing it will lose skilled staff to civil power station projects such as Hinkley Point’.

[22] Elsewhere, Defense News disclosed last April that ‘as part of the effort to attract the skilled engineers and commercial staff it needs’ the Defence Equipment and Support group within the MoD has ‘been given approval to break civil service pay norms’.[23]

Rolls Royce is currently undertaking reactor design work for Successor, yet Ritchie has argued that ‘the costs of developing the new PWR3 nuclear reactor



are unlikely to be assigned to the Successor programme' and thus should be considered an additional cost.[24] On this topic, the National Audit Office's (NAO) 2012 MoD Major Projects Report stated that, 'the Nuclear Propulsion Critical Technology programme brings focused investment to regenerate the UK nuclear propulsion design and support capability, and ensures we have the design base essential to maintain a strategic sovereign UK nuclear capability'. [25] For Dr Peter Burt, this raises the question of whether 'expertise in submarine reactor design has declined since development of the Navy's last submarine reactor (PWR2 Core H)' leading him to ask 'will this pose a risk to delivery of the programme?'[26] A Financial Times article from last January on the Successor project sheds some light on this question noting that a 'new nuclear propulsion system, the PWR3' was necessary owing to regulators demanding improvements to safety. Yet whilst the new system will 'last longer and be easier to maintain' Rolls-Royce has, according to industry insiders, 'struggled to find enough skilled workers.'[27]

Lord Heseltine warned that the Brexit vote and lack of a settled government meant that the situation for industry and commerce was 'deteriorating day by day' with investment decisions being postponed because of uncertainty about what kind of settlement Britain will get from the EU.[28] As the Times reported, this situation has 'thrown into serious doubt' whether some of the UK's biggest infrastructure projects—including the Hinkley Point nuclear power station—will go ahead.[29] Despite the new Chancellor, Phillip Hammond, signalling his support for the project, if Hinkley Point is cancelled this may mitigate some of the skills risks for the civil and military nuclear programmes highlighted above. [30]

The other danger in the parliamentary debate and vote on Successor being held now, is that it could lead the government to sign a range of expensive contracts that will lock it into billions of pounds worth of spending. These contracts could then snowball over the next few years leaving it much more difficult for future governments to change course.

#### **iv) Government management of Successor / relations with monopoly suppliers / shortages of other skilled personnel**

The size of the Successor project is such that the former top MoD civil servant Jon Thompson admitted to the Public Accounts Committee last October that it is the project which ‘most keeps me awake at night’ because it is the ‘single biggest future financial risk we face’.[31] It has been reported that then Chancellor George Osborne subsequently sought to take over the megaproject, with the Treasury at the head of a new management consortium. Osborne apparently made this move to try and ensure that the Successor programme arrives on time and does not go even further over budget—unlike the UK’s new conventionally-armed Astute subs which have been plagued by design and construction flaws.[32]

The UK’s submarine base relies on two monopoly suppliers: BAE Systems and Rolls Royce. As Peter Burt has noted, the problem of a monopolistic relationship is that ‘there are real difficulties in providing the right incentives for these suppliers to deliver to time and budget’. This was shown during the construction of Astute where ‘the cost of procured parts’ constituted ‘more than 50 per cent’ of the submarine’s value yet specialist suppliers considered leaving the submarine market ‘due to infrequent orders and poor returns’.[33]

As well as skilled nuclear workers Professor Hartley has noted that the UK's retention of its nuclear-powered submarine industrial base necessitates:

**“ a commitment to retaining the industry's specific skills, especially those skills which are not available from the broader market place and which have to be maintained within the specialist submarine industry. These submarine-specific skills include structural acoustic design, together with specialist welding and fabrication skills. Retaining this industry also requires the retention of specialised industrial facilities and supporting technologies.[34] ”**

In addition to submarine-specific skills there is also the question of, in Tom McKane's words, the 'long-standing shortage of skilled personnel to fill certain types of Royal Navy posts which are critical to the operation of the deterrent'.

[35]

### **v) Scottish independence and relocating Trident**

Trident submarines are based at the Faslane naval base in Scotland yet polls show that a majority of Scots want the UK to scrap its nuclear weapons.[36] As a study by RUSI found, were there to be another referendum whereby Scotland

voted for independence, it 'may not be politically feasible' for the UK to base its nuclear forces there.[37] In addition, relocating Trident to another base would involve significant technical and political challenges, with the government itself noting that this 'would cost billions of pounds and take many years'.[38]

The revived debate over the future status of Scotland within the UK casts further uncertainty over the viability and financial costs of the UK remaining a nuclear weapon state given its reliance on a submarine-launched nuclear weapon system. It would therefore be unwise at this time for the UK to make a multi-billion pound commitment to a weapons system tied to basing infrastructure that may be located outside of the national territory before the Successor submarines are commissioned. At the minimum, it would be prudent for the government to await Edinburgh's formal response to the invocation of Article 50.

### **Options: Keep, Scrap or Downgrade Trident?**

In addition to the costs and risks of replacing Trident highlighted above, modernising and replacing the UK's nuclear arsenal, as per current government (and Labour Party) policy, runs counter to the nation's dual responsibilities under the Nuclear Non-Proliferation Treaty (NPT): to eliminate its nuclear weapons and support the creation of a nuclear weapons free world (NWFW). There are a range of possible measures the UK could now take to realise these obligations. The most direct approach would be to opt for unilateral nuclear disarmament.

The UK also made a commitment at the 2010 NPT Review Conference to reduce the salience of nuclear weapons in its national security policy.

[39] Rethinking the UK's role in the world in line with sustainable approaches

to security would expedite a rethinking of the UK's minimum deterrence requirements, so that nuclear and other offensive forms of power are replaced by conventional and defensive capabilities.

If disarmament is deemed to be politically unacceptable at present, other options are open which could contribute to a less salient arrangement.

[40] These include the possibility of re-configuring the UK's nuclear weapons system so that it is recessed or at reduced readiness rather than continually operational. The UK should also consider changes to the other policies governing nuclear weapons, including moving to a no first use policy. This may require greater independence from the US and NATO-tasking, however.

Regarding multilateral nuclear disarmament efforts, it is important to consider how the UK may act responsibly in terms of its international actions, conventional and nuclear military capabilities and posture, to enable nuclear possessors to move towards disarmament and to reduce incentives for others to seek non-conventional deterrents.

In the case of building a NFWF, as well as national nuclear disarmament, relevant UK policies requiring review include its arms sales and nuclear energy exports to countries and regions of concern, as well as its military capabilities and use of power projection. Further conventional militarisation of NATO-Russia borders is unlikely to encourage Russia to commit to nuclear disarmament or de-escalation. Furthermore, the regime-change precedents of Iraq and Libya hardly encourage North Korea or Iran to disarm.

## Conclusion

It is now crucial that the government, before construction of the Successor mega-project has begun, carefully considers both the case for cancellation as

well as more responsible and sustainable policy options. These options should include disarmament which is, after all, a commitment the UK has made under the NPT. Given the upward trajectory of planned spending on Successor, and ongoing uncertainties about the programme's costs, a revised Major Equipment Plan and Strategic Defence and Security Review would allow the government to locate and justify spending on—and consider alternatives to building four new nuclear-armed submarines.

The UK's current state of political flux and lack of substantial parliamentary consideration of the nuclear question means that the most prudent and responsible course of action for the government would involve it ensuring a properly scheduled and informed parliamentary debate on Successor after the summer recess. The government should therefore avoid rushing through a final decision at this juncture. To do so would undermine the legitimacy of the decision-making process on such an important issue and unnecessarily commit the country to building a new generation of nuclear weapons at enormous financial, and potentially political, cost.

**For more information on the questions raised in this briefing see Oxford Research Group's [submission on Trident replacement to the Labour Defence Review and the March 2016 briefing](#) [The UK's Nuclear Future: Options Between Rearmament and Disarmament](#).**

**[Download as PDF](#)**

---

[1] BBC (2016), Trident replacement: Theresa May calls for Commons vote, [www.bbc.co.uk](http://www.bbc.co.uk)

[2] Claire Apthorp (2016), Succeeding with Successor: the UK presses on with its next-gen submarine programme, [www.naval-technology.com](http://www.naval-technology.com)

[3] Elizabeth Piper (2016), Exclusive- What cost a nuclear deterrent? Britain doesn't know yet, <http://uk.reuters.com>

[4] Crispin Blunt (2015), Figures show crippling costs of renewing Trident, [www.blunt4reigate.com](http://www.blunt4reigate.com)

[5] CND (2016), Trident replacement cost rises to £205 billion, [www.cnduk.org](http://www.cnduk.org)

[6] For further discussion on this question see Oxford Research Group's [submission](#) on Trident replacement to the Labour Defence Review.

[7] Personal correspondence

[8] Margaret Hodge (2013), Statement on Ministry of Defence: Equipment Plan 2012-2022, [www.parliament.uk](http://www.parliament.uk)

[9] According to the 2010 annual report of France's national auditors, the unit cost of the seven largest French weapon systems has risen on average by 33.9% since their launch. This includes a unit cost increase of over 50% for the production of France's four SSBNs. See: [www.defense-aerospace.com/articlesview/feature/5/112431/opposing-views-of-bae-settlements.html](http://www.defense-aerospace.com/articlesview/feature/5/112431/opposing-views-of-bae-settlements.html). As for the US, a 2015 Congressional Budget Office report on the cost of the Navy's shipbuilding programs found that the Navy has, in recent years, underestimated the cost of lead ships in new classes by a weighted average of 27%. See: [www.cbo.gov/publication/50926](http://www.cbo.gov/publication/50926)

[10] Amy Woolf (2013), Nuclear Modernization in an Age of Austerity, [www.armscontrol.org](http://www.armscontrol.org)

[11] Nick Ritchie (2011), Replacing Trident- Background Briefing for Parliamentarians, [www.york.ac.uk](http://www.york.ac.uk)

[12] Richard Norton-Taylor (2014), Nuclear weapons deal with US renewed in secret, UK confirms, [www.theguardian.com](http://www.theguardian.com). As the government explained in the 2015 SDSR, 'A replacement warhead is not required until at least the late 2030s, possibly later. Given lead times, however, a decision on replacing the warhead may be required in this Parliament or early in the next'

[13] Malcolm Chalmers (2013), Towards the UK's Nuclear Century, <https://rusi.org>

[14] Tim Street and Richard Reeve (2016), Brexit: Whither UK Defence and Foreign Policy?, <http://oxfordresearchgroup.org.uk>

[15] Julian Borger (2016), 'Trident is old technology': the brave new world of cyber warfare, [www.theguardian.com](http://www.theguardian.com)

[16] Michael A. McDevitt, M. Taylor Fravel, Lewis M. Stern (2013), The Long Littoral Project: South China Sea, A Maritime Perspective on Indo-Pacific Security, [www.cna.org](http://www.cna.org)

[17] Nick Ritchie (2010), Continuity / Change: Rethinking Options for Trident Replacement, [www.york.ac.uk](http://www.york.ac.uk); Chris Parry (2015), Labour should keep its powder dry on Trident – the debate has barely begun, [www.theguardian.com](http://www.theguardian.com); Julian Turner (2013), Deep impact: inside the UK's new Successor-Class nuclear submarine, [www.naval-technology.com](http://www.naval-technology.com)



[18] HM Government (2015), Sustaining Our Nuclear Skills

[19] Tom McKane (2016), The Challenges of Maintaining Nuclear Cultures: US and UK perspectives, [www.ifri.org](http://www.ifri.org)

[20] HM Government (2015), Sustaining Our Nuclear Skills

[21] Personal correspondence

[22] John Murray Brown (2015), Navy offers £24,000 to keep its nuclear engineers, [www.ft.com](http://www.ft.com)

[23] Andrew Chuter (2016), UK Relaxes Salary Cap To Recruit New Nuclear Chief, [www.defensenews.com](http://www.defensenews.com)

[24] Nick Ritchie (2016), Feeding the Monster: Escalating Capital Costs for the Trident Successor Programme, [www.basicint.org](http://www.basicint.org)

[25] National Audit Office (2013) The Major Projects Report 2012- Appendices and Project Summary Sheets

[26] Peter Burt (2013), Progress with the Successor submarine programme: National Audit 'Ministry of Defence Major Projects Report 2012, [www.nuclearinfo.org](http://www.nuclearinfo.org)

27 Peggy Hollinger (2016), Nuclear submarine project looks to take lessons on board, [www.ft.com](http://www.ft.com)

28 Charlie Cooper (2016), Brexit campaigners admit 'there is no plan' for what comes next as rivals plan Tory leadership bids, [www.independent.co.uk](http://www.independent.co.uk)

29 Mark Hookham and Danny Fortson (2016), Heathrow runway and nuclear site left in doubt by EU fallout, [www.thetimes.co.uk](http://www.thetimes.co.uk)

[30] Terry MacAllister (2016), Hinkley Point: new UK chancellor determined to start building, [www.theguardian.com](http://www.theguardian.com)

[31] Andrew Chuter (2013), Nuclear Sub Project Poses UK's Biggest Financial Challenge, [www.defensenews.com](http://www.defensenews.com)

[32] BBC (2015), George Osborne 'wants Treasury oversight of Trident', [www.bbc.co.uk](http://www.bbc.co.uk)

[33] Peter Burt (2009), A Replacement For Trident: Can We Afford It?, [www.nuclearinfo.org](http://www.nuclearinfo.org)

[34] Keith Hartley (2012), Defence-Industrial Issues: Employment, Skills, Technology and Regional Impacts, [www.basicint.org](http://www.basicint.org)

[35] Tom McKane (2016), The Challenges of Maintaining Nuclear Cultures: US and UK perspectives, [www.ifri.org](http://www.ifri.org)

[36] What Scotland Thinks (2014), Should Trident be scrapped or maintained?, <http://whatscotlandthinks.org>

[37] Hugh Chalmers and Malcolm Chalmers (2014), Relocation, Relocation, Relocation: Could the UK's Nuclear Force be Moved after Scottish Independence?, <https://rusi.org>

[38] House of Commons Scottish Affairs Committee (2013), The Referendum on Separation for Scotland: Terminating Trident – Days or Decades?

Government Response to the Committee's Fourth Report of the Session 2012-13, 1st Special Report of Session 2012-2013, [www.publications.parliament.uk](http://www.publications.parliament.uk)

[39] NPT (2010), Final Document, [www.nonproliferation.org](http://www.nonproliferation.org)

[40] These options are explored in Oxford Research Group's [submission](#) on Trident replacement to the Labour Defence Review

---

Image via [Pixabay](#)

---

### ***About the Author***

*Tim Street is the Senior Programme Officer on the Sustainable Security programme, with a specific focus on the UK's defence, security and conflict prevention policy. These briefings are circulated free of charge for non-profit use, but please consider making a donation to ORG, if you are able to do so.*

---

### **Copyright Oxford Research Group 2016.**

Some rights reserved. This briefing is licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Licence. For more information please visit <http://creativecommons.org/licenses/by-nc-nd/3.0/>.

### **Share this page**



## Contact

Unit 503  
101 Clerkenwell Road London  
EC1R 5BX  
Charity no. 299436  
Company no. 2260840

Email us

020 3559 6745

## Follow us



## Useful links

[Login](#)  
[Contact us](#)  
[Sitemap](#)  
[Accessibility](#)  
[Terms & Conditions](#)  
[Privacy policy](#)