Update on the Trident Successor Programme

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The programme to replace the UK's nuclear deterrent from 2028 onwards continues apace and in December 2012 the Government published its first update report to Parliament.

This note briefly examines the progress that has been made since Initial Gate on the programme was passed in May 2011, including the contracts that have been placed to date and the estimated costs of the replacement programme. It also briefly looks at wider issues such as the Review of Alternatives, which is due to report to the Prime Minister and Deputy Prime Minister in the first half of 2013, and the potential impact of the Scottish referendum on independence which is expected in autumn 2014.

Contents

1 Basic Timeline of Decisions and Reports

- December 2006 – Government publishes its White Paper *The Future of the United Kingdom's Nuclear Deterrent,* Cm 6994
- 14 March 2007- Vote in the House on the general principle of whether the UK should retain a strategic nuclear deterrent.
- October 2007 – MOD establishes its Future Submarine Integrated Project Team to work in collaboration with the MOD's integrated project Team based at Defence Equipment and Support in Abbey Wood. In conjunction with the MOD, BAE Systems, Babcock Marine and Rolls Royce were identified as the three Tier 1 partners on this programme.
- October 2010 – *The Strategic Defence and Security Review*, Cm 7948, is published. This updates elements of the 2006 White Paper.
- May 2011 – Initial Gate Parliamentary Report is published.
- December 2012 – First progress report to Parliament is published.
- 2016 – Expected Main Gate.

2 SDSR Conclusions

In line with expectations the 2010 Strategic Defence and Security Review (SDSR) concluded that the UK strategic nuclear deterrent would be retained as a key element of the Future Force 2020. As a result of the Government's value for money review, the SDSR made several recommendations, however, on changes to the successor programme in order to achieve cost savings. The basis for those changes was the overriding conclusion that minimum effective deterrence could be achieved with a smaller nuclear weapons capability. Therefore, the SDSR concluded:

- The number of operational launch tubes on the current Vanguard-class submarine will be reduced over the next few years from 12 to eight and the number of warheads deployed from 48 to 40.

- The operational stockpile of nuclear warheads will be reduced from less than 160 to fewer than 120; while the overall nuclear stockpile will be reduced from no more than 225 to no more than 180 by the mid 2020s.[1]

- Main Gate of the programme will take place in 2016.

- Continuous-at-sea deterrence (CASD) will be maintained. Breaking CASD is not considered by the MOD to be a viable means for achieving costs savings. The submarines are nuclear powered so there would be no savings on fuel, while they would also still need to be crewed when in port for safety and security reasons. A decision on the final number of submarines required to maintain CASD will be taken at Main Gate when further information on the reliability and maintenance requirements of the new submarine design becomes available.

- The service life of the current Vanguard-class submarines will be extended and the first replacement platform will enter service in 2028. This involves service-life extension of nine years, if an original 25-year lifespan is assumed.[2] It will also bring the successor programme largely into line with the US programme to replace its existing Ohio-class SSBN.[3]

- The new platform will be configured with eight operational missile tubes, instead of the originally planned 12. It had been suggested that reducing the size of the missile compartment would make a re-designed Astute-class more feasible as a potential successor platform.[4]

- The current nuclear warheads will remain viable until the late 2030s and therefore, a decision on the replacement warhead will now be deferred until 2019.[5]

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1 This decision has been considered part of UK's commitment toward disarmament, a position put forward at the NPT Review Conference in May 2010. Further information on the outcome of that review conference is available in Library Research Paper, RP10/42, *Progress towards nuclear disarmament?,* 15 June 2010

2 Assuming a 25-year lifespan for the Vanguard-class, the first submarine would have left service in 2019 (HMS *Vanguard* entered service in 1994), and in 2024 if assuming a 30-year span. The final vessel of the fleet (HMS *Vengeance*) entered service in 2001 and therefore decommissioning dates were 2026 or 2031 respectively.

3 That programme is expected to bring a new submarine into service from 2027 onwards.

4 Comment by Dr Jeffrey Bradford of King's College London on: http://kingsofwar.org.uk/2010/10/sdsr-mortgaging-the-future-to-a-war-in-afghanistan/

5 In the 2006 White Paper the Government had indicated that a decision on the replacement warhead would be taken during the post-2010 Parliament.

3 Initial Gate

Despite expectations in the SDSR that the Initial Gate of the Trident replacement programme would take place by the end of 2010, approval of Initial Gate was not announced until 18 May 2011.[6] In a Statement to the House, the Secretary of State for Defence confirmed:

> I am announcing today that we have approved the initial gate investment and selected a submarine design that will be powered by a new generation of nuclear propulsion system—the pressurised water reactor 3—that will allow our submarines to deliver our nuclear deterrent capability well into the 2060s if required [...]
>
> We have now agreed the broad outline design of the submarine, made some of the design choices—including the propulsion system and the common US-UK missile compartment—and the programme of work we need to start building the first submarine after 2016. We have also agreed the amount of material and parts we will need to buy in advance of the main investment decision.[7]

More detailed information on the decisions taken at Initial Gate was published in a separate report to Parliament. That report highlighted the following key decisions:

- A number of systems from the Astute-class submarine design 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.

- In order to take advantage of technological developments since the Astute was originally designed, the successor submarine will incorporate a new nuclear propulsion design, while also ensuring sufficient flexibility in the overall design to incorporate through-life upgrades.

- The Pressurised Water Reactor 3 (PWR3) has been chosen as the propulsion system. 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.[8]

- Work with the US on a Common Missile Compartment is 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 unit. It has been recognised that the cost of the CMC will be minimised by keeping as much of the design as possible in common with the US.

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6 Initial Gate is an investment approvals point in the procurement process which assesses the feasibility of the programme going forward in terms of time, cost and performance. Initial Gate approval is required before any programme can move into its assessment phase. Approval at Initial Gate does not ensure approval at the later Main Gate which is the main investment decision on a programme and the point at which a preferred bidder is chosen and contracts placed.

7 HC Deb 18 May 2011, c351

8 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 the extended in-service life that the PWR3 offers.

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.

- Around £8m is expected to be spent over the next three years to study in detail the requirement for investment in the UK's nuclear deterrent infrastructure.

The Initial Gate business case outlined several 'long lead' items that would be procured as part of the next phase of work, 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".[9]

The Initial Gate report to Parliament in May 2011 also indicated that contracts for other long lead items would be placed during the assessment phase, including items relating to the propulsion system of the submarine. No long lead items will be procured for the fourth boat as a decision on the size of the eventual fleet is not due to be taken until 2016.

The intention to procure a number of long lead items prior to the main investment decision in 2016 prompted criticism from a number of MPs, including Tom Brake who argued:

> It's a false start, he's [the Secretary of State] has jumped the gun. Clearly there is a commitment on behalf of the Government to assess the value for money of the Trident replacement programme. This has got to happen before components of the system are being purchased.[10]

4 Assessment Phase Progress and Contracts Placed to Date

The assessment phase has been 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 will 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 will be incorporated into the overall submarine design.

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9 HC Deb 16 February 2011, c805W

10 "Liam Fox risks Lib-Dem backlash with steel order for new nuclear sub", *The Evening Standard,* 17 February 2011

- Stage Three – detailed technical drawings for the submarine will be produced.

In its update to Parliament in December 2012, the MOD confirmed that the focus of work over the last year has been on Stage One, which is now about a third complete. Work on the production of the technical specifications for each of the submarine's constituent systems is expected to continue into 2013 and beyond.

In May 2012 framework contracts were awarded to BAE Systems, Babcock and Rolls Royce. These contracts cover the period up to Main Gate and provide an overarching structure under which rolling waves of work packages will be established. That first set of work packages, worth approximately £350m and covering the first 18 months of work on the assessment phase, were also announced. The largest contract, worth £328m, was awarded to BAE Systems for work on the overall design of the submarine. A £15m contract was awarded to Babcock for part of the in-service support package; while a contract worth £4m was awarded to Rolls Royce for work on the integration of the reactor design.[11]

In October 2012 the second set of work packages were announced. These packages cover a further 18 months of design work for BAE Systems and Babcock and are also valued at approximately £350m (£315m for BAE Systems and £38m for Babcock).[12]

Further work packages will be negotiated as work on the assessment phase progresses.

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.[13]

As an aside, the MOD also announced in May 2012 its commitment to continue investing £1bn a year in facilities at the Atomic Weapons Establishment under the current 25-year contract with AWE Management Ltd. 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 ensure we retain the capability to design and manufacture a replacement warhead should that be necessary".[14] A decision on whether to refurbish or replace the existing warhead, as part of the overall successor programme, will be made in the next Parliament.

As a result of the work packages announced under the assessment phase, the number of people working on the successor programme has steadily increased. Figures released in November 2012 confirmed that:

> there are approximately 1,100 BAE Systems and 100 Babcock Marine personnel employed on the Successor submarine programme. Work on the Successor programme is also sustaining around 600 jobs at Rolls-Royce [...]
>
> there are approximately 130 Ministry of Defence personnel employed solely on the Successor submarine programme.[15]

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11 Ministry of Defence press release, 22 May 2012
12 Ministry of Defence press release, 29 October 2012
13 Ministry of Defence, *The United Kingdom's Future Nuclear Deterrent: 2012 Update to Parliament,* December 2012
14 HC Deb 14 May 2012, c21WS
15 HC Deb 28 November 2012, c353W

5 Costs

The trident successor programme will be funded from the MOD's core equipment budget.

5.1 Cost Savings under the SDSR

The decisions set down in the SDSR are expected to reduce the costs of the nuclear deterrent by £750m over the current spending review period up to 2014-15, and £3.2bn over the next ten years (£1.2bn of savings and £2bn of deferred spending). The £750m savings over the period of the current CSR will largely come from the decision to reduce the number of missiles and warheads deployed aboard the Vanguard-class submarine.

In answer to a Parliamentary Question on 8 November 2010 the Secretary of State for Defence confirmed that the additional costs of maintaining the Vanguard-class in service would be in the region of £1.2- 1.4bn.[16] It has also been acknowledged, however, that savings achieved from the Submarine Enterprise Performance Programme (SEPP) will be used to offset the additional costs of delaying the successor programme:

> The deferral does add cost to the successor programme but we are embarking on a programme to improve the efficiency of the submarine enterprise. The savings we expect this efficiency programme to generate will more than offset any additional costs resulting from the deferral of the submarines in service date.[17]

To date no estimates have been made of the of the savings which may be accrued from reducing the deterrent fleet from four boats to three, a decision on which is expected to be made as part of the Main Gate in 2016.[18]

5.2 Costs of the Programme to Date

In December 2012 the MOD confirmed that current forecast costs for the successor programme remain within the estimates initially set down in the 2006 White Paper, ie. £15-20bn including £11-14bn for the successor platform (2006/2007 prices).

The MOD has also confirmed that 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, will be similar to the current level of around 5-6% of the defence budget.[19]

During the Concept Phase of the programme (prior to Initial Gate) the MOD estimated that the Department had spent £900m (at current prices) on the programme thus far. The overall cost of the assessment phase for the successor platform was estimated at £3bn,[20] which will equate to approximately 15% of the total value of the programme (if based on a four boat fleet).

Of that £3bn, £500m has already been earmarked for long lead items, including £380m for the propulsion, main boat systems (computer systems, hydraulic systems and atmospheric systems, the generators and the communications systems) and specialised high-grade steel

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16 HC Deb 8 November 2010, c5
17 SDSR Briefing Pack: Trident V4M: Q&A
18 HC Deb 31 October 2012, c296W
19 HC Deb 20 December 2012, c907W
20 Ministry of Defence, *The United Kingdom's Future Nuclear Deterrent: The Submarine Initial Gate Parliamentary Report,* May 2011

for the first boat, £145m for the propulsion system of the second boat and £6m for the propulsion system of the third boat.[21]

In November 2012 the MOD outlined its projections for year-on-year spending during the assessment phase, up to Main Gate in 2016:[22]

> The Initial Gate decision for the Successor Submarine Programme was announced to Parliament on 18 May 2011 at an estimated cost of some £3 billion. The latest forecast year-on-year profile of spending on the programme, out to the Main Gate investment decision in 2016, forecast by the Ministry of Defence as at 31 March 2012, is as follows:

Financial year	*Costs (£ million)*
2012-13	431
2013-14	486
2014-15	595
2015-16	695
2016-17	608

Given the financial commitments associated with the replacement of the nuclear deterrent, questions have continued to be asked about the rationality of such spending at a time of austerity and cuts across the MOD's entire conventional equipment procurement programme. In Prime Minister's questions on 17 October 2012, Sir Nick Harvey MP highlighted precisely that dilemma within the context of the Review of Alternatives which is currently underway (see below):

> **Sir Nick Harvey (North Devon) (LD):** Returning to the Trident issue, has the Prime Minister looked at the severe cost pressures facing defence at the very moment the Trident replacement has to be paid for? Joint strike fighter airplanes, Type 26 frigates, unmanned aircraft and Army vehicles all need paying for at much the same time. This has to come out of the defence budget, and austerity will be with us for some time yet, so will he keep an open mind about how exactly to replace our nuclear deterrent?
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> **The Prime Minister:** All the things that my hon. Friend lists are programmes that are fully funded and will be properly invested in, because, as he well knows—because he played a major role in it—the Government have sorted out the defence budget. Having carefully considered the issue of the nuclear deterrent, I do not believe that we would save money by adopting an alternative nuclear deterrent posture. Also, if we are to have a nuclear deterrent, it makes sense to ensure we have something that is credible and believable, otherwise there is no point in having one at all.[23]

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21 ibid
22 HC Deb 19 November 2012, c409W
23 HC Deb 17 October 2012, c319

6 Review of Alternatives

In tandem with the Initial Gate announcement, the Secretary of State for Defence also confirmed that, in order to assist the Liberal Democrats in making the case for alternatives (which was set out in the 2010 Coalition agreement), a study into the costs, feasibility and credibility of alternative systems and postures would be undertaken.

That study is being led by the Cabinet Office, with Ministerial oversight provided by the Chief Secretary to the Treasury, Danny Alexander, and was expected to take 18 months to complete. The terms of reference for the review were limited to the following questions:

1. Are there credible alternatives to a submarine-based deterrent?
2. Are there credible submarine-based alternatives to the current proposal, such as a modified Astute-class submarine using cruise missiles?
3. 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.

The outcome of the review is expected to be presented to the Prime Minister and Deputy Prime Minister in the first half of 2013. In December 2012 the MOD confirmed that "there are no plans to publish either the report itself or the information it draws upon due to its highly classified nature. It remains too early to speculate about what it might be possible to say publicly about the conclusions when the review has been completed".[24]

7 Impact of the Scottish Referendum

A referendum on Scottish independence is to be held in autumn 2014. The implications for UK defence policy, and in particular the strategic nuclear deterrent, could be far reaching in the event of a 'yes' vote as the Scottish National Party has a longstanding policy of removing nuclear weapons from Scotland.

First Minister of Scotland and Leader of the SNP, Alex Salmond, recently stated that if Scotland were to vote for independence then this policy should be enshrined in a written constitution that "should include an explicit ban on nuclear weapons being based on Scottish territory".[25] At its 2012 Conference, the SNP agreed a resolution outlining that if Scotland were to gain independence "a sovereign SNP government will negotiate the speediest safe transition of the nuclear fleet from Faslane which will be replaced by conventional naval forces".[26]

The UK Government's position on independence has remained consistent. In its January 2013 response to the Scottish Affairs Committee report on independence and the implications for the nuclear deterrent, the MOD stated:

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[24] HL Deb 19 December 2012, c301WA
[25] SNP press release, 7 October 2012
[26] http://www.moraysnp.org/p/snp-defence-policy-update.html

> The UK Government's position on the referendum on Scottish independence is clear: Scotland benefits from being part of the UK and the UK benefits from having Scotland within it. We are confident that the people of Scotland will choose to remain part of the UK and are not planning for Scottish independence or to move the strategic nuclear deterrent from Her Majesty's Naval Base Clyde (HMNB Clyde) [...]
>
> The UK Government will not pre-negotiate the departure of Scotland from the UK.[27]

That report went on to state:

> If the result of the referendum on Scottish independence were to lead to the current situation being challenged, then other options would be considered. Any alternative solution would come at huge cost. It would be an enormous exercise to reproduce the facilities elsewhere. It would cost billions of pounds and take many years. It is impossible to estimate how much it would cost to replicate the infrastructure, which would depend on many factors including timescales and the precise scope of the facilities that might be required.[28]

On the issue of jobs in Scotland specifically, the report noted:

> HMNB Clyde is the largest employment site in Scotland, with around 6,700 military and civilian jobs and this is projected to increase to around 8,200 by 2022. The Base is a major source of employment for highly skilled workers and a significant contributor to the local economy. The rise in the number of jobs over the next decade accompanies the move to base all Royal Navy submarines on the Clyde to achieve economies of scale and the greater effectiveness of collocation; this symbiosis of a submarine centre of specialisation and associated contractor and base support is a matter of pride for the United Kingdom. It is for the Scottish Government to explain how this quality and quantity of employment in the region would be matched if the enterprise had to be relocated.[29]

At its 2012 Conference the SNP also passed a resolution stating that an independent Scotland should become a member of NATO, albeit dependent upon nuclear weapons being removed from Scotland and Scotland's inclusion in the Alliance as a non-nuclear country. However, NATO's status as a nuclear alliance, as set down in its Strategic Concept,[30] has prompted criticism of this new policy, even from within the SNP itself. Eight SNP members of the Scottish Parliament called on the Conference to maintain the status quo in light of the fact that "NATO continues to be a nuclear based alliance".[31] Malcolm Chalmers, writing for RUSI, has observed:

> It would be hard to square Scotland's acceptance of the Strategic Concept with an expulsion of the UKEWNI's [United Kingdom of England, Wales and Northern Ireland] nuclear force from its bases at Faslane and Coulport. There would be a fundamental inconsistency in accepting the role of nuclear weapons in NATO's security, but demanding their rapid removal from one's own national territory. Even Germany, which has made clear that it wishes to remove US nuclear weapons from its territory, has

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27 Scottish Affairs Committee, *Government response to the Committee's Fourth report,* HC861, Session 2012-13

28 Scottish Affairs Committee, *Government response to the Committee's Fourth report,* HC861, Session 2012-13

29 ibid

30 NATO's updated Strategic Concept (2010) states that "as long as nuclear weapons exist, NATO will remain a nuclear alliance. The supreme guarantee of the security of the Allies is provided by the strategic nuclear forces of the Alliance, particularly those of the United States; the independent strategic nuclear forces of the United Kingdom and France, which have a deterrent role of their own, contribute to the overall deterrence and security of the Allies" (para 17 and 18).

31 "SNP members vote to ditch the party's anti-NATO policy", *BBC News,* 19 October 2012

> also made clear that it would co-ordinate this with NATO allies and would not act unilaterally.[32]

On this issue of NATO membership the Lords Spokesman on Defence, Lord Astor of Hever, has also stated:

> there is no guarantee that membership of NATO would be automatic. No country joins NATO and pretends that it is not a nuclear alliance. The UK's nuclear weapons are assigned to NATO, and an independent Scotland, if it were part of NATO, would continue to benefit from the nuclear umbrella that it provides. NATO's strategic concept, as agreed and reiterated by all the allies at the 2010 Lisbon summit, is that its deterrence posture will consist of both conventional and nuclear forces.[33]

The Defence Select Committee and the Scottish Affairs Select Committee, among others, have looked at this issue in some depth during recent evidence sessions. See the further reading section below for appropriate links.

8 Future Parliamentary Scrutiny

Going forward, it will be for the Government that takes office in 2015 to determine whether parliamentary scrutiny of the programme prior to Main Gate in 2016 will include a further debate and votes in the House. In July 2010 the MOD confirmed that "a decision on how best to consult will be made nearer the time".[34]

9 Some Further Reading

9.1 Library and Other Parliamentary Material

Further information on the conclusions of the SDSR and nuclear co-operation between the UK and France is available in Library Standard Note SN05757 *Trident after the Strategic Defence and Security Review.*

More background is also available in Library Standard Note SN05150 *Future of the British Nuclear Deterrent: A Progress Report,* September 2010. That note examines, among other things, the initial conclusions of the 2006 White Paper on the nuclear deterrent and the outcome of the vote in Parliament in March 2007.

Defence Committee inquiry into the Defence Implications of Possible Scottish Independence

Scottish Affairs Committee, *The Referendum on Separation for Scotland: Terminating Trident- Days or Decades?,* HC676, 25 October 2012

Government Response to the Scottish Affairs Committee's Fourth Report, 8 January 2013 and MPs reply to the Government's response, 9 January 2013.

9.2 Reports and Articles

"The price of deterrence", *The Financial Times*, 10 January 2013

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32 Malcolm Chalmers, "Kingdom's End?", *RUSI Journal,* June 2012
33 HL Deb 1 November 2012, c651
34 HC Deb 26 July 2010, c621W

Nuclear Education Trust, *Trident Alternatives Review and the Future of Barrow*, December 2012

John Ainslie, *Disarming Trident*, June 2012

Toby Fenwick, *Dropping the bomb: a post Trident future,* Centre Forum, March 2012

John Ainslie, *Trident: Nowhere to go,* February 2012

BASIC Trident Commission: http://www.basicint.org/tridentcommission