

Progress with the Successor submarine programme National Audit 'Ministry of Defence Major Projects Report 2012'

The National Audit Office's 'Ministry of Defence Major Projects Report 2012' (<http://bit.ly/U6Dmmo>) provides information on progress with the Ministry of Defence (MoD) 'Successor' submarine programme which is intended to replace the current Vanguard class Trident submarines. The report appears to give a greater level of detail on the programme than was published in the MoD report 'The United Kingdom's future nuclear deterrent: 2012 update to Parliament' (<http://bit.ly/ULdWbU>), which was published in December. This note outlines the state of play with work on the Successor programme based on information which is revealed in the National Audit Office report.

Programme structure

The Successor programme is being run as a number of sub-programmes covering submarine design, design of a new PWR3 nuclear propulsion plant, and design of a 'common missile compartment' which will house the Trident missile launch tubes in collaboration with US submarine designers. The sub-programmes are as follows:

- Future Submarines.
- Next Generation Nuclear Propulsion Plant.
- Nuclear Propulsion Critical Technology.
- Common Missile Compartment (Non-Recurring Costs / Assessment Phase).

Within these sub-programmes work is broken down further into different projects and contracts covering specific areas of work.

The National Audit Office report gives expenditure to date on each of the sub-programmes at the Concept Phase (prior to the 'Main Gate' decision) and the Assessment Phase (between the Initial Gate and Main Gate decisions).

Management of the Successor Programme is the responsibility of the Mod Future Submarines Project Team and the Senior Responsible Owner for the programme within MoD is Vice Admiral Sir Andrew Mathews, Chief of Materiel (Fleet) Royal Navy and Chief of Fleet Support on the Navy Board.

The National Audit Office Report also gives a status report on the 'Core Production Capability' Project, which is a separate but related project to refurbish the Rolls-Royce submarine reactor production plant at Raynesway, Derby, so that it can continue to produce reactors for the Navy's future submarines, including Successor submarines.

Spending to date

The report states that total expenditure at 31 March 2012 on the entire Successor project (as defined by MoD for the concept phase and assessment phase combined) was £1103 million.

Forecast spending on the Assessment Phase was £3037million, against an approved budget of £3016 million (a forecast overspend of a minimal £21 million).

The budget for the Successor project, at £3016 million, is by far the largest of the nine assessment phase projects examined by the National Audit Office, with the next largest budget being for the Type 26 global combat ship (£158 million).

The MoD's approach to the Successor programme

- Spending on the Successor programme has been slowed down as a consequence of the Trident Alternatives Review and the target in-service date for the first of the new submarines to enter service is 2028. The National Audit Office report states: “An option was taken during the 2011 Planning Round to defer the Successor In-Service Date and modify build delivery rate. Astute build drumbeat was revised to match Successor revised In-Service Date.”
- MoD is hoping that construction of Astute class submarines, currently being built by BAE Systems at Barrow, will “de-risk capability essential for an affordable Successor deterrent programme”, and the programme will build on Astute class technology. The Audit Office report states: “Initial Gate considered the Submarine design using pull through of Astute technology to reduce cost and design and delivery risk, and provide commonality in training and maintenance. There were also opportunities to take advantage of developments since the Astute design”.
- Submarine design activities are underway in the BAE Systems shipyard at Barrow where a design team of around 1000 staff is working on the Successor project. Design work “commenced under an extension of the Concept contract while the full Design Phase and Engineering services framework contracts were finalised and signed with BAE Submarine Solutions and Babcock on 13th December 2011. These cover the period up to Main Gate and consist of an overarching framework structure with rolling waves of task packages. A contract amendment to align with these contracts was also placed with Rolls-Royce. A Collaborative Agreement between all three companies and the MOD was also signed. This governs the relationships between industrial parties' performance and profit retention”.
- Reactor design work is being undertaken by Rolls-Royce. With regard to the new reactor design for the submarine, the report says: “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.” Does this give a hint that expertise in submarine reactor design has declined since development of the Navy's last submarine reactor (PWR2 Core H) and will this pose a risk to delivery of the programme?
- Another possible area which may pose problems in future is the number of personnel available to work on the programme. According to the National Audit Office, “Staff resource remains a challenge for the MOD in the face of overall MOD cuts.”
- The report includes assessments of 'technology readiness levels' for MoD major projects currently in the assessment phase – another area of potential risk identified by the National Audit Office - but the technology readiness levels for the Successor project are said to be classified and are not published in the report.
- In order to control costs over the entire life of the submarines, MoD is working with

Babcock, the company responsible for providing in-service support to submarines at Royal Navy dockyards, to consider servicing and maintenance issues. The Audit Office report states: “The Support Chain Strategy is in preparation, and engagement has started. The aim is for optimised, affordable Through Life Support with established Whole Life costs and challenging availability targets. The target is to have a Whole Life Cost that does not exceed that of the current Vanguard class and ensure maintenance of the Continuous At Sea Deterrent. Drivers for change include: Long term supply chain incentivisation and reductions in design complexity and component range and scale.”

- Key to the MoD's aims of saving money and improving performance during the Successor programme is the Submarine Enterprise Performance Programme – a long-term partnership between MoD and the three main contractors engaged in the design, construction, and maintenance of its submarines: BAE Systems, Rolls-Royce, and Babcock. All three contractors have monopolies in their areas of the submarine programme and the partnership aims to provide incentives to improve the effectiveness of programme delivery by sharing cost savings between MoD and the contractors and through closer collaborative working between all partners.

Recent developments in the Successor programme

- A Review Note on progress with the programme during the year was submitted to the MoD's Investment Approvals Committee in July 2012.
- A Review Note on the Common Missile Compartment regarding the build location was also intended to be submitted to the Committee in 2012.
- Key project milestones for the year 2012/3 were to hold a Whole Boat Strategic Concept Design review and an extension of the Next Generation Nuclear Propulsion Plant contract.

Core Production Capability Project

Reactor cores for the Royal Navy's nuclear powered submarines are manufactured at the ageing Rolls-Royce plant at Raynesway, Derby, and if production at the site is to be continued the plant will require refurbishment to bring it up to modern safety standards. The core production capability project is intended to refurbish the Raynesway site and allow Rolls-Royce to retain the capability to manufacture reactor cores for the final Astute class submarines, Successor submarines, and potential future classes of submarine for the Navy.

Work undertaken to date on the project includes design of a new Manufacturing Facility and Product Assembly Building and their equipment, and enabling works for the construction sites. Although the project is included in the National Audit Office report as a project for which the main investment decision has yet to be taken, the Secretary of State for Defence announced in June 2012 (<http://bit.ly/10n2H1u>) that a contract worth approximately £1.1 billion had been signed with Rolls-Royce for an 11 year programme of work at Raynesway. Site regeneration work would cost approximately £500 million, with the remaining £600 million allocated to “sustain reactor core production at the facility” until March 2023, including production of reactor cores for Astute Class and Successor submarines.

The National Audit Office reports that at 31 March 2012 £107 million had been spent on the core production capability project, matching the budgeted figure for the project.