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NATIONAL AUDIT OFFICE

Report by the Comptroller and Auditor General

Ministry of Defence: Trident Project

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Ministry of Defence: The United Kingdom Trident Programme

Report

1. The Government announced in July 1980 its decision to purchase the United States Trident I (C4) missile system to replace the Polaris force from the 1990s. The capital cost of the total acquisition programme, including submarines, missiles and warheads, was then broadly assessed at £4,500–£5,000 million (at July 1980 prices and exchange rates). Following the subsequent US decision to replace the Trident I (C4) by the Trident II (D5) system, the Government in March 1982 announced its revised choice of the Trident II (D5) system, to be fitted in larger, improved submarines, at an estimated cost of some £7,500 million (at September 1981 prices and exchange rates).
2. Defence Open Government Documents 80/23 and 82/1 have been published to explain the background to, and various factors involved in, the decision to purchase Trident. The Defence Committee has also reported on the programme in its Fourth Report, Session 1980–81, and First Special Report, Session 1981–82. Parliament's knowledge of, and ability to comment on, the Trident programme therefore contrasts favourably with the position on the Chevaline improvements to the Polaris missile system, where lack of information and accountability to Parliament was criticised in PAC Ninth Report, Session 1981–82.
3. This present report summarises the results of my initial review of project management and financial control aspects of the Trident acquisition programme. The project is, of course, in its early stages and when the study was being undertaken the Ministry of Defence (MOD) were in the process of implementing general changes to improve their management arrangements for sea systems procurement, including Trident. Costs and progress were also being reviewed as part of the process leading up to formal endorsement of the programme requirements and as a basis for future control.
4. The Trident acquisition programme comprises the construction of four nuclear-powered ballistic missile submarines; the provision of missiles and nuclear warheads, and associated building works and research and development programmes; and the supply of necessary training, support and refitting facilities. The US will supply the missiles and associated strategic weapons systems equipment, certain warhead-related components and services, and missile preparation and refurbishment services; the remainder of the programme will be carried out by the UK.
5. The decision to acquire Trident II (D5) was made on the basis of a November 1981 estimate of total project cost amounting to £7,520 million, including some £1,100 million for contingencies; the latest estimate available at the time of my

Programme costs

review, based on a report in February 1983, was £6,984 million (all figures at September 1981 prices and exchange rates). The reduction was attributable to the decision to prepare and refurbish missiles in the US, thus saving an estimated £500 million on the provision of capital facilities in the UK; there will also be long term operating savings estimated at some £700 million. Of the total estimated costs of £6,984 million, approximately £4,200 million was expected to be incurred in the UK and some £2,800 million in the US.

6. Areas of particular uncertainty in the present figures include the provision of associated works services where assessments are tentative pending the preparation of firm plans for the various works concerned; extra mural warhead costs, where total requirements have not yet been defined; and the Tactical Weapons System, where the requirement is also still under detailed consideration.

7. The project estimates, including the contingency provision, are currently being reviewed as part of the process leading up to formal endorsement of the programme requirements.

8. There are some areas of expenditure associated with the Trident project where costs are not included in the programme estimates. For example, the US obligation to offset the cost to the UK of manning Rapier air defence systems for US airforce bases in the UK will be discharged by part of the reduction in the UK contribution to US research and development costs on Trident. Nor does the programme include any contribution to new production and research facilities at AWRE Aldermaston (estimated cost £250–£300 million) which are required for purposes other than Trident but on which Trident in-service dates depend. Improvements to construction facilities at Vickers Shipbuilding yards in Barrow in Furness, which will be used partly for Trident, are being financed from public funds through loans and public dividend capital. However, MOD informed me that, were there not a Trident programme, almost all of the projected £200 million investment, of which £25 million is being provided as loans from Defence Votes, would still be required to sustain the yard as a builder of modern warships.

9. Generally the Trident costing, which includes the cost of the weapons platform and armaments and associated training, support and refitting facilities, is unusually comprehensive compared with those for conventional projects.

10. Financial approval had been given by end March 1983 to commit a total of £486 million on Trident up to 31 March 1984, including £209 million in the US. Expenditure up to 31 March 1983 amounted to £88 million, of which £65 million had been spent in the US.

11. These figures include the expenditure on contracts and other commitments on advance Trident I (C4) procurement incurred before the revised choice of the Trident II (D5) system. Though action was taken in 1981 to minimise such commitments pending final decisions on the choice of systems, MOD estimate that unavoidable nugatory expenditure will amount to nearly £18 million at 1982–83 prices and exchange rates. This provisional loss was noted in the 1982–83 appropriation accounts, Class I, Vote 2. The final amount will not be known for some time and will depend on negotiations on the US contracts and the disposal value of materials procured.

12. MOD have stated that expenditure on Trident is expected to total £200m by the end of 1983–84 and to reach its peak at the end of the decade. The programme as a whole is expected to absorb some 1–1½ per cent of the defence budget during

Expenditure and commitments

Spread of expenditure

the build-up in the first half of the 1980s, some 5 per cent at the end of the decade when expenditure will be at its height and then remain at about this level during the early 1990s before declining.

Project management

13. General oversight of the Trident project is exercised by the Trident Group comprising the Chief of Naval Staff, Chief of Defence Procurement, Chief Scientific Adviser, Controller of the Navy (C of N), Chief of Fleet Support and Deputy Under Secretary (Navy). In 1982 a Trident Watch Committee, chaired by C of N, was established at senior level to maintain a regular review of progress and report upwards as necessary. Subject to the responsibilities of Controller R & D Establishments, Research and Nuclear Programmes for warhead procurement, the procurement aspects of Trident are managed as a sea systems project under C of N.

14. Overall management is the responsibility of the Chief Strategic Systems Executive (CSSE) who is also responsible for the Polaris and Chevaline programmes. His responsibilities specifically include the design and construction of the new class of SSBN submarines; procurement and introduction into service of the Trident weapon system; and the construction of all necessary support facilities. To carry out these responsibilities, he co-ordinates the work of other Navy directors, including the staff of the Chief of Fleet Support, and through them the staff of the Property Services Agency, on support and building works. He also co-ordinates the work on warhead development and production. He liaises with the US on strategic weapon system development and procurement. He reports regularly to the Trident Watch Committee and the Trident Group.

15. Following an in-depth review of the Sea Systems Controllerate in 1982, the CSSE's responsibilities have now been extended by the transfer to him of total technical and financial accountability for SSBNs, strategic weapons systems and submarine launched strategic ballistic missiles. This action draws further together responsibility for overall co-ordination of the project and its line management, although CSSE does not have similar accountability for the tactical weapon system or the propulsion plant.

16. Though they have yet to be tested thoroughly in practice, generally the arrangements described above should provide a framework for effective management of the Trident programme. Although because of the complexity of the project it will not be possible to place complete financial accountability for the equipment procurement aspects of the project on one individual below the Chief of Defence Procurement, MOD have taken steps to establish clear lines of responsibility for both technical and financial aspects of the programme, with necessary co-ordination and liaison between the various interests involved. In this respect the management arrangements are significantly more satisfactory than those for the early stages of the Chevaline project (PAC Ninth Report, Session 1981-82, paragraphs 7 to 9).

17. Financial control of major defence projects is based on MOD instructions which take account of the principles recommended in the Downey Report in 1966. These have been progressively developed to control complex and technically advanced projects throughout defined stages of their development, and to provide reliable estimates of costs as a basis for decisions on further work. Previous PAC reports have endorsed the Downey principles of strong central project management, cost estimating, control and monitoring.

Financial control

18. MOD is pursuing these principles for Trident in accordance with its own instructions. The special nature of the project, including the US arrangements and its scale and complexity have created difficulties, however, in complying with the Downey recommendation that development should be carried out in distinct stages. Although MOD normally aim to do this, ensuring that heavy commitments are not entered into before Staff Requirements for major areas have been costed and approved, individual elements of the Trident project are necessarily at different procurement stages and the Ministry have found it necessary to enter into significant financial commitments in advance of formal endorsement of the Naval Staff Requirement.
19. MOD have stated that these commitments were either in areas, such as submarine design, where firm decisions had been taken very early in the project, in advance of formal endorsement of the Staff Requirement in order to ensure that planned deployment dates would be achieved, or were made necessary by the planned closure of US production lines. The commitments were consistent with the overall programme as already approved by Ministers. MOD have also stated that their procedures for major weapons systems projects provide for work on particular sub-systems to proceed if necessary in advance of the formal endorsement of the overall Staff Requirement to facilitate overall system integration. In such circumstances strong central co-ordination and control is necessary and MOD have taken steps to establish this for Trident.
20. The range of operational and financial options available has been affected by entry into an existing US programme since the specific parameters of the Trident II (D5) strategic weapon system and missile are determined by the US. Most of the contracts let to date are on a cost plus basis, which is MOD's usual practice for the early stages of a major development project.
21. CSSE is responsible for ensuring a proper system of financial monitoring and reporting over the Trident programme as a whole. A Trident Finance Office has been established with the aim of providing comprehensive financial management and secretariat services for the submarine, missile system, support and refitting aspects of the project, and ensuring the necessary co-ordination and liaison with those responsible for the warhead and building works aspects. Accounting responsibilities have been clearly defined.
22. Particularly important features of Trident financial monitoring and control are the preparation and updating of the Trident Cost Plan and the arrangements for measuring progress against approved programme "milestones" (see below). The first issue of the plan, originally intended for July 1983, was expected to be issued before the end of 1983. This will give a costed breakdown of all main elements of the Trident programme, relating approved budgets to predicted and actual expenditure profiles. It will also link cumulative expenditure projections to technical milestones, thereby enabling costs and physical progress to be monitored jointly. The plan will be updated annually, with quarterly reviews as the basis for regular briefs to the Trident Watch Committee.
23. Physical progress on the Trident programme is being measured at the top level against more than 200 technical milestones which specify dates for completion of major key events in the timely introduction of the system into service. There are additional programmes for co-ordinating work in the US and within each separate element of the project. So far there has been virtually no slippage reported on the early stages of the main parts of the approved programme. Some minor delays have occurred but MOD informed me in December 1983 that the programme was on schedule.

...for other projects, the existing MOD vote accounting system does not provide for Trident expenditure to be readily identified in the published appropriation accounts. To co-ordinate and monitor expenditure the Trident Finance Office relies on periodic returns from a wide range of spending branches. These returns vary in format and coverage. MOD are considering alternative accounting methods with the aim of enabling the Trident Finance Office to identify expenditure centrally at an earlier stage.

25. In addition to financial reporting within MOD, costs and progress on Trident will also be reported periodically to PAC as part of the agreed arrangements for submitting information on all major defence projects.

US arrangements

26. The estimated cost of some £2,800 million to be incurred in the US will come mainly under the provisions of the Polaris Sales Agreement, covering such matters as supply of hardware and services; pricing; the basis for UK contributions towards research and development and other costs; payment arrangements; documentation and audit. The remainder of the US expenditure will be incurred under the 1958 US/UK Defence Agreement covering the uses of atomic energy for mutual defence purposes, which embraces the exchange of information and the transfer by sale of materials and equipment. The Polaris Sales Agreement, which generally provides for the UK to purchase missiles and equipment on the same terms as they are acquired by the US Government, and thus provide significant advantages to the UK, has been only slightly amended to cover the sale of Trident II (D5).

27. On Trident the UK will contribute a fixed sum of \$116 million in US fiscal year 1982 dollars (actual payments being subject to adjustment for inflation) towards US research and development costs, payable over 10 years from 1988. The UK will also pay an administrative overheads surcharge. MOD estimate that the total UK contribution towards US costs, including the estimated cost of the associated provision for UK manning and support of USAF Rapier air defence systems (paragraph 8 above), is significantly less than the amount that would have been payable had the US insisted on a contribution pro rata to the UK share of Trident production. MOD informed me that there is an understanding that the waiver by the US of charges for Trident II went further than was required to offset the cost of the USAF Rapier manning and support agreement and that the residual element of that waiver would be used by the UK to reinforce its efforts to upgrade its conventional forces.

28. As with Polaris, the Trident arrangements do not provide for penalty or cancellation charges in the event of significant changes in UK or US requirements; nor for offset provisions under which the US will purchase UK equipment. UK manufacturers are, however, allowed to compete on the same terms as US firms for all Trident II weapons system sub-contracts. MOD are assisting UK contractors who wish to tender for such work.

29. Expenditure in the US is funded under the trust fund arrangements prescribed in the Polaris Sales Agreement and used also for Chevaline. These provide for MOD to advance sums to the US on the basis of quarterly estimates of expenditure. No interest is payable on any balance of funds not required, and there is thus the same need to ensure accurate forecasting and to avoid the build-up of unused advances as was referred to in the case of the US Foreign Military Sales (FMS) arrangements which were the subject of PAC Third Report, Session

1980-81, paragraphs 18-22. The subsequent agreement by the US to create an interest-bearing account for funds not required as working balances in the FMS trust fund (which remains non-interest bearing) does not extend to Polaris. MOD informed me that important differences between the Polaris Sales Agreement arrangements and those governing FMS transactions are that Polaris advances are deposited directly into the Polaris trust fund, and that they do not include funds to meet possible termination liabilities which are required by the US in all FMS cases.

30. A review of the US funding arrangements by MOD internal auditors, completed in 1983, noted that the quarterly funding required under the Polaris Sales Agreement resulted in significant unused balances during the quarter. On certain broad assumptions they calculated that — had interest been payable — the balances during the 2½ years to mid 1982-83 might have earned interest of some \$4.1 million (\$3.4 million Polaris: \$700,000 Trident). Internal Audit pointed out that the issue had become even more significant given the predicted rise in UK expenditure on Trident. MOD are continuing their checks on deposits with the aim of achieving minimal balances at the end of each funding period.

Audit of US expenditure

31. Expenditure from the trust fund is audited by US navy auditors, who report annually to MOD whether expenditure has been reasonably and properly incurred. A clear certificate for the period 1 October 1980-30 September 1981 was furnished in January 1983. A final certified statement of actual expenditure will be furnished by the US Government as soon as possible after the complete discharge by the US of its obligations under the Polaris Sales Agreement.

32. The Agreement also provides for audit of the US records by representatives of the British Government. MOD's normal policy on overseas purchases is to rely on the supplying Government's own audit arrangements, and no audit visits to the US under the Agreement have taken place during the past 11 years. In view of the substantial sums involved in the Trident purchases, however, MOD are planning to resume audit visits in concert, it is hoped, with US navy auditors.

33. The PAC have previously been informed of, and welcomed, an assurance by a previous C&AG that the General Accounting Office of the US had confirmed that the internal audit resources of the Defense Department were deployed as fully on contracts for the UK as on those for the US; and that the GAO applied the same selective or test audits to UK and US programmes. Nevertheless, I intend to review the arrangements for my staff's audit of US expenditure on UK Trident procurement, taking into account any changes in the extent of direct MOD audit and assurances received from the GAO.

Conclusions

34. The results of this initial review of the framework of control being established for the Trident programme suggest that — with all the qualifications and uncertainties that attach to the early stages of a project of this size, complexity and timescale — MOD are seeking from the outset to introduce sound organisation, firm project management and effective financial control and reporting systems. The latest cost projections are significantly lower than the original estimates in real terms ie excluding inflation and exchange rate variations; and though there are areas of uncertainty in these figures the main elements appear to be as firm as can reasonably be expected at this stage of the programme. Physical progress appears to be largely on target. Inevitably at this stage of the project, however, there are some risks in all elements of the programme.

35. Specific aspects highlighted in this report which are important for future control of the Trident project include the role of the Trident Group and the Trident Watch Committee (paragraph 13); the strengthening of the role and responsibilities of the Chief Strategic Systems Executive (paragraph 15); adherence as far as possible to the Downey principles for project management and control (paragraphs 17 to 19); the timely preparation and review of the Trident Cost Plan (paragraph 22); improvements in accounting methods to ensure accurate recording and monitoring of Trident expenditure (paragraph 24); and the arrangements for funding and audit of expenditure in the US (paragraphs 29 to 33).