THE
UNITED
KINGDOM
TRIDENT
PROGRAMME
THE UNITED KINGDOM TRIDENT PROGRAMME

On 15 July 1980 my predecessor announced the Government's choice of the Trident submarine-launched ballistic missile system to replace the United Kingdom's current Polaris-equipped strategic deterrent force. He also published Defence Open Government Document 80/23 "The Future United Kingdom Strategic Nuclear Deterrent Force" which set out in detail the reasons which led the Government to the conclusion that the Trident system was the right choice for Britain. It is worthwhile repeating here the main message of that document.

The basic question which it asked was whether the possession of an independent and invulnerable strategic deterrent by this country would make an attack, whether conventional or nuclear, by the Soviet Union on us and our NATO allies more or less likely. The Government's view is that there is no doubt about the answer, and five successive Governments have taken the same view. Deterrence, and preventing war, is a matter of showing that the risks involved in starting a war are seen by a potential aggressor as far greater than any possible gains he could hope to achieve. The striking power of our nuclear forces provides the risk of appalling damage to him — more damage than we believe any rational being could regard as acceptable as the price to be paid for a military adventure in Europe.

In saying this, we do not in any sense mean that the United Kingdom deterrent is in some way a substitute for the American nuclear guarantee; the United States has consistently shown by its maintenance of strong conventional and nuclear forces in Europe that it sees its own security as indissolubly linked to the security of our continent. The integrity and vital importance of that commitment are not in doubt. But, and it is worth saying again, deterrence is a matter of the perception of the potential aggressor and the presence of an independent deterrent under the absolute control of the British Prime Minister greatly multiplies the risk to any potential aggressor of starting a war in Europe. Those who argue that the expenditure on Trident would be better devoted to strengthening our conventional forces must consider whether a future Soviet leadership are more likely to be deterred by an invulnerable second strike submarine-launched ballistic missile force or, for example, by two extra armoured divisions with 300 additional tanks (even if this were a sensible alternative) given that the Warsaw Pact already out-numbers NATO in tanks by some 30,000.

The Government's decision was endorsed by the House of Commons on 3 March 1981. The Open Government document, and evidence given by my officials and myself to the Defence Committee of the House of Commons, made it clear that a number of details of the design of the new submarines which would carry the Trident missiles remained to be settled.

The Government has published (1) the texts of letters exchanged between the Prime Minister and President Reagan providing for the United Kingdom to buy from the United States the Trident II (D5) missile system, rather than the Trident I (C4) system as had been envisaged under our previous plans. This document explains that decision, and our other related decisions on the Trident submarine design. Taken together, our decisions mean that our replacement strategic deterrent force will spend more time at sea and less in the dockyard, be less vulnerable to detection by our enemies, and be significantly easier to maintain.

The Government has already shown in a number of ways that it attaches great importance to helping wider understanding and more informed public debate of major defence issues, particularly in the field of our nuclear forces. This memorandum is a further step in that endeavour; the Government believes it shows clearly why the decisions it has reached on the configuration of the United Kingdom Trident submarines, and the Trident II missile system, are the most cost-effective way of maintaining well into the next century an effective independent strategic nuclear deterrent force, which is in itself a vital contribution to the preservation of peace.

JOHN NOTT
Secretary of State for Defence

Ministry of Defence
March 1982

Defence Open Government Document 82/1

(1) Cmd 8517
1. The Government's decision to replace our existing Polaris submarine-launched ballistic missile nuclear deterrent force with the Trident I (C4) missile deployed in a new generation of British-built submarines was announced on 15 July 1980. The policy background to the decision was explained in Defence Open Government Document 80/23, published on the same date.

2. That document made clear that before detailed decisions were taken on the design of the submarines further studies and discussions with the United States authorities would be required. In evidence to the Defence Committee of the House of Commons (1), the Defence Secretary and his officials explained that, so far as the new generation of strategic missile-carrying submarines (SSBNs) was concerned, the principal decisions which remained to be taken related to the size of the hull, both in terms of the diameter of the boats and the number of missile tubes to be installed in each, the nuclear propulsion plant to be adopted and the design of the "tactical weapons system". This latter is the complex of sonars and other defensive aids which make a major contribution to ensuring that the submarines will be able to remain undetected, and hence invulnerable to preemptive attack, while they are maintaining their deterrent patrol. The studies have now been completed.

3. The second development since the Government's announcement of its plans for the Trident force in July 1980 has been the decision of the United States Government, announced in October 1981, to develop the Trident II (D5) submarine-launched ballistic missile with a view to its deployment by the United States Navy from 1989. The final United States' decision on the D5 programme had previously not been expected until 1983 at the earliest. And their announcement, while at first sight introducing an additional complicating factor to be taken into account in our studies, nevertheless was very welcome since it meant that the development of our plans for the United Kingdom Trident force could proceed against the background of firm knowledge of the United States' long term programme for sea-based strategic missiles.

(1) Published as Minutes of Evidence taken by the Committee in its Fourth Report 1980/81 (HC 36) on Strategic Nuclear Weapons Policy
Figure 1

NUCLEAR POWERED BALLISTIC MISSILE SUBMARINE

CENTRE SECTION
Missiles

REAR SECTION
Propulsion system

FRONT SECTION
Accommodation, Galley, storerooms and operations complex - sonars, communications, computers and torpedoes

Figure 2

SUBMARINE HULL COMPARISON

POLARIS A3 MISSILE

TRIDENT I MISSILE

TRIDENT II MISSILE

33 FT
PRESENT 'R' CLASS SSBN

34 FT
MODIFIED 640 CLASS SSBN

42 FT
OHIO CLASS SSBN
4. Broadly speaking, nuclear-powered strategic ballistic missile carrying submarines (SSBNs) can be divided into three sections:

- The Front Section, which includes the operations complex, accommodation, galley, offices and store-rooms and also the tactical weapons system;
- The Centre Section, which contains the strategic missiles in their tubes;
- The After Section, which contains the propulsion system of the submarines.

This is shown in the diagram in Figure 1.

5. In reaching its conclusions on the final configuration of our submarines, the Government had to make technically complex decisions about the design of each of these sections.

(a) The Front Section

6. The decisions to be taken on the front section of the submarine involved the tactical weapon system – that is, principally, the boat's sonars. In order to meet the standards of invulnerability required from a strategic nuclear deterrent, the submarines must be able to detect any potentially hostile surface ship or submarine at very long range in order to be able to take the necessary evasive action in good time. The assumption made at the time of the July 1980 announcement was that our new generation of SSBNs should be fitted with the tactical weapons system being installed in the nuclear-powered hunter-killer submarines (SSNs) which we are now building. Further studies have shown, however, that while this current system (which is based on technology 10 to 15 years old) would, with some modification, be capable of countering adequately the threat from potentially hostile ships and submarines in the 1990s, it would allow little scope for improvement in order to meet advances in the threat which might occur later in this century or early in the next. It has therefore been decided that improved sonars which are being developed should also be adopted for our new strategic submarines. These new equipments will provide a significantly improved defensive capability for the submarines, and one which will have the potential for further improvement to counter increased Soviet capabilities during the life of the force. As well as the improved detection aids, each of the submarines will have torpedo tubes for self defence.

(b) The After Section

7. The main equipments in the after section of the submarine are the components of the propulsion system. This consists primarily of a nuclear pressurised water reactor (PWR) to generate steam and turbines which provide the boat's motive and electrical power. We had originally planned to fit the new generation of SSBNs with the pressurised water reactor (PWR 1) which is being installed in the SSNs we are building now.

8. But we have under development a new reactor and propulsion system – PWR 2 – to power the next class of our SSNs. This development programme is designed primarily to give longer reactor core life (that is, the fuel in the reactor will require replacement less frequently), reduced operating noise as compared with the current system, increased power and even better nuclear safety than existing reactors. The first two of these factors are particularly important for the maintenance of a continuous and invulnerable deterrent. The longer core life of PWR2 would allow the period between refits of the submarines to be lengthened considerably, thereby increasing significantly the operational availability of the boats and offering the possibility of a reduction in the total number of refits. It would also provide a substantial reduction in the through-life costs of the force. Boats equipped with the PWR2 system would be able to operate much more quietly than current generation submarines, and this increased quietness would not only make them more difficult to detect, but also, by reducing the background noise against which their sonars have to operate, make the boats' own detection systems more effective. The degree of invulnerability of the boats would therefore be improved in two ways by the adoption of PWR2; this would be particularly valuable in the context of possible improvement in Soviet anti-submarine capabilities during the life of the force.

9. In the light of all these advantages that boats powered by PWR2 would have as compared to those powered by current generation propulsion systems, the Government has therefore decided that it makes sense for our replacement SSBNs to be equipped with the PWR2 system. Given the increase in operational availability of our boats which this decision will bring about, we have concluded that it would no longer be sensible to consider having a five-boat force, despite the increased insurance against accidental loss or damage which this would provide. We are therefore planning on having a four-boat force.

(c) The Centre Section

10. The final decisions to be made on the submarine concern the centre section of the hull which contains the missile tubes and control systems. The diameter of the submarine hull required depends critically upon the choice of missile that should be carried, both initially and at any later stage in the life of the force. Its length depends on the number of missiles each submarine is to carry.

11. The feasibility studies which we have undertaken in the United States since July 1980 (and which were not possible before the Trident decision had been announced) have been of great help in reaching decisions on the diameter of the submarines. The original Ministry of Defence studies had pointed to the conclusion that the United Kingdom Trident force should be deployed in a new class of submarine, whose missile compartment would be based on that of the United States' 640-class submarine which currently deploys its Poseidon and Trident I (C4) missiles. The subsequent feasibility studies have shown that the straightforward incorporation of the 640-class missile compartment into our new submarines would not in fact be practicable because much of the equipment associated with this design of compartment will soon be out of production. We should either have to re-design the 640-class missile compartment to accept "OHIO class" equipment (the OHIO being the first of the new United States' class of larger submarines designed to carry both versions of the Trident weapons system), and this would involve a risky and expensive United Kingdom programme, or ourselves adopt a missile compartment based on the OHIO design. A comparison of our present "Resolution" class Polaris boats, 640-class boats and OHIO class boats is shown in Figure 2.

12. Choice of the Trident II missile system would make it essential to opt for the larger diameter hull based on the OHIO class. But even if we remained with Trident I it would still make sense to opt for the larger diameter hull in order to retain the flexibility to switch, if necessary at some later stage, to a later missile whether it be Trident II or some successor system. To adopt the 640-class hull would mean that we should be constrained to run on our
strategic force with the Trident I missile for at least 20 years after the system had been withdrawn from service with the United States Navy. The logistic and other problems which such a course would entail would be enormous, and extremely expensive to resolve (this dimension of the problem is explained in more detail in Section III). The Government has therefore decided that the new United Kingdom SSBNs should be built with a missile compartment diameter based upon that of the United States OHIO class submarines.

13. The other question is the number of missile tubes the submarines should carry and hence their length. As Defence Open Government Document 80/23 noted, judgements as to the optimum number of missiles which each submarine should be equipped to carry involved compromise between different factors. Amongst these, the fact that we shall only be able to guarantee one boat on patrol all the time means that we must ensure that the missiles carried by that boat are in themselves sufficient to pose a credible deterrent. Given that missile tubes are arranged in groups of 4, our choice was between 12 and 16 tubes (the United States OHIO class submarines have 24, but we do not believe we need boats of this size). Clearly, the final choice of missile to be deployed is a major factor in deciding upon the number of missiles to be carried, and this aspect of the submarine’s design is therefore considered in more detail in the next section of this document.

3 - THE CHOICE OF MISSILE

14. The background to our decision that a ballistic missile was the right choice for the Polaris replacement was explained in considerable detail in Defence Open Government Document 80/23. But there has been increasing comment to the effect that a solution based upon cruise missiles would in some way be cheaper than Trident, and this has been heightened by the United States’ decision to deploy sea-launched cruise missiles in both nuclear and conventional roles on its submarines.

15. It is important to remember that the United States’ programme for nuclear-armed submarine-launched cruise missiles does not form part of their main strategic force programmes. Their cruise missiles are intended to augment, rather than replace, their submarine-launched Trident missiles. Nevertheless, on the face of it, cruise missiles might indeed appear to provide a cheaper solution than Trident for the United Kingdom. However, closer examination shows that this is not the case.

16. Leaving aside operational problems involved with cruise missiles, such as their comparatively short range (which means the submarines have less sea-room in which to hide), the fact remains that each cruise missile carries only one warhead, as compared with the multiple warheads of Trident. For a given striking power, therefore, one must deploy very many more cruise than ballistic missiles. And in order to deploy them continuously in submarines (so as to provide an invulnerable deterrent) one must therefore have many more submarines. Given the high cost of the submarines themselves (the largest single element in the programme) this means that a cruise missile force would both cost more to build than a ballistic missile force and also be significantly more expensive to run. The alternative of installing very small numbers of cruise missiles on our existing hunter-killer submarines (SSNs) also makes little sense; apart from the doubtful deterrent value of such a small force, the role of the SSNs as our most powerful anti-submarine warfare (ASW) system is totally incompatible with that required of a strategic deterrent force, both in deployment area and nature of operations. To hold back our SSN force for a strategic role would effectively make it impossible for it to fulfil its crucially important ASW function. On grounds of cost alone, therefore, we remain convinced that the Trident solution is the best choice for the United Kingdom.

17. The rationale behind our decision that our replacement ballistic missile should be Trident I (C4), which has been in service with the United States Navy since 1979, was also set out in our Open Government Document. In essence, this was that C4 was a tried and tested system already in service, whose long range and multiple independently-targetable re-entry vehicles (MIRVs) would give excellent long-term insurance against advances in Soviet anti-ballistic missile defences. In particular, the Open Government Document noted (paragraph 51) “The Trident system is likely to remain in United States service for many years to come, during which all the economies of commonality will be available to us”. It also noted (paragraph 53) that a concept for a large submarine-launched ballistic missile known as Trident II (D5) was being studied in the United States, although the United States Government was then not expected to decide for another two or three years whether to proceed with the D5 programme. In these circumstances, the only option available to the United Kingdom was to plan on the basis of the adoption of the C4 missile.

18. In the event, the United States Administration decided to advance the timing of the Trident II programme. On 2 October 1981, President Reagan announced his decision to proceed to full development of the Trident D5 missile as part of a package of measures designed to modernise the entire range of United States’ strategic nuclear forces. It was planned that the first deployments of the new missile by the United States Navy would take place in 1989. President Reagan has also made it clear to us that he would be willing to make the D5 system available to the United Kingdom should we decide that we wished to adopt it, rather than the C4, for our next generation strategic deterrent.

19. The Trident D5 missile system will be an evolutionary development of the existing Trident C4 system consisting of a multi-stage solid fuel ballistic missile with multiple independently-targetable re-entry vehicles. It will be significantly larger than the C4 missile and will have the option either to carry the same payload a much greater distance and with greater accuracy or to carry its maximum payload to a range approximately the same as that of Trident C4.

20. While the advancement of the United States’ decision introduced a further complicating factor into our studies on the final configuration of our Trident programme, it was nevertheless welcome, since it enabled our planning to be
out against a background of certainty as to American intentions and in the knowledge that the D5 system would be made available to us should we require it.

21. The United States Government has not announced the date by which it expects to have replaced all its current SSBNs by the OHIO class submarines deploying D5, but it has made clear that it expects to continue ordering OHIO class submarines at the rate of one a year at least until 1987. Taken with the 9 already in the programme, this indicates that the United States Navy will be likely to withdraw their last Trident C4 missiles from service in the latter part of the next decade, only a few years after, on current plans, the system would have been introduced into United Kingdom service. This would mean that shortly after we had introduced the first of our Trident boats into service (and probably before we had completed the introduction of the force), we would be faced with the prospect of being the sole operators of C4. This position of "uniqueness" gives rise to a number of logistic, operational and financial penalties which are discussed below.

Penalties of Uniqueness

22. The penalties resulting from uniqueness stem in the main from two causes. The first is that of logistic support of the weapon system, where we would increasingly have to make judgements on our own future programme without the benefit of detailed United States advice based on their own continuing experience from deploying C4. The second results, paradoxically, from the very high priority that the United States give to their strategic nuclear forces. While we retain commonality we get all the benefits that accrue from that priority; if we became unique we would only get such services which the Americans could fit into their programme and we could afford to pay for.

23. Age-related problems occur in Polaris and are bound to occur in Trident as in any other weapon system, but the wide range of advanced technology involved means that they can be numerous and varied. Their significance is exacerbated by the high reliability required from the strategic deterrent force — the system must be available for launch at short notice for months at a time over a period exceeding a quarter of a century. No other weapon system has to meet such a demanding requirement.

24. So far as Polaris is concerned no problem resulting from uniqueness has yet proved impossible of solution albeit at a price — and the recent decision to re-motor the missiles shows how high such a price can be. But there is a long way to go and, by the mid-1990s we will be dealing with a system designed 40 years before, with the components extremely difficult to reproduce and with many of the original manufacturers either out of business or with no interest in re-involvement in technology now obsolete. The United States have ceased their comprehensive programme of operational test firings, and we can only afford to fund a very limited series of firings. It was missile motor failure shown up in the United States' test programme which led directly to our decision to re-motor Polaris. It is because we are becoming unique that we have had to take that decision alone and will have to fund the entire cost of the programme; we could otherwise have depended on the United States' need to maintain the reliability of its own inventory both for the assessments of the technical problems and for a major share in the funding of the re-motorising programme.

25. The United States first deployed Trident C4 in 1979. If we were to purchase it with a view to deployment in our new SSBN force we would be many years further behind their Trident programme than we were with Polaris. Current operational test firings show the system is very reliable and experience indicates that it should remain so into the 1990s. But as a United Kingdom unique system its ability to remain so for a further 25 years or more without re-motorising or other deep refurbishment must be questionable. Furthermore, with the pace of modern technology it would seem to be imprudent to exclude the possibility of a need to improve the Trident C4 missile in the 2000s to counter improved Soviet capabilities. The costs and technical risks associated with such programmes to the United Kingdom, acting alone, are impossible to quantify so far ahead, but would be high by any standards. Again our experience of the Chevaline system shows just how expensive the resolution of problems in this field by programmes unique to the United Kingdom can be.

26. If the United Kingdom were to adopt the Trident D5 rather than the Trident C4 missile for its next generation SSBNs, we would expect to retain commonality with the United States' system throughout its projected service life. This would give us continued assurance of weapon system reliability without the large investment programme which would be required to provide an equivalent degree of assurance with a weapon system unique to the United Kingdom. We should also benefit from significantly reduced operating costs as compared with those of a United Kingdom unique system.

27. The estimated costs of a Trident D5 programme are set out in detail in Section IV. But the additional capital cost of adopting the D5 missile compared with C4 is assessed at September 1980 prices as some £390M, or about 7 per cent of the total programme. It is difficult to assess precisely the likely cost penalties resulting from the problems of uniqueness if we were to remain with C4, particularly since the timescale involved stretches over 30 years or more. But as indicated in paragraph 25 experience with Polaris has underlined the probability that in addition to the increased support costs involved if we opted for C4 we should need to undertake some sort of mid-life improvement programme. With a smaller-diameter submarine this could only be a United Kingdom—unique programme; with an OHIO-class hull initially equipped with C4 a switch to D5 at a later date would be an alternative possibility. But even in the latter case the total programme cost over the life of the force would be much greater than those of an initial deployment of D5, not least because two complete sets of missiles would have to be installed in the submarines over the lifetime of the force.

28. On the basis of cost-effectiveness, therefore, the Government believes that it is now sensible to adopt the Trident D5 system for our next generation strategic nuclear deterrent. By doing so, we shall avoid the cost and other penalties which uniqueness brings; as a corollary we shall obtain all the benefits that commonality with the United States will provide.

The Number of Missile Tubes

29. As was noted in paragraph 13, it was not possible to reach a judgement on the number of missile tubes to be fitted in each submarine until a decision had been reached on the missile to be carried. As was made clear to the House of Commons Defence Committee, we believe that the Trident C4 missile carried in submarines with 16 tubes would be adequate for our deterrence needs. Since the design of the D5 missile should give it the ability to carry up to 14 warheads compared with the maximum of 8 carried
on C4, a similar deterrent capability to the originally planned C4 force could be achieved by deploying a smaller number of D5 missiles at sea. We therefore considered whether we should build the new submarines with only 12 missile tubes rather than 16 (a design with less than 12 tubes is not practicable).

30. Such a reduction in the size of the submarines would save about £80M on the capital costs of the Trident submarine programme as a whole. Although a large enough sum in itself, this is a relatively small proportion of the total cost of the force (see Section IV). Moreover the larger number of tubes would provide flexibility to cope with any possible improvements in Soviet anti-ballistic missile defences throughout the life of the force. For this reason, and bearing in mind the relatively small cost premium involved, the Government has decided to build the new generation of submarines with 16 tubes. However, this should not necessarily be taken to imply that we are currently planning to deploy the maximum number of missiles and warheads that will theoretically be possible as a result of this decision. While it has been the practice of successive Governments not to comment on the number of missiles and warheads carried by our SSBNs at any given time, in view of the implications for both our deterrent requirements and the cost of the programme, we feel it right to make clear that the move to Trident D5 will not involve any significant change in the planned total number of warheads associated with our strategic deterrent force in comparison with the original intentions for a force based on the C4 missile system.

Wilder Implications of the Choice of Trident D5

31. As noted earlier, the Trident D5 missile will be more accurate than Trident C4, and this increased accuracy gives D5 the ability to attack land-based missiles in hardened silos. It has therefore been characterised by some as a “first strike” weapon — that is, a weapon which is designed to be able to destroy an opponent’s land-based strategic missiles, even inside their hardened silos, before he has a chance to fire them. The Government wishes to make it absolutely clear that the increased accuracy of the Trident D5 system played no part in its decision to adopt the modern system. Indeed, even if a United Kingdom Government had any thoughts of a first strike capability, simple arithmetic demonstrates that it is totally beyond its grasp. The fire power of the British force with maximum D5 payloads would be sufficient to target only a very small proportion of the Soviet ICBM silos. As has been said, Trident C4 would be sufficient for our deterrent needs. It is important to be clear about this, since the reasons behind the United Kingdom and United States decisions to deploy D5 are very different. The reasons for our choice are those set out in this document; essentially they hinge on the retention of commonality with the United States Navy. The purpose of the United States in deploying the more accurate Trident D5 missile is to make it clear that it has the ability to use its nuclear weapons, from invulnerable submarine platforms, against different numbers and types of targets including specifically military targets. This is made possible by the increased accuracy of the more modern missile. Their policy is designed to underline NATO’s capability for flexible response, which is entirely defensive. It is not in any way to provide a “first strike” capability or to make “limited nuclear war” easier or more likely; neither the United States, the United Kingdom nor NATO as a whole subscribes to either concept.

32. Throughout its detailed studies of the configuration of the United Kingdom’s Trident programme, the Government has had in mind developments in the field of arms control between the United States and the Soviet Union. The Geneva negotiations on reduction in intermediate range nuclear forces (INF) are now underway, and the Strategic Arms Reduction Talks (START) are expected to begin later this year. Both of these are bilateral United States–Soviet negotiations, the objectives of which are to establish a stable equilibrium between the two superpowers at reduced levels of force and risk.

33. We have made it clear that we do not believe that a unilateral renunciation of our strategic nuclear deterrent would have anything but an adverse reaction on the prospects for peace. Our decision to adopt the Trident D5 system, rather than C4, does not alter this simple fact. The role of a British Trident force, like Polaris, is essentially that of an ultimate strategic deterrent. Thus even if the Geneva negotiations on INF were of a multilateral nature, the United Kingdom Trident force would not be relevant to them, as those negotiations are concerned with sub-strategic land-based forces.

34. As in the SALT I and SALT II negotiations, the British nuclear deterrent will not be considered in the forthcoming START talks. These are also bilateral negotiations between the United States and the Soviet Union and, as President Reagan has stated, their objective must be to bring about reductions to a level of parity between those two countries. This basic principle of strategic parity between the United States and the Soviet Union is the only acceptable approach to strategic arms control; any attempt by either side to achieve in these negotiations a position of superiority over the other will condemn the talks to failure. For his part, President Reagan had made clear that the United States does not seek superiority.

35. Furthermore, even with the adoption of the D5 missile the number of warheads deployed on the British strategic force will account for no more than a very small fraction of the total size of the strategic nuclear forces maintained by the United States and the Soviet Union, as would have been the case with C4. The British force will, however, be of the minimum size compatible with ensuring a cost-effective deterrent at all times. If these circumstances were to change significantly, e.g. if Soviet military capabilities and the threat they pose to the United Kingdom were to be reduced substantially, we would of course be prepared to review our position in relation to arms control. But this point would appear to be a long way off.
Figure 3
TRIDENT COST COMPARISONS (£M)
(TOTAL COST – £7500 M.)

Figure 4
TRIDENT II (D5) PROGRAMME : MAIN COST ELEMENTS
TOTAL COST : £7500 M.
36. At the time of the July 1980 public announcement of our Trident programme, it was made clear that the costs for the proposed Trident force could not be estimated in close detail at that stage — further discussions were needed with the United States authorities, and several decisions remained to be taken about the design of the submarine. The broad cost of the programme at the price levels then prevailing, was assessed at £4,500—£5,000M. Subsequently, in evidence to the Defence Committee of the House of Commons, the Secretary of State for Defence explained that the options under consideration for the final configuration of the Trident programme varied in cost by about £1,000M between the most expensive and the least expensive.

37. The further work on refining the alternative programmes since July 1980 has of course had an impact on our assessment of their cost. At September 1980 prices, the £4,500—£5,000M figures of our public announcement is £4,600—£5,125M. (Prices and exchange rates prevailing in September of each year are used in the Ministry of Defence's annual review of its forward expenditure programmes; prices on September bases are therefore used in the remainder of this document). At September 1980 prices, we now estimate that the Trident C4 force in 640-class submarines we originally planned would cost some £5,100M, within the bracket we estimated after our original, and limited studies. The improvements to the propulsion and sonar systems together with the adoption of the OHIO-class hull (all of which would, as has been explained, be incorporated even if we were staying with a Trident C4 force) bring the cost of the C4 force up to £5,600M. The increment for the adoption of Trident D5 rather than C4 is £390M, giving a total for the D5 force of £5,990M (as compared with our original estimate for the basic C4 force of £4,600—£5,125M) thus falling within the range of options described to the House of Commons Defence Committee.

38. But, as has been explained, these figures are on the price base of September 1980. They also assume the then prevailing exchange rate of $2.36 to £1. Clearly, inflation since September 1981 and the strengthening of the dollar against the pound have had a significant impact on the estimates. Changing the basis of the estimate from $2.36 to £1 to $1.78 to £1 (the September 1981 rate) adds some £700M to the estimated cost of the project. Of course, the exchange rate could always move again in the opposite direction. When allowance is made for exchange rate changes and inflation, and the cost is brought up to September 1981 price levels, the total cost of the D5 force on the terms agreed with the United States Government becomes £7,500M. The composition of the cost increase is shown in Figure 3; of the total cost, at September 1980 rates, only some £390M, or about 7 per cent results from the decision to move to D5. At September 1981 rates, the figures are £570M and 7.6 per cent. (It must be borne in mind that these figures relate only to the capital costs of the programme; the decision to adopt D5 can be expected to provide substantial cost savings over the life of the force as a whole.) An approximate breakdown of the capital expenditure is:

35 per cent — Submarines (less weapon system equipment)
17 per cent — Missiles
17 per cent — Weapon system equipment (including tactical weapons and strategic fire control systems)

8 per cent — Shore construction

This is shown in the diagram in Figure 4. The remaining 23 per cent covers warhead design and production, miscellaneous items and unallocated contingency.

39. The cost of Trident must be recognised as providing a complete system, including all support and training facilities. Moreover, the capability which Trident will provide for the cost must be seen against the background of the cost of other capabilities funded from the defence budget. Figure 5 shows a comparison of equipment expenditure on the strategic deterrent over the next 15 years with that of other capabilities. The attributions to the various capabilities are very broad since equipment with more than one role can often be used in more than one function. It must also be made clear that there is no simple relationship between what we plan to spend on our main capabilities and the relative importance of each.

40. Nevertheless it is clear from Figure 5 that the planned expenditure on the strategic deterrent can in no way be described as excessive in relation to other capabilities. It is also interesting to compare (Figure 6) the cost of the Trident D5 programme (£7,500M) with that of the Tornado project which, costing on the same basis, is £11,300M. Over a fifteen year period in each case, Trident is likely to take a smaller proportion of the defence budget than was the case with Tornado, and also a substantially smaller proportion of the equipment budget. The Government remains totally convinced that no other way of spending the money which we shall spend on Trident could contribute as significantly to deterrence and hence the maintenance of peace.

41. So far as the impact on the defence budget is concerned, we estimate that the Trident D5 programme will cost on average around 3% of the defence budget over the period during which it will be introduced into service. No exact forecast of year-by-year phasing is possible at this stage, but we expect expenditure to reach its peak in the later 1980s. Broadly, the programme as a whole might absorb some 1-1½ per cent of the defence budget during the build-up in the first half of the 1980s, some 5 per cent (and some 10 per cent of the equipment component) when heavier spending builds up in the late 1980s, and then remain at this level during the early 1990s.

42. Given the movement in exchange rates since July 1980 and the decision to adopt Trident D5, the dollar element of spend in the programme has increased from around 30 per cent to something under 45 per cent. However, this assessment is based on the current pattern of procurement. Under the agreements negotiated with the United States Government, the United Kingdom’s purchase of Trident D5 is to be accompanied by American agreement to allow United Kingdom firms to compete on the same terms as American firms for sub-contracts for weapons systems components for the Trident D5 programme as a whole. This, together with other steps to be taken by the United States, will mean that in the final analysis the dollar impact of the United Kingdom’s acquisition of Trident D5 will be affected by the success with which United Kingdom firms can exploit these new opportunities. Moreover our decisions on the improved tactical weapons fit, propulsion system and the OHIO class hull will mean that British industry will now receive an additional £550M worth of work on Trident as compared with the £3,650M envisaged in our previous plans.