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CABINET

A DEFENCE SUPPRESSION WEAPON FOR THE ROYAL AIR FORCE

Note by the Secretary of the Cabinet

The Prime Minister has instructed me to revise the paper attached to C(83) 22, on the facts and issues on the choice of a defence suppression weapon for the Royal Air Force, in the light of the revised proposals put forward by British Aerospace and Lucas Aerospace referred to in a minute by the Secretary of State for Defence (MO.26/7 dated 15 July).

2. The revised note is circulated herewith for consideration by the Cabinet.

Signed ROBERT ARMSTRONG

Cabinet Office

21 July 1983

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A DEFENCE SUPPRESSION WEAPON FOR THE ROYAL AIR FORCE

Note by Officials

Requirement

The Royal Air Force have a requirement for a missile capable of suppressing the radars and electronic components of missile defences. Without such a missile the new Tornado aircraft, which from 1985 will be equipped with the airfield attack weapon JP233, will be unable to penetrate the air defences which the Warsaw Pact is expected to deploy without suffering very high attrition rates.

2. The requirement is for 750 missiles, possibly increasing to over 1,000 if funds are available.
3. The United States also plans to deploy aircraft equipped with modern defence suppression weapons. Other NATO countries have expressed interest in such weapons, but none has yet taken a decision.

Options

4. The choice is between two missiles - HARM is a missile already developed in the United States which will be produced for the United States Forces by Texas Instruments (TI). Proposals have been made under which an element of final development and a substantial part of production to meet a British order would be carried out in the United Kingdom by British firms under the leadership of Lucas Aerospace, though the high technology homing-head would be supplied entirely from the United States. The cost of 750 missiles would be £254 million (all figures in 1982/83 prices); of this 53 per cent would be on a fixed price basis, and the final price paid for the remaining 47 per cent would be the same as the United States Forces would pay. The cost for 1,000 missiles would be £309 million. These estimates assume an exchange rate of £1 - \$1.59. Under the original offer which assumed a firm order being placed by 1 April 1983, sufficient missiles for an initial operational capability could

have been delivered by September 1986 - the In Service Date (ISD) - with the full 750 order being completed by January 1991. TI have advised that these dates now have to be slipped in step with the delay in signing the contract, which would mean an ISD of January 1987. It would be possible to purchase HARM entirely from the United States at a slightly lower cost, estimated at £235 million for 750 missiles or £292 million for 1,000 missiles, though with a fixed price element of only 10 per cent; but since the cost saving would be small and there would be no involvement of British industry, this option is not considered further.

5. TI/Lucas have recently offered two additional options, both of which have the necessary United States Navy approval, but would also require the endorsement of the Administration as a whole. The first is an invitation to United Kingdom firms to compete for the production of microwave sub-assemblies worth about 20 per cent by value of the homing-head; the second is to set up a United Kingdom HARM homing-head repair depot at TI's United Kingdom subsidiary at Bedford.

6. ALARM is a missile which would be developed by British Aerospace Dynamics in conjunction with Marconi Space and Defence Systems (part of GEC), Thorn-EMI and other firms. Some early development work has been done at both the firms' and Government expense and British Aerospace have very recently offered a fixed price development and production contract at a total cost of £291 million for 750 missiles and £360 million for 1,000 missiles (compared with their earlier offer of £388 million for 750 missiles and £426 million for 1,000 missiles). The contract would provide for enough missiles to achieve an initial operational capability to be delivered by August 1987 and for deliveries to be complete by September 1989. Failure to deliver the first 100 missiles on time would render British Aerospace liable to liquidated damages of up to £0.4 million (a similar premium would be payable by the Ministry of Defence for early delivery).

Uncertainties

7. The choice of missile is complicated by a number of uncertainties. These affect delivery and operational capability, final cost and export potential.

8. Sharing the order between HARM and ALARM would be the most expensive course of all, and we have not considered it further in this paper.

Delivery and Operational Capability

9. The Americans have demonstrated that HARM works, but the missile will not necessarily be capable of dealing with improvements in Warsaw pact defences in the 1990s without itself being improved. ALARM is as yet undeveloped, but the concept is more advanced than HARM: it incorporates the latest technology, particularly in software, and would therefore be more readily capable of being enhanced to deal with improvements in Warsaw Pact defences in the 1990s (although there must also be some uncertainty as to how the threat develops and what will be needed to meet it). We should be able to develop it to meet our own requirements and should not be dependent on improvements which the Americans might decide to introduce in HARM.

10. But there must be a question mark over the ability of British Aerospace and its sub-contractors to develop ALARM to an acceptable standard in the four years which they have allowed. Past experience of weapon developments, both in the United Kingdom and the United States, suggest that a six-year development programme would be more realistic. The contractor's development plan is based on optimistic assumptions and allows virtually no time for the solution of any serious problems that arise. There is a risk of some slippage in deliveries. This has to be weighed against the financial incentive on the firms to deliver on time and the need to supply the RAF with an operationally fully acceptable weapon. If nevertheless delays occurred and the RAF had to face a conflict without an adequate weapon, it would take between 6 and 12 months, assuming full United States co-operation, to adapt the RAF Tornado to operate HARM.

11. On final cost the ALARM programme on the face of it has a greater degree of certainty than HARM, since 97 per cent of the work would be on a fixed price basis subject only to increases due to inflation. As is usual under such arrangements, it is the contractor who would be liable for all increases in cost caused by delays or failures on his part to meet the agreed programme; this could cost him up to £3 milion for every month overrun. British

Aerospace could be expected to exploit every opportunity to overturn the fixed price contract, but the Ministry of Defence would be obliged to meet additional costs if, and only if, delays arose from Government failure to provide trials or other facilities. The Ministry of Defence regard British Aerospace's new offer as acceptable from a contractual point of view. It involves the company absorbing development and production costs at a saving to the Ministry of Defence of £97 million in return for a higher unit price to the Department for any missiles bought beyond the original 750. The effect is that the cost is reduced by comparison with the previous offer if less than 1,620 missiles are bought and increased if the total purchased is higher than 1,620 (though the offer does not imply any commitment by the Ministry of Defence to buy more than 750).

12. The final price of HARM is not within our control, since we should have to pay the same price for the homing-head, which would be manufactured in the United States, as would be paid by the United States Forces themselves. The cost could therefore increase if improvements were introduced to meet the requirements of the United States Forces, or be reduced if the United States Department of Defense secure savings in the price. The cost differential between HARM and ALARM is also subject to fluctuations in the real exchange rate of the pound against the dollar. For a 5 per cent change in the rate the cost differential on 750 missiles would change by about £10 million.

13. Export prospects are also unclear. If the United Kingdom purchased HARM, Lucas would have an excellent opportunity to export the components which they would be making in Britain to the United States for incorporation in missiles which would be assembled there for delivery to United States Forces and to export customers for HARM. They would have the right to compete with United States suppliers for United States domestic and export sales expected to total 25,000 missiles. Their share of the work, providing they were competitive, has been estimated at about 10 per cent, equivalent to 1,550 missiles. Prospects for exports of ALARM are uncertain. HARM will be a powerful rival, particularly for those countries who already have United States aircraft and missiles: and the United Kingdom's past success rate in selling British weaponry against direct United States competition is not

encouraging. The new price quoted by British Aerospace implies that the company are expecting that exports (and additional purchases by the Ministry of Defence) will determine the financial success of the project. The Ministry of Defence believe that British Aerospace could at best hope to win some 25-30 per cent of the third country market, ie some 1,250-1,500 missiles. The Treasury judge it more likely that there would be no export business for ALARM, particularly if it proves to be uncompetitive on time and price.

Effect on British Aerospace

14. There is a wider problem in relation to British Aerospace. The Treasury point out that, as well as the additional costs from any slippage, the contribution that the company will in effect be making to the development cost of ALARM will come at a time, mainly over the next 3 years, when their cash flow will probably be under considerable pressure from other projects. The company's revised offer is based on their confidence that these development costs will be covered by additional sales revenue. If, as a result of slippage, or other reasons, it becomes apparent that these receipts will not materialise, their cash flow problems will be exacerbated. In such circumstances the Government must expect to receive a somewhat lower dividend on its 48 per cent shareholding, and also to face demands from British Aerospace for alleviation in other areas (eg pressing for follow-on orders for ALARM on other defence contracts or greater launch aid for civil projects). In view of the the risk, the Treasury feel that British Aerospace should be asked formally for a financial appraisal and how precisely they expect to be able to secure a sufficient return to meet the cost of their price reduction.

15. The Department of Trade and Industry, on the other hand, consider that it would be improper for the Government to require such an appraisal as a means of defending its interests as a shareholder of British Aerospace. Such a course would run counter to assurances given in the 1981 Prospectus (offering British Aerospace's shares for sale) that the Government did not intend to use its rights as a shareholder to intervene in the company's commercial decisions. Furthermore the Department of Trade and Industry note that the additional financing burden which might fall on the company as a result of the price reduction or any cost overrun would be relatively less

significant than the calls which other projects (Advanced Combat Aircraft, A 320 and existing programmes) might make on the company's funds over the relevant period. The Department of Trade and Industry have no reason to doubt the financial prudence of British Aerospace's management: they believe it is for British Aerospace itself to judge how far ALARM is essential to the company's future and to balance risk against ultimate return.

Technological factors

16. The development of ALARM would be one way to retain in the United Kingdom a capability in homing-head technology. Marconi is the only British firm with this capability. They have successfully developed a number of missiles and are at present engaged in completing the homing-head for the airborne anti-ship missile Sea Eagle. The ALARM programme would provide continuity and keep the present development team together.

17. Homing-head technology will be of great and increasing importance in modern weapon systems as the emphasis switches to "fire and forget" missiles. Their value was demonstrated in the Falkland Islands conflict (Exocet is such a missile) but will be even more vital in the sophisticated electronic environment in which NATO would have to fight any future battle against the Warsaw Pact.

18. There is no real risk in the foreseeable future that the United States will either cease developing weapons of this sort or would refuse to supply them to a major NATO ally such as the United Kingdom. The Ministry of Defence nevertheless judge it essential on defence grounds to retain in this country a homing-head and guided missile technological base. Moreover, if British industry loses such a capability it will become progressively less able to compete in the market for modern weapon systems both for our own forces and for export.

19. The Ministry of Defence considers that much the most effective way to maintain this capability would be to develop and manufacture ALARM. No other programme using anti-radar technology is ready to go into development: in the absence, therefore, of an order for ALARM the expertise in British

industry would be endangered and perhaps lost. The Treasury, on the other hand, believe that it would be possible to preserve the capability in British industry for relatively modest expenditure, by bringing forward national work on other future missile projects and by financing a supporting programme in key aspects of missile technology. The Department of Trade and Industry consider that a decision in favour of ALARM would be an excellent example of a public purchaser supporting important technology and would be consistent with the Government's policy of buying British when British industry is competitive in terms of price, performance and technology.

20. Another possibility would be to arrange with the Americans a form of collaboration on the HARM programme which would give British companies the necessary technological benefits. The further options offered by TI (see paragraph 5) which would provide work on the homing-head and a repair facility in the United Kingdom, albeit at significant extra cost, would not add significantly to the United Kingdom national technology base. The question remains whether an attempt should be made with the United States Administration to secure more extensive collaboration on the homing-head to give British Industry the high technology work. The Ministry of Defence believe that the chances of success are slight, and even if successful the extra cost would remove most, if not all, the remaining cost advantage of HARM over ALARM and would set the in-service date at risk. Nevertheless, exploring this possibility further would be relevant if the operational considerations referred to in paragraphs 9 and 10, rather than cost, were considered the determining factor in favour of a purchase of HARM rather than ALARM.

Employment considerations

21. The ALARM programme would generate some 9,400 man years of work over 7 years in British industry. The employment would be mainly in the London area, the South of England and Lancashire. HARM would generate some 3,500 man years of work over 8 years, mainly in Lancashire and the West Midlands. In both cases, the value of export potential in job terms is assessed as about 5,000 man years, but the calculation is difficult and cannot be stated with any great precision. The combined effect of the additional TI/Lucas options would amount to some 1,150 additional man years' work in the United Kingdom (750 of them at TI Ltd Bedford), at an extra cost of some £25.5 million.

Budgetary considerations

22. On the basis of present estimates the ALARM programme would cost £37 million more than HARM, a margin of some 15 per cent. However, in the Public Expenditure Survey (PES) years 1984-85 to 1986-87, ALARM would cost £98 million more than HARM. To accommodate these extra costs would require adjustments. Nevertheless, on the basis of the Government's existing commitment to 3 per cent growth in defence expenditure up to and including 1985-86, the Ministry of Defence believe that they can absorb the extra costs, averaging over £30 million a year, without substantial detriment to the rest of the programme.

International aspects

23. We have argued firmly with the Americans - in the pursuit of a better balance of trade in defence equipment between the United Kingdom and the United States - that each side should be willing to buy from the other when a competitive product exists, on which research and development has been completed, and which meets the military requirement. Our efforts have had considerable success. Since 1975 defence sales to the United States have doubled in real value and the adverse trade imbalance has improved from 3.1:1 in 1976 and 4.4:1 in 1978 and to 1.5:1 in 1980 and about 2:1 in 1982 (this contrasts with a balance between the United States and Europe of about 8:1). Notable successes during that period have been the sale of Rapier (£153 million), combat support boats (£20 million), medium girder bridge (£70 million), head-up displays for combat aircraft (£113 million), ship stabilisers (£16 million), AV8B (the British Aerospace/McDonnell Douglas development of the Harrier - at least £500 million). There are good prospects of maintaining the balance at current levels at least over the next 2 years or so.

24. On the face of it, the substantial reduction in British Aerospace's price for ALARM should go a long way towards removing the criticism in the United States which could have resulted from a decision not to buy HARM. But there remains a risk that the extent of the price reduction could in itself lead to attacks in the United States on its credibility, and TI are known to be very unhappy about the way in which this reduction was produced at the last minute. There may therefore remain a substantial risk of continued

criticism, particularly in the United States Congress, in the event of a decision not to buy HARM, the consequences of which could be to undermine the efforts which our friends in the Administration and Congress have been making to secure a change in American attitudes to purchases of defence equipment from Britain.

25. A decision to purchase HARM would not of course guarantee favourable treatment for other prospective sales of United Kingdom defence equipment to the United States ; the protectionist tides in Congress are strong. There remains the possibility that criticism of a decision in favour of ALARM could affect other British sales interests although explicit linkage between this decision and specific United Kingdom sales is perhaps unlikely. Prospective British sales to the United States include the Hawk trainer (£750 million) on which a decision in principle has been taken, additional Rapier (£50 million), additional combat support boats (£22 million), 81 mm mortar (£250 million), Searchwater radar (£50 million), and ICS3 (a naval communications system - (£50 million)) - figures in brackets are approximate. Crucial decisions on some of these items - eg Searchwater and perhaps Hawk - could be made before the end of this year.

Conclusion

26. The choice to be made turns on four key factors, and a judgement has to be made about the weight to be attached to them individually and in the round. They are -

- a. operational capability (in the short and in the longer term);
- b. financial aspects;
- c. importance of indigenous technological capability;
- d. the international dimension.

27. On operational capability the main questions are -

- a. in the long term ALARM can be more readily enhanced to deal with improvements on Warsaw Pact defences: decisions on improvements to HARM will be in the hands of the Americans (paragraph 9);
- b. in the short term the risks involved in the development of ALARM could lead to a period when the RAF's ability to penetrate Warsaw Pact defences would be reduced (paragraph 10).

28. The financial aspects can be summarised as follows -

- a. at present prices, HARM costs £37 million less than ALARM: the final cost difference could be less or more depending on relative inflation in the USA and United Kingdom, exchange rate movements and changes in the requirement (paragraphs 11 and 12);
- b. British Aerospace's latest offer reduces their income from the project by some £85 million over 5 years: this raises questions of the risks which the company can appropriately bear and the wider implications for the Government (paragraphs 14-15);
- c. purchasing ALARM would put some extra pressure on the defence budget in the PES years and could involve adjustments in other areas (paragraph 22).

29. The importance of indigenous technological capability, together with the related question whether the ALARM programme is the best way of retaining it, is a matter on which Departments differ. Departments agree that homing-head and guidance technology will be of increasing importance in modern weapon systems. They disagree on whether the ALARM programme represents the only effective way of preserving the technology (paragraphs 16-20).

30. The international dimension, following the revised offer by British Aerospace, consists primarily in the negative effects which a decision to buy ALARM might have on prospective sales of British defence equipment to the United States (paragraphs 23-25).