

Ministry of Defence

# Building an Air Manoeuvre Capability: The Introduction of the Apache Helicopter



REPORT BY THE COMPTROLLER AND AUDITOR GENERAL  
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# executive summary

*"I have no doubt whatsoever that the Attack Helicopter will represent the biggest single enhancement to the Army's capability for many years. It will change the way we go to battle. Now we have taken the decision to buy the Apache, the Army must ensure that doctrine is developed to allow us to make the fullest possible use of its tremendous capability."*

Chief of the General Staff, General Sir Charles Guthrie, 1996

- 1 The Westland Attack Helicopter 64 (WAH 64), known as the Apache, will improve the ability of the armed forces to conduct offensive mobile operations by delivering firepower and a level of protection that is more deployable and more mobile than existing equipments.
- 2 The decision to procure an Attack Helicopter was taken in the early 1990s. At that time, military doctrine was based on the assumption that the most likely threat to the United Kingdom was from the Eastern bloc and the Attack Helicopter was therefore seen as a direct replacement for the existing Lynx-based capability. By the time the contract for the supply of 67 WAH 64 Apache helicopters was placed with GKN-Westland Helicopters Ltd (Westland) on 1 April 1996, the perceived threat had changed and the Department had begun to develop the concept of Air Manoeuvre<sup>1</sup>. The concept has continued to evolve as the Department has sought to maximise the Apache's full potential.
- 3 The Department's original procurement strategy was based on an international competition for the off-the-shelf procurement of a complete integrated weapon system through a single prime contractor. In practice, this strategy has changed in several ways. Training services and the supply of munitions have been procured outside the prime contract. Nor is the Apache merely an off-the-shelf buy of the United States' WAH 64 helicopter. Rather, it incorporates significant changes to meet the Department's specific requirements. Most notably, the installation of the RTM 322 engine made by Rolls Royce Turbomeca was included in the original contract and several amendments covering key improvements to the baseline aircraft, such as an improved Defensive Aids Suite and Communications Suite, have been agreed since.

<sup>1</sup> Air Manoeuvre is defined as "Operations within the Land Component Scheme of Manoeuvre, seeking decisive advantage by the exploitation of the third dimension: primarily by combined-arms forces centred around and integrated with rotary aircraft supported by other component elements, within a joint framework - nationally and multi-nationally".



- 4 Introducing a major enhancement to the armed forces' capability such as Air Manoeuvre, involves considerably more than acquiring new equipment. The Department has therefore adopted an approach known as the "Six Lines of Development" to ensure that all the elements required to deliver a given capability are put in place. The Lines of Development are described in [Figure 1](#).

### 1 The Six Lines of Development

*Delivering defence capability involves more than just buying new equipment*

- 1 Delivery of the equipment;
- 2 Development of appropriate structures and infrastructure;
- 3 Development of concepts and doctrine for how the equipment will be used;
- 4 Delivery of the required training;
- 5 Recruitment and retention of manpower; and
- 6 Supporting and sustaining the new capability once the equipment has been introduced to service.

*Source: Ministry of Defence*

- 5 Given the importance of Air Manoeuvre to the United Kingdom's armed forces, this Report examines whether the Apache helicopter is being delivered in a timely manner and as a coherent package. The report examines:

- The progress being made on the programme to acquire the Apache;
- How the Department is delivering the other five Lines of Development for the Apache; and
- The management structures that the Department has put in place to oversee the delivery of the Air Manoeuvre capability.

- 6 We found that:

- Delivery of the Apache is going broadly according to plan but, not surprisingly for such a complex weapon system, some acquisition risks remain and there may be some initial gaps in capability;
- The Department is working hard to deliver the remaining Lines of Development but further risks remain; and
- Managing all aspects of delivering the Air Manoeuvre capability in a coherent manner is challenging.

- 7 Given the challenges that the Department faces in ensuring the successful delivery of the programme and the achievement of its wider Air Manoeuvre objective, we plan to report again on the programme once the capability is in operational use.

## Delivery of the Apache is going broadly to plan but risks remain and there may initially be some capability gaps

- 8 The Apache is generally being delivered to time and cost. Deliveries against the prime contract will be completed in April 2004, four months later than planned. The cost of the helicopter is currently expected to be £3.068 billion, which is £71 million above the original approved cost. This increase is due to a combination of higher than expected modification costs and the increased costs of trials. The total acquisition cost of the project, including the training package, is expected to be £4.117 billion. There is still some risk to the delivery of the Apache as development work to install a range of more recently contracted enhancements to the baseline helicopter has yet to be completed. The first 37 helicopters will require retrospective installation of some or all of the enhancements, in accordance with the contract amendments<sup>2</sup>. This should be completed by mid 2005.
  
- 9 Before the Apache can be accepted into military service it must receive a Military Aircraft Release from the leader of the Integrated Project Team responsible for delivering the agreed capability. This confirms that the equipment and its weapons systems are operationally effective and safe to use. This release is scheduled for August 2003. Whilst this is some two and a half years later than the original planned date, it is only eight months later than required by the contract amendments that introduced the latest enhancements. The Army has elected not to commence full pilot conversion training until the latest system enhancements are introduced. Achieving this date will be crucial to completing pilot Conversion to Role (CTR) training to enable the Department to achieve an Initial Operating Capability (IOC) in August 2004. Clearance of the aircraft to operate in conditions of ice is targeted for December 2006. The slippage in the Military Aircraft Release programme reflects in part the additional testing undertaken by the Trials and Evaluation Organisation (part of QinetiQ) once Westland has completed its contractually required tests. Obtaining the necessary data from the United States has also been a lengthy process, although the situation has improved since a Memorandum of Understanding was signed between the United Kingdom and the United States on 22 May 2000.
  
- 10 Problems remain with the performance of key systems on the Apache. There are problems with damage to the airframe caused by debris from both the Hellfire missile and CRV7 rockets. The Department is also working to ensure that it can fully exploit the performance of the Longbow Fire Control Radar and to overcome anomalies with the operational support of the Helicopter Integrated Defensive Aids Suite. The Department is working with the prime contractor and other industrial partners to resolve the difficulties. These issues are not currently preventing training from being conducted although some limitations have had to be imposed to ensure that this can be done safely. The Department is confident that it will be able to progress solutions to resolve these issues by the time the Initial Operating Capability is introduced in August 2004.

<sup>2</sup> The first 18 helicopters will require all the enhancements. Helicopters 19 - 37 will require some of the enhancements.

- 11 The Apache will replace the Lynx helicopter fitted with Tube-launched Optically-tracked Wire-guided (TOW) missiles. The delay in introducing the Apache capability has led the Department to extend the life of some of the TOW missiles until early 2005 at a cost of £13.9 million. The life of the TOW missiles could not be extended further and any additional delay in introducing the Apache helicopter would result in a significant capability gap.

## The Department is working hard to deliver the other key components of the Apache but risks remain

### Structures and infrastructure: Likely to be in place

- 12 The structure that will deliver the Air Manoeuvre capability, the newly formed 16 Air Assault Brigade, is in place and the necessary infrastructure works at the Army bases at Wattisham and Dishforth are either already completed or due for completion in time for delivery of the first capability. The Army's Development and Doctrine branch has made good progress in developing the framework for how Apache will be used in support of Land operations, and clear priorities and milestones for delivering the Air Manoeuvre capability have been set. More recently, however, and following the terrorist attack of 11 September 2001, the priority has shifted towards deploying the Apache in smaller detachments.

### Concepts and doctrine: How the Apache will be used is not fully decided

- 13 There has been a long-standing requirement to provide a squadron of Apache in support of Maritime operations. The nature of the requirement has changed, and these Apache will now play a role in delivering the "Littoral Manoeuvre" capability (sea-to-land operations). The Department is intending to deliver a capability in 2004 that is less than the full requirement the Navy has identified for basing the Apache at sea for long periods. Although the prime contract included requirements for Apache to operate in a maritime environment and be capable of transportation at sea, the Department's increased emphasis on the requirement for embarked operations is not reflected in the contract. The Department's risk assessment has estimated an additional £30 million cost of sending the Apache to sea which will lie with the Department. The full risks of operating at sea will not be clarified until trials are carried out in early 2004, although the Department is cautiously optimistic that it can achieve the required level of capability. There are also other issues to be resolved to deliver the required level of support for Maritime operations.

### Training: Has been delayed

- 14 Pilots, groundcrew and maintenance staff are being trained for the Apache under a separate 30-year £1 billion PFI deal with a joint venture of Boeing and Westland known as Aviation Training International Limited (ATIL). Separation of the training services from the prime contract late in the procurement has led to a split of responsibilities, and the Department has incurred additional costs of £34 million for training courses that have not run. The joint venture is delivering simulators embodying advanced technology, and high-class training facilities. However, the specified performance of the Full Mission Simulator, used to train pilots in how to fly the new helicopter, was achieved some 17 months late.

A small number of simulator software problems remain and it needs to be fitted with the specified visual system before it achieves full functionality. However, the Department was not required to pay ATIL any sums related to the Full Mission Simulator until the specified performance was achieved. The delay in delivering the Full Mission Simulator, together with the late delivery of training material and an increase in the duration of pilot training, has delayed completion of pilot retraining in 16 Air Assault Brigade from April 2004 to February 2007. There is some doubt whether the planned pilot course numbers will deliver enough trained pilots for the key milestone of delivering the Lead Aviation Task Force in February 2005.

### Recruitment and retention: The issues are being addressed

- 15** Introduction of the Apache will require a significant increase in manpower in the Army Air Corps, mainly in groundcrew and maintenance staff, and in the School of Army Aviation. The Department has identified the additional manpower required and most of the additional posts have been agreed. It does not expect there will be a shortage of aircrew to fill the pilot training programme, although experience with the United States' Apache suggests there may be a problem in retaining pilots at a later stage in the programme.

### Support: The through-life management strategy is still developing

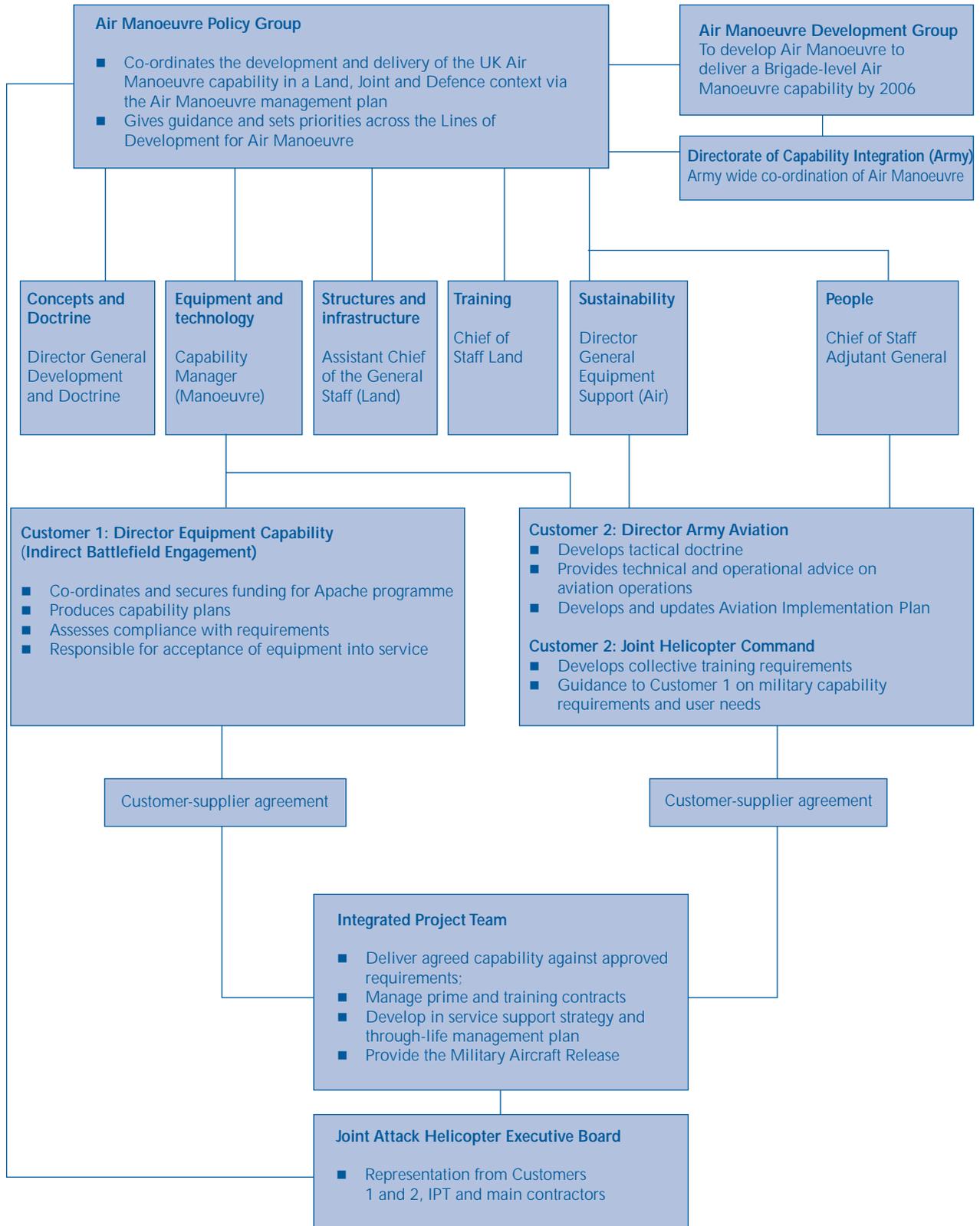
- 16** A number of elements have to be in place to provide effective support for the Apache, including arrangements for providing spares and consumable items and for repairing aircraft components and whole airframes. The Department also needs to consider the requirements for modernisation throughout the Apache's in-service life, which is expected to last until 2030. During the initial period after declaration of the In-Service Date the Apache was supported by Westland under an arrangement known as the Contractor Spares Package. The arrangement transferred the risk associated with supporting the Apache to Westland. As actual levels of flying were considerably lower than expected the outcome was a lower than expected cost to Westland. This arrangement runs out in October 2002, and the Department has still to put in place arrangements for the supply of some spares after this date. As a result of the delays in contracting for the period that follows the Contractor Spares Package there are likely to be shortages of some long-lead items. This could result in the Department having to source these items from Apache aircraft which are being held in reserve until trained pilots are available to fly them, although the spares inclusive repair contracts already in place partially mitigate this risk.
- 17** Arrangements for repair of aircraft components until 2005 are mainly in place. The Department is undertaking a review of the contractor-based maintenance policy agreed as part of the prime contract, with the aim of achieving savings of up to £1 billion in life-cycle costs from 2006. The Department is currently considering the options for major airframe repair - the preferred option being to set up a facility in the United Kingdom, at Westland's premises in Yeovil. The Department is also starting to consider the requirement to modernise the Apache in the future, although it has not yet developed costed proposals. The Department is now managing the Apache capability through a 30-year Through Life Management Plan which includes a Modernisation Plan. Under the auspices of the Memorandum of Understanding the Department is currently having discussions with the United States to explore the potential for aligning both nations' Apache support programmes.

## Managing all aspects of delivering Air Manoeuvre capability in a coherent manner is challenging

- 18** **Figure 2** shows that overarching responsibility for delivering the Air Manoeuvre concept rests with the Air Manoeuvre Policy Group (AMPG). The Group, established in March 2001, is chaired by the Assistant Chief of the General Staff (Land) and meets every six months. Each of the six Lines of Development has a senior representative on the AMPG. Responsibility for co-ordinating the equipment programme rests with the Director of Equipment Capability (Indirect Battlefield Engagement). A further key player is the Integrated Project Team (IPT) within the Defence Procurement Agency which is responsible for the manufacture, in-service support and, ultimately, disposal of the Apache. Responsibility for Army-wide co-ordination of Air Manoeuvre rests with the Director of Capability Integration (Army) who is also tasked with developing an Air Manoeuvre Capability Integration Plan.
- 19** The arrangements that the Department has put in place to oversee the Apache's introduction provide a good demonstration of its flexibility in adapting to meet changing circumstances, notably the development of the Air Manoeuvre concept and structural changes following the Strategic Defence Review. In many ways the arrangements mirror the best practice promulgated by the Office of Government Commerce. The creation of the AMPG is a significant step in taking forward the delivery of Air Manoeuvre capability generally - and the Apache in particular - in a more coherent way, and provides a very important corporate focus.

2 Management arrangements for the delivery of the Apache capability

The Air Manoeuvre Policy Group has overarching responsibility for delivering the Air Manoeuvre concept



Source: National Audit Office

# Recommendations

**20** In 2001, the AMPG set revised milestones for the delivery of Air Manoeuvre capability. The Department is confident that the milestones for delivery of a Lead Aviation Task Force by February 2005 and an Air Manoeuvre formation capable of operating in a UK Divisional context by December 2006 will both be met. **Figure 3** lists a number of actions the Department needs to take if it is to maximise its chances of meeting these milestones.

## **3** Actions required to deliver the first milestone

*The Department is aiming to deliver the first Regiment capable of operations using the Apache in February 2005*

The Department should continue to update its risk assessment of the problems with the performance of key Apache systems and consider the implications for the delivery of the initial capability (paragraphs 10, 1.8, and 1.17 to 1.23).

The Department needs to maintain strong management of the remaining stages of developing and fitting enhancements to the baseline aircraft and obtaining clearance of these upgrades through the Military Aircraft Release programme by August 2003 if they are to avoid slippage to the introduction of the capability at the end of August 2004 (paragraphs 9 and 1.11).

The Department needs to focus on resolving the issues relevant to delivering support to Maritime operations including additional training requirements and the appropriate structure within 16 Air Assault Brigade for supporting Maritime operations. (paragraphs 12, 13 and 2.14-2.17).

The Department needs to ensure that the remaining issues with the Full Mission Simulator are resolved quickly and full capability is achieved in time for the start of Conversion to Type training in September 2003. The Department should also ensure that a timetable is set for upgrading the simulator in line with enhancements to the baseline aircraft (paragraphs 14, 2.24 and 2.26).

The Department should review the assumptions on pilot training concerning wastage, sickness and flying rates and examine the scope for increasing throughput if found to be necessary (paragraphs 14 and 2.29).

The letting of some contracts for spares, which will be required from October 2002, has been delayed, with the result that shortages of key spares may have to be filled by removing them from stored aircraft. This is very unsatisfactory, and if proved necessary, will need to be very carefully managed. The Department should take prompt action to resolve this situation and put the remaining contracts in place for spares as soon as possible (paragraphs 16 and 2.37).

Given that there is likely to be a long lead time in designing and constructing a facility for major repairs to airframes, the Department should complete its evaluation of the available options as soon as possible ( paragraphs 17 and 2.42).

*Source: National Audit Office*

**21** There are a number of lessons which we consider can be learned from the Department's experiences in managing the delivery of the Apache capability:

- (i) In future procurements, the Department should at the outset consider carefully the potential costs and benefits and the impact on risk allocation of removing elements from the prime contractor's responsibility; and ensure that contractual incentives are properly aligned between related contracts (paragraphs 14, 1.18 and 2.22-2.23).
- (ii) The Committee of Public Accounts has previously expressed concern over delays and problems in cases where Defence equipment has been purchased from the United States, and the US government has withheld technical information (HC 487 1994-95; Ministry of Defence: Major Projects Report 1994). It urged the Department to make strenuous efforts to ensure that, in future, the required technical information was provided at the outset. The Department should make further efforts, when procuring equipment from the United States, to establish that technical information is available at the outset of the programme and whether it is likely to satisfy the Department's standards (paragraphs 9, 1.14-1.16).
- (iii) In future procurements, the Department should align the processes used by the contractor and by QinetiQ for certifying the equipment design as part of the Military Aircraft Release programme (paragraphs 9 and 1.13).
- (iv) In drawing up future arrangements for the initial support of an equipment, the Department should consider transferring more of the risk to the contractor by relating payment to measures of actual activity such as flying rates rather than a defined time period (paragraphs 16 and 2.36).
- (v) Some of the Department's and the prime contractor's assumptions concerning time-scales for key processes and activities have proved over-ambitious, including development of the Full Mission Simulator, the MAR programme and pilot training. In planning the introduction to service of new capabilities, it is important that assumptions are supported by credible evidence and are as realistic as possible at the outset (paragraphs 9, 14, 1.11-1.12, 2.24 and 2.27).
- (vi) The introduction to service of a new capability typically involves the co-ordination of a large number of interested parties both within and outside the Department. The experience of the Apache programme reveals the importance of appointing - at an early stage - a senior-level individual with specific responsibility for directing and co-ordinating such a programme (paragraphs 19 and 3.8-3.10).