Report by the Comptroller and Auditor General

Ministry of Defence

Training new pilots

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Executive summary

Introduction

1 The Ministry of Defence (the Department) need pilots for aircraft flown by each Armed Service: helicopters for the Army; helicopters and fast jets for the Royal Navy; and helicopters, fast jets and multi-engine aircraft for the Royal Air Force. Training new pilots is a complex process involving: the recruitment and selection of trainees; the delivery of training courses, from the first lessons in a single engine propeller aircraft to operational training ensuring that front line pilots are combat ready; and the deployment and career management of trained pilots. Figure 1 shows this process together with the various influences on the training pipeline. This report focuses on the initial stages of pilot training – from elementary training to the transfer of pilots to their individual Services for operational training.

2 Initial pilot training is handled by the Department’s Training Group Defence Agency for all three Services. Pilot training is staged, with all trainees undertaking elementary flying training, following which Royal Air Force and Royal Navy trainees are streamed, according to their assessed aptitude – the Army require helicopter pilots only. Trainees then receive further training dedicated to their aircraft types – fast jets, helicopters and multi-engine aircraft. Individual Services then take responsibility for operational training – when new pilots are trained to fly specific front-line aircraft.

3 During the five years from 1994-95 to 1998-99, the Services needed some 250 new pilots each year. This figure is set to increase to some 290 in 2001-02. In recent years, the Agency have trained fewer pilots than Service staffing plans indicated were necessary, and some 45 a year (18 per cent) fewer than needed have entered operational service after operational training. This shortfall has in part contributed to an overall shortfall in operational pilots - the retention of pilots is another important factor - and is particularly severe for the stock of fast jet pilots. On present plans, a shortfall in such pilots will continue until 2012, even if output of new pilots meets targets every year. The numbers of trainees entering the training pipeline have broadly met targets but at times during the 1990s there have been severe blockages in the pipeline and the time taken to train pilots has increased.
Our study centres on the Agency and Operational Training Unit management of pilot training, but considers broader recruitment selection and retention issues as they affect pilot training.
Departmental costing systems do not readily identify the costs of flying training, nor the relative importance of the various cost elements. Our analysis of the Department’s data estimates the overall cost of initial pilot training in 1998-99 to be some £280 million, with operational training an additional cost. Despite difficulties in achieving targets for new pilots, the Agency have had to contribute to the efficiency savings demanded of the Department as a whole – in the five years to 1998-99 the Agency have reported savings of £50 million against a target of £41 million.

In view of these circumstances, we looked further at the following main issues:

- **recruitment, selection and overall success rates**: the process of delivering new pilots embraces more than just the training activity, it includes general activities such as recruitment, as well as specific selections for pilot training and progression through the stages, which contribute to overall performance. This Part of the report therefore looks at the effectiveness of these activities from the perspective of subsequent pilot training outcomes;

- **fast jet training**: we selected the training of fast jet pilots as a case study because of the combination of a shortfall in desired output and the high cost of this stream of training. The focus on fast jets enabled us to generate better cost and activity data, and to link initial training with subsequent operational training and deployment;

- **managing for quality**: the training process has had to deliver pilots of the right quality while making savings. This Part looks at management measures taken to promote quality and efficiency, including joint-Service initiatives, which contain an element of both quality and efficiency improvement.

**Recruitment, selection and overall success**

Recruitment arrangements in the round lie outside the scope of this report but we examined those aspects of recruitment and selection which bear directly on flying training. Trainee pilots may be direct officer recruits, selected serving officers or, in the case of the Army or Royal Marines, selected non-commissioned officers. All Services, however, apply the Agency’s aptitude tests as part of their trainee pilot selection processes. While aptitude tests are designed to predict success during elementary training, we found that there was a strong correlation...
between higher aptitude test scores and greater likelihood of subsequent success in pilot training. However, there was only a small absolute difference in success rates between very high aptitude test scores and much lower scores. In taking forward their aptitude tests there would be benefits if the tests could discriminate more clearly between those candidates who are likely to do well in future pilot training. We also noted that other countries have developed psychometric testing to help evaluate candidates’ fighting instincts.

7 All Services use direct experience of flying as part of their selection process, to some degree. Royal Navy and Army trainees have 13 hours of flying experience after which they are graded, with the best trainees moving on to elementary training. The Royal Air Force take trainee pilots either after around 90 hours of flying at University Air Squadrons, or from direct recruitment, when candidates often have little or no flying experience, although some candidates may have Air Training Corps experience.

8 Different approaches led to different results. 12 per cent of Royal Navy candidates failed the flying grading element of selection. The corresponding figure for the Army was 64 per cent – in part because the Army select from a broad range of Service personnel and they place greater weight on grading rather than aptitude testing. But Army wastage rates at later stages of helicopter training remained higher than for the other Services. During elementary flying training the wastage rate for Royal Air Force direct entrant trainees was marginally higher than for the other Services who include flying as part of their selection process. Royal Air Force University Air Squadron trainees were more successful at providing premium fast jet pilots than the direct entrant route, but by less of a margin than targeted – providing 55 per cent of fast jet pilots rather than 70 per cent.

9 Although wastage rates have reduced overall, and in some areas such as operational training are less than the expected rates used for planning purposes, they remain stubbornly high for fast jet trainees (Figure 2). Comparisons with overseas countries are complicated by differences in standards and processes. But indications are that overall wastage is in line with that in, for example, the United States and Canada.

Figure 2

While actual wastage on most courses is less than planned, wastage rates in fast jet training are substantially higher than for other aircraft streams.

<table>
<thead>
<tr>
<th>Type of Training/Aircraft Stream</th>
<th>Joint Elementary Flying Training: 5.8 (15)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basic</td>
</tr>
<tr>
<td>Fast Jet</td>
<td>17.6 (17)</td>
</tr>
<tr>
<td>Helicopter</td>
<td>6.0 (6)</td>
</tr>
<tr>
<td>Multi Engine</td>
<td>0.0 (NA)</td>
</tr>
</tbody>
</table>

Notes: 1. Figures in brackets are planned wastage rates.
2. The Multi Engine basic course was introduced in 1997 and the Agency do not yet have a planned wastage rate.

Fast jet training

10 We looked to see why there was a shortfall in new pilots in our case study of fast jet training. We found that the reasons for the shortfall centred on the increased length of time taken for pilots to reach operational status - some 5.5 years down from a peak of 6.0 years in 1997-98 compared with just over three years planned, (and which was achieved in the early 1990s) - rather than factors such as recruitment or wastage during training, which have been at or better than planned values. That increase in elapsed time in part reflected factors internal to the training process, such as difficulty in obtaining sufficient qualified instructors, and securing available aircraft and facilities. But in part training delays also reflected external decisions, such as those on commitments to operations, which reduced the pool of qualified pilots to act as instructors. And cuts to Operational Training Units reflected a reduction in the size of the Royal Air Force, even though the number of trainees already in the system was appropriate to its former size. The reduced front line meant that newly trained pilots could not be absorbed, leading in turn to backlogs in the training pipeline and the need for refresher training. A lack of coherence in planning meant that the impact of actions in one part of the training system was not fully appreciated for the system as a whole operating beyond the boundaries of the Agency.

11 We analysed the cost of fast jet training, the most expensive stream of training, in more detail. That analysis suggested that the cost of training flying instructors was the largest single component (30 per cent), and that the actual training courses made up some 29 per cent of cost. We estimated that wastage, the need to fly more hours than planned (in part as a result of simulators not being available), and costs due to delays in moving trainees through the system contributed 27 per cent to the unit cost of a successful trainee of some £3.8 million.
The costs of operational training are dependent on the particular front line aircraft to which a trainee is assigned. But, because front-line aircraft are more expensive to operate than training aircraft, the cost of such training is significant. As an illustration, we estimate that the cost of an operational training course for a Tornado GR1 pilot adds some £1.9 million to the £3.8 million unit cost of their initial flying training.

Finally, we looked for a measure of the significance of the shortfall in new operational fast jet pilots. Valuing the shortfall as the cost of an operational Tornado GR1 (comprising the flying hours expected of an operational pilot and the cost of maintaining and operating one aircraft), we estimate the cost to be £6 million annually for each vacancy. While this is a crude figure, it shows clearly that the economic effects in one year of a failure to produce a pilot are of the same order as the total training cost of a new pilot. Of course, small numbers of pilot shortages do not mean that the aircraft fleet will be under-utilised and the Department are managing the current shortages of fast jet pilots such that there are no gaps on front line squadrons. Indeed the Department have been able to maintain their operational commitments, in part by increasing the frequency of deployments of trained pilots. There are, however, longer-term consequences as ‘over-stretch’ may well affect morale and add to the difficulties of retaining trained pilots.

Managing for quality and efficiency

United Kingdom military pilots enjoy a high reputation internationally, a fact confirmed during our consultation with overseas colleagues and in the performance of United Kingdom pilots in international operations, exercises and competitions. The quality of their initial training has clearly played a part in that outcome. In the past output quality standards throughout the training pipeline have been unclear, but the Agency have made recent progress on agreeing standards for the various aircraft streams and customers. In March 2000 the Agency agreed output standards with Royal Air Force fast jet customers and they expect to agree standards for other aircraft in 2000-01, establishing service level agreements with Royal Navy and Army customers by September 2000.

There are, nevertheless, aspects of the training system which do not sufficiently grip quality issues. The quality target for the Agency is poorly formulated and there has been no credible mechanism for obtaining customer views of quality achieved. The Agency are, however, developing new arrangements for tracking quality. Our survey of Operational Training Units suggests that there are several areas meriting attention. The majority of units considered that the quality of trainees was lower than in the past and that there
were shortfalls in some skills levels. Without clear output standards it is difficult to determine whether these perceptions are firmly evidenced or whether they reflect ‘output creep’ - a ratcheting up of expectations. An indication of the quality of initial pilot training might be provided by the extent to which Operational Training Units undertake additional training - but the Department do not collect these data.

Similarly, targets for outputs were not in place for all of the Agency’s customers, and their ‘efficiency target’, which they have achieved in recent years, takes the form of a simple economy target - to make savings on expenditure. There is no efficiency measure in place which brings inputs and outputs together. More generally, there is no clear string of customer/supplier agreements running through from recruitment to final output of a trained, operational pilot.

Some of the weaknesses evident in setting targets also show through in other initiatives. The Agency have pursued a variety of site rationalisation and contractorisation projects with mixed results. Weaknesses in specification of services and contract monitoring and enforcement have cost the Department output and money. And similar weaknesses in planning have meant that the implications of site rationalisation were not fully understood, with the result that fewer sites have been sold than planned, and some initially closed have had to be re-opened. Overall, however, contractorisation and rationalisation have contributed towards improved efficiency, if not on the scale originally envisaged.

On more general management matters, the Agency have vigorously pursued a number of externally-framed management initiatives, such as participation in the Public Sector Benchmarking Project and assessment against the European Foundation for Quality Management Business Excellence Model, as well as obtaining ISO 9000 and 'Investor in People' accreditation. Assessment against the business excellence model shows that there is scope for improvement in the management of the Agency, achievement of which is addressed in the Agency’s business improvement plan. We welcome the efforts made to assess the quality of management by reference to external benchmarks, and to pursue improvements according to the results of the comparison.
Recommendations

On recruitment and selection and the numbers of pilots

While the current recruitment and selection systems deliver candidates in the planned number and overall wastage is less than plans allow for, the training pipeline delivers fewer pilots than required. There is scope for rationalisation of approaches between Services, and improvement of the various mechanisms employed, to help achieve overall requirements for new pilots. The Department should:

- review the way aptitude tests and the grading of trainees following direct experience of flying are applied across the Services, to ensure that best value is obtained from the existing, relatively cost-effective, aptitude tests;

- explore the scope to improve aptitude tests’ ability to discriminate between the capabilities required of fast jet, helicopter and multi-engine pilots, to facilitate early and accurate decisions on streaming of trainees;

- in the light of variation between forecast and actual wastage rates, review planning assumptions which inform the numbers of trainees required.

On training activity

Training a new pilot takes over three years even in ideal conditions, and involves several stages, and many different trainers and training facilities. And there are many different ways of achieving the same outcomes. In these circumstances, the quality of management information, and the incentives to act on it, are crucial to providing cost-effective training. To improve current arrangements, the Department should:

- ensure that information on training activity, and the performance of trainees, trainers, and facilities, is collected in a standardised way, and made readily accessible, so that analysis of training activity is facilitated;

- recognise the importance of the elapsed time taken for a trainee to qualify, and include elapsed time in monitoring of training performance;
improve the system for capturing the costs of training, and their major elements, so that monitoring of cost-effectiveness can be attempted, and analysis of possible improvements is more soundly based;

ensure that current initiatives to set formal output standards for the various stages and types of flying training are quickly brought to fruition, and extended to all stages, streams and customers; and

make sure that the interactions between activities, resources, standards and outputs are recognised and accurately reflected in analysis which captures the effects on the system as a whole, of varying a given element within it.

On management of the training system and resources

The training system involves many different stakeholders in public and private sectors, and consumes significant resources - in current and capital terms. Managing a complex system on this scale places a particular strain on the overall coherence of management actions and on the accuracy of planning and project implementation. The Department should improve their performance in these areas by:

making sure that the customer/provider logic of current arrangements is more fully and consistently applied through the training system, both within the Agency and between the Agency and their suppliers, contractors and colleagues who deal with operational training;

ensure that the targets set at various stages reflect overall targets and objectives, have a common format, and are soundly based on analysis of current and potential performance;

revitalise arrangements which provide customer input to target setting and performance monitoring, and charge the ‘owner’ with more active review of training system performance as a whole;

continue with current Agency quality management initiatives, to help consolidate and improve the professionalism of Agency management, and consider extending that approach to all elements of the system, to promote a uniform management culture;
consider the prospects for greater commonality of content and joint delivery of Elementary Flying Training, which should offer cost and operational benefits; and

make important services to training management, such as contracts expertise, both accessible and responsive, and ensure that local managers who monitor contractors’ performance are in full possession of contractual details.

Concluding comments

22 The process of training new pilots is complicated and resource-intensive, and must be viewed as a whole if best value for money is to be achieved. Even small changes to the system can result in wasted effort, or money, if those changes have not been set in the context of the overall process. For example, a change to training aircraft maintenance contracts to incentivise higher aircraft availability can result in nugatory payments, even when customers are desperate for more pilots, if there are not sufficient trainees, instructors and airspace to make use of that extra resource. The Department should look at possibilities for making existing arrangements, already drawn together to a good degree in the Training Group Defence Agency, more coherent. They should:

- review the boundaries between personnel commands, the Agency, and operational commands, to ensure they are sensibly drawn, and that a consistent approach to training is maintained across any boundaries;

- make sure adequate information is available to support decision on change, and that analysis covers the full range of implications of change, and known disturbances to the system - such as, for example, the effects of deployments on instructor availability; and

- develop an outline model of the pilot training system, drawing on our work in Figure 1 and Appendix 2, to facilitate understanding of the interactions and dynamics of the system, and to refine the indicators and targets used to manage pilot training.

23 Moves in this direction should help the Department achieve full value from the resources committed, and from projects undertaken, while also enabling management to form a clearer view on the overall efficiency of the system, and the adequacy of its resourcing. Overall, pilot training has to be seen as part of a
continuous process with a series of customer/supplier relationships crossing commands and all three Services, covering trainee numbers, timetables and quality standards. The output from one stage of training provides the input to the next stage and if an holistic view is not maintained, there is a risk that changes in one stage of training will impact adversely on later, more costly stages of training.