

Pilot training review – interim report: task 2 interview study

CAP 1581c

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Preface

This independent research, initiated and funded by the CAA, and part of the CAA's strategic approach to improving safety, reviews UK pilot training in the wider international context. Against a background of increasingly highly automated aircraft, with air travel as a major UK industry with a consumer expectation of the highest safety standards, it is essential that pilots receive effective, evidence-based training that keeps pace with technological, operational and organisational change. This report, together with associated reports below, detail current research directions, current training issues and opportunities. We will explore with the aviation industry how potential safety improvements may be achieved to maximise the benefits of this study.

Related publications

- [CAP 1581 – Recommendations and Conclusions](#)
- [CAP 1581a – Gap Analysis](#)
- [CAP 1581b – Literature Review](#)



Pilot Training Review

Interim Report: Task 2 Interview Study

FNC 46243/46563R Issue 2
Prepared for Civil Aviation Authority (CAA)

SYSTEMS AND ENGINEERING TECHNOLOGY

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EXECUTIVE SUMMARY

This document is the second Interim Report from CAA project 2217: Pilot Training Review. It describes the findings of interviews conducted with aviation community stakeholders to establish current practice amongst air operators and training establishments for the delivery of pilot training against current regulatory requirements. The output of these interviews will be utilised for the Gap Analysis in the next step of the work. A Final Report at the end of the project will provide overall conclusions and recommendations.

Following a number of air accidents where pilot training has been cited as a contributory factor, the effectiveness of pilot training has come under increased scrutiny. In response, the aviation community has been exploring approaches to address problem areas, and the CAA was keen to understand the extent of such activities, their impact, and any remaining issues not being addressed. To this end, the CAA commissioned a project to conduct a review of “recent training studies and activities and potential improvements in order to inform policy on taking the matter forward internationally.” (CAA Research Specification, July 2014).

The first task in the project was to establish the current state of the art in pilot training through a review of published training, human factors and aviation psychology literature. The current task was to identify current practises and issues for pilot training in the UK through interviews with a broad range of aviation community stakeholders. This document describes the findings from these interviews.

A semi-structured interview schedule was developed based on the findings from the literature review. Key topic areas in the interview were: overall approaches to training, content, instructors, pilots/careers, support, changes and challenges. Interview participants were from 16 organisations including: airlines, helicopter operators, training organisation, military aviation, professional and trade associations and regulators.

The results from the interviews were analysed to identify issues, concerns, new approaches and current activities from the organisations. The findings are discussed in the report with a summary presented as a table to provide a snapshot sample of current practise and issues in UK pilot training. The key highlights from across this and the surveyed organisations are:

- ▶ Strong desire to move away from traditional technical proficiencies and time-base measurement of training to competence- and risk-based content and assessment for all operator types and across a pilot's career. Some organisations already report following Training Needs Analysis (TNA) approaches to inform this training content but the exact details of these processes were not identified;
- ▶ Military flight training organisations adopt a systems approach to training that provides clear processes for identifying requirements and structuring development, delivery and evaluation all within a broader quality assurance and governance framework;
- ▶ The advantages of simulation are widely recognised and exploited but, with minimal training footprints, time for training and practice are limited. Lower-fidelity devices could be utilised, however, resources to invest in alternative technologies are limited; also there would need to be more flexibility in the regulation around use of flight training devices;
- ▶ There seems to be a common understanding as to the general content required for training; for example, integration of technical and non-technical skills was highlighted. Detail on specific techniques from training competencies were not covered but the need for more specific approaches to train elements of cognitive skills, e.g. decision making was identified. It also appears that knowledge for understanding and using automation is still a challenge for pilots, although this is a strong focus in simulator training and increasingly considered in early training. Specific approaches for maintaining manual flying skills – other than regular practice – were not identified although again this is recognised as important;

- ▶ A significant challenge and concern is the increasing demand for pilots and the falling supply, and how to manage this without reducing quality and safety standards. There is a perception that standards vary across training establishments with the EASA region and that there is no longer any central control for this from the CAA or ability to check up on training history. Military organisations face similar challenges with numbers but they have very strong selection and performance management mechanisms to manage standards, which other organisations may not be able to sustain;
- ▶ As with other professional areas, there is a growth in flexible working. This may have an impact on pilot training that needs to be considered;
- ▶ As with the increasing demand for pilots so there is an increasing demand for training instructors and a challenge in some areas with attracting people to the role. Improved salaries and reward was thought would be helpful. The need for instructors to have broader capabilities to address the greater demands of competence-based training (less prescriptive) and the growing complexities of the pilot role and aircraft operations was highlighted. The need for this is further reinforced given the reducing level of overall flying experience in the aviation community. Two anomalies were identified as regards training and qualification of instructors. It appears there is no formal regulatory requirement for either of these for Ground School Instructors and Line Training Captains which, given the importance of these roles, is surprising;
- ▶ Following the move to EASA, the role of the CAA has changed, as has its capacity. As a result, operators and training organisations report experience of reduced staff numbers, high turnover and, importantly, access to less expertise and guidance. EASA itself is viewed as reducing the pace of change in regulation and there is concern it has increased variability in standards. There was no sense that the levels of expert support and guidance previously provided by the CAA are now being provided by EASA or elsewhere, which may be particularly challenging for smaller or less developed organisations;
- ▶ Change is an ongoing challenge for aviation training. The need to be able to adapt training to address operational risks is critical not least because changes in ATM, continuing developments in aircraft automation and growing globalisation all influence the pilot's role and, therefore, the competences needed to support that safely and effectively.

Interestingly, most of the focus of discussion in the interviews was on the challenges facing organisations in delivering training than the training content itself. This is different to the findings from the literature review when the focus was more on the detailed content and training for specific skills rather than on the broader training system. Change is an ongoing challenge for aviation training. The need to be able to adapt training to address operational risks is critical not least because changes in ATM, continuing developments in aircraft automation and growing globalisation all influence the pilot's role and, therefore, the competences needed to support that safely and effectively

A significant finding from the interviews is that none of the organisations interviewed indicated that they thought current pilot training practise in the UK was unsafe, although there was a perception amongst organisations that it would be difficult for UK organisations to protect themselves from lower standards of training if supplied from elsewhere in the EASA community. However, to ensure safety going forward, given the demands placed on pilots and the modern aviation system, there are clear areas for continuing improvement, scope for rationalisation and further development. The main concerns and challenges identified relate to the capability of the current training system to meet increasing demands going forward whilst, importantly, maintaining high performance and safety standards in an ever more complex, global and commercially-driven aviation environment. Ultimately, if the training footprint cannot be increased to address the growing demands on pilots then the training provided and the system around that must be absolutely optimal. A number of clear messages were identified around organisations' concerns, or opportunities for improvement, such as: the requirement for some form of Evidence Based Training (EBT) to be fully supported by EASA regulations for both airlines and helicopter operators (as is currently being developed

under Rule Making Task .0599), and a stronger competence-based approach flowing back down the training pipeline; simulation is recognised as providing enormous benefit in aviation training, and could be used further for 'non-jeopardy' (i.e. no assessment) training and practice perhaps through lower cost devices; the need to continually refresh training for automation; the need to update ground school training; the challenge of managing variation in standards across training suppliers; and, importantly, the desire for knowledgeable, experienced support from the UK regulator.

The next step in the project is to conduct a gap analysis on the results from the interviews and from the literature review to identify any shortfalls, and the residual risks associated with these, on aviation training. Responses from the interviews, that discuss anticipated changes in future aviation and barriers and enablers to change in training, will be used to support the development of recommendations. The recommendations for changes to training and future research activities will be proposed, based upon the findings of the gap analysis.

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1. INTRODUCTION

1.1 PURPOSE

This document is the second Interim Report from CAA project 2217: Pilot Training Review. It describes the findings of interviews conducted with aviation community stakeholders to establish current practice amongst air operators and training establishments for the delivery of pilot training against current regulatory requirements. The output of these interviews will be utilised for the Gap Analysis in the next step of the work. A Final Report at the end of the project will provide overall conclusions and recommendations.

1.2 PROJECT BACKGROUND AND AIMS

Following a number of air accidents where pilot training has been cited as a contributory factor, the effectiveness of pilot training has come under increased scrutiny. In response, the aviation community has been exploring approaches to address problem areas, and the CAA was keen to understand the extent of such activities, their impact, and any remaining issues not being addressed. To this end, the CAA commissioned a project to conduct a review of “recent training studies and activities and potential improvements in order to inform policy on taking the matter forward internationally” (CAA, 2014). The project is divided into two main information collection phases: a Literature Review and Interviews with aviation community stakeholders. From these, a Gap Analysis shall explore shortfalls and any residual risk before making recommendations to address these. The overall project output will be a set of recommendations for interventions and/or further developments to improve training-related safety outcomes for UK aviation.

The project scope considers the breadth of civil commercial aviation including fixed- and rotary-wing aircraft, different operator types and training organisations, and it also explores future changes in military aviation that could influence the pilot training pipeline.

The objective of the interview study was to establish the state of current practice and issues for pilot training in the UK.

1.3 REPORT STRUCTURE

This Report is divided into the following sections:

- ▶ Literature Review Findings;
- ▶ Interview Methodology;
- ▶ Interview Findings;
- ▶ Next Steps - Gap Analysis;
- ▶ Conclusions.

The Report also contains two annexes: one contains the interview schedule; and the other contains data from the interviews grouped by organisation type.

2. LITERATURE REVIEW FINDINGS

2.1 SUMMARY

The objective of the literature review was to establish the 'state of the art' in pilot training, including to identify the current and latest training techniques, design philosophies and recommended content, including the results of training effectiveness evaluations, skill fade studies and consideration of issues around instructor training. This was achieved through reviewing recent training, human factors and aviation psychology literature on pilot training and associated topics. The regulations themselves were not reviewed but a number of guidance documents and manuals from the broader aviation community were included at a high level, e.g. guidance on EBT from both ICAO and IATA. The literature review has been reported previously as a separate report (McDougall and Fletcher, 2014).

The key findings from the literature review were:

- ▶ The literature identifies a wide range of 'state-of-the-art' training activities; however, the extent to which these are implemented in the aviation training community is not known;
- ▶ There is an increasing use of Competence-Based Approaches in training, supporting trainee resilience, as it becomes impossible to train for every eventuality possible in a modern cockpit;
- ▶ Training that provides pilots with resilient skills enables the pilot to be adaptive to a wide catalogue of situations.

The types of topic covered in the literature includes:

- ▶ Increased opportunity for manual flying, including in unusual attitudes;
- ▶ Specific training to support 'upset' recovery, including managing 'startle' through more realistic training environments regarding stress;
- ▶ Increased focus on declarative knowledge on automated systems, including underlying logic to help development of mental models, different modes and their transitions;
- ▶ Integration of technical and non-technical skills related to flight handling;
- ▶ Development of monitoring skills;
- ▶ Training on cues to recognise 'upsets' and lapses in situation awareness;
- ▶ Development of meta-cognitive skills to support self-evaluation and review;
- ▶ Prioritisation skills and strategies for workload management, including task shedding.

However, it was noted that much of this literature was without practical guidance on how to deliver the developments in the course of real-world training programmes. Indeed, it was noted in the review that to achieve implementation of the state-of-the-art in operational training, it is crucial that there are organisational pathways that bridge the gap between research, the development of training programmes and the day-to-day delivery of pilot training.

Additionally, the literature review revealed gaps in knowledge and available information, including:

- ▶ Clearly defined, detailed competency frameworks for pilot Knowledge, Skills and Attitudes (or sometimes Abilities; KSA);
- ▶ Methods to develop airline specific KSAs;