Civil Aviation Authority: Certification and surveillance functions

June 2005

This is the report of a performance audit we carried out under section 16 of the Public Audit Act 2001.

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Foreword

This is the third time that my Office has reviewed the surveillance function of the Civil Aviation Authority (CAA), and I am concerned that little action had been taken by the CAA to address the recommendations in our 1997 and 2000 audits.

The CAA has an important role to play in promoting civil aviation safety in New Zealand.

Our audit on this occasion of the CAA's certification and surveillance functions highlighted the following issues of concern:

- although the CAA's certification process in the Airline sector is generally sound, the CAA's general aviation inspectors need to be more rigorous in their assessment of operator capability to comply with the Civil Aviation Act 1990 and the Civil Aviation Rules;
- the risk analysis and risk assessment processes are not as effective as they should be;
- the risk analysis does not necessarily "feed into" the surveillance process;
- operators that are assessed as higher risk are not always appropriately targeted in relation to both depth and frequency of the surveillance undertaken; and
- CAA inspectors are not ensuring that Finding Notices are issued for all operator non-compliances with the Civil Aviation Act. They therefore cannot be sure that the appropriate corrective action has been taken. We also had concerns about the length of time it took for some inspectors to check that corrective action had been taken to address the matters raised in the Finding Notices.

I am pleased to note that the CAA is already taking steps to address the recommendations in this report, and have included the actions that the CAA intends to take in the Appendix. I will be checking 6-monthly with the CAA to ensure that those intended actions are followed through.

K B Brady
Controller and Auditor-General

17 June 2005

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Glossary

Accident	Means an occurrence that is associated with the operation of an aircraft and takes place between the time any person boards the aircraft with the intention of flight and such time as all such persons have disembarked and the engine or any propellers or rotors come to rest, being an occurrence in which – (a) A person is fatally or seriously injured as a result of – (i) Being in the aircraft; or (ii) Direct contact with any part of the aircraft, including any part that has become detached from the aircraft; or (iii) Direct exposure to jet blast – except where the injuries are self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to passengers and crew; or (b) The aircraft sustains damage or structural failure that – (i) Adversely affects the structural strength, performance, or flight characteristics of the aircraft; and (ii) Would normally require major repair or replacement of the affected component – except engine failure or damage that is limited to the engine, its cowlings, or accessories, or damage limited to propellers, wing tips, rotors, antennas, tyres, brakes, fairings, small dents, or puncture holes in the aircraft skin; or (c) The aircraft is missing or is completely inaccessible.
Act	The Civil Aviation Act 1990.
Airline sector	Operators of aircraft weighing more than 5670kg, or containing 10 or more seats, along with the associated maintenance, training, design, manufacturing and supply organisations.
Aviation document	Any licence, permit, certificate, or other document issued under the Act to or in respect of any person, aircraft, aerodrome, aeronautical product, or aviation-related service.
Certification	An entry process to ensure that an applicant is able to comply with the Civil Aviation Act 1990, and with the associated Civil Aviation Rules before being issued with an aviation document.
Civil Aviation Rules	Rules made under Part 3 of the Civil Aviation Act 1990, which are “secondary” legislation, like statutory regulations. Participants in the civil aviation system are required to comply with the rules that are relevant to the documents that they hold.
Exposition	A suite of manuals containing information about an operator’s (or an operation’s) general policies, duties, operational control policy, procedures, and the responsibilities of personnel. The exposition is the principal means of showing that the management and control systems required under the Civil Aviation Rules are in place. Part 119 requires

	these manuals to include the instructions, procedures, and information necessary to permit the personnel concerned to perform their duties and responsibilities with an acceptable degree of safety. The information that must be addressed in the exposition depends on the scope of the operation.
General Aviation sector	Operators of aircraft that weigh less than 5670kg and have 9 seats or less; all helicopter, agricultural and balloon operations; and all sport and recreation aviation (both commercial and private).
Incident	Any occurrence, other than an accident, that is associated with the operation of an aircraft that affects or could affect the safety of the operation.
Inspector	An airworthiness inspector or a flight operations inspector. (In our 1997 and 2000 reports, we used the term "safety auditor".).
Operator	Participants in the civil aviation system – whether individuals or firms.
Participant	Defined in the Act as anyone who does anything for which an aviation document is required. Participants therefore include airline operators, pilots, and maintenance providers.
Quality Index	A qualitative score, reflecting the "level of confidence" that an inspector has in an organisation. It is based on the audit work done by the inspector during the routine audit.
Safety Target Group (STG)	There are 9 Safety Target Groups, distinguished by the type of aircraft, the weight of the aircraft, and the type of operation being carried out.
Surveillance	The function of the Civil Aviation Authority that monitors operator adherence to the Civil Aviation Act 1990, the Civil Aviation Rules, and operators' expositions. It includes identifying action that operators need to take to ensure that they comply with safety standards.

Summary and recommendations

Introduction

The Civil Aviation Authority of New Zealand (CAA) was established on 10 August 1992 by amendment to the Civil Aviation Act 1990 (the Act). The objective of the CAA *is to undertake its safety, security, and other functions in a way that contributes to the aim of achieving an integrated, safe, responsive, and sustainable transport system.* The CAA's functions include promoting civil aviation safety and security in New Zealand and beyond, in accordance with New Zealand's international obligations.

In New Zealand, the Civil Aviation Safety System is based on:

- setting a minimum standard for entry into and operation within the civil aviation system;
- allowing entry to only those operators who meet the entry requirements, and are capable of maintaining compliance with the Civil Aviation Rules (CARs) and the conditions of their aviation documents;
- providing information and advice to operators to assist them to comply with the CARs;
- monitoring operator adherence to the safety standards and their own documented procedures, including identifying action that operators need to take to ensure that they comply with the safety standards; and
- where necessary imposing conditions on, or suspending or revoking, the aviation document issued to the operator.

In the year to 30 June 2004, the CAA spent $15.890 million ($14.367 million in 2002-03) on the output described as Safety Assessment and Certification.

Previous audits

In 1997 we audited the risk management capabilities of the 3 transport safety authorities – the CAA, the Land Transport Safety Authority, and the Maritime Safety Authority – and we were concerned about several aspects of the CAA's surveillance function; in particular:

- the adequacy of risk management processes within the CAA to identify the most cost-effective safety initiatives; and
- the extent to which audit resources:
  - targeted high-risk operations and operators; and
  - tested whether operators actually applied their quality management systems.

We conducted a follow-up audit in 2000, to establish how the CAA had addressed our concerns. We found that there had been improvements in:

- inspector understanding and documentation of the safety audit process;

- establishing confidence for individual operators (Quality Index) and developing broad strategies to address risk areas; and
- reporting and follow-up of corrective action to fix instances of non-compliance with the CARs.

However, we still had concerns about and made recommendations in relation to:

- resources not being appropriately targeted at high-risk operators;
- how consistently the Quality Index was applied to operators;
- the extent of inspection undertaken with operators who had limited quality management processes; and
- staff capability.

This audit

Two significant changes have occurred since our 2000 audit:

- First, the CAA introduced a new organisational structure in May 2000. This resulted in the safety audit unit (at that time a unit within the Safety Certification Group) being amalgamated into the operational groups.
- Secondly, operators of aircraft with 2 or more engines who were previously operating under a *Transitional Air Operator Certificate*, were required to gain Part 119/135 certification by the end of February 2001. Single-engine, fixed-wing, and helicopter operators were required to gain their certification by the end of February 2003. Certification has effectively changed the approach taken by CAA inspectors towards surveillance of these operators.

As a result of these changes, this audit covered both the certification and surveillance functions, to assess whether:

- the certification (or entry) function ensures that prospective operators understand and are capable of complying with the Act, the CARs and the conditions of their aviation document(s); and
- an effective surveillance function is operating, to ensure that an acceptable level of civil aviation safety is maintained.

Key findings

Overall, we found that:

- The certification process used by the Airline Group is generally sound, in that the certifications we reviewed were not subsequently found to be deficient through surveillance. However, General Aviation Group inspectors need to be more rigorous in their assessment of operator capability to comply with the Act and the CARs. Out of the 11 certifications that we reviewed relating to the General Aviation sector, the behaviours demonstrated by 6 of the operators within 12 months of certification suggested that they had been certificated without understanding, or being able to comply with, their own expositions or the CARs.
- As little action had been taken to address the recommendations in our 1997 and 2000 audits, we still have significant concerns with the surveillance function. The areas we were particularly concerned about were:
  - the effectiveness of the risk analysis and risk assessment processes;
  - ensuring that the risk analysis "feeds through" to the surveillance process; and
  - ensuring that operators, or groups of operators, that are assessed as "high-risk" are appropriately targeted, in relation to both depth and frequency of the surveillance undertaken.
- CAA inspectors were not ensuring, in accordance with the CAA's *Surveillance Policy*, that a Finding Notice is issued to operators for all instances identified where the operators are either not complying with the Act or the CARs or not conforming to their own expositions. We were also concerned about the length of time it took inspectors to ensure that corrective action had been taken by operators to address the matters raised in the Finding Notices.
- CAA inspectors were not recording all the hours that they work on surveillance in the time recording system. Not recording hours worked means that the CAA is not aware of the actual level of resources required to maintain its surveillance programme. It also affects the accuracy of risk assessment tools that use the hours as part of their calculation (for example, the Non-Compliance Index).
- Due to financial pressures, resource demands, and the high cost of specialised technical training, only essential training of CAA staff (including inspectors) has been carried out over the last 3 years.
- Although the internal audits help to promote consistent practice across the CAA, the operational groups do not always "buy in" to the internal auditors' recommendations.

We discussed our concerns with the CAA during the audit, and recommended that the CAA evaluate its surveillance function with a view to increasing the effectiveness and efficiency of the current resources it puts into the process.

We were pleased to note that the CAA has since begun a review of its surveillance function.

Recommendations

The following recommendations from our audit should be incorporated into the CAA's review:

Recommendation 1: We recommend that the CAA continue to establish measures to better assess the effectiveness of its safety interventions.

Recommendation 2: We recommend that the CAA improve its analysis of industry information by:

- including more analysis of the information in the *Aviation Safety Report* and the *Aviation Safety Summary Report* to support further action, and to improve the timeliness of these reports; and
- improving analysis of accident and incident data (for example, by identifying further opportunities – such as the CAA's joint study of pilot-caused and controller-caused airspace incidents), from which the CAA will draft recommendations for safety intervention mechanisms.

Recommendation 3: We recommend that the CAA further develop the tools it uses to assess the risks associated with individual operators. For example:

- For the Non-Compliance Index to be more effective, CAA inspectors need to correctly record all instances of non-compliance, as well as the actual audit hours spent with each operator. Operators need to be further encouraged to advise the CAA of instances of non-compliance.
- For the Quality Index score to be more consistent, it should be supported by the information in the routine audit report, and reasons for significant changes should be explained.
- For Client Risk Assessments to be more useful to the surveillance process, the CAA needs to re-assess their function. These assessments identify changes to a company's operation, but not necessarily changes to risk. We recommend that this tool be used to highlight any changes in the company's operations for inspectors, who would then be responsible for assessing the effect of those changes on the risk of an individual operator.

Recommendation 4: We recommend that the CAA use better indicators of the financial status of operators when assessing operator risk, both at certification and during surveillance.

Recommendation 5: We recommend that the CAA ensure that its inspectors follow the policies and procedures set down for certification.

Recommendation 6: We recommend that the CAA continue with its review of its surveillance function. In undertaking this review and designing a new approach, the CAA should:

- ensure that the audit process directs resources at the highest-risk operators;

- direct appropriate activities and interventions at high-risk Safety Target Groups;
- give priority to the sampling project (a sampling methodology will allow inspectors to make informed decisions on the work necessary to cover the assessed risk);
- assess where reliance can be placed on operators' own quality and risk management systems, so that audits can be targeted at higher-risk areas;
- ensure that the depth and frequency of surveillance is adjusted to reflect operator and operation risk; and
- develop guidelines to indicate when instances of non-compliance should be referred to the CAA's Law Enforcement Unit for further action.

Recommendation 7: We recommend that CAA inspectors issue a Finding Notice for all identified instances of non-compliance and non-conformance.

Recommendation 8: We recommend that the CAA establish a system that ensures that operators take quick and effective corrective action when inspectors tell them to do so. This system should include re-assignment of responsibility for that function when an inspector leaves the CAA.

Recommendation 9: We recommend that CAA inspectors ensure that they record all time spent on the surveillance function. Continuing to do otherwise will affect the accuracy of the CAA's risk analysis tools, and its ability to produce accurate business cases.

Recommendation 10: We recommend that the CAA:

- ensure sufficient investment in training CAA staff so that they develop and maintain the appropriate skills to carry out their functions;
- review its staffing levels when the current review of the surveillance function has been completed, to ensure that it has sufficient resources to undertake this function (Both the review of the surveillance function and the review of staffing levels need to take account of the potential pressures or "surges" put on inspectors as a result of unanticipated requests for certifications.);
- ensure that the operational groups comply with the CAA's generic policies and procedures (particularly relating to Quality Assurance);
- promote consistent standards of quality and practices throughout the operational groups by ensuring that they address internal audit Finding Notices; and
- ensure that the internal audit section is appropriately staffed to enable the CAA's operations and inspectors to be audited on a more regular basis.

Part 1: Background to our audit

1.1 In this Part, we discuss:

- our 1997 report on the 3 transport safety authorities;
- our 2000 report on the CAA's surveillance function;
- the scope of this audit; and
- our audit methodology.

Our 1997 audit and report[1]

1.2 In 1997 we audited the risk management capabilities of the 3 transport safety authorities – the CAA, the Land Transport Safety Authority, and the Maritime Safety Authority. We made findings and recommendations for all 3 safety authorities, but the more serious of these concerned the CAA.

1.3 In particular, we concluded that the CAA did not systematically assess the potential consequences of aviation accidents and incidents in order to identify accurately:

- the areas of highest risk; and
- the aviation safety initiatives that offered the best safety benefits to New Zealand.[2]

1.4 We also found that the CAA's surveillance was focused on checking an operator's documentation rather than seeking to confirm that the procedures specified in the operator's manuals were being carried out in practice.

1.5 The standard of the routine audits also did not meet our expectations. Individual inspectors applied their own standards, and as a result could reach different conclusions. This was because there were no routine audit plans, senior staff did not review routine audit findings, and there was little follow-up of previous routine audit recommendations.

1.6 We therefore recommended that the CAA should:

- develop a cost-benefit analysis system which would accurately identify aviation safety initiatives that offered the best safety benefits, and therefore adequately manage risk;
- continue a broad-based approach to routine audits with a focus on more rigorous audits of high-risk operators or types of aircraft;

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1 Report of the Controller and Auditor-General: *Fourth Report for 1997*, parliamentary paper B.29[97d], pages 77-121.

2 Ibid, page 86, paragraph 4.031.

- conduct more inspections to confirm that operators applied their quality management systems in practice; and
- develop the proposed confidence rating system to allow audit resources to be targeted at high-risk operations and operators.

Our 2000 follow-up audit and report[3]

1.7 A follow-up audit in 2000 focused on how the CAA had addressed the recommendations made in our 1997 report.

1.8 Our audit found that:

- the CAA had established priority areas and developed broad strategies to address risk areas, and had developed a system for establishing a level of confidence for individual operators (the Quality Index);
- the quality of routine audit reports and documentation had generally improved, and the routine audit process appeared to be well understood by CAA inspectors; and
- the CAA had a well-established system for requiring operators to take corrective action to fix instances of non-compliance with the CARs, and for following up operators' responses.

1.9 However, we still had concerns about the surveillance process. In particular:

- Routine safety audits were being undertaken annually, irrespective of each operator's risk profile.
- Some operators were dissatisfied with these routine audits. Large operators felt that the CAA could do more to add value to its quality assurance processes, and smaller operators felt that routine audits of their operations should focus less on checking documentation and more on physical inspections.
- There were inconsistencies in the approach to routine audits between individual inspectors, some of which the CAA had attempted to address. Management review of routine audit plans was limited.

1.10 We therefore recommended in our 2000 report that the CAA should:

- ensure that its new organisational structure did not reduce the effectiveness of its surveillance resources;
- consider what resources were required to gain assurance on the safety of low-risk operators;
- more appropriately target surveillance resources at high-risk operators;

[3] *Civil Aviation Authority Safety Audits – Follow-up Audit*, ISBN 0-477-02874-8.

- improve the consistency of the use of the Quality Index – for example, by Group Managers selectively reviewing audit plans and how inspectors arrived at their scores;
- increase the proportion of routine audit time spent on physical inspections for operators with limited quality management processes; and
- seek to strengthen staff capability by seconding skilled staff from large operators (recognising relevant constraints).

What this audit covered

1.11 Rather than carry out a follow-up review, we re-audited the CAA's surveillance function because:

- The CAA had introduced a new organisational structure in May 2000, which resulted in the safety audit unit (at that time a unit within the Safety Certification Group) being amalgamated into the operational groups.
- Since our 2000 audit, operators of aircraft with 2 or more engines who were previously operating under a *Transitional Air Operator Certificate* were required to gain Part 119/135 certification by the end of February 2001. Single-engine, fixed-wing, and helicopter operators were required to gain their certification by the end of February 2003. Certification has effectively changed the approach taken by CAA inspectors towards these operators.

1.12 To establish whether our 1997 and 2000 recommendations had been addressed, we focused on the surveillance function. In particular, we looked at the extent to which the CAA's risk assessments influence the depth and frequency of surveillance.

1.13 In addition, we considered whether the certification process was sufficiently robust to keep out potentially unsafe operators.

1.14 We did not cover the following areas, as we considered them outside the scope of the certification and surveillance functions:

- pilot licensing and aircraft certification;
- sport and recreation activities;
- the CAA's "fit and proper person" assessment criteria; and
- the CAA's role in monitoring the occupational safety and health of aircrews during domestic operations[4].

[4] The CAA has been assigned this responsibility through the Health and Safety in Employment Amendment Act 2002.

How we conducted this audit

1.15 We carried out this audit by interviewing:

- senior CAA managers, including General Managers and the Director of Civil Aviation;
- a sample of CAA staff, including team managers, inspectors, internal auditors, and staff from the Safety Research, Education and Publishing Group;
- the then Chair and the Deputy Chair of the CAA;
- staff from the Ministry of Transport and the Transport Accident Investigation Commission; and
- representatives from the Aviation Industry Association.

1.16 We also:

- surveyed, by phone, 27 operators of varying sizes and types;
- observed CAA routine audits in practice and spoke with the operators being audited; and
- reviewed CAA documentation – including audit methodology, the draft strategic plan, the *Aviation Safety Report,* and certification and routine audit files.

Part 2: Regulatory structure and measuring performance

2.1 In this Part, we discuss:

- the role and structure of the CAA;
- the Civil Aviation Safety System;
- the CAA's measurement of performance;
- training courses conducted by the CAA to improve operator performance; and
- the responsibility of the participants in the system.

The role and structure of the Civil Aviation Authority

2.2 The CAA's regulatory role and responsibilities are set out in the Act, section 14 of which states that the objectives of the Minister of Transport (the Minister) are–

(a) to undertake the Minister's functions in a way that contributes to the aim of achieving an integrated, safe, responsive, and sustainable transport system; and

(b) to ensure that New Zealand's obligations under international civil aviation agreements are implemented.

2.3 The functions of the Minister include promoting safety in civil aviation and administering New Zealand's participation in the Chicago Convention (see paragraph 2.11) and any other international aviation convention, agreement, or understanding to which the Government of New Zealand is a party.

2.4 Section 22 of the Act allows the Minister's functions and powers to be delegated to a 5-member board, known as the Civil Aviation Authority (the Authority). It enables the Authority to appoint a Director of Civil Aviation (the Director) and delegate responsibilities and powers to him or her.

2.5 In addition to the responsibilities and powers delegated by the Authority, the Director also has a range of functions and powers conferred or imposed by the Act, including 2 functions which are relevant to the surveillance process:

- controlling entry into and operation within the civil aviation system, through the granting, monitoring, suspending and revoking of aviation documents; and
- taking such action as may be in the public interest to enforce the provisions of the Act and the CARs made under the Act, including inspections and monitoring.

2.6 In exercising his or her statutory functions and powers, the Director acts independently, and is not responsible to the Minister or the Authority in relation to any particular case.

2.7 The organisation through which the Authority and the Director discharge their functions or powers is also known as the Civil Aviation Authority. To distinguish between the 2 bodies, we refer to the 5-member board as "the Authority", and the organisation as "the CAA".

2.8 The CAA is organised into divisional groupings (as shown in Figure 1), of which the following 3 are aligned with sectors of the civil aviation industry:

- the Airline Group is responsible for overseeing the activities of operators of aircraft weighing more than 5670kg[5], or containing 10 or more seats[6], along with the associated maintenance, training, design, manufacturing and supply organisations;
- the General Aviation Group covers the operators of aircraft that weigh less than 5670kg and have 9 seats or less, all helicopter, agricultural and balloon operations, and all sport and recreation aviation (both commercial and private); and
- the Personnel Licensing and Aviation Services Group covers:
  - personnel licensing of pilots, maintenance engineers, air traffic controllers, flight engineers, and flight examiners (including medical certification);
  - aviation service – air traffic service providers, airports and aerodromes, training organisations, meteorological services, communication services, aviation security and dangerous goods; and
  - search and rescue co-ordination.

2.9 This structure has the advantage of building expertise in distinct aviation sectors. To maintain effective oversight, the CAA requires expertise in each of these sectors, and adequate training needs to be provided to ensure that this expertise remains current.

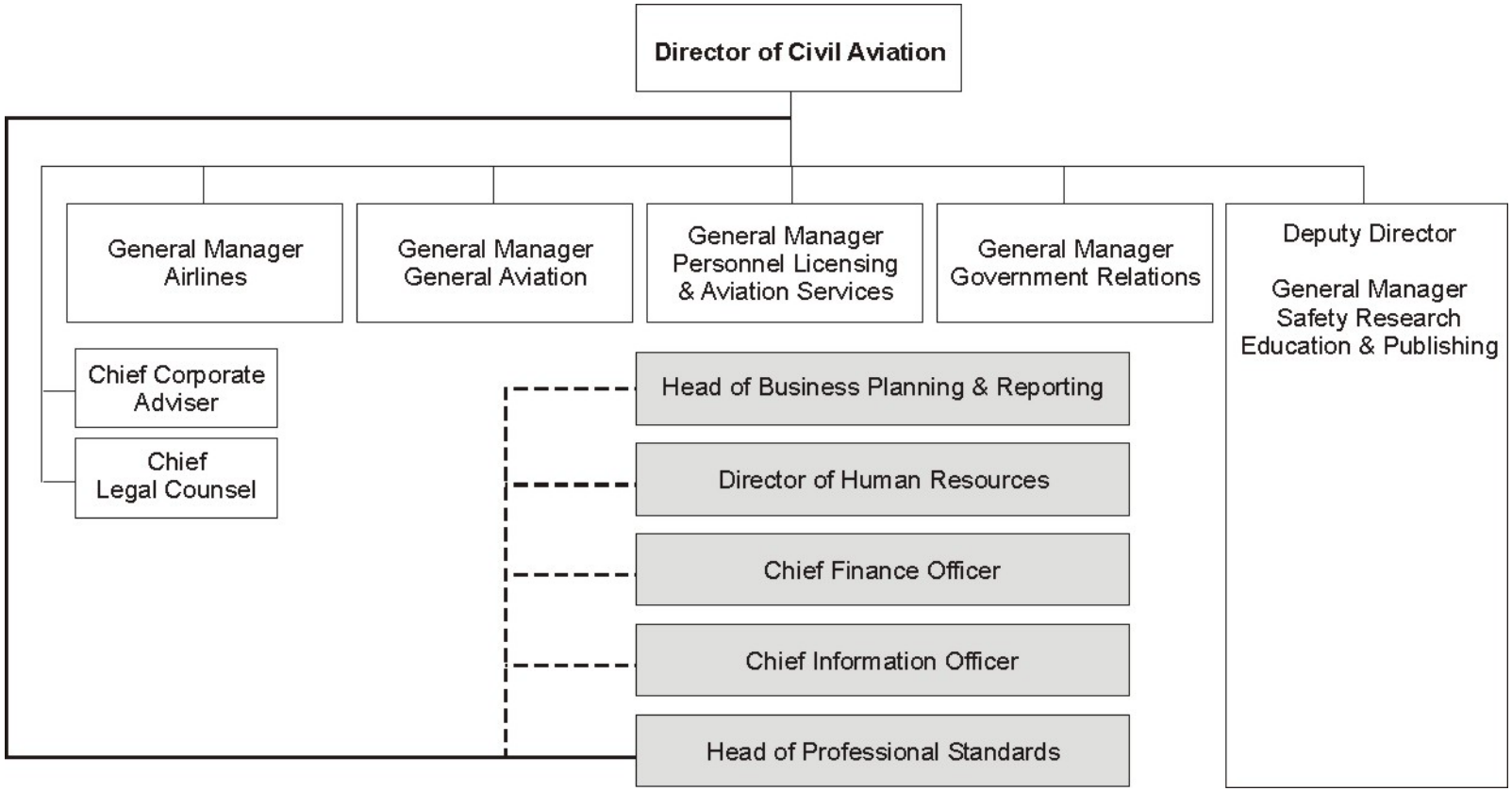
Independent internal inquiry of the CAA

2.10 Although not related to the audits of the CAA that we have undertaken, we note that the Director has recently launched an independent internal inquiry into some aspects of the CAA's performance. The report of this inquiry is to be completed by the end of August 2005, and will be made public.

5 This figure is normally rounded to 5700kg.

6 This class of aircraft makes up about 96% of passenger hours in the aviation industry.

Figure 1
Structure of the Civil Aviation Authority (excluding the Aviation Security Service)



The role of the regulator in the international context

2.11 The *Convention on International Civil Aviation (Chicago 1944)* – "the Chicago Convention" – established the International Civil Aviation Organisation (ICAO). It was signed on behalf of the Government of New Zealand in Chicago on 7 December 1944.

2.12 Article 37 of the Chicago Convention states that the ICAO shall adopt international standards and recommended practices and procedures regarding safety, regularity and efficiency of air navigation. Standards and recommended practices are designated as Annexes to the Chicago Convention. At present, there are 18 Annexes.

2.13 Each contracting state (of which New Zealand is one) is responsible for developing and promulgating the national legislation, regulations and standards necessary to comply with the ICAO commitments, and to implement national decisions in discretionary areas. New Zealand legislation provides for this in section 14(b) of the Act (see paragraphs 2.2 and 2.3 above).

The Civil Aviation Safety System

2.14 The Civil Aviation Safety System is based on the "life cycle" approach advocated in the Swedavia-McGregor Report.[7] This System is based on:

- setting a minimum standard of safety behaviour through CARs and by placing conditions on aviation documents;
- allowing entry into the civil aviation system to those operators who have the capability to meet the required minimum standard for certification and the conditions placed on their aviation documents (certification);
- providing information and advice to operators to assist them to comply with the CARs;
- monitoring operator adherence to the safety standards and their aviation documents, including identifying action that the participants need to take to ensure that they comply with the safety standards (surveillance); and
- where necessary in the interests of safety, imposing conditions on, or suspending or revoking, the aviation document issued to the operator.

[7] The Swedavia-McGregor Report (1988) was the result of a study *... to consider the need, in the interests of safety, for regulatory controls of civil aviation and their enforcement, to identify the appropriate level of regulation, and to determine the resources needed for a civil aviation safety authority*. At the time of the Swedavia-McGregor Report, the Ministry of Transport undertook that function. The findings and recommendations in the report are the foundation of the present regulatory framework in New Zealand.

The Civil Aviation Rules

2.15 The Act provides for 2 principal tiers of legislation – the Act and the rules made under Part III of the Act. The rules are "secondary" legislation, like regulations.

2.16 The rules that apply to general aviation operators are: Part 119 for compliance and operating requirements, Part 135 for flight operation requirements, and Parts 91 and 137 for agricultural operators. Parts 119, 121, and 125 apply to airline operators, and cover compliance with certification and operating requirements. Part 129 covers certification for foreign airline operators that fly to and from New Zealand.

2.17 The CAA initiated a Rules Review Implementation project in April 2004 to improve the rules development process. The Director engaged an independent reviewer[8] in 2002 to make recommendations to increase the efficiency and effectiveness of the rule making process.

2.18 The Rules Review Implementation project addresses the recommendations from the review, which include:

- better identification of necessary rules changes;
- filtering out issues that could be dealt with using other processes;
- using risk management processes; and
- improving aviation community participation in the rules development process.

Certification

2.19 The certification process is intended to ensure that prospective operators understand and are capable of complying with the Act and the CARs.

2.20 Prospective operators are required to complete an "exposition", and submit to the CAA the career histories of nominated staff members performing key roles in the organisation. The CAA completes a "fit and proper person" assessment for these staff members, and checks the exposition to ensure that it complies with the CARs. Airline operators must also have an internal quality assurance system in place that ensures compliance with the procedures specified by Part 119.

2.21 Once the CAA accepts the exposition, staff nominations, and internal quality assurance system, inspectors carry out an entry-level inspection.[9] If successful, the operator is certificated for an initial period of 6 months. Within that period,

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8 Mary Scholtens QC, December 2002 *Review of Participation of Interested Persons in the Development of Ordinary Civil Aviation Rules* (also known as "the Scholtens Report").

9 The main purpose of this inspection is to establish whether management systems detailed in the exposition are in place. This inspection also involves on-site evaluations of support facilities, aircraft, training facilities, maintenance equipment and facilities, and an evaluation of the likely effectiveness of the policies, methods, procedures, and instructions described in the applicant's exposition.

inspectors perform a spot check and a "compliance inspection".[10] At the end of this process, if CAA requirements have been met, the operator is re-issued a certificate for a total period not exceeding 5 years.

2.22 At the end of the 5 years, operators are required to "re-enter" the system by going through the certification process again.

Surveillance

2.23 Section 15 of the Act empowers the Director to carry out such inspections and monitoring as he or she considers necessary in the interests of civil aviation safety.

2.24 CAA surveillance programmes cover all aspects of the civil aviation system (e.g. operators, design and training organisations, aircraft and components, as well as aerodromes and airspace in respect of which CAA approvals are granted). Our audit focused on CAA surveillance of those operators with Air Operator Certificates (Part 119/121,125,135) and Agricultural Aircraft Operator Certificates.

2.25 The CAA considers that the surveillance function is the prime means of ensuring that an acceptable level of aviation safety is maintained, in that it:

- checks that operators are complying with the CARs and the conditions of their aviation documents; and
- aims to identify and correct non-compliant behaviour and unsafe practices before they cause an accident or incident.

2.26 The CAA's *Surveillance Policy* sets out the CAA's surveillance requirements, and *is designed to provide the foundation for the day-to-day surveillance operations of the operational groups, viz. the Airline, General Aviation, and Personnel Licensing and Aviation Services Groups*.

2.27 The *Surveillance Policy* refers to both the depth and frequency of audits and states that *auditing frequency can only be varied based on the results of the audit, or series of audits over a period and the level of confidence the CAA has in the organisation's activities.* The inspector's level of confidence is reflected in the Quality Index score.

2.28 The *Surveillance Policy* includes the range of surveillance tools shown in Figure 2.

2.29 The *Surveillance Policy* requires that all failures by an operator to comply with the CARs, conditions of their aviation document, or their organisation's exposition are to be raised with the operator and included in a Finding Notice, which is to be given to the operator at the end of the audit or inspection.

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[10] The purpose of a compliance inspection is to:
- confirm that the certificate-holder is able to demonstrate compliance with their documented systems and procedures; and
- establish whether their documented systems and procedures are adequate for the nature and size of the operation.

2.30 The Finding Notice lists:

- instances of non-compliance (failure to comply with the CARs) or non-conformance (failure to comply with any additional standards detailed in the organisation's exposition) identified by the inspector;
- the severity of the finding[11], and the cause of each instance of non-compliance and non-conformance;
- the corrective action the operator must take to address the finding; and
- the deadline by which the action has to be taken.

Figure 2
Audit tools in the CAA's Surveillance Policy

Audit Tool	Description
Routine audit	Routine audits are "systems based" in that they check what is actually being done against what the organisation says it will do in its exposition (conformance). These audits also include a review of the management and quality assurance systems the organisation has in place to ensure that it complies with the CARs (compliance).
Inspections	Inspections are undertaken for organisations that are not required to produce an exposition, or that do not require an operating certificate**.** Inspections focus on the operator's safety practices and supporting records.
Spot checks	Spot checks provide the CAA with a snapshot of an aviation operation and its ongoing level of compliance in specific areas, with little or no prior warning that it will be carried out. The CAA's *Surveillance Policy* requires spot checks to be done on either a programmed or an individual basis. Programmed spot checks involve multiple teams in checks of particular operator classes (e.g. tourist or ski plane operators), or an activity (e.g. frost control operations) during a concentrated period of generally 4-7 days. Individual spot checks may be done randomly, on an opportunity basis, as part of the certification process, or in response to other surveillance outcomes (e.g. a low Quality Index score, an increase in the Client Risk Assessment score, or high levels of non-compliance identified during a routine audit).
Special purpose audits	Special purpose audits are used to establish the cause of poor safety performance, or to identify a particular problem within an organisation. These are used to follow up an occurrence, information received, or a safety concern that justifies a special purpose audit or inspection before the next scheduled routine audit or inspection.

[11] Findings are classified as **critical** (an occurrence or deficiency that caused, or on its own had the potential to cause, loss of life or limb), **major** (an occurrence or deficiency that caused, or had the potential to cause, significant problems to the function or effectiveness of the system) or **minor** (an isolated occurrence or deficiency not indicative of a significant system problem).

2.31 To "close" the finding in accordance with the *Surveillance Policy*, the operator must forward evidence that the corrective action has been taken. Until the finding is "closed", the operator remains non-compliant or non-conforming. CAA inspectors are required to ensure that the corrective action is taken within the stipulated time.

2.32 At the end of the audit or inspection, the inspector is required to prepare an audit report for the Director that includes details of the operator's business, audit coverage, the findings identified during the audit, and the required corrective action(s). A copy of this report is also to be given to the operator.

Measuring performance

2.33 The CAA uses "safety targets" to measure the safety performance of the aviation industry, areas where it needs to take action, and the consequences of those actions. Safety targets were first set for the 1995-2000 period, and new targets were set for 2000-2005.

2.34 Safety targets are set for each Safety Target Group (STG). There are 9 STGs, distinguished by the type of aircraft, the weight of the aircraft, and the type of operation being carried out.

2.35 Both primary and secondary measures are used for each STG. The primary measure is the number of aircraft accidents per 100,000 flight hours. Secondary measures assess the number of the following factors per 100,000 flight hours:

- aircraft incidents;
- airspace incidents; and
- reportable aircraft defects.

2.36 Industry non-compliance with the CARs is also assessed. This assessment is based on the median level of non-compliance detected during the routine audit and inspections (for the previous 12 months) weighted for severity and divided by CAA routine audit hours (for the 12 months) as a measure of organisational size.

2.37 An analysis of industry performance against the safety targets shows:

- A decreasing trend in accidents for 8 of the 9 STGs, but increasing trends in the 2721 to 5670kg group (STG 3), which historically has shown the highest level of risk.
- The targets for 7 of the 9 STGs (including the 2 largest STGs, which make up about 96% of the passenger hours of New Zealand's civil aviation industry) are being achieved.

2.38 However, the report for the *Transport Safety Strategies Project*[12] questioned the ability of the safety targets to measure the effectiveness of aviation safety interventions. The report highlighted the fact that relatively small numbers of aviation incidents and casualties in New Zealand made it difficult to evaluate interventions or establish statistically researched causal links between death and injury outcomes and safety programmes.

2.39 The CAA's *Annual Reports* for 2001-02, 2002-03 and 2003-04 have noted that the current safety targets are not a reliable measure of trends in the safety performance of the civil aviation industry. The reports referred to both the primary and secondary measures, and noted –

> *The significance of reporting trends cannot be determined using current systems, as there is currently no means of determining if a changing trend represents a change in actual safety performance or a change in reporting patterns by industry.*

2.40 The CAA's concerns relate primarily to the reliability of the data on which the measures are based, especially in relation to the General Aviation sector. The concerns are that:

- Aircraft flying hours are being under-reported by owners, which means that the safety rates can look worse than they really are.
- Accidents, incidents and defects are also being under-reported by either the pilots-in-command or the operators, which means that the safety rates may look better than they really are. Under-reporting also means that the CAA's Safety Investigation Unit does not have access to all accidents and incidents to see if there is a systemic problem requiring an Airworthiness Directive or a CAR change.

2.41 The CAA's *Statement of Intent 2004/2005 – 2006/2007* also noted concerns about the reliability of incident data, especially as there is no information on what is actually occurring against which to test the accuracy of what the operators and pilots-in-command are reporting.

2.42 The CAA is currently reviewing the measures to establish their reliability and, if necessary, to develop replacements.

2.43 In 2000, the CAA published a booklet (*how to... report your accidents and incidents*[13]). However, the pilots-in-command, or the operators, are still not reporting all incidents to the CAA as they are required to do. The *Aviation Safety Report* for 2002 notes that *the majority of pilot related airspace incidents continue to be reported to the Authority by the ATS* [Air Traffic Service] *provider and not by the pilot or aircraft operator.*

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12 This project involved the CAA, Land Transport Safety Authority, Maritime Safety Authority and the Ministry of Transport engaging in a collaborative planning process to determine the first steps towards a co-ordinated and timetabled approach to the development of aviation, maritime and rail safety strategies.

13 Safety Education and Publishing Unit, Civil Aviation Authority, Lower Hutt.

Training courses conducted by the CAA

2.44 The CAA conducts regular courses for operators. For example, in relation to general aviation, the following courses were held during 2004:

- The Aviation Safety Co-ordinators Course. This 2-day course was held in September-October 2004 at Rotorua, Palmerston North and Queenstown. It covered safety programmes and their structure (including risk management, hazard identification, accident/incident report and analysis), and accident prevention concepts. 60 people attended this course.
- Av-Kiwi – Recent Aircraft Accidents. This course was held at a variety of locations throughout New Zealand from February to September 2004. The course lasted approximately 2 hours and covered the causes and the lessons to be learned from recent air accidents. 429 people attended this course.
- Av-Kiwi Safety Seminars – A to Z Flight Planning. These seminars were held over November-December 2004 at a wide variety of locations throughout New Zealand, and lasted approximately 3 hours. They focused on pre-flight planning and in-flight considerations, and discussed new visual navigation charts, an internet weather service for general aviation pilots and the booklet *New Zealand Airspace – Good Aviation Practice*, which was revised in November 2004. 749 people attended this course.

Responsibility of participants

2.45 All participants in the civil aviation system are required to take their share of responsibility for safety by fully understanding and complying with their obligations under the Act. Section 12 of the Act requires participants to ensure that all activities and functions are carried out safely and in accordance with the relevant safety standard and practices. This includes ensuring that their employees are appropriately trained and supervised, that the organisation is appropriately resourced, and that its management system will ensure compliance with the CARs and any conditions attached to the aviation document.

Recommendation 1: We recommend that the CAA continue to establish measures to better assess the effectiveness of its safety interventions.

Part 3: Information

3.1 The CAA's regulatory role involves making decisions on, for example:

- when an operator has satisfied the requirements for certification;
- the depth and frequency of surveillance required to ensure that operators are complying with the Act and the CARs; and
- at what point an operator has sufficient non-compliance and/or non-conformance with the Act and the CARs to warrant regulatory sanctions.

3.2 To be effective in its regulatory role, the CAA's decision-making must be effective. Good decision-making depends on good information and good analysis of that information so it can, if necessary, lead to action.

3.3 In this Part, we report on:

- the sources of information gathered by the CAA at the industry and operator levels; and
- how this information is analysed at the industry and operator levels.

Sources of information

3.4 The CAA collects a large quantity of data in its Aviation Safety Management System, most of it reported by participants in the civil aviation system (pilots-in-command, owners, operators, air traffic controllers and others). For example:

- aircraft owners are required to provide their aircraft's flying hours annually (for private owners) or quarterly (for commercial owners);
- pilots-in-command (or, if they are unable to, operators) must notify the CAA of the details of all accidents, as well as any aircraft and airspace incidents they have been involved in;
- operators must get approval from the Director for changes in key personnel or the scope of their operations, including any changes of aircraft;
- air traffic controllers must advise the CAA of any aircraft or airspace incidents they have been involved in (for example, misidentification of an aircraft by a radar operator) or are aware of (for example, undershooting, over-running, or running off the edges of runways);
- the Transport Accident Investigation Commission reports on the results of its investigations;
- the Aviation Security Service reports on security incidents; and
- members of the public and the industry may also lodge complaints against operators (Aviation Related Concerns).

3.5 The CAA also gathers a large amount of information from its certification and surveillance functions, and from its own investigations of accidents and incidents and Aviation Related Concerns reported to it. However, in order for this information to be useful, it has to be analysed so it can lead to action if necessary. Action may involve changes to the CARs, education programmes that target high-risk areas of the industry, or additional audits/inspections of individual operators.

Analysis of industry information

Aviation Safety Report

3.6 The CAA provides information about the civil aviation industry in its *Aviation Safety Report* (6-monthly) and *Aviation Safety Summary Report* (quarterly). These reports are produced from data in the CAA's Aviation Safety Management System, and provide a snapshot of the size, shape, and activities of the civil aviation industry in New Zealand. They also allow the safety performance of each STG to be measured against the safety targets.

3.7 The *Aviation Safety Report* is the more detailed of the 2 reports, and contains:

- industry activity statistics – for example, the number of registered aircraft, the number and type of licences, the number of movements at aerodromes (including takeoffs, landings, and missed approaches), the number of air transport flights, and total hours flown;
- trends over time – for example, in aircraft accidents, airspace and defect incidents, and how these compare to the safety targets, including a brief description of serious and significant events; and
- where the factors causing accidents have been assigned, an analysis of them by aircraft group and by aircraft flight operations.

3.8 The *Aviation Safety Report* informs CAA managers of the outcomes of the CAA's safety programme. Concerns over the reliability of the data that operators report to the CAA have been discussed earlier (see paragraphs 2.39-2.43).

3.9 The *Aviation Safety Report* could be improved by:

- Including more interpretative analysis of the information in it, making it a basis for future action. CAA Safety and Analysis staff agree that the reports would be more useful if they contained recommendations based on an analysis of that information.
- Improving its timeliness. In the past, the information has been up to 12 months old before being received by CAA managers. For example, the report for the 6 months to 31 December 2002 was not published until November 2003. We noted an improvement, in that the report for the 6 months to 31 December 2003, was produced in June 2004. However, to be useful, this time lag needs to be further reduced.

Analysis of accidents and incidents

3.10 In our view, the CAA needs to improve its analysis of accident and incident data. For the period 1 July 2002 to 31 December 2003, for example, causal factors were assigned to only 37% of air accidents. We consider that this figure is low, given that accidents are "failures" of the safety system. We believe that the causes of these failures should be investigated to determine whether the CARs need to be changed, or surveillance tailored to address identified risk areas in relation to particular types of operators or functions.

3.11 At its April 2004 meeting, the Authority questioned why only 33% of accidents investigated for the period 1 October 2002 to 30 September 2003 had causes assigned.[14] CAA staff responded that this was a *"fairly typical"* figure, and that it was largely a result of investigator workload.

3.12 The other main reasons given for causal factors not being assigned to accidents were:

- 30% were sport-related (including hang gliders and parachutes). These accidents were assigned a lower priority for investigation. Basic information was "captured" but no causal factors were assigned.
- 15% were not investigated in sufficient depth to determine causal factors. These involved a management judgement call, ensuring that resources were not deflected from cases that had greater potential for safety improvements.
- 10% were still under investigation when the *Aviation Safety Report* was produced.

3.13 The Authority was also concerned that accident and investigation findings were not being fed back into the surveillance process. In the case of a fatal accident report, for example, the Authority asked –

- *Should the CAA establish a more rigorous checking process for organisations undertaking single pilot IFR operations?*
- *How could the CAA deal constructively with anecdotal concerns relating to organisations and individual operators?*
- *What can be done to raise the levels of experience in the sector?*

3.14 We share the Authority's concerns. The CAA advised us that these matters are included in the training courses it conducts. However, we consider that they should also be used to better target routine audits in areas of higher risk.

[14] As reported in the October-December 2003 *Aviation Safety Summary Report*.

Analysis of operator information

3.15 In addition to requiring operators to submit information and statistics about their operations, the CAA collects information on individual operators, primarily through its certification and surveillance functions. To enable a risk profile to be established for each operator, the CAA has developed 3 tools:

- Client Risk Assessments;
- the Non-Compliance Index; and
- the Quality Index.

Client Risk Assessments

3.16 Client Risk Assessments are produced by the CAA's Safety and Analysis Unit. This assessment considers 9 factors, which have been assessed by the CAA to affect the potential risk inherent in an operator's business and operational environment. These factors are:

- Operator profile – the risk inherent in what an operator does (for example, a single pilot flying with instruments is a higher risk than a light twin aircraft in visual flight conditions).
- Operator type – looks at the type of operation (for example, unscheduled would be higher risk than scheduled).
- Operator management – one person covering more than one senior position is considered potentially higher risk.
- Management stability – weights how long the management of the operation has been in place (for example, a change in management is considered to increase risk, if only in the short term).
- Operational stability – weights how long the operator has been doing the job with the current equipment (for example, the introduction of new or a different type of aircraft or opening a new base of operation is considered to increase risk).
- Occurrence evaluation – looks at the number of incidents and accidents an operator has had (for example, the higher the number of occurrences, the higher the risk).
- Financial status – is scored if the operator has not paid money owing to the CAA within the required time (for example, if money is owing, it indicates higher risk).
- The latest Quality Index score – the lower the score, the higher the risk.
- The current Non-Compliance Index score – the higher the score, the higher the risk.

3.17 The risk assessment results in a score that indicates whether the operator is a "low", "moderate", "high" or "very high" risk.

3.18 Client Risk Assessments are generated either when inspectors request them, or when there is a change to any of 9 key items (for example, a change in the operation, or any new accidents, incidents or other occurrences, reported by or about the operator) that increases the risk rating to a "moderate" or higher grading. The reason for the increased risk is then reviewed and appropriate action taken if the inspectors consider it necessary.

3.19 During the trial phase in mid-2000, an operator criticised the process, noting that some changes (such as replacing a senior staff member with a better skilled and more experienced person) might actually reduce risk, whereas the current system resulted in an increased risk rating. The then Director replied saying that he recognised *the relative lack of precision, the difficulty in weighing and balancing some of the factors, and the fact that some – perhaps many – changes are likely to prove positive after a short period of instability or disruption.* He then went on to say that *the risk assessment scores are not intended to be acted on in their "raw" form, but to be a simple "flag" for operators that may require further attention.*

3.20 This view still prevails today. CAA staff we interviewed found the assessments to be of limited use, and most thought the system too unsophisticated to effectively measure risk. The General Manager of the Airline Group thought the present system of risk assessment could be substantially improved by the addition of data provided by the client airline. This additional data, which could include information such as financial and "on time" performance, would give the CAA a more focused and immediate assessment of operator risk.

3.21 To improve the quality of the assessments and increase staff confidence in them, we consider that they should be used to highlight operational changes, but that the details then be given to the inspectors (who have a more detailed knowledge of the operator) so that they can assess what impact the changes have had on operator risk. Rather than the system calculating risk, it would be the inspectors' responsibility to assign an overall risk score, which would then be recorded in the CAA's Management Information System.

3.22 Client Risk Assessments should also better reflect the operator's financial condition. Currently, financial risk is based on whether the operator has paid the CAA's fees (including any CAA surveillance fees), but cash-flow shortages increase the risk that discretionary costs (for example, maintenance, training, and replacing or upgrading aircraft) will be deferred. Potentially, cash-flow shortages also increase the pressure for operators/pilots to fly in marginal weather conditions, or at the limit of, or beyond, their capability.

3.23 Financial risk should be assessed as part of the certification and surveillance functions. Both of these functions should include a discussion with an organisation's Chief Executive about:

- intended/planned expansion or retrenchment in the organisation;
- the organisation's financial position at the end of the previous year;

- the cash budget for the current year, and how the organisation is currently performing against that budget;
- any strategies in place to improve cash flow within the organisation, and the likelihood of their success; and
- any other business risks facing the organisation – for example, competitors coming into the locality, changes to the scale of competitor operations, or the availability of a qualified maintenance engineer.

3.24 In 2004, the CAA commenced a review of its *Surveillance Policy* and related processes, and has advised us that more emphasis will be placed on the Client Risk Assessments in the future, to determine the type and extent of surveillance. This tool is seen to be the most comprehensive of the 3 tools, in that it includes the current Non-Compliance Index score and the latest Quality Index score, as well as the 7 other factors (set out in paragraph 3.16) which are continually monitored.

Non-Compliance Index

3.25 The Non-Compliance Index (NCI)[15] weights instances of non-compliance identified by either the operators or the CAA over a 12-month period. The combined weights are then divided by the latest number of CAA routine audit hours[16] completed for the particular operation. The index is designed to rank operators in their respective sector groups.

3.26 We consider that the under-reporting by inspectors of instances of non-compliance and their routine audit hours (see paragraphs 6.2-6.16 and 7.3), and the under-reporting by operators of instances of non-compliance (see paragraphs 2.39-2.43), affect the accuracy of this tool and therefore reduce its effectiveness.

3.27 We noted from the 31 December 2003 *Aviation Safety Report* that 2 aero clubs of similar size received significantly different NCI scores. One scored 780 and the other 226.5. The club that scored 226.5 had 4 more instances of "major non-compliance" than the other club, but its NCI score was lower because it had 15.75 more routine audit hours. So the aero club that appeared to be the higher risk (because a larger number of major non-compliances were identified) actually had a lower NCI score because the routine audit hours skewed the results.

3.28 Staff from the Safety and Analysis Unit have already recognised this concern, and acknowledge that a better measure is needed to reflect the size of an organisation for the purposes of the NCI.

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15 Each instance of non-compliance is scored for relative severity as critical (30 points), major (2 points) and minor (1 point).

16 Routine audit hours are used to "normalise" the data so that different-sized organisations can be compared, on the basis that the number of audit hours are directly related to the size of the organisation.

3.29 The number of instances of non-compliance is also likely to be understated, because the CAA:

- Relies on operators to advise it of all instances of non-compliance. During our audit, CAA staff advised us that, although operators are required and encouraged to report non-compliance, this does not necessarily happen.
- Requires its inspectors to identify and report instances of non-compliance. During our audit, we detected instances where this did not occur (see paragraphs 6.2-6.16), and our conclusion is supported by the CAA's internal auditors' findings (see paragraph 6.17).

Quality Index

3.30 The Quality Index (QI) was introduced in response to the 1998 Ministerial Inquiry that recommended that inspectors record a "level of confidence" in a certificate-holder's adherence to the CARs and their exposition.

3.31 The QI score is a qualitative rating based on the audit work done and observations made during the audit. The QI requires inspectors, as part of their routine audit, to assess and rate the organisational culture and internal functioning[17] of each part of the organisation.

3.32 For operators in the General Aviation sector, the QI score can be determined for both flight operations and maintenance, which would result in 2 QI scores. For the Airline sector, where operators are audited under Customised Audit Programmes (see paragraph 5.43), a QI score is determined for each module.

3.33 The CAA's *Quality Index Policy* requires that information in the report to the Director, on the results of the audit (the audit report), must support the QI score. A copy of the audit report to the Director and the QI scores is also given to operators in the General Aviation sector. Operators in the Airline sector are given QI scores only on request, as the CAA considers that the independent audit modules make an overall QI score difficult to calculate.

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[17] The following 10 areas are assessed:

- management and staff attitude towards safety;
- clarity of quality management system;
- documentation;
- facility suitability and upkeep;
- tools/equipment/materials;
- adherence to standards and specifications;
- personnel skills, knowledge and numbers;
- control/management system effectiveness;
- corrective and preventative actions; and
- inspector assessment.

Each area is marked using a scale of 1 to 10, with 10 being exemplary. When 1 of the 10 areas is 'not observed', and is therefore not scored, the total raw score is scaled to achieve a final score out of 100.

3.34 The CAA is concerned that QI scores have become a quasi-performance measure for operators in relation to staff performance, and that they are also being used in promotional material. The scores were never intended to be used for either purpose.

3.35 Under the *Surveillance Policy*, the QI score should influence both the depth and frequency of surveillance. For example, for a QI score of 30 or less, the organisation is to be *referred directly to exit control for further investigation with a view to Certification action*. For QI scores of less than 65, inspectors are to consider special purpose audits, more frequent audits, intensive spot checks and Chief Executive interviews. Scores of 65-80 or better indicate that the organisation is at a satisfactory level of compliance and likely to remain so, and need therefore be subject to only routine audits and spot checks. For scores of 80 or more, inspectors can consider reducing the depth and frequency of future routine audits.

3.36 We reviewed 36 QI scores and audit reports prepared by General Aviation Group inspectors. We noted that the Group's *Policy and Procedures* document required the QI score to be incorporated within the audit report, and that the QI score should be supported by information contained in the audit report.

3.37 We found that neither of these procedures had been followed. The QI scores were included in the letter to the document-holder, along with a copy of the audit report, but were not incorporated in the audit report. Not following this procedure means that there is a risk that the Director, for whom the formal audit report is prepared, does not get a copy of the QI scores. He or she therefore does not have access to the inspector's assessment of the document-holder's organisational culture (i.e. the likelihood that an organisation will remain compliant with the CARs).

3.38 More importantly, out of our sample of 36 audit reports, 35 did not have sufficient information to support the QI scores. This lack of analysis and support may contribute significantly to the inconsistency of QI scores (both for the same operator over a period of time as well as between different operators). Providing the required support and analysis will not necessarily increase the length of the report. For example, the one report that we identified that provided the best linkage was no longer than the average report.

3.39 In one example of inconsistency, an operator's scores went from 62% to 71% for flight operations and from 64% to 76% for maintenance in one year. The audit report, however, did not explain the increase. Another operator advised us that, although his practices had not changed, his QI score had increased by 11 percentage points over the year. We reviewed the respective audit reports for this operator and found that they did not explain the increase.

3.40 Inconsistency in scoring, and lack of explanation of the scores in audit reports, has reduced the effectiveness of the QI. Overall, the operators we spoke to did not consider the QI score helpful. In fact, one operator commented that it did not make him any safer. However, operators acknowledged that some sort of ranking was needed – as long as it was supported by feedback on how they could do better.

Recommendation 2: We recommend that the CAA improve its analysis of industry information by:

- including more analysis of the information in the *Aviation Safety Report* and the *Aviation Safety Summary Report* to support further action, and to improve the timeliness of these reports.
- improving analysis of accident and incident data (for example, by identifying further opportunities – such as the CAA's joint study of pilot-caused and controller-caused airspace incidents[18]), from which the CAA will draft recommendations for safety intervention mechanisms.

Recommendation 3: We recommend that the CAA further develop the tools it uses to assess the risks associated with individual operators. For example:

- For the Non-Compliance Index to be more effective, CAA inspectors need to correctly record all instances of non-compliance, as well as the actual audit hours spent with each operator. Operators need to be further encouraged to advise the CAA of instances of non-compliance.
- For the Quality Index score to be more consistent, it should be supported by the information in the routine audit report, and reasons for significant changes should be explained.
- For Client Risk Assessments to be more useful to the surveillance process, the CAA needs to re-assess their function. These assessments identify changes to a company's operation, but not necessarily changes to risk. We recommend that this tool be used to highlight any changes in the company's operations for inspectors, who would then be responsible for assessing the effect of those changes on the risk of an individual operator.

Recommendation 4: We recommend that the CAA use better indicators of the financial status of operators when assessing operator risk, both at certification and during surveillance.

[18] A joint study was undertaken with the Centre for Transport Studies, Imperial College London. A report on this study has been published in *The Aeronautical Journal*, the Royal Aeronautical Society, May 2004, enitiled *Airspace safety in New Zealand: A causal analysis of controller caused airspace incidents between 1994-2002*.

Part 4: The certification function

4.1 The main purpose of certification is to ensure that prospective operators understand and are capable of complying with the Act and the CARs. It therefore restricts entry into the civil aviation system to those operators who will operate safely, and keeps potentially unsafe operators out. In this Part, we report on how well the certification process is being used to do this in both the General Aviation and Airline sectors.

4.2 We reviewed samples of certifications for each sector, to establish whether the process used was an effective "gatekeeper" in keeping unsafe operators from entering the civil aviation system. We consider that an effective certification process would ensure that operators have a good understanding of what is required in terms of their own expositions, as well as a good understanding of the Act and CARs requirements. We expected to find few instances of operators subsequently identified, through CAA surveillance activities, as failing to maintain the level of compliance and conformance necessary for certification.

General Aviation sector

4.3 Since our December 2000 audit, operators of aircraft with 2 or more engines who were previously operating under a *Transitional Air Operator Certificate*, were required to gain Part 119/135 certification by the end of February 2001. Single-engine, fixed-wing, and helicopter operators were required to gain their certification by the end of February 2003.

4.4 We reviewed a sample of 11 certifications (7% of the total number of General Aviation certifications). The behaviours demonstrated (as shown in the examples below) by 6 of these operators within 12 months of certification suggested that they had been certificated without understanding, or being able to comply with, their own expositions or the CARs.

The CAA's compliance with its policies and procedures

4.5 Our review found that the CAA's stated policies and procedures were not always followed. The procedures require:

- inspectors to review the exposition to ensure that it complies with the CARs;
- an entry inspection to confirm that the management systems detailed in the exposition are in place;
- an initial 6-month period during which a spot check is undertaken; and
- a compliance inspection near the end of the initial 6-month period to confirm that the operator can demonstrate compliance with their documented systems and procedures, and to establish whether these are adequate for the nature and size of the operation.

4.6 In one case, an operator was given a 6-month certificate without the exposition being fully checked to ensure that it complied with the Act and the CARs as required by the CAA's policy and procedures. This was done on the basis that the operator purchased an exposition that was CARs-compliant. The *Safety Audit & Entry Inspection Report* observed –

> *The operator was found to be in compliance with all of the relevant rules and ready for certification under the new rules. Although the Exposition has not yet been critiqued in the detail required, it is generic to the degree that we have confidence that it shows rule compliance under Part 119/135. A detailed critique of the Exposition will be provided separately and it will detail those items that were not checked on this audit. The Company Base at … will be inspected as part of the compliance inspection.*
>
> *It is proposed that a Part 119/135 certificate be issued for six months with a spot check to be held after approximately three months, and a compliance inspection be conducted at the five-month point to check that the procedures that are detailed in the IEX are being used.*

4.7 The practice of buying a "generic" exposition from a supplier, which passes the CAA inspector's critique, can lead to problems if the operator's actual policy and procedures are different to, and not brought into line with, the generic exposition. In such cases, the operator will be non-conforming with their exposition and possibly non-compliant with the CARs.

4.8 For example, the report on the compliance inspection, (conducted 6 months after the entry inspection) on the operator with a generic exposition (paragraph 4.6) noted–

> *It is confirmed from the logbook inspection that the recording of maintenance as specified in the operator's exposition and the rules has not been carried out… procedures should be introduced through the company's quality assurance system to ensure the appropriate detail is contained in the logbooks.*

4.9 Although we accept that, in this instance, the maintenance had been done, we were concerned that the inspectors, having noted during the compliance inspection that this operator had failed to conform with its own exposition, issued the operator with a long-term (5-year) certificate. Our understanding is that certification requires the achievement of a certain level of competency, and that, during compliance inspections, operators are required to demonstrate that management systems detailed in the exposition are in place and functioning as specified. We do not believe that was demonstrated in this instance. Moreover, we note that, in a subsequent safety audit conducted a year after the compliance inspection, the audit report observed –

> *Exposition procedures were not always being followed and the Company appeared to have put insufficient effort into reviewing and amending the manual to ensure that it remained a true reflection of the operation.*

4.10 While CAA policy and procedures require an entry inspection and a compliance inspection, we noted one instance where these inspections were combined. The operator was certificated for 5 years, provided that a spot check was done within 3-6 months of certification, but we found no evidence that the spot check was done. It is

therefore not surprising that, within 12 months of certification, the inspector noted problems with the operator being ignorant of many of the CARs requirements and its own exposition (see paragraph 4.15 – "the first operator").

4.11 The CAA has advised us that this practice occurred occasionally where an already certified operator subsequently changed its name after completing the full initial entry process. While we acknowledge:

- that the operator was previously operating as a trading arm of another operator, and was seeking certification to enable them to operate independently; and
- that the exposition the operator was intending to use was virtually the same as that used in the operating arm,

the initial review of the exposition highlighted 44 corrections required to the exposition, and further corrections were required after the entry/compliance inspection. In our opinion, the issues with the exposition should have meant that combining the entry and compliance inspections was not justified in this instance.

Is the CAA's certification process an effective "gatekeeper" for the General Aviation sector?

4.12 In order for the process to act as an effective "gatekeeper", the General Aviation Group needs to be more rigorous in its assessment of the operator's ability to comply with the Act and the CARs. Out of a sample of 11 operator certifications that we reviewed, we noted that CAA inspectors had identified significant problems with 6 operators who, within 12 months of being re-issued with a certificate for up to 5 years, were found to be not conforming with their expositions.

4.13 The problems identified from our sample were such that they brought into question the quality of the certification undertaken by inspectors. Our review raised questions as to whether operators had fully understood the purpose and requirements of their exposition and certificate, and whether certification had adequately "tested" the operators.

4.14 For example:

- For the first operator, within 12 months of certification, the routine audit report noted –

  > *…the Company is in ignorance of many of the requirements of the Rules and its own exposition procedures… extra spot checking will be scheduled over the coming year to confirm that the issues raised in this report are corrected and compliance is improved.*

  This operator also had a special purpose audit within 20 months of certification, because of concerns relating to the "risk" posed by the operator. Our expectation was that, having undergone certification, there should not have been such a significant change in behaviour over a 20-month period that the operator's risk increased to the extent of warranting a special purpose audit.

- For the second operator, we noted from the routine audit report (12 months after certification) that –

  Exposition procedures were not always being followed and the Company appeared to have put insufficient effort into reviewing and amending the manual to ensure that it remained a true reflection of the operation. However, in spite of this, it was pleasing to see that there was a genuine desire to operate appropriately and safely, and there was no evidence to suggest that any unsafe practises were condoned or exercised by senior persons within the company.

- For the third operator, the report from the routine audit noted –

  The Auditor found that this system [quality assurance/management system] *fell well sort (sic) of the compliance standard, whilst staff were trying hard to come to grips with a change in its operation and legislative requirements there can and was no excuse for the poor performance of this system…the system currently in place cannot and will not be able to keep the Company in a compliant state.*

  From the number of Findings issued for Maintenance deficiencies it is evident that there are some major lapses with the Maintenance Control and this is common when one person carries out all duties.

  This operator's QI scores (59% for flight operations and 64% for maintenance) did not achieve the required 65% "pass" mark.

- For the fourth operator, the routine audit report (12 months after certification) stated –

  It was extremely disappointing to the auditor to find such a large degree of non-compliance, the problem is twofold the operator has to take responsibility for their own exposition and make sure that amendments are approved before inclusion into the exposition, they also need to ensure that the exposition reflects its own operation and that procedures contained within are those that the operator use …Confusion or mis-communication has led the operator into an unacceptable level of non-compliance.

- For the fifth operator, the routine audit report stated –

  The Exposition does not adequately describe the current organisation. Consequently, the operator does not comply with elements of the computer Exposition because those sections of the Exposition do not describe current Company practice.

  The Company has in place a number of systems/processes which are in compliance with applicable legislation but which are at variance to their Exposition …Particular items of concern have been identified as currency of Airworthiness Directives and the full completion of Logbooks.

- For the sixth operator**,** there were enough concerns about the organisation within 7 months of certification to require a special purpose audit. Resulting from that audit, 26 Finding Notices were issued**.**

Airline sector

4.15 To assess whether the CAA's inspectors complied with their procedures (as noted in paragraph 4.5), we reviewed a sample of 8 certifications – 4 under Part 121, 3 under Part 125, and 1 that came under both parts. The sample covered almost a third of the total number of Airline operators.

The CAA's compliance with its policies and procedures

4.16 Our review revealed few instances of non-compliance by CAA inspectors with the CAA's policies and procedures.

4.17 In those cases where there was deviation by CAA inspectors from the policies and procedures, audits within a year of certification did not identify any significant problems with the operator. This contrasted with our findings relating to the General Aviation sector (see paragraph 4.13).

4.18 This situation may be due in part to the more complex entry requirements placed on the Airline sector than the General Aviation sector, which means that operators applying for Part 121 and 125 certification have more requirements to meet before being certificated. For example, on top of CAA certification and surveillance regimes, airlines are required to have their own quality assurance processes, the sophistication of which reflects the emphasis they place on safety.

4.19 Notwithstanding these findings, our file reviews highlighted 3 issues that we have raised with the CAA.

4.20 In the first instance, the certification process identified concerns with an operator's quality systems and management acceptance of its Quality Management process. Instead of this matter being addressed at entry, it was transferred to the routine audit process for closure. Additionally, the recommended term for the certificate's term from the compliance inspection report was exceeded – the certificate was granted for 2 years rather than the recommended 18 months.

4.21 A second instance was where the CAA's files contained no evidence, other than *Audit Work Request Control Sheets* (see Part 7 of this report), that the required inspections for an operator's certification had been conducted.

4.22 In the third instance, at the time an operator applied for a certificate, they suggested a time within which they wanted to be certificated, attaching to the application a schedule for meeting that deadline. The issue with this example is the appearance that the operator, rather than the CAA, determined the timeline for certification.

4.23 The Airline Group's management expressed confidence to us that, while tight timeframes had been placed on the certification process, the standard of the process had not been compromised, and the dates in the plan would not have been agreed to if the standard had to be lowered to meet them. Nevertheless, the CAA's internal auditors have commented that a number of operators have established "aggressive start-up

times", and that this has placed pressure on the Airline Group's ability to meet its planned commitments for the year (on top of apparent staff shortages).

4.24 We consider that, while the CAA must be aware of the commercial realities facing airline operators, its paramount concern should be the compliance of those operators with the CARs, not the need to achieve certification by a date set by the operator.

Is the CAA's certification process an effective "gatekeeper" for the Airline sector?

4.25 We consider that the certification process for the Airline sector is generally sound, in that the certifications we reviewed were not subsequently found to be deficient through audits. This may be due in part to the more complex entry requirements placed on the Airline sector.

Recommendation 5: We recommend that the CAA ensure that its inspectors follow the policies and procedures set down for certification.

Part 5: The surveillance function

5.1 In this Part, we assess the CAA's surveillance function, in particular the extent to which risk assessments (identified in Part 3 of this report) influence the depth and frequency of the surveillance.

Policy in relation to risk and the surveillance function

The industry

5.2 The *Surveillance Policy* requires the CAA's operational groups to adjust surveillance priorities and methods. For example:

- surveillance associated with air transport operations and related service providers is to be given priority over surveillance associated with other forms of activity (such as agricultural aircraft operations);
- the surveillance programme must adopt strategies from the *CAA Business Plan* that relate to particular groups of operators (such as air transport operators with aircraft in the 2721 to 5670kg group); and
- information from the *Safety Plan* (now part of the CAA's *Statement of Intent*) and the 6-monthly *Aviation Safety Report* is intended to lead to longer term shifts in the focus or direction of the surveillance programme.

Individual operators

5.3 The *Surveillance Policy* allows for changes in individual operator risk through varying the depth and frequency of the surveillance.

5.4 The *Surveillance Policy* states that a change in depth is achieved by changing the extent of sampling done during the audit or inspection, or by carrying out additional surveillance – for example, a special purpose audit or inspection.

5.5 The extent of sampling depends on the judgement of each inspector. Currently, there is no sampling methodology to guide inspectors in exercising this judgement. The CAA's Professional Standards Group identified a need for guidance in this area in 2002, and has since implemented the "Surveillance Review Project", which includes development of and training in sampling practice and methodology.

5.6 "Frequency" refers to the number of times the operator is visited in a year. The International Civil Aviation Organisation (ICAO) recommends that –

All significant aspects of [an] *operator's or organisation's procedures and practices should be evaluated and appropriate inspections conducted at least once every twelve-month period.*[19]

5.7 It is current CAA policy for the CAA to undertake an annual routine audit in all instances. However, in the case of Part 119/135 and 137 operations assessed as low risk, we believe the CAA could undertake a routine audit less frequently than yearly. Such an approach would need to be supported by a robust risk assessment framework and other forms of intervention (e.g. spot checks). We understand that the CAA is now reviewing its procedures to consider the circumstances in which routine audits may be undertaken less frequently than every year.

5.8 This would be similar to the approach of the Australian Civil Aviation Safety Authority (CASA), which requires all general aviation operators to be audited at least once in every 3-year certificate lifecycle. Larger passenger-carrying operators and the Certificate of Approval operators[20] that maintain them have more frequent scheduled surveillance. High Capacity Regular Public Transport operators[21] are audited every 6 months, and Low Capacity Regular Public Transport operators[22] and large charter operators every year.[23]

5.9 This scheduled surveillance is supported by risk-based audits of operators that CASA believes are a relatively high risk to aviation safety. They may be triggered by:

- a high Safety Trend Indicator score;
- industry intelligence;
- aviation incidents or accidents; or
- findings from scheduled surveillance.

Surveillance in the General Aviation sector

Types of audit

5.10 Since our December 2000 audit, operators of aircraft with 2 or more engines who were previously operating under a *Transitional Air Operator Certificate*, have been required to gain Part 119/135 certification by the end of February 2001. Single-engine, fixed-wing, and helicopter operators were required to gain their certification by the end of February 2003.

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19 ICAO document 9734-AN/959, *Safety Oversight Manual* (Part A).

20 In Australia, a Certificate of Approval is issued to persons and organisations that intend to carry out the design, distribution or maintenance of aircraft, aircraft components, or aircraft materials.

21 In Australia, High Capacity Regular Public Transport refers to aircraft with 38-seat capacity or greater operating regular public transport services.

22 In Australia, Low Capacity Regular Public Transport refers to aircraft with less than 38-seat capacity operating regular public transport services.

23 *Aviation Safety Compliance Follow-up Audit*, ANAO, Audit Report No.66, 2001-02, page 58.

5.11 Certification effectively changed the approach taken by CAA inspectors towards General Aviation sector operators. Inspectors are generally now able to take a systems-based audit approach that checks whether the operators are conforming to their expositions. These expositions set out the instructions, procedures, and information necessary to permit the personnel concerned to perform their duties and responsibilities with an acceptable degree of safety and comply with the Act and relevant CARs.

5.12 In practice, inspectors in the General Aviation Group have combined systems-based audit with some observation of activities. We support this hybrid approach because we consider that some observation-based sampling is required to confirm that the systems are operating effectively. The degree of reliance that inspectors consider they are able to place on the management systems should determine the extent of inspection undertaken. Non-compliances or non-conformances identified in the initial sample should determine the extent to which further sampling is done.

5.13 Those operators certificated under Part 119/135 are intended to be audited annually, but this is subject to work pressures and staff availability.

5.14 Agricultural operators under Part 91/137 are subject to inspection. Although the *Surveillance Policy* states that such operators are to be visited on a 2-year cycle, in practice they are inspected annually.

Impact of risk on depth and frequency of audits/inspections

5.15 Our audit assessed the extent to which assessments of industry risk and individual operator risk affected the surveillance process.

5.16 We found that industry risk does influence the spot check programmes that are based on types of operations (for example, frost control, or looking at aircraft areas that are prone to cracks). However, we were not able to establish, and the CAA was not able to demonstrate to us, how increased risk in particular STGs feeds into the routine audit process. For example, despite increasing accident trends in the 2721-5670kg group (which has historically shown the highest level of risk), this group still undergoes the same depth and frequency of audit as the other STGs.

5.17 To assess the extent to which individual operator risk influences the surveillance process (routine audits, spot checks and special purpose audits), we selected 5 operators with “very high” Client Risk Assessment ratings and low QI scores (less than the “pass” mark of 65) to establish whether the depth or frequency of the audit was altered to reflect this risk.

Depth

5.18 In our sample, we found that individual operator risk had little overall effect on the depth of surveillance undertaken. In fact, in 2 instances we were concerned that the depth of the audit or spot check was not sufficient to address the risks noted.

5.19 In the first instance, the depth of the routine audit appeared to be determined by the time available rather than risk, in that the January 2003 routine audit report noted –

- *Changes and repairs to the pilot seat are questionable, but there was not time during the audit to pursue this further.*
- *Only the helicopter log books were available for inspection and from these it was very difficult to determine that all required maintenance had been performed, or that all maintenance that had been carried out had been recorded correctly. Maintenance requirements that could not be verified as being carried out include those inspections and re-torques required by the maintenance manual chapter 05-20-15 and 05-20-20. From the log book it could be seen that a number of compass calibrations had been carried out, but these could not in all cases be related to other maintenance entries. The additional work records associated with work identified in the log books could well hold the required information and this will be followed up at a later date. No findings have been issued as a result of this inspection as the information may be contained in additional maintenance records.*

5.20 The report's summary commented –

> *Due to the standard of logbook entries, a spot check will be conducted at a later date to determine that all the required maintenance has been carried out and the appropriate record of that maintenance has been compiled. This may result in findings being raised.*

5.21 In the second instance, the depth of the spot check did not appear to address the risks noted, in that it was reported –

> *Discussions with the Maintenance Controller…left the Airworthiness Inspector with a feeling that* [the organisation's] *approved procedures were not being followed and also poor attitude to CARs requirements with Tech Logs being raised for periods greater that the approved maintenance programme.* …the Maintenance Controller *was also observed to fit an altimeter without carrying out a leak test.*

5.22 However, no findings were raised as a result of this spot check.

5.23 In both of the above instances, we would have expected CAA inspectors to have done enough work to establish whether the organisation's approved procedures and the CARs were being followed and, if not, to have raised appropriate findings.

Frequency

5.24 We noted that, although a perceived increase in risk did not affect the depth of the audit, it did increase the frequency of the audit.

5.25 For one operator the areas observed by the inspector actually reduced from 2002 to 2003 in that:

- in August 2002, the QI scores (64% for maintenance and 59% for flight operations) did not constitute a "pass" and the audit resulted in 11 findings against this operator. One of the 10 QI areas (tools, equipment and materials) in the flight operations area was "not observed" during the audit; and
- by September 2003, the QI scores had improved to 67% for maintenance, and 61% flight operations, but given the results of the previous surveillance, we were surprised that 3 areas of the maintenance side of the organisation (clarity of management systems, control/system effectiveness, corrective/preventive actions), and one area in the flight operations area (tools, equipment and materials), were "not observed" during the audit.

5.26 However, we noted that the frequency of surveillance did increase after the August 2002 routine audit, in that:

- A spot check was undertaken in October 2002 to do a *QA system follow-up check and exposition content and knowledge check. Also went through individual findings from the last audit to check what had actually been done to rectify them.* The audit report from the spot check found that ... *the company have addressed all the findings issued at the audit; however the knowledge and experience required to ensure QA system compliance will take some time to achieve … the company requires assistance to achieve the necessary standard and will require spot check surveillance to check on progress.* This was positive in that the audit had identified a "risk" that was to be followed up by more frequent surveillance.
- A further spot check was performed in February 2003. The report of the spot check noted that the outstanding issues from the last audit had been discussed with the operator's Chief Executive – *However it was not possible to establish that the issues relating to Quality Assurance had been resolved.* We were concerned to note that the depth of the spot check had been affected by the time available to the inspector rather than risk; fuel was stored in a shed some distance from the hanger, but ... *Due to a shortage of time this was not inspected.*

5.27 In relation to another operator, the frequency of surveillance also increased. However, it took 2 routine audits and more than a year for this to happen, in that:

- A routine audit was completed in July 2002, producing a QI score of 67% for maintenance and 57% for flight operations. Despite the policy that a low QI score should be followed up, the next contact CAA staff had with the organisation was a routine audit in July 2003. The QI score in this audit was still below a "pass" – 62% for maintenance and 62% for flight operations.
- Additional spot checks have been completed since the July 2003 audit – one in November 2003 and another in January 2004.

Deficiencies in follow-up action

5.28 In another case, although the perceived risk in relation to the operator did result in the inspector identifying a need for increased surveillance, the frequency of surveillance did not increase. A routine audit in August 2002 resulted in 7 Finding Notices and a QI score of 64% for maintenance and 62% for flight operations. Another spot check was carried out in November 2002 as a follow-up, with the report noting that spot checks on the operation should be carried out when staff were in the area. The next visit was not until August 2003, at which time the company's exposition was still found to be deficient, but its QI scores had improved to 71% for flight operations and 67% for maintenance.

5.29 A final example leaves us concerned about the amount of surveillance of what appears to be a high-risk operator.

5.30 In this case, a routine audit had been completed in July 2003 (12 months after certification), which resulted in a QI score of 73% for maintenance (the peer reviewer thought that this was not low enough to reflect the findings recorded in the report) and 59% for flight operations. The routine audit resulted in 10 findings (6 non-compliances with the CARs and 4 non-conformances with the operator's exposition).

5.31 We were concerned when we reviewed this operator's file that no follow-up action was recorded from the time of the routine audit (July 2003) until a special purpose audit was completed in April 2004.

5.32 CAA staff advised us that the following action had been taken:

- CAA staff had visited the operator in September 2003, and *discussions of a general nature took place with an emphasis on compliance issues*. They also had discussions with another senior operator who undertook to "have a severe word" to the operator from an industry or mentor perspective and to provide him with sound advice from his peers.
- Two spot checks (December 2003 and January 2004) were attempted, but the operator was not at the airfield so the inspectors made no contact.
- A special purpose audit was undertaken in April 2004, which resulted in a reduction of both QI scores (maintenance from 73% to 59% and flight operations from 59% to 52%). This audit and our concerns with it are discussed in paragraphs 5.39-5.42 below.

5.33 We have the following concerns about the follow-up action taken by inspectors in relation to this operator:

- It was left to a member of industry to undertake to "have a severe word" to the operator while CAA staff had discussions of a general nature. We would have expected the CAA staff to have at least strongly reprimanded the operator.
- The fact that the operator's absence from the airfield on 2 occasions meant that a spot check by inspectors was not undertaken. We would have expected that, in

instances where operators are clearly not meeting the required standard and not taking corrective action in relation to findings, every effort would be made to inspect the operation.

- The fact that, when the operator still did not take corrective action to address the findings noted during the routine audit (apparently in spite of warnings by both CAA staff and his peers), and the subsequent special purpose audit resulted in a further reduction in the operator's QI scores, this did not lead to any stronger follow-up action than a further routine audit being completed in July 2004.

5.34 It was not until the further routine audit was completed that the operator achieved a pass for the QI scores (66% flight operations and 73% maintenance). However, we note that, at the time of the routine audit, there were findings still outstanding from the special purpose audit, in spite of the operator being given a reminder that the findings needed to be attended to.

5.35 The General Manager of the General Aviation Group advised us that the operator *would undoubtedly benefit from operating under the watchful eye of a helicopter operator experienced in the discipline of today's environment. However the CAA is not in a position to impose this.* The General Manager then went on to say that he *also counselled him on several occasions, including speaking to his father and mother.* He then went on to say –

> *The action taken … has been time consuming, scrupulous and onerous to both operator and CAA but may be taken to be representative of the approach taken by GA Group to operators who cause concern. It will always be our first intention to bring an operator back into compliance rather than impose heavy handed administrative or enforcement action, unless that operator is negligent, unrepentant or dangerously at fault.*

5.36 In our view, this case raises a question about the level of non-compliance required before a case is referred to the CAA's Law Enforcement Unit for further action. We consider that the CAA should develop guidelines to determine when instances of non-compliance should be referred for enforcement action.

Special purpose audits

5.37 Over the last 5 years, 2 special purpose audits have been directed at Part 119/135 operators. The first, in June 2002, was done in response to:

- the results of a spot check which revealed deficiencies in the company's systems;
- information that had been forwarded to the CAA;
- CAA statistics; and
- the company's previous audit.

5.38 The audit covered all aspects of the operation in question and replaced the routine audit scheduled for the following month. Twenty-six Finding Notices were issued as a result of this audit.

5.39 The audit was followed by a spot check in August 2002. It focused on following up the findings from the special purpose audit (at the time of the spot check, 2 findings still required action). No findings were noted from the spot check. A routine audit was completed in June 2003 and no Finding Notices were issued.

5.40 A second operator (the same operator referred to in paragraphs 5.29-5.34) was subject to a special purpose audit in April 2004. This special purpose audit was completed as a result of a lack of action to clear routine audit findings, a low QI score from the same audit (59%), and a "moderate" Client Risk Assessment.

5.41 The special purpose audit included a follow-up of the findings of the previous audit (5 of the 10 findings had still to be closed). Staff changes, facilities, exposition and maintenance planning were also reviewed, the aircraft was inspected, and maintenance records examined.

5.42 Although a Finding Notice was issued at the conclusion of the special purpose audit, we were concerned that other observations had been made in the audit report, but had not been verified to determine whether a Finding Notice should have been issued. They included the following –

- *There is no indication that an operational flight check, or a check of the autorotation RPM had been carried out in accordance with the manufacturer's maintenance manual at the appropriate times. The results of these tests are required to be recorded as specified in Part 91 and 43.*
- *A maintenance entry indicates that the fuel low light has been adjusted to come on at 28 litres. The maintenance manual chapter 29-00-00 requires this to be set to illuminate at 35 pounds of fuel in line with the fuel gauge indication.*
- *There is no record of the yearly inspections being carried out as specified in chapter 05-20-15 of the maintenance manual.*
- *Information relating to the above issues may well be found in the work records associated with the log book entries, but as these were not sighted at the inspection this possibility was not confirmed.*

5.43 The special purpose audit resulted in a reduction of both QI scores (maintenance from 73% to 59%, and flight operations from 59% to 52%). However, we were surprised that only 9 of the 10 categories of QI were graded during the audit ("corrective and preventative actions" was not). As the special purpose audit was in response to the "risk" associated with the organisation (low QI score, moderate risk, and non-response to findings) the *Surveillance Policy* requires an increase in the depth of the audit.

Surveillance in the Airline sector

Types of audit

5.44 Unlike Part 135 and other operators in the General Aviation sector, Part 119/121 and 125 operators are audited according to a Customised Audit Programme that contains all the audit modules that will be completed during the coming financial year. According to the CAA's *Surveillance Policy*, these programmes ... *are proposed by CAA and agreed with the operator…*

5.45 The *Surveillance Policy* also notes that –

> *In selecting the modules customised for that operator, account is taken of that organisation's past safety performance (from data held in the CAA safety database) and the capability of its internal quality assurance function.*

5.46 The General Manager of the Airline Group told us that the content of the programmes was determined through reference to database material and risk assessments, in addition to the combined experience of the Group's inspectors. He said that the programmes changed little from year to year, but that for 2004-05 the Group took a "zero-based" audit approach to revise its assignment of modules, with the number of audit hours coming out at about the same as in previous years.

5.47 As a result of our file reviews and discussion with an airline operator, we do not believe that all Customised Audit Programmes are the result of consideration of the operator's past performance or the quality of their quality assurance, as envisaged by the CAA's *Surveillance Policy*. We found instances where programmes were simply rolled over from one year to the next, while others were largely unchanged from year to year, despite a record of sound audit performance. It also appears that little reliance is placed on the operator's own quality assurance function, regardless of their maturity and sophistication.

5.48 We acknowledge that the CAA has international obligations to aviation regulatory bodies to maintain a certain level of monitoring for airlines that operate in their jurisdictions. Nevertheless, our findings relate to the components of the programmes, as well as the level of audit. These findings are supported by the examples below.

Operator 1

5.49 This operator told us that their audit programme was "negotiated" with the CAA, but that the term was a misnomer as the CAA sent a programme for the company to agree to, and there was no negotiation over which particular modules were to be completed. Nevertheless, this operator thought that the components of the modules were normally appropriate, but that the programme remained consistent from year to year regardless of their performance in the previous year's audits. The operator wanted more communication with the CAA, and more analysis of the findings of previous audits so that areas in the next year's Customised Audit Programme could be better targeted.

5.50 We reviewed this operator's audit files to see whether its Customised Audit Programmes reflected the *organisation's past safety performance (from data held in the CAA safety database) and the capability of its internal quality assurance function*, as required by the CAA's *Surveillance Policy*.

5.51 A CAA audit of this operator's quality assurance function found that –

> *The audit programme appeared to cover all the activities of the company, with most of the audits carried out to schedule. Some had been re-scheduled, but it appeared that all was in good control.*

5.52 As for the internal audits completed by the operator, the CAA concluded –

> *The reports indicated that the depth of audit was sufficient, and this was verified by the complexity of some of the audit findings*.

5.53 The CAA audit raised no findings against the operator's quality assurance function.

5.54 In relation to the operator's safety performance, a special purpose audit had been conducted in the previous year, because the CAA wanted assurance that organisational changes had not affected the operator's lines of communication. The fact that this audit was done shows that the audit programme has a degree of flexibility, although the operator questioned its value and wondered if the inspectors had had enough time to do a thorough job.

5.55 Looking at this operator's safety performance from QI scores recorded for the recent past, the range was 66.7% to 90%[24] for 2001-02 and 65% to 91.1%[25] for 2002-03. Despite this level of performance, the content of the operator's Customised Audit Programme changed little over the period reviewed. In fact, audit hours remained the same for both the 2001-02 and 2002-03 programmes (the programmes were simply rolled over) and then increased slightly for the 2003-04 programme. The operator's QI score ranged from 68.9% to 90%[26] for 2003-04. According to the CAA's *Surveillance Policy*, for QI scores of 80 or more, inspectors can consider reducing the depth and frequency of the audit, but that has not happened in the case of this operator.

5.56 We also observed during one of the operator's audit modules that not all elements of the module, as detailed in the Customised Audit Programme, had been completed by the CAA inspectors. Time constraints appear to have meant that some elements of this organisation were audited lightly, with others not being covered at all.

5.57 Such constraints could mean that an inspector does not have enough time to test a process in any great detail, and that concerns us. We are not convinced that there is a process by which any unfinished audit work is incorporated into the next module, or by which risk areas are identified during the module so that they can be targeted if time is running short.

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[24] 25 of 34 (73.5%) QI scores given were 80 or over.
[25] 26 of 33 (78.8%) QI scores given were 80 or over.
[26] 27 of 32 (84.4%) QI scores given were 80 or over.

5.58 In contrast to audits by the General Aviation Group, standard checklists had not been used for this Airline Group audit. During our file reviews we noted the presence of a variety of CAA checklists, depending on the nature of the audit (for example, line operations, or aircraft and log book checks). We consider that the regular use of checklists by Airline Group inspectors would save time and help to ensure consistency.

Operator 2

5.59 During correspondence with the CAA about its Customised Audit Programme, this operator noted that –

> *Your suggested programme is larger than last year's which we accept for Part 125 elements, but consider the other sections could be streamlined taking into account the time we have been operating under Part 119 and the results of the last few audits.*

5.60 In response, the CAA stated –

> *You will probably have noted that we have gone away from speaking of 'negotiating' audit programmes. This is because the 'negotiation' gave the idea of haggling over time taken. Under the Act the Director has to monitor operators, so this is what has to be done. The idea of estimating hours is for an indication of budgeting for the operator and for CAA – as you say "as a best guess". It is better than a guess in that it takes into account past experience etc.*

5.61 Later in the same response, the CAA added: –

> *…I don't mind what the hours are the modules just have to be completed satisfactorily and effectively*. [sic]

5.62 This example illustrates some industry frustration at the formation of standard Customised Audit Programmes that do not necessarily reflect previous audit results. We agree that audit programmes should not be negotiated, but they should be developed taking account of previous audit experience and findings.

Impact of risk on depth and frequency of audits/inspections

5.63 In a similar exercise to that done for the General Aviation Group, we reviewed operators who had received a "high" risk assessment score (higher than 40%), and QI scores less than the "pass" mark of 65% over a 12-month period. This exercise was designed to see whether audit programmes were adjusted in response to the CAA's indicators of high risk and low level of confidence that the operators will adhere to the CARs and their own expositions.

5.64 The Airline sector differs from the General Aviation sector in that risk assessment and QI scores are calculated more regularly for airlines because of the audit module system that applies to their operations. Over the period reviewed, we noted 3 modules where airline operators scored a QI of less than 65% (the range being 40-

62%), while another 3 operators between them had 7 "high" or "very high" risk assessment scores (the range being 43-56%).

5.65 Our review found little evidence that routine audits done as part of the Customised Audit Programmes were adjusted, either in frequency or depth, in response to indicators of "potential increased risk" or low QI scores. We would have expected risk areas to be reviewed more frequently, even if this necessitated unscheduled reviews to ensure that deficiencies had been corrected. There was also little evidence that operators scoring low-risk assessments and high QI scores were audited in less depth or less frequently, despite this being CAA policy.

5.66 We consider that, when preparing an operator's audit programme for the forthcoming year, CAA inspectors need to take account of the risk assessments available to them, in addition to drawing on their combined knowledge and experience. We also consider that, if the risk assessment or QI scores change during the year, the programme needs to be altered to reflect any increase in risk. This may mean that unscheduled reviews need to be undertaken, to ensure that the deficiencies have been corrected.

Recommendation 6: We recommend that the CAA continue with its review of its surveillance function. In undertaking this review and designing a new approach, the CAA should:

- ensure that the audit process directs resources at the highest-risk operators;
- direct appropriate activities and interventions at high-risk Safety Target Groups;
- give priority to the sampling project (a sampling methodology will allow inspectors to make informed decisions on the work necessary to cover the assessed risk);
- assess where reliance can be placed on operators' own quality and risk management systems, so that audits can be targeted at higher-risk areas;
- ensure that the depth and frequency of surveillance is adjusted to reflect operator and operation risk; and
- develop guidelines to indicate when instances of non-compliance should be referred to the CAA's Law Enforcement Unit for further action.

Part 6: Surveillance follow-up

6.1 In this Part, we assess whether the CAA's follow-up practices ensure that unsafe operator behaviour and practices identified during surveillance are addressed in a timely manner.

Findings and corrective actions

6.2 We reviewed a sample of audit reports to establish whether inspectors had raised all instances of non-compliance or non-conformance in a Finding Notice, as required by the *Surveillance Policy*. In many cases, this had not been done.

6.3 One audit report contained the following observations, that appeared to note instances of non-compliance or non-conformance and for which a Finding Notice had not been issued –

> *Maintenance planning is rudimentary relying on the technical log and other information generated by the maintenance organisation. As all of the required inspections are not being tracked it is conceivable that some items in relation to the major replacement and routine inspection of components could be missed.*
>
> *No occurrences have been reported in the last year. In the course of the audit some defect incidents were found that should have been reported (tail rotor gearbox problems).*

6.4 We note that this same issue had been raised as a finding in a routine audit report by a different inspector for another operator.

6.5 We found 2 instances of non-compliance and non-conformance where Finding Notices had not been raised because the operator was in the process of doing something about the problems –

- *The other equipment attached to the helicopter was spray gear identified as that produced under the Marine helicopter modification. There is no indication that this equipment has undergone any inspection, and the maintenance requirements should be included in the maintenance programme. With the introduction of the new helicopter the maintenance requirements for fitted role equipment will be required to be included in the maintenance programme*.

- *The Exposition has not been amended since re-certification and some editorial corrections to delete reference to the Planning Manual and VFG and include the new references (Aeronautical Information Publications Volume 1 and Volume 4 respectively) are due. The Company has an Exposition amendment under way to reflect the proposed changes.*

6.6 Even if the operator is in the process of taking corrective action, we consider that a Finding Notice should still be raised to ensure that the operator follows through and fixes the problem.

6.7 We also noted that the copy of the Finding Notice that should have been given to the operator at the conclusion of the audit was still on the CAA file, which raises 2 issues. The first is that the procedure of giving the Finding Notice to the operator at the end of the audit had not been followed. The second is that, as the operator was not given a copy of the notice, it is unlikely that corrective action would have been taken.

6.8 In a separate case, the audit report noted an instance where an occurrence report had not been submitted to the CAA as required by the CARs. However, the operator's non-compliance was not raised as a Finding Notice –

> *A main rotor lead-lag had been replaced on 21 June 2002 due to cracking. There was no evidence that a defect report had been submitted. Mr* [name of operator] *was requested to ensure that a defect report is submitted as soon as possible.*

6.9 In another case, the spot check audit report noted –

> *Discussions with the Maintenance Controller…left the Airworthiness Inspector with a feeling that* [organisation's name] *… approved procedures were not being followed and also a poor attitude to CARs requirements with Tech Logs being raised for periods greater that the approved maintenance programme. Mr… was also observed to fit an altimeter without carrying out a leak test.*

No findings were raised as a result of this spot check.

6.10 In another case, the audit report noted that –

> *the standard of maintenance control and planning was hampered by Logbook sections not being fully completed and a fragmented approach to scheduling and tracking of required maintenance.*

6.11 Again, no Finding Notices were raised as a result of this review. However, the letter to the operator's Chief Executive did advise that a spot check would be carried out in the future, concentrating on the areas identified.

6.12 In another case, the audit report on a spot check of *critical areas prone to cracks* located cracks in the engine mounting brackets. According to the report, the *cracks were highlighted to the maintenance engineer for rectification.* No findings were raised as a result of this spot check.

6.13 In another case, a spot check report noted –

> *No physical checks of aircraft were carried out although we were shown the various aircraft under restoration. There is not really any question of the quality of the workmanship but the recording of what is being done leaves something to be desired.*

Again, no findings were raised as a result of this review.

6.14 In the case of another operator, the audit report noted that –

> *Pilot competency and currency due dates were monitored on a computer database but it was noticed that there was some mixing of due and actual dates.*

The company will need to review its internal audit program checklist for Quality Assurance to ensure that Rule requirements do not appear to be compromised.

The audit showed deficiencies in the fatigue monitoring system (because it had not been completed), which will need to be addressed, especially if operations increase.

Despite these comments, no findings were raised.

6.15 In a later audit of the same operator, the inspector commented –

During boarding at Wellington, the first wave of passengers wandered off across the apron toward the wrong aircraft…. They were intercepted by loading staff who redirected them. The cause of that incident was a lack of ground staff at the gate. There was only one staff member handling the boarding and he was inside checking tickets so was unable to marshal the passengers at the same time. Another staff member should be on the apron to guide and supervise passengers.

6.16 This represented a significant safety issue for the passengers involved. However, no finding was raised.

Internal auditors' concerns

6.17 The CAA's internal auditors were also concerned about findings not being raised when they should have been, and about inconsistencies in practice between inspectors (as well as between the Airline and General Aviation Groups). For example, a finding might be raised in one case, but not in others that warranted the same treatment.

6.18 After conducting internal audits of both the Airline and General Aviation Groups, an internal auditor reported in August 2002 that he had –

…observed variations in auditing practice between Flight Operations Inspectors and Airworthiness Inspectors within the AL [Airline] *Group. Also observed were variations in the auditing practice between the AL Group and the* GA [General Aviation] *Group.*

6.19 Later in the same report, the internal auditor noted –

The lack [sic] *use of the findings process to effect corrective and preventative action is a concern that needs to* [be] *addressed across the CAA. Recent internal audits of both the GA Group and AL Group have identified this issue and finding notices against CAA have been issued accordingly to address it.*

6.20 After the publication of the internal audit report, the Airline and General Aviation Groups held workshops in an attempt to improve the consistency of audit practice.

Clearance of Finding Notices

6.21 Along with our concern about findings not being raised, we are also concerned about the length of time taken to close the findings that are issued, and the way in which some of them are closed. This concern is based on data on all Finding Notices issued to both Airline and General Aviation operators over a 12-month period.

6.22 Operators are supposed to provide supporting evidence for their claim that they have carried out the corrective action required to close a finding. We found that some inspectors attached supporting evidence for closing a finding, while others appeared to close findings simply on an operator's assurance that appropriate action had been taken.

6.23 In one case, 10 Finding Notices were issued. However, at the time of our audit, both copies (the CAA copy as well as the copy that should have been given to the operator) were still on the file. In short, there was no evidence that the operator had taken corrective action, and the inspector had taken no follow-up action to find out why these matters were still outstanding.

6.24 In another instance, vague wording made it difficult to identify exactly when the finding had been closed. For example, a finding required the *Operations manager to remind all pilots to take more care in completing documentation*. This kind of action should be an ongoing responsibility, rather than one to be completed within a finite period. At the time of our fieldwork, action on this finding was more than a year overdue.

6.25 We also found a large number of findings where corrective action was significantly overdue. For example, a routine audit in January 2004 noted that findings raised at the time of the compliance inspection had not been cleared. Effectively, this meant that the operator had been non-compliant with the CARs for over 12 months.

6.26 We are concerned at the time that it takes to close critical findings in the General Aviation Group. The CAA describes a critical finding as *An occurrence or deficiency that caused, or on its own had the potential to cause, loss of life or limb*. We therefore expected that CAA inspectors would ensure that appropriate action was taken by the operator immediately or within the following month.

6.27 We analysed the time taken to close critical findings during the 12 months from July 2002 to June 2003 (the General Aviation Group closed 32 critical findings during this period). We consider that an unacceptably long time was taken to close the majority of these findings. For example, 11 findings took over 200 days to be closed, and only 5 were closed in less than 25 days. The time taken is shown in Figure 3.

Figure 3
Time taken by the General Aviation Group to close critical findings

Time taken to close critical findings (days)	Number of findings
Over 400	1
300-400	3
200-299	7
100-199	8
50-99	7
25-49	1
10-24	5

6.28 In addition, there was one critical finding dating back to March 2003 that had not been closed at the time of our audit.

6.29 However, we were pleased to note that, for the one critical non-compliance identified by the Airline Group for this period, the finding was closed in a day.

6.30 We are equally concerned about the number of "major" findings for which corrective action was overdue. At the time of our audit, 22 major findings were outstanding in the General Aviation Group (20 non-compliances and 2 non-conformances). Seven findings dated back to late-2001, 2 were made in December 2002, and the remaining 12 were made prior to June 2003 (more than 9 months before our audit). Six major findings were outstanding in the Airline Group (3 non-compliances, 2 non-conformances and 1 observation).

6.31 We found that 2 of the 6 findings outstanding in the Airline Group (one a major non-compliance and the other a major observation) had been assigned to a person who had since left the CAA. This resulted from the CAA having no process for re-assigning outstanding findings when staff leave.

Recommendation 7: We recommend that CAA inspectors issue a Finding Notice for all identified instances of non-compliance and non-conformance.

Recommendation 8: We recommend that the CAA establish a system that ensures that operators take quick and effective corrective action when inspectors tell them to do so. This system should include re-assignment of responsibility for that function when an inspector leaves the CAA.

Part 7: Surveillance resources

7.1 In this Part, we:

- review the amount of time CAA inspectors spend on surveillance, to establish that this time has not decreased since the implementation of the new organisational structure in 2000;
- review the amount of surveillance audit training undertaken, to ensure that inspectors have and maintain appropriate skills; and
- assess the CAA's internal quality assurance processes for the surveillance function, to ensure that the quality of this function is being adequately monitored.

Time spent

7.2 During our audit, we noted that inspectors did not record all the hours spent on the certification and surveillance functions (especially routine audit hours). We believe that this under-reporting is significant enough that we are unable to make a definitive statement on the trends in audit hours over the last 6 years. We are therefore unable to assess whether the CAA's change in organisational structure in 2000 has affected the level of surveillance undertaken.

7.3 CAA staff told us that:

- the inspectors do not record all the hours that they work in the time recording system; and
- the majority of preparation and report writing time is often charged to an administration code.

7.4 This means that the CAA does not know the actual level of resources required both to maintain the surveillance programme and to improve the accuracy of its risk assessment tools (for example, the Non-Compliance Index uses audit hours as part of its calculation).

7.5 It also makes it difficult to assess the number of staff required. For example, the General Aviation Group has requested additional staff, but the hours reported for airworthiness and flight operations inspectors showed an average of only 288 hours of surveillance work for the 2003-04 year, which was down from the 318 hours recorded for the previous year.

7.6 We were told that one of the main reasons for not recording all the hours worked is that the cost of the routine audits is charged to the operator at $133 per person hour (normally 2 inspectors are involved in a routine audit, which means $266 per hour). Understandably, many smaller operators may be resistant to paying any more than the actual hours spent on-site at the organisation.

7.7 The Professional Standards Group reported this issue to the Authority's Audit Committee in March 2004 noting –

> *Management and staff in these groups* [the Airline and General Aviation Groups] *are working extended hours to meet the industry demands. Time management figures establish that every person in the Groups record an additional 2 hours per person each week. Further, there is strong anecdotal evidence to suggest that both field staff and management are under-reporting hours worked. Invariably, travel time, work taken home and preparation and follow-up activities while in the field in the evening are not being recorded in timesheets.*

7.8 The report then went on to say that the current workloads meant that the CAA's operational groups had limited time for support activities – for example, following up audit findings, developing the CARs, group policy and procedures, and quality assurance and risk management activities.

7.9 The CAA's internal auditors have also noted a high turnover of managers and staff within the operational groups, some of whom have left for positions with aviation operators.

7.10 The internal auditors have reported that workload and management turnover have resulted in piecemeal attention to various management functions (such as strategic and business planning, project and programme management, and staff oversight). In essence, operational activities (such as certification and audit) have taken priority over management functions, with some managers becoming too closely involved in operational activities.

Surveillance audit training

7.11 Two concerns were raised during our audit about the training of CAA inspectors. The first concern related to the deferral of training due to staff shortages and workloads within the operational groups. The second concern was from industry representatives, who were worried about the level of currency training done by inspectors.

7.12 New inspectors are required to attend a 1-week residential course in basic auditing, which is reinforced by a 2-day refresher course every 3 years (although we noted during our audit that the CAA was trying to locate a course better targeted at civil aviation audits). Inspectors are also required to do sufficient training to maintain their professional qualifications (currency). The CAA has also run courses on the Act, the CARs, risk analysis, report writing, and communication skills.

7.13 Inspectors may also be required to attend familiarisation courses for new aircraft run by aircraft manufacturers. For example, an inspector from the Airline Group travelled overseas to be familiarised with the Airbus A320 passenger aircraft.

7.14 The training budget was increased from $0.4 million in 1999-00 to $0.9 million in 2000-01 in response to criticism from the industry on the competency of CAA personnel. However, due to financial pressures and the high costs of specialised technical training, the CAA decided to "temporarily curtail" this investment. The training budget was reduced to $0.7 million in 2001-02, which allowed for the

minimum of essential training to be carried out, and the actual amount spent was only $0.3 million.

7.15 In 2002-03, the training budget was maintained at the same level as in the previous year ($0.7 million) to enable training to be resumed. Resource demands resulted in actual expenditure being limited to $0.6 million.

7.16 In our view, the technical nature of the job is such that the training to which the CAA has committed must be done, notwithstanding competing priorities. The pace of technological change in the industry also reinforces the importance of training to maintain an inspector's currency.

Quality assurance processes

Peer review

7.17 The CAA's internal quality assurance processes require that every routine audit report and spot check report produced by the Airline and General Aviation Groups is to have an *Audit Work Request Control Sheet* attached to it. This control sheet requires audit reports (but not spot check reports) to be peer reviewed and proof-read by a person not involved in the audit.

7.18 We found that this review was often completed long after the audit. Generally, there were no peer review comments. To be meaningful to the inspectors being reviewed, and an effective quality improvement tool, these reviews need to be completed in a timely manner.

7.19 We also had concerns with the quality of some peer review comments noted on the routine audit reports. For example, in one case the peer reviewer noted that recommendations had been made. In our view, the reviewer should have questioned why the recommendations were made (because the CAA's policies and procedures do not allow for them), and also why a Finding Notice was not issued for one particular recommendation, which was –

> *That further Competency Checks are to be clearly identified as such and be recorded in Company Records and the applicable Pilot Logbook.*

7.20 In addition, the audit report noted –

> *The following comments were discussed with the Maintenance Controller during the audit and are listed to ensure they have been rectified:*
>
> - *A loose leaf logbook entry (or direct entry) for a repair carried out on the right lower wing @ 4036.1 hours.*
> - *During the inspection the Maintenance controller made logbook entries for the ELT RCPI battery change and the annual proof testing of the seat belts.*

7.21 These seem to be matters where Finding Notices should have been raised to ensure that corrective action was taken by the operator.

7.22 We were also concerned to find a case where the peer reviewer noted that they did not think, given the comments in the report, that the QI was low enough. We were not able to ascertain that any action was taken as a result of this comment. Neither the report nor the QI score were adjusted, and nor was there any evidence that the inspector had justified the QI score in the light of the peer reviewer's comments.

7.23 Group meetings are another quality assurance tool, but their frequency varies between the CAA's operational groups. General Aviation Group managers meet once a week, and quarterly to examine the application of the general aviation rules and consistency of practice between inspectors. The Airline Group has a weekly management meeting, monthly unit meetings, and monthly group meetings.

Internal audits

7.24 We were pleased to see that the CAA's Professional Standards Group has audited both the Airline and General Aviation Groups. For the financial year 2002-03, the internal auditors completed 9 audits of routine audits completed by the inspectors. In addition, the Professional Standards Group also completed 6 audits of activities by the Chief Legal Counsel and the Government Relations Group.

7.25 We reviewed a sample of the internal audits, and consider that they help to promote consistent good practice across the CAA. We also noted that they raised many of the issues that we identified during our audit. However, as the operational groups did not always "buy in" to the internal audit recommendations, corrective action has sometimes not been undertaken.

7.26 The internal audit function operates in a similar way to the surveillance function, in that CAA staff are audited for compliance against ISO standards, legislation, policies and procedures. Finding Notices are issued for any non-compliances or non-conformances, and an internal auditor (called a Co-ordinator Quality Systems) is responsible for ensuring that the appropriate corrective action is taken.

7.27 For example, an internal audit in February-March 2004 raised a Finding Notice against the Airline Group relating to *minimal QA procedure and practice.* The corrective action was that the Group's management should *adopt and implement CAA generic QA policy and procedures*.[27]

7.28 In response, the General Manager of the Airline Group noted that the group was not currently reporting on quality because it was waiting for CAA-wide policies and procedures to be developed. He considered that –

> [while] *The adoption and implementation of CAA generic QA policy and procedures is a priority for the CAA, this finding on a lack of procedure and practice in the Airline Group reflects a wider problem within the CAA.*

[27] During fieldwork for this audit, the Head of Professional Standards indicated that the development of generic CAA policies and procedures was progressing, and would be made available to staff electronically.

7.29 He added that, while the CAA's management had been given a presentation on the internal quality assurance system, all CAA staff should be given the same presentation because –

> *There is, as was demonstrated at a management level, an almost total lack of knowledge of the system…The lack of a correctly functioning QA system is a serious risk to the CAA.*

7.30 The internal auditors are planning regular (bi-monthly) workshops to consolidate action on internal audit findings and other CAA quality assurance policies and procedures.

7.31 The internal auditors normally arrange an internal audit programme for the year ahead. Historically, this has proved difficult to complete, however, because the 2 internal auditors are often taken off-task by various external reviews of the CAA – for example, those done by the Bureau Veritas Quality International (BVQI) and the State Services Commission[28] – and the work required by the Health and Safety in Employment Amendment Act 2002.

7.32 We consider that the internal audit process needs to be strengthened. The small size of the Group (2 internal auditors) and competing priorities mean that the practices used by each inspector will be covered only every 2 years. In our view, this review needs to be undertaken at least annually.

7.33 The internal auditors are also responsible for completing special projects, one of which is the audit rate sampling confidence project. This project is designed to help inspectors establish the level of sampling needed to establish confidence levels that any outcomes are representative. Sampling practices vary at present, and a standard for establishing confidence in sampling would promote consistency across the CAA.

ISO accreditation

7.34 The CAA is an ISO9001: 2000-accredited organisation, certified with BVQI, and is audited against this standard once a year. The last BVQI report we sighted, dated 29 January 2004, noted that the CAA's *Internal audits continue to be effectively managed, suitably reported and actioned in a timely manner…. The internal audit process is judged to be very effective.*

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[28] The SSC undertook a review of, and made recommendations regarding, the CAA's internal policies and procedures for identifying and managing conflicts of interest. The SSC also reviewed the adequacy of the CAA's practices, policies and procedures for the conduct of special purpose inspections and investigations relating to the suspension of aviation documents.

Recommendation 9: We recommend that CAA inspectors ensure that they record all time spent on the surveillance function. Continuing to do otherwise will affect the accuracy of the CAA's risk analysis tools, and its ability to produce accurate business cases.

Recommendation 10: We recommend that the CAA:

- ensure sufficient investment in training CAA staff so that they develop and maintain the appropriate skills to carry out their functions;
- review its staffing levels when the current review of the surveillance function has been completed, to ensure that it has sufficient resources to undertake this function (Both the review of the surveillance function and the review of staffing levels need to take account of the potential pressures or "surges" put on inspectors as a result of unanticipated requests for certifications.);
- ensure that the operational groups comply with the CAA's generic policies and procedures (particularly relating to Quality Assurance);
- promote consistent standards of quality and practices throughout the operational groups by ensuring that they address internal audit Finding Notices; and
- ensure that the internal audit section is appropriately staffed to enable the CAA's operations and inspectors to be audited on a more regular basis.

Appendix

Intended actions advised by the Civil Aviation Authority in response to our recommendations

Summary of findings	Intended action by the CAA
Recommendation 1: That the CAA continue to establish measures to better assess the effectiveness of safety interventions.	• Continue to review the current measures in order to establish their reliability and where appropriate develop replacements.
Recommendation 2a: That the CAA improve its analysis of industry information by including more analysis of the information in the Aviation Safety Report and the Aviation Summary in order to support further action and improve the timeliness of the reports.	• Identify further opportunities for analysis to include in the safety reports and improve the timeliness of the reporting.
Recommendation 2b: That the CAA improve its analysis of industry information by improving analysis of accident and incident data to identify further opportunity to make recommendations for safety interventions.	• Review data gathering and analysis processes to enhance the CAA's ability to identify safety improvement opportunities and make recommendations for safety initiatives.
Recommendation 3: The current risk assessment tools used by the CAA to assess risks associated with individual operators are underdeveloped and the outcomes from the current practices are adversely affected by inaccurate or incomplete data.	• Reassess the function of a client risk assessment as an audit planning tool. • Review the provision of accurate and meaningful input data from all sources within the CAA. • To improve the effectiveness of the NCI inspectors must record all instances of non compliance. • The inspectors should ensure that the audit report, the findings and the Quality Index are in accord.
Recommendation 4: The CAA, during certification and surveillance, does not examine or take significant account of the financial condition of a client when assessing the operator risk.	• Review the impact of finance on safe aviation operations and the ability of CAA to meaningfully monitor this aspect of operators' performance. • Establish if the CAA can require detailed financial data from a client for certification and subsequent monitoring purposes.
Recommendation 5: That CAA ensures that its inspectors follow the policies and procedures set down for certification.	• DCA to make a clear statement that CAA are to adhere to approved policy and procedures. • That management ensure that all CAA/Group/Unit policies and procedures are current, relevant

Summary of findings	Intended action by the CAA
	and documented.
Recommendation 6a: Elements of the current CAA surveillance function should be reviewed and this includes the processes and tools used to direct resources, activities and interventions at the highest risk operators.	• Review current processes and tools used to determine operators at risk and amend the current or develop new tools and procedures to plan and schedule resources, activities and interventions.
Recommendation 6b: Elements of the current CAA surveillance function should be reviewed and this includes the lack of sampling methodology and processes to enable inspectors to make informed decisions when planning and conducting an audit, and to assess risk.	• Develop and implement a sampling methodology for inspectors to use during surveillance/certification activities.
Recommendation 6c: Elements of the current surveillance function should be reviewed and this includes the lack of a sensible process to determine the reliance that can be placed on an operator's quality & risk management systems so that audits can be re-focussed on higher risk areas (e.g. inspect or monitor?).	• Develop and implement a methodology to determine the level of credence and reliability that can be placed on an operator's QA and risk management systems so that the depth and style of a surveillance activity can be adjusted appropriately.
Recommendation 6d: Elements of the current surveillance function should be reviewed and this includes the depth and frequency of the current audit schedules (excepting customised programmes) as these do not necessarily reflect the individual operator risk level.	• Review the current policy to audit annually and develop policy, methodologies and procedures to allow the CAA to adjust the level of surveillance to better meet the assessed risk level of an operator.
Recommendation 7: CAA inspectors fail to issue findings for all identified instances of non-compliance and non-conformance.	• Review and simplify the current systems and processes used to record findings. • Resolve the current CAA/client conflict over fees and charges for surveillance activities. • Establish programmes to train staff on the Rule parts essential to their regulatory tasks. • Establish regular currency training programmes for all staff on the policy, procedures and Rule parts essential to their regulatory tasks. • Review and establish a more rigorous peer & management review of audit reports and findings.

Finding	Action
Recommendation 8a: CAA inspectors/ managers are not ensuring that operators close all findings in a timely manner.	• Review and amend current findings follow-up and close-out procedures.
Recommendation 8b: When a CAA inspector leaves CAA there is no process to transfer that inspector's open findings to another inspector.	• Develop procedures to transfer the follow-up of open findings to another inspector when an inspector leaves the CAA.
Recommendation 9: CAA inspectors are not recording all the time spent on surveillance activities. This impacts on management's ability to provide resources and accurately assess client's risk levels.	• Staff to be instructed in the necessity to maintain accurate time records. • Review current management processes to check accuracy of entry data in the time management system. • Resolve the current CAA/client conflict over fees and charges for surveillance activities.
Recommendation 10a: There is a lack of investment in the training of CAA staff to develop and maintain the appropriate skills to carry out their functions.	• Review current inspector audit training programmes.
Recommendation 10b: Operational groups are not addressing internal Finding Notices.	• Operational groups to review current practices for managing QA internal findings at their next QA Management Representative meeting
Recommendation 10c: The internal audit section is not able to regularly conduct audits of staff in the field given the current staffing level	• Review, prioritise and document the Professional Standards Group's workload in order to determine staff resource requirements
Recommendation 10d: Review staffing levels to ensure that there are sufficient resources to undertake the surveillance function once the current review of this function (Surveillance Review project) is complete. The review needs to take account of surge requirements brought about by unanticipated requests for certification for example.	• Review operational group staffing levels on completion of the Surveillance Review Project.