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POINTING TO SAFER AVIATION

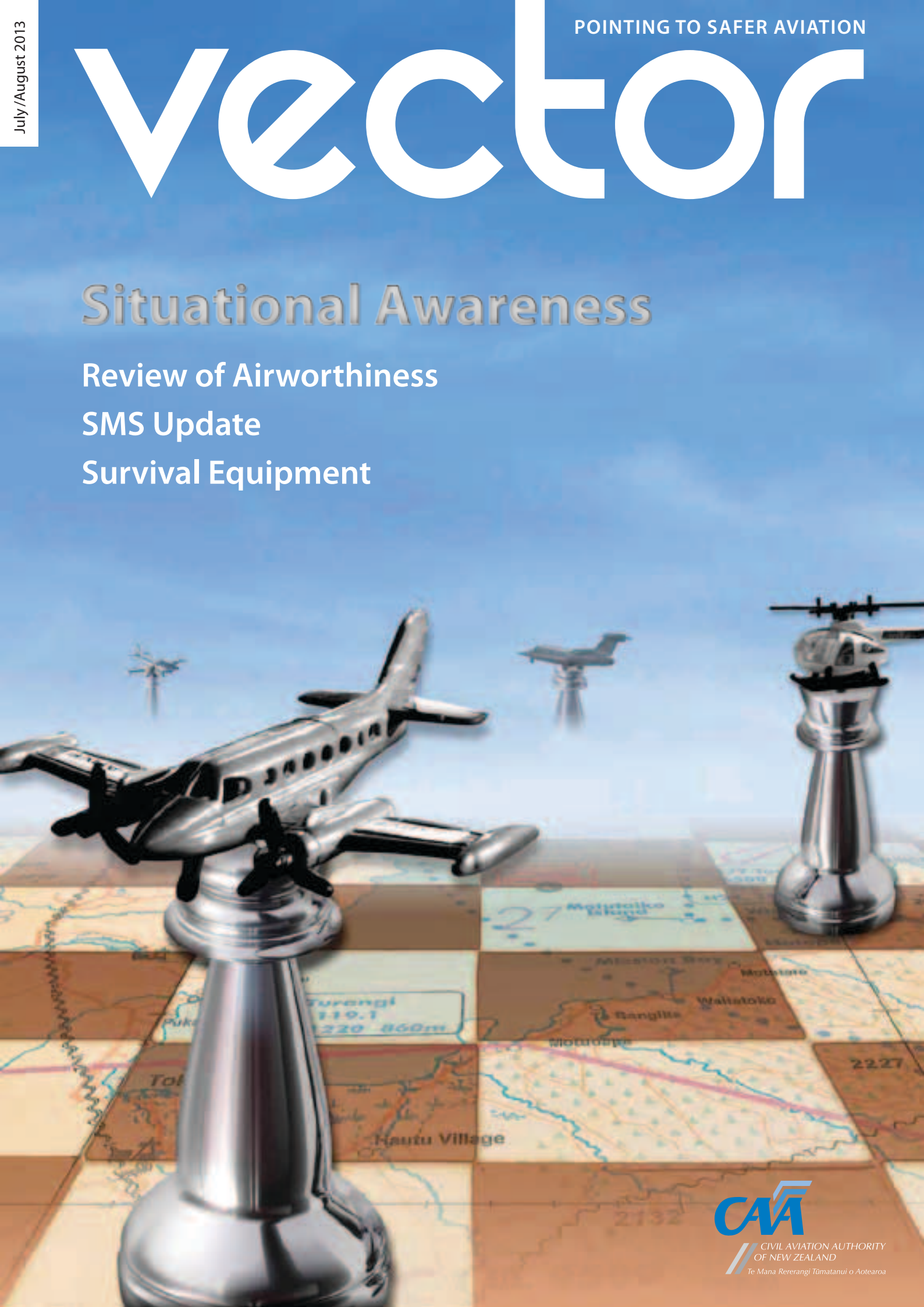
vector

Situational Awareness

Review of Airworthiness

SMS Update

Survival Equipment



CIVIL AVIATION AUTHORITY
OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

vector

In this issue...

Situational Awareness

Can you recall a time when your mental picture didn't reflect what was happening outside the cockpit? Here we discuss the process of gathering information, understanding it, and thinking ahead. Improving these situational awareness skills could save your life one day.

Review of Airworthiness

A Review of Airworthiness (RA) is an important part of ensuring that an aircraft remains airworthy. This article gives information on RA essentials, such as what it involves, who can perform one, and how you can work out if your aircraft needs one done.

SMS Update

A Safety Management System (SMS) is a proven means of achieving a safer workplace. The CAA is encouraging proactive adoption of SMS, and recently ran a series of industry forums at which several operators detailed their SMS experience to date.

Survival Equipment

This article emphasises the need for safety and survival equipment on over-water flights, and suggests that compliance with the bare minimum standards might just not be enough to save your life.

Cover: Just like a chess game, situational awareness requires you to comprehend all available information so you can make the correct decision. Everything is in a state of flux – you have to think a few moves ahead.
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Situational **Awareness**

Situational awareness is the key to collision avoidance. Improving these skills could save your life one day. Simply put, situational awareness can be described as, "What was, what is, and what might be".

To gain and maintain situational awareness, you need to Gather, Understand, and Think Ahead – in other words, get some GUTs.

We gather information through preparation and by scanning the environment. We understand information by comparing the information with our mental models. We use those models to make decisions, take action, and review.

Gather

In order to attune yourself to your surroundings, you need to develop a sound systematic scanning pattern and sufficient mental capacity to absorb the information.

Carlton Campbell, CAA Standards Training and Development Officer, explains how important it is to build the big picture.

"Constantly honing your lookout and listening skills is important, but this is only one component of situational awareness. Other building blocks include your knowledge of airspace, weather, terrain, approach procedures, aerodrome patterns, and aircraft configuration," says Carlton.

Scanning Technique

To scan effectively, you must pause to focus as you move your head and upper body from side to side.

While your head is moving, your vision blurs so unless you fixate, you won't be able to recognise all the objects in the scanning area.

Looking outside the aircraft should take up 90 per cent of your scanning time.

There is no one-scan-fits-all technique that will suit every pilot or every situation. You need to find the scan that works best for you.

The method you use must include pauses to focus, and be as close to a 360 degree scan as the aircraft structure will allow.

One method is to start your scan in the centre, moving progressively to the left, pausing for two seconds every 20 degrees. Then swing quickly back to the centre and continue your scan to the right.

Continued over ❯❯

Photo courtesy of Gavin Conroy

There are many scanning techniques - this is one example. Use a method that suits you, but make sure it includes pausing to focus in each zone, and continues round the sides as far as you can see.

If scanning before turning the aircraft, do your scan so that it ends in the direction of the turn. The illustration doesn't show the scan reaching right around to the sides, but this is essential, as the following example illustrates.

Milford Sound Accident

On the day of the accident, 17 aircraft departed from Milford Sound in a 20-minute period. A busy stream of departures was common procedure, and still is.

DAX, a Cessna 207, took off at 1525. The pilot-in-command had 1100 hours, and had learned to fly in the Queenstown area.

DQF, another Cessna 207, got airborne three minutes later. The pilot of DQF had 450 hours, and had just qualified for Milford Sound flights.

After DAX and DQF became airborne, the lead aircraft in the stream of flights reported that the Mackinnon Pass was closed due to cloud. All aircraft in the stream were forced to turn back to Milford Sound and take an alternate route to Queenstown.

Subsequently, DAX and DQF paralleled each other's track for about 90 seconds. Neither pilot saw the other aircraft. A passenger in DAX filmed DQF as it flew alongside, but failed to alert the pilot to the close proximity of the two aircraft. English was not the first language of the passengers on board DAX and DQF.

The two aircraft collided – the pilot of DAX managed to fly the damaged aircraft back to Milford and land safely, but DQF crashed into Milford Sound. The wreckage was never recovered.

A safety investigation identified that causal factors included the pilots' restricted cockpit vision, the lack of an effective lookout, the high density of traffic, and the unplanned merging of two streams of aircraft.

This shows the tracks of DAX and DQF before and up to the Milford Sound accident.

Unexpected Tigers

Flight Examiner, Penny Mackay, was caught out by multiple aircraft.

"I was telling my student that even when you're in an area without much traffic, maintain a vigilant scan at all times. I spotted a Tiger Moth approaching us, but the student didn't.

"While I was discussing this with the student, two more Tiger Moths that I hadn't anticipated appeared and passed us. Neither of us saw them.

"This shows the importance of not making an assumption that you've seen all the traffic.

"Aircraft can also be on a different frequency, or NORDO," says Penny.

Understand

Once you have gathered all the information, you need to make sense of it. We achieve this by comparing the gathered information with our mental model.

» Is the information you are receiving what you expected it to be? If not, why not? The information is often there, but not absorbed.

» Do you understand the airspace limitations?

» What are the threats?

You also need to prioritise, knowing what's important to concentrate on and why, while managing your workload to avoid crunch points.

The world won't always conform to your mental model – sometimes your model is wrong. Don't fall into the trap of willing the information to fit your mental picture.

Your mental model also needs to be dynamic, constantly changing and updating to fit the circumstances of your flight.

Advice from Flight Examiner, Paul Kearney, is to get yourself out of a situation when you need more time to figure it out.

"There are times when you have a whole bunch of facts and information presented to you, and they don't fit the mental picture you have in your head.

"You can spend a long time convincing yourself that those facts and figures are wrong. In doing that, you are getting yourself further and further into trouble.

"One thing I've learnt is that as soon as you start to notice this happening, get yourself out of the situation. Give yourself some time to think and then you can look at the information that's being presented in a more rational way," says Paul.

Think Ahead

Always keep reviewing your information, and assess how it compares with what you should be seeing.

Prepare before something happens. For example, before approaching an aerodrome, have the aerodrome chart out and plan your calls. Before that cloud descends, get a weather update and have some alternatives planned.

This is often referred to as keeping ahead of the aircraft.

Flight Examiner, Mark Woodhouse, says your gut feeling is probably telling you something.

"I was very fortunate – I've had some very good teachers through my pilot training. One of them said to me, 'Listen to the whispers.' What he meant by that is, if it feels wrong, it probably is," says Mark.

When thinking ahead, ask yourself:

» What are the threats?

» Have the threats changed?

» Are there any new threats I didn't identify previously?

A pilot can take 5 to 7.5 seconds to react after sighting a potential threat.

If the closing speed between the aircraft is high, for example, a light twin and a jet, there could be less time available than the required 5 to 7.5 seconds to detect and react to the other aircraft.

If you determine another aircraft is a potential threat, and you know its whereabouts or operating level, take decisive action.

You can take precautionary action by climbing, descending, changing heading, turning on anti-collision and landing lights, or reporting your position.

Continued over ❯❯

Collision Statistics

Do you think your risk of being involved in a mid-air collision increases or decreases as conditions become clearer and visibility increases?

It increases. On a poor weather day with restricted visibility, your field of vision is reduced, allowing you to focus your scan in a narrower area. On a clear day, your attention will be less focused as you have a full 360 degrees of unlimited sky to scan.

New Zealand data supports the following overseas findings.

According to the European General Aviation Safety Team, nearly all mid-air collisions occur in daylight and in excellent visual meteorological conditions.

Collisions are also more likely to occur when aircraft are concentrated, especially close to an aerodrome, and when one or both aircraft are turning, descending, or climbing.

The UK CAA identified the most frequent causal factor (41 per cent) of all accidents was a lack of positional awareness in the air by the pilot.

One third of situational and positional awareness errors could be attributed to distraction. The available information was not used effectively in these situations.

French studies show that most collisions take place in uncontrolled airspace, and in every case, radio use was not optimal.

In recent New Zealand occurrences, however, adequate radio calls were made, but did not prevent collisions.

Listening to the whispers and taking positive action is illustrated by Mark Woodhouse.

"I was in a helicopter formation and we were turning. I just knew something wasn't right, so I left the group – got out of there. I was told afterwards that I was within feet of colliding with another helicopter."

Position Reporting

A good lookout will help you avoid another aircraft, but an **accurate** position report will help other aircraft know where you are.

When reporting your position, be clear and accurate. Where possible, give a position relative to a published reporting point.

In lieu of a visual reporting point, or a clear geographical feature, give a position report using direction and distance from an aerodrome.

Think Back (Evaluate)

Carlton Campbell says we can all learn from our experiences if we are honest with ourselves.

"Avoid becoming complacent, and when things don't go as well as they should have, take ownership of the situation and learn all that you can from it."

Evaluating your performance allows you to build your situational awareness through experience.

Try to be specific in noting the actions that you took, or failed to take, and devise ways you can improve.

AvKiwi Safety Seminar 2013

This year's AvKiwi Safety Seminar, *Get the Mental Picture*, was about situational awareness.

The seminar was held in 31 places, from coast to coast and Kerikeri to Invercargill. Over 2230 people attended.

Seminar Surprises

A surprising number of people were not familiar with the symbols on the Visual Navigation Charts. These can help you build your situational awareness. For example, you can note where there might be glider winch launching, or model aircraft activity on your planned route.

Here's a quiz you can take to see if you are familiar with the chart symbols. The answers are somewhere in this issue of *Vector*.

The other surprise was how many people were unaware of the distances marked on the Visual Navigation Charts. These can help you estimate distance, and make accurate position reports.

When using your Visual Navigation Charts to determine distance, the divisions of latitude on the longitude lines represent one nautical mile.

Free Apps for Your Smartphone

The CAA has released two free smartphone apps. To download, search "AvKiwi" on Google Play or the iTunes store.

Available on the Mac App Store

Graph My Flights

Graph My Flights is a self-evaluation tool that allows you to focus on, and rate, different aspects of your flying performance. After rating your flight, the app will plot a graph that will show the performance from your previous 10 flights.

Evaluation is an often forgotten, yet critical, stage in improving your flying skills. You can practise often, but unless you evaluate your performance, you won't know how well you are doing and where to focus your efforts.

Fuel Calculator

This handy tool will help you plan the amount of fuel you need for your flight. This is a simple calculator for light aircraft.

We've preloaded a few sample aircraft templates you can work from, but also included an option for you to enter the figures for your own aircraft.

Designed by the CAA's Safety Promotion Unit, the *Graph My Flights* and *Fuel Calculator* applications were created to complement the 2013 CAA AvKiwi Safety Seminar, *Get the Mental Picture.* ■

Flight Instructor Seminars 2013

The CAA Flight Instructor seminars are held every two years, and are an excellent opportunity for flight instructors to network and develop professionally.

This year, there will be three one-day seminars:

» **Wellington**
Thursday 8 August
Brentwood Hotel, Kilbirnie

» **Christchurch**
Thursday 15 August
Copthorne Hotel Commodore

» **Auckland**
Thursday 22 August
RSPCA building opposite
Jet Park Airport Hotel, Mangere

The seminars will run from 0930 to 1630 hours, and cost $50 to register. Lunch and other refreshments will be provided.

These seminars aim to raise awareness on a number of topical issues, and the CAA encourages all flight instructors (including microlight, glider, etc) to make full use of this opportunity.

Presentations will include:

» *The modern cockpit accessory*, by Kiran Parbhu of Massey University. This presentation focuses on the iPad™.

» *Instructor preflight trainng*, by Stan Smith from North Shore.

» *Lesson belongem where,* by Ross Crawford, current Flight Examiner, Instructional Techniques course presenter, and retired airline pilot. This session will focus on laws of learning as they relate to where each lesson 'belongs'.

» *FISCOM use,* by Mike Haines, Manager, Aeronautical Services, CAA.

To see the programme and venue details, and to register, check out the CAA web site, www.caa.govt.nz, "Seminars and Courses".

Numbers are limited, so early registration is recommended. ■

Review of **Airworthiness**

A Review of Airworthiness (RA) is an essential part of ensuring that an aircraft remains airworthy. What exactly does the RA involve? Who can perform the RA, and how do you know if your aircraft needs one?

A Review of Airworthiness (RA) is a check of the aircraft's conformity to approved type design, or properly modified design, and applicable maintenance compliance since the last RA.

An RA is not a maintenance activity – it is not part of a periodic maintenance check (which is also known as a 50-hr, 100-hr, or annual check). For convenience, the RA is often carried out in conjunction with the periodic maintenance check.

This is comparable to the Warrant of Fitness (WoF) and service for your car. The WoF is a separate legal requirement to the actual servicing of the car, but in practice, you may have them both done at the same time.

The RA used to be called an ARA (Annual Review of Airworthiness).

What Aircraft Need RAs?

Special Category aircraft and General Aviation (GA) aircraft that do not undergo a Maintenance Review, must have an RA completed (Part 91 *General Operating and Flight Rules*).

Aircraft that are operated under Part 121 *Air Operations – Large Aeroplanes*, Part 125 *Air Operations – Medium Aeroplanes*, and Part 135 – *Helicopters and Small Aeroplanes,* that are maintained under rule 135.402(a)(2) undergo a Maintenance Review. Therefore, they do not require an RA.

An RA should be certified within the periods prescribed in rule 91.615 *Review of airworthiness*, or else the aircraft should not be flown.

How Often Should an RA be Performed?

An RA must be completed every 365 days for GA aircraft that do not undergo a Maintenance Review, and for Special Category aircraft that are operated for hire or reward.

Special Category aircraft that are not operated for hire or reward are required to have an RA completed within a 730-day period.

There is a 36-day latitude period, available for maintenance planning purposes, for both GA and Special Category aircraft.

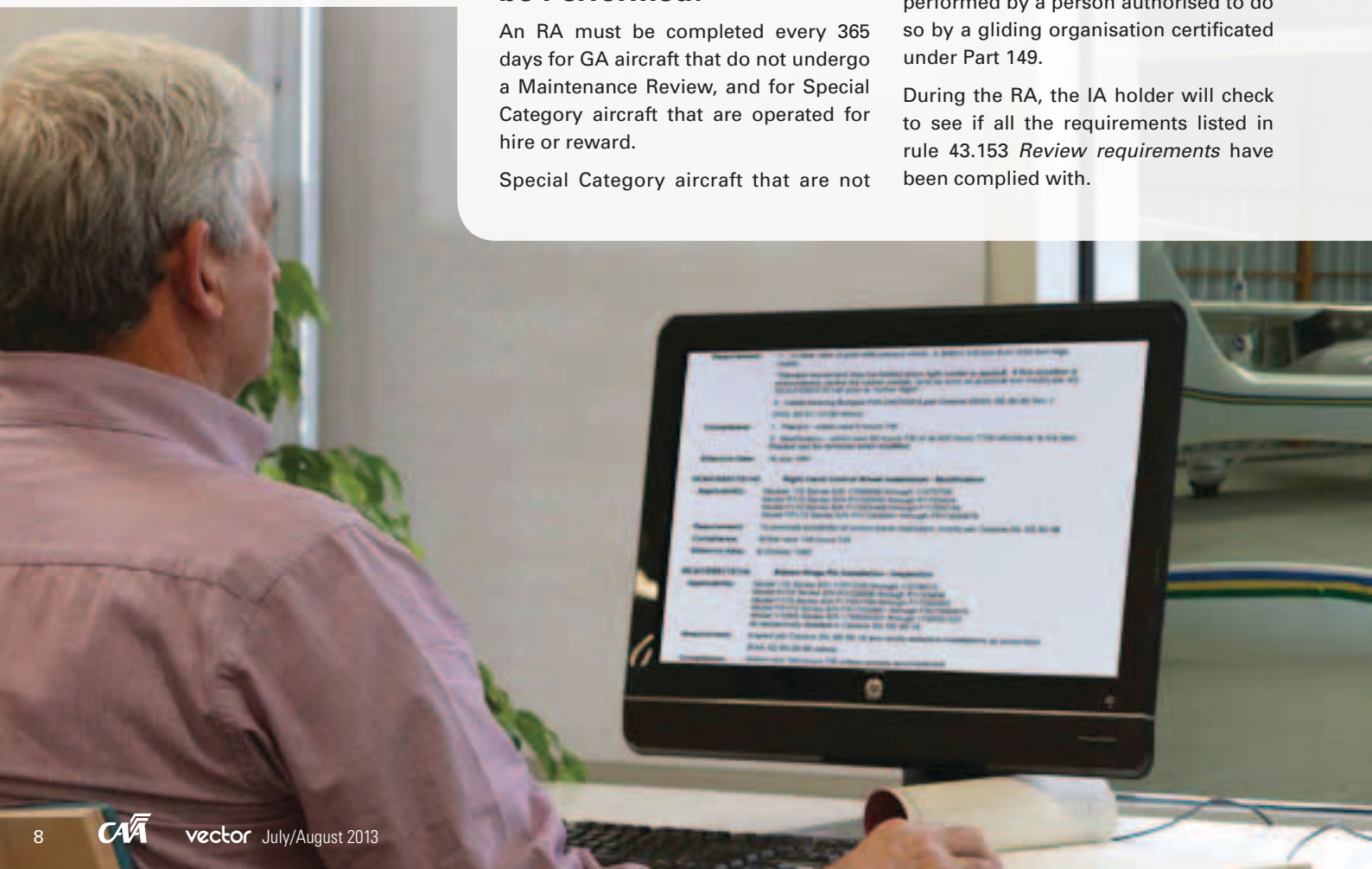
If the RA has expired, but the aircraft is otherwise airworthy, it may be flown to another location if the sole purpose is for the RA to be completed.

Who Can Perform an RA?

An RA can be performed and certified only by a Licensed Aircraft Maintenance Engineer (LAME) who holds a Certificate of Inspection Authorisation (IA) under Part 66 *Aircraft Maintenance Personnel Licensing.*

In the case of a glider, the RA can be performed by a person authorised to do so by a gliding organisation certificated under Part 149.

During the RA, the IA holder will check to see if all the requirements listed in rule 43.153 *Review requirements* have been complied with.



The IA holder will use one of these forms: 24066/06, 24066/07, 24066/09 or 24066/12, as a means of complying with the rule requirements. These forms were developed by the CAA in conjunction with IA holders.

These forms are currently being updated to reflect the format of the new logbooks and AD schedules. Form 24066/06 has already been updated. The current versions of all the forms are on the CAA web site, www.caa.govt.nz, "Forms."

The IA holder performing the RA does not need to be rated on the aircraft. However, the CAA encourages them to be familiar with the aircraft type or model.

Review Requirements

In carrying out an RA, the IA holder must check for the following before certifying that the RA has been completed:

- the aircraft conforms to the Type Certificate Data Sheet, or equivalent acceptable data sheet;
- the aircraft has all the required instruments and items of equipment.

Also, the IA holder will check for the following since the last RA or issue of an Airworthiness Certificate:

- all modifications and repairs have been correctly recorded, and certified for release-to-service, with the applicable technical data listed;
- all due maintenance required by the aircraft maintenance programme has been correctly recorded and certified;
- the maintenance programme is the correct one for the aircraft;
- all the relevant ADs have been assessed, embodied as required, and properly recorded;
- every defect recorded in the CA006 – *Aircraft Technical Log*, has been properly recorded and rectified, and the aircraft released to service;
- instruments and equipment permitted to be inoperative are properly placarded and recorded;
- the aircraft weight and balance is properly controlled and documented;
- the aircraft Flight Manual and its supplements are current;
- all the overhaul and finite lives are recorded, and are within the manufacturer's limitations, and where practicable verify serial numbers by physical inspection; and
- perform a general condition inspection. Typically, this would be similar to a pilot pre-flight inspection outlined in the aircraft Flight Manual.

What if Defects are Found?

If defects are found during an RA:

- the defects must be rectified by a person who may perform the maintenance in accordance with rule 43.51 *Persons to perform maintenance.*
- If a defect is present, the aircraft can be flown to another location to complete the RA, only if a Special Flight Permit is issued by the CAA.
- if the aircraft is not airworthy, it can be made airworthy only when the items recorded as defects are rectified and certified in the log book.

Onus is on the Operator

It is the aircraft operator's responsibility to ensure the RA is completed on time, all defects are rectified, and that the aircraft is not flown before defect rectification.

In the case of an incomplete inspection, the IA holder will enter any defects found into the aircraft logbook, and will not complete the RA certification.

If the review is not completed and certified, the IA must forward a report of the review to the CAA within seven days after the 30-day period specified in rule 43.153(a) for completing the review.

More Information

Contact the CAA Aviation Safety Advisers (see page 23 for details).

View the relevant rules on the CAA web site, www.caa.govt.nz, under "Rules".

- Rule 91.615 *Review of airworthiness*
- Part 66 *Aircraft Maintenance Personnel Licensing Subpart E*
- Rule 43.153 *Review requirements.* ■

Not a Pre-purchase Inspection

It is important to note that an RA does **not** constitute a pre-purchase inspection.

A pre-purchase inspection involves a number of elements, one of which could be an RA.

For more information on a pre-purchase inspection, read:

- A complete pre-purchase checklist by Brian Jacobsen at www.avweb.com/news/usedacft/182803-1.html
- *The Handbook of Aeronautical Inspection* by Denny Pollard.

In carrying out an RA, the IA holder must check numerous items on the aircraft and in the documentation, including Airworthiness Directives.

SMS Update

A Safety Management System is a structured means of managing safety risk and safety performance in your everyday operations.

SMS can be good for your business, your reputation, and your safety record. It's not a new concept, and many of us may already be applying SMS principles to our business without realising it.

Safety management systems have existed in different forms for a good many years, but only in recent times has a formalised structure been adopted for aviation.

Some 10 years ago, ICAO introduced SMS standards in various Annexes, particularly Annex 6 *Operation of Aircraft* Part I – *International Commercial Air Transport – Aeroplanes*. ICAO realised that the SMS concept was being picked up by different States, and that it would be desirable to have one standardised approach rather than a series of mismatched systems.

The safety management Standards and Recommended Practices were subsequently removed from the various Annexes and combined into a stand-alone Annex 19 *Safety Management*, effective on 15 July 2013. Guidance material is published in Document 9859 *Safety Management Manual (SMM)*, third edition.

What New Zealand Has Been Doing

New Zealand has long had a requirement in the Civil Aviation Act 1990 (s12) for certain participants to "establish and follow a management system that will ensure compliance with the relevant prescribed safety standards and the conditions attached to the document".

The requirements are expanded in Part 119, which prescribes an internal quality assurance (QA) system for airline air operator certificate (AOC) applicants, and an organisational management system for general aviation AOC applicants.

Both systems embody a requirement for a safety policy and procedures, and other elements that can be related to an SMS.

Other participants required under the current rules to have an internal QA system, or organisational management system, are Part 115 adventure aviation operators, Part 139 aerodrome operators; Part 141 training organisations; Part 145 maintenance organisations; and other organisations certificated under Parts 146 to 149, and 171 to 174.

Why the Changed Approach?

The concept of risk management was promoted through the release of the original risk management standard in 1995, which has subsequently evolved into AS/NZS ISO 31000:2009 *Risk management – Principles and Guidelines*.

Since 1995, many elements of government and industry have opted for a proactive risk management approach to safety. An example of this can be found in the Health and Safety in Employment (HSE) Act 1992, which requires employers to identify and manage hazards in the workplace.

The management and reduction of safety-related risk should be the goal of all aviation organisations. An SMS will provide a structured framework for achieving this and improving safety performance.

An SMS takes a proactive approach, and is a continually-evolving entity. Risks can be identified and managed before they lead to a bad outcome, not only for safety, but also for business enhancement.

The SMS New Zealand logo was developed to give an instantly recognisable 'brand' to the SMS development material produced by and for the CAA.

Where Are We At?

A rules project has been under way for the last few years, with the object of replacing the current QA system rules with SMS rules. An Advisory Circular (AC00-4 *Safety Management Systems*) was released in December 2012 to provide guidance for those organisations wishing to proactively adopt SMS in advance of the rules.

The rules project was put on hold at the direction of the Minister, just before the NPRM (Notice of Proposed Rule Making) stage, with an instruction to consult with industry before progressing further.

On 28 May 2013, a consultation document was issued by the CAA, seeking input from interested parties by 8 July 2013. Four options were put forward:

- Continuation of the status quo;
- Increased inspections, audits, and enforcement;
- Voluntary implementation of risk management systems; and
- Mandatory implementation of risk management systems.

A summary of the feedback received on the consultation document will be available in the near future on the CAA web site, www.caa.govt.nz/SMS.

CAA's preference is for the fourth option, but proactive, or voluntary, implementation is strongly encouraged.

The consultation submissions will form the basis of a recommendation to Cabinet by the end of August 2013, and Cabinet's decision will determine the next steps.

CAA Industry Forums

Four industry forums were held from 10 to 13 June 3013, in Palmerston North, Auckland, Christchurch, and Queenstown, to present the CAA's position on SMS. There was an excellent turnout to these, with over 350 attendees representing some 250 different organisations.

Director of Civil Aviation, Graeme Harris, introduced the CAA's view on SMS, emphasising the CAA's desire to move from the current audit/compliance focus to a safety performance-driven approach.

"Simple compliance with the regulatory standards is just not enough," said Graeme, noting that rules intervention was not always appropriate, given the current lag in the rule-making process.

"Currently, there are about 90 rules issues on the list, and the system can handle only about four of those each year, and that certainly isn't proactive."

Graeme emphasised that proactive implementation of SMS (by organisations) was the way to go, adding, "if it's adding value and reducing safety risk, why wait?"

Mark Hughes, General Manager Operations and Airworthiness, gave an overview of safety management systems, pointing out in particular the similarities to existing quality management systems.

Mark also covered the principles of risk management, which is a cornerstone of SMS, and the safety and business benefits that follow.

"SMS is not just for the big guys – it can be scaled to suit any size of operation," Mark said.

Policy Adviser Bryce Wigodsky outlined the consultation process in the final presentation of the morning session, and the afternoon session was facilitated by Kimberley Turner, Chief Executive of Aerosafe Risk Management.

A feature of this session was a panel of industry participants, who had either

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SMS Materials

Further SMS material will be published on the CAA web site as it becomes available. You can subscribe to receive an email notification when new information is added to the SMS web pages. Existing subscribers to our email notification service will need to add this to their current subscription lists. See the links on the SMS home page.

AS/NZS ISO 31000 can be sourced at cost through the Standards New Zealand web site www.standards.co.nz; Annex 19 and ICAO Doc 9859 through the ICAO online store at http://store1.icao.int.

implemented an SMS, or were developing elements of an SMS.

Industry Perspectives

Two of the three industry perspectives presented at the Palmerston North forum are summarised here.

Vincent Aviation

Peter Vincent, Chief Executive of Vincent Aviation, related his experience with having to develop an SMS for their Australian operation at very short notice.

"We were transferring two Saabs from the New Zealand register to the Australian register, and it just so happened that our application landed on the desk of an SMS specialist at CASA. 'Where's your SMS?' was the first question.

"So we had to develop an SMS in a hurry, and the quickest way was to hire a consultant, who did it for us in 11 days. Because of that, it wasn't cheap, but we had to do it to keep operating."

Peter said that as a result, they have adopted the concept for the New Zealand arm of the business, and Blair Frampton, their Quality Assurance and Security Manager, was the key person in the process.

Blair admitted not knowing much about SMS to start with, but said, "The biggest gap identified was risk management – I figured that the best way was to sign up for the risk management diploma and just get on with it."

Vincent Aviation sees the advantages of SMS for their operation as:

- Informed decision making;
- Team effort;
- Creating the SMS culture;
- Making management aware of issues; and
- Seeing where the effort needs to be directed.

Ravensdown Aerowork

Rick Harding and Rod Trott of Ravensdown Aerowork described their introduction to SMS, which was a culture change driven from within the company, and with Ravensdown's endorsement.

Two areas of risk were discussed – organisational and operational. The organisational risks included changes in senior personnel; changes in aircraft; and the addition of new equipment. Operational risks included airstrip condition; product condition; and the overload considerations of Part 137.

As part of the risk management approach, pilots now complete a risk assessment form for each operating site, even if there are several in one day.

"It gets them thinking about the risks they face in that particular environment, and how they are going to manage them," said Rick.

Perceived benefits for the company include liability protection; transparency; the ability to monitor developing trends; and uniformity and clarity throughout the operation.

QA Manager, Rod Trott, said that developing an SMS was not a major undertaking. Combining existing QA, health and safety, hazard identification, and risk management systems into one SMS package now covers the company's Parts 135, 137, 145, and 148 operations.

Transition to SMS

Some organisations that operate (and compete) in the international arena

SAFETY MANAGEMENT SYSTEMS RESOURCE MAP

HOW TO FIND THE INFORMATION YOU NEED

WHAT TO READ...

CAA INFORMATION FOR INDUSTRY

- AC 00-4 Safety Management System
- The CAA Implementation Strategy
- Industry Resource Kit booklets:
  - BOOKLET ONE – Safety Management Systems (SMS): an introduction
  - BOOKLET TWO – From Quality Management Systems to Safety Management Systems: an enhancement guide
  - BOOKLET THREE – Implementing Safety Management Systems: guidelines for small aviation organisations
  - BOOKLET FOUR – Aviation Risk Management: an introduction.
- Vector magazine articles (SMS special features)
- CAA safety reports
- CAA SMS website (www.caa.govt.nz/SMS).

have already made the transition to SMS, seeing it as a necessary part of doing business.

Examples are Air New Zealand, Airways New Zealand, Vincent Aviation as mentioned, and some training organisations catering for international students.

Moving from a QMS to an SMS is not a huge step. Comparison of the elements of an SMS with those of a QMS will show a number of common features – see Booklet 02 (described below) for the SMS elements, and check these against the QMS requirements in Part 119 or other applicable Part.

If a QMS is part of your business, and especially if you hold ISO quality accreditation, there is no reason why you should abandon it. Making the QMS part of your SMS should ease the transition and subsequent administration.

We mentioned in the introduction that some may already be applying SMS principles without realising it. For example, airline AOC holders require a safety policy and safety policy procedures, and an investigation capability as part of their QMS. This relates directly to Element 1 of the 13 SMS elements listed in the AC.

Part 115 certificate holders have the same requirement in rule 115.77, which also mandates a hazard identification procedure and a procedure for risk assessment and mitigation.

Similar provisions exist in the HSE Act 1992. Most organisations should at least have addressed these, as they are common to all workplaces.

So there are plenty of existing foundations on which to build, making getting started less intimidating.

Resources

An SMS Resource Kit was provided to all attendees at the industry forums, comprising:

» The booklet *Safety Management Systems Implementation Strategy 2013 – 2018;*

» The first two booklets of a set of four – 01 *Safety Management Systems (SMS) – An Introduction* and 02 *From Quality Management Systems to Safety Management Systems: An Enhancement Guide;* and

» A resource map (reproduced below).

The Strategy booklet outlines the CAA's approach to adopting SMS, including the '7 Point Plan' and an overview of the implementation phases.

All booklets and the forum presentations are currently available on the CAA web site, with Booklet 03 *Implementing Safety Management Systems: Guidelines for Small Aviation Organisations*, and 04, *Aviation Risk Management: An Introduction* due to be released in August 2013.

If you have questions on SMS, you can email sms@caa.govt.nz, or speak to your regional Aviation Safety Adviser - see contact details on page 23. ■

Survival Equipment

The three most useless things in aviation are often said to be runway behind you, altitude above you, and in this context, the safety and survival equipment left behind in the hangar – it can't save your life if you haven't got it with you when you're about to end up in the water.

What You Should Have

The overall requirements for safety equipment to be carried on flights over water are set out in rule 91.525 *Flights over water,* and rules 121.363, 125.87, and 135.87 add detail specific to the type of operation.

Basically, if you are flying more than gliding distance from shore in a single-engine aircraft or a twin that can't maintain at least 1000 feet on one engine, you must have a readily accessible life jacket for each occupant. If your twin can fly safely on one engine, life jackets are required if operating more than 50 NM offshore.

For any flight more than 100 NM offshore, life rafts and additional survival equipment (including a survival ELT or EPIRB) are required.

While the parameters seem very clear-cut, in reality things aren't that exact. You should always be prepared for the worst case. For example, imagine you are flying along the Kaikoura coast in weather that keeps you down at 1000 feet – you may well be within gliding range of the shore, but for a good part of that coastline, there is nowhere to land safely and you would have no option but to ditch. Add a crashing surf and some big rocks to the equation, and it's not looking good.

Similarly, if you ditched 5 or 95 miles from land without a life raft, the 100-mile criterion for carrying one might seem a little theoretical. At either distance, you're in the same boat – none.

If You Have It

Statistically, the chances of surviving an actual controlled ditching are surprisingly good. Surviving the subsequent time in the water depends largely on how well you are prepared. Having the right equipment on board is one thing, but having it readily to hand is essential.

Water survival training with a professional provider will stand you in good stead in a real emergency.

Life Jackets

Where you know that there won't be much time between encountering a problem and ditching, wear the life jackets right from the start, and brief your passengers on their operation. Take care to point out that premature inflation might make it hard to escape from the aircraft.

All a life jacket is going to do is keep you afloat and your head above water. It should do this even if you are unconscious, if properly worn and securely fastened. It won't keep you warm, however, and the colder the water, the sooner you will be affected by hypothermia. It is therefore essential that you spend as little time immersed as possible.

Make no mistake – hypothermia kills, but it will reduce you to a state of utter physical and mental helplessness well before it does so. See table below:

Water Temperature	Time to Exhaustion or Unconsciousness	Survival Time
21 – 27 °C	3 – 12 hours	3 hours – indefinitely
16 – 21 °C	2 – 7 hours	2 – 40 hours
10 – 16 °C	1 – 2 hours	1 – 6 hours
4 – 10 °C	30 – 60 minutes	1 – 3 hours
0 – 4 °C	15 – 30 minutes	30 – 90 minutes
<0 °C	Under 15 minutes	Less than 45 minutes

Time in the water after ditching can be minimised by accurate position reporting, and early activation of ELT and other location devices when an emergency situation develops. These actions will help rescue services locate you with minimal delay.

Life Rafts

Carriage of a life raft means that you can at least get out of the water, but it is very unlikely that you will be lucky enough to transfer from aircraft to life raft without getting wet.

To be effective, a life raft must be accessible for ready use, not stowed away at the bottom of the baggage locker. As with a life jacket, the last thing you need is for it to inflate inside the cabin. That would mean having to deflate it by the quickest means available, and that usually involves puncturing it. It isn't going to be a great deal of use after that, however.

A raft will normally have a lanyard, which attaches to a tiedown ring or other suitable strong point on the aircraft. This serves two purposes: it keeps the raft from blowing or drifting away when it is launched, and triggers the inflation mechanism when pulled to its full extent.

Normally the lanyard will have a weak point so that it will break free if the aircraft sinks after the raft has deployed. Having a knife handy is a good idea, in the event of premature inflation, or if there is any doubt about the weak link.

Even in a raft, you are still at the mercy of the elements. Wind will chill you, the sun will burn, and even light seas can make you seasick. A covered raft reduces sun and wind exposure, but may increase the likelihood of seasickness.

Opening up the survival kit early and taking stock is a good idea – if the seasickness tablets are distributed and taken promptly, the chances of fluid loss and subsequent debilitation are greatly reduced. Deployment of the sea anchor will minimise wind drift, and may reduce the randomness of the sea movement, which could help delay or avert the onset of seasickness.

Activate any EPIRB or ELT in the survival kit as early as possible, and check what other location aids are available on board, flares or smoke for example. Have these ready for use when a search aircraft or vessel is sighted.

Preparation

There are many ways you can prepare for the worst. Minimising your time over water is a good start; flight following; carriage of appropriate survival equipment; practice and training in its use; and knowing what to expect will all help.

Knowing in advance what is in your survival kit, as well as how to use it, is strongly recommended. This could be achieved by including the topic in your organisation's training programme.

Taking a course in water survival training, with a suitable provider, is a sound investment that will stand you in good stead in the event of a real emergency.

Advisory Circular AC125-2 *Ditching – Techniques, Hazards, and Survival: A Basis for Assessing Risk* gives a comprehensive coverage on aspects mentioned in this article, and further useful information is contained in the GAP booklet *Survival* – both are available on the CAA web site www.caa.govt.nz. ■

Ear Travel

All aviators will be familiar with the 'popping' sensation in the ears during climb and the necessity for 'clearing' the ears during descent. For most of us, the routines will be second nature, but for the uninitiated, severe pain and actual physical harm are real possibilities if preventative actions are not taken.

How It All Works

In a constant-pressure environment, the atmospheric pressure on both sides of the eardrum (or tympanic membrane) will be the same, as the middle ear cavities are connected to atmosphere by the Eustachian tubes, which open out into the nasopharynx (ie, high up on either side of the throat).

As atmospheric pressure decreases during a climb, the air in the middle-ear cavity will expand, creating a pressure differential across the eardrum. You will feel this as a 'full' sensation in the ear shortly after takeoff, but this increased pressure will progressively equalise, because the air can escape from the middle ear via the Eustachian tube. Without any conscious effort required by you, the air will vent every 500 to 1000 feet of altitude change, and this is sensed as the familiar 'popping' sensation.

The tissue surrounding the Eustachian tube is not rigid, and in an equalised pressure state, the tube may be closed. It does not take much of a pressure differential for the trapped air to escape, thus a climb to altitude will seldom cause a problem. Exceptions can occur when the tissue is inflamed or swollen as a result of infection (including the common cold), making it harder for air to escape. It usually will, but at a higher pressure differential, and this may be uncomfortable until the pressure equalises.

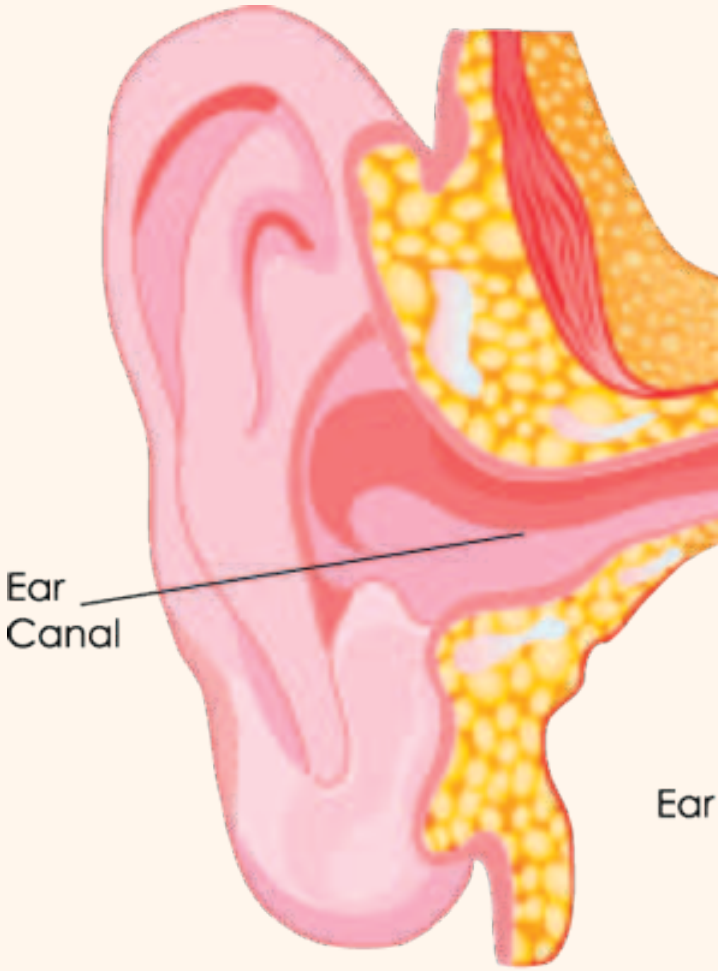
Generally, once cruise altitude is reached, any remaining pressure difference will equalise after a short time, and the ears will feel normal again.

On Descent

During the descent is when most ear problems occur in flight, regardless of whether the aircraft is pressurised or unpressurised. An unpressurised aircraft will normally not operate above 10,000 feet except on short-term cycles such as parachute dropping, or when supplementary oxygen is provided for crew and passengers. A pressurised aeroplane, although operating at higher altitudes, will typically maintain an equivalent cabin pressure in the range 6000 to 8000 feet, depending on the airframe limitations and actual altitude flown.

As the aircraft descends, increasing atmospheric pressure will impinge on the outside of the eardrum, forcing it inwards. Unless the pressure in the middle ear cavity can be equalised, the eardrum will bulge further inward with increasing pressure, and this is felt as increasing 'fullness' and apparent deafness in the affected ear.

The nature of the tissue surrounding the Eustachian tube can cause it to act as a 'one-way valve', in that air will not flow readily from the nasopharynx to the middle ear without some positive action on your part. This varies between individuals; some having no problem without having to do anything, and others having to actively work at it from top of descent to landing.



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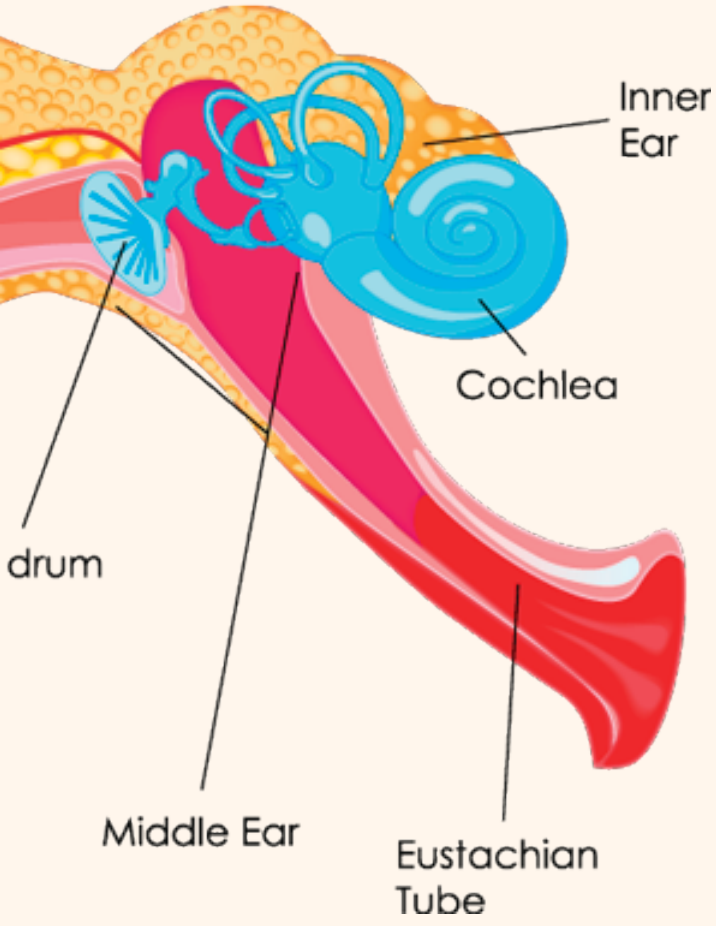
Clearing the Ears

In the best case, all that is required to open the Eustachian tube is a slight forward movement of the jaw, as if you are starting a yawn. Even practising this at ground level, you will be able to feel the effect.

If, however, you have even a slight cold, or normally have difficulty clearing the ears, more positive action is called for. Pinch the nostrils closed, close the lips, and blow (as if you were going to blow your nose). This is known as the Valsalva manoeuvre. The momentarily increased pressure in the nasopharynx forces the Eustachian tubes open and equalises the pressure in the middle ear. If this isn't immediately successful, try again while 'wiggling' the jaw at the same time. Don't blow so hard as to give yourself a hernia! During descent, you may have to do this almost continuously, as the further behind the descent you get, the harder it is to equalise.

The sweets handed out on some airline services do serve a purpose – sucking on a sweet keeps the jaw active, and will help with clearing the ears. Crunching it and swallowing it immediately will limit the benefits, however. For young babies, a great way of assisting their ear-clearing is to arrange a feed just before top of descent, or to give them their pacifier ('dummy') if that's what they are used to.



Possible Problems

If you are suffering from a cold or similar infection, you may have equalising problems even during climb. This is fair warning that you are probably going to have difficulty on descent. On a scheduled service, there's probably not a lot that can be done, but if you are flying yourself, you may have the option of levelling at a lower altitude than originally planned, or even abandoning the flight altogether.

If you do have a light cold, and you can't avoid flying, it may be advisable to seek the advice of your medical examiner if time permits. Using an appropriate nasal spray before flight may temporarily relieve swelling and inflammation in the nasopharynx to the point where equalising can be achieved without too much difficulty. An additional danger with an infection is the possibility of forcing mucus into the Eustachian tube during a Valsalva manoeuvre, causing a subsequent inner ear infection.

Ear discomfort may also be accompanied by sinus pain, where inflamed tissue is limiting equalisation in the sinus cavities. The combined pain may be severe enough to be incapacitating.

The worst-case scenario is not being able to equalise at all, and a likely result is a burst eardrum from the increased external pressure. Leading up to this, there will be increasingly intense pain, then immediate relief when the eardrum ruptures. If you even suspect that this has happened, seek medical attention as soon as possible after landing. A burst eardrum will normally heal by itself in a matter of several weeks, but care is required to prevent infection during this process.

Pilot Actions

Any time you are taking passengers flying, you should include 'ear travel' in your preflight briefing, rather than trying to sort out a problem after it has occurred. Point out that the use of earplugs as a remedy will not have any effect. Children are usually good at entering into the spirit of things, and a proper lesson will see them right for any future flying they do.

When descending, limit the rate to 500 ft/min, as this will enable most people to 'keep up'. In a pressurised aeroplane, the cabin rate of descent is normally set at this rate for the same reason. Let the passengers know when the descent is about to start, so they can get the equalising going. If the aircraft and the middle ear pressure can arrive at ground level about the same time, all is well. If not, keep trying to equalise after landing, but if persistent severe pain is experienced, medical advice should be sought. ■

ELT Reminders

Two recent concerns about emergency locator transmitters (ELTs) expressed to the CAA are remote switch batteries, and the possibility of some non-compliant ELTs having found their way into the country.

Remote Control Batteries

Some panel-mounted ELT remote switches are self-powered by an internal battery, while others are supplied from either the aircraft electrical systems or the ELT battery. Additionally, some audio alert units (eg, for the ACK E-04) run off an internal battery separate from the panel battery.

Like the ELT batteries, these need replacing from time to time. While the due date for replacement of the ELT battery will normally be recorded in the aircraft logbooks, the remote battery is an item that could be easily overlooked. To complicate the issue, some replacement intervals are 5-yearly, and others 10-yearly, usually depending on the type of battery fitted (alkaline or lithium respectively).

Ideally, the panel battery expiry date should be recorded in the aircraft logbook, but if in doubt, check with your maintenance provider or avionics specialist – the latter are all aware of the issue.

ELTs known to be affected are the Artex ME406 series with the remote switch part number 455-0023, and the AmeriKing 451. One provider estimated the number of affected Artex units to be less than 50 nationwide.

Note that all ELT battery changes must be done by an approved person.

Not Just 406 MHz

The ICAO standard and CAR Part 91, A.15 both specify that ELTs transmit on both 406 and 121.5 MHz.

The 121.5 MHz transmitter is to facilitate local homing by rescue aircraft after SAR action has been triggered by reception of the 406 MHz transmissions. See the article "Less Search – More Rescue" in the November/December 2011 issue of *Vector* (available on the CAA web site, www.caa.govt.nz) for a full description of the system.

The Rescue Coordination Centre (RCCNZ) has expressed concern that some aircraft ELTs recently imported and installed may lack the 121.5 MHz capability. In the event of an accident in hostile terrain, this could seriously delay finding the aircraft, even though its approximate position may have been determined from the 406 MHz signal.

If there is any doubt about whether a recently-installed ELT complies with the rules requirements, check with the installer, or if you know the make and model, check the manufacturer's web site for the detailed ELT specifications.

General Reminders

- All 406 beacons must be registered **before** installation. This can be done by telephoning 0800 406 111 or 0508 406 111, or through the web site www.beacons.org.nz.
- If ownership of an aircraft changes, or an ELT is moved from one aircraft to another, the updated details must be notified as above. Up-to-date details will avoid delays in contacting the owner or operator in the event of beacon activation.
- 121.5 MHz is still the international distress frequency, and is still monitored by many aircraft, particularly those on long-haul operations.
- The 121.5 MHz ELT signal will enable a homer-equipped rescue helicopter to find you in difficult terrain.
- In an emergency where a safe forced landing is a doubtful outcome, activate the ELT early to at least alert the RCC to start making appropriate enquiries.
- Unless a 406 beacon has an integral GPS set, or a GPS feed, position information will not be available until a suitable LEOSAR satellite pass. In extreme cases, this could take some hours.
- The space segment of the Cospas-Sarsat system is being upgraded by the inclusion of SAR packages on all GPS, Galileo and Glonass satellites launched since February 2011. When fully operational, this system should result in near-instantaneous position solution.
- Proper flight planning, position reporting, flight following and additional aids such as proprietary tracking systems will all help narrow down your position, supplementing the ELT alert. ■

Director's **Awards 2013**

This year's winners of the Director's Awards were announced in June by Graeme Harris, the Director of Civil Aviation.

These awards are given to deserving aviation participants with an overwhelming safety ethos. Their actions have directly resulted in raising safety levels, and they have encouraged others in the industry to do the same.

Individual Award

Errol Burtenshaw is a popular and worthy winner of this award. It recognizes Errol's significant career in New Zealand aviation and a lifetime of dedication to safety.

Graeme Harris said Errol's influence in his current role, as Manager Operational Integrity and Safety with Air New Zealand, extends to New Zealand and international aviation systems.

Errol said, "I was very surprised and honored to receive the award. I was, in fact, speechless!

"In my 50 years of aviation, firstly with the RNZAF and now with Air New Zealand, I have had great opportunities to train, and be trained, and have always looked for continual improvement in myself and my company," Errol said.

Graeme Harris also said that Errol is held in very high regard by his company and industry colleagues through his credibility and integrity, and that the travelling public continues to receive the benefits of Errol's contribution to aviation safety.

Organisation Award

The Director presented his Award for an Organisation to Strikemaster Limited. This company provides passenger flights in an ex-RNZAF Strikemaster jet aircraft.

Owner and operator, Brett Nicholls, said the award was an honour for his operation and people.

"I am surprised, shocked and stunned by our award but it reflects on our capable and very professional flight crew, a great aircraft, and high levels of safety management. We want to make this jet flight a safe and enjoyable experience for our passengers.

"We have embraced Part 115 and we can now provide a sustainable adventure aviation operation into the future," said Brett.

Graeme Harris commended Strikemaster for their constructive, professional work in gaining operator certification under Part 115.

"It is clear that this operator is very focused on risk management and committed to high levels of safety in their adventure aviation business," Graeme said.

CAA Flight Instructor Award

This year's recipient is Dave Brown.

The award recognizes Dave's significant contribution to training and aviation safety as Chief Flying Instructor for New Zealand Warbirds.

A former RNZAF Flying Instructor, and now a senior Airbus Captain with Cathay Pacific, Dave is also the training manager, and a pilot, for Strikemaster.

"I am very pleased and honoured to accept this award.

"It reflects on the organization and importantly, the efforts of Warbirds volunteer instructors throughout the country. They have contributed so much to raising the standards of our pilots and others through training for aerobatics, formation flying, and low level display flying.

"We have also enjoyed working with CAA personnel to help shape Rules and Advisory Circulars, and to help introduce Jet Warbirds," says Dave.

Graeme Harris said that Dave is personally responsible for the steady improvement in the safety culture and professionalism of the Warbirds and air display pilot community. ■

Above inset: Individual Award winner Errol Burtenshaw dwarfed by a Boeing 787.

With the appropriate background of BAC 167 Strikemaster, NZ6370 are, from the left; CAA Flight Instructor Award winner, Dave Brown, CFI Warbirds; Andrew Hope and Brett Nicholls, both from the Organisation Award winner, Strikemaster Limited.

Position **Reporting**

Accurate position reporting has many benefits, including collision avoidance, situational awareness for ATS and other pilots, and narrowing down the search area if you have an accident.

We report position for various reasons, such as when:

» Requesting a clearance into controlled airspace;

» Updating position when on a flight plan;

» Operating in a mandatory broadcast zone (MBZ) or common frequency zone (CFZ).

Knowing exactly where you are is always a good basis for an accurate position report, so for a VFR pilot, good map-reading is essential. Vague position reports are of no use, especially to other pilots trying to sight you. Reporting "abeam" or "approaching" somewhere is especially unhelpful. Watch the use of "overhead" too – if you can see it ahead of you, you're not over it.

Always try to report position in relation to a visual reporting point (VRP), or if not available, a prominent feature.

Not only is the position accuracy important, but also the manner in which you transmit your report. The GAP booklet *Plane Talking* gives a useful tip for formatting your position reports.

Once you have established contact, your report would take the form **PTA – ETA**, that is, Position, Time (this can be implied), Altitude, ETA, and intentions if relevant.

Another useful aid to message formatting is the "**Four Ws**":

» **W**ho you are calling, eg, Christchurch Information, Napier Tower, Waimate Traffic.

» **W**ho you are – your callsign. Prefixing with your aircraft type can assist others with recognition and expected performance.

» **W**here you are – accurate position report including time (where appropriate) and altitude.

» **W**hat you want – a clearance, what your intentions are, or weather information for example.

Remember that not only is accuracy important, but also good radio discipline, especially the use of standard phraseology. *Plane Talking* is available on the CAA web site, www.caa.govt.nz, or by emailing info@caa.govt.nz. ■

Clarification

In the article "Winter Happens" (May/June 2013 issue of *Vector*), we said that frost or ice must be removed before flight.

We also said that water was very effective, but to be careful that runoff wasn't likely to refreeze and lock up control surfaces.

Our advice was clearly aimed at the GA sector where water is probably the only aid available, and the aircraft is less likely to be operating at freezing temperatures.

In the air transport sector, operators are guided by their Standard Operating Procedures, which should have procedures covering icing conditions, and these may include other options, such as de-icing and anti-icing fluids.

For more information, see the *Aircraft Icing Handbook*, available on the CAA web site, www.caa.govt.nz, "Publications – *Good Aviation Practice* booklets".

As with any flight, it is the responsibility of the pilot to assess the risks and manage them appropriately – and this includes cancelling the flight. ■

Answers to the symbol quiz on page 8


Parachute landing area


Flight training activity


Hang glider / Paraglider activity


Kite flying activity


Model aircraft / UAS

Wire Hazard
(highest span shown AMSL if known)


Meteorological balloon


Sensitive fauna

Glider Winching
(maximum winch height shown)

Woodbourne Airspace Changes – Helicopter Frost-Fighting

Temporary Woodbourne airspace will be activated as required to accommodate frost-fighting helicopter operations in the local area. The changes will also have implications for IFR operators.

An important point to note is that the airspace arrangements for this coming frost season are not the same as last year's, when the entire Woodbourne Control Zone (CTR/D) was reclassified as a restricted area.

This year, when the temporary airspace is activated, the CTR is disestablished and replaced by a much-reduced version. This is basically the present Instrument Sector with shortened outer ends.

The replacement CTR extends from the surface to 1500 feet, and has a surrounding control area (CTA) from 1000 to 1500 feet. This arrangement is then capped by a new CTA from 1500 to 3500 feet.

The CTAs provide continued protection for IFR traffic in and out of Woodbourne, and the laterally reduced CTR will afford more flexibility for the large numbers of helicopters operating in the local area.

A caution – in some areas, there is less than 700 feet clearance between the CTA lower limit and the ground. Transiting at minimum legal height while remaining clear of the CTA may be impracticable.

As part of the temporary airspace, a small transit lane T690 is established between the northern boundary of Omaka Aerodrome and New Renwick Road. This is basically what remains of the existing transit lane T654 when the CTR dimensions reduce.

Activation times are likely to be in the afternoon before a forecast heavy frost, when a large number of helicopters converge on the Blenheim area, and in the morning when Woodbourne Tower opens watch while frost-fighting operations are in progress.

Activation of the temporary airspace will be notified via the Woodbourne ATIS on 126.05 MHz. Outside tower hours, the CTR will revert to Class G (uncontrolled) airspace, and the CTAs will revert to their normal configuration (as shown on the VNCs).

On opening watch in the morning, Woodbourne Tower will make an 'on-watch' broadcast on 122.8 MHz, and any aircraft operating in the temporary CTR will need to obtain clearance to continue operating.

While the temporary airspace is active, IFR traffic will not be able to make circling approaches, and when below 1500 feet, should be on either the extended Runway 06/24 centreline, or a published IFR or VFR procedure.

See AIP Supplement 119/13, effective 29 July 2013, for detailed procedures. Airspace coordinates are listed in the Air Navigation Register (available on www.aip.net.nz), for those operators wishing to programme these into their GPS. Make sure you check NOTAMs for any changes or amendments before doing so, however.

As frost operations normally start in earnest about 1 October, the early Supplement date gives operators plenty of time for planning and airspace familiarisation. ■

Health and Safety **Resources**

Need help developing your health and safety practices and knowledge? Visit the CAA web site, www.caa.govt.nz, "Health and Safety".

For those establishing a health and safety in employment (HSE) system, sample manuals and hazard registers have been provided. HSE audit standards are also available.

Got questions? Take a look at the range of Info sheets. These address frequently asked questions. A few of the topics covered include:

» Hazard management

» Defining HSE duties

» Employee participation

» Accident and Illness reporting.

Part 115 Drug and Alcohol Management

In adventure aviation, detection of drug, alcohol, and substance use that can cause impairment is critical to establishing safe operations.

It is now mandatory for Part 115 certificate holders to establish a drug and alcohol programme for monitoring and managing the related risks.

Guidance is provided for those wanting to develop a drug and alcohol policy, along with advice for conducting workplace testing.

Top Dressing

Agricultural companies, pilots, and farmers can find a Safety Guideline document discussing farm airstrip safety and appropriate fertiliser storage. Information for fertiliser manufacturers, transporters, and aviation companies is also included.

This Safety Guideline is out of print, but you can still access it online in PDF format.

The CAA HSE page also contains links to the Health and Safety in Employment Act 1992, and to ACC guidance material.

The Civil Aviation Authority has now been administering the provisions of the Health and Safety in Employment Act 1992 for over 10 years. If you have any HSE issues that may concern the CAA, contact the HSE Unit, hsu@caa.govt.nz. ■

Exam **Cheating**

No form of exam cheating will be tolerated, and those cheating will be caught.

This is the message that the CAA wants to get across to students, says John McKinlay, Manager Personnel and Flight Training.

"Everyone has leadership responsibilities, and it comes down to ethics in all aspects of aviation," says John.

"Holding a licence is a privilege. One has to be fit and proper, and have a high level of personal integrity to continue to be a licence-holder."

John encourages the aviation community to be proactive.

"If you see something happening that is not quite right, it's good to give a heads-up that this isn't the right way. Friends are the most effective form of moderation."

Bob Brownlie, General Manager, Aviation Services Limited (ASL), the organisation that administers the aviation theory exams under delegation from the Director of Civil Aviation, agrees.

"It behoves all of us in the industry to be vigilant and report any untoward incidents so that integrity of the system is not compromised," he says.

The CAA and ASL have been working closely together to ensure that exam processes remain robust and that those cheating are being caught.

Those found guilty under the Civil Aviation Act 1990 or Civil Aviation Rules face regulatory action, including being debarred from sitting further exams for up to 12 months, withholding of results, or paying fines. Existing licences may also be revoked.

Depending on the level of the offence, offenders can also be charged under the Crimes Act 1961. ■

Pre-Pay Medical Fee Online

The medical fee must be paid **before** your medical examination takes place. To pay online, visit the CAA web site:

www.caa.govt.nz/payment

You can pay by credit card (Visa or MasterCard) or internet banking. To safeguard your personal information, payment is processed by a secure third party. The CAA does not see or store your private banking details.

After payment, you will be provided with a CAA receipt number by email. Print this and remember to take it with you to your medical examination.

You can make a payment by cheque, but confirmation will take longer than if payment is made online. Plan your pre-payment to make sure you receive confirmation before the date of your examination.

General Direction Consultation

The General Direction, *Impaired Colour Vision* (GD/VIS/01/2013.1), is now available for consultation. You can see the proposed General Direction on the CAA web site, www.caa.govt.nz, "Medical – General Directions". You are invited to make your submissions on this proposal – please use the form on the web site, and email to gd-consultation@caa.govt.nz. Comments close **28 August 2013**. ■

How to Get Aviation Publications

AIP New Zealand

AIP New Zealand is available free on the Internet, www.aip.net.nz. Printed copies of Vols 1 to 4 and all **aeronautical charts** can be purchased from Aeronautical Information Management (a division of Airways New Zealand) on 0800 500 045, or their web site, www.aipshop.co.nz.

Pilot and Aircraft Logbooks

These can be obtained from your training organisation, or 0800 GET RULES (0800 438 785).

Rules, Advisory Circulars (ACs), Airworthiness Directives

All these are available free from the CAA web site. Printed copies can be purchased from 0800 GET RULES (0800 438 785).

Planning an Aviation Event?

If you are planning any aviation event, the details should be published in an AIP Supplement to warn pilots of the activity. For Supplement requests, email the CAA: aero@caa.govt.nz.

To allow for processing, the CAA needs to be notified **at least one week** before the Airways published cut-off date.

Applying to the CAA for an aviation event under Part 91 does not include applying for an AIP Supplement – the two applications must be made separately. For further information on aviation events, see AC91-1.

CAA Cut-off Date	*Airways Cut-off Date*	*Effective Date*
5 Aug 2013	12 Aug 2013	17 Oct 2013
2 Sep 2013	9 Sep 2013	14 Nov 2013
30 Sep 2013	7 Oct 2013	12 Dec 2013

See **www.caa.govt.nz/aip** to view the AIP cut-off dates for 2013.

Aviation Safety Advisers

Aviation Safety Advisers are located around New Zealand to provide safety advice to the aviation community. You can contact them for information and advice.

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Aviation Safety & Security Concerns

Available office hours (voicemail after hours).

0508 4 SAFETY
(0508 472 338)
isi@caa.govt.nz

For all aviation-related safety and security concerns

Accident Notification

24-hour 7-day toll-free telephone

0508 ACCIDENT
(0508 222 433)
www.caa.govt.nz/report

The Civil Aviation Act 1990 requires notification "as soon as practicable".

Accident Briefs

More Accident Briefs can be seen on the CAA web site, www.caa.govt.nz, "Accidents and Incidents".
Some accidents are investigated by the Transport Accident Investigation Commission, www.taic.org.nz.

ZK-WRL SkyStar Kitfox IV

Date and Time:	21-Apr-12 at 15:15
Location:	Koromatua
POB:	2
Injuries:	0
Damage:	Substantial
Nature of Flight:	Private Other
Flying Hours (Total):	835
Flying Hours (on Type):	600
Last 90 Days:	26

The aircraft, equipped with a Rotax 618 engine, had just taken off from a farm airstrip. When the pilot throttled back from full power, the engine seized completely at low altitude. The aircraft landed on a barberry hedge in a farm drainage ditch.

The engine had suffered from a 'cold seizure', a known issue associated with these engines.

CAA Occurrence Ref 12/1783

ZK-EZK Cessna 172M

Date and Time:	25-Apr-12 at 12:18
Location:	Otorohanga
POB:	3
Injuries (Serious):	3
Damage:	Substantial
Nature of Flight:	Private Other
Pilot Licence:	Private Pilot Licence (Aeroplane)
Age:	60 yrs
Flying Hours (Total):	725
Flying Hours (on Type):	597
Last 90 Days:	8

The aircraft landed well into the 570-metre private airstrip with about five knots of tailwind, and the pilot was unable to stop the aircraft before it struck a drain embankment at the end of the strip. The aircraft was substantially damaged and the three persons on board were seriously injured.

Before departing for the airstrip, the pilot had received a briefing from the airstrip owner, who advised him to "watch out for the drain". During his overhead join for the airstrip, the pilot didn't position his aircraft to give him a good overall view of the airstrip, and also forgot the advice about the drain.

On final, a wind change resulted in a slight tailwind component, but the visual cues available to the pilot led him to believe that he had sufficient distance to land. The drain at the far end of the airstrip was not visible. Late in the landing roll, the pilot realised that the strip was shorter than anticipated and despite maximum braking, he was unable to stop the aircraft before it struck the drain embankment.

CAA Occurrence Ref 12/1818

ZK-ISG Robinson R44

Date and Time:	14-Jun-12 at 8:50
Location:	Opuawhanga
POB:	1
Injuries:	0
Damage:	Minor
Nature of flight:	Agricultural
Pilot Licence:	Commercial Pilot Licence (Helicopter)
Age:	25 yrs
Flying Hours (Total):	781
Flying Hours (on Type):	430
Last 90 Days:	91

The pilot and supervising pilot carried out a ground briefing of the area to be sprayed, and identified a potential hazard of power lines running between two buildings on the property. During the preparatory reconnaissance flight, power lines were identified close to a tree line.

About halfway through the spraying operation, the supervising pilot saw the helicopter operating from a different direction, and shortly afterwards, collide with the power line. The pilot made a safe landing, and inspection found only minor damage to the helicopter. Several properties in the district were without power until the line was repaired.

CAA Occurrence Ref 12/2716

ZK-XEN Celier Xenon

Date and Time:	24-Oct-12 at 13:35
Location:	Tauranga
POB:	2
Injuries:	0
Damage:	Substantial
Nature of Flight:	Private Other
Age:	64 yrs
Flying Hours (Total):	259
Flying Hours (on Type):	201
Last 90 Days:	14

The gyrocopter took off on Runway 34 at Tauranga, and made an early left turn at the request of the tower controller. During the turn, the airspeed decayed from 55 to 45 knots and the climb turned into a descent.

The pilot made a further left turn to get back over land, and during this turn, the aircraft landed heavily in the bay, about 300 metres from shore. Neither of the two occupants was injured.

CAA Occurrence Ref 12/4682

ZK-FWS Piper PA-28-181

Date and Time:	27-May-12 at 14:06
Location:	Raglan
POB:	4
Injuries:	0
Nature of Flight:	Private Other
Pilot Licence:	Commercial Pilot Licence (Aeroplane)
Age:	26 yrs
Flying Hours (Total):	1334
Flying Hours (on Type):	131
Last 90 Days:	11

During an attempted takeoff from Raglan Aerodrome, the aircraft did not accelerate or lift off as anticipated, so the pilot elected to abandon the takeoff. Braking action was poor due to wet grass, and the aircraft ran through the wire fence at the end of Runway 23.

CAA Occurrence Ref 12/2324

ZK-HGT Aerospatiale AS 350B

Date and Time:	20-Jul-12 at 13:30
Location:	Mokau
POB:	1
Injuries:	0
Damage:	Substantial
Nature of Flight:	Agricultural
Flying Hours (Total):	740
Flying Hours (on Type):	29
Last 90 Days:	148

The helicopter engine flamed out during an agricultural spraying operation, and although the pilot was able to make a run-on landing, the helicopter rolled over and sustained substantial damage. The pilot was uninjured.

It was discovered that the flameout was due to fuel exhaustion, with less than two litres remaining. The fuel quantity gauge was reading erroneously, being stuck at 20 per cent due to contamination of the transmitter unit by debris. The unit was of the older resistance type, and the manufacturer had advised that it was "not defect free". The low-level warning light did not illuminate, as the switch was connected directly with the transmitter.

The manufacturer had issued Service Letters (1190-28-93/867-28-88) and Service Bulletins (28.12 R1) addressing the inherent unreliability of the fuel quantity indicating system. However the operator said he was not aware of the content of 'recommended' Service Bulletin (SB) 28.12 R1 advising availability of an improved capacitance-type system and separate low-level warning switch. The operator also said that he was not aware that the low-level warning light was not separate from the transmitter. The Flight Manual did not detail the relationship between the transmitter and the low-level warning light.

The pilot, who was inexperienced on type, had been relying on the fuel quantity reading and the low-level warning light for fuel state awareness. EASA have been advised of the accident and how the various anomalies with the indicating system were involved. The operator has put in place improvements to ensure better fuel state awareness.

CAA Occurrence Ref 12/3085

ZK-EMA NZ Aerospace FU24-950

Date and Time:	04-Jul-12 at 14:30
Location:	Tarras
POB:	0
Injuries:	0
Damage:	Substantial
Nature of Flight:	Agricultural
Pilot Licence:	Commercial Pilot Licence (Aeroplane)
Age:	44 yrs
Flying Hours (Total):	7618
Flying Hours (on Type):	3742
Last 90 Days:	131

After landing at the airstrip, the pilot parked the aircraft, set the engine to idle, feathered the propeller and applied the park brake, before vacating the aircraft to discuss the planned work. About 30 minutes after arrival, the pilot heard the sound of the (turbine) engine spooling up, and the unoccupied aircraft began to move off, travelling about 30 m before colliding with the loading vehicle.

The pilot shut the engine down using the fuel lever, noting that the propeller lever was 45 per cent forward, and the power lever approximately 5 mm forward. It was possible that the lever positions resulted from displacement of the engine at impact, so these were not considered a reliable indication of the pre-impact positions.

It is now the operator's procedure to apply the park brake before feathering the propeller, and to chock the nose wheel before leaving the aircraft unattended. A mechanical linkage (which is removed before flight) has also been added to the quadrant to physically hold the propeller lever in the feather position.

CAA Occurrence Ref 12/2849

ZK-BEL Cessna 180

Date and Time:	10-Aug-12 at 13:55
Location:	Big Bay
POB:	3
Injuries:	0
Damage:	Substantial
Nature of Flight:	Private Other
Pilot Licence:	Commercial Pilot Licence (Aeroplane)
Age:	26 yrs
Flying Hours (Total):	3562
Flying Hours (on Type):	51
Last 90 Days:	159

Before landing on the beach at Big Bay, the pilot made an inspection run along the beach by running the main wheels along the sand to determine the surface condition. Approaching an area of softer sand, the pilot initiated a go-around. The engine 'hesitated' momentarily due to rapid throttle opening.

The seaward wheel sank into soft ground, the aircraft began to ground loop, and as the other wheel dug into the sand, the aircraft overturned. There were no injuries, and the aircraft has subsequently been declared an insurance total loss.

CAA Occurrence Ref 12/3422

GA Defects

GA Defect Reports relate only to aircraft of maximum certificated takeoff weight of 9000 lb (4082 kg) or less.
More GA Defect Reports can be seen on the CAA web site, www.caa.govt.nz, "Accidents and Incidents".

Key to abbreviations:

AD = Airworthiness Directive
NDT = non-destructive testing
P/N = part number
SB = Service Bulletin
TIS = time in service
TSI = time since installation
TSO = time since overhaul
TTIS = total time in service

Aerospatiale AS 355 F1

Main rotor blades

Part Model:	AS355F1
Part Manufacturer:	Aerospatiale
Part Number:	355A11-0020-09
ATA Chapter:	6210
TSI hours:	100.4
TTIS hours:	7492

During separate inspections approximately one month apart, both scheduled and non-scheduled, two of the main rotor blades were found to have a crack in the lower skin at the 1310 -1325 mm stations (outboard from grip area). In both cases, the blades were found to be unserviceable and were replaced. The total time in service was 6625.45 hours and 7492.7 hours.

CAA Occurrence Ref 13/731

Aerospatiale AS 355 F1

Fuel control end fitting

Part Manufacturer:	Eurocopter
Part Number:	350A57-1053-00
ATA Chapter:	7320

After landing the helicopter, the pilot attempted to shut down the number 1 engine. Although the throttle lever was moved to the shutdown position, all engine indications remained at the flight idle values. Engine shutdown was then initiated by selecting the emergency fuel shutoff lever.

Inspection of the fuel control lever actuation cable, where it attaches to the fuel control, revealed that end fitting had failed, resulting in loss of function of the fuel control actuation cable when engine shutdown was selected. The end fitting failure could be directly attributed to loss of an end fitting assembly retention roll pin. The failed end fitting was replaced, and fuel control actuation cable was re-rigged as per the manufacturer's maintenance manual.

To prevent recurrence, the associated engineering personnel recommended securing the end fitting assembly retention roll pin with a strand of lockwire.

CAA Occurrence Ref 12/5861

Hughes 369D

Axial compressor stator vane

Part Model:	250-C20B
Part Manufacturer:	Allison
ATA Chapter:	7230

About 20 feet agl during takeoff, the helicopter engine lost power. The pilot was able to make a successful forced landing.

Inspection of the engine found that the axial compressor had failed catastrophically after the loss of one of the stator vanes. A metallurgical examination of the failed compressor case halves was carried out. This determined that the vane failed due to corrosion. It was thought that the corrosion could not be detected at the last compressor condition inspection 20 hours previously, as it appears that the corrosion existed underneath the plastic compressor lining.

CAA Occurrence Ref 12/2288

Diamond DA20-C1

Magneto

Part Model:	4309 & 4310
Part Manufacturer:	Champion Slick
Part Number:	M3827
ATA Chapter:	7400
TSI hours:	500
TTIS hours:	2046

During 500-hour inspection of the LH and RH magnetos, it was noted that both distributor gears had sheared drive tangs, compromising the internal timing of both magnetos. It was also observed that both the external driver hubs were badly spalled. The manufacturer when informed advised that this type of defect had never been reported before but indicated that this could occur only through severe kick-back on engine start. A contributing factor may have been the lightweight propeller installed on the aircraft, which is known to cause excessive internal and external magneto wear unique to this installation, with TCM SB03-07 and Slick SB1-07 applicable to this issue. Slick SB03-7 addresses the issue of driver hub spalling.

The maintenance provider implemented a mandatory internal magneto inspection on aircraft operated following engine kick-back on engine start. The operator implemented instructions to covers the pilot requirement, with regards to reporting engine kick-back and informing pilots to follow starting procedures closely. The damaged components were replaced, magnetos installed and the aircraft returned to service.

CAA Occurrence Ref 12/2453

Cessna 185D

Alternator

Part Manufacturer:	Kelly Aerospace
Part Number:	DOFF10300J
ATA Chapter:	2420
TSI hours:	100
TSO hours:	100
TTIS hours:	100

During flight, the pilot found the alternator was not producing a charge, so decided to return to the aerodrome, landing without further incident.

The alternator rotor had separated during operation. It is believed that the alternator came apart in flight due to the through-bolts loosening when the mating surfaces bedded in with normal in-service vibration. This left the joint loose, leading over time to bolt failure and attachment failure.

This was the first defect of this type seen by the pilot and the maintenance provider. The maintenance provider noted that on all new units, the manufacturer has labelled them as follows: "CAUTION: Engine vibration may cause loss of thru bolt torque due to metal wear on the case and/or stator. Kelly Aerospace recommends the retorqueing at all thru bolts after the first 10 hours of operation and again at each 100 hour interval."

CAA Occurrence Ref 12/4554

Gippsland GA200C

Wing strut bolt

Part Number:	AN6-23A
ATA Chapter:	5740
TSI hours:	110
TTIS hours:	2053

During a maintenance inspection, the left wing main spar lift strut attachment bolt was found fractured. Further investigation found that the bolt head had fully migrated out of the strut fitting, The threaded end of the bolt had migrated aft, leaving only 1/8 of an inch of shank in the strut fitting. The fuel tank vent tube had prevented the bolt from migrating completely out of the fitting. The bolt had not failed in shear, and had failed in the centre of the strut attachment fitting.

The failed bolt was sent by the CAA to GippsAero for evaluation. GippsAero commented that after examination of the bolt, it appears that the failure was due to the bolt being loose in the strut attachment fitting. This has caused the bolt to fail through fatigue, and the final fracture was small indicating a low-load failure.

CAA has raised DCA/GA200/2A Wing Strut Bolt - Inspection Replacement effective 27 September 2012 in response to the occurrence. GippsAero have also produced mandatory Service Bulletin SB-GA200-2012-08 Replacement of Wing Strut Mounting Bolts effective 04 September 2012.

CAA Occurrence Ref 12/3542

Akrotech G200

Oil pressure indication wiring

ATA Chapter:	7930

After taking off from Runway 16 at Wellington, the pilot reported "no oil pressure" and turned downwind, requesting an immediate landing. A B737 on final was instructed to go around, and the aircraft landed safely.

Extensive maintenance investigation found that the loss of oil pressure was due to a wiring fault in the oil pressure indication system. The aircraft had just undergone a maintenance inspection and work around the engine mount area; this appeared to have disturbed the soldered connections in the oil pressure system wiring, leading to intermittent pressure indications at high power settings.

CAA Occurrence Ref 12/5382

Cessna P210N

Relay

Part Manufacturer:	Cessna
Part Number:	S2443-2
ATA Chapter:	2450
TTIS hours:	2956

The aircraft had a complete electrical failure approximately 10 minutes after take-off. The back-up generator was used for essential systems.

Maintenance investigation found that the starter solenoid had remained permanently engaged after engine start, causing the starter to carry on running, burning out, and draining the battery. It is suspected that the starter solenoid failed due to age. The starter adaptor was inspected for operation and damage, and the starter and solenoid replaced.

CAA Occurrence Ref 12/4263

Pacific Aerospace Cresco 08-600

Incorrect bolts

ATA Chapter:	5320
TTIS hours:	14211

During wing replacement, it was noted that 3/16-inch bolts had been used in the installation of the stress band. The maintenance manual calls for the stress band to be bolted to a longeron with 1/4 inch bolts.

The longeron is predrilled 3/16 and should have been opened to 1/4 inch to match the stress band and 1/4 inch bolts fitted. The aircraft was rebuilt after an accident by a previous maintenance organisation, and this is likely to have been where the incorrect installation occurred. The exact origin, however, could not be determined. Inspection revealed no secondary damage, and the defect was rectified during the wing replacement.

CAA Occurrence Ref 12/4217

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