March/April 2015

POINTING TO SAFER AVIATION

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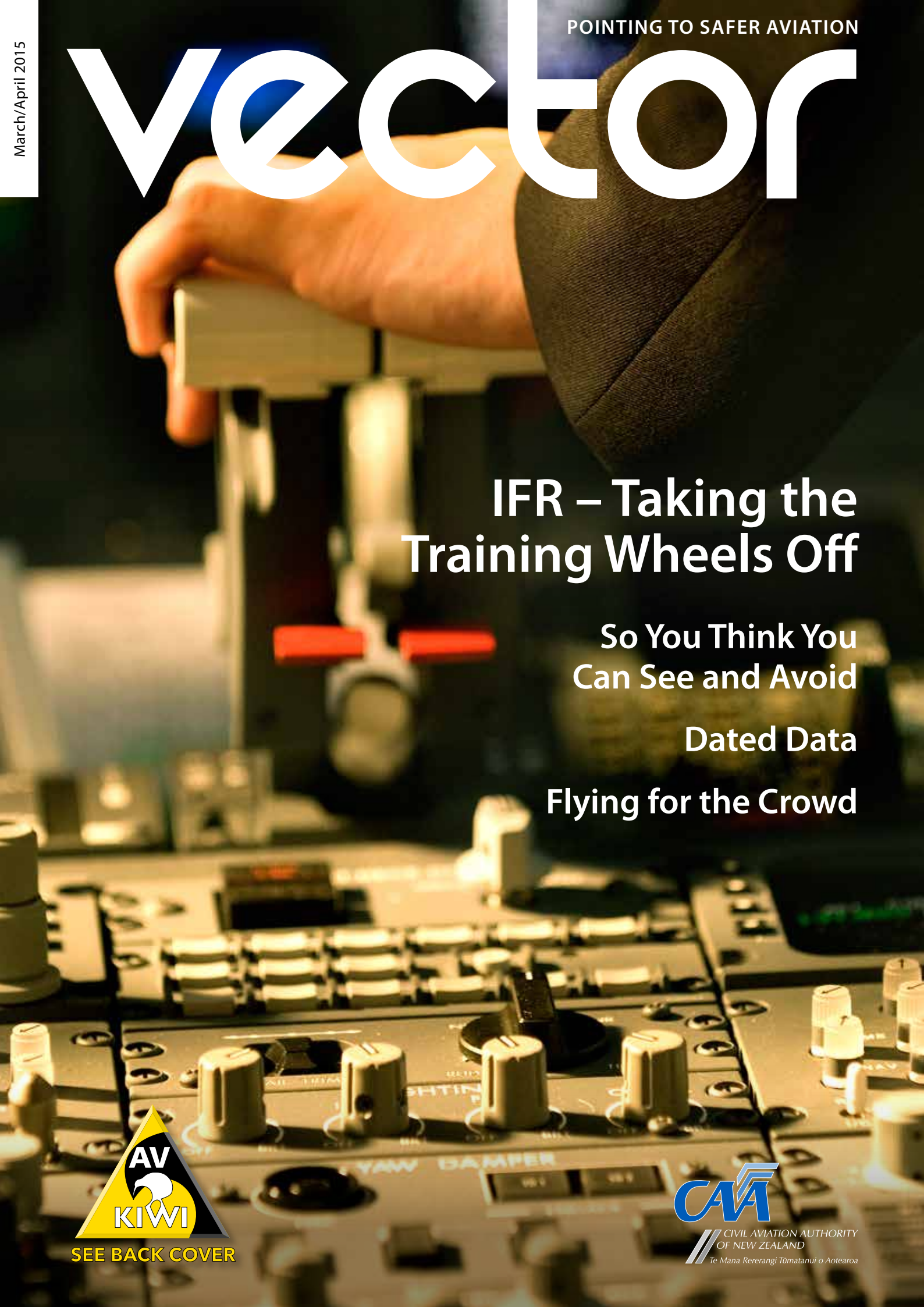

IFR – Taking the Training Wheels Off

So You Think You Can See and Avoid

Dated Data

Flying for the Crowd

SEE BACK COVER

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

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3 IFR – Taking the Training Wheels Off

The transition from IFR training to IFR operations is one of the most difficult experiences for a pilot. *Vector* talks to three pilots who've made that move, about what they learned.

9 So You Think You Can See and Avoid

Human factors mean that seeing and avoiding other aircraft sometimes isn't enough to stop a mid-air collision. When you know your limitations, and how to scan effectively, that risk is greatly reduced.

14 Dated Data

Aviation manufacturers cease trading, become incorporated into another organisation or, for myriad reasons, no longer support an aircraft component. We explain what owners can do to make sure their ageing aircraft remains compliant.

16 Flying for the Crowd

They may fly like their hair's on fire, but airshow pilots practise relentlessly, preflight meticulously, and always fly within their limits. *Vector* talks to three of the best about their ultra-careful approach to burning up the sky.

In this issue...

Cover: IFR – Taking the Training Wheels Off, see the story on page 3. Photo: istockphoto.com/zkoritni

Published by
Safety Promotion Unit of the Civil Aviation Authority of New Zealand, PO Box 3555, Wellington 6140.

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Published six times a year, in the last week of every odd month.

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IFR – Taking the Training Wheels Off

You've completed your multi-IFR rating, but now's not the time to relax. The transition from IFR training to real commercial flying could be one of the most difficult periods of your career. Three pilots who've been there, done that, share their experience and advice.

Dan Foley, 2000 hours single pilot multi-IFR time, trained and instructed at Kapiti before flying with Vincent Aviation.

"It was all go. I was approached by Vincent Aviation, did a type rating the following day, and then departed in a crew of two to do calibration flying in Papua New Guinea.

"Vincent had a really good mentoring programme where you sit in the right-hand seat for a period of time, slowly building your expertise. You get opportunities to sit in the left on back flights, or non-revenue flights without passengers. After 200 hours in the right seat, I did my check which involved three hours of flight examining," says Dan.

Dan now works at the CAA as a Safety Investigator. He still flies multi-IFR in a training capacity to remain current.

Gareth Clare, a turboprop pilot, trained and instructed at Kapiti Aero Club.

"My multi-rating training was done in a Seneca, and that prepared me for the aircraft I'd eventually fly, in my first commercial job with air2there," says Gareth.

It's a Licence to Learn

When asked if he was pushed to his limits during his multi-engine training, Dan replies "in stages".

"A multi-engine instrument rating is a starting point. By no means do you have all the skills or the knowledge to fly IFR commercially at that stage.

"Training is mainly done in smaller regional towns where there isn't a lot of traffic. After I got my rating, it dawned on me that in the scheme of things, I didn't know a lot about flying in an instrument environment. I could fly routes that I'd flown 10 times during training, such as Paraparaumu to Foxton, but at airports such as Auckland, Wellington, and Christchurch, things are done a lot faster and more efficiently.

"I did a number of holds during my multi-IFR training, but during the six years I was flying for Vincent Aviation, I didn't do one operational hold. That's a reflection of the difference between the training and operational environments," says Dan.

Gareth cautions those who have just completed their training.

"The most dangerous point in your instrument flying career is when you've just got your licence. That's when you're going to learn those operational considerations that aren't taught during training.

"You have to be conservative. I can't stress that enough when making the transition. Set yourself personal minimums that are above the rules," says Gareth.

Commercial Pressures

Flying is only one part of the operation. There's security, passenger handling, communication with maintenance controllers, and the constant need to manage your time effectively.

Photo: istockphoto.com/sierrarat

Simon Davenport has flown 2500 hours single pilot on both single and multi-IFR operations.

His first IFR job was in Kerikeri for Salt Air, before going to Paraparaumu to work for air2there. He is a Part 125 Airline Flight Examiner, and now flies for Air Nelson.

He says working in commercial IFR means quick turnaround times.

"There's a lot to do during that time.

"As an instructor, you can take your time planning before your flight to get a solid picture of the weather and everything else that's going on. When flying commercially, you're only picking out the information that's relevant to your flight – do I need an alternate, do I need extra fuel?

"You also have to think about your passengers' requirements. Is the weather going to be bumpy? Can I make it a nice flight for them?" says Simon.

"When tuning and identifying navaids, always have two or three methods of navigation available, so if one fails, you can move to the other one," advises Dan.

Gareth says, "You tend to grow accustomed to the routes that you train on.

"It's easy to forget how your workload can increase when you fly somewhere out of the norm with a different arc or inbound, or have to conduct a missed approach.

"I remember my first solo missed approach into Paraparaumu. It occurred shortly after I got my instrument rating when I was building the hours needed for air2there. I'll never forget that feeling, and experiencing how high the workload was.

Simon encourages pilots to keep their brains engaged.

"Before pushing any button in the aircraft, think, `is this what I actually want to do?' When you get an altitude change, write it down or program it into the aircraft

Photo: istockphoto.com/xaviermarchant

Managing your Workload

It's all about staying ahead of the aircraft, and keeping a handle on the big picture.

"When you're flying single-pilot multi-IFR, you're never sitting there fat, dumb, and happy. You are thinking ahead about the next task or action," says Dan.

"The Cessna 406 I trained in had dual radios that allowed me to pre-program frequencies. You're always tuning and identifying a radio, or listening to an ATIS to stay ahead of the game.

"At one stage when I was doing my operational check out of Blenheim, we had a simulated engine failure on departure. During the climb, I was already identifying navaids, listening to the ATIS in Nelson, and briefing the approach.

"A short sector is already a time of high workload, but add a simulated engine failure into the mix and the workload becomes huge. This makes task prioritisation all the more important.

straightaway so you don't have to second guess yourself – it's good cockpit management. Of course, this depends on your workload, you have to be practical and prioritise.

"Trim the fat – you're trying to make all aspects of the operation efficient. Keep the preflight briefing and radio calls to the point. Say what you need to, but don't tell the air traffic controllers your life story. If ATC know you can be quick and efficient, they will have greater confidence fitting you into traffic sequences.

"I don't believe in rushing, but there's a certain amount of efficiency that you need to develop. For example, on reaching a holding point, you don't want to have a whole bunch of checks left to do – you should be almost ready to depart. If you receive a last minute change in departure clearance, and you haven't briefed the amended procedure, it can definitely throw you. Either request to stay with the original departure instructions, or tell controllers that you're going to need a minute or two to re-brief. Get your head in the right airspace before launching.

"When airborne, it's also about knowing what the next step is and 'massaging' the flight. That could be requesting direct to shave off a couple of minutes, or anticipating the next set of instructions. When practical, it's also useful to have a look every now and then to see if you can get a visual approach. It will make your life easier and save the company money," says Simon.

Gareth brings situational awareness into the picture.

"If you're flying VFR, the big picture is easier to maintain as you can see what's going on around you. When flying with instruments you need to maintain that same mental picture with limited information.

"During your training, it's really difficult to reach that level of awareness. Your capacity is completely taken up by the constant flow of new information you have to assimilate.

"But when you're in your first job and you start getting some time under your belt, then you have some extra capacity to take all of those other considerations into account – maintaining your situational awareness is invaluable," says Gareth.

Prior Preparation

"If I'm flying into an airport for the first time, I'll have a read of the AIP the night before," says Simon.

"You need to grasp the important information, such as speed requirements or ATC frequencies. The preparation is invaluable and it costs you nothing.

"You also need to be aware of the exceptions. For example, if you're going from Woodbourne to Nelson and you're cleared for the VOR/DME A approach, theoretically you'd need to make a reversal procedure before the outbound. However, on closer inspection of the AIP Nelson procedure pages, that isn't the case."

"A multi-engine instrument rating is a starting point."

Terrain Clearance

When you're flying IFR in controlled airspace, air traffic controllers are responsible for your terrain separation. But what happens if your radio fails? Gone are the days when you could look across at your instructor for guidance.

Always keep an ear to the ground and make sure you have VORSEC and enroute charts at your fingertips.

Aircraft Performance

"You really need to know the performance characteristics of your aircraft and its limitations," says Gareth.

"Initially, I flew the Partenavia. The Partenavia and Caravan boast similar speeds. The Chieftain on the other hand was more demanding to fly. Not only was it 25 to 30 kts quicker, but as it's a piston, you always had to be conscious of engine management. You need to have different approach plans for different aircraft. You also need to consider what you would do in the event of an engine failure – that's an article in itself."

Simon adds, "Know your aircraft specs and the specific aerodrome rules in the AIP.

"For example, one company I worked for climbed at 90 knots until 3000 feet which is fine at uncontrolled aerodromes; however in Wellington, the controllers want you to get airborne and out of the way so they can launch other traffic behind you."

Weather

"A good number of instructors can become 'fair weather pilots'," Simon remarks.

"When instructing, they have to fly in weather conditions suitable for their students, so they lack exposure to real world weather. When flying commercially, you're flying in weather conditions that aren't the greatest – sometimes at minimums.

"I remember when I was with Salt Air flying Whangarei to North Shore. Conditions were marginal and being a brand-new IFR pilot in my first job, it definitely got the adrenaline going. We had big, scary Auckland as the alternate, so there were all these considerations, like what to do with the passengers.

"If you're training, you'd just head back – no biggie. But when you're flying commercially, the chance of a missed approach can be a bit daunting.

"The actual thought of missing at North Shore was quite exciting as I'd never done a missed approach for real at that stage.

"We ended up getting in all right so it wasn't a big deal. It all comes down to prior preparation. I've seen a few students over the years that let themselves down on that front," says Simon.

Gareth warns new licence holders about the risk of icing.

"There are a host of challenges that aren't covered in great detail during your training – I cannot stress enough the dangers of icing in GA aircraft," says Gareth.

"Looking back on my experiences and the things that scared me, icing was the biggest. It's not really covered in great detail during your training. In the training environment, you're probably lucky if you're flying an aircraft with prop de-icing.

The CAA's *Aircraft Icing Handbook* is available free on the CAA web site, www.caa.govt.nz, "Publications – Good Aviation Practice booklets".

Night Flying

When night flying, you'll need to manage the additional risks: reduced pilot reports, ATC off-watch, fatigue, and limited visual references.

"I got caught off-guard flying between Auckland and Christchurch at night," recalls Dan.

"At 2 am, a front was coming up the east coast of the South Island and nobody had flown through it, or could give me any advice on its exact location or severity. In hindsight, I shouldn't have been flying.

"I was the first person to reach the front and I got hammered. Fortunately, a Boeing 737 was in the vicinity. After coordinating with ATC, it slowed down behind me and helped to vector me out of the front and around the CBs," says Dan.

Gareth cautions those who have minimal night flying experience.

"Your work schedule can become hectic when a good chunk of your sectors are at night – especially during winter when it gets dark around 5:30 pm. And there are the classic difficulties: illusions, fatigue, aerodrome lighting, and so on.

"I'm grateful that I did quite a bit of night instructing, but I still found the night shifts challenging.

"There are a lot of subtleties you need to understand, such as how specific aerodrome lighting systems function. If you're flying into aerodromes where air traffic control has gone off-watch, you'll need to coordinate with the nominated person to turn on the aerodrome lighting. Have a backup plan if they fail to do so." ■

> *"Looking back on my experiences and the things that scared me, icing was the biggest."*

Photo: istockphoto.com/amygdala_imagery

Young Eagles Stars of National Champs

Amidst the competition and contest, trophies and honour at the 2015 Flying NZ National Championships, nine quiet, determined young people won the admiration and hearts of their seniors.

It's not often during the Flying New Zealand National Championships awards night there's a standing ovation.

But that's what happened in February in Whitianga. It was announced that the nine Young Eagles attending the event had so impressed Peter and Lyn Walton, that the Whitianga flier and his wife decided to give each $500 towards flying lessons.

That announcement brought the rest of the 170-strong crowd to its feet.

Peter had taken the Eagles, one by one, up in his T51 Mustang – a little adventure that had the teens grinning from ear to ear.

"Those young people were quiet, interested, enthusiastic and motivated. Not a smartarse among them!" says Peter.

"Some of them have got only a few hours under their belt, and even though they're really motivated, they could struggle to get to solo. So Lyn and I talked about it and decided to give them a little bump along the way."

The young fliers included five who were recipients of the Ross Macpherson Memorial Flying Scholarship. They each received $2,500 from a group of sponsors, which included the CAA, Aviation Services, and Aviation Co-operating Underwriters.

A sixth Young Eagle, Tom Steel, won the Air Safari 2013 prize, including a $3,000 grant.

Dazzled by the prospect of a flying career, and more immediately by doing their first solo and PPL, the group all hold down jobs, some of them, multiple jobs, and sacrifice other things that teens normally revel in, to get into the air.

The awards night belonged to Luc Wesson, from Waikato Aero Club, who was already a Ross Macpherson scholar. He won the Nola Pickard Memorial Trophy, and Airways award, for overall points in preflight, defect and aviation knowledge competitions run during the national champs.

"This is the best night ever!" he told *Vector* after taking off the two latter prizes.

"I worked really hard before the champs, but I was quite nervous about the exams so I'm buzzing. I'm so excited I'm shaking!"

Most of the group were aiming for the air force or airlines, but a second scholar, 17-year old Ryan Wensel, from North Shore, wants to put his future flying experience to good environmental practice.

"I want to start a company making aviation fuel out of 50 percent household waste. It's being done in the United States and I want to do that here in New Zealand."

Ryan is also interested using flight to broadcast 'seed-balls' to rehabilitate deteriorating landscapes.

Bryn Cotton-Tait, 15, of Tauranga Aero Club, is particularly interested in the technical side of aircraft, such as avionics.

"I do want to fly," he says, "but I'm also interested in design. I want to create new and more efficient ways for the aircraft to manage itself, say with navigation and communication with ATC."

While these Young Eagles have limited time in the air, they already have the safety essentials down pat – a thorough preflight, no alcohol the night before, look out the cockpit window, if the weather looks difficult, forget the flight, get enough to eat and drink before flying, make clear calls to ATC.

All the group said the money they received would help them with the cost of flying lessons and exams.

Some also mentioned that their parents were at least partially underwriting the teenagers' passion. "They'll be even happier than us!" ■

The Ross Macpherson Memorial Flying scholars from left to right: Luc Wesson, Waikato Aero Club; Logan Brooks, Canterbury; Dylan Pope, Marlborough; Tim Braim, Tauranga; and Ryan Wensel, North Shore.

Assessing the Safety Risk in **Part 135**

Photo: istockphoto.com/brittak

The CAA is building a sector risk profile of the Part 135* passenger air transport sector. What are the risks that community is managing? More importantly, what can be done to reduce those risks?

A CAA sector risk profile analysis is under way, trying to get a picture from industry as to how the risks to safety are spread throughout Part 135 passenger air transport operations.

Since September 2011, the accident rate per 100,000 hours flown by helicopters on air transport operations has increased from 4.1 to 7.4. Since 2012, the small aeroplane airline sector has exceeded the accident rate for the rest of the commercial aeroplane sector.

Currently however, the CAA's understanding of risk in the helicopter and fixed wing passenger air transport sector is limited to reported accident and occurrence data.

A sector risk profile allows the CAA to have a look at the various underlying influences on safety in a given area. By breaking down the overall risk into specifics, we can focus on distinct problems. For example, 'reducing landing accidents' is more easily addressed than simply 'reducing accidents'.

Jack Stanton, manager of the CAA's Intelligence, Safety and Risk Analysis unit, says an external company is conducting the risk profiling.

"They will be gathering information from industry, through workshops, surveys, and interviews, on the basis that participants are the best ones to evaluate the risks they face.

"All information will be de-identified before being collated and passed to the CAA. We are interested in risks prevalent across the sector, not those specific to one operator, so it doesn't need to know who said what. That's the essential difference between a sector risk profile and an operator risk profile."

The resulting mix of fact and opinion is combined with data from formal studies, and expressed as a set of 'risk statements' that describe the likelihood of a particular risky event occurring, and its consequence.

*Air Operations – Helicopters and Small Aeroplanes

"The CAA and operators can then allocate resources according to need, and respond according to urgency," says Jack.

The analysis will focus first on rotary wing operations for two reasons. Firstly, two-thirds of Part 135 participants are involved in helicopter operations. Secondly, as mentioned, the accident rate of Part 135 rotary operations has risen to 7.4 accidents per 100,000 flying hours. That compares with 3.0 for Part 135 fixed wing ops. (See page six of the Aviation Safety Summary report, www.caa.govt.nz, "Safety Info – Safety Reports".)

"We are particularly interested in how risk alters for rotary wing operators, depending on what activity they're engaged in," says CAA Intelligence Analyst Dominik Gibbs.

"From, for instance, carrying passengers, to fighting fires. We want to know if mixed operations introduce additional risks, or if the additional experience gained mitigates risk."

Dominik, who has oversight of much of the Part 135 project, says that while risk profiles help the CAA in targeting its actions and resources, there are likely to be some areas of risk beyond its effective influence.

"Some operations may carry risks highly dependent on the actions of individual participants, organisations, or industry groups.

"The greatest value of a sector risk profile is to be had, therefore, when participants read the risk statements, decide which ones apply to their organisation, then determine what they can do to minimise that risk. In that way, the overall accident rate, and costs to the sector, are reduced."

In the coming weeks the CAA will write to you with further information and the details of the company that will be carrying out the risk profiling. The company will then get in touch regarding your Part 135 operation and how you can be involved.

The completed risk profile analysis will be presented to the CAA on 30 June 2015, and later, in industry forums. ■

So You Think You Can **See and Avoid**

For pilots operating under VFR, seeing and avoiding is the final defence against a mid-air collision. But pilots need to be aware of the human factors that affect their ability to scan effectively.

A 2010 investigation studied 12 mid-air collisions that had occurred in New Zealand in the previous 20 years. Seven of the collisions were fatal, with 20 people killed. Interestingly, all of those collisions were during daylight in good weather conditions with the pilots operating under VFR. The principles of see and avoid failed to alert those pilots to conflicting traffic.

So why were those pilots unable to grasp the traffic situation accurately?

Case Study

On Monday 26 July 2010, two Cessna 152 aeroplanes were being used for training flights near Feilding aerodrome. Cessna A was returning to the aerodrome circuit with an instructor and student pilot on board, and Cessna B was climbing away from the aerodrome, flown by a solo student.

The two aeroplanes collided at 1300 feet – about 1100 feet above the ground.

The nose wheel of Cessna B struck and severed part of Cessna A's wing, rendering Cessna A uncontrollable.

Cessna A was seen to enter a steep descending spiral dive before striking the ground, destroying the aeroplane and killing the two occupants. The other pilot involved was able to glide Cessna B back to the aerodrome without injury.

The Transport Accident Investigation Commission (TAIC) safety investigation report stated the pilots of both aircraft should have been able to see each other but failed to do so.

The report also provided some key lessons and recommendations.

Workload

The sighting of other aircraft requires an effective scan outside the cockpit, supported by good radio use. During periods of high workload, a pilot's systematic scan can be disrupted by essential tasks inside the aircraft. For example, checking engine gauges, or making a switch selection. Cockpit workload is likely to be higher near airports where traffic is most dense, but where scanning is all the more crucial.

Remember to maintain visual contact after sighting an aircraft. If you do lose sight, let other aircraft in the vicinity know and state your intentions.

Feilding Mid-air Case Study – Finding

"The first priority of a pilot-in-command must be to ensure the safety of their aircraft, before engaging in other tasks."

Photos: istockphoto.com/sandsun and istockphoto.com/sambrogio

An instructor has the role of balancing aircraft safety with enabling their student to learn effectively. When flying with a student, you need to get a feel for their capacity and then compensate accordingly. Students who are in the early stages of training will be completely focused on flying the aircraft, so their ability to direct their attention to other tasks will be limited.

Limitations of the Visual Scan

'Accommodation' is the process of focussing on an object. Visual scanning involves moving the eyes to bring successive areas of the visual field onto the small area of sharp vision in the centre of the eye.

Pilot scans are often unsystematic. Areas of sky near the edges of windscreens are generally scanned less than the sky in the centre, and the scan may be in chunks that are too large.

FAA Advisory Circular AC 90-48C, recommends scanning the entire visual field with eye movements of 10 degrees or less. It estimates that around one second is required at each fixation. So to scan an area 180 degrees horizontal, and 30 degrees vertical, could take 54 fixations, so 54 seconds. But only a young person can accommodate to a stimulus in one second. The average pilot probably takes several seconds to accommodate to a distant object.

A big part of the answer is using a practical scanning technique. By fixating every 20 degrees, it should be possible to detect any contrasting or moving object in each visual block. Across the total scan area, that involves 9 to 12 blocks, each requiring one to two seconds for accommodation – see the two diagrams.

Aircraft Design Limitations

When flying, you need to compensate for the design limitations of the aircraft. All aircraft have blind spots that you need to keep in mind when scanning for traffic.

Feilding Mid-air Case Study – Key Lesson

"Pilots need to … ensure that their scans cater for any blind spots in the cockpit, either by moving their heads to look around any obstructions or by manoeuvring their aircraft."

Before turning, start scanning by looking in the direction opposite to the turn as far as the cockpit vision allows. Then move your eyes to scan in the direction of the intended turn, finally raising/lowering the wing to give you a view above and below. Once this scan is complete, a turn can be initiated.

In high-wing aircraft, there is a considerable blind spot created by the lower wing during a turn. To partially overcome this problem, you should lean forward to look through the side of the windscreen, moving both your head and body for a better view.

When descending in low-wing aircraft, make shallow turns to compensate for your blind spots so that lower flying traffic can be seen.

On descent and climb-out, make gentle 'S' turns to ensure no-one is in the way. On final, do not fixate on the touchdown point. Look in front and behind that point for other traffic.

Also, be aware of how your seating position affects your line-of-sight. Your visibility is most restricted on the side of the aircraft furthest away from the pilot. If you're short, or the aircraft combing is high enough to significantly restrict vision, it may pay to use a cushion.

Window-posts, bug splatter, sun visors, hats and caps, wings, and front seat occupants all have the potential to hide an approaching aircraft from view. An obstruction wider than the distance between the eyes will not only mask some of

One method is to scan side-to-side by starting at the far left of the windscreen and making a methodical sweep to the right, splitting the viewing area into blocks and pausing briefly on each block to focus.

the view completely, but will also make other areas visible to only one eye. Obstructions can also act as focal traps for the eyes, making it difficult to see distant objects.

Limitations of Vision

As well as the aircraft blind spots, the eye itself has a built-in blind spot at the point where the optic nerve exits the eyeball. If the view from one eye is obstructed, then objects in the blind spot of the remaining eye will be invisible. You can compensate for that by moving your head and upper body during your lookout. Use the blind spot test on page 14 to check your blind spot.

Acuity, or sharpness of vision, varies across the visual field. In daylight, acuity is greatest at the centre (fovea), in low light it is fairly equal across the whole retina, and at night it is greatest in the periphery. There are times when an approaching aircraft will be too small to be seen because it is below the eye's threshold of acuity. Acuity can be reduced by factors such as vibration, fatigue, and hypoxia.

Empty field myopia occurs in the absence of visual cues, causing the eye to focus at a relatively short distance. In an empty field, such as blue sky, the eyes will tend to focus at two to three metres, or onto a nearby object, such as a dirty windshield. It therefore requires an effort to focus at greater distances. To combat this, look for a cloud or distant terrain to focus on.

The average person has a field of vision of around 190 degrees, although it varies from person to person, and is generally greater for females than males. The field of vision begins to contract after age 35. In males, this reduction accelerates after 55.

A comfortable and alert pilot may be able to easily detect objects in the corner of the eye, but the imposition of a moderate workload, fatigue, or stress, may induce tunnel vision. This has also been observed under conditions of hypoxia and adverse thermal conditions.

The limited mental processing capacity of the human can present problems when they need to do two things at once. Experiments conducted by NASA indicated that a concurrent task could reduce pilot eye movement by up to 60 per cent. The key is to carefully prioritise your tasks.

Direct glare from the sun, and veiling glare reflected from windscreens, can effectively mask some areas of view. Direct glare is a particular problem when it occurs close to the target object. When the glare source is five degrees from the line of sight, visual effectiveness is reduced by 84 per cent. A good pair of non-polarised sunglasses will help combat this.

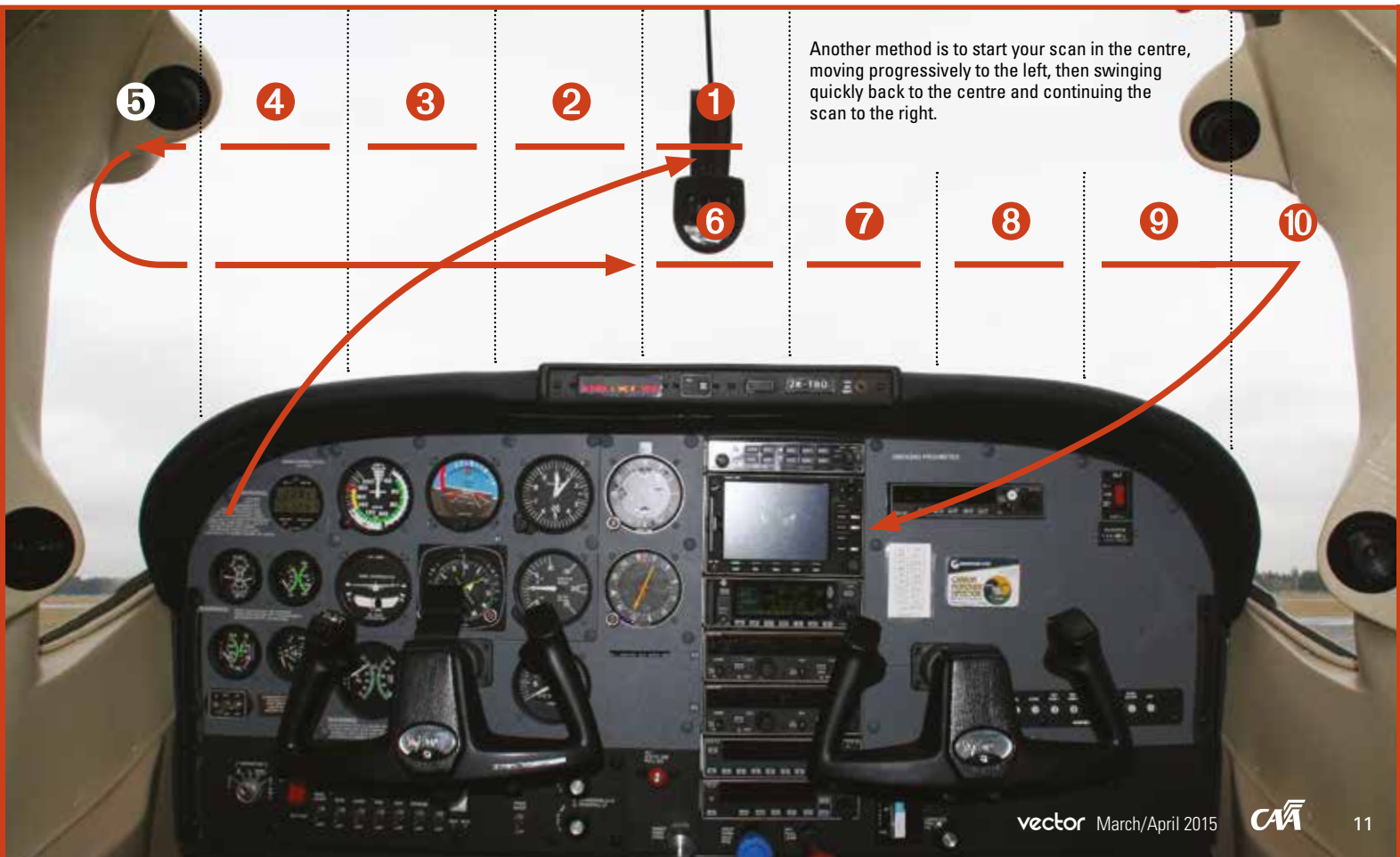
Hear and Avoid

Feilding Mid-air Case Study – Key Lesson

"Pilots must make clear, concise, accurate and timely radio transmissions, and they need to listen actively to the transmissions of others to help build accurate pictures of what is occurring around them."

Without detracting from the need for effective lookout, it's clear that relying purely on see and avoid won't guarantee you'll avoid a collision. Engaging in good radio use helps pilots build a mental understanding of where other aircraft are and the risk they pose.

In the Feilding collision, the solo student should have heard, but did not recall hearing, the joining call made from the other Cessna just before the accident occurred.



Here's a simple test to reveal your blind spot:

Close your left eye and stare at the plane on the left with your right eye. Now slowly move your head towards the diagram while focusing on the plane on the left. At a particular distance the plane on the right will disappear.

He was aware it was in the vicinity performing overhead joins, but had he heard the specific joining call, he would have had between 35 and 95 seconds to respond and look for that aircraft.

When making transmissions, remember to follow the four Cs: clear, concise, consistent, correct. It's just as important, however, to actively listen to the transmissions from other aircraft and understand their implications. This will allow you to focus your efforts on locating and avoiding other aircraft. If there is any doubt or confusion, don't hesitate to ask the other pilot for clarification.

Don't favour 'hear and avoid' over 'see and avoid' though, warns Carlton Campbell, CAA Aviation Safety Adviser.

"There is a tendency to think if you don't hear any traffic, then there isn't any. Also, some pilots tend to treat 119.1 MHz as a de facto enroute instead of FISCOM. There could be traffic on FISCOM or NORDO (no radio) aircraft. See and avoid is your fundamental collision prevention.

"Additionally, with the increase in handheld GPS, EFBs (mostly iPads) and glass cockpit technology replacing analogue instruments, a reliance on, or placing too much confidence in, this technology, also contributes to a degradation of the see and avoid principles," adds Carlton.

Traffic Characteristics

Background Interaction

Contrast is the difference between the brightness of a target and its background. Complex backgrounds such as ground features, or clouds, hamper the identification of aircraft due to contour interaction. That happens when background contours interact with the outline of the aircraft, producing a less distinct image.

Small particles of haze or fog scatter light. That may give some light from the aircraft the appearance that it originates from behind the aircraft, and vice versa.

Lack of Relative Motion

Feilding Mid-air Case Study – Analysis

"With a closing speed calculated to be between 130 and 145 knots … the constant bearing and the lack of relative movement meant that there was little to attract the pilots' attention towards the other aeroplane."

The human visual system is tuned to detect movement firstly, then to focus on an object to identify it. When two aircraft approach each other on steady headings, they maintain a constant relative bearing to each other. From each pilot's point of view, the converging aircraft will grow in size, but remain fixed at a particular point on the windscreen. That can be particularly dangerous, as the perceived size of an approaching object changes little until it gets much closer.

Equip and Be Seen

Feilding Mid-air Case Study – Recommendation

"Various aircraft paint schemes have been shown to have little benefit in improving the conspicuity of aircraft for the wide range of weather, environmental and geographical conditions likely to be encountered … however, more modern, high-intensity strobe lighting and new high-visibility paints may increase the ability of see and avoid as a primary means of preventing mid-air collisions."

The visibility of a light largely depends on the luminance of the background. While strobes are not likely to be helpful against bright sky backgrounds, they may make aircraft more visible against terrain or in conditions of low light. In addition, it's wise to using landing lights while in the circuit or on hazy days.

Evasive Action

Seeing and avoiding other aircraft, even when you know their general location, isn't always a quick and easy process. Once an object of interest has been detected, a pilot still needs to identify it, determine if it's a potential threat, and if required, make the necessary control movements and allow the aircraft to respond.

Research has estimated that the time from recognition to evasive action is around 12.5 seconds.

That may increase for less experienced pilots, older pilots, and those with less than optimal vision. ■

Searching for **Excellence**

In an industry constantly striving for improvement in safety, every now and again we all see a person, or organisation, we would love to see rewarded for their safety-first commitment. With the upcoming Director's Awards, now is your opportunity. The CAA is calling for names of individuals, organisations, and flight instructors you believe deserve recognition.

"Honoured", "humbled", "speechless", "delighted", are some of the reactions of past recipients of the Director's Individual and Organisation Awards, and the CAA Flight Instructor Award.

Presented for an 'outstanding aviation safety ethos', the awards recognise an exceptional contribution to safety in the skies, professionalism, the raising of safety awareness, and the encouragement of others to do the same.

After examining about 150 test candidates annually, for 34 years, Graham Leach won the Individual Award in 2014 for his immense contribution to "the safe and professional pathway for flight crew into New Zealand commercial aviation".

Graham said the award was an endorsement of what the "old experienced guys are trying to achieve, passing on what it is to be a professional, and teaching good basic habits, like the old stick 'n rudder skills".

You may know someone like Graham, or perhaps like Jeremy Anderson, who won the CAA Flight Instructor Award in 2014. The Director, Graeme Harris, said "Jeremy was highly respected in the industry and set, maintained, and demanded high standards".

Jeremy found the award humbling. "The awards are given out to some real heavyweights of aviation," he said. "I feel I still have a long way to go."

Perhaps you know of an organisation deserving of recognition. Presenting the Organisation Award last year to Helicopters Otago, Graeme Harris described the company's CEO, Graeme Gale, as "exceptional" – someone who "sets very high standards and leads a continual exploration of opportunities to enhance services in a safe and efficient manner".

In response, Graeme Gale said the award was a tribute to his 30 staff. "I've surrounded myself with some great people. They're dedicated and they believe in what we are doing," he said.

If any of this reminds you of someone, or some organisation, deserving of a formal salute, put their names forward with a few paragraphs on why they should be considered.

Email: bill.sommer@caa.govt.nz
Fax: +64 4 569 2024
Post: PO Box 3555, Wellington 6140

The last date for nominations is Tuesday, 2 June 2015.

The awards will be presented at the Aviation Leadership Summit 2015 annual awards dinner, in July, in Queenstown. ■

The Individual Award features a hand throwing a dart. The dart represents a generic aircraft. The hand is throwing the spirit of aviation forward into the future.

The Organisation Award, right, features a pair of hands catching the dart, or generic aircraft. The hands represent aviation safety, the actions of keeping the dart from falling to the ground, protecting it.

The trophies were sculpted by New Zealand artist, Peter Roche, of Auckland.

The first Director's Award was presented in 1995, and the CAA Flight Instructor Award in 2005.

Dated **Data**

What happens when an aircraft or its component parts are no longer supported by the type certificate holder or manufacturer? New Zealand's ageing fleet of aircraft means that's becoming an increasing issue, particularly with reference to instrumentation.

Photo courtesy of Gavin Conroy, http://classicaircraftphotography.com

Whether you're a Maintenance Controller, Part 66 licensed engineer, authorised certifying engineer within a Part 145 certificated organisation, or a pilot performing maintenance under Part 43 Appendix A, work done using inaccurate, or out of date, maintenance data can result in unsafe conditions.

"For maintenance organisations operating component overhaul shops, 'dated data' can be a major issue," says Hawker Pacific NZ's Quality and Safety Manager, Robert Feasey, "and may ultimately lead to a requirement to remove the equipment from their capability list."

CAA Air Transport Inspector (Airworthiness), Austin Healey, says it can also put the certifier at risk when they sign off maintenance using incorrect procedures.

Austin says nobody goes to work with the intention of performing an unsafe act, but offers the examples below, where the currency of data is in doubt:

» The manufacturer no longer supports a particular component, has ceased trading, or has been incorporated into another organisation. Flight instruments fitted into older aircraft are particularly susceptible to that.

» The primary product is unsupported because it no longer qualifies for a type certificate (TC) – the orphan. That could be because the person or organisation holding the TC has ceased to exist or is no longer providing support for their products, such as is often the case for older aircraft.

» The continued use of the 'handy' hard copy of a manual that's labelled 'Uncontrolled' on the spine, even though there's a current version available via the computer terminal sitting next to it.

Austin says if an engineer already has the data on hand there are some simple things that can be done.

"You can maintain a valid subscription to receive revisions, or periodically contact the manufacturer to check for any changes to the document you hold. If you're performing maintenance for an operator, make sure you get written confirmation from the Maintenance Controller that the data supplied or referenced is current."

If you can't contact the original equipment manufacturer, try the holder of the primary product type or Supplemental Type Certificate (STC) holder for advice.

It might seem obvious that a vintage aircraft, such as this De Havilland Dominie, could have dated data, but many other aircraft could be affected because of changes to the manufacturer of the aircraft, or a component.

They're responsible for providing instructions for the continued airworthiness of their product.

In the case where the STC holder is no longer in business, the national aviation authority (NAA) of the country that issued the STC may have accepted responsibility for all airworthiness support for the product.

The Type Certificate Data Sheet lists the contact details of the current Type Certificate Holder. The owner of a Supplemental Type Certificate can normally be identified by visiting the appropriate NAA web site.

In some cases, rather than tracking down repair data, it's more economical to replace an instrument either with another original item, or installing an alternative, using an acceptable STC.

"That will likely become increasingly more cost effective as Part 145 shops find themselves unable to support the units due to a lack of acceptable data," Robert Feasey says.

For aircraft that no longer have a supported type certificate, you need to contact the custodian of the extant airframe design data, manufacturing drawings, and repair schemes for the aircraft. Ideally, that would be an organisation with a Type Responsibility Agreement – usually with the NAA for the State of Design.

Alternatively, type clubs often have a wealth of expertise and advice on maintenance techniques, as well as access to manufacturers' data.

There are also pilot supplier organisations providing replacement manuals for popular older models.

In the absence of a manufacturer's repair or maintenance instructions, Part 21 Appendix D identifies other acceptable technical data. They include FAA AC43.13-1B detailing methods, techniques, and practices for the inspection and repair of non-pressurised areas of civil aircraft.

CAA AC43-14 also provides acceptable technical data for avionics modifications on unpressurised aircraft of less than 5700 kg MCTOW / <10 passenger seats, provided the work is not classified as a major modification.

As for that 'handy' hard copy of a manual labelled 'Uncontrolled' on the spine – Austin Healey says it's time to move on.

"So flash up that computer screen to get current information, and remove the obsolete documentation so that it can't, any longer, potentially contribute to an unsafe condition." ■

Flying for **the Crowd**

The saying is that aerobatics is like having sex and being in a car wreck at the same time. The truth is far more mundane. Successful aerobatic and display fliers are all about checking and practice and self-discipline, and recognising personal limits and more practice, and checking twice more.

It's interesting being a CAA staffer at an airshow. Directly after a display, little boys in particular, pile into the CAA tent wanting the booklet *How to be a Pilot*.

They see the rolls, spins, and low level manoeuvres and, sensing the crowd's awe, think "I want a piece of that".

What they probably don't realise is there isn't a thing that hasn't been anticipated, thought through, planned and prepared for, and repeatedly practised, in order that pilot and aircraft get home safely.

Aerobatic pilot Doug Brooker, 38 years in the air, flings his yellow and blue MX-2 around the heavens like a paper dart. His routine includes unique manoeuvres and at times, he pulls 8 Gs (some people start to lose consciousness at 5) and plenty of negative Gs (while descending, and even worse). But he's never oblivious to what he is doing or where his limits are.

"I was at a display at Ardmore in 2014," he says, "and due to cloud, could fly only to 2800 ft. To start an inverted flat spin I need to be at 3000 ft. It would have been tempting to do the spin anyway. There would have been no particular problem. But I thought 'no, I've set my limit at 3000, I'm not going to start it any lower'. Later reflecting on the routine, I was very pleased I was smart enough to stick to that."

Dave Brown, 42 years an aviator, is a former air force display, Strikemaster and Skyhawk pilot, current Strikemaster display pilot, member of the 'Roaring Forties' Harvard display team, and overseer of NZ Warbirds Association aerobatic and display training. He says display flying, similarly, is all about discipline, and some tough decisions.

"A few years ago at a show, the crosswind had been building all day. We came up to the finale which was an airfield attack, including pyrotechnics, WWII fighters, and eight Harvards. We were in our aircraft waiting to go and I got a wind check that told me it had swung even more. So I cancelled the display. That was a hard decision to make and of course the show organisers were disappointed. But they understood, because the last thing they wanted was for someone to wrap themselves into a ball at their airshow."

Doug and Dave's airshow preparation is similar. They practise over and over at height, until the routine becomes comfortable, before bringing it lower.

Dave says every practice should be carried out with the same focus as a display.

"A casual approach to a practice routine leads to poor discipline in the display. If I have a glitch in the practice routine, I break it off and set it up again. It means every time I go out, practice or display, I'm in the right frame of mind."

Both pilots thoroughly pre-flight every aspect of the aircraft. Doug has replaced some of his aircraft's inspection panels, in the tail, with Perspex® so he can shine a torch in and make sure there are no foreign bodies that could make life difficult.

Dave takes the Strikemaster on an inverted run at 2000 ft, before the display, to dislodge any debris in the cockpit.

"Once, a fire extinguisher ended up in the canopy. The latch had broken. Imagine that happening, inverted, at 500 ft."

Dave says it doesn't matter how often he's flown an aircraft, a detailed preflight is essential.

"It might have been okay for yesterday's display, but it could have been that last manoeuvre that weakened an already-fatigued component."

He also does the pre-flight earlyish in the day so any repairs can be done in plenty of time.

"It's no good trying to fix something when you're trying to make a slot time."

He also checks the airshow environment.

Photo courtesy of Errol Cavit.

Doug Brooker says loss of rudder control would be catastrophic in an MX2, particularly if in some unusual attitude.

"Even though I might have been to that airshow a number of times before, on the ground I have a really good look around, check that someone hasn't put up some new aerials or buildings where I'm not expecting them."

Veteran Warbirds pilot Keith Skilling, 50 years flying, sometimes displays the same aircraft three times in one day at a show.

"I do a thorough preflight every single time. Staying engaged with the checklist the second and third time is just something I've learned as a mental discipline. It never becomes box ticking."

Just before taking to the air, all three men quietly go through their routine in their mind's eye. Essentially, it's their final practice.

Keith says this "quiet time" is too important to be interrupted.

"It's part of the display really, that mental preparation. If you do get approached, you just have to be blunt and say you are too busy to talk."

Then they fly.

The displays themselves are all about safety.

Doug says for him, it's the gyroscopic moves most likely to come unstuck.

"It is very difficult with gyroscopics to anticipate and be consistent with the energy that the aircraft has when you recover to normal flight. It can vary from being high energy to being virtually stalled.

"I start a gyroscopic move on an upline, so while the plane ends the manoeuvre pointing downwards, it's at an altitude where there's plenty of recovery margin."

Dave says when working up a display, pilots have to sort out what they call 'gates'.

"Each manoeuvre needs a certain speed and altitude, so you have to practise a range of speeds at which to enter that manoeuvre, to help you with positioning and timing. But in all cases you have to have absolute minimums."

Keith says he'll change a routine only for safety reasons.

"If I'm setting myself up for a loop, and I haven't got the speed, or the energy, I'll fly through or do a roll. In the Corsair for example, I need 250 knots for a loop. If I've only got 230, I'll do a roll. If you were to see my last 30 Corsair displays, no two would be exactly the same.

"But a golden rule for me is never, ever, trying something I suspect I do not have the speed or energy for."

During the displays, the pilots' concentration can never lapse. To illustrate, Doug describes what happens during an inverted flat spin.

"You're virtually weightless, pulling only 0.5 or 0.25 G and the plane is spinning around its centre of gravity and you are pretty close to that, so there are no big stresses on your body. You have this soothing, surging hum of the engine and I've read a number of times about people almost being hypnotised by that state, trying to recover too late, and spinning into the ground. So I count the rotations out loud 'one, two, three, four, five, five-and-a-half, RECOVER.' And by talking to myself I keep conscious of where I am and what I should be doing."

Dave Brown says display flying is not a 'group think' exercise.

"What that means is, if the conditions are marginal for your individual abilities, or you're not 100 per cent fit, then you, and only you, have to decide whether to fly.

"Of course, it takes someone quite mature to make the decision to pull out, if the rest of the team is going ahead."

The three men say airshow flying is no place for egos, with Keith saying a really good airshow pilot takes constructive criticism thoughtfully.

"If someone has the guts to come up to you and say 'I think you were too low, or too slow' you really must take that on board. No matter how long you have been flying.

"And other pilots should never be too scared to offer constructive criticism if they are worried by someone's flying.

"Some really experienced pilots have been killed after nobody felt they could offer some observation about something that was worrying them."

One of Dave Brown's biggest fears is a small aircraft bumbling into the middle of a display.

"Because you assume you have sanitised airspace, a large part of your lookout is centred on positioning your display, or other team members, and not on other aircraft."

It has happened a couple of times to him.

"Didn't read their Supps or NOTAMs, did they?"

Fortunately, he has been able to recover from the 'invaders'. "But it still gives you a hell of a fright."

Keith's worry revolves around something failing in one of the 70-year old aircraft he displays, hence the meticulous pre-flight checks.

Doug shares that fear and is equally particular. Periodically his mechanic crawls right down inside the fuselage to check there are no cracks, particularly in the tail section, that cannot be checked from outside. His biggest fear is of a structural failure.

"For example, loss of rudder control would be catastrophic in an MX2, particularly if in some unusual attitude."

It is obvious that all three men recognise that safe display flying is difficult and demanding. Each year there are 10 to 15 accidents at displays around the world. They are very aware that these accidents are caused by failures of either the aircraft or the pilot. Hence the extensive preflight checks, the practice, and the mental preparation.

The biggest thrill for them? "Getting a routine right," they all say. "The spectators would probably not even notice, but when the more difficult manoeuvres go well, it's a great buzz."

Doug Brooker, however, has a final big fear: the plane's engine refusing to ignite before a routine.

"It's never happened, but the MX-2 battery has limited starting capacity, and if for some reason it didn't start, it would be a disaster!" he says, laughing. ■

Dave Brown, of the Roaring Forties Harvard aerobatic display team, says such flying is all about discipline, and some tough decisions.

Photo: Gavin Conroy, http://classicaircraftphotography.com

Get Those Hours and Flights In…

If the CAA doesn't get accurate flying hours data, it can overestimate the accident rate in a particular sector. That means more attention from auditors, more spot checks, and possibly unneeded regulation. That's why the Intelligence, Safety and Risk Analysis (ISRA) unit is going to great lengths to contact participants to get that information.

CAA's ISRA unit members have been hitting the phones trying to reach every last owner of an aircraft with Standard or Restricted certificates of airworthiness, to encourage them to submit their hours and flights.

The team is also contacting operators of parachutes and aircraft used on Part 115 operations.

Unit team leader, Mike Campbell, says 1400 emails have been sent out, and when those have bounced back, the participants have been getting a phone call. Anyone who doesn't have a working email address has been sent a letter.

"Submitting flights and hours to the CAA is actually a legal requirement (rule 12.151), but many people do not realise that, or can't be bothered, or try to avoid it.

"We're blitzing the aviation community to get as many replies as we can.

"In the end, getting a better response means better data and better decisions by the CAA about how it can help industry."

ISRA manager, Jack Stanton, says the CAA focuses its efforts on the highest-risk areas of aviation.

"To assess the risk in a particular sector, we need to know the accident rate, so we use the number of accidents per 100,000 hours flown. We know, pretty accurately, the number of accidents in any area, but if the number of flying hours reported from that area is lower than it really is, that sector will appear to be higher-risk than it should.

"For example, the returns we've received, plus an estimate of those not received, indicates that private flying hours have decreased 31 per cent since 2008.

"We need to know whether that is genuine, or the result of under-reporting."

The aggregated information is also passed to the Ministry of Transport and Statistics New Zealand, where it is available to the public and Government, and influences decisions about investment and infrastructure.

Each participant is being mailed, or emailed, Form CAA605a or Form CAA605b to complete. Those forms can be emailed back to stats@caa.govt.nz; or posted to Safety Data Analyst, Civil Aviation Authority, PO Box 3555, Wellington 6410.

All that is required from private owners is their annual total hours flown, divided into 'Private' and 'Test/Ferry'. An appropriate form is included in the email to private owners, although they can also just email the figures to stats@caa.govt.nz.

Mike Campbell says an incidental benefit of the 'blitz' is the updating of the contacts list.

"It has been an interesting exercise – we've corrected more than a hundred email addresses, and some phone numbers and physical addresses as well.

"Many participants have had a bit of a yarn about their aviation interests, and we've passed on some suggestions about the CAA's operations to the appropriate sections too!" ■

Photo: istockphoto.com/mirexon

Should I do the **Maintenance Controller Course?**

Are you the Senior Person responsible for the control and direction of maintenance in a Part 119 or 135 aviation organisation, or even an aircraft owner or someone else interested in the planning and direction of maintenance? Then the Maintenance Controller Course could be for you – and it's coming up soon!

John Keyzer, CAA Aviation Safety Adviser, says the role of the maintenance controller is a very important task.

"Maintenance needs to be done at certain times, so you need to plan that in advance to minimise any effect on your operation.

"You need to know what's due, when it's due, and make sure you've got the time to do it, as well as knowing what it is going to cost. An effective maintenance controller will ensure that all happens smoothly."

There are two parts to the Maintenance Controller Course – a self-paced learning module focusing on the Civil Aviation Rules, and a two-day workshop focusing on helping you acquire practical experience.

You can complete the first part from the comfort of your own couch so long as you have internet access. Depending on your experience, it will take five to 10 hours.

John is one of the course facilitators and says participants can expect "a very intense, but rewarding, two-day course".

If you pass the end-of-course exam, you can register with Service IQ and pursue a further qualification, the NZQA accredited National Certificate in Aeronautical Engineering (Maintenance Control). The Maintenance Controller Course accounts for roughly half the units of learning required for the National Certificate, and the remaining units can be achieved through a workplace assessment.

Paul Claridge from HeliOps Southland attended the course in Nelson in April 2014 and says, "The workshop was very full on – a lot of information to take in in such a short space of time. However, the tutors – John, Bob (Jelley), and Rick (Ellis) – all made it easier and interesting to understand."

While the Queenstown course in April is now full, you can still register for the courses in Taupo and Auckland. The courses are strictly limited to 18 people, with a maximum of two people from an organisation on each course. Keep an eye on the CAA web site and future issues of *Vector* as two further courses for 2015 may be added in the North Island.

To find out more about the NZQA accredited National Certificate in Aeronautical Engineering (Maintenance Control) check the NZQA web site, www.nzqa.govt.nz – search for 1132. ■

2015 Courses Available

Taupo – 26 to 27 May

Suncourt Hotel and Conference Centre
14 Northcroft Street, Taupo

Auckland – 22 to 23 July

Jet Park Airport Hotel and Conference Centre
63 Westney Road, Mangere, Auckland

Register Online

You can register for a Maintenance Controller Course online. An enrolment form can be accessed on the CAA web site, www.caa.govt.nz, "Seminars and Courses".

We can't guarantee your place on the course until payment is made.

Closing date for course enrolment is three weeks before the course date as pre-course training notes need to be distributed and completed.

Photo: istockphoto.com/andresr

Regulating RPAS – Where to Now?

Remotely piloted aircraft systems (RPAS), or drones as they're often called, are rapidly changing the world's airspace, and with that increased airspace traffic comes the need to ensure everything can operate safely.

For that reason, the CAA is planning to update Civil Aviation Rules, Part 101 and introduce a new Part 102. In November, we published a Notice of Proposed Rule Making (NPRM) and asked for submissions.

Steve Moore, CAA General Manager, General Aviation says over 80 submissions were received.

"We'd like to thank all those that took the time to make submissions. Consultation is important for us to ensure the rules are covering the issues at hand."

Here's a summary of some of the key themes in the submissions received.

Part 101

There is a need to ensure those engaged in lower risk operations under Part 101 are aware of their responsibilities and that they don't pose a risk to traditional manned aviation.

Steve says, "There is some concern around how people, who've traditionally been outside the aviation system, will know about the rules that apply to them, in particular around airspace requirements where they are flying their RPA."

Some submissions also raised the issues around the potential difficulties in obtaining consent to fly over property or people under the Part 101 rules.

"We intend to work with councils and other landowners to get them to start thinking about setting aside areas for RPAS use," says Steve.

Proposed Part 102

The proposed Part 102 will ensure that higher risk unmanned aircraft have appropriate regulatory oversight and don't pose a threat to aviation safety.

The new rules will put in place a certification process for operators of unmanned aircraft, while continuing to allow low-risk unmanned aircraft activity under Part 101.

There is a large, and growing, list of issues being brought to our attention. Those include maintenance requirements, overlap with other government regulatory bodies (eg, MBIE on radio spectrum issues), and how we will generally ensure safety.

"Any certificate granted under Part 102 will ensure the utmost safety of the aviation system," says Steve.

Some submissions asked why the CAA has not gone for a commercial/recreational split with the rules, as many overseas jurisdictions have.

"We have pursued a high risk/lower risk strategy, which we think is a far better representation of the risk profile of the emerging RPAS sector," says Steve.

"We believe that a commercial/recreational split is inappropriate for RPAS."

Many of the issues raised in relation to the proposed changes to Part 101 are to do with people questioning how we will educate people not traditionally part of the aviation sector.

"We are aware of the challenges that the emergence of RPAS poses to traditional aviation regulators such as the CAA. We are therefore constantly engaging with the industry and undertaking an education strategy that is seeking out non-traditional aviation users to inform them of their responsibilities," says Steve.

Next Steps

The submissions, and the CAA's responses to them, are published on the CAA web site, www.caa.govt.nz, "Policy and Rules – Rules Development More – NPRMs Closed for Submissions".

The proposed rules, amended based on feedback received, will be delivered to the Minister for sign-off shortly. ■

Carlton Campbell Becomes an Aviation Safety Adviser

Carlton Campbell is embarking on his third incarnation in aviation, becoming a CAA Aviation Safety Adviser (ASA).

Formerly CAA Training Standards Development Officer, and before that, chief flying instructor with Wakatipu Aero Club, Carlton will return home to Queenstown in May.

After a decade in Wellington, Carlton is anticipating his new role with relish.

"One of the challenges for the CAA and industry surrounds the nature of the communication between them. An ASA, out in the field and in constant touch with industry, is critical to facilitating that communication. I want to do my best to do that, and improve the exchange of information where needed.

"I'm also very motivated by the proactive and educational aspects of being an ASA."

Carlton says he is looking forward to making appointments to meet everyone and establishing working relationships.

"I know how busy everyone can be, but I'm sure we can work around that to help each other. Providing safety advice is the fundamental role of an ASA, but equally, I intend to be on hand to help keep industry informed of any current or future CAA projects, policies and perspectives."

CAA General Manager of Policy and System Interventions, John Kay, says Carlton will make an excellent Aviation Safety Adviser.

"He brings an almost unique combination of qualities to the role. His teaching background, his vast flying experience, his rapport with CAA's operational units, and vast network of contacts in industry, will make him a very effective ASA indeed."

Carlton says it's been an extremely busy 10 years as Training Standards Development Officer, and it's difficult to pinpoint one particular job he is the most pleased to have done.

But he says three areas do stand out.

"For a long time, the CAA was under pressure from the coroner's court and TAIC to bring mountain flying training into the syllabus, so I'm really pleased about being part of the process to do that.

"With my teaching background, I also have pride in having improved instructional technique courses, and working to improve the teaching standards of our instructors.

"I also really enjoy being part of the AvKiwi team. I think it is one of the flagships of CAA's outreach."

While Carlton will be sorry to leave the Wellington staff behind him, he is not sorry to be returning home.

"I'm a dedicated South Islander, so the prospect of going back feels really good for the soul!" ■

Airspace Review Plan – Update

The 2014–2016 Airspace Review Plan aims to de-clutter, simplify and clarify domestic airspace in New Zealand. Taking a regional approach, its goals are to reduce confusion and identify 'hotspots' of incidents and occurrences.

Airspace changes in Auckland and Hamilton took effect in November 2014, and the redesign of the Whenuapai, Auckland and Hamilton control zones continues.

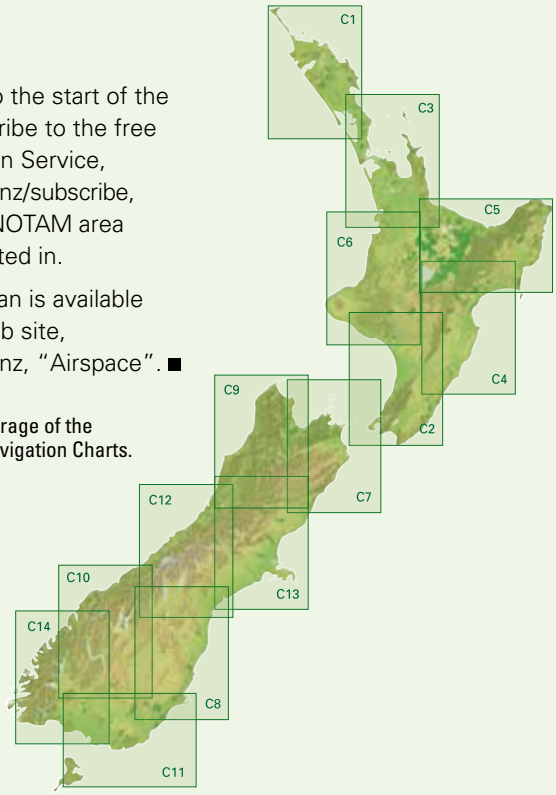
The review plan is to align with possible changes to controlled airspace brought about by Airways' PBN Implementation Plan. Airways has had to revise the timetable of that plan, affecting the schedule of the Airspace Review Plan.

The PBN Implementation Plan is now expected to finish in 2018 – so too will the review plan. For clarity, the update is now called the 2015–2018 Airspace Review Plan.

The review of the Manawatu area, including Palmerston North and Ohakea aerodromes, will be one of the most involved, due to the complexity of the existing airspace, and the mixed types of operation. It's due to start in May 2015 for completion in April 2016, with implementation in November 2016.

To be alerted to the start of the reviews, subscribe to the free CAA Notification Service, www.caa.govt.nz/subscribe, and select the NOTAM area you are interested in.

The updated plan is available on the CAA web site, www.caa.govt.nz, "Airspace". ■



Map showing coverage of the 1:250 000 Visual Navigation Charts.

New Poster – **Check NOTAMs and AIP Supps**

"During one display, a Tomahawk appeared and flew through the aerobatics box, right at the G200's recovery height."

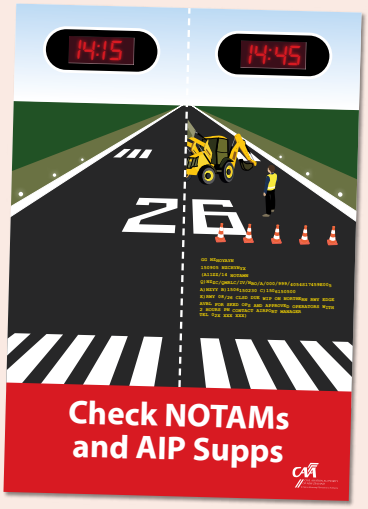
The CAA has released a new poster targeted at pilots, such as those above, who fail to check NOTAMs and AIP Supplements prior to flight.

Checking NOTAMs and AIP Supplements is just as important as checking the weather, charts, fuel, the aircraft, and preflighting yourself.

NOTAMS advise you about the status of aeronautical facilities, services, procedures, or hazards.

AIP Supplements are issued every 28 days. They contain information that is of a temporary nature not urgent enough to warrant a NOTAM, or where a NOTAM wouldn't be suitable due to the extensive text or graphics required.

To get your free poster, email: info@caa.govt.nz.



Correction

In the January/February 2015 *Vector*, page 17, we referred to an antihistamine as cyclizine. This should have been cetirizine. We apologise for any confusion.

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

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
13 Apr 2015	20 Apr 2015	25 Jun 2015
11 May 2015	18 May 2015	23 Jul 2015
8 Jun 2015	15 Jun 2015	20 Aug 2015

Visual Navigation Charts 2015 (scheduled dates for change requests)		
2 Apr 2015	23 Apr 2015	12 Nov 2015

See **www.caa.govt.nz/aip** to view the AIP cut-off dates for 2015.

Aviation **Safety Advisers**

Contact our Aviation Safety Advisers for information and advice. They regularly travel the country to keep in touch with the aviation community.

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Report Safety and 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-OLV Cessna 152

Date and Time:	09-Apr-14 at 17:00
Location:	Feilding
POB:	2
Injuries (Serious):	2
Damage:	Destroyed
Nature of flight:	Training dual
Pilot Licence:	Commercial Pilot Licence (Aeroplane)
Age:	23 yrs
Flying Hours (Total)	526
Flying Hours (on Type)	521
Last 90 Days:	44

During the approach to land following a dual training exercise, the aircraft struck a digger being transported by a truck on the road which passes close to the end of the runway. On impact with the digger, the aft fuselage and tail section separated from the fuselage, the remainder of the aircraft then struck the end of the runway in an inverted attitude. Both occupants sustained injuries but were able to remove themselves from the wreckage.

At the time that the aircraft struck the digger, the instructor was flying the aircraft and also discussing the considerations for the approach and landing with the student.

It appears that the instructor had a lapse in situational awareness during this process and did not recognise in sufficient time that the aircraft was low and that the truck was approaching along the road.

Also compounding the issue was a possible slight wind shear causing further height loss at the critical moment as the aircraft passed over the truck.

Following the accident, the instructor has since completed remedial training with the CFI and also passed their C-Cat renewal flight test.

CAA Occurrence Ref 14/1569

ZK-UTC Foxcon Aviation Terrier 200

Date and Time:	02-Jun-14 at 12:41
Location:	Motueka
POB:	1
Injuries:	0
Damage:	Substantial
Nature of flight:	Private other
Age:	63 yrs
Flying Hours (Total)	620
Last 90 Days:	14

The pilot was on a local flight of the area. He had tracked from Motueka Aerodrome to Mount Arthur and then proceeded to Marahau before turning to return to Motueka. As the pilot crossed Tapu Bay the engine started losing power and surging. The engine eventually failed completely. The pilot attempted to re-start the engine but it would not run for more than a few seconds.

The pilot elected to attempt a glide back to the aerodrome due to the unsuitability of the terrain for a landing, and the pilot had completed this exercise previously. At one kilometre from the aerodrome the pilot realised he would not make the aerodrome and clear powerlines located just prior to it. The pilot elected to land in a kiwifruit orchard between the rows. The pilot was uninjured and the aircraft sustained significant damage.

Inspection found wiring in poor condition with inadequate crimping, split insulation and damaged terminal/plug on the igniter negative wire. Distributor wiring was probably giving intermittent signal to ECU.

CAA Occurrence Ref 14/2450

ZK-JGV Rans S-7 Courier

Date and Time:	05-Mar-14 at 15:00
Location:	Waipahi
POB:	1
Injuries (Minor):	1
Damage:	Substantial
Nature of flight:	Private other
Pilot Licence:	Recreational Pilot Licence (Aeroplane)
Age:	73 yrs

While in the cruise, the engine started losing power and running rough. The pilot carried out a forced landing, but during the approach to the selected field, the aircraft contacted trees resulting in a hard landing. The aircraft was damaged by contact with the trees and the left main gear collapsed on landing. The pilot received minor injuries.

Maintenance investigation found a significant amount of water in the fuel lines prior to the fuel filter. It is suspected that the fuel filter had prevented the water from reaching the carburettors but had also restricted the fuel flow due to the presence of the water.

It could not be determined how the water had entered the fuel system, but it is possible that this may have occurred over a period of time due to condensation.

In Safety Alert 168 RANS states: "We recommend the gascolator option for both fuel filtering and separation of water from the fuel. Some models feature this standard and more will in the future".

This aircraft was not fitted with a fuel gascolator which may have alerted the pilot to the presence of water during the pre-flight.

CAA Occurrence Ref 14/908

ZK-IQQ Hughes 369D

Date and Time:	26-Feb-14 at 9:55
Location:	Moonlight Creek
POB:	3
Injuries:	0
Nature of flight:	Transport passenger A to B
Pilot Licence:	Commercial Pilot Licence (Helicopter)
Age:	40 yrs

During a commercial sight-seeing flight, the pilot in command heard a change in the helicopter noise, followed three seconds later by a loud bang. This occurred while the helicopter was climbing through 5000 ft amsl. The pilot immediately entered autorotation, and landed the helicopter heavily on rough terrain, causing the main rotor blades to flex and strike the tail boom, severing the tail from the aircraft.

The helicopter sustained substantial damage to the fuselage, rotor systems and drivetrain. Once the aircraft came to a stop, the pilot got out and escorted the passengers away from the helicopter. There were no injuries.

Post-accident examination found the overrunning clutch housing and outer race fractured. The fractured overrunning clutch assembly was sent to the manufacturer for further examination. Analysis of the fractured outer race did not identify any manufacturing or material deficiencies. The Power Take Off (PTO) gear was also recovered during the investigation and sent for analysis. Visual inspection of the female splines of the PTO gear exhibited significant wear. The root cause of the overrunning clutch failure could not be determined, however possible contributing factors are: excessive wear of the PTO internal spine, causing rotational misalignment; possible misalignment of the engine to transmission drive shaft; and the possibility that at some point the drive train sustained a shock event that had a detrimental effect.

CAA Occurrence Ref 14/769

ZK-MLF Micro Aviation Bantam B22S

Date and Time:	30-Jan-13 at 21:00
Location:	Westport
POB:	2
Injuries (Fatal):	2
Damage:	Destroyed
Nature of flight:	Private other
Age:	58 yrs
Flying Hours (Total)	765

Witnesses saw the microlight aeroplane flying towards Cape Foulwind. The weather conditions at the time were reported as low visibility with reducing cloud ceiling and fog developing in the vicinity. The microlight was located partially buried on Carters Beach. The first persons on the scene found the occupants deceased and the microlight destroyed. The CAA safety investigation did not identify any mechanical defects which may have contributed to the accident. The safety investigation considered it probable that the microlight flew into deteriorating weather after sunset and the pilot experienced spatial disorientation resulting in a loss of control of the microlight. A full report is available on the CAA web site.

CAA Occurrence Ref 13/365

ZK-MVT Tecnam P2002 Sierra

Date and Time:	19-May-14 at 14:30
Location:	Masterton
POB:	1
Injuries:	0
Damage:	Destroyed
Nature of flight:	Training solo
Flying Hours (Total)	19
Flying Hours (on Type)	19

After a period of inactivity of approximately 3 months, the novice microlight pilot carried out a dual training flight of approximately 50 minutes duration. On completion of that flight, following a good performance by the novice pilot, the instructor felt comfortable to allow him to conduct a solo flight.

During the takeoff, the aircraft was observed by the instructor to rotate early, pitch up to an approximate 30 to 40 nose up angle, roll to the left, descend and strike the ground which extensively damaged the aircraft.

The novice pilot was able to extract himself from the aircraft and recover a few items from the cockpit before a fire which had originated in the engine compartment took hold and consumed the majority of the fuelage before emergency services arrived. The novice pilot was not injured.

Investigation into the accident by the instructor and the CAA Safety Investigation Unit determined that the accident appears to have been caused by the novice pilot becoming pre-occupied with the directional control of the aircraft at the initial take-off phase. He failed to recognise and control the aircraft attitude and airspeed which has led to a stall/wing drop situation at low level.

The fire which originated in the engine compartment was most likely due to fuel leakage with the ignition source either hot engine components or from an electrical source (the battery is located in the engine bay). The student did not turn off the ignition or fuel after the accident. This may have also contributed to the fire.

CAA Occurrence Ref 14/2168

ZK-IQN Hughes 369D

Date and Time:	26-Jan-14 at 17:31
Location:	Queenstown 7 NM S
POB:	2
Injuries (Minor):	2
Damage:	Substantial
Nature of flight:	Transport passenger A to B
Pilot Licence:	Commercial Pilot Licence (Helicopter)
Age:	43 yrs
Flying Hours (Total)	873
Flying Hours (on Type)	137
Last 90 Days:	75

As the helicopter was landing at Wye Creek to drop off a passenger, a large fertiliser bag blew out of the tray of a utility vehicle parked by the landing site. The bag struck and damaged the main rotor, which then struck and severed the tail boom. Despite the resultant violent gyrations, the helicopter remained upright on its skids, and the pilot immediately shut the engine down using the fuel valve.

CAA Occurrence Ref 14/280

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 350B2

Engine

Part Model:	LTS101-700D-2
Part Manufacturer:	Honeywell
Part Number:	4-001-000-33
ATA Chapter:	7100
TSI hours:	105.5
TSO hours:	3017.8
TTIS hours:	10273.8

During the last flight before a 100-hr Inspection, the engine chip light illuminated. Inspection of the chip plug found 'minor fuzz' as classified by the maintenance manual. During the 100-hr Inspection, the main and scavenge oil filters were found with excessive non-ferrous metallic particles.

The engine was removed and sent to an authorised maintenance provider for inspection and rectification. The fuzz and metallic particles were from worn power take-off, torque idler and power pinion gears, as well as the power take-off clutch bearings.

CAA Occurrence Ref 14/1708

Robinson R44 II

Fuel control unit

Part Model:	RSA-10AD1
Part Manufacturer:	Precision
Part Number:	2576630-4
ATA Chapter:	7320
TTIS hours:	2200

On a fuel control unit received for overhaul, loose material was found between the idle bush and PTFE washer (P/N 367757) that seats on the idle valve. The material had delaminated from the PTFE washer. There are similarities with this and other FCUs of the same part number and application. All engineering staff were briefed regarding this defect.

Continuing Airworthiness Notice 73-003 and Emergency AD DCA/MA/17 refer. See also GA Defects 14/793, 14/1994, and 14/2676.

CAA Occurrence Ref 14/2672

Piper PA-38-112

Control column

ATA Chapter:	2731

During a local dual training flight, the aileron and elevator controls became significantly less effective. A safe landing was carried out.

Maintenance investigation found that one of the two elevator control column pivot bolts had come loose and partially migrated from the hinge, allowing the column to move excessively, resulting in lost motion in the aileron and elevator control system.

The nut and washer from the bolt were located in the aircraft, inspection of the stiff nut found that it was in a serviceable condition, ie, it could not be wound onto the bolt without the use of a spanner. As a precaution, both stiff nuts were replaced.

No previous maintenance had been recorded for the elevator control column since the aircraft was imported into New Zealand in a disassembled state in 2008.

There were no other reported occurrences of this nature and a random check of other PA38s failed to find any issues.

The area where the hinge bolts are located is accessible for inspection during scheduled maintenance. Anyone performing an inspection in this area is encouraged to take a detailed look at the two hinge bolts and nuts for adequate security.

CAA Occurrence Ref 14/2607

Diamond DA 40

Magneto

Part Model:	Slick
Part Manufacturer:	Champion Aerospace
Part Number:	4370
ATA Chapter:	7410
TTIS hours:	143.7

A number of occurrences have been reported to the CAA where the internal timing (e-gap) of Slick magnetos has advanced after a relatively short time in service. This has resulted in hard starting and rough running in some cases. Champion Aerospace and the FAA were contacted by the CAA about this issue.

Champion Aerospace have determined that the excessive timing advance has occurred on a small percentage of M3081 (single point mags) and is caused when the portion of the point face closest to the hinge is opening last and closing first, causing abnormal erosion in this area. They have also determined that once the initial erosion has occurred (usually in less than 30 hours TIS), these points, if readjusted (resetting of the internal e-gap), will remain stable out to the 500 hour TIS inspection interval. Champion Aerospace are working on processes to prevent making points in this configuration, and have implemented an inspection process to eliminate shipping such points.

CAA Occurrence Ref 14/2533

Bell 206L-3

Diode Link

Part Number:	30-126-5AA
ATA Chapter:	3340
TTIS hours:	6770

During maintenance associated with an intermittent landing light, the helicopter master electrical switch and the landing light were turned on. Shortly afterwards, smoke was observed coming from the end of the collective and from the side panel below the instrument panel. The smoke was caused by the diode link in the landing light switch circuit failing and acting as a short circuit.

Investigation determined that the landing light switch circuit protection device rating was higher than the diode link wiring current capacity, so the wiring was subject to an electrical load greater than it was rated for, and burnt out.

It was determined that this configuration was standard for all production helicopters and, unless modified, the landing light switch wiring may be subject to a sustained electrical load greater than the wiring is rated for. If the diode link were to short-circuit during flight, it could result in significant heat and smoke in the cockpit, and could affect the pilot's ability to continue operating the helicopter safely.

That safety concern has been raised with the OEM, who highlighted an existing customer option technical bulletin. This bulletin comprises the installation of replacement relays as the original parts are no longer available, and includes an upgrade of the wiring gauge. The technical bulletin does not, however, highlight the safety risk inherent in the standard configuration. As the bulletin is a customer option, it is dependent on the original relays reaching service life before the wiring changes are made, putting the helicopters at risk.

The Safety Agency overseeing the state of design was informed of the above safety risk and are working with the OEM to resolve any issues.

CAA Occurrence Ref 14/2833

Cessna R172K

Control yoke

Part Manufacturer:	Cessna
Part Number:	0560014-4
ATA Chapter:	2700
TTIS hours:	3897.65

While carrying out Cessna Service Bulletin SEB01-3 Revision 1 during the aircraft SID inspection, corrosion was found on the internal surfaces of the control yoke requiring replacement of the control yoke.

SEB01-3 Revision 1 was raised by Cessna to alert operators and maintainers to the potential failure of the welded steel tube yoke assembly, which can result in loss of primary pitch control of the aircraft, and to strongly recommend compliance with Cessna Service Bulletin SEB01-3. This SB describes an inspection procedure to detect corrosion, and determine the serviceability of a yoke that has suffered corrosion pitting.

In support of SEB01-3, the CAA issued Continuing Airworthiness Notice 27-001 C172, 180 and 185 Primary Flight Control Yoke Inspection in April 2008.

Inspection of another C172 also found corrosion requiring replacement of the control yoke. CAA occurrence 14/6223 refers.

CAA Occurrence Ref 14/6224

Cessna 172P

Control yoke

Part Manufacturer:	Cessna
Part Number:	0560014-5
ATA Chapter:	2700
TTIS hours:	4568.3

While carrying out Cessna Service Bulletin SEB01-3 Revision 1 during the aircraft SID inspection, corrosion was found on the internal surfaces of the control yoke requiring replacement of the control yoke.

SEB01-3 Revision 1 was raised by Cessna to alert operators and maintainers to the potential failure of the welded steel tube yoke assembly, which can result in loss of primary pitch control of the aircraft, and to strongly recommend compliance with Cessna Service Bulletin SEB01-3. This SB describes an inspection procedure to detect corrosion, and determine the serviceability of a yoke that has suffered corrosion pitting.

In support of SEB01-3, the CAA issued Continuing Airworthiness Notice 27-001 C172, 180 and 185 Primary Flight Control Yoke Inspection in April 2008.

During SIDs inspection on another C172 by the maintenance provider, corrosion was also found requiring replacement of the control yoke. CAA occurrence 14/6224 refers.

Internal corrosion on a Cessna control yoke.

CAA Occurrence Ref 14/6223

Robinson R44 II

Fuel control unit

Part Model:	RSA-10AD1
Part Manufacturer:	Precision
Part Number:	2576630-4
ATA Chapter:	7320
TTIS hours:	1638.7

The fuel control unit was received for repair due to excessive movement in the throttle linkage. Disassembly of the idle valve found loose material between the idle bush and PTFE washer (P/N 367757) that seats on the idle valve. Further investigation found material delaminating from the PTFE washer.

Continuing Airworthiness Notice 73-003 and Emergency AD DCA/MA/17 refer. See also GA Defects 14/793, 14/1994, and 14/2672.

CAA Occurrence Ref 14/2676

WX Matters

Weather can be a puzzle – you've got all the pieces, but how do you fit them together to create the right picture?

Accident investigations suggest that pilots who had weather related accidents didn't understand the weather.

This year's seminar can help you navigate your way through the mass of information out there.

You'll also hear of some close encounters of the weather kind from pilots who lived to tell the tale.

At the seminar, you'll get early access to our free apps and new online course, plus learn how to fit the pieces of weather information together.

AvKiwi Safety Seminars are FREE to attend.

AV KIWI SAFETY SEMINARS

North Shore
Wednesday 20 May, 7:00 pm
North Shore Aerodrome

Kerikeri
Friday 22 May, 7:00 pm
Bay of Islands Aero Club

Tauranga
Tuesday 16 June, 7:00 pm
Tauranga Aero Club

Auckland
Tuesday 19 May, 11:00 am
ATC Hall, Ardmore Aerodrome

Tuesday 19 May, 7:00 pm
Auckland Aero Club,
Ardmore Aerodrome

Whangarei
Thursday 21 May, 7:00 pm
Whangarei Flying Club,
Hangar 10, Whangarei AD

Taupo
Monday 15 June, 7:00 pm
Suncourt Hotel and Conference Centre, 14 Northcroft Street

Hamilton
Sunday 17 May, 5:00 pm
CTC Aviation Training,
131 Boyd Road
Followed by pizza supper

Monday 18 May, 7:00 pm
Waikato Aero Club

Gisborne
Wednesday 17 June, 7:00 pm
Gisborne Aero Club

Hastings
Thursday 18 June, 7:00 pm
Aerial Mapping Hangar,
Hastings Aerodrome (Bridge Pa)
Followed by refreshments at Hawke's Bay and East Coast Aero Club

New Plymouth
Monday 22 June, 7:00 pm
Taranaki Air Ambulance Trust
Air Ambulance Hangar, Airport Drive, New Plymouth Airport

Dannevirke
Friday 19 June, 7:00 pm
Fountain Theatre, 2 Ward St

Paraparaumu
Thursday 25 June, 7:00 pm
Kapiti Districts Aero Club
25 Dakota Road, Paraparaumu Beach

Feilding
Wednesday 24 June, 6:00 pm
Flight Training Manawatu,
Cardinal Hangar
Followed by fish and chip supper

Wellington
Friday 26 June, 7:00 pm
CAA, Level 15 Asteron Centre,
55 Featherston Street

Palmerston North
Tuesday 23 June, 3:00 pm
Massey University Campus,
Japanese Lecture Theatre
(Opposite commercial complex)

Motueka
Tuesday 5 May, 4:15 pm
Nelson Aviation College

Blenheim (Omaka Aerodrome)
Wednesday 6 May, 7:00 pm
Marlborough Aero Club

Nelson
Monday 4 May, 7:00 pm
Nelson Aero Club

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Te Mana Rererangi Tūmatanui o Aotearoa