Pointing to safer aviation

Spring 2023

vector

THINGS THAT JEOPARDISE YOUR LOOKOUT

High safety

Dip 'n check

Worth their weight in gold

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

// DIP 'N CHECK

// HIGH SAFETY

// WORTH THEIR WEIGHT IN GOLD

Cover: Keith Skilling piloting a de Havilland Mosquito.
Photo: Gavin Conroy.
See our cover story on page 9.

In this issue...

// THINGS THAT JEOPARDISE YOUR LOOKOUT

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CIVIL AVIATION AUTHORITY OF NZ

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Reader comments and contributions on aviation safety are welcome. Let us know your thoughts by emailing education@caa.govt.nz. We'll try to publish a selection in each edition, although they may be edited or shortened.

We'll only publish ideas and observations contributing towards safer aviation.

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DIP 'N **CHECK**

These two stories are from the *Vector* archives. Does this stuff still happen?

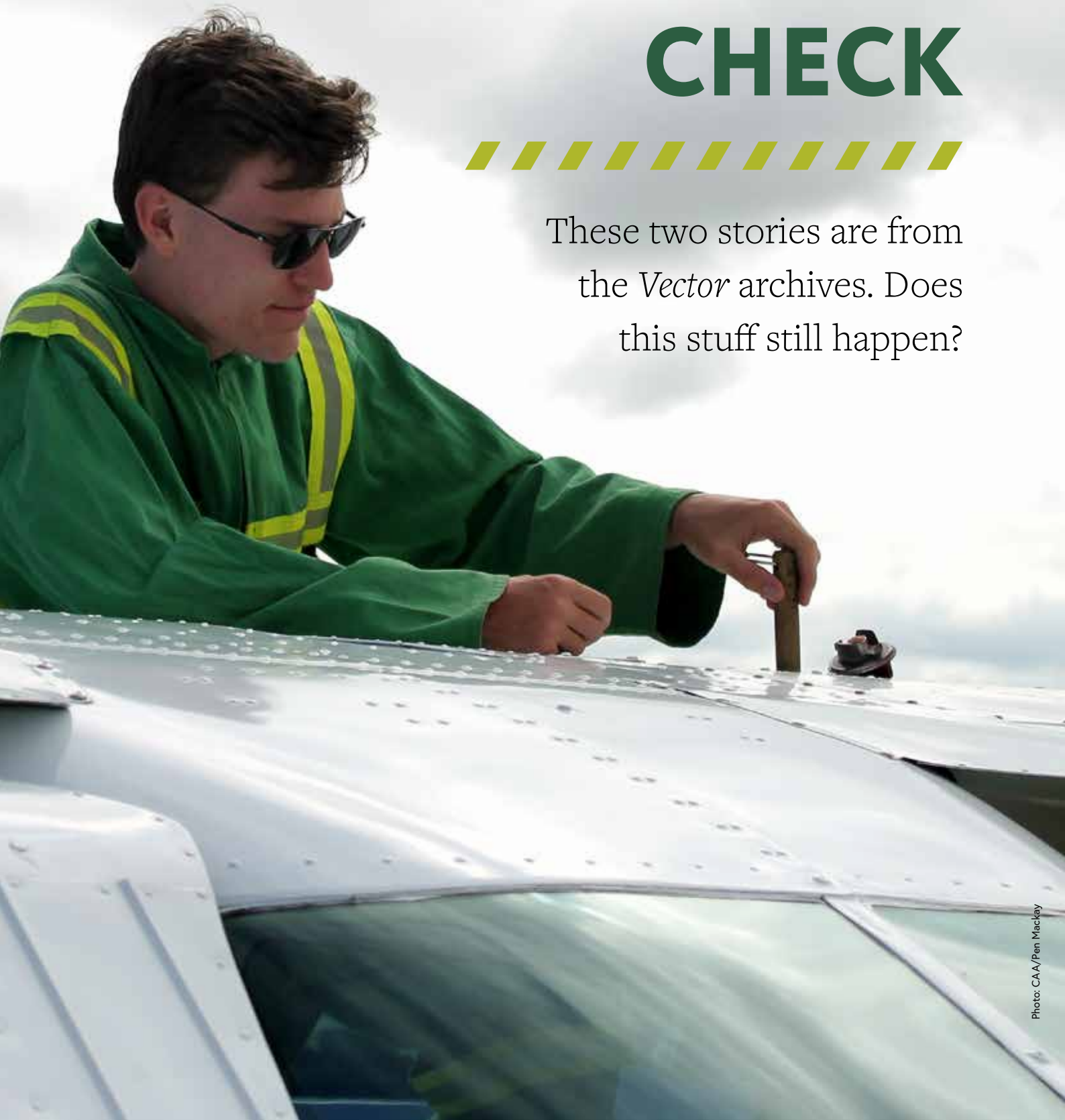


Photo: CAA/Pen Mackay

A fuel fiasco

An aero club pilot planned to fly a hired Piper Cherokee from Wellington to Rotorua with a number of passengers.

During the preflight, the pilot failed to dip the tanks, only looking at the gauges.

He assumed the tanks were nearly full and entered an endurance of four hours.

A club flight instructor also didn't dip the tanks but removed the cap and checked their levels, then shortened the endurance by 30 minutes on the flight plan – but didn't tell the pilot.

As neither had dipped the tanks they couldn't know the tanks were, in fact, only about 80 percent full, or 2.5 hours of flight.

This was, however, still enough for the planned 1.5-hour flight from Wellington to Rotorua, plus regulatory reserves.

The Cherokee left about 1626 hrs, with ETA about 1816 hrs.

Bad weather and cloud build-up north of Palmerston North forced the pilot to detour, until the journey was so far behind the flight plan, the expiry of the SARTIME was 60 NM south of the destination.

At this point, Rotorua air traffic control advised the pilot to approach from Mt Tarawera, due to cloud cover to the south of the aerodrome.

Taking this into account, the pilot further delayed his ETA to 1830 hrs.

At 1847 hrs, the pilot gave his position as 20 NM south of Rotorua, and his ETA as 1845 hrs (two minutes earlier than his radio call).

At this point, civil twilight had been in effect for six minutes and the pilot was not cleared for night flying.

He soon began having difficulty establishing his position. Two National Airways Corporation pilots began helping via radio.

Rotorua ATC fired a series of flares to help the pilot orientate, but he could not see them.

At 1854 hrs, the pilot stated he had enough fuel to fly until 2026 hrs. But the flight plan transmitted to Rotorua showed empty tanks at 1956 hrs.

One of the NAC pilots directed the Cherokee toward Tauranga, where night landing facilities were to be made available.

At 1913 hrs, the Cherokee pilot reported seeing the lights of Matata, 30 NM east of Tauranga.

Three minutes later, he reported he was out of fuel. The aircraft made a forced landing in shallow water, 15 NM south of Tauranga aerodrome.

All aboard were unharmed.

No fuel to taxi

A pilot of a Cessna 180 flew from Christchurch to Pomahaka River, Clifton, and then to his cousin's farm at Pukeawa.

The Cessna was parked on a slope on the farm for two hours. Before start-up the pilot noticed some fuel had drained out.

It was later estimated that three to four gallons had siphoned from one tank into the other, then overflowed.

The pilot didn't think this would be an issue, and didn't dip the tanks before his return flight to Christchurch.

He gave an estimated return time of 55 minutes, and fuel endurance as two hours. Not accounting for the fuel loss, the maximum fuel endurance was more likely an hour and a half.

After exactly 55 minutes, the pilot landed at Christchurch and the tower gave the pilot instructions to taxi.

At this point, the pilot informed the tower he had no remaining fuel to do so.

This was the first point anyone, other than the pilot, knew about the aircraft's fuel exhaustion.

CAA Aviation Safety Advisor Carlton Campbell says parking an aircraft on a slope, however slight, can and does catch pilots unaware.

"If there's sufficient cross feed – where tanks have this function – to fill and ultimately overflow the lower tank, fuel is lost. If the fuel quantity is not checked between flight legs, this loss isn't noticed.

"Appropriate positioning of the fuel selector when parked can avoid this problem."

Does it happen now?

Well, yes it does. There've been 63 reported instances of fuel exhaustion since 2000, including one earlier this year.

A plane with passengers, flying a round trip between Alexandra and Mt Aspiring, suffered engine failure due to fuel exhaustion, as it passed Wānaka.

"Fortunately, they had sufficient height to glide to Wānaka aerodrome and make a safe forced landing," says Carlton.

However, such incidents are less common than those of fuel starvation – when fuel on board cannot, for whatever reason, get to the engine.

A few years ago, Carlton witnessed, first-hand, an occurrence where a Cessna 207, on a return flight from Milford, suffered engine failure.

"I was about to join from a right base on to runway 23 at Queenstown, when the C207 on final in front of me advised the tower he was landing short, in the rough sandy paddocks neighbouring the Kawarau River.

"I circled to make sure all were okay before continuing to land. Another pilot and I immediately went to the accident site, where it turned out there was plenty of fuel in one tank.

"The pilot had neglected to change tanks in Milford, contrary to company SOPs, and ran the tank dry on the return journey, resulting in fuel starvation."

John Fogden, director of aviation auditing company Total Quality Aviation, notes that the Cherokee preflight involved at least four of the human factors 'Dirty Dozen':

- Departure from norms (dipping)
- Lack of communication (between pilot and instructor)
- Complacency (assumptions made)
- Distraction (route changes).

// If you've used up your fuel, you've used up your options. //

Photo: CAA/Pen Mackay

In the Summer 2022/23 *Vector* article "50 years of *Vector*", John said he believes fuel-related incidents are often due to distractions during flight preparation.

"Attending to cellphone calls or responding to other interruptions during preflights, and particularly during refuelling, is a known precursor to critical elements of flight preparation being skipped or omitted."

John, who's had 45 years' experience in aviation, also advised:

"Monitor your fuel and the situation around you. Be prepared to change your plan while the state of your fuel, or your situation, still allows you options.

"If you've used up your fuel, you've used up your options.

"The only remaining element is luck."

// FOR MORE GUIDANCE

Check out our Good Aviation Practice (GAP) booklet on fuel management. Go to **aviation.govt.nz/education** to download or order your own copies.

We also have fuel conversion stickers available for Avgas and Jet A-1.

BIRD STRIKE
ANYTHING COULD HAPPEN

A group dedicated to preventing bird strikes is having long-term success, without always resorting to culling.

Just about anything could happen when an aircraft is struck by a bird, says the New Zealand Aviation Wildlife[1] Hazard Group, NZAWHG.

"It depends on the pilot's reactions, what kind of bird, and where the bird hits the aircraft," says Lizzie Civil, who's the group's chair.

A strike to the nose cone will be financially costly but not fatal. If birds are ingested into both engines, it could be a different story, Lizzie says.

New Zealand is doing fairly well with bird avoidance. Its bird strike rate at airports is about four in 10,000 aircraft movements.

"Of course, that strike rate could be four sparrows. That's likely not going to cause much damage to a plane.

"Whereas a Canada goose could be catastrophic," she says.

Part of the country's success in avoiding bird strike is down to the work of the NZAWHG.

Annually, nearly every airport meets the NZAWHG to discuss how to reduce the risks of aircraft-versus-bird.

"We had a falconer at our last meeting. He discussed the pros and cons of using falcons for wildlife harassment at airports.

"Falconry is an environmentally friendly, cost-effective, and non-lethal way to deal with pest control.

"But it does require a well-trained and mature bird as well as an experienced handler.

"Further, the CAA has not yet approved the use of either a real or 'robo' falcon.

"However, it's likely to just be a matter of time before falconry is used," says Lizzie.

"It has great potential."

A proactive rather than reactive approach

Lizzie – the former Wildlife and Ground Manager at Auckland Airport, and was an Airfield Environmental Officer at NZDF Whenuapai – says that, in the past, the approach to birdlife at airports was very much reactive culling.

"But culling some territorial airport wildlife that are, at least, used to that environment, and act in predictable ways, just leads to non-airport savvy wildlife coming in and acting erratically, and causing an even higher risk to aircraft.

"But we've managed to change the mindset of many aerodrome owners and operators, to a more 'proactive' one, that preserves the environment, while managing problematic species.

"What we do is manage the airport ecosystem, so it's less attractive to whatever species may be a high risk to aviation."

Often that includes building alternative habitats for the birds elsewhere, like bird roosts. And making sure any development near the airport doesn't include bird-attracting features like flat roofs, and seeding, fruiting, or large roosting trees.

Lizzie says that in some cases, culls are necessary if the birds are categorised as high risk and their numbers are increasing.

"Spur-winged plovers for instance, often flock. They're territorial, aggressive and are common to most New Zealand airports. They have the highest species strike rate and are often culled.

"But a holistic approach is getting better long-term results than just shooting the birds, and makes management steadier and easier to predict."

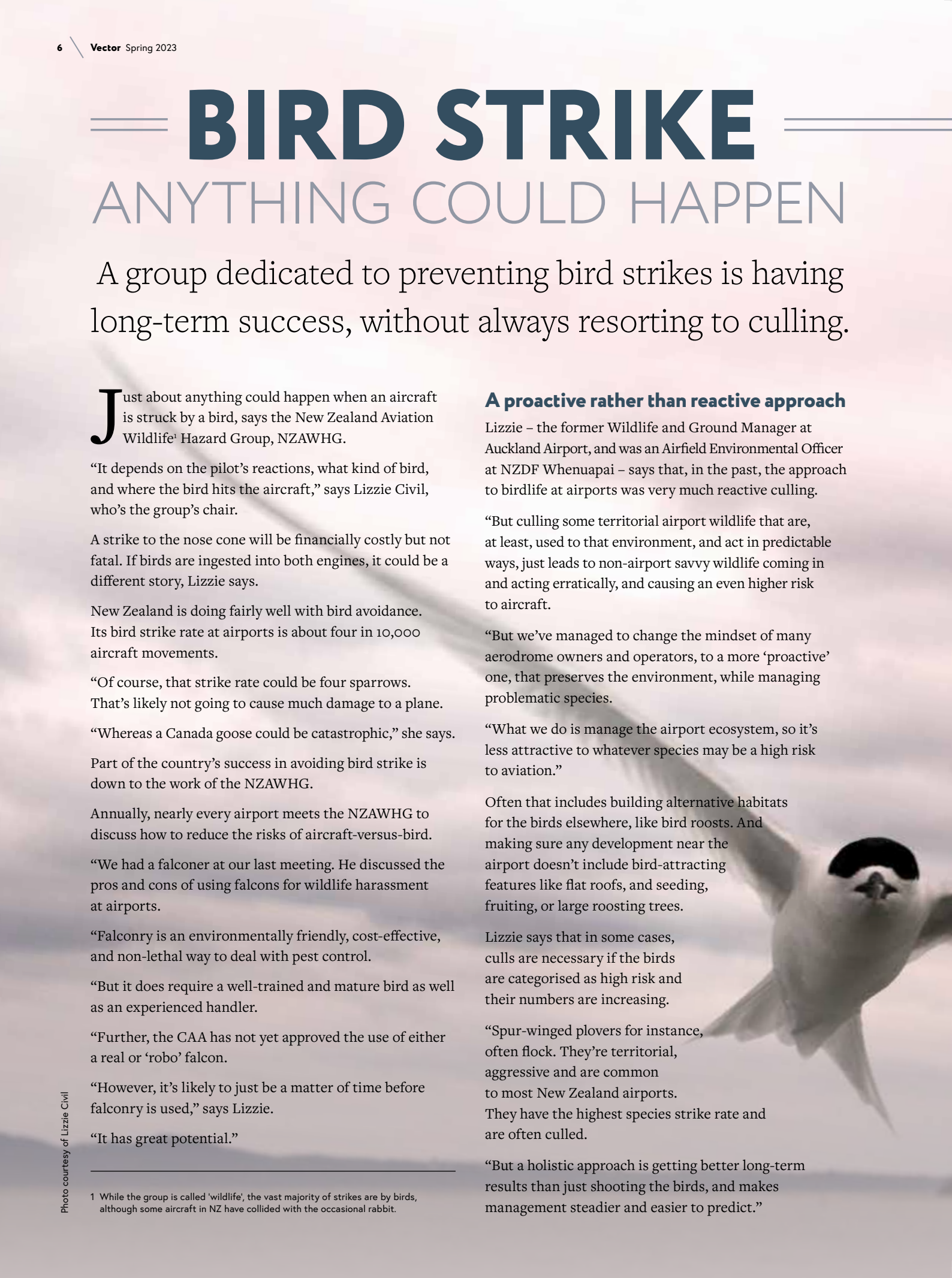


Photo courtesy of Lizzie Civil

1 While the group is called 'wildlife', the vast majority of strikes are by birds, although some aircraft in NZ have collided with the occasional rabbit.

Predicting a strike

To help aerodromes manage their bird strike risk, the NZAWHG has also designed a risk assessment model based on the likelihood of a bird strike at any particular aerodrome, and the consequences of such a strike.

"We assess the consequences of a strike by a particular species of bird. We do this by factoring in its weight and flocking characteristics – whether it flies solo or in groups – and its behaviour, so whether it's a rapid or direct flier, or a hoverer, which is higher risk. Then we come up with a risk score."

Birds of primary concern are large in size, flocking birds that are slow flying, less manoeuvrable or erratic, such as plovers, Canada geese and black swans. Secondary concerns are species of small to medium size that habitually hunt or forage on or over the airfield, like hawks, starlings, gull species, and waterfowl species. Or birds such as wading species, which habitually fly across the airspace.

"All the aerodromes then have to do is calculate the likelihood of a particular species of bird causing a strike at their airfield. Some base this on the presence of a particular species at their location. Other aerodromes calculate it on the basis of whether that bird has actually caused a strike in the previous five years. Some aerodromes use a combination.

"Airports then use these risk assessments to prioritise how they'll manage wildlife hazards.

"A lot goes on behind the scenes for people to fly safely in and out of our airports."

// MORE READING

Check out our Good Aviation Practice (GAP) booklet on bird strikes. Go to **aviation.govt.nz/education** to download or order your own copies.

Go to page 23 "Letters to *Vector*" for a reader's tip on avoiding a bird strike.

And visit **nzawhg.nz**.

// White-fronted terns roost off the Auckland Airport runway.

REPORTING DEFECTS IN MODS

A reminder to aircraft owners, and engineers, to report defects that are affecting modifications, to the relevant design organisation.

In a recent occurrence reported to the CAA, cracks were discovered in a spray boom, and during the removal of the boom for replacement, even more cracks were found.

The engineer also reported the defect to the boom's designer.

"That's exactly the right thing to do," says CAA Safety Investigator Sam Stephenson.

"But problems in service are not always reported back to the supplementary type certificate holder. I think sometimes there's a 'let's just fix it and get on with it' approach.

"But it's important for the designer to know if there's a weakness in their product's design, or materials. How else can they improve it, and let other operators know about it?"

On the CA005D *Defect Report*, there's a tick box for "Manufacturer advised". You use this to tell the CAA you've also reported the problem to the designer.

"If other participants find the same problem, we can work with the designer/manufacturer to issue a continuing airworthiness notice, so others can be made aware of the potential problem," says Sam.

"If it was someone else who'd identified an issue with an aircraft you operate, wouldn't you want to know about it?

"Also, the designer needs to stay on top of the reliability of their product, and if a participant has valuable information about that – for obvious safety reasons, they should pass that on."

It's usually the maintainer filing CA005D forms and notifying the original equipment manufacturer (OEM) of any faults. But because airworthiness issues are the responsibility of the aircraft owner or operator, they should always check this has been done.

Sam says the important thing is that issues in mods are reported – to both the CAA, and the designer.

A SPECIAL EDITION OF VECTOR

Our fatal accident investigators attend scenes of tragedies caused by the same few factors.

In October, you're going to receive a special issue of *Vector*. It's a first for us to produce an 'out-of-cycle' edition.

Why are we going to the expense, time, and trouble to produce this special edition?

Well, fundamentally, our fatal accident investigators don't want to visit your family.

They've learned that many flying tragedies are caused by one or more of quite a narrow range of factors.

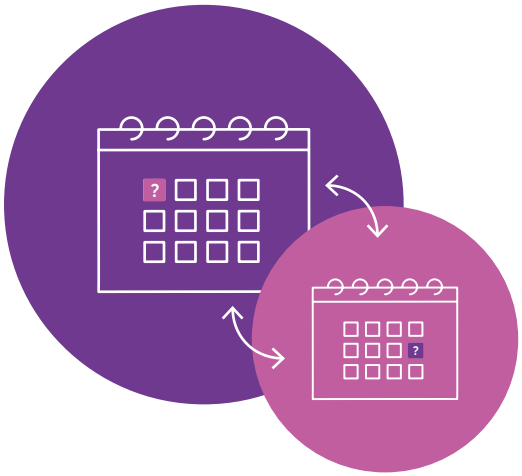
Among the most common – a lack of flight planning (including getting the weather), VFR into IMC, over-reliance on tech, and a generally careless attitude to flying within the rules. (Yes, rules are 'boring and stop you having fun', but they don't come out of thin air and they are there to keep you safe.)

So the special edition of the magazine is about the experiences of the CAA's fatal accident investigators, and the advice they have for you, based on what they find out – time and again – during their investigations.

Based on their observations, the special issue of *Vector* is going to look at, among other things:

- why planning and monitoring 'the middle' of a journey is so crucial
- the good reasons you should listen to your fellow aviators, and maybe even your family, when they say, 'Mmmm, today's a bit iffy, maybe don't fly'
- *really* knowing your aircraft and its limitations.

Look out for the special issue mid-October this year. Reading it may just save your life.



BE AWARE OF DATE MIX-UPS

08/01/23 could be 8th January – or 1st August.

As most people know, English (including Australian and New Zealand) date formats are different from American date formats.

The standard English format puts the day first and the month second, while the American format puts the month first and the day second.

CAA Airworthiness Inspector Robert Van Asch, says confusion between the two is emerging as a problem for compliance, and for maintenance reminders.

"If you need, for instance, to comply with an FAA airworthiness directive, or you're doing a biennial flight review, and you think you need to do this on say, 3 August, you might actually have needed to have done it back on 8 March."

In fact, this exact problem occurred when a pilot's BFR was due on 11 August 2022, but it was set in the calendar as 8 November 2022 – that is, 11/08/22 was set as 08/11/22 and the BFR was missed.

Robert says this problem can also occur when dates are logged in the aircraft tracking programme with an American default date format, or the logbook from source documentation using the American date format.

"So take the time to check exactly on which date you need to act. It might save you the embarrassment, at the least, of flying without a BFR, and therefore without a licence, and it might save you from operating with an overtime component."

THINGS THAT JEOPARDISE YOUR LOOKOUT

// **By Marc Brogan,**
CAA Chief Advisor of Standards

Your awareness of your place in the air is *vital*. So what conditions limiting that awareness should you always be aware of?

Despite advances in technology, improved pilot training, a greater understanding of human factors, and enhanced aircraft design – one problem remains the same in New Zealand's skies.

Aircraft continue to be drawn, almost magnetically, toward each other – at best, giving both pilots and their passengers a nasty fright, and at worst, involving them in a mid-air collision.

In New Zealand since 2008, there have been three fatal mid-airs at unattended aerodromes, resulting in seven deaths. There continue to be a significant number of 'near-miss' events. Between 2018 and July 2023 there were 337 (see table), 158 of which have required avoiding action.

They're a sobering reminder of the human frailties we take into the air every time we pilot an aircraft. A single decision, or a single action or non-action that damages our lookout, can be the difference between a safe flight and tragedy.

When factors such as high workload, poor radio calls, perhaps the sun at an awkward angle, drive us toward catastrophe, great situational awareness[1] and great lookout will provide that last slice of swiss cheese preventing an accident (see diagram).

Number of reported 'events' in New Zealand 2018 – July 2023

Year	Air proximity	Loss of separation	Near collision	Total
2018	32	13	09	**54**
2019	28	12	13	**53**
2020	17	29	14	**60**
2021	18	32	16	**66**
2022	20	22	14	**56**
To July 2023	26	15	07	**48**

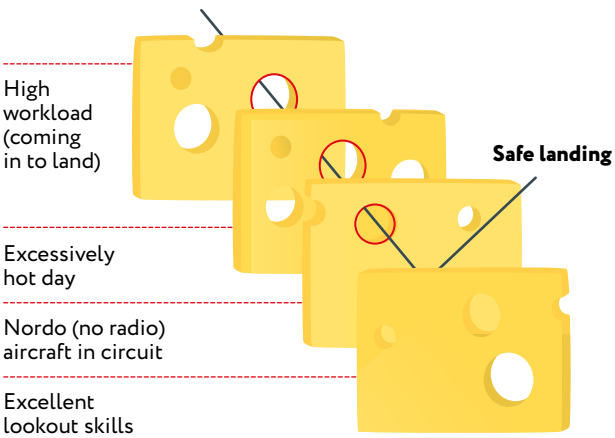
CAA research into mid-air collisions has found many of those tragedies shared a number of features.

The Licensing and Standards team found the most marked feature the three most recent mid-air collisions had in common was that they all happened at their home aerodromes, that were all unattended (see sidebar on page 11).

1 In a well-managed flight, the passengers will have been briefed, and that will include them looking out for other aircraft and informing the pilot. So they're an important aid to lookout and situational awareness.

The 'swiss cheese' model of accident causation

Pilots' lookout and situational awareness can be the last slice of cheese, where the holes *don't* line up, preventing a catastrophe.



The findings of the research into those three mid-air collisions are described here, because some of the factors common to those three accidents could also be part of *your* next flight.

Will you be prepared for them? Or will you be surprised by them, allowing them to impair your lookout and situational awareness?

Common factors in the accidents

In 2008, three people died in a collision between a C152 and an R22 at Paraparaumu.

Two years later in Feilding, two died in a collision between two C152s.

And in 2019, a collision in Masterton between a C185 and a Tecnam P2002 killed another two.

All three collisions were at aerodromes subject to high itinerant use, and local traffic, all on the same frequency. Was radio congestion a factor?

This reminds us that while the radio is a great tool for situational awareness, lookout is key.

As already noted, all the accident aircraft were at their home base.

Was there, as a consequence, an over-reliance on local procedures – 'overhead water tower' type calls – that itinerant traffic would not understand?

Did complacency play a part? It's easy to take your eye off the ball when it's your home aerodrome, but this has been the precursor to many incidents and accidents.

> **// 'Shared airspace', particularly at unattended aerodromes, absolutely means a shared understanding of procedures. //**

The reports from the Transport Accident Investigation Commission on these accidents indicate they all occurred when the pilots were undertaking degrees of non-standard practice. It was noted in the TAIC report findings and recommendations that the pilot training content and syllabus should be reviewed, especially regarding lookout and standard procedures.

That shift from a standard and commonly understood procedure or method will have resulted in a loss of predictability for other pilots. 'Shared airspace', particularly at unattended aerodromes, absolutely means a shared understanding of procedures.

There were no weather-related factors in the accidents – all occurred on clear VFR days with no cloud.

But keep in mind that time of day, and the position of the sun, are often factors in incidents – the pure difficulty of 'seeing' – especially on an anti-cyclonic day with lots of haze.

Be aware of long flying days that can lead to physical tiredness, and all the potentially poor decisions associated with that. Remember the I'M SAFE check for yourself before flying.

Between, and within, the six aircraft involved in the three accidents, there was significant difference in crew experience and gradient.

In Paraparaumu, one flight was a PPL test and one was an early solo training flight.

The Feilding accident involved an aircraft doing a training exercise – where a dual training flight was practising overhead joins at lower than standard height – while another aircraft climbed out after take-off.

In Masterton, a new commercial pilot operating a complex aircraft type was descending to land, while a newly qualified pilot was established on long final.

All the flights therefore contained psychological stressors that could have possibly influenced pilot performance.

For various reasons, all the pilots were under physiological stress. Some were flying on a hot day. All had high workload during a hectic phase of flight, approaching to land. Some were handling a complex aircraft type. All of them had either pitch, bank, or both – and would have been experiencing 'G' as a consequence – just before the accident.

And all would have been trying to see and identify conflicting traffic.

'G' and other significant physiological factors

Consider, if seeing and identifying other aircraft is already challenging because our body is experiencing 'G', and possibly, the other effects described here, what mental capacity do we have for threat and error management? Try to consider these *before* beginning the high workload phase of the flight. »

Work Together, Stay Apart

The number of critical near-miss incidents in unattended circuits has increased every year since 2016.

The CAA has launched the *Work Together, Stay Apart* campaign – an initiative highlighting the very real threats to all aircraft who fly in proximity to other machines and the pilots flying them. (See page 15.)

The campaign is focussing on flying behaviours at unattended aerodromes, and standardising practices in their circuits.

Look out for the Summer 2023/24 issue of *Vector*, which will be wholly dedicated to education about this one problem.

We don't know if this was the case in these three accidents, but it's worth remembering that during flight, we pilots – and our passengers – experience the effects of gravity if our turns are steep.

In extreme cases, we experience reduced vision and ultimately a G-LOC – a gravity-induced loss of consciousness.

This is more likely to happen if you're unfit, tired or fatigued, or not anticipating the possibility of G-LOC – often the case with any passengers – because you're distracted by workload.

Almost as bad is reduced, or no, visual reference. Our body gyros 'topple' and our vestibular – inner ear – system lies to us about our physical orientation in space. This hampers our sense of direction and can cause additional physical stress.

Limitations of physical vision

In your PPL study, you learned how our vision allows threats and errors to present themselves.

Remember empty-field myopia? The eye tends to 'rest', focussing a few feet in front of us – nearer in poor visibility conditions – and that prevents us seeing obstacles further into the distance, but right in front of our aircraft.

For older pilots, adding to the problem of empty-field myopia, is that quality of vision is age-related. Generally, we become short-sighted as the years go by.

And if your aircraft windscreen is dirty, it makes the myopia even worse because your eyes will focus on spots immediately in front of you.

To overcome this, we need to 'stretch' our vision, allowing our focus to improve as we steadily look further and further into the distance.

For example, if you look out to the wing for a few seconds, then further down the wing, then beyond the wing, you'll find your focus will sharpen.

Difference between foveal and peripheral vision

Essentially, these two types of vision carry out different tasks to provide a 200-degree field of view (FOV) – although with varying levels of detail.

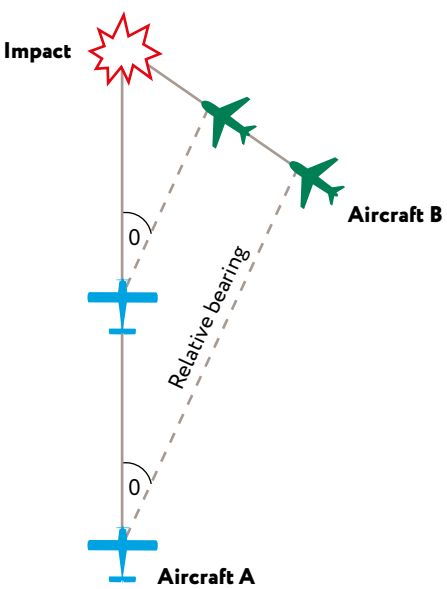
Foveal vision is the area of acuity – getting something in focus – directly in front of us. It's a very narrow field and not as responsive to movement as our peripheral vision.

Peripheral vision is sensitive to stimulation, meaning items – aircraft – that don't appear to move are often undetected.

Try holding a finger out to each side of your peripheral vision. If you move them, they're visible, but if you keep your fingers still, eventually they become less obvious or even undetectable as they merge into the horizon.

The interaction between foveal and peripheral vision has contributed to mid-air collisions – particularly through something called the 'constant relative angle of convergence'. This is where an object in the peripheral range remains in the same relative position.

Lack of relative motion on collision course



Source: ATSB "Limitations of the see-and-avoid principle" 1991

This is what happened in a mid-air collision in New Zealand in the late 1980s between two scenic aircraft at Milford Sound, and again in 2019, in an accident in the city of Ketchikan, in Alaska.

Knowing and recognising the strengths and weaknesses of these two forms of vision is vital to better understand how to look out effectively.

Other limitations to a good lookout

During training and type ratings, we often talk about the fact that design features of an aircraft can inhibit good views and limit visibility.

Windscreen pillars, wing configurations, and seating position can all have a significant effect on the ability of the pilot and their passengers to scan the horizon.

Some aircraft have sunshades, or shading printed into the windscreen. These are great for knocking back sun glare, but they can create an obstacle to good vision, especially when an angle of bank is applied.

Be aware it diminishes usable windscreen as you look into the turn. You may need to move to look around them or, if possible, lift the shade up.

Newer technologies such as ADS-B, can, ironically, affect our situational awareness. We pilots should integrate our visual and tech scans for the best situational awareness. But many pilots become so entranced with the bells and whistles, they literally lose sight of what's actually happening outside their aircraft.

And the tech can fail. In the Ketchikan accident, the ADS-B in one machine was not broadcasting pressure altitude – necessary to provide an alert to the kit being used by the second pilot.

Using the horizon to improve lookout

Let's refer to the image below, often used for perspective, and reference to the horizon, in medium and steep turn lessons.

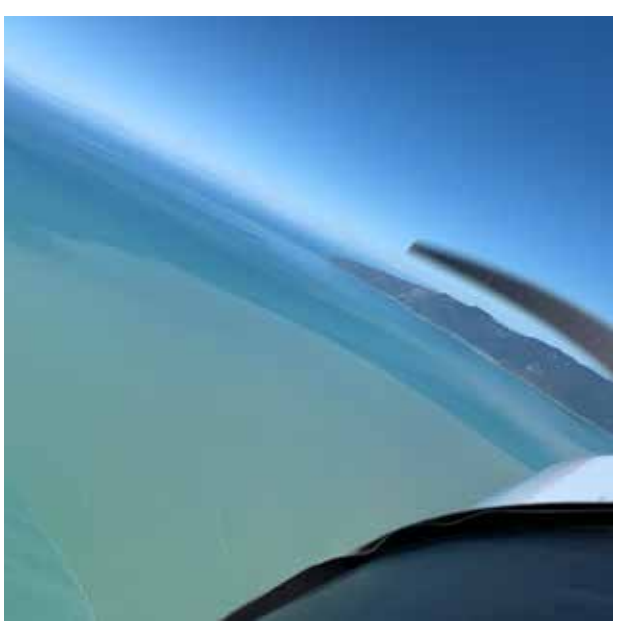


Photo: CAA/Marc Brogan

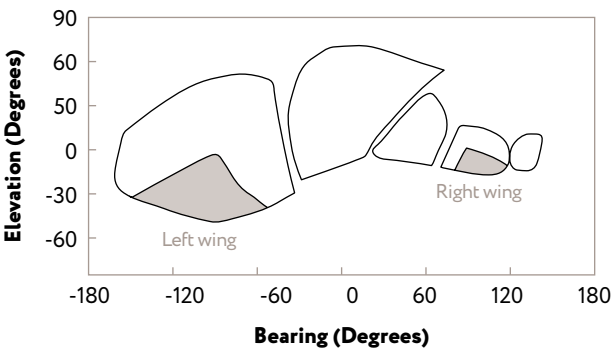
The image depicts the left-hand turn with the pilot sitting upright in the aircraft – their horizon is angled.

This means a natural movement of the head is down the turn rather than across the horizon, which should be your reference for VFR flight for yourself, and other aircraft.

If you slightly lean away from the turn, the horizon assumes a level perspective, and the scan now has a greater FOV around to the left, where the aircraft is turning.

This is important to understand because we actually see the world like this image below.

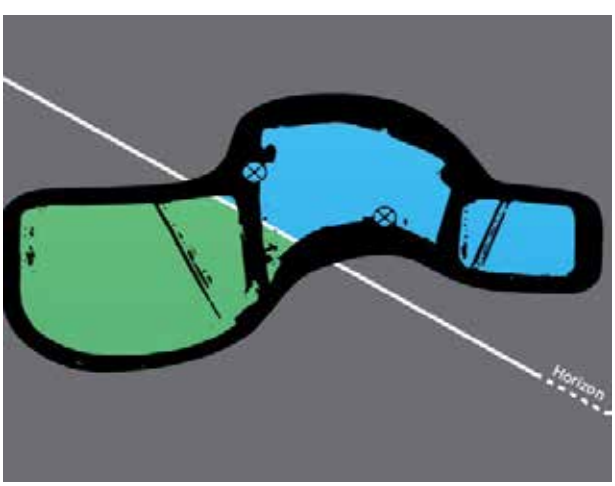
Limited cockpit visibility from a typical general aviation aircraft



Source: ATSB "Limitations of the see-and-avoid principle" 1991

As you can see, the actual usable FOV – when you allow for aircraft design and our human eyeballs – is extremely limited. If you were to overlay this on to a real-world image – diagrammatically presented below – the picture becomes obvious.

Pilot forward view, without tilting their head

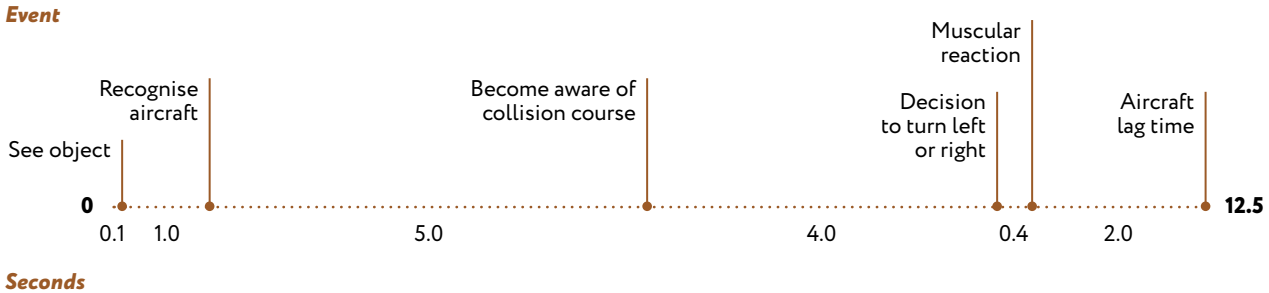


Source: CAA

By leaning slightly *away from the turn*, your head can now be moved, with a greater reference to the actual horizon, past aircraft design features that may otherwise limit the view and your peripheral vision.

You're now more effectively able to look into the actual plane of movement and the reference for all other pilots, the horizon. »

Aircraft identification and reaction time

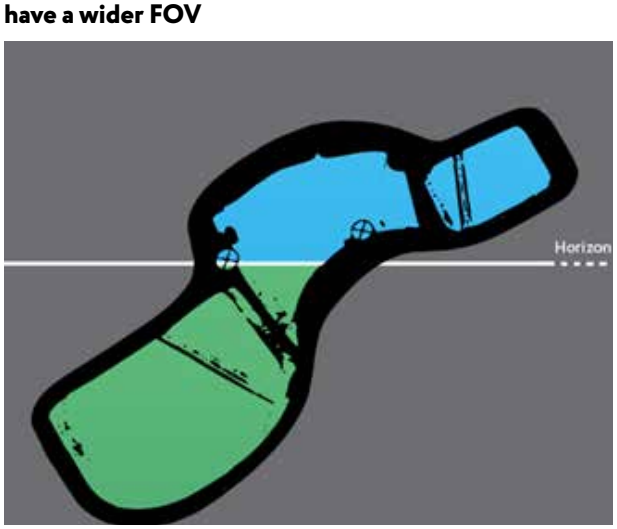


Source: FAA AC 90-48D CHG 1 Pilots' role in collision avoidance

» The picture below simulates that change of view, as does the second diagram.

Photo: CAA/Marc Brogan

Pilot forward view, tilting their head so they have a wider FOV



Source: CAA

An effective scan

The timeline above shows the number of seconds you have to react to a collision threat.

Become acquainted with the principles of an efficient VFR scan so that it becomes automatic. Check out the material at the links under *more information* below.

Having to do an effective VFR scan is often accompanied by the stress of undergoing a flight check, flying a new aircraft, learning a lesson, starting a new job, flying on a particularly hot or cold day, all the while trying to move around in a confined space to get a good look at what's where outside.

If you follow the principles of an effective scan as a matter of course, it will free up 'brain space' to accommodate these other pressures.

How many of the factors in the accidents described here are present every day in your flying? Hot day? Radio clutter? Coming into land at an unattended airfield?

Consider your place in the air. We pilots are the greatest weakness in the aviation loop. But we can also be the last slice of swiss cheese preventing a catastrophe.

// MORE INFORMATION

- **atsb.gov.au** > aviation > aviation publications *and search on "see and avoid"*
- **aviation.govt.nz/vector-online** > health and human factors > so you think you can see and avoid
- **aviation.govt.nz** > safety > safety initiatives > situational awareness and threat and error management
- **ntsb.gov** *and search on "Ketchikan midair"*

WORKING TOGETHER TO STAY APART AT UNATTENDEDS

The CAA has launched a first-of-its-kind campaign to make flying safer around unattended aerodromes.

In 2008, a mid-air collision between a light aeroplane and a small helicopter over Paraparaumu resulted in the deaths of two student pilots and a flight examiner. The subsequent TAIC investigation found one of the main contributors to the tragedy was that the pilots did not maintain sufficient lookout.

There've been two fatal mid-air collisions within the vicinity of an unattended aerodrome since then, at Feilding in 2010, and at Masterton in 2019.

And the number of critical near-miss incidents in unattended circuits has increased every year since 2016. So the CAA has launched *'Work Together, Stay Apart'* – an industry-wide collaboration to reduce the likelihood of mid-air accidents, and the number of near-collision and air-proximity events in the circuits of unattended aerodromes.

It's aimed at all those flying around those airfields, and those who influence that flying, such as aerodrome managers.

There's never been a CAA safety campaign of this scale. Operating alongside business-as-usual safety education, inspections, and industry guidance, the campaign aims to increase shared understanding of standardised procedures among pilots, improve aerodrome management and safety, and collaborate with operators to promote best practice.

The Director of Civil Aviation says the loss of life because of unsafe or inconsistent flying practice is unacceptable.

"Safety is paramount, and a safe and secure aviation system is a shared responsibility," says Keith Manch.

"We want to work with industry to prevent further tragedy because we all need to do more."

// MORE INFORMATION

In a first for *Vector* magazine, the Summer 2023/24 edition will be wholly turned over to the campaign, with all stories focussed on what we can all do to make the unattended aerodrome a safer place to fly.

For dates and places of the campaign's *Plane Talking 2023* radiotelephony seminars, see this issue's back cover.

WET WET WET

No, it's not the 1980s Scottish band – it's a new measure to prevent runway excursions.

Runway excursions have been identified by ICAO as a key risk area globally. In many cases, the excursions are due to water, ice, or snow.

From 30 November 2023, to help to ensure safe landing and take-off, new rule 139.107 *Assessment of runway condition and provision of runway condition report* will require all controlled aerodromes in New Zealand to report to pilots the condition of their runway surfaces.

The runway condition report (RCR) provides the current surface condition of the runway described in thirds, over its length. The runway surface condition 'thirds' are provided to pilots in the direction the runway is being used.

A runway surface condition of DRY DRY DRY means there's no visible discolouration over all thirds of the runway's operational length.

The condition of each third of the runway is further described by numerical runway condition codes or 'RWYCC' codes. These are used mainly by jet pilots to describe the performance of the runway.

For instance, RWYCC 6,6,6 DRY DRY DRY means the entire runway is completely dry.

WET WET WET means there's discolouration, or water present over all thirds of the runway's operational length, and the depth of water is up to and including 3mm.

If a runway surface condition is not DRY or WET, it must be contaminated.

Runway surface contaminants include standing water deeper than 3mm, a slippery wet runway, snow, ice or slush, wet ice and wet snow.

The role of ATC

While the overall responsibility to assess and report runway conditions to pilots lies with aerodrome owner/operators, they may delegate RCR responsibilities to air traffic control – but only as long as conditions are DRY (RWYCC 6,6,6) or WET (RWYCC 5,5,5).

Once there's a possibility that conditions are contaminated, air traffic control will hand responsibility back to the aerodrome.

Airways' senior air navigation specialist James Culleton says that regardless of the weather and runway conditions, air traffic controllers will maintain a lookout over the runway.

"Say, for example, a shower passes over the airfield. The runway, which was previously dry, becomes wet. If there's no reason to suspect standing water or slippery wet conditions, there's no need to wait for an inspection of the runway by the aerodrome.

"ATC will immediately advise any aircraft about to use the runway, and issue a new ATIS with 'RWYCC 5,5,5 WET/WET/WET'."

If, however, the rainfall is heavy enough that there's the possibility of standing water or slippery conditions, air traffic control will hand back its delegated responsibility for reporting to the aerodrome.

When reporting, aerodromes can use a variety of tools to make assessments – rulers, vehicles with brake sensors, imbedded runway sensors[1] and so on – and will then generate a detailed runway condition report. This report is sent directly to the ATIS, as well as being issued as a NOTAM.

1 At Wellington, controllers can view data from runway sensors to support a dry or wet assessment.

Photo courtesy of Queenstown Airport

In cases where air traffic control hands reporting responsibility back to the aerodrome, it's possible the ATIS will, for a short period of time, state 'RUNWAY ASSESSMENT IN PROGRESS'.

"This simply means the conditions are still being measured, and an accurate report will be available soon," says James.

"Don't forget that ATC will always verbally pass relevant ATIS changes to aircraft about to use the runway."

RCR is being provided during the promulgated hours of the ATC service specific to each location. If the ATC service is off watch, there's no mandatory requirement for aerodrome operators to provide an RCR.

Air New Zealand

Air New Zealand says it's managed runway excursion risks through a range of measures, from pilot training to investment in new aircraft technology.

"But one aspect over which we've always had minimal control," says Senior Manager of Aircraft Operations, Imogen Cullen, "is runway surface condition reporting, which has varied around the world.

"The accuracy and reliability of those reports are critical for safety during take-off and landing, but it's been troubling how inconsistent and unreliable they can be.

"If pilots don't have up-to-date, accurate data about the condition of a runway, they can't accurately determine the expected aircraft deceleration performance, the runway distance requirements, and operational limitations such as wind limits for take-off and landing.

"Our flight crews are exposed to various local procedures and the full spectrum of weather and runway conditions at 50 airports around the world," Imogen says.

"So we're greatly reassured that come 30 November, aerodrome operators in New Zealand will provide reports more detailed than 'wet' and 'dry'.

"This is because the new standardised runway condition report is based on the contaminant type, depth and coverage – and that data correlates directly with take-off and landing performance data provided by aircraft manufacturers, based on real flight tests in a range of runway conditions.

"That scientific correlation between reported runway condition and aircraft performance therefore removes subjectivity."

Queenstown Airport

Queenstown Airport already has a runway condition reporting programme but says the new requirement will further reduce risks, and improve operational efficiency, which will make air travel "safer for all".

NZ Airports Association

Since the new rule was signed off by the Minister of Transport in May, NZ Airports has been working with its member aerodromes to understand what will be required from November, and how to go about that.

"It will improve aviation safety and bring New Zealand into line with ICAO SARPs (standards and recommended practices)," says Policy Director Steve Riden.

"Our focus has been on making the final rule and advisory circular something that's practical, fit for purpose, and easily understood by airport staff.

"A key issue for airports has been how the data collected by airport staff then gets to the pilots that use it, in a timely, reliable, and traceable way.

"We're looking forward to seeing the final roll-out of the Airways' portal for aerodromes to enter their RCR data."

// MORE INFORMATION

- To see the new draft advisory circular, go to **aviation.govt.nz** > rules > advisory circulars > AC139-3 *Aerodrome inspection programme and condition reporting.* Scroll to the bottom of the page.
- **aip.net.nz** > aerodromes > 1.6 Aerodrome Operations. Note: This applies from 30 November 2023.

For queries, email **aerodromes@caa.govt.nz**

HIGH SAFETY

In 1972, in the first issue of *Vector*, we reported a fatal aircraft accident in the lee of a mountain range. Mountain flying still presents risks that every pilot needs to keep front of mind.

Time moves on, and aviation safety has evolved for the better, but mountains stay right where they are – so be prepared!

That's the message from CAA Aviation Safety Advisor Carlton Campbell, who stresses the importance of education, training, competency, and currency for every pilot who flies in the mountains.

"Fifty years on from that fatal accident, it's important to remember that the mountains haven't changed, pilots are the only variable.

"Pilots need to stick to key principles and keep their skills up-to-date."

Skills for thrills

Mountain flying is thrilling and beautiful, presenting a rare opportunity to observe New Zealand's stunning natural scenery from a different perspective.

But not just anyone can pilot an aircraft into the mountains – adequate training and experience is required first.

The CAA's safety investigators are still called to the scene of mountain flying accidents – the causes of those 1972 tragedies still, in some cases, featuring today.

Carlton says there are four key principles for pilots to keep in mind when preparing for mountain flying. They are horizon, position, options, and anticipation.

"Pilots need to have the knowledge and skill of using the real horizon – this is where the sky meets the sea. Or they might use an 'imaginary' horizon by visualising where the real horizon would be, if the obstacle obscuring it were transparent.

"Pilots also need to make sure they place their aircraft in the correct position in relation to terrain.

"They should always make sure they have escape options if they run into trouble.

"And they'll always have options if they remain aware and alert, ensuring they're always in a position of responding, rather than reacting.

"They should anticipate difficulties, and come up with plans to escape them when needed."

In addition to these four principles, there are basic mountain flying exercises that anyone working towards a commercial pilot licence must complete. Carlton believes those who hold a private pilot licence, and have completed the PPL terrain and weather awareness training, would benefit from completing this further training as well – a minimum of 10 hours' worth.

"It will give them not just the basics to survive, but the competence to fly in mountains with more confidence," he says.

GPS is only part of the picture

Pilots are increasingly using GPS to get themselves around mountains. Sometimes this encourages them to be head down in the cockpit, rather than looking out. Or they don't plan their flights properly, feeling that with GPS, there's little need.

If the GPS database is out-of-date, or doesn't accurately reflect rising terrain, they can get into real difficulty.

"A GPS is only an aid to position knowledge," says Carlton. And it has no idea or awareness of the dynamic conditions of wind, lift, sink, poor visibility, or traffic ahead.

"Eyes outside, checking for any movement of the nose attitude, provides the most instant indicators of performance.

"By comparison, using the instruments as a primary indicator is subject to delays." »

Photo courtesy of Aaron Pearce

Risks for rotary

It's not just fixed-wing aircraft getting into trouble in the mountains.

The helicopter sector has seen a vast improvement in mountain flying standards since the introduction of more formalised training programmes, but CAA Flight Examiner (Helicopter), Andy McKay, says there's always room to examine past mistakes and improve performance.

"In 2018, the CAA conducted a more in-depth study of the fatal and non-fatal accidents occurring in mountainous terrain for the period 2000-2016.

"In the early days by far the most prevalent factor contributing to these accidents was the pilot's unrealistic expectation of the performance and power expected of the helicopter.

"They often didn't consider that, in summertime, on a higher temperature day with a low QNH in the hills, the performance of the helicopter was considerably degraded. Coupled with a lack of attention around wind and loading, the helicopter was pushed beyond its capabilities, and those of the pilot.

"Working backwards from the accident to its contributors shows that, instead of better planning, and building in a safety margin, there was more of a 'see how it goes' culture, leading to something that went horribly wrong."

These days, Andy sees far too many mountain flying-related incidents caused by inadvertent entry into IMC.

He echoes Carlton's sentiment that good planning and having exit options are the key to avoiding trouble, no matter what type of aircraft you're in.

"I like to use the three Ps when I talk about a flight in the hills. First is planning – understanding the weather and terrain you're flying into.

"The second is performance – understanding and actively considering both the limits of the helicopter, and you as the pilot.

"And the third is patience. In the commercial aviation world, we try to be as efficient as possible. But it's worth remembering that sometimes it's faster to slow down, or go around, or back off a load, than continually push the limits.

"If the weather is marginal, wait it out. Sadly, investigations of many weather-related accidents – particularly bad visibility – shows that 30 minutes after the accident, the weather cleared, and it would have been safe to fly."

Head in the clouds...safely

Such circumstances are a sobering reminder that mountain flying isn't to be taken lightly.

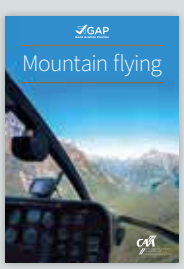
Carlton's fundamental message is, "Enjoy flying in the mountains, but make sure you have good training and are continually learning and improving your skills."

He says that, as your confidence grows, be aware of becoming complacent.

"In the beginning, natural fear means you keep wide safety margins. As your confidence grows, those margins tend to reduce – that's when you need to remember that every day is different, and Mother Nature can bite!"

// MORE INFORMATION

More mountain flying guidance



Check out the CAA's *Mountain flying* GAP booklet with the latest safety information to help you enjoy safe mountain flying. Download your own copy, or request a printed copy, at **aviation.govt.nz/education**.

Also take a look at the CAA's mountain flying DVD which is available to purchase from **videonz.co.nz**.

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Flight Advisor

Flight Advisor allows you to access low-level flight routes, lower-level NOTAMS, and use identified ground hazards and other flight advisories, from AirShare. (This new tool, developed by Aeropath and the NZDF, won the Civil Aviation Navigation Services Organisation Global Safety Achievement Award, in Geneva in early March 2023.)

flightadvisornz.io

"WORTH THEIR WEIGHT IN GOLD"

COCKPIT VIDEO RECORDERS

Three recent incidents have highlighted how invaluable onboard recorders can be.

During a recent agricultural operation, a helicopter experienced a partial engine failure. It was destroyed in the subsequent impact with the ground, but fortunately the pilot suffered only minor injuries.

In the operator's investigation, the onboard recorder validated the pilot's actions and was able to quickly confirm that nothing he'd done had caused the crash.

"When you're a pilot in an accident," says the operator, "you can start doubting yourself and what happened.

"But after looking at the footage, we could reassure the pilot that in the six to seven seconds between the engine failure and hitting the paddock, everything he did was spot on."

"Immediately black and white"

Although the investigation is still continuing, images of the gauges captured by the video recorder proved extremely useful, although a definitive cause for the engine power loss has not yet been absolutely determined.

The operator says their entire fleet has had cockpit video recorders installed since the Department of Conservation and Fire and Emergency NZ mandated in September 2021 that their personnel would no longer fly in aircraft without them.

"It was a huge cost," says the operator, "but it was worth it. It saved us time, resources, and money in our internal investigation, and that of the CAA.

"The engine was destroyed, so that would have slowed the investigation, and without the video recorder, we could only go off what the pilot said had happened."

The operator says the recorders are "worth their weight in gold".

"This was a very different experience from other incidents we've had over the years where there were no cameras.

"It's been hard in the past, because we've had to rely on the pilot's word against what the investigators think might have happened, and it can become a grey area.

"This way it was immediately black and white." »

Photo courtesy of Eye in the Sky

Proving the pilot had done everything correctly

Another organisation has found video recorders help them in unexpected ways.

"We installed video recorders because we were doing a lot of work for DOC and FENZ.

"It was a bit of an initial outlay, but we staggered the cost over time across our fleet."

After a component failure caused the crash of a LongRanger helicopter during an aerial spraying operation, video recorders proved to the organisation that the pilot had done everything correctly.

"The pilot did everything right, his training came into effect. There was no panic, he was calm. He didn't even swear!

"After the aircraft came to a stop at the bottom of the hill, he switched the fuel off, and radioed his ground crew.

"He handled the situation perfectly."

Another investigation by the same organisation discovered the same benefit of having onboard recorders.

"After a pilot flipped the wrong switch and inadvertently dropped a sling load in a river, we could see by the footage that he radioed the lead pilot to let him know what happened, then came back to the loading site to collect his ground crew, who he then flew back to retrieve the load from the river.

"This was exactly what we needed him to do."

The organisation says if their pilots haven't been doing things by the book, it's regarded as an opportunity to develop, not a disciplinary situation.

"It would be whole-company training if we found something that wasn't ideal."

The organisation also finds video recorders useful when pilots report an issue to the engineers.

"Our engineers have gone into the footage, just to have a look at the gauges, if the pilots are reporting something 'a bit funny' to them.

"It's not like we look at it every day or every check when they come in, but if the footage is needed, it's there."

Loss of tail rotor effectiveness?

Early in 2023, a Bell JetRanger was being flown by a (current, approved, and rated) private pilot, when the aircraft did two rapid right rotations during a flat, downwind approach.

Shamus Howard is the CEO and chief pilot of the operator of the aircraft, Aviation Training, operating under Parts 135 and 141.

"Unknown to us at first, someone external had caught the incident on video," says Shamus.

"Everyone who saw the video quite reasonably assumed the helicopter had experienced LTE – loss of tail rotor effectiveness.

"They assumed this because, particularly with the earlier JetRangers, the tail rotor needs to be applied early.

"Yaw on landings is best controlled, where possible, with gentle power management, as opposed to being heavy on the pedal.

"The pilot landed safely and immediately called me. He said he'd stuffed up, misjudging the wind. But as it spun, he'd remembered me verbally bashing him constantly in training, 'lower to live'. It worked immediately."

Shamus also initially believed the yaw was due to LTE, based on the pilot's recall and the external video.

"But then we viewed the cockpit footage. It was overtorque. We could clearly see the pilot was simply late getting in left pedal, then, when it didn't react, he freaked a bit and applied heavy right pedal, which of course exaggerated the yaw. But he lowered the collective lever, applied left pedal and fixed it.

"No hard landing, no damage. He dropped his passenger off, and flew home to debrief us."

Shamus says the overtorque would likely not have been identified by the pilot, because of the low all-up weight of the aircraft and the low density altitude.

"But the footage showed an overtorque of 123 percent. This is only fractionally over the limit of overtorque requiring just a visual inspection. Nevertheless it was over that limit, and we did have to do a full inspection and overhaul of various components.

"Some people reading about this might say it's a case against cockpit recorders. But the footage allowed us to accurately identify the issue, and appropriately debrief and discuss. We all learned a lesson, the pilot was provided with appropriate remedial training, and he's now back enjoying the skies.

"I would rather spend the money we spent and have a safe outcome, than have the money and not know the true cause of the yaw.

"We've also now got the best 'Jetty' on the planet!"

LETTERS TO *VECTOR*

Landing lights to avoid bird strikes

The latest *Vector* magazine (Winter, 2023) contained a letter regarding the use of landing lights to avoid bird strikes. I believe the writer has a valid point.

I spent 38 years flying for the airlines and retired from a major foreign airline five years ago. Our SOPs required us to use taxi lights, if required, until take-off clearance was received, then landing lights were required to be switched on, and left on, until passing 10,000'/F100.

On descent, landing lights were again required from F100/10,000' until clear of the runway. We had very few bird strikes.

In the five years since retiring, I've flown my own VFR aircraft around New Zealand, and still always operate with the landing lights on – partly to assist with being seen by others, but also to reduce the risk of a bird strike.

So far, no bird strikes.

Paul Jones
Blenheim

Get prepared for a *real* cyclone

Regarding the article "Lessons from a cyclone" in the Winter 2023 issue of *Vector*, no cyclone has ever hit New Zealand. All have been downgraded to tropical depressions well north of New Zealand. Gabrielle was downgraded from a category 1 cyclone to a depression somewhere near Norfolk Island.

Sure, it's good to magnify the noble and heroic actions of many in the aftermath of the huge flood disaster, but the only lesson learned here is that a true cyclone is still not understood by the media generally, and in this article once again. We are misinformed simply for the sake of attention-gathering headlines.

To be truly prepared, we need to understand what a cyclone really is and the appalling devastation it leaves behind.

Chris Batten
Silverdale

Solid briefings and proficient airmanship for post-Gabrielle separation

Regarding the "Lessons from a cyclone" article in the Winter 2023 issue of *Vector*, I was a little disappointed in the focus on compulsory ADS-B being the essential guide to aircraft separation.

Yes, ADS-B contributed, (especially enabling aircraft, outside those involved in post-Gabrielle support, to identify low-level helis). However, solid morning briefings and proficient airmanship coupled with clear taskings all contributed to no incidents or occurrences.

The first four days were far too busy to focus on ADS-B for separation. It was more a case of good airmanship, with eyes continuously scanning the horizon, and effective radio language. Certainly, ADS-B is a good secondary tool though.

The nomination of flight paths/routes were also key, while our NOTAM required just two radio frequencies – rather than three – to simplify procedure, while making sure all aircraft and their intentions were heard.

It was great to read about what happened at Hawke's Bay Airport, which contributed to safe, credible support work throughout the region. The Hastings airfield was the principal airfield and hub during and post-Gabrielle operations – FENZ, NZDF, St John, welfare, and UAV flight operations all being utilised out of the Rotor Force hangar.

There were up to 17 helicopters and upwards of 200 people daily in this facility for the first two weeks, conducting evacuations, people transfers, surveys, welfare flights, logistical support, medical support, infrastructure support, and media flights. Hundreds of tonnes of food, fuel, and numerous supplies were flown and distributed to our isolated communities.

An initial nightmare tamed to that of safe efficient support. Congratulations and respect to all pilots and crews involved.

Joe Faram
Hastings

// DEAR VECTOR...

Reader comments and contributions on aviation safety are welcome. Email **education@caa.govt.nz**.
We may edit or shorten letters, or decide not to publish.

WE'RE IMPROVING OUR ONLINE SERVICES

You'll soon be able to submit an online application for a new licence, or update your existing one.

We're rolling this out for pilots, LAMEs, and air traffic controllers over the next few months.

This is part of how the Authority is improving the way we engage with you.

You'll need to register to complete the online application, but it's easy. Just select the online services button from the home page to get started. You'll even be able to do it from your phone.

It's a better way to submit your application because you'll be guided through what documents you need to provide, and you'll receive notifications throughout the process.

DANGEROUS GOODS WORKSHOPS 2023

We're continuing our programme of workshops providing training and qualification for the carriage of dangerous goods (DG). The two-day course is targeted particularly at Part 135 and 137 operators who carry DG as part of their normal business, and is applicable to all personnel involved in the handing of DG. Private pilots and other commercial operators also require DG training, and should consider attending. Dates below.
To register, see **aviation.govt.nz/education > courses and workshops**.

Dunedin	
14–15 September	Scenic Hotel, Southern Cross
Queenstown	
09–10 October	Sudima Hotel, 5 Mile
11–12 October	Sudima Hotel, 5 Mile
Nelson	
30–31 October	Rutherford Hotel
Wellington	
14–15 November	Willeston Conference Centre
Christchurch	
28–29 November	AvSec office
Blenheim	
04–05 December	Scenic Hotel, Marlborough

OCCURRENCES DASHBOARD

These are the number and type of occurrences reported to the CAA, 1 April 2023 to 30 June 2023.

Occurrence type

6	**Aircraft accident**
45	**Aerodrome incident**
400	**Aviation-related concern** (of which 93 were laser strikes)
505	**Airspace incident**
549	**Bird strike**
236	**Defect**
13	**Dangerous goods occurrence**
6	**Hang glider accident** (of which 4 involved paragliders)
474	**Operational incident** (for example, encountering severe icing)
11	**Navigation installation occurrence** (for example, a transmitter failure)
2	**Parachute accident**
14	**Promulgated information occurrence** (for example, inaccurate weather information)

AVIATION SAFETY ADVISORS

Contact our aviation safety advisors for information and advice. They regularly travel around the country to keep in touch with the aviation community.

Carlton Campbell – Operations, South Island
027 242 9673 / carlton.campbell@caa.govt.nz

Richard Lane – Maintenance, South Island
027 296 5796 / richard.lane@caa.govt.nz

Pete Gordon – Operations, North Island
027 839 0708 / peter.gordon@caa.govt.nz

John Keyzer – Maintenance, North Island
027 213 0507 / john.keyzer@caa.govt.nz

AIRSPACE OCCURRENCES

Airspace occurrences can be read on the CAA website, **aviation.govt.nz > safety > airspace occurrence briefs.**

Date:	16 April 2023
Time:	10:15 NZST
Location:	Near Darfield
Airspace:	CH CTA/C
Nature of flight:	Private X-country

The aircraft briefly flew into a 1500' sector of the CH CTA/C without a clearance, near Darfield while flying a direct track from NZAS to NZOM.

The direct track near NZCH has the following CTA sector restrictions, not above; 5500', 3500', 2500' and 1500'.

The aircraft inadvertently entered the 1500' sector of airspace without a clearance, however the pilot soon realised and immediately vacated the CTA.

The pilot (and his instructor) have since analysed the error and advised CAA of several preventative safety actions intended to reduce the chances of repetition. They are:

- continuous monitoring of the flight, especially when near controlled airspace;
- writing down altitude restrictions on the flight log; or highlighting them on the VNC maps;
- avoid using the 'direct to' function without additional planning consideration, such as proximity to, or airspace restrictions; and
- planning routes to avoid controlled airspace (for example NZAS-Oxford-NZOM only has 3500' and 5500' sector restrictions).

Subsequently the CAA accepted the pilot's safety actions and did not investigate this occurrence further, beyond thanking him for his report and his proactive engagement with the CAA.

CAA occurrence number 23/2666

Date:	31 October 2022
Time:	12:30 NZDT
Location:	Oamaru (NZOU)
Airspace:	Unattended aerodrome occurrence – Class G airspace
Nature of flight:	Private

A dual training flight landed on grass runway 02 at Oamaru and was backtracking on the runway, because there is no associated taxiway. A Cessna 185 that had joined long final was then on short final for grass 02.

The taxiing aircraft expedited its taxiing to avoid a possible conflict. However, the C185 flew over them and landed late on the remaining runway. After the incident the C185 pilot allegedly told the instructor he didn't want to carry out a go-around because he thought there was enough runway left to land safely.

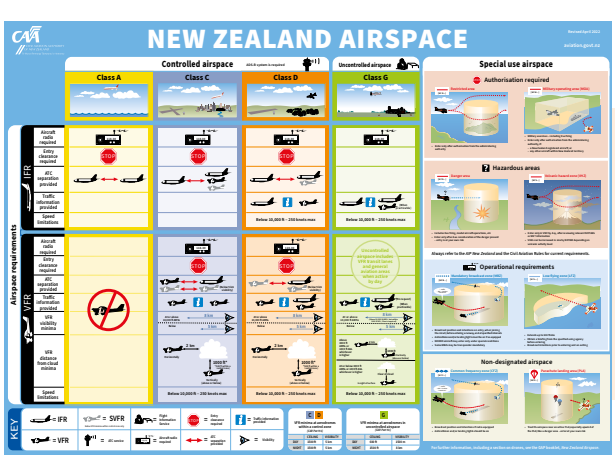
The CAA investigation pointed out to the C185 pilot that he had breached several rules by continuing to land on an occupied runway, and that a go-around was his last 'legal' option. The alternatives such as orbiting or slowing down earlier (if safe) were also discussed. They may have prevented him from having the occurrence in the first place, or he could have joined long final for sealed runway 36 instead, as the other aircraft was landing ahead of him on grass 02.

The investigation suggested to the QA manager of the other operator that having their pilots add the words 'will need to backtrack on runway 02', or words to that effect, to a downwind or a long final radio call, may help following pilots realise that a separation conflict may develop, and that they need to safely plan for such a possibility.

It is noted that this is not the only aerodrome or airfield in New Zealand where this scenario may occur.

The investigation was closed because the pilot is now fully aware of the relevant rules and what the appropriate and safer options are in the future.

CAA occurrence number 22/6687



New Zealand airspace poster

If you're keen for your own copy of our *New Zealand airspace poster*, download a digital copy or order a printed copy (A1 size only) at **aviation.govt.nz/education**.

ACCIDENT BRIEFS

More accident briefs can be seen on the CAA website, **aviation.govt.nz** > **safety** > **aircraft accident briefs**. Some accidents are investigated by the Transport Accident Investigation Commission, **taic.org.nz**.

Rans S-6ES Coyote II

Date and time:	22-Jan-2023 at 14:45
Location:	Oxford
POB:	2
Nature of flight:	Private other
Age:	81 yrs
Flying hours (total):	3180
Flying hours (on type):	720
Last 90 days:	40

The aircraft crashed on to a riverbed soon after taking off. After lift-off, the aircraft's climb profile was observed by witnesses to be shallower than it had been during previous departures that afternoon. The aircraft was observed to climb to approximately 30' to 50' AGL, pitch up slightly and commence a left turn before stalling and crashing on to an adjacent riverbed. The pilot was able to exit the aircraft on his own while the passenger was helped by first responders.

The aircraft had been operating from the airstrip for most of the day with two others, in wind conditions that were described by many as 'fickle'. Both runway vectors had been in use at various times because of the changing wind direction. The aircraft had been refuelled to half full capacity prior to the accident flight. However, the pilot considered the weight and balance to still be within the allowed limits.

During the take-off the pilot said it took longer to lift off and during the climb he observed that the view of the trees ahead and to the right 'looked different'. He said he became focussed on them and the need to turn left about 30 degrees to be over the adjacent river. He did not look at the airspeed or altimeter after that, but he remembered raising the nose of the aircraft slightly, and starting a slight left turn, at which time he noticed a slip to the left. The aircraft then stalled suddenly and dropped on to the riverbed.

In a later interview with CAA, after his own self-analysis, the pilot said he became alarmed soon after lift-off and that he felt startled by all the information he was faced with. He directly contributed his slow reaction time to his age (81), and he now accepted how things can go very wrong, very fast.

The investigation found that the most likely causes of this accident were a combination of:

- a high ambient temperature that reduced aircraft performance
- a likely tailwind component that changed the climb profile
- the startle effect and pilot's alarm as the flight conditions deteriorated.

The CAA investigator applauds the pilot for being so open and honest with regards to his self-analysis of the accident.

CAA occurrence number 23/364

Jabiru J160 U/L

Date and time:	15-Feb-2022 at 12:52
Location:	Mt Whitcombe
POB:	2
Nature of flight:	Private other

On 15 February 2022, two aero club members hired an aircraft to conduct a local private flight. The PIC decided to deviate from the original intended flight and venture into the mountains. The weather was reported as being clear skies and low winds. The PIC reported that they were tracking to Whitcombe Pass with the intention of crossing the Pass.

As they tracked towards it, the aircraft entered an area of downdraught. The PIC decided to conduct a turn with the intention of gaining sufficient altitude to enable them to cross the Pass. However, during the turn, the aircraft impacted terrain, coming to rest on the Ramsay Glacier. The aircraft sustained significant damage and the pilots received minor to moderate injuries. They were able to activate a personal locator beacon and make emergency radio calls. The pilots were located by a helicopter pilot working in the area and were subsequently transported by rescue helicopter to hospital.

The investigation identified:

- preflight planning did not include considerations for flight in mountainous terrain, as there had originally been no intention to go there
- the PIC did not actively consider the wind patterns in mountainous terrain that may adversely affect an aircraft
- the PIC did not have any recent experience in the mountains
- the PIC was not legally current at the time of the accident.

The pilot acting as passenger stated that they had no awareness of the proximity of the aircraft to terrain and was shocked when they hit the glacier, believing they had been higher above terrain. The passenger wondered if they had suffered from a 'white-out' type of illusion. The PIC did not feel they had suffered from this. However, this may explain why the pilot passenger did not take any action to alert the PIC to the proximity to terrain.

Lack of currency at the time of the accident likely led to the pilot not effectively considering the mountainous environment and the challenges this can present, and resulted in reduced capacity for effective decision-making.

CAA occurrence number 22/849

GA DEFECTS

GA defect reports relate only to aircraft of maximum certificated take-off weight of 9000 lb (4082 kg) or less. More GA defect reports can be seen on the CAA website, **aviation.govt.nz > aircraft > GA defect reports**.

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

Diamond DA 42

LWR Rudder Bellcrank Attch

Part model:	DA42
Part manufacturer:	Diamond
Part number:	D60-5710-20-00-NPC
ATA chapter:	2720
TTIS hours:	3187.5

During climb the pilot lost rudder control input. The lower carbon fibre bracket for the rudder bellcrank was found to have failed at the bellcrank attachment bolt hole, causing the rudder bellcrank to dislodge. The bracket was replaced as per the manufacturer's repair scheme.

Further investigation determined that the edge distance (distance from the centre of the hole to the edge of the bracket) of the hole was less than 10mm. The aircraft manufacturer recommended a minimum edge distance of 18mm for the attachment bolt hole. A loose attachment bolt and elongated hole may have also contributed to the bracket failure.

EASA issued AD 2023-0013 effective 1 Feb 2023 to address the potential for reduced edge distances in the DA 42 fleet.

CAA occurrence number 20/5291

Rainbow Skyreach BushCat

Wire terminal

ATA chapter:	7930

During a test flight following repair of the aircraft, and while in the mid-downwind position, the pilot declared a PAN due to a low oil pressure indication. ATC cleared the aircraft to land. No further assistance was requested. The aircraft landed safely a short time later and taxied back to the maintenance facility.

The maintenance investigation found that a wire on the oil pressure transmitter had detached, resulting in the loss of oil pressure indication. The wire was re-terminated, and oil pressure indication found to be satisfactory.

CAA occurrence number 22/1298

Piper PA-31-350

#2 Cylinder

Part model:	TIO-540-J2BD
Part manufacturer:	Lycoming
ATA chapter:	8500
TSO hours:	156.28
TTIS hours:	55532.05

A catastrophic engine failure on the left-hand engine occurred while conducting an air ambulance operation. The aircraft was IFR in VMC at 4000ft AGL. A MAYDAY call was made and the aircraft diverted, landing safely.

The initial maintenance investigation found that the #2 cylinder had separated from the crankcase as a result of the crankcase through bolts and cylinder base studs failing.

The CAA sent a failed through bolt and base stud to NZDF's Defence Technology Agency (DTA) for metallurgical assessment. DTA determined as far as practicable, that the through bolt and base stud had failed due to cyclic fatigue, with the through bolt most likely failing first.

CAA discussion with the NZ Lycoming representative determined that the crankcase past history (lives) was undetermined due to age. Apparently over time, the crankcases can warp which will reduce the tension on the through bolts and base studs. This can then lead to cyclic fatigue and failure.

The operator has decided to follow the engine maintenance provider's policy in that in the future, each engine being proposed for overhaul will be assessed on a case by case basis, giving consideration to engine type and number of previous field overhauls. A decision will then be made whether the crankcase through bolts and cylinder base studs will be replaced with new ones, although Lycoming allow inspection by NDT, or whether the engine will be accepted for overhaul at all.

CAA occurrence number 20/3037

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.

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2023 DATES AND PLACES OF *PLANE TALKING 2023* RADIOTELEPHONY SEMINARS

Rangiora – MainPower Stadium	Wednesday, 6 Sep	7:00pm
Canterbury Aero Club	Thursday, 7 Sep	7:00pm
Taieri – Otago Aero Club	Monday, 11 Sep	7:00pm
Wānaka – The Runway Lounge, Wānaka Airport	Tuesday, 12 Sep	7:00pm
Franz Joseph – Alpine Adventure Centre	Wednesday, 13 Sep	7:00pm
Greymouth – Greymouth Aero Club	Thursday, 14 Sep	7:00pm
Nelson – Nelson Aero Club	Monday, 25 Sept	7:00pm
Motueka – Nelson Aviation College	Tuesday, 26 Sep	5:30pm
Omaka – Marlborough Aero Club	Wednesday, 27 Sep	7:00pm
Kaikōura – Kaikōura Aero Club	Thursday, 28 Sep	7:00pm
Kāpiti – Kāpiti Districts Aero Club	Monday, 9 Oct	7:00pm
Masterton – The Hood Centre	Tuesday, 10 Oct	7:00pm
Hastings – Hawkes Bay and East Coast Aero Club	Wednesday, 11 Oct	7:00pm
Whangārei – Whangarei Flying Club	Tuesday, 24 Oct	6:30pm
Ardmore – Auckland Aero Club	Wednesday, 25 Oct	7:00pm
North Shore – North Shore Aero Club	Thursday, 26 Oct	7:00pm
Feilding – Feilding Aviation (Hangar #11)	Wednesday, 1 Nov	7:00pm
Whanganui – Wanganui Aero Club	Thursday, 2 Nov	7:00pm
Hamilton – Waikato Aviation	Tuesday, 14 Nov	1:00pm
Te Kowhai – Te Kowhai Aerodrome	Tuesday, 14 Nov	7:00pm
Matamata – Matamata Aerodrome	Wednesday, 15 Nov	7:00pm
Tauranga – Tauranga Aero Club	Thursday, 16 Nov	7:00pm

Find out more

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

Te Kāwanatanga o Aotearoa
New Zealand Government

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