Pointing to safer aviation

Summer 2022/23

vector

50 YEARS OF *FLIGHT SAFETY*

VFR into IMC Part Three

Why counting cycles counts

Night-induced spatial disorientation

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

// LITHIUM BATTERY FIRES DO HAPPEN HERE

// RAISING THE ALARM ACCIDENTALLY

// WHY COUNTING CYCLES COUNTS

Cover: The first issue of *Flight Safety* (November 1972), renamed *New Zealand Flight Safety* (50th issue) and renamed again *Vector* in November 1996.

Original cover design – Flight Safety Publications [ADRJ 18994 7/1/21 Pt 1 R16482181]. Courtesy of Archives New Zealand Te Rua Mahara o te Kāwanatanga.

See our cover story on page 3.

In this issue...

// VFR INTO IMC – PART THREE

vector

CIVIL AVIATION AUTHORITY OF NZ

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

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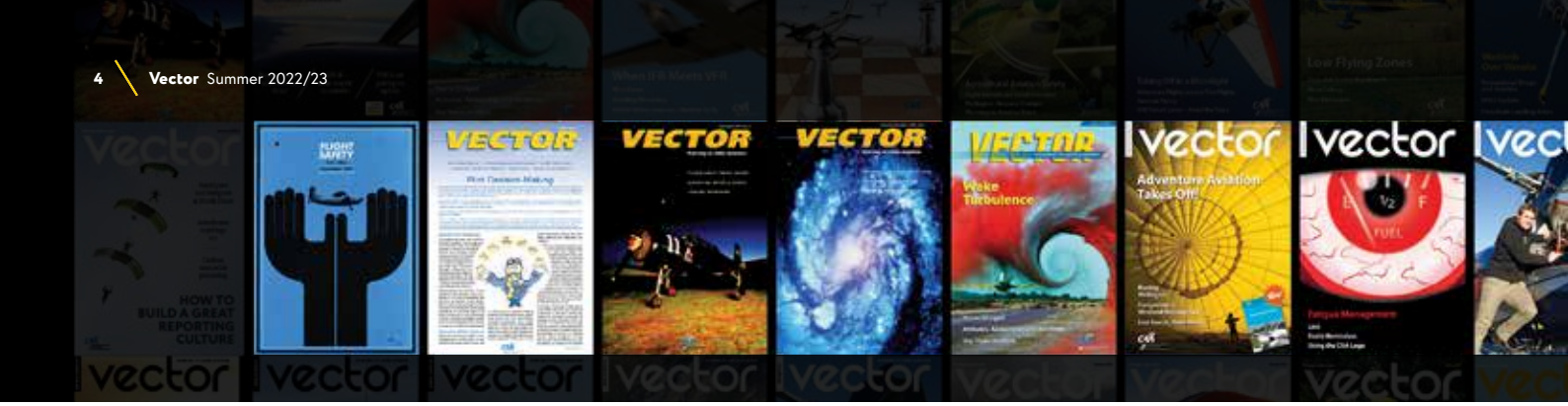
50 YEARS OF *VECTOR*

WHAT'S CHANGED?

Vector turns 50 this year. So, what has improved in the field of aviation safety since 1972? What's still a problem? »



Here are some of the aviation concerns catalogued in Volume 1, Number 1, of what was then called *Flight Safety*.

Mountain flying

The cover story was about a Piper Cherokee's fatal attempt to escape low-level turbulence in a mountainous area. The magazine noted that the pilot had prepared himself well, and was conscientious about keeping within VFR limitations.

He elected to "vacate in good time an area where flight conditions were unacceptable to him". But, tragically, he chose "an escape route which, in the prevailing conditions, took him into the rotor zone of a typical mountain wave system where the worst type of turbulence is normally present".

The magazine went on to say, "...it is essential that all pilots become thoroughly familiar with the basic theory of airflow over mountains and learn how to avoid the hazards".

Commenting on what's happened since 1972, CAA Aviation Safety Advisor Carlton Campbell says, "In the 15 years leading up to the introduction of a compulsory five hours of mountain flying training in the PPL syllabus – and an additional five for the CPL – there were 29 deaths in GA fixed-wing mountain flying accidents.

"Since then, there've been only four deaths in two such accidents, to my knowledge.

"So obviously things have improved greatly.

"I would, however, encourage any PPL candidate to get at least 10 hours training. The first five hours are, in any case, mandatory PPL training in terrain and weather awareness. Basic mountain flying exercises do not kick in until CPL training, but I recommend PPL-holders get this training anyway. It will give them, not just the basics to survive, but the competence to fly in mountains with more confidence."

Helicopter safety

Another article described a double fatality tragedy where two deer hunters, very experienced in the safe approach to a helicopter, inexplicably, made a direct approach to the aircraft, rather than from the side. They were killed on impact with the moving rotor blade.

A second accident involved an insecure loading procedure. Hardboard sheets had been fastened to the freight loading racks, but the downwash of the rotor blades blew the sheets away, creating asymmetrical loading, and resulting in an accident.

CAA stats indicate that from 1991-2005, there were 265 helicopter safety incidents either on the ground or in the air. Since 2006, there have been 959.

But CAA Flight Examiner (helicopter) Andy McKay says the almost quadrupling of the number of reported occurrences does not reflect a deteriorating safety culture in the helicopter sector.

"Reporting was virtually non-existent back then and the fleet size was less than half the size it is today.[1] Obviously, the combination of more reporting and an increase in the size of the fleet has led to the increase in reported occurrences.

"Things have, in fact, improved dramatically in the helicopter sector over the years."

Unauthorised mods

A third story concerned unauthorised modifications. A Schliecher glider crash was found to have been caused by a steel plate being welded to the skid shoe.

On take-off, it picked up an extra cable lying on the runway. At 800 ft AGL the winch crew realised there was a problem and cut both cables. However, towing 3000 ft of cable meant that the glider was difficult to control and eventually it stalled into a nosedive 30 feet above the ground. The pilot survived but suffered compression fractures to his lower spine.

John Keyzer has been visiting North Island workshops for nearly 15 years as a CAA Aviation Safety Advisor, and he maintained rotorcraft for 30 years before that.

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1 In 1995 there were 403 helicopters on the New Zealand aircraft register. In 2022, there were 932.

"Many years ago, the industry had, to some degree, a culture of 'giving it a go if we can get away with it'.

"We did not have a highly regulated industry, nor the oversight we must have today. Quite often, things just got done 'in accordance with a good idea'.

"Occasionally, today, the odd modification installed may not meet the current rule requirements."

"However, there's much more of a safety culture. And engineers' licences and livelihoods are too valuable to be jeopardised by doing something stupid."

Fuel management

Another article concerned three instances of fuel exhaustion.

Between 1993 and 1999, there were nine accidents because of fuel exhaustion, but none have occurred since then. However, reported incidents are still common. There were 20 in that same period and there have been 62 since.

John Fogden, the director of aviation auditing company Total Quality Aviation, says there appears to be a continuing trend of fuel-related incidents.

"These are possibly due to inadequate flight preparation or pilots allowing themselves to be distracted during refuelling, both of which have the potential to result in an aircraft accident with fatalities.

"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.

"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."

VFR into IMC

As pointed out in the Winter 2022 issue of *Vector* (*VFR into IMC - Part One*) the final main issue covered 50 years ago, was VFR pilots pressing on into hazardous weather.

In describing a fatal accident, *Flight Safety* said, "The warnings of deteriorating weather ahead were there, loud and clear in the nature of reports, and the continually worsening flight conditions".

What's happened since? Well, between 2000 and 2015 in New Zealand, 31 people died in about 15 CFIT accidents caused by the pilot pressing on into deteriorating weather.

According to the online aviation library, SKYbrary, 75 percent of global weather-related GA fatalities are caused by VFR-IMC events.

And it remains one of the top 10 worldwide causes of aviation accidents.

David Harrison, CAA Deputy Chief Executive (aviation safety) says that over the last half-century, New Zealand VFR pilots have become more aware of the dangers of going IMC, and have learned what to do instead, but not perhaps as much as they could have.

"Almost regardless of training, VFR into IMC occurrences are almost always about poor decision-making. And those poor decisions seem to come from some sort of self-induced pressure – to get home, to meet client expectations, to save time.

"I would also say that utter trust in an electronic device is potentially very dangerous. Two recent VFR into IMC tragedies have resulted from what appeared to be total reliance on electronic devices. They're wonderful aids to our situational awareness, but they can be inaccurate, and the VFR pilot cannot rely on them to make up for their lack of skills and experience flying in IMC.

"Take that pressure off yourself. Plan, know what to expect, don't completely replace looking out with relying on tech, and if unexpected IMC looms ahead, for goodness sake, just turn around – always have a plan B!"

Download or request a free copy of the Good Aviation Practice booklets, *Mountain flying*, *VFR MET*, and *Fuel management*, and the new poster *Safety around helicopters* at aviation.govt.nz/education.

LITHIUM BATTERY FIRES DO HAPPEN HERE

AvSec officer at Wellington Airport prevents catastrophic event.

When Wellington-based Aviation Security Officer Hayden Bradley started a 10am shift in February 2022, the last thing he expected was a lithium battery fire.

Senior staff had told Hayden in the past about the possibility of unstable lithium batteries, and to be mindful of screening for chargers that still had batteries in them. It had also been talked about in dangerous goods training, but he hadn't personally heard of such an incident before.

But, while scanning passengers' carry-on bags during the busiest part of the evening, the x-ray picked up four loose batteries, and two more in a charging device. Following protocol, Hayden re-checked the bag.

To his astonishment, there was smoke curling out of the bag, and underneath some clothes, he found a very hot and molten vape charger.

"I removed the batteries immediately to prevent further damage and to stop any ignition of the items. They were obviously extremely hot and melted through the PPE gear I was wearing.

// The startling find that ASO Hayden Bradley made, at the bottom of an embarking passenger's luggage.

"The passenger was as startled as me, and very apologetic.

"They told me the charger had been only recently plugged into the wall, and then put into the bag. They'd expected everything to be fine."

Geoffrey McConnochie, AvSec Team Leader at Wellington, says they find so many items of concern that they usually treat them like an everyday occurrence.

This incident, however, was different.

"The batteries and charger had already deteriorated, and the two components were the ingredients of a catastrophic event."

Geoffrey says the batteries were in a "volatile state".

"They contain acid which is corrosive, and the battery charger was still holding energy which would produce heat until all the power was released.

"All this corrosiveness and heat was wrapped in clothing, so the combination was highly flammable."

Is New Zealand complacent?

Catastrophic lithium fire events do occur on aircraft in New Zealand. In Kaikohe, in 2017, a fatal glider crash was caused by structural failure after one of the fitted lithium polymer batteries ignited.

While there've been no recorded lithium battery *fires* on New Zealand commercial aircraft, there have been four occurrences of thermal runaway[1] – the precursor to a fire – with accompanying smoke. One was during baggage loading, one at engine start-up, one just prior to pushback, and one during the climb.

CAA dangerous goods specialist Jim Finlayson says three of the four thermal runaway events were saved from becoming a full-blown blaze because the batteries were carried in the cabin, and detected by the passenger.

"This is why lithium batteries have to be in carry-on luggage. Thermal incidents should be seen and reacted to straight away. A battery in thermal runaway doesn't have the ability to eventually cool down."

Meanwhile, Fire and Emergency New Zealand has responded to 41 battery-caused fires this year. One, in July, was caused by an unplugged lithium battery, and it destroyed an entire house.

Lithium battery fires have become such an issue globally that air cargo logistics company, World Flight Services, are trialling dog detection of lithium batteries.

But there's resistance to the reality.

In 2017, the CAA's then dangerous goods specialist, Kate Madden, observed[2], "It's sometimes hard for people to comprehend that the lithium batteries in their cameras, power tools, and cellphones are considered dangerous goods when carried on aircraft".

That lack of comprehension extends to some New Zealand operators.

Jim says many go on the basis of, 'it won't happen to me'.

"Because people have carried lithium batteries for a long time without an issue, complacency is common.

"But lithium battery fires are like many things we train for in aviation – the possibility of it occurring is statistically low, but the potential outcome, if it does occur, is very serious – possibly lethal."

Without screening

Jim says international flights out of New Zealand, and between major domestic airports, are subject to AvSec screening. But other operators have to be vigilant about communicating and educating passengers on the dangers of lithium batteries, and the civil aviation rules about taking them on aircraft.

"Rules[3], policies, and procedures are there for safety.

"But it goes beyond basic compliance to be always striving for the best safety outcomes that we can. If that means taking a real good look at how we carry certain items safely, to the point of being pedantic about applying the rules, then we should do it."

Back at Wellington Airport, Geoffrey McConnochie says, "I was very proud of Hayden for acting the way he did.

"If this bag had made its way onto the aircraft, it could have, at the very least, caused a standard fire or even an electrical fire.

"We can only speculate what the outcome would have been – logic and experience tell me it wouldn't have been at all good."

Photo courtesy of Geoffrey McConnochie.

1 When handled improperly, or if manufactured defectively, some rechargeable batteries can experience thermal runaway resulting in overheating. Sealed cells will sometimes explode violently if safety vents are overwhelmed or nonfunctional. Finegan D.P. et al; 2015.

2 "Lithium Batteries – The Good, the Bad and the Ugly", *Vector*, September/October 2017

3 For specific guidance on carrying lithium batteries, refer to Section 7 of Advisory Circular AC92-2 *Carriage of dangerous goods*, pages 21, 24 and 25.

Photo courtesy of Mark Houston.

VFR INTO IMC

Part Three

It's not just VFR pilots who need to be aware of the dangers of entering instrument meteorological conditions.

In the second part of this series on VFR pilots entering instrument meteorological conditions, we said, "One of the surest ways of a VFR pilot dying in an IIMC[1] encounter is a lack of robust planning".

But planning to avoid IIMC applies to IFR pilots as well.

Operations Manager for the Hamilton-based Westpac Air Ambulance, Massey Lynch, trains VFR pilots to avoid IIMC.

To illustrate how even an IFR-rated pilot must plan, he uses the example of an Italian IFR AW139 pilot going IIMC, in 2017, resulting in the death of all six occupants.

"He was in an extremely capable aircraft," says Massey. "He was very experienced, and although not IFR-current, he was a qualified IFR pilot.

"Despite fog-like conditions at the time of departure, when visual reference was lost in snow, he may not have been prepared with an escape flight path, despite being in a familiar area. He may have attempted to continue to fly by visual reference after becoming lost and disorientated.

"The aircraft crew and patient, with nothing more than a broken leg, may well still be alive, if instead, he'd pre-planned an extraction and reviewed it, for familiarity, in the minutes before departure. Then, when he started to lose reference, he could have transitioned to instruments and climbed according to the extraction plan, likely a heading aligned with the valley.

"Better still, after planning the instrument extraction, his awareness may have been heightened about the severity of the conditions and the lack of good options, and he may have stayed on the ground."

The role of trainers

The online aviation library, SKYbrary, says pilots must understand that unless they're trained, qualified, and current in the control of an aircraft solely by reference to flight instruments, "they will not be able to do so for any length of time".

But the CAA's Chief Advisor of Human Factors, Alaska White, warns training can have unintended consequences.

"Instructors need to clarify for their students that, just because they become comfortable using instruments in normal flight, that does not mean they'll be proficient using only instruments in IMC."

"Otherwise your VFR student may begin to believe they are skilled enough using instruments to enter and deal with IMC." »

1 Also known by the ICAO term, UIMC - unintended entry into IMC

// Flying in poor conditions becomes 'the way things are done around here' //

The role of the commercial operator

In 2020, nine people were killed in a helicopter crash in California, including the basketball star, Kobe Bryant. The US National Transportation Safety Bureau found that the helicopter's operator, Island Express Helicopters, did not have in place a sound safety management process[2]. The NTSB said this contributed to the crash.

On the day of the fatal flight, the pilot only partially completed a flight risk analysis form, ignoring updated preflight weather information. This kept the flight risk score low enough that he didn't have to discuss the intended flight with his company's operations director, nor develop an alternate plan.

There was, the NTSB found, a lack of documented policy and safety assurance evaluations to ensure Island Express pilots were correctly completing the flight risk checklists. It said the operator should have made sure its pilots were "consistently and correctly completing the flight risk analysis forms...".

Back in New Zealand, some operators in the most complex environments haven't even started using preflight risk analysis.

CAA Investigator Jason Frost-Evans says a recent investigation identified an issue with operators not ensuring that appropriate meteorological information was provided to pilots.

"This issue appears to be widespread," he says. "Pilots need good information to make sound decisions [see sidebar]. But many certificated operators aren't even subscribing to the appropriate service, despite it being a necessary resource to ensure they comply with prescribed safety standards."

In the Autumn 2021 *Vector* article, "The braver decision", Jason said of pilots under operational pressure to fly in poor conditions, that if they fly – against their better judgement – and don't have any difficulty, next time they may be less concerned.

Eventually, Jason says, flying in poor conditions becomes 'the way things are done around here'.

Alaska White says such deviations from standards become institutionalised as a result of behaviour modelled to younger, less experienced pilots by the more proficient pilots that they admire.

"Or the pilot's under peer or management pressure, or they're complacent because they've not been caught, corrected, made accountable or faced negative consequences... yet.

Good information to make sound decisions

CAA Chief Meteorological Officer Paula Acethorp says some pilots are using free online weather tools that, "do a great job in their presentation of data, but rely on a single weather model that may not capture the current weather situation.

"Particularly on marginal weather days, these tools can't provide the whole picture that a pilot needs. They may indicate only whether it's likely to rain, but not what the visibility reduction will be, let alone what the expected cloud ceiling is.

"When using tools like these for flight planning, how will a pilot know they'll meet VFR requirements?"

Paula advises a better choice is a Part 174-certificated forecast, available to pilots via Part 174 briefing sites, listed in the *NZAIP*.

"These forecasts are created by considering a range of different weather models and comparing them with what the actual weather conditions are – which model is telling the most likely story?

"The forecaster then adds in further expert knowledge to account for details that weather models can't yet resolve, such as how the Nelson ranges can protect Wellington from rain during a wet, westerly flow."

Referencing Kobe Bryant's pilot, Ara Zobayan, not including more recent weather briefings in his flight risk analysis, Paula stresses the importance of checking for weather updates as part of preflight activities.

"Sometimes the weather doesn't evolve as expected, so the meteorologists issue forecast updates – or perhaps a new model run has come in, changing the timing of when a weather feature passes through.

"Pilots should make sure they have the latest forecast before taking off."

2 NTSB Report AAR2101

"Unless those pilots – and the supervisors who send them out into poor weather – are challenged and corrected by colleagues, peers and managers, their decision-making will further drift from safe practice.

"Their comfort zone for deviance expands until they completely lose sight of why standards and safety limits were there in the first place. Until it's too late."

The role of tech

Is there a role for technology in bringing down the number of pilots who inadvertently enter IMC, or who chance it deliberately?

New research from Griffith University[3] in Queensland thinks there might be.

"Continued education of pilots, aiming for behaviour change, continues to be important," says Anthony Stanton, lead author of the research.

"But our study – which was mainly of pilots who've at least once intentionally entered IMC, and who largely over-rate their flying ability – found that changing the attitudes of such pilots is up against some pretty resistant human thinking.

"Our research poses the question, 'How could technology help to change pilot behaviour, as they're making that decision to fly toward or near IMC?'

"For instance, ADS-B and electronic flight bags allow general aviation craft to transmit their location and be tracked. Safety systems could be developed by integrating normally unrelated information sources to provide a proactive adverse weather advisory service to pilots considered to be at risk of attempting entry into IMC.

"Any such service could be initiated by an air traffic controller, for instance, as the pilot is taxiing for departure. A sort of 'are you sure?' opportunity to give them pause about their decision.

"We're not proposing the exact science that could do this. But we hope aviation regulators worldwide will pick up the conclusions of our research and invite their tech industry to come up with some innovative ideas about how it might be developed."

The tech already with us

"If your operation is at high risk of IIMC," says Jason Frost-Evans, "then from a risk management perspective, you should equip with reasonably practicable risk controls.

"These could include flying two pilot, and/or with an autopilot which can stabilise the flight path and reduce the workload for the pilot flying.

"Or Synthetic Vision Systems – SVS – which combines three-dimensional data into pilot-friendly displays to provide improved situational awareness.

"Or the latest TAWS and helicopter TAWS – terrain awareness and warning system – which work out the precise three-dimensional position and speed of the aircraft in real time, relative to terrain height and locations of hazards, and give alerts if predetermined criteria are met.

"Remember the first rule of risk management is to eliminate the risk if possible. If you can't, then do everything else possible to minimise it.

"Pilots and operators need to employ everything available – psychological, operational, and technological tools – to bring down this seemingly resistant toll of tragic accidents."

// FOR MORE INFORMATION

Weather and aeronautical information in the one place: **gopreflight.co.nz**

56 seconds to live campaign
United States Helicopter Safety Team
ushst.org/56secs

178 seconds to live video
Civil Aviation Safety Authority YouTube video

Download or request a free copy of the Good Aviation Practice booklet, *VFR MET*, at aviation.govt.nz/education.

3 Stanton, A. A, (2022) 'Gathering Clouds' A study of plan continuation, risk, rules and pilot behaviour, [Unpublished doctoral dissertation]. Griffith University.

RAISING THE ALARM ACCIDENTALLY

Emergency locator transmitters (ELTs) inadvertently activating are an ongoing problem in the aircraft maintenance sector.

Photo courtesy of Primary Avionics.

First, a personal story

// By CAA Aviation Safety Advisor (and former 14,000-hour agricultural pilot) Mark Houston

Some years ago, I was charged with delivering my usual aircraft to a 'north of the South' maintenance workshop for overhaul.

After handing over my aircraft I was directed towards my temporary replacement machine – a PL-12 Airtruk, being reassembled after maintenance – which I'd never flown before.

I noticed the emergency locator transmitter had been fitted high in the rear of the fuselage pod, and the aerial was attached just above it on the upper surface. It was a known ELT and I checked that it was set to 'off' while the machine was in the workshop.

After reviewing the flight manual, talking to another pilot who'd flown the PL-12, and passing a test with him about the systems and speeds, I was ready to fly.

My preflight check was probably the most comprehensive I've ever carried out, and included the ELT, which had been switched to auto when 'Chiefy' – the chief engineer – had been conducting ground running and other checks.

After I got it started and spent some time taxiing around the aerodrome and conducting high speed taxi runs, I ran through the flight manual checklist, then lined up on the active strip.

Off I went, and it was different and a little confusing, but it had delightful handling and was stable.

I landed and taxiied back, to be met by Chiefy, who advised that the ELT had activated on take-off, and continued for the whole 30-minute flight, which left most of the aviation-related folk around the place very grumpy with me. (These were the days when having a VHF radio in an agricultural aircraft was deemed useless and not cost-effective, so we didn't have them, including in this PL-12.)

If I'd had a radio, I would have completed a check on 121.5 for inadvertent ELT activation (IELTA) before departure.

Chiefy said that it looked like that ELT was "stuffed", so he quickly found me a new one, fitted it, tested it, taxiied it, and pronounced it fit for flight. I also conducted a successful ELT-test circuit.

I filled up with fuel, got my bag in the back, glared at the new ELT – willing it to behave – climbed up the side of the machine, and with a cheery wave, blasted off for the journey south.

I went around the Kaikouras and spent a few minutes watching the whales, before tracking to Rangiora and West Melton, where I was to have role equipment fitted at another maintenance shop.

When I landed at West Melton, the chief engineer there gave me a curt hand signal to stop and turn off the engine.

Just as the engine clamour died down, I was startled to see and hear an RNZAF Friendship at a very low level, passing directly over the PL-12.

Second Chiefy yelled at me, "Don't touch a bloody thing, and climb down!"

He told me that the ELT had activated just after getting airborne and stayed that way for the hour and a half flight to West Melton!

The RNZAF had spent considerable time and money in tracking me down and confirming that the ELT was actually moving.

Their flypast was, therefore, not a welcome, but rather a statement. And the lovely chap at the Rescue Coordination Centre was also less than conciliatory.

He understood, however, that it was inadvertent, as acknowledged by Second Chiefy (he'd sighted the ELT switched to auto).

We later conducted an air test with Second Chiefy in the rear fuselage pod, with a hand-held VHF to monitor the ELT, and make appropriate switch changes as required.

After the flight, he said the ELT and its cradle were physically moving in sympathy with aircraft vibration and buffeting airflow. It activated after power was reduced after take-off, and the airspeed leaped from 70 to 80 knots.

The ELT was relocated, and a test flight was found to be satisfactory.

Considering the involvement of RCCNZ and RNZAF, I also purchased a VHF hand-held radio and monitored the ELT and other air traffic until the aircraft operator relented, and fitted a VHF in the aircraft.

Moral of the story

Just because you can't see it, don't forget the ELT. Check its functionality when you're going flying and when you get back.

It's a fantastic tool in your safety toolbox, so make sure it's going to operate when you most need it. »

// In action after an activation is (from left) former RCCNZ Watch Leader Ramon Davis, Senior Search and Rescue Officer Conrad Reynecke, and Search and Rescue Officer Dougal Cockrell.

Activation in workshops

Adam 'Sammy' Seumanutafa, from Primary Avionics, says their workshop sees inadvertent activations relatively often, usually when an aircraft comes in for its regular inspections.

"The ELTs are often installed in hard-to-reach places, so if they're accidentally activated, it can take some time to access the ELT to switch it off."

Sammy says, in a recent event he noticed the ELT had been removed from its cradle on a helicopter in for repairs.

"It was dangling by its electrical connections. Disconnecting the ELT and storing it safely would have been a much better option, considering how easy it is to do.

"If the connections had given way overnight and the ELT dropped and activated, who would be the person getting the phone call?"

The person at RCCNZ, that's who

Every year, countless inadvertent activations mean the RCCNZ is alerted to get out and rescue aviation participants who don't actually need rescuing.

"RCCNZ Project Lead Rodney Bracefield describes the first 19 days of October 2022.

"We've had 17 inadvertent activations – nine during maintenance, two on US aircraft in McMurdo Sound (Antarctica), two Australian-coded ELTs, two in Papua New Guinea, one in Canada, and a discarded Warbird 121.5 MHz ELT eventually found in a rubbish bin at Ardmore. We've had three genuine aircraft accident activations!"

(These activations, genuine and inadvertent, were among 67 total beacon alerts – aviation and non-aviation – for the same period.)

Rodney says that to try to prevent unnecessary rescue callouts, it's important to leave your aircraft maintenance, checks, and repairs to the professionals.

"If you're an aircraft maintainer or engineer, check AIP GEN 3.6 - 14 (6.4 *ELT Testing*) and make sure you have access to the ELT before you do any testing, so you can readily deactivate it, if it goes off.

"If you're doing any modifications or repairs, it's always best to disconnect the ELT before starting work.

"Also, make sure your receiver is set to the 121.5MHz frequency (the guard frequency) so you can be made aware if your ELT does activate accidentally."

Rodney says that inadvertent activation of ELTs is a mostly avoidable occurrence.

"But the false alarms continuing to plague RCCNZ every year waste valuable time, money, and people-power.

"Take the time to check your ELT is disconnected before carrying out any work and let RCCNZ save the people out there who really need saving."

Comments or queries?
Email **education@caa.govt.nz**

BVLOS IS HERE

Read your NOTAMs and Supplements!

Beyond visual line of sight uncrewed flights are happening right now. Here are some tips to share the sky.

Always be prepared

Right-of-way rules give piloted aircraft precedence over UA (uncrewed aircraft) and UA have to remain clear of crewed aircraft. But good airmanship, and the see and avoid principle, means always being prepared to take action to ensure separation.

Keep ADS-B OUT on

For UA to give way to piloted aircraft, they'll need to detect and avoid you. One of the ways they'll do this is by detecting your ADS-B OUT signal. Keep it switched on, whichever airspace you're in.

Some UA may themselves be equipped with ADS-B OUT. Take advantage of this by using ADS-B IN to help your own situational awareness.

NOTAMS

Uncrewed aircraft may be large. They may be faster than your aircraft (or much slower). And they may be authorised to operate above 400 ft. Knowing where UA are operating should be part of a thorough preflight, and it's critical to check NOTAMs and AIP Supplements before your flight.

New aeronautical tools to help

PreFlight (gopreflight.co.nz) combines aeronautical and MET information into one online tool.

Flight Advisor (flightadvisornz.io) allows you to access low-level flight routes, lower-level NOTAMS, and user-identified ground hazards and other flight advisories, from AirShare.

Some things don't change

BVLOS operators who interact with traditional airspace users often use flight radio, and the UA operators conducting complex operations are required to be competent in radiotelephony – so communicate as you would with a piloted aircraft.

You might be surprised how normal it is!

Get your new

Check NOTAMs poster from inside the back cover of this magazine. It's perforated at the spine so it's easy to remove.

You can also download a digital copy, or request a free printed A3 copy, at aviation.govt.nz/education

WHY COUNTING CYCLES **COUNTS**

Another cautionary tale for you, if you're the operator of an aircraft.

We've said it many times before in *Vector*, and here it is again. The airworthiness of an aircraft is the responsibility of the operator.

If that's you, you're responsible for, among many other things, accurately recording how long an aircraft component – that has a life limitation or is subject to overhaul – has been in service on, or in, your aircraft.

You may also need to take into consideration what your aircraft is being used for, because the life of some components may be subject to, or affected by, operational conditions.

An aircraft component remaining in service beyond a mandatory replacement interval represents a serious safety risk.

There have been incidents and accidents, mainly overseas in certain sectors of aviation – for instance, mustering and fish spotting – as a result of operators not wanting to adhere to life limitations.

It's clearly critical to the safety of your aircraft, and to that of everyone flying in it, that you manage this risk well.

As the name suggests, the *Instructions for continuing airworthiness* (ICA) of the aircraft and its components provide you with the details of the maintenance required to keep the aircraft airworthy.

These will normally be found in the aircraft or engine maintenance manual, usually in Chapter 4 and Chapter 5.

This maintenance, such as inspections, and replacement of components, carried out by the maintainer, are scheduled by you, the operator, based on information such as flight times and cycles, that you provide to the maintainer.

So it's vital that you record – in the tech log or an approved alternative – all the information the ICAs require – for example, engine starts, take-offs and landings.

The requirement for capturing this information extends beyond the aircraft and its components, to role equipment such as cargo hooks and winches. Each of these components has an ICA telling you which information is necessary to record.

Some components, such as turbine engines, will require you to calculate and record part cycles. How you identify those part cycles can vary from simply reading off the aircraft's automated recording system to a relatively complex calculation using flight details recorded by the pilot.

Whichever is the case, the method for calculating cycles, and the actions to be taken based on those cycles, will be detailed in the aircraft or component ICA.

iStock.com/Ryan Fletcher

If you don't have access to the aircraft ICA, or are unsure what information should be captured, ask for help from your maintainer or training provider.

It's too important to ignore.

> // It's clearly critical to the safety of your aircraft, and to that of everyone flying in it, that you manage this risk well. //

This is one reason why

Many years ago, CAA Aviation Safety Advisor, John Keyzer, was overseas carrying out a pre-purchase inspection of a Bell 206L for his employer.

As always, it involved a thorough condition inspection, as well as a full review of the documents relating to previous maintenance and component history. This included looking at all the component history cards.

John identified that the engine turbine assembly had previously been fitted to another aircraft. This in itself was not a problem, because the hours and start cycles had previously been correctly recorded on the loan turbine.

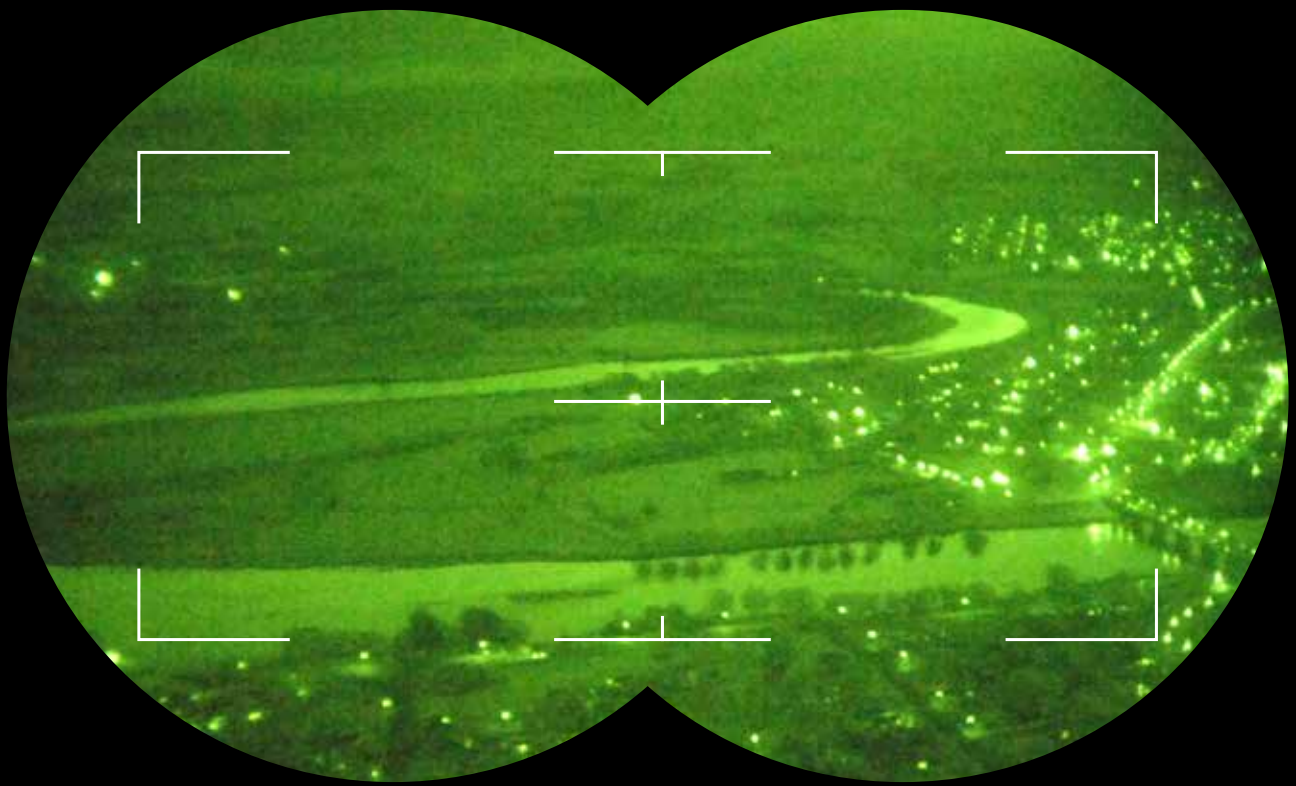
But when the loan turbine was removed some 500 hours later, those 500 hours had been added to the turbine's total time, but the total number of cycles had not changed.

John took this as a possible indication that the operator had not been recording start cycles, as there was now no accurate record of the total number of cycles on the turbine wheels – which is a life limitation.

If they couldn't be determined, there was a high probability the wheels would need to be changed out.

John's organisation didn't buy that particular Bell.

Comments or queries?
Email **education@caa.govt.nz**



NIGHT-INDUCED SPATIAL DISORIENTATION

A fatal accident in Canterbury and a close call near Murchison illustrate how a straightforward night flight can descend into killer spatial disorientation.

Photo supplied.

About 2045 hours on a mid-December 2020 night, a BK117 B-2 helicopter lifted off from Nelson Airport to uplift a patient from Murchison and fly them back to Nelson.

On board were the 9200-hours pilot, a 2000-hours crewman, and an intensive care paramedic.

Picking up the patient after a non-eventful outward flight, the crew began the homeward journey to Nelson Hospital.

The weather was clear and calm and the pilot and crewman were wearing night vision goggles (NVG).

During the 120-kilometre journey north, the pilot's attention was partially diverted by a persistent band of light reflecting on his side of the windscreen. All three crew tried to identify the source of this light because it was degrading the pilot's visual picture[1].

As he flew on, the pilot's attention was further divided. He was trying different ways to improve the visual picture of his surroundings, diminished by that band of light. He was still trying to identify what it was. And he was also navigating towards a narrowing valley near Kawatiri Junction, which was further reducing the quality of visual conditions, due to the lack of ambient light.

The pilot slowed the aircraft, and descended from approximately 1000 feet AGL to 500 feet. But then he had another problem. Both he and the crewman noted their NVG visual picture seemed to 'darken off', and it further deteriorated due to oncoming headlights along State Highway 6.

Swiss Cheese. Aligning holes.

The pilot slowed again and descended. The crewman noticed this and also that the pilot's demeanour had altered. They'd flown together for years and the crewman was able to identify the pilot "just wasn't himself".

"His physical posture was altered; he was turned and had his head lowered, attempting to look under the reflected light. He was quieter and preoccupied.

"His brain was having to interpret the images he was 'seeing' through the goggles, and he was having to deal with the mystery band of light. There were differences in switch operations between this machine and our regular aircraft, and on top of it all, a shiny dash-mounted vinyl map pocket was reflecting light on to the pilot side of the windscreen. It all came together in the worst possible Swiss Cheese moment[2]."

Recognising that the pilot was probably suffering from task saturation[3], the crewman began to talk to him about whether to land or turn around.

"I have been taught some important aviation skills by pilots over the years, so I was trying to relieve some of his mental workload, and trying to gauge his level of overload as well as getting him focussed."

A subsequent safety investigation into what happened next, says, "It's likely, based on the indicators identified, that the pilot had lost situational awareness at this point".

As the crewman attempted to engage the pilot in a discussion of options, headlights from an oncoming vehicle on State Highway 6 threw the pilot into full spatial disorientation.

"I realised what was happening and just became his 'eyes and brain' as we fought to regain control of the aircraft.

"I was reading data off the gauges and instructing him as to what control movements to make. I was making urgent 'positive voice commands' for him to climb – to counteract the aircraft's rearwards and sideways movements."

It took nearly 90 frightening seconds to regain control.

"We landed as soon as safely possible and called for a road ambulance to pick up the patient and medic.

"The pilot had the presence of mind to immediately take photos of the conditions through his NVG to show it wasn't a weather/IMC event.

"The event had a big effect on all of us for some time, but it's made us more risk-averse in our night flying decision-making. We're more conscious of verbalising our situation and we do it more readily. We're talking more about the flight, the conditions, our options, how we're feeling, and we regularly fact-check each other."

The role of fatigue

In late November 2019, a visual flight rules CPL student was 25 minutes into a solo night flight, when inexplicably, his Cessna 172 entered a high-speed spiral dive, impacting a Lake Ellesmere sandspit, and killing the 23-year old.

A CAA safety investigation concluded the 206-hours student was fatigued, and was also likely experiencing visual and sensory illusions. »

1 This was eventually identified as the reflection of the rear tailight, the assembly of which was incompatible with a certain class of NVG.
2 The Swiss Cheese Model of Accident Causation. skybrary.aero > articles > james reason-hf-model.
3 'Task saturation', according to the US-based National Business Aviation Association, is "having too much to do without enough time, tools, or resources to do it."

He'd completed a successful cross-country flight test that morning, and returned to the organisation's base about 1630 hrs to prepare for a solo night flight in the aerodrome circuit later that evening. He was unable, however, to obtain a solo circuit training slot so he was authorised by his training school to fly in a local training area instead.

About 2140 hrs, he took off from Christchurch aerodrome. The night was clear with unlimited visibility.

The subsequent safety investigation found that, after a series of turns, "The aircraft started losing height as soon as the [final] right turn was begun. During the last 30 seconds, the height loss and change of direction both increased exponentially until the aircraft impacted the sandspit in a steep nose-down spiral turn. The average rate of descent over this time was calculated to be approximately 4500 feet per minute".

Such were the impact forces, some parts of the aircraft were found almost 60 metres away from the main fuselage.

Physically and mentally overwhelmed

There was no failure found with the aircraft. The pilot was competent and current. The post-mortem had no adverse pathological or toxicological findings. The pilot had no pre-existing medical condition that may have contributed to the accident. He'd formally declared himself fit to fly, using his provider's preflight checklist.

The safety investigation concluded that in fact, the student had likely been affected by visual and sensory illusions.

The subsequent report noted that, "Many types of visual and sensory illusions can affect a pilot, particularly if flying visual flight rules at night, with reduced external visual references".

The Good Aviation Practice booklet, *Night VFR*, also describes environmental features that can lead to pilot disorientation. "Large areas of water can be hazardous because of loss of horizon, lack of landmarks for situational awareness, and reflections of stars can contribute to disorientation."

As the safety report notes, "All these features were present during the final right turn leading to the departure from controlled flight".

The safety investigator, Peter Stevenson-Wright, says, "The final turn was conducted away from the bright lights of Christchurch city, towards the relative darkness of the Akaroa Peninsular and Pacific Ocean in the east. There would have been very few significant visual lighting clues for the student to reference during the latter stages of this turn.

"Absence of visual references can contribute to the onset of visual and sensory illusions. Sensory illusions caused by fluid movement in the ear's vestibular canal can be overwhelming."

The Australian Transport Safety Bureau describes three types of spatial disorientation (SD), with Type III being the most extreme.

"The pilot may be aware of the disorientation, but is mentally and physically overwhelmed to the point where they are unable to successfully recover from the situation. They may freeze at the controls, or make control inputs that tend to exacerbate the situation rather than effect recovery from it. The pilot may fight the aircraft all the way to ground impact, never once achieving controlled flight.

"Such forms of disorientation are a result of breakdowns in the normal cognitive processes, possibly due to the overwhelming nature of the situation, especially if other factors such as fatigue and high workload are also present."

"[This form of SD] closely resembles the scenario that available evidence suggests may have contributed to this accident," the Lake Ellesmere safety investigation report notes.

As to fatigue, the report notes that flying exams are generally quite stressful, placing more mental burden on the pilot than a training flight.

"It's likely that by the time of the night flight," it concludes, "the student was suffering a level of fatigue from the long duty day and the earlier flight test."

CAA Chief Advisor of Human Factors, Alaska White, says the effects of fatigue are a well-known threat to aviation safety.

"Fatigue can lead to the failure of pilots to recognise a rapidly changing environment, and it can slow and degrade a pilot's decision-making response times. Fatigue causes them to be more prone to making errors and even worse at detecting them, once they've happened."

It can happen to any pilot

Peter Stevenson-Wright says such illusions can occur, regardless of a pilot's experience or the aircraft's instrument panel design.

The safety investigator who reviewed the Nelson to Reefton occurrence, Siobhan Mandich, agrees.

"The ATSB research shows that experience does not protect a pilot from spatial disorientation. It's not always the junior pilot who gets disorientated – some studies show the more at-risk pilot is the highly proficient one.

"Disorientation can affect any pilot, any time, anywhere, in any aircraft, on any flight, depending on the prevailing circumstances.

"And a pilot's experience of disorientation does not mean it will never happen again to them. It does, however, allow the disorientation phenomenon to be recognised more readily in the future. Awareness and preparedness are key elements in preventing a spatial disorientation accident."

According to the ATSB, there are many steps pilots can take to minimise their risk of experiencing spatial disorientation.

"Many of those involve preflight planning and adequate preparation," says Siobhan. "Being aware of the risk of spatial disorientation is one of the key elements in preventing an SD accident. Increasing awareness of spatial disorientation illusions is essential. In the preflight planning process, plan for their possible appearance at different stages of flight.

"It's getting the crew to talk about what scenarios they may experience on a particular night, based on various factors – moonlight, geographical location, weather, for instance – and discussing what cues to look for to identify the onset of the loss of situational awareness that could lead to SD – as mentioned in the first story.

"That means the crew have that fresh in their minds during that flight, making it easier to pick up on."

There are very few loss of situational awareness or spatial disorientation incidents reported to the CAA.

These incidents highlight valuable information on how loss of situational awareness can lead to spatial disorientation, and what the indicators are that can be detected and ultimately recovered from.
The CAA encourages participants to report any loss of situational awareness, or spatial disorientation events, to enable accurate guidance material to be provided.

// MORE INFORMATION

For your free copy of the *Night VFR* Good Aviation Practice booklet, complete the order form at aviation.govt.nz > order publications.

Comments or queries?
Email **education@caa.govt.nz**

YEAR-END LICENSING REMINDER

The last day for issuing licences in 2022 will be 23 December. Licences will again be issued from 9 January 2023.

Licence applications are dealt with on a first-in, first-processed basis. Calling the licensing unit doesn't give your application greater priority, and only takes staff away from processing applications.

If you're applying for a new licence, you'll need to satisfy the Director of Civil Aviation that you meet the 'fit and proper person' (FPP) requirements of the Civil Aviation Act 1990. Obtaining the necessary information can take several weeks. As a rough guide, allow up to six weeks before your flight test to complete the FPP process.

If you need to renew your medical certificate, take into account the time that may take, particularly if you require a specialist examination.

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.

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

Mark Houston – Operations, North Island
027 221 3357 / mark.houston@caa.govt.nz

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

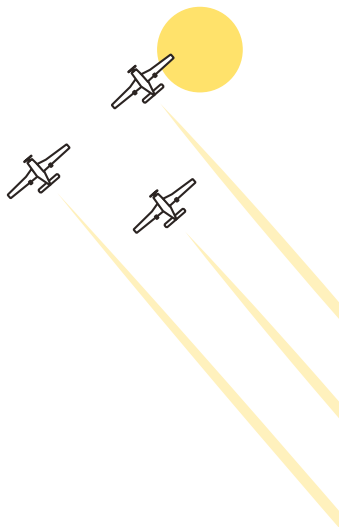
NEW GAP BOOKLET: *MEDICAL MATTERS*

Safe flying starts with you.

This new Good Aviation Practice booklet explains all things medical – from types of medical certificates and the application process, through to how endorsements work and how to renew your medical. There's also information and advice about human factors, and where to look for more information.

Go to **aviation.govt.nz/education** to download a digital copy or to order a printed copy.

SUMMER FLYING



Great Northern Air Race
28 to 30 January 2023
NORTH SHORE-THAMES-ROTORUA-TAUPŌ-GISBORNE-MATAMATA-NORTH SHORE (Route A)

North Shore-Thames-Rotorua-New Plymouth-Hāwera-Matamata-North Shore (Route B)
Route depending on weather conditions

WAIRARAPA
Wairarapa Balloon Festival
6-10 April, 2023
Masterton, Carterton, Greytown, Martinborough

WHANGANUI
First in the world fly-in
1 January 2023

MURCHISON
National hang-gliding championships
2-11 February 2023

WĀNAKA
National paragliding championships
7 January 2023

BALCLUTHA
Tiger Moth fly-in and AGM
3-5 March 2023

WAIPUKURAU
Gliding NZ central districts regional champs
18-24 February 2023

OMAKA
Classic Fighters
7-9 April 2023

Flying NZ national champs
7-10 February 2023

OMARAMA
Gliding NZ South Island regionals
3-10 December 2022

Youth Glide New Zealand camp
12-16 December 2022
9-13 January 2023

Gliding NZ multi-class national champs
20-29 January 2023

MATAMATA
Youth Glide New Zealand camp
12-16 December 2022

2023 Walsh Scout Flying School
6-20 January 2023

Gliding NZ club class national champs
3-12 February 2023

Gliding NZ Grand Prix
19-26 March 2023

DRURY
Auckland Gliding Club competition
1-7 January 2023

MASTERTON
Wings over Wairarapa
24-26 February 2023

NZ Aerobatic Club national champs
1-5 March 2023

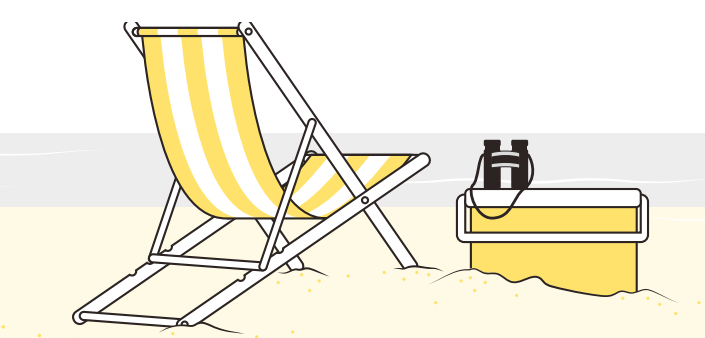
MOTUEKA
Aerodrome closed for drag racing
7 January, 4 February, 8 April 2023

ASHBURTON
SAA Great Plains Fly-in
3-7 February 2023

CARTERTON
Model flying NZ national champs
2-6 January 2023

DANNEVIRKE
Autogyro Assn fly-in and AGM
29-30 January 2023

WOODBOURNE
NZ Cadet Forces (ATC) national aviation course
10-20 January 2023



OCCURRENCES DASHBOARD

These are the number and type of occurrences reported to the CAA, 1 July 2022 to 30 September 2022.

Occurrence type

15	**Aircraft accident**
32	**Aerodrome incident**
358	**Aviation-related concern** (for example, complaints about low flying)
346	**Airspace incident**
485	**Bird strike**
268	**Defect**
15	**Dangerous goods occurrence**
14	**Hang glider accident** (all 14 involved paragliders)
417	**Operational incident** (anything not fitting into any other category – for example, a go-around)
21	**Navigation installation occurrence** (for example, a transmitter failure)
4	**Promulgated information occurrence** (for example, inaccurate weather information)

NEW SAFETY EDUCATION POSTERS

Our poster range has been updated with:

Check NOTAMs

I'M SAFE
Am I fit to fly?

I'M SAFE
Am I fit to work?

Go to **aviation.govt.nz/education** to download a digital copy or to order a printed copy.

There's also a copy of the *Check NOTAMs* on the inside back cover of this issue of *Vector*. You can easily remove the poster from the magazine by tearing along the perforated margin.

AIP CUT-OFF DATES FOR 2023

Visit **aviation.govt.nz/aip** to download the AIP production cut-off dates for 2023.

The CAA cut-off date is the final date for receiving submissions. Submit your planned changes well before this date, especially when you may have many changes or if they're complex, including the development of AIP charts and SUP graphics.

If your changes require the CAA to consult externally (for example, airspace changes or hazards, air shows, or other complex changes), the proposed changes should be sent to the CAA well before the CAA cut-off date. This ensures there is sufficient time to assess the proposed changes and complete consultation if required, before a change is published.

Remember: To promulgate changes to aeronautical information via AIPNZ and NOTAM, your details must be up-to-date in the AIM (Aeronautical Information Management) register of authorised originators. Go to originators.aeropath.co.nz for more information.

NEW INTERACTIVE APPLICATION FORMS NOW LIVE

If you're renewing or amending your certificate, you'll find some of our website application forms, and rule checklists (renamed from 'compliance matrix'), completely revamped. They're more user-friendly, easier to understand, more logically laid out, and you can download them to complete and email to us.

So far we've re-done the applications and rule checklists for Parts 119, 121, 125, 135, 137, 108, Part 91, and the Section 37 *Petition for exemption* form. We've also revamped the Part 92 carriage of dangerous goods rule checklist, and split the Part 91 approval or amendment of maintenance programme into two forms – one for hire or reward aircraft, and one for private operator or non-hire or reward aircraft. We plan to overhaul more certification forms in the coming months.

We're still going to need a lot of information from you, however, because aviation is complex and there's a lot we need to assess to comply with global regulations.

But by using these forms, you'll be making a great start to getting your application under way. And it will potentially save you time and stress.

LETTERS TO *VECTOR*

The importance of checking wiring

I want to endorse Philip Hutching's article "Ageing aircraft wiring" (*Vector* Autumn 2022) and the CAA for adding maintenance issues in *Vector*.

I was involved in rebuilding and/or major modifications of early generation Bell 206As from the mid-1970s to mid-80s.

The original wiring in these aircraft was a product that was found to deteriorate quite rapidly in hot and humid environments, and was prone to electrical shorting. It also had poor resistance to mechanical wear like chafing.

I found a lot of degradation with locations of possible arcing during the rebuilds, and was instructed to replace this product in areas where it was vulnerable with the newer spec wiring. This was mainly in the engine, combustion heater and centre console areas.

The issue was well-known in the 70's.

There has been much controversy about this product over the years, because some installations have had no problem, but the fact is, it's vulnerable to breakdown in certain conditions. Good wiring inspections are therefore required.

A second point – I felt the image in the article, depicting wiring clamped to a control cable, indicated a lack of knowledge of aircraft wiring, of aircraft systems, and a lack of LAME and non-LAME training in the GA environment.

I'd like to recommend FAA AC43-13-1B, Change 1, Chapter 11, Section 8, *Wiring installation inspection requirements*.

This section is explicit on what to do and what not to do, and I believe would be good for training maintenance staff.

Owen Walker, Whitianga

// 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.

Radio techniques

After reading the article "Are you a crowing rooster?" (*Vector*, Spring 2022) I'm writing with regards to radio procedures and frequencies for position reports on cross-country flights.

My understanding was that the FISCOM published frequency is to be used, which is Christchurch Information, unless a frequency is published on a VNC as CFZ, and so on.

I've found on occasion that Christchurch Information staff complain about using this frequency as well, as most aircraft remain on 119.1 for the whole flight.

I was told this frequency was to be used for operating in and out of uncontrolled aerodromes only. At the moment, I have to monitor both frequencies, as conflicting traffic could be on either.

Is it possible to clarify the frequencies and procedures (does the call need to be addressed to ATC, as a lot of the South Island does not get Christchurch Info or can it be transmitted 'blind')?

Stefan Roth, Wanaka

Aviation Safety Advisor Carlton Campbell replies:

Hi Stefan

Only make calls that are mandated according to the airspace, or that are essential to aiding another pilot's situational awareness, on the designated frequency for that airspace.

FISCOM is the dedicated frequency for traffic information as per the AIP.

In an emergency, using 119.1, you cannot be as assured of a prompt professional service, whereas with FISCOM you can.

A position report on FISCOM, without them directly responding unless they had pertinent information to convey, such as traffic, shouldn't be a problem, although they aren't currently staffed to handle these.

As to the FISCOM/119.1 confusion, I'm hopeful of some reset and clarity ahead, as Airways and CAA are currently working on the issue.

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**.

Staaken Flitzer Z-21A	
Date and Time:	24-Apr-2022 at 13:50
Location:	Hastings
POB:	1
Nature of Flight:	Private other

Upon touching down on 01 grass at NZHS, the aircraft encountered a slight crosswind from the right. Right rudder was applied to compensate, but the cable failed at the eyelet crimp on the pedal. As a result, the pedal went straight forward, and the rudder itself swung fully to the left, accelerating the already encountered drift, and causing the aircraft to ground loop. The speed was still quite high, causing the right wing to dip, and dig into the ground causing the aircraft to flip upside down.

The CAA had recently released AD - DCA/ABUILT/13 on 25/11/2021 which covered the requirements for cable testing during builds and installation after this date. The aircraft was built prior to this date.

The set up in this aircraft made daily inspections of the link difficult. The end of the cable after the crimp was covered in black heat shrink, making a visual inspection impossible. A better way could be to use clear heat shrink so a daily visual inspection is possible, or not cover the cable ends at all. This would allow for inspection to note the excess length of the cable after the crimp, to ensure no movement.

CAA occurrence number 22/2099

Tecnam P2002 Sierra RG UL	
Date and Time:	29-Sep-2019 at 13:42
Location:	Putara Valley
POB:	2
Damage:	Destroyed
Nature of Flight:	Training dual
Flying Hours (Total):	910
Flying Hours (on Type):	7
Last 90 Days:	5

The aircraft was on a training flight from NZPP to NZFP. At some point the crew elected to fly through the Tararua Range to Flat Point aerodrome. The aircraft encountered strong downdraughts on the lee side of the range that exceeded the aircrafts climb performance and it collided with terrain. Both pilots lost their lives.

The investigation revealed that the pilots did not conduct sufficient preflight planning and did not obtain any new weather information once they changed to a new destination. See the CAA website for the full fatal accident report.

CAA occurrence number 19/6687

Benson B8M Gyrocopter	
Date and Time:	25-Jan-2019 at 20:25
Location:	Dannevirke
Damage:	Destroyed
Nature of Flight:	Private other
Age:	35 yrs
Flying Hours (Total):	30
Flying Hours (on Type):	15
Last 90 Days:	7

During the take-off roll, the pilot noticed that the engine was not producing full power. They continued with the take-off as they thought that it may have been a fouled spark plug causing the reduced RPM which would eventually clear.

The gyrocopter climbed to approximately 50 feet along the runway but the engine continued to lose power. The pilot attempted to turn back to the runway but underestimated the effect of the prevailing wind when he turned downwind. After a further turn to avoid a fence, the gyrocopter landed heavily and rolled on its side. During the ground impact, the fuel tank ruptured spraying fuel on the pilot's legs. The fuel then ignited, resulting in severe burns to the pilot. First responders were immediately on hand to assist the pilot who was then taken to hospital.

CAA occurrence number 19/445

Progressive Aerodyne Searey	
Date and Time:	17-Apr-2022 at 10:43
Location:	Waimea Inlet
POB:	2
Nature of Flight:	Private other

The pilot was demonstrating an approach for a water landing to low level with the gear down, but not an actual water landing. The pilot reported that during the go-around, the aircraft made contact with the water and subsequently flipped over. Both the pilot and the passenger received minor injuries.

CAA occurrence number 22/1973

ACCIDENT NOTIFICATION

24-hour 7-day toll-free telephone

0508 ACCIDENT (0508 222 433)

aviation.govt.nz/report

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

Gippsland GA200

Propeller

ATA Chapter: 6110

During agricultural operations, after the second load of the day, it was noted that the tailwind on the airstrip was increasing. The operator decided to stop flying and wait for an improvement in the conditions.

The pilot reported that during the landing, the aircraft slipped off the side of the airstrip and the wet long grass along the edge dragged the aircraft further into the paddock.

The post-flight inspection revealed a small bend in the downward blade of the propeller from a ground strike, and a deformed tailspring. The engineer replaced the propeller and tailspring and the aircraft was ferried back to base. It was determined that a special flight permit should have been issued prior to the ferry flight.

CAA occurrence number 21/4872

Britten-Norman BN2A

Pilot's door window

ATA Chapter: 5630

During descent, following a parachute drop, the pilot's door window popped in at the rear, while the front of the window levered outside of the aircraft into the slipstream. The pilot grabbed the rear of the window and pulled it into the aircraft, however, the front of the window made contact with the propeller and shattered.

The investigation by the operator found that pilots would rest their elbows on the window ledge in the front portion of the window. In the event that this may have been a contributing factor, company pilots were requested not to use the windowsill area as an armrest.

Britten Norman were also contacted, and they advised that this was the first occurrence of this nature that they were aware of.

A new pilot window has been fitted incorporating the use of an approved sealant to all BN2 windows to achieve a better seal. The propeller was replaced, and bulk strip carried out on the engine.

CAA occurrence number 20/1134

Kawasaki BK117 B2

The number 2 engine chip light activated nine minutes into a flight while in IMC. A PAN PAN was declared and a precautionary landing performed.

This was the third instance of this engine chip light activating between late December 2021 and early January 2022, after significant engine work in early December, with no indication of any actual failing or damage.

The three reports were intermittent in time and, in each case, reported with an operations and maintenance review being conducted.

A detailed process with initial checks and cleaning by the engineers after the first chip light was conducted, followed by a more detailed flush and inspection, after the second event.

The maintenance investigation identified the cause of the light activations to be a sliver of aluminium metal left over from the HSI installation, which was stuck inside a scavenge screen around the chip detector. This meant that, due to it not being magnetic, it kept being left behind when the plugs were pulled, but was enough to bridge the detector once oil flow established.

The scavenge screen and housing were removed and replaced, and the plunger was also found to have some bare metal exposed which could have led to erroneous chip indications.

CAA occurrence number 21/5790

REPORT SAFETY AND SECURITY CONCERNS

Available office hours (voicemail after hours)

0508 4 SAFETY (0508 472 338)

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