Pointing to safer aviation

Spring 2021

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NOT DROWNING IN THE TECH

Anti-wire strike tech

Slow down those radio calls

Ag aviation accident stats

Unite against COVID-19

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

// ANTI-WIRE STRIKE TECH

// SLOW DOWN THOSE RADIO CALLS

// AG AVIATION ACCIDENT STATS – A GOOD NEWS STORY

Cover photo: The glass cockpit is both a boon and a potential risk to the pilot. It depends on how they use it. See our story "Not drowning in the tech" on page 4. Photo: iStock.com/Jetstream Rider

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'BVLOS' IS COMING READ YOUR NOTAMs!

Up until now, flying a drone has been allowed only if its operator or an observer could always see it, and the surrounding airspace, with their own eyes. But 'beyond visual line of sight' is coming.

Unmanned aircraft (UA) technology, including situational awareness tools, has come a long way since the introduction of Part 102 rules in 2015.

Today the CAA is assessing applications from certificated Part 102 participants for beyond visual line of sight – BVLOS – operations.

The UA operator wanting to undertake BVLOS operations will need multiple mitigations in place to do that. For example, where their craft can fly, in what airspace, how high, how it engages with other airspace users – and having a NOTAM or AIP Supplement published.

One of those applicants is the air logistics company, Swoop Aero. It wants to deliver medical supplies, and other vital goods, by UA around the country.

Its New Zealand general manager, Richard Adams, says applying for NOTAMs and AIP Supplements to be published will just be part of normal procedure.

"We want to integrate successfully with other aircraft and obviously airspace notifications will allow us to do that."

CAA's manager of the emerging technologies programme, Rebecca Langton, says engagement between traditional pilots and UA operators is a two-way street.

"UA operators will have to make sure they know about what other airspace users are doing and where – things like the local aero club having a fly-in – and traditional pilots will need to know the details of UA ops that could have an impact on their plans."

CAA team leader of Part 102 operations, Corey Price, says a traditional pilot carrying out thorough flight planning has probably never been more critical.

"They should be checking NOTAMs and AIP supps anyway. But with BVLOS operations increasingly possible on their route or at the destination aerodromes, it's essential they include this vital step in planning a safe flight."

// The not-for-profit research organisation, MAUI63, will use BVLOS to more comprehensively survey the ocean and collect data on the critically endangered Māui dolphin.

Photo courtesy of MAUI63.

NOT DROWNING IN THE TECH

No pilot needs to be told what a boon the glass cockpit is. But intoxication with those bells and whistles can blunt good flying skills, and has contributed to tragedies.

In April 2011, a microlight pilot lost his life on the slopes of Mount Duppa, north-east of Nelson.

The CAA safety investigation found the EFIS terrain data the pilot was using had "significant errors[1] which may have led the pilot to believe incorrectly that he was clear of the terrain ahead".

The findings also noted the VFR flight had continued into deteriorating weather conditions and that good weather at the intended destination "may have encouraged the pilot to continue his flight perhaps based on a high level of reliance on information presented by the EFIS".

The safety report is peppered with phrases like, "over-reliance" and "high level of reliance" in terms of the trust the pilot had in the capabilities of his glass cockpit.

The CAA's investigator of this tragedy, Colin Grounsell, says it highlights the ever-increasing problem with pilots' enchantment with technology.

"The tech *is* great. You can do a weight and balance calculation in just a few minutes, rather than, say, half an hour. You can also have very accurate fuel management.

"But that really critical preflight planning and preparation sometimes goes out the window. Some pilots jump in, fire up the engine and just go, because it's costing them money the longer they muck about."

The pilot who died on Mount Duppa hadn't filed a flight plan. Many pilots don't – something that CAA investigation team leader, Dan Foley, believes is the result of uncritical trust in cockpit technology.

"Some pilots rely on the tech to the degree they're not involved in even those informal preflight actions that help keep a flight safe. For instance, standing around talking to other pilots, getting the benefit of their experience, talking about route options.

"There's no thinking about the flight for a few days before departure. No getting out the charts and mapping the actual route, no getting familiar as much as possible with what might be encountered."

Not abandoning the basics

CAA flight examiner Katrina Witney says the basic skills must be maintained, no matter how clever the onboard tech.

"Pilots must not forget the fundamentals of 'aviate, navigate, communicate' and make sure they remain proficient in basic skills and knowledge.

"Being able to navigate using landmarks, dead reckoning and completing manual calculations of groundspeed and time are just as important as being proficient in using the technology.

"There's no doubt that technology can make routine flying less demanding. The safe and proficient use of technology, however, requires preparation, skill and a conscious work cycle. Otherwise its ability to distract is equal to its ability to inform."

Katrina says technology introduced in the cockpit provides only the *potential* for increased situational awareness.

"It should be used as an aid to, not as a replacement for, a pilot's skill, knowledge and situational awareness."

In the *Vector* article "Advice from ADS-B equipped pilots" (Winter 2020), North Shore pilot Steven Perreau said of his new kit, "You can never assume that a lack of traffic on the display means there's actually no traffic around. You'd be a mug to use it 100 percent instead of the Mark 1 Eyeball".

In the same article, South Island pilot Ian Sinclair said, "Even though it has quite good eyesight, ADS-B IN is still only one tool in the awareness shed. Lookout, good radio work, and predictable flight patterns all need to be maintained."

Katrina Witney agrees. "Take the time to understand the full abilities and limitations of your equipment, and that of other aircraft. Understanding those limits reduces the likelihood of unintended consequences.

"For example, being equipped with ADS-B doesn't mean your technology will tell you the location of every aircraft in your vicinity. »

Photo: iStock.com/Fabian Gysel

1 The safety investigation noted that after the accident, the avionics manufacturer swiftly corrected those errors.

"Including technology into your lookout scan, however, will aid your situational awareness."

CAA flight examiner (helicopter) Andy McKay says a similar thing about TCAS (traffic collision avoidance system).

"While TCAS is a great tool, it's not foolproof outside controlled airspace. Often, light aircraft in those circumstances may not have a transponder or may not have it turned on.

"Don't make the assumption that because there are no targets on a TCAS, no conflicts are present."

"Despite emerging technology, pilots mustn't fall into the trap of continually monitoring the inside of the instrument panel at the expense of situational awareness outside the cockpit.

"Too often I see pilots trying to manage the systems and losing awareness of the basic principles of airmanship.

"First and foremost is a good lookout."

When the tech fails

The CAA has numerous accounts of the ways in which tech can fail.

"...took their tablet with them and it was on three percent battery. There was no back-up."

"The battery ran out and there was no charger on board."

"The device overheated in the sun and it cracked the plate, making it unusable."

"Loaded the app on the phone, without realising it was going to eat up the battery before we reached the destination."

"The databases on the app were out-of-date."

Again, Katrina Witney's advice is to make sure the basics are covered, should the technology pack up.

"Pilots should always carry current hard copy plates and charts. And, of course, backup devices and chargers."

With regards to an out-of-date database, CAA investigator Jason Frost-Evans says if the airspace the database portrays has changed, the database simply isn't fit for its intended purpose.

"For VFR flight, the 28-day updates aren't necessarily required, but at a minimum, when the airspace updates come out in November every year, the database should be updated," he says.

"For commercial ops, databases should be addressed in the operator's software configuration management."

For further guidance, see advisory circulars AC43-15 and AC91-18 *Aircraft software configuration management*.

Rotary tech

Andy McKay says the rotary sector is in many ways outpacing the GA fixed-wing community in adopting automation.

"Autopilot 'upper' modes such as auto hover[2], SAR mode[3], and flight management systems are all creeping into medium-sized helicopters," he says.

"Even standard, light helicopters are increasingly equipped with automatic systems that monitor attitude, navigation and performance.

"Some modern helicopters even have to be flown with a dual autopilot and stability system functioning at all times – which takes them closer to an airliner in its avionic system, than the older helicopters from which they emerged."

Andy says the introduction of such complex tech has massive implications for training.

"Part 61 sets only minimum standards for a type rating. But it's clear that, with a type rating being competency-based, the training in advanced systems like these must exceed that of a standard type rating.

"The CAA has recently amended Advisory Circular AC61-10 *Pilot licences and ratings – type ratings* giving more information about what the CAA is doing to ensure there's thorough training in flying complex and multi-engine helicopters.

"This advice is based specifically on the standards in the manufacturers' training programmes, and guidelines set down by the FAA's flight standardisation boards and EASA's operational suitability data."

// Make sure the basics are covered, should the technology pack up. //

2 Hover mode – uses sensors to determine height, speed and direction of machine, and flies it accordingly.
3 SAR mode – enables the helicopter to automatically fly predefined search patterns during cruise flight, and to move from cruise flight to a stabilised hover and departure.

Operators' obligations

CAA investigator David Oliver believes training in using technology needs to be part of an operator's standard operating procedures.

"Every operator should provide training in the use and care of all technologies used in the cockpit, for flight planning and for ground support roles," he says.

"This should be embedded in the operator's training programme or SOPs to make sure any variability between each aircraft or each piece of equipment is covered.

"That also would provide confidence that there's consistency of use throughout the organisation.

"In addition, each crew member needs to be trained in the care and use of every *new* piece of technology/equipment as it's introduced to the operation. That training has to be covered according to the Part 135 operator's initial and transition training programme."

For more information, see Part 135 Subpart I *Training* (135.557 & 135.559).

The same goes for private pilots

A recent 'I learned about flying from that' account highlights the need for private pilots, too, to train on their new technology.

A PPL pilot was on a cross-country flight using an EFB showing traffic in his vicinity. After a short time in the air he discovered he was being followed closely by another aircraft.

Being concerned about being so close he climbed to a higher altitude only to discover the other aircraft following him did exactly the same.

Now becoming really concerned, he performed a number of turns to see if he could spot the aircraft behind him, without success.

After speaking with his CFI, it was discovered the other 'aircraft' was, in fact, a time-delayed projection of his own.

There are also accounts of pilots not knowing the crucial difference between the blue symbols – traffic position data, which can be delayed by several minutes – and green symbols – traffic in real time – on their EFB display. »

Photo courtesy of Matt Morris-Jenkins.

Photo courtesy of Matt Morris-Jenkins.

For reasons that these accounts highlight, the CAA aviation examiner for emerging technologies, Scott Griffith, says the same advice to operators about training applies to private pilots.

"There are now many excellent and affordable in-cockpit technologies available to recreational flyers. Used correctly the tech can increase safety, but there remains the obligation on anyone using these devices to seek out appropriate operational advice and training."

Erosion of good judgement

Some pilots are so entranced by the information they're seeing on their tech, and the way it's presented to them, they sometimes doubt what they're seeing with their own eyes.

CAA's chief advisor on human factors, Matt Harris, says when automation works consistently well, pilots tend to become overly reliant on it for information about what's happening.

"Essentially they transform from active controller to passive monitor. And while technology can provide them with a huge array of raw *data*, sometimes there isn't enough meaningful *information* to tell the pilot of the gravity of the situation."

In its guidance, "CFIT/Automation Overreliance", the FAA noted that, "The most insidious aspect of automation is its propensity to breed complacency and erode pilot confidence.

"The more time we spend on autopilot, the less time is available to maintain our hands-on skills.

"Instrument approaches on autopilot are so precise that it's tempting to 'let George do it' all the time. But how would you feel if 'George' decided to take a break in the middle of an instrument approach?"

It advises that pilots should understand how automation works and how it behaves when it isn't working; that they understand where the automation is getting its information, and how it'll respond if that information is missing or flawed; and to know all the ways to quickly disconnect the automation and revert to hand flying.

Installing devices

The way in which tablets and phones are carried in the cockpit or installed, even temporarily, cannot be done without thought – even where they are positioned. For instance, a device positioned in a way that reduces the pilot's vision is obviously a risk to lookout, situational awareness, and safety.

Massey University School of Aviation CFI, Paul Kearney, says when new students were originally given a lap-held device to help their navigation, it encouraged them to have their heads down.

"So we mounted the tablets at eye height and slightly to their left. The students can look briefly at the display then look outside to confirm what it says, very quickly, very easily, and that encourages them to keep their heads up and looking out."

A device sitting in a seat pocket in the cockpit and charging through a USB port in the instrument panel is carry-on luggage.

> // Some pilots are so entranced by the information they're seeing on their tech, and the way it's presented to them, they sometimes doubt what they're seeing with their own eyes. //

But if it's affixed in any way to the aircraft and wired directly into the aircraft's electrical system, it's a 'non-permanent fixed installation' and must be installed in accordance with 'acceptable technical data'.

In the *Vector* article, "Is that a design change?" (Summer 2020-21), CAA aviation safety advisor John Keyzer says if a device is sticky-taped or otherwise carelessly secured to the aircraft, it could dislodge during turbulence or other manoeuvres.

"(It could) jam aircraft controls, block crew vision, or even injure an occupant.

"Devices affixed in ways such as this make the aircraft un-airworthy and therefore unsafe.

"It's also a breach of rule 91.101."

John says operators must make sure installing a device is done properly.

"In accordance with a good idea is not acceptable."

The overheating battery

"I regularly ask my students what they would do if their tablet started smoking," says CAA flight examiner Marc Brogan.

"They can't just jettison it out the window. They have to know, ahead of it ever happening, what to do."

The lithium ion battery powers our modern lives but it can also be dangerous if knocked about.

CAA flight operations inspector – and former airline captain – Owen Bieleski, says there's not a lot of difference between a B777 flight deck and an RV-7 cockpit in the basic handling of an overheating lithium battery.

"Water," he says simply. "A traditional fire extinguisher has no effect on an overheating lithium battery because it's about heat.

"Airlines use 'heat bags' which they place the smoking device into, then fill the bag with water.

"While this option may not be available to a GA pilot, they should always carry a water bottle for hydration. So remove the power supply then pour the contents of the bottle over the device.

"Just be mindful of where that water goes, as it may create a second hazard, if it's over the floor.

Owen says that if the overheating device creates an actual fire, perhaps igniting adjacent items, it's time to use an extinguisher. Get the aircraft on the ground as soon as safely possible.

"Consider making a PAN call and divert to the nearest suitable airfield."

Owen says prevention is obviously better than having to battle a lithium battery overheat, no matter how successfully that's done.

"Keep tablets off glare shields, and away from the sun. Make sure they can't be damaged by moving objects, or becoming jammed somewhere."

"Not holding their charge, overheating, shutting down regularly, or not charging efficiently may be a sign of a damaged battery.

"That might mean it's time to buy a new device."

// MORE READING

Vector Jan–Feb 2012 "Electronic Flight Bags"

Vector Winter 2020 "Advice from ADS-B equipped pilots"

Vector Summer 2020–21 "Is that a design change?"

Advisory Circular AC91-20 *Guidelines for the Approval and Use of Electronic Flight Bag Devices* – new revision being finalised.

Comments or queries?
Email **katrina.witney@caa.govt.nz**

ANTI-WIRE STRIKE TECH

Nothing replaces identifying hazards before a flight, and vigilance once in the air, but technology is increasingly protecting pilots from a lapse in concentration.

An Australian Transport Safety Bureau study[1] indicates 63 percent of pilots involved in wire strike accidents know in advance the wire is there.

So wire detection and protection systems have been used overseas for years to help situational awareness, and to provide a 'last resort barrier' if all else fails.

New Zealand operators are yet to pick up the technology in a big way, however. Here's an introduction.

Detection

Wire detection science alerts the pilot to the proximity of nearby lines.

One overseas-manufactured kit picks up the electromagnetic fields produced by all power lines and emits a pulsing tone, which increases in frequency the closer the pilot gets. If the pilot continues to approach the line, a red warning light illuminates the cockpit. As the aircraft moves away, the pulsing tone reduces in frequency.

This kit costs around NZ$24,000 including the antenna but excluding installation.

Using the New Zealand-produced TracMap TML-A, pilots mark wires and hazards on the device in the cockpit. The device then warns the pilot on the lightbar and screen when they're near a hazard.

The marked hazards are shared with all the other TracMap devices in the organisation.

The cost for such technology is between NZ$4,000 and NZ$16,000, depending on a rebate for trading in an old unit.

Radar is also being used to detect the presence of power lines. Mounted on the nose of the helicopter a radar unit transmits a very high radio frequency to detect obstacles along the flight path.

The pilot is given an audible alert, the level of which depends how near the obstacle is. A cockpit display lights up in a way that indicates distance and direction of the obstacle.

Lasers are also being used overseas to scan the environment for wires and other obstacles. The system uses optical and acoustic signals to warn pilots of a hazard.

Both the radar technology and laser technology cost around NZ$144,000.

The advantage of detection tech is that the pilot is given ample warning they are near a wire hazard. The disadvantage for some pilots is that the alerts can become intrusive over areas with many lines and they have to turn the alert down or off.

Photo: Unsplash/Roger Starnes.

1 ATSB. Avoidable Accidents No.2. Wirestrikes involving known wires: a manageable aerial agriculture hazard.

Nevertheless, a NASA study[2] examining the circumstances of 208 wire strike accidents in the United States concluded that detection technology would have prevented 76 percent of them, and 30 of the 37 people killed in those accidents would have survived.

Protection

Wire protection technology, as the name suggests, protects the aircraft and its occupants, if contact is made with lines.

A wire cutter, like a sharp forward-pointing fin, sits above the windshield, and one below. There's a 'deflector' running down the middle, which guides the cables into those cutters.

The advantage of this tech is its price – between NZ$8,500 and NZ$20,000.

Its disadvantage is that the aircraft actually makes contact with the lines, and to be truly effective, the helicopter needs to be travelling faster than 30 kts and at an angle of 60° or more from the wire.

The NASA study deduced that wire cutting kits would have prevented 49 percent of the 208 wire strike accidents it looked at, and about 18 of the 37 people who were killed would have survived.

Training

Low-level operations in a 'wires environment' require specialist and formal training.

The international helicopter body, the HAI, says such flying is subject to the following potential hazards:

- Collision with wires, conductors, or structures
- CFIT
- engine failure at low altitude
- settling with power
- loss of tail rotor effectiveness or failure at low altitude
- bird strike
- loss of situational awareness due to sun, low light or haze
- fatigue-related stress
- complacency or over-confidence.

The HAI recommends specialist training for both pilot and crew members including in crew resource management, communication, hazard identification and risk mitigation.

Such flying in multi-crew aircraft requires good and effective communication, and an understanding that, "Each person on board has a role, responsibility and authority to make the other team member(s) aware of any hazard or safety concern and to effectively communicate that concern to the other team member(s)."

The US-based magazine *Professional Pilot*[3] says that "Specific training in the 'wires environment' and proper crew resource management ... can all lessen the threat of an accident".

The NASA study also recommended formal training for safe flying techniques and procedures near wires. It concluded that such training would have reduced the 208 accidents it looked at by 56 percent, and an estimated 20 lives of the 37 lost in the accidents would have been saved.

Hazard identification, risk mitigation

"No amount of technology should replace preflight identification of the location of wires and of other possible hazards, and then using safe practices to mitigate the risk they present," says CAA investigator Sam Stephenson.

"As with any technology the danger lies in the pilot turning over responsibility for 'seeing' the lines to the tech, which can fail for any number of reasons.

"But technology should be treated only as a final risk control measure – in the case of wire cutter kits – or in the case of detection equipment, an *aid* to maintaining and enhancing the situational awareness of those on board."

And *Professional Pilot* says, "The best methods for reducing the wire strike threat are education about this potentially lethal environment and increased vigilance in the cockpit."

// FURTHER INFORMATION

The following websites are for readers' further information only. In no way does *Vector* recommend any particular product.

safeflight.com
dartaerospace.com
TracMap.com
amphitec.com
magellan.aero

Comments or queries?
Email **sam.stephenson@caa.govt.nz**

2 NASA – Civil helicopter wire strike assessment study. Volume 1: Findings and recommendations.
3 *Professional Pilot*, "A plan for reducing wire strike accidents", Stuart Lau.

SLOW DOWN THOSE RADIO CALLS

Many pilots are guilty of making, at some time, a radio call that's hard to understand. One of the main reasons is the speed of their delivery.

Radio calls are arguably second only to lookout in the critical basics of safe flying. Yet, complaints are widespread among pilots about the poor delivery of those calls.

Claude Preitner, a CAA medical officer and a 1600-hours pilot, had a recent experience.

"I was flying to Whanganui and traffic was heavy. There were a lot of aircraft reporting their position. One pilot in particular was just incomprehensible. I didn't know who they were, or where they were."

Fortunately, Claude had ADS-B IN on his tablet and was able to identify where that pilot was.

But he says it's obvious that if a reporting position isn't clear, it's worthless.

"If not understood by others, reporting only creates confusion, contributes to radio clutter and gives a false sense of security."

Underconfident, overconfident

CAA aviation safety advisor Carlton Campbell says sometimes the speed of a radio call is due to fear, particularly in the case of student pilots.

"When people press the button, they're really trying to get the message out and, in some cases, get the radio call over and done with because they're a bit apprehensive."

Photo courtesy of Massey University School of Aviation.

Other times, says Carlton, it's due to the opposite – complacency.

"Some of our more senior commercial pilots are very au fait with their RTF. They know what they're saying – they've said it a thousand times. As a consequence they rattle it off as fast as their brain thinks, forgetting that it's supposed to be informing somebody else's situational awareness."

Paul Kearney, the CFI at Massey University School of Aviation, supports that view, saying many of their students will be quite nervous about making radio calls when they first start.

"But at the later stage, when they think they're really good at making calls, it becomes 'the faster I can do it, the better I must be'.

"It's a matter for the flight instructor to slow the student down and get them to acknowledge that if they want other aircraft to understand their radio calls, they must slow them down."

A call-replay function in the school's Diamond aircraft allows students to replay the radio calls of other aircraft. Paul says it's a useful tool that lets students hear how many times a poorly done radio call needs to be replayed, to understand what was said.

Massey also makes use of simulators to ensure students practise perfect radio calls.

"So if they're not quite right or the wording's wrong, then we can fix it in the simulator before we fly," says Paul.

Too fast

Amy Dreverman, from Wellington Aero Club, says not only do many pilots speak too quickly, they can be 'lazy' in their delivery.

"I think we don't articulate clearly enough, and when combined with the speed that we talk – and sometimes on the radio, there's pressure to perhaps talk faster – it can make it quite difficult to understand at times."

Twenty-year-old Alice You is training at Massey University. While she's now getting used to the New Zealand accent, she says some locals do speak quite indistinctly.

"When I first started doing this course, it was really hard. Sometimes it's quite 'blurry', and it fades sometimes.

"Like, there was an aerodrome next to Taupō – Taumarunui. And on the radio, it just sounds like [a blur].

"I just find it really hard to locate where they are and avoid them."

Twenty-year-old Shagun Sharma is in his second year at Massey.

"I have been told I'm too fast and I have been told 'slow down'. I've been trying to do that. So I'm sorry for anybody out there who's been listening to me," he says, laughing.

CAA flight examiner Marc Brogan recently demonstrated for a student how fast their radio call had been.

"You couldn't make out any of the words, so the detail of the radio call was lost."

Once on the ground, Marc started talking rapidly to the pilot.

"And they looked at me, puzzled. And I said, 'That's effectively what we hear via the radio'."

Marc says speaking face-to-face is a world away from speaking on the radio.

"If you don't understand someone or they don't understand you, you've got facial expressions which will relay (to you) how effective you're being, but in the air of course, you don't have that. So it's lost."

Carlton Campbell says the correct speed is about 140 words a minute.

"Whenever we're in an aircraft, speak..at..a..slightly.. slower..than..your..normal..conversational..pace."

Claude Preitner, who's from Switzerland, is very aware of how important it is to speak slowly and distinctly.

"I want to be absolutely confident that other traffic is clear as to my own position and my intentions."

"Say again"

Amy Dreverman says some pilots who don't understand a radio call don't necessarily ask a pilot to repeat.

"Because it seems like it's your fault for not hearing it, and it's not on the other pilot.

"It depends what environment you're in. If you're in controlled airspace, it can be busy and you don't want to clutter the airways more than is necessary.

"And if you're in uncontrolled airspace, there's an inclination to just try and decipher it as best you can and keep a closer lookout, which is not ideal, because they could be right where you are."

Amy says safety always demands asking an unclear pilot to repeat themselves.

The president of the NZ Association of Women in Aviation, Margaret Wright, wholeheartedly agrees. »

// We're human, you're never really going to be perfect, but if people can practise the call first, make it nice and concise, and then articulate clearly, you get a perfect radio call. //

"You always ask them to repeat. Safety's number one, and they could be in close proximity. It's important that we get a visual contact with them."

Alice You says pilots sometimes don't think about why you've asked them to 'please repeat'.

"I'd just be like, 'Where are you going? What are you talking about? And say again?' They still read the name too fast."

Paul Kearney is also finding an increasing divide between the task of transmitting the radio call and the pilot remembering what the call is actually for.

"Let's say you're operating in uncontrolled airspace, and somebody makes a radio call. You need more information from them, so you ask them to repeat. It's very, very difficult, at times, to get them to respond to you."

"So it's almost like radio calls are being done as a transmit-and-forget. 'I've done my job, I've done my position report, tick checklist' rather than a tool to actually communicate between pilots.

"And from talking to other examiners, they sort of found the same sort of thing."

Carlton Campbell agrees.

"We feel as though we've just got to get it done. But really, we should be conveying the same information we need to help our decision-making and our sequencing, when we're in the listening position."

"Overhead water tanks"

Apart from speed, possibly the most complained-of radiotelephony habit is the local use of informal reporting points – 'overhead water tanks' type of thing.

Shagun Sharma, from Massey, finds this particularly difficult.

"Sometimes they say, 'Oh, yeah, overhead a street or a house'. And like, I don't know where you are. I just don't know.

"So I just avoid it as far as I can. You're at 1500 feet and they're at 100 feet in an ag aircraft – they're clear but you still don't know where they are.

"It's just a problem sometimes."

It's not just international students who have a problem with informal reporting points.

Even someone with Margaret Wright's experience finds colloquial reporting points difficult.

"You really don't know where they are. It's not an actual position report – they're reporting from somewhere pretty obscure.

"When we're doing a cross-country and in a place we don't fly to very often, it can certainly be an issue."

The varied pronunciation by different pilots of Māori place names is something that Alice You, just beginning her aviation career, and from overseas, and Margaret Wright – 40 years with a current PPL and very much a local – both struggle with.

CAA investigator Jason Frost-Evans says pilots should try to pronounce Māori names correctly. "Firstly, to be respectful, and secondly to avoid confusion.

"When people don't take care with how they pronounce Māori place names, you can get one name pronounced half a dozen different ways.

"If everyone says Māori place names the correct way, everyone understands where everyone else is, and that's good for safety."

Over reporting

In the *Vector* article "Too much noise in the CFZ, too little in the MBZ" (March/April 2017) Carlton Campbell says it's a fine line how many calls a pilot should make.

"While pilots should make them at recognised reporting points … (or clearly identifiable geographic features) some pilots make position, height and intention reports

far in excess of what's necessary. The result is a jumble of reports, which can become confusing, and counter-productive to safety."

Carlton says it's about making calls to enhance the mental map of other traffic, and not adding to the 'noise'.

Push to transmit, not to think

Matt Earl is training at Nelson Aviation College. He says pilots who 'push to think' are frustrating to try to listen to.

"I've been guilty of this as well. People go to make their call, stutter, almost like stalled during the call. They've pressed the button and they're still trying to string the call together in their head."

Amy Dreverman offers this key tip for any ab initio pilot.

"If you have the time, articulate in your head what you want to say first. That way, you've got clarity with what you're saying, making sure the details are correct.

"Then when you go to say it, you can say it more clearly, and much more confidently."

Shagun Sharma from Massey says running through the call in his head first, interestingly, helps him to slow his delivery.

"I plant a structure in my head which is basically where I am, what I'm doing and what I intend to do. And if reading back the clearance, then what I intend to do.

"And that's how I just go ahead with it and then add stuff into it. So that's a basic structure for it. If you keep that in mind, you should be fine."

Matt Earl agrees it's a really good exercise.

"We're human, you're never really going to be perfect, but if people can practise the call first, make it nice and concise, and then articulate clearly, you get a perfect radio call."

// REFRESH YOUR KNOWLEDGE

To listen to the audio version of this article, which includes some slightly different insights, go to **aviation.govt.nz > safety > publications > vector magazine**

Refresh your knowledge about best practice radiotelephony by emailing **publications@caa.govt.nz** for your free copy of the *Plane Talking* Good Aviation Practice booklet. Or pick up a copy from your local training provider's GAP rack.

Comments or queries?
Email **carlton.campbell@caa.govt.nz**

Photo: CAA/Pen Mackay

I FLY OUTSIDE CONTROLLED AIRSPACE **ADS-B IS OF NO USE TO ME. OR IS IT?**

// **By ADS-B grant scheme technical advisor Tom Gormley**

Since 2008 there've been three fatal mid-air collisions – all in uncontrolled airspace – and at least 325 reported near misses overall. The benefits of being conspicuous to other aircraft are huge and obvious.

Photo courtesy of Garmin.

A newly equipped ADS-B pilot told my team recently, "I'm amazed how full a sometimes quiet and empty-looking sky really is".

The comment highlights the degree to which Automatic Dependent Surveillance-Broadcast technology can improve situational awareness.

That applies as equally to uncontrolled as it does to controlled airspace.

Being equipped with ADS-B will be mandatory in all controlled airspace from 31 December 2022, and some pilots, who avoid controlled airspace, may believe they don't need the kit.

But close calls can happen anywhere. So can collisions.

However, the relative effectiveness of ADS-B relies on as many aircraft as possible being equipped with it.

Earlier in 2021, in uncontrolled Bay of Plenty airspace, a non-equipped aircraft passed within 100 feet of a fully equipped (OUT and IN) aircraft.

The ADS-B pilot heard no radio call (it was in an area where a frequency change was due) and, of course, no OUT transmission showed up on the IN display.

Fortunately, through sheer luck, the aircraft avoided each other. But it could have had a catastrophically different outcome.

If *both* aircraft had been equipped with ADS-B OUT and IN, a quick glance at the ADS-B IN display would have identified the other approaching aircraft. (A system providing an audio warning of the nearest conflict would have been even better).

Then a good look out the window to confirm the approach of the other aircraft and a calm management of separation would have avoided the potential heart attack in both cockpits.

The non-aviating passenger in the ADS-B equipped aircraft later expressed surprise that the other plane in their close call was not ADS-B equipped in any way. Possibly shaken by their experience, they made the sage observation that, "Surely all aircraft should be equipped to avoid these types of incidents".

Lookout is still paramount

An ADS-B IN display should certainly not replace a good lookout, and it's important not to become complacent or over-reliant on this technology.

Why? Because not everyone is going to be equipped.

Even if 90 percent of aircraft were to equip with ADS-B, you would still need to keep a lookout for the remaining 10 percent.

But that 90 percent of aircraft being identified on your IN display leaves more time to identify those not transmitting ADS-B data.

Not quite magic ...

You also need to be aware of the limitations of ADS-B IN equipment that connects to, for instance, an iPad® running your favourite EFB app.

With portable ADS-B IN receivers that sit in your cockpit, a line of sight to the aircraft transmitting the OUT data is required – an obstruction such as the aircraft body itself can block these transmissions from being received.

You also need to be aware the display device you're using for your ADS-B IN receiver may be showing incorrect altitude readings.

ADS-B OUT data is set to a standard pressure setting of 1013.2 hPa. The EFB app, however, may try to apply a local QNH which could cause the altitude readings to be out by several hundred feet.

This could potentially mean that an aircraft you believe is 100 ft below, could, in reality, be 100 ft above. Be aware of what your EFB app is, or isn't, doing. Either way the advice is the same – treat the information on altitude displays with a pinch of salt.

This illustrates why you need to always remain on the lookout for other aircraft. The ADS-B system has many benefits, but you're not necessarily going to see the aircraft detected on your display in exactly the location expected when doing your visual lookout. The technology is available to provide increased situational awareness – but it's not the only thing you rely on.

... but pretty close

We all know about the importance of the 'golden hour' in an emergency and subsequent medical help.

If you need to be found, and medevaced out to medical treatment, a working ADS-B system has the potential to identify your exact location, leading searchers straight to you.

So ADS-B OUT and IN have the potential to both reduce mid-air collisions and to assist in search and rescue missions – possibly reducing serious injuries and deaths.

That's in uncontrolled airspace too.

Comments or queries? Email **tom.gormley@caa.govt.nz**

Photo: iStock.com/tzahiV

AG AVIATION ACCIDENT STATS A GOOD NEWS STORY

In 2014, there were 17 reported accidents for every 100,000 hours in the fixed-wing agricultural aviation sector. By 2021, that rate had fallen 65 percent, to 6.

No-one in New Zealand aviation needs to be told that agricultural aviation has always been an unforgiving business. But it has dramatically improved its safety record.

In the 1970s, in the fixed-wing ag sector, there were 270 accidents and 25 deaths. In the decade to 2020 there were 51 accidents and four deaths.

Manager of the CAA's team of analysts, Joe Dewar, has worked closely for many years with the agricultural aviation sector to improve its safety – including sending out to industry more regular updates about safety performance and notable occurrences.

"The fixed-wing ag sector is currently safer than it's ever been. I'm personally really heartened by this – operators should be proud of what they've achieved," he says.

The managing director and chief pilot of Hawke's Bay-based Aerospread Ltd, Bruce Peterson, says there's no one silver bullet that's suddenly 'fixed' the sector.

"It's a natural maturing of the industry. For instance, with modern training, it's about competence, and attitude to safety, not the number of hours you've spent training."

Joe Dewar believes the rollout of safety management systems has been key to improved safety.

"The proactive nature of SMS with its inclusion of all staff in identifying hazards and reporting them has undoubtedly had an impact."

But Joe also says an effective SMS is a moving target.

"Effective safety management requires constant vigilance and effort. It takes attention and discipline, but it can be done."

Bruce, who's been in the industry for 30 years, says there was a time in the infancy of the sector when risk – and tolerance of risk – was much greater.

"Those guys who came back from World War II, they were used to taking risks to get the job done. And they started out with ex-military aircraft with open cockpits and no brakes."

Today's industry has a far more intolerant attitude to risk-taking.

"We have modern health and safety regulations," says Bruce, "with individuals having to take personal responsibility for acting in a safe way, and ensuring their colleagues do.

"They're being held to account for the decisions they make, and operators are also being made to take personal responsibility."

Bruce says modern aircraft manufacturing has also done its bit for improved safety.

"We've got better performance and better reliability, particularly in the move from piston to purpose-built turbine engine aircraft."

Bruce says improving aircraft maintenance standards has also played a huge part in increased safety.

"The changes in the last 10 to 15 years have seen inspection intervals go to a maximum of 150 hours. A check that used to take a day will now take two to three, and that's a good thing."

Bruce says at Aerospread, new technology has probably made the biggest difference to safety.

"One of the best safety features we have now is that the weight from the loader is sent wirelessly to the aircraft so the pilot can double-check how much is in the bucket, before it goes on the aircraft.

"If there's too much for the conditions, you can drop the weight to whatever the pilot is comfortable with. Then they aren't having to decide on take-off whether to jettison some of it or try to fly with a too-heavy load."

Bruce says despite the modern engines and technologies, Aerospread still observes the safety basics it set out with a quarter of a century ago.

"For instance, each and every change of season, the guys and I talk about what that change of season means for our flying.

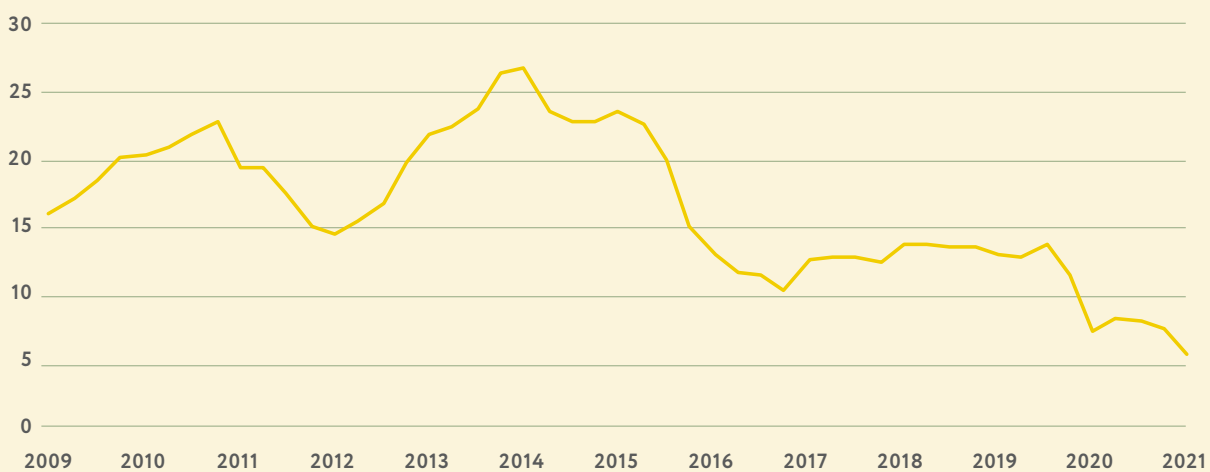
"And we still load the aircraft according to the conditions on the day.

"And a huge one for me, 'If the weather turns, and you bring the aircraft home, you can always go back to work if the weather improves'.

"If it's safely in the hangar ready to go to work, and you're also home safe, you've never made the wrong decision."

Comments or queries? Email **joe.dewar@caa.govt.nz**

Overall accident rate (accidents per 100,000 hours, 3-yearly rolling average)



A **BLUNT** MESSAGE

Two of the most experienced pilots at the CAA are increasingly worried by what they're seeing, and hearing about, in the circuit.

In the last two years there've been 141 reported circuit occurrences. In 91 of those instances, the pilots needed to take avoiding action to prevent a catastrophe.

While 39 of the occurrences involved student pilots on solo flights, far more – 54 – involved aircraft with an instructor aboard.

CAA aviation safety advisor Carlton Campbell presented the statistics to the recent national conference of Flying NZ, telling the assembled aero club instructors and CFIs that, "This is something we can and need to positively influence and improve".

At 74 reported occurrences, however, the group of pilots most involved in circuit conflict were locals.

Carlton says this highlights the complacency of some pilots at their 'home' aerodromes.

"Sometimes good airmanship diminishes, the more familiar a pilot becomes with their environment. They relax and stray from radio telephony standards, and their situational awareness is not as vigilant as it might be in an unfamiliar environment.

"As with all increasingly lax safety behaviour, it seems fine – until the day it isn't."

CAA flight examiner Marc Brogan, who's often moving around the country visiting training organisations, is also increasingly worried by what he's seeing in and around circuits.

"While locals and complacency may be at one end of the occurrence spectrum, itinerants and a lack of preparation, are at the other.

"Non-local pilots – not all of them, but of sufficient number to be of concern – are using non-standard procedures to try to join a circuit. They might also be flying in the wrong direction in the circuit, or opposing the circuit that is – or should be – in use.

Photo courtesy of Jess Jennings.

> // If everyone approached the circuit courteously and flew predictably in the circuit, many of the early mentioned statistics would not have occurred. //

"There is, at times, no adherence or even an acknowledgement of the right-of-way rules," says Marc.

"There are even instances of these pilots berating the pilot who was doing the right thing.

"This is unacceptable and should be reported – for everyone's benefit."

Safe circuit flying

Here's a rundown of what Carlton and Marc believe is needed for everyone to be safe in the circuit.

- Observe the right-of-way rule (91.229).
- Apply the principles of rule 91.223 *Operating on and in the vicinity of an aerodrome*.
- Maintain good airmanship – including making clear, correct, consistent, concise and timely radio calls, using standard RTF.

Also –

- **Maintain good situational awareness**

  "The three most critical behaviours in VFR flying are look out, look out, and look out," says Carlton.

  "No matter how close to home you are, no matter how relaxed you think you can now become, no matter how many perfect radio calls you've made, nothing replaces looking out the window and actually seeing the threats."

  "Move around, don't just shift your head as you look out," says Marc.

  "Consider the cockpit layout, obstructions in the design and the physical forces on you.

  "Move your entire torso and add some greater areas of view to your scan."

And –

- **Apply a 'yield, don't push' philosophy**

  "Many of the occurrences reported to the CAA were in part a result of a pilot pushing into the conflict zone as opposed to stating early, 'I'll be number 2'," says Carlton.

  "It's not too dissimilar to a roundabout or 'merging like a zip' as you enter a motorway – use good decision-making and proper awareness to take your appropriate slot.

  "If everyone approached the circuit courteously and flew predictably in the circuit, many of the earlier mentioned statistics would not have occurred."

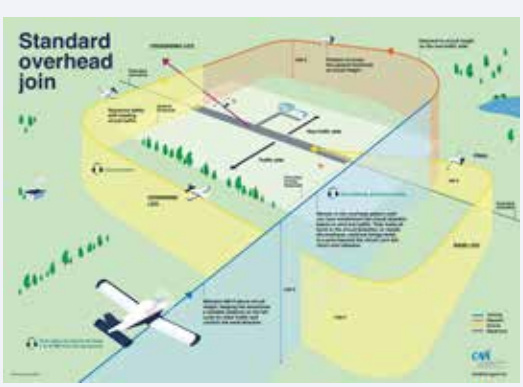
The 'blunt message' bit

Marc says if pilots don't get the message about consciously improving their flying in circuits, it'll be only a matter of time before there's a tragedy.

"Don't sit in your machine and think, 'they'll have me in sight'. Because 'they' may be thinking the same thing!

"There may not be a second chance."

// NEW STANDARD OVERHEAD JOIN POSTER



This poster has been updated and improved. To get free copies for your training organisation or for yourself, email **publications@caa.govt.nz**; or contact one the CAA's aviation safety advisors, whose names and numbers are on page 25.

A CAUTIONARY TALE ABOUT **CESSNA FLAP FAILURE**

A recent asymmetric failure highlights why operators and maintainers should keep a particularly close watch on the Cessna flaps system.

Back in April, Sunair's B-cat Jake King was doing routine circuit training at Whangārei.

Jake's 20-hours student had selected full power and flaps 'up' for a third go-around, when they heard a "structural bang" and the 172 rolled to the right.

The "visibly confused" student struggled to keep the wings level and Jake took control.

Checking the trailing edge, he saw the right-hand flap had retracted as normal, but the left-hand flap was stuck in the 'down' position.

"I've read plenty of reports about Cessna flap supports having failed," he says. "And I talk to students about the possibility of that happening.

"But an asymmetric flap was something new. It's not something I'd even read about."

Despite the startling occurrence, Jake went on "autopilot".

"The atmosphere in the cockpit was calm. I wasn't freaked out and neither was the student. I remember making a joke at the start to lighten the mood. But I was also aware that this was serious, and I wasn't mucking about.

"I flew the circuit countering the roll with the control column, and I maintained airspeed to maintain roll authority, so things felt pretty under control.

"The four minutes it took to land went pretty quickly really."

Once on the ground, Jake had a look at the flaps and discovered a roller bearing had disintegrated and parts of it were actually missing.

The subsequent CAA safety report notes, "An inspection of the LH flap assembly revealed a failed/broken flap attachment roller assembly P/N 0523920 at the forward position of the inboard track of the LH flap.

"The investigation determined that with the flaps selected UP, the unsupported LH flap jammed on the flap support bracket, which prevented flap retraction. Minor flap deformation was also detected due to the mechanical force of the flap drive motor applied to the jammed LH flap."

"It can deteriorate quite quickly"

The incident is not a first, even in New Zealand. And overseas, some of the same incidents have ended with all on board killed.[1]

In 2001, Cessna issued a service bulletin (SEB95-3R1) warning that the flap supports could be damaged by wear from the flap rollers and a potential loss of flap control.

Sunair LAME and flight operations manager, Dan Power, says the rollers take the full aerodynamic load when the flaps are extended.

"If the roller seizes, it starts to grind against the flap support arm or track, eventually leading to a possible breakup of the roller.

"In our case, the broken bits of roller jammed up in the rail and stopped the left-hand flap from moving.

"It can deteriorate quite quickly from being intact to being in bits."

What Cessna says

Cessna service bulletin SEB95-3 amends the manufacturer's service/maintenance manual, or instructions for continued airworthiness, and must be accomplished for ongoing airworthiness compliance.

Maintainers should regularly inspect the flaps system every 100 hours – and install stainless steel washers on each side of the forward rollers.

Failing to accomplish these inspections and modification could result in damage to the flap supports and/or loss of flap control.

1 See Transportation Safety Board of Canada, report A17O0209. See also www.gov.uk/aaib-reports/cessna-152-g-brcc-31-may-1996.

Photos courtesy of Neil Morris.

// Roller in the flap track of a Cessna 172.

What to be aware of

When the student preflighted the Cessna at Whangārei, with Jake watching, the flaps had worked perfectly.

“It’s probably impractical and unreasonable,” says Dan, “to expect a pilot’s preflight to include checking that the rollers are rotating freely.

“But they might get a hint something is up, if the flaps are ‘chattering’, or running rough, in the carrier arms.”

But the preflight had detected nothing amiss, and nothing untoward had been identified at the Cessna’s last 100-hour inspection.

After the Whangārei incident, the CAA issued a continuing airworthiness notice (27-020) alerting operators and maintainers to the importance of thoroughly inspecting the flap supports and roller bearings for wear and corrosion.

What Sunair advises

“What can be learned from our experience,” says Dan, “is that if any flap roller bearing assembly is found worn or damaged, it should be replaced immediately.”

Sunair’s investigation recommended that replacement kits are readily available to the maintainer if there’s any evidence of a deteriorating roller, washer or bolt.

“This is a non-deferrable item,” it said.

It also recommended that a safety notice “be circulated to all flight crew regarding first-of-day preflight inspection of the flap system, particularly the carrier arms wear and roller integrity”.

It also advised that its maintenance personnel be reminded again of the importance of the 100-hour inspection, and that they are vigilant about their check of the roller assembly area of the flap system.

“It ended okay for us,” says instructor Jake King. “But I doubt a solo novice pilot would have been able to maintain control and land safely.

“We would have been looking at a completely different outcome.”

// A FREE LESSON

The investigator in charge of reviewing this occurrence, Lou Child, commends Sunair for sharing their story.

"It means other Cessna operators get a 'free lesson' in the importance of the 100-hour check and the daily preflights," she says.

"The CAA is very grateful to Sunair for its willingness to help, both with the investigation, and with getting this important message out to the Cessna-owning community."

Comments or queries? Email **lou.child@caa.govt.nz**

THE DAMAGING EFFECT OF TORSIONAL LOADS ON CARGO HOOKS

After repeated instances of damage to hooks carrying spreader bars, defect reporting has encouraged the manufacturer to recommend extra checks.

Towards the end of 2020, the CAA became aware that several cargo hooks had become damaged due to torsional[1] loads.

Rotor and Wing in Taupō submitted a flurry of defect reports to both the CAA and the hook's manufacturer, Onboard Systems.

The CAA published a continuing airworthiness notice – *05-014 Onboard Systems Cargo Hooks – New inspections for hooks used for torsional load applications*. This advised that loads attached to a cargo hook with a spreader bar (such as a fertiliser bucket) may cause the cargo hook to be subjected to high torsional loads which could damage the cargo hook.

Rotor and Wing reported to Onboard Systems, that, "If the spreader bar reacts against the load beam, the torsion is carried through the side plates to the armor plate bolt, which is the only bolt in the hook that can carry a shear load. The side plate is weak in the area of the armor plate, and cracks due to the twisting that results from the shear load on the bolt. The torsion on the load beam pivot pin would tend to loosen it in the load beam, and the torsion on the hook would tend to spread the side plates apart. This will tend to pry the pin out of the load beam, and also damage the bearings".

Onboard Systems responded by adding to its component maintenance manual, recommendations of additional inspections of the cargo hook, certain on-condition repairs, and/or appropriate replacement actions to its component maintenance manual. (See CMM document number 122-015-00, section 4.5 15 December 2020 at onboardsystems.com.)

Chief engineer of Rotor and Wing John Hobday says while the additional inspections should prevent further damage and safety issues, they don't fix the basic problem of the hooks and attachments becoming damaged in the first place.

"The fertiliser buckets over time have larger engines, high impeller RPM and larger diameter impellers, all leading to increasing torsional forces.

"There is experimental work going on around isolation units, however, and this work is aimed at eliminating these forces from impacting on the cargo hook."

// ROPES AND STROPS ADVICE

To view the 2019 ropes and strops presentation, "Inspections and safe use of lifting equipment", go to **aviation.govt.nz > safety > safety advice > helicopter safety**.

Photo courtesy of Helisika Helicopters.

1 "Torsion is a twisting effect on something such as a piece of metal". *Collins Dictionary.*

OCCURRENCES DASHBOARD

These are the number, and type, of occurrences reported to the CAA, 1 April 2021 to 31 June 2021.

	Occurrence type
12	**Accident**
31	**Aerodrome incident**
358	**Airspace**
331	**Aviation-related concern** (for example, complaints about low flying)
403	**Bird**
8	**Dangerous goods**
220	**Defect**
10	**Hang glider accident**
408	**Incident** (anything not fitting into any other category, for example, a go-around)
12	**Navigational installation occurrence** (for example, a transmitter failure)
1	**Parachute accident**
5	**Promulgated information occurrence** (for example, significantly incorrect weather information)

ACCIDENT NOTIFICATION

24-hour 7-day toll-free telephone

0508 ACCIDENT (0508 222 433)

aviation.govt.nz/report

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

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

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Neil Comyns – Maintenance, South Island
027 285 2022 / neil.comyns@caa.govt.nz

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

GETTING TOO MANY VECTORS?

Email: vector@caa.govt.nz

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, www.taic.org.nz.

Schempp-Hirth Discus-2c	
Date and time:	21-Nov-2017 at 16:00
Location:	Omarama
POB:	1
Damage:	Destroyed
Nature of flight:	Private other
Pilot licence:	CASA private pilot licence – glider, GFA level 2 instructor, CASA PPL (A)
Age:	78 yrs
Flying hours (total):	4,782
Flying hours (on type):	11
Last 90 days:	20

A Schempp-Hirth Discus-2c glider was being flown by a visiting overseas pilot as part of the South Island Regional Gliding Championship on the afternoon of 21 November 2017.

The pilot had achieved the first two points of the set racing task and was thermalling close to terrain below the Hunter Ridge in the Huxley Range, Central Otago. Following a series of right-hand turns the aircraft made a left turn, the airspeed rapidly reduced, followed by an aerodynamic stall. There was insufficient height to recover from the stall and the glider impacted the terrain with the pilot receiving fatal injuries.

The safety investigation identified the following contextual factors:

- Wreckage signatures and track data indicated an unrecovered aerodynamic stall.
- Though an experienced glider pilot, they had minimal experience gliding in the South Island mountainous environment.
- The pilot made an error in judgement by delaying a decision to stop circling.
- It was possible the pilot's performance had degraded after a period of challenging flying.
- Flying in the Championship may have influenced the pilot's decision-making.
- The South Island mountainous area is regarded by pilots as one of the world's most challenging gliding environments and the soaring conditions were challenging that day.

See the full safety investigation report at **aviation.govt.nz > safety > safety reporting > fatal accident reports**

CAA occurrence number 17/7309

Vans RV-7	
Date and time:	01-Jan-2018 at 12:20
Location:	South of Dargaville
POB:	2
Damage:	Substantial
Nature of flight:	Private other

A Vans RV-7 departed Whangārei aerodrome with two people on board. After about 17 minutes flying, the aircraft entered a high angle of bank (AoB) manoeuvre, achieving 70 degrees AoB. Five seconds later the AoB increased to 130 degrees and the aircraft began to pitch nose-down.

During the resulting descent, the indicated airspeed was recorded at 244 kts, which exceeded the aircraft 'never exceed speed'.

Approximately 30 seconds after entering the high AoB manoeuvre, witnesses saw the aircraft break up in flight and then impact terrain approximately three nautical miles south-west of Te Kopuru.

The CAA's safety investigation identified the following:

- The aircraft entered a high-speed descent from an unusual attitude.
- The pilot did not recover the aircraft from the unusual attitude or subsequent high-speed descent, which resulted in structural failure and in-flight breakup.
- In-flight breakup occurred as a result of rudder flutter, as the aircraft airspeed exceeded the design limitations.

Three safety actions and two recommendations were raised as a result of the safety investigation relating to raising awareness among the light sport aircraft communities of the need to understand the performance and handling characteristics of high inertia/low drag aircraft and the risks associated with operating close to the aircraft limitations.

See the full safety investigation report at **aviation.govt.nz > safety > safety reporting > fatal accident reports**

CAA occurrence number 17/8080

GA DEFECTS

GA defect reports relate only to aircraft of maximum certificated takeoff weight of 9000 lb (4082 kg) or less. More GA defect reports can be seen on the CAA 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

Eurocopter AS 350 B3

On descent to base, during a ferry flight with only the pilot on board, the aircraft developed a vertical vibration/bounce. This quickly increased, to the point the pilot became very uncomfortable.

The pilot altered the collective and cyclic positions in an attempt to stop the vertical bounce. However, these attempts were ineffective. The pilot then put the aircraft into a medium right turn which stopped the vertical bounce immediately. The pilot proceeded to land the aircraft with no further issues, and the aircraft was grounded pending an engineering inspection.

The aircraft was inspected the following day, paying particular attention to the rotor system. No defects or discrepancies were found. The aircraft was test flown and released back to service. The aircraft subsequently flew approximately 10 hours before undergoing a scheduled heavy maintenance check. As part of the heavy maintenance the star flex was removed and replaced due to time expiry, and subsequent track and balance carried out on the main rotor blades.

Due to the nature of the event, the operator contacted the manufacturer for advice. The advice given by the manufacturer had already been carried out by the maintenance facility. Other than the inspections and checks already carried out, no further input was received from the manufacturer. The operator investigated the history of the aircraft with no similar incidents being recorded, and also contacted another operator who had experienced a similar incident.

While the cause of the vertical bounce could not be conclusively determined, it is possible it could have been the result of a momentary single blade imbalance. However, the operator was unable to provide corrective or preventative actions to prevent future reoccurrence.

CAA occurrence number 19/8182

Eurocopter AS 350 BA

After maintenance and having a new hour meter fitted, test flights were carried out. Several run-ups on the ground lasting 2–3 minutes caused no issues.

However, on the first flight, about five minutes into running the engine and one minute after having the collective raised, smoke was noticed coming from behind the hour meter, as well as an orange glow. All electronics, including the battery, were turned off and the pilot returned to land.

The hour meter was quickly removed by which time the fire had self-extinguished.

It was found the incorrect hour meter had been installed in the helicopter. The maintenance provider will ensure the relevant data sheet is stored with the unit to prevent a reoccurrence.

CAA occurrence number 19/5786

Piper PA-28-181

Rear trim cable

Part model:	PA 28-181
Part manufacturer:	Piper
Part number:	62701-014
ATA chapter:	2700
TSI hours:	18.6

With the aircraft parked, an unusual noise was noticed when the elevator was moved. Further investigation discovered that the elevator trim aft cable turn barrel was contacting the rear pulley.

The elevator trim system was found to be rigged incorrectly. The elevator trim system was rigged in accordance with Piper maintenance manual section 2C23,2C18.

CAA occurrence number 19/3627

Pacific Aerospace Cresco 08-600

Flap torque tube

Part model:	Cresco 08-600
Part manufacturer:	Pacific Aerospace
Part number:	08-45935-1
ATA chapter:	5750

During refuelling, the pilot noticed that the flap torque tube attachment lug was cracked. The cause of the cracking could not be determined. However, the Cresco MM CH5 requires regular inspection of the flap torque tube and linkage for cracks and security every check 1 and 2. The torque tube was removed and paint stripped. A visual inspection of the entire torque tube was carried out with nil defects detected. Torque tube repaired in accordance with 43.13-1B, Ref 4-103 Para B. The torque tube was repainted white to aid in visual inspection/defect detection for the future.

CAA occurrence number 19/2943

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