

POINTING TO SAFER AVIATION

March/April 2018

vector

Tuning Into Ag



Thrills, Risk, and Dying
Report Laser Strikes

'Uncontrolled'
doesn't mean *you*

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Tuning Into Ag

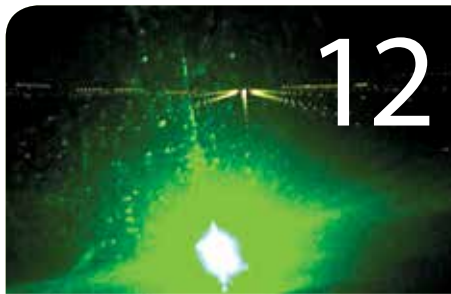
Radio use in the agricultural sector is under the spotlight following several aviation related concerns. We take a look at what's involved in good communication.



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Thrills, Risk, and Dying

What drives some pilots toward disaster, as they chase flying thrills? Research finds it's a combination of neurological and social factors. An uncompromising emphasis by training schools, instructors, and experienced pilots on *always* having a margin of safety might save lives.



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Report Laser Strikes

Laser strikes against New Zealand aircraft have become frighteningly regular. Pilots report them to ATC but it is equally important to report to the CAA.



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'Uncontrolled' doesn't mean you

The number of 'proximity events' at uncontrolled aerodromes increases each year. Avoiding airborne conflict comes down to the basics of situational awareness, communication, lookout, courtesy, and preflight preparation.

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Cover: An Air Tractor conducting an agricultural spraying operation. See our agricultural articles on pages 4 to 6.

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Director's Awards Nominations

The Director of Civil Aviation is calling for nominations for this year's Director's Awards, and the CAA Flight Instructor Award.

The awards, which are in their 23rd year, are presented in three categories that personify safety: an individual, an organisation, and a flight instructor.

The awards give aviation participants an opportunity to acknowledge those who have made a significant difference to aviation safety. The recipients are recognised for actions that have been responsible for increasing safety awareness, and who give excellent examples for others to follow.

If you think someone has made this valuable contribution, consider nominating them. Send in a few paragraphs on why your nominee should be considered, to the CAA's Manager Communications and Safety Promotion, Mike Richards.

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The last date for nominations is Monday 4 June 2018.

The winners will receive their awards during Aviation New Zealand's annual conference, to be held 30 to 31 July 2018 in Nelson. ■



From the Director



Welcome to this new feature in *Vector*. I want to take this opportunity to share news and information from the CAA – and I don't want it to be one-way. Email any comments or questions to info@caa.govt.nz with "For the Director" in the subject line.

I'm very pleased with the working relationship established with the Aviation Community Advisory Group (ACAG), and the quality of the advice it has been providing on behalf of the aviation community. That advice covers rules, policy, and any other matters affecting aviation safety or the operating environment.

Perhaps the biggest challenge that industry and the CAA face is the certification of the 300 or so operators needing to meet new safety management system (SMS) requirements in the next couple of years.

Congratulations to the 59 organisations that have completed SMS Certification. We will work closely with operators and industry bodies to assist the certification of those that still need to meet the new standards. The changes will improve safety and also have the advantage of bringing aviation systems into closer alignment with the requirements of the Health and Safety at Work Act 2015.

As for other priorities, at present our eight safety focus areas remain:

- » Loss of control in flight
- » Runway excursions
- » Airborne conflicts
- » The helicopter sector
- » Queenstown operations
- » Security threat levels and responses
- » International air cargo security
- » Smart Security.

You can read more about these at www.caa.govt.nz, "About Us > Annual Reports and Statements of Intent".

Fly safe.

Graeme Harris

For more about SMS implementation plan deadlines, see the insert.



Recent issues concerning poor radio use by some agricultural pilots have *Vector* going back to the basics.

Radio use was highlighted in two recent aviation related concerns (ARCs) involving agricultural aircraft. One of these occurred at Tokoroa aerodrome between a Fletcher FU-24 and a Cessna 172. The C172 had to conduct a go-around despite making radio calls to the FU-24 it had in sight, but which wasn't responsive on the radio.

CAA's ARC investigator, Roger Shepherd, said the Fletcher pilot explained that when working near Tokoroa, he's found the number of calls other pilots make to be a distraction to his sowing work at times. So, he turns the radio volume down.

Roger says he's heard similar explanations from other agricultural pilots. But good radio use is a key part to keeping everyone safe. It's all about listening out, communicating, and making sure that you're on the right frequency.

Turn it on, and turn it up

While keeping a lookout is still the primary traffic avoidance tool, there's no use in a radio with its volume turned down, or worse, *off*.

The issue is possibly due to old habits in pilots who started out when it was normal for agricultural aircraft to not have radios fitted.

This is because they had been operating only in Class G uncontrolled airspace. However, with more agricultural aircraft based out of busy unattended aerodromes, and the increased mandating of radio use through MBZs, more agricultural aircraft are being equipped.

With radio equipment cheaper and lighter than 25 years ago, Roger thinks there's really no excuse for not having a radio – even if you are only ever operating in uncontrolled airspace.

"It's good airmanship to be listening out, and these days it's surprising what traffic is around in uncontrolled airspace," he says.

Communicate

CAA agricultural specialist, Gary Langman, says that some ag pilots tend to think the airspace they are in is their own.

"They don't expect someone else to pop up over the hill and look at them. But it does happen."

The second ARC involved two agricultural aircraft (fixed wing and rotary wing) operating in the same area. In transit, the fixed wing came close to the working helicopter, without warning.

Earlier, the fixed wing had been at an airstrip waiting for fog to clear. After departing the airstrip, the fixed wing pilot was still monitoring only their 'company frequency'. He hadn't communicated or heard any calls from other traffic on the local Class G frequency.

"Be aware of where you're operating and who is around you. If you can see or hear other operators around, try to make yourself known, and tell them where you are," recommends Gary.

Good radio use is becoming even more important with the growth in air traffic, especially from flying schools. If you're going to be operating in an area where it is common for training aircraft to be flying, be proactive and talk with the local training organisations before going out.

Keep radio calls concise and use standard phraseology. That will help keep radio clutter down, and reduce the likelihood of radio distraction for others.

Tune in

Tuning into the right frequency may seem obvious, but it's important to remember, when operating in Class G airspace, to listen out on the appropriate FISCOM frequency (see *AIP New Zealand* GEN 3.4) unless you are operating within an MBZ or CFZ.

Aerodromes without an air traffic service, that have their details published in *AIP New Zealand*, will always have a dedicated frequency listed in the COM box on the aerodrome chart. In some cases, this frequency will be 119.1 MHz, as it will be with most unpublished aerodromes. If any of the latter are located in an MBZ or CFZ, expect the unattended frequency to correspond with that of the airspace. At attended aerodromes, when ATS are off watch, the frequency remains the same as during the hours of watch.

For agricultural operators, often the focus is on monitoring the 'company frequency' for operational and safety reasons.

But when an aircraft isn't equipped with a radio that has multi-channel monitoring capabilities, it's even more critical to keep a good lookout for other traffic operating at low level, as seen in the ARC described earlier.

If you spot any traffic, change to the appropriate frequency to advise your whereabouts and intentions.

"Be aware of where you're operating and who is around you. If you can see or hear other operators around, try to make yourself known, and tell them where you are."

It's for everyone's benefit

Roger says that while agricultural operations are conducted under VFR, it's not that distracting to hear a radio call. Gary compares it to listening to a radio while driving a car.

Radio use comes down to common-sense airmanship, and keeping other pilots in the loop about what you're doing. While pilots' primary consideration must be to keep a lookout as part of maintaining situational awareness, good radio use is an important component of it too.

More information

For more information on radio use, see the *AvKiwi Plane Talking* e-learning, available at www.caa.govt.nz/avkiwi. This course also provides handy links to Advisory Circular AC91-9 *Radiotelephony Manual* and the GAP booklet *Plane Talking: A Guide to Good Radio Use*. ■



Ag Rules

It's been two years since important changes to agricultural ratings and training requirements were made in Part 61 *Pilot Licences and Ratings*. Here's a reminder for pilots, instructors, and examiners.

The April 2016 re-issue of Part 61 was supported by the Part 137 *Agricultural Aircraft Operations* Sector Risk Profile (SRP) completed in 2013. This SRP identified the need to lift training standards in the sector, leading to some significant changes for agricultural aviation participants.

To enable a smooth transition between training requirements, a period of more than a year was allowed for agricultural participants to meet the new rules. Since the changes were implemented, however, there have been cases of participants not being fully aware of what the new rules require.

Pilots

For agricultural pilots, the main impact of the changes was the introduction of more specific rating requirements. While previously the agricultural rating was all-encompassing, from April 2016, ratings were split into three specialisations: topdressing, spraying, and an aerial vertebrate toxic agent (VTA) rating. So, pilots have to be assessed in each competency rather than receiving a blanket rating.

The rule changes also affected the pilot chemical rating. A current chemical rating is now required before undergoing training for the initial Grade 1 and 2 agricultural ratings. Also, the refresher requirement for the chemical rating was increased from three to five years.

On the subject of chemicals, this is an important reminder that before undertaking any aerial spraying, ensure that the chemicals are legally approved for this type of operation.

Often this information isn't included on individual product labels. So, to check if your chemicals can be aerially sprayed, visit the Environmental Protection Authority website, www.epa.govt.nz, "Quick Links > Database search > Approved hazardous substances with controls".

Once you have entered the name of the substance and brought up its information, expand the "HSNO additional controls" section to view information about the restrictions on the use of the specific chemical.

Instructors and examiners

The introduction of an agricultural flight examiner rating was a key change for instructors from April 2016. This aligned the agricultural sector with the airline and general aviation sectors.

To become an examiner, participants must also hold a Category E flight instructor rating. Meanwhile, E-cat instructors must pass a competency assessment every two years to remain current.

Some changes to instructor privileges were also included in the rule changes. Of note is that instructors can no longer conduct competency assessments for the issue of Grade 1 or 2 agricultural pilot ratings. This privilege is restricted to agricultural flight examiners.

E-cat instructors continue to train pilots and conduct annual competency assessments. They are also able to separately issue topdressing, spraying, and aerial VTA ratings. However, the initial prime agricultural rating (which includes one of these specialised ratings), must be issued by an agricultural flight examiner.

More information

To read a more comprehensive overview of the changes, we have a guide available, *Agricultural Aircraft Operations: The effect of April 2016 changes to Part 1, Part 61 and Part 137*, at www.caa.govt.nz, "Aviation Info > Pilots".

To view Part 61 in full, see www.caa.govt.nz, "Quick Links > Rules > Part 61". To view a summary of changes made to Part 61, see Amendment 11 in "View History of Amendments". ■

Photo: iStock.com/6381380



Thrills, Risk, and Dying

“Fear is a super important thing, man ... without fear, you *will* die.” Jeb Corliss, 2016

So who is Jeb Corliss? Only about the world’s most well-known proximity (yes, that means close to things) wingsuit pilot.

In January 2012, just seconds into a flight off South Africa’s Table Mountain, about two metres off the ground and doing 193 km/h, Corliss clipped some rocks. He was critically injured and had he not been able to deploy his emergency chute, a spokesperson later said, he would have surely died.

Corliss claims that 10 years earlier, he’d almost died jumping from the same mountain.

What is it about certain pilots who willingly edge closer and closer to catastrophe in the pursuit of a thrilling flight?

According to a 2017 literature review¹ for the CAA’s safety investigation unit, it’s a combination of things.

Firstly, a certain part of the brain of the most extreme risk-takers appears to lack effective dopamine ‘receptors’, which help control the brain’s reward and pleasure centres. Risk-takers don’t get the same buzz as the rest of us from enjoyable activities, so they up the ante.

Secondly, according to a 2004 study of skydivers, risk can become ‘normalised’, the more flights that are successfully completed. Risk doesn’t stand out as risk any more, it’s just part of a great flight.

Thirdly, a study in 2010 published by *The Research Quarterly for Exercise and Sport* found extroverts tend to tolerate more risk for the psychological arousal they seek. Neurotic people may accept a higher degree of risk in an activity that counters stress or tension.

A 2011 study of hang glider pilots by the New York Academy of Sciences found a significant factor in the pilot weighing risk and reward of a certain activity was being able to enhance their reputation with their flying peers. This is particularly the case in what have been described as “hyper masculine” extreme sports groups. In these groups, it is not uncommon to find participants regarding their peers who die in the sport as ‘heroes’, who lived life to the full.

This philosophy is expressed by a 31-year old climber whose friend had died in a mountain climbing accident.

“People spend their whole lives, maybe, doing something they don’t want to do ... instead of dying at 25 and doing what they want to do! I do see merit in that ... dying at 25 doing what you really want to do, eyes open.” Creighton, 2015

Continued over >>

¹ A Literature Review of Risk Taking Behaviours and the Regulation of Private Hang Gliding in New Zealand, Civil Aviation Authority of New Zealand, E Duggan, 16 June 2017.



Photo: iStock.com/vuk8691

That someone can be so enchanted with a sport that they dismiss any consideration of risk, was highlighted to the CAA's safety investigators a few years ago.

Watching video of a fatal paragliding flight they were struck that, despite the paraglider being at times only a few centimetres from the ground at an estimated 50 or 60 km/h, the only expression on the pilot's face was sheer exhilaration.

Now CAA safety investigator, Steve Rogers, and Jim Burtenshaw, the CAA's manager of safety investigations, are making a plea to such pilots to always build a margin of safety into their flying.

It's not that Jim, a former Muriwai surfer, and Steve, a former hang glider pilot, are without sympathy for chasing the thrill.

It's just that they've had to investigate a few fatalities in their time.

Steve has even witnessed the death of a parachutist as she tried to carry out a steep turn, low to the ground.

"She stalled, and fell from about 20 or 30 feet."

He investigated the death of a glider pilot who, looking for lift, got in very close to a hill without a clear escape path.

"Suddenly there was a downdraught," says Steve, "and there was nowhere to go."

"If you look at the safety net around a major airline," says Jim, "they have layers and layers of procedures and training, and all the airspace they fly in is regulated, and they've got people watching them and controlling them, so their safety net is huge.

"But the safety net around people jumping off the side of the cliff, for instance, is, 'Did I check my rig properly? Are the weather conditions okay? What is my alternate route if the wind changes?' Their safety net is them, and maybe their mates.

"If they choose to reduce a safety margin that was kind of minimal anyway, they're bound to have an accident."

Someone who now understands how intoxication with an upcoming flight can blind even an experienced pilot to risk, is a hang gliding instructor with 14 years of flying under his belt.

Normally subjecting himself and his rig to a thorough risk assessment before each flight, in October 2017, he nevertheless "missed a step".

"I'd discovered my brand new glider had a tendency to pull to the left. I'd done two flights in it, but was able to fly in such a way as to make up for that. I'd been in touch with the

manufacturer so I was taking steps to remedy the issue. In the meantime I was still flying. The tendency to fly left didn't make for ideal flying but I could manage it.

"The conditions on the day of the accident were perfect for a great cross country run, possibly the only opportunity in the season for a flight like that.

"I ran off the hill, and the glider sunk slightly – maybe there was a little lull in the air coming up the takeoff – and lost a little bit of height. I skimmed a fence – just – but the left tip of the glider caught it.

"The glider spun, which initiated a stall that was irrecoverable. Because the hill was dropping away, I ended up falling with a stalled wing and landing on a big rock, which broke my right femur.

"And I'm an instructor and warranted to check gliders. I've got more than a thousand hours flying. But I'm in that group that suffers from what we call 'intermediate syndrome' – you sort of get to a point where you go, 'Hey, what can happen to me? I know everything.'

"So that day, I'd become obsessed with the potential of the day and I almost negated, or forgot, that there was a risk with the wing."

Four months after the accident, the pilot was still not back at work and flying was out for at least another two months.

That's if he decides to fly again.

"I'm questioning myself," he says, "if it's really worth it."

Always, a margin

How do you build a culture of 'always, a margin' when so many participants in the more extreme flying sports may be neurologically or characteristically resistant to it?

Jim Burtenshaw believes there's a crucial part to be played by training organisations and their instructors.

"It would be great if they could focus on instilling in novice pilots from the outset, the absolute necessity to have some wriggle room should things go wrong.

"There are many instructors and senior pilots who do that, of course, but they – and their organisations – need to foster a total safety culture, including leading by example.

"So, along with all the talk about edgy flying, there should always be the question, 'And what have you got up your sleeve in terms of margin?'"

The safety investigators would be very happy to see such messages in all communications, from instructor-student conversations to marketing material and community newsletters.

"That's particularly important with the more accident-prone sports like paragliding²," says Jim.

"Some of the would-be pilots 'educate themselves' watching YouTube videos. They then set out to emulate what they've seen, without realising – or perhaps even caring – that the pilots they've been watching have years of experience.

"They need a reality check, in the form of someone more experienced, asking them what they'll do if things go pear-shaped.

"It can be done. Look at the attitudes towards drink driving. A generation ago, it was 'one for the road'. Now it's 'who's the designated driver?'

"In the same way, if everyone is saying the same thing, 'What's your *out?*' it just becomes part of the flying culture, rather than a slightly tedious add-on to exhilarating flying."

"It's in the interests of the training and membership organisations to lead that," says Steve. "Sure, exciting flying is good for business, but injuries and deaths aren't."

After his near-death experience on Table Mountain, Jeb Corliss spoke about fear. He said in a later promotional video for GoPro, that his biggest mistake in South Africa was that he had "lost fear".

"I'm actually pretty happy this happened. I think in the long run, it saved my life. I feel very fortunate that I was able to make so many mistakes and then have such a catastrophic accident, and not die. And get an opportunity to live again."

Jim and Steve want that message out as well.

"Future chute and aircraft design may well increase the rush of a great flight," says Jim. "But if someone ends up a statistic, they'll never discover that."

Steve agrees. "Why only have this many thrills," he questions, with his hands close together, "when you can exercise just a bit of caution, and have this many?" he finishes, grinning, with his hands wide apart. ■



"So, along with all the talk about edgy flying, there should always be the question, 'And what have you got up your sleeve in terms of margin?'"

2 2017 – Twelve reported paragliding accidents, two deaths, six serious injuries, five minor injuries.

Lycoming Valves

Any time the valves in a piston engine stick, even intermittently, it's a serious problem. So what can be done to prevent it, and how can Lycoming operators maintain their engines and rectify valve train problems?

Imagine the small space between each valve stem and its guide. There are many ways it can become compromised, so it pays to keep on top of maintenance. Always ensure your engine is running clean oil and breathing clean air.

Filter it out

"Contaminants ingested into the engine are a known major cause of valve train problems," says CAA Airworthiness Inspector, Brendan Odell.

The first line of defence against contamination is filtration.

The air filter can prevent dirt and abrasives from entering the engine, but only if it forms a good seal when fitted and isn't bypassed by leaks elsewhere in the induction system.

In extremely dusty conditions, the air filter could even need changing every few hours.

"An operator's maintenance programme should be appropriate to the operation of the engine and the conditions it operates in," says Brendan.

Equally, contaminants in the engine oil need to be filtered out.

Most of today's opposed Lycoming engines are fitted with a full-flow oil filter. Older engines with pressure screens may be converted to the newer system for more effective cleaning.

400-hour valve inspection

Some operators have misunderstood the intention of Lycoming Service Bulletin No. 388, using it as the guide for their regular 400-hour valve inspection. In fact, the service bulletin only relates to exhaust valves, and should be complied with *in addition* to the regular inspection.

The process outlined in the relevant Lycoming operator's manual and the latest version of Lycoming SSP 1776 *Table of Limits* should still be used as the reference for inspection. It covers both inlet and exhaust valve trains.

Rectifying problems

Should valve train problems like sticking valves, camshaft problems, or low compression occur, the *correct* inspections are necessary to ensure the problem doesn't repeat.

Failing to do so could prove a lot more costly in the long run.

The latest revision of Lycoming Service Instruction 1425 provides recommendations to reduce the possibility of valve sticking. It also outlines a procedure for reaming valve guides without removing the engine from the aircraft, or the cylinders from the engine.

Let us know

Always remember to file a CA005D *Defect Report* when a problem of this type is found. Sharing information helps the whole industry. ■



Photo courtesy of Boris Misjencevic / canuckaviation.com

Update on Sector Risk Profiles

Sector Risk Profiles are a great example of the CAA and the aviation community working together to improve aviation safety. The action phase has begun for Part 121, 125, 129, ANZA, and Part 135 operators.

Sector Risk Profiles (SRPs) provide a framework for the CAA and industry to examine risks and identify where improvements can be made. Understanding the risks in our different aviation sectors is an important step in mitigating them.

So far, the following SRPs have been developed, in partnership with industry:

- » Part 137 *Agricultural Aircraft Operations* (2013)
- » Part 135 *Air Operations – Helicopters and Small Aeroplanes* (2015)
- » Parts 121, 125, 129, and ANZA *Medium and Large Aircraft Air Transport Operations Sector* (2017)

Further work is under way on the two most recent SRPs.

Medium and Large Aircraft Air Transport Operations

Through industry workshops, 11 key risk 'themes', three overarching causes, and 189 potential actions were identified in this sector. To provide the sector with a manageable starting point, a refined list of 31 actions was produced.

Operators in this sector are encouraged to review the report, identify which risks are relevant to their operation, and employ or enhance mitigations to address the risks through their safety management systems (SMS).

Action implementation plans available on www.caa.govt.nz/srp detail possible actions, benefits, resources required, expected outcomes, and the coordinator for each plan. The coordinator could be the individual or group within the sector who will oversee the action taken. This may be a CAA operational unit manager or one of the sector groups.

CAA Sector Risk Profile Lead, John McKinlay, says, "the key to a successful outcome is for both the CAA and the aviation community to take an active part in the action implementation phase, to mutually create an even safer aviation environment for New Zealanders and our visitors".

Helicopters and Small Aeroplanes

Four industry workshops were held between November 2017 and February 2018, as part of continuing work into the Part 135 SRP.

From these workshops, actions related to the risk themes will be updated and refined in an action list.

Criteria for that list includes:

- » The actions will have a positive impact
- » They are achievable in roughly 24 months
- » They are feasible
- » They have general alignment with other international activity (eg CASA, CAA UK, ICAO, etc.)
- » Factors unique to New Zealand have been considered
- » They are data-based and evidence-based.

Following the release of the action list, an implementation plan will be created, similar to that produced for operators in the Medium and Large Aircraft Air Transport Operations sector.

Part 135 operators can then use the plan to assist and inform the development of their own risk management plans within their SMS.

A key indicator that the SRPs have been successful will be when operators within the sectors have implemented the agreed actions within their risk management plans.

More information

For more information, visit www.caa.govt.nz/srp. If you have any questions, email the project team at srp@caa.govt.nz. ■

Photo: iStock.com/lazingbee



Report Laser Strikes

The incidence of flight crew being targeted by the menacing green (or blue) light is on the increase. There's not a lot you can do to prevent them, there's a bit you can do to mitigate their effects, but the most important thing is to report them.

The number of reported laser strikes against aircraft has been growing since 2014.

In that year, rising stats briefly dipped when tough new rules covering the import, supply, and possession of high-power laser pointers came into effect.

Now included under the Summary Offences Act 1981, just *possessing* a high power (an output of more than one milliwatt) laser in public, without a reasonable excuse, can land someone in jail for up to three months or with a fine of up to \$2000.

Since 2014, however, there's been a 55 per cent increase in reported laser strikes, with 2017 the most laser-struck year on record – 161 reported occurrences.

CAA Air Transport Inspector, Pete Wilson, has more than 6000 hours flying in Europe, including as a British Airways CityFlyer captain.

He's been lasered more than 30 times – on one occasion, twice in a few moments, from one direction, and then from the completely opposite direction.

"But the worst was on final approach to London City Airport. The first officer took the brunt of it and was in a fair bit of pain. Fortunately, I was looking in a slightly different direction."

Which was just as well, because London City is a captains-only landing due to the short runway. If Pete had been hurt instead of his first officer, the aircraft would have had to divert.

Direct eye exposure to a laser beam can result in momentary flash 'blindness', where visual interference persists after the laser beam is removed. There can be 'after-images' left in the visual field after the light is moved away.

Pete says it is, at the very least, a huge distraction, particularly during approach when workload is high. And, as with anything startling, it can be disruptive

to the pilots' decision-making; it can completely disorient them, or even incapacitate them.

It's not just large air transport aircraft being attacked. Latest police figures show that in 2015/2016, the Eagle helicopter suffered 10 major laser beam strikes.

When *Vector* spoke to Constable Mike Collins of the Eagle unit at the end of January 2018, he'd just been lasered – the third time that month.

"I was once hit by the beam of a laser so high-powered," he says, "that once we confiscated the laser, we found that at close range, its beam actually burned through items."

"The effects of that incident took a couple of days to pass."

Hits in New Zealand have also been reported on small commercial aircraft, private aeroplanes and helicopters, and sport aircraft. After a dip in 2015, the number of strikes against these aircraft, too, is rising.

While there are technologies available to mitigate the effects of a laser strike, they're considered awkward to use and don't provide full protection. In development are systems to detect where a laser is being fired from, but they're not yet ready for market, and won't stop the strike in the first place.

Currently, advice to pilots mostly surrounds what to do in the aftermath of a laser strike.

The much-lasered Pete Wilson offers the following.

"Try not to look at the light. It's a natural reaction to want to do so, and you want to be able to identify where the laser beam is coming from. But to limit the effects, try to make your automatic reaction to glance away."

"Don't rub your eyes, although that's another natural response. It can cause further irritation or injury."



“Report the strike immediately to air traffic control. Other aircraft need to know what they may be up against, and the police will get an opportunity to chase it up.

“Turning up the cockpit lighting may help get over the laser’s effects.

“Finally,” says Pete, “take the time to formally report it after you land. There’s a temptation not to bother because you’ve had a long day, and now you have to do the paperwork.

“But reporting will help the CAA analysts identify if there are peaks of laser strikes in certain places, or times of the day or year.

“That at least will help other pilots to be prepared.”

Civil Aviation Rules 12.55 and 12.57 actually mandate the reporting of a laser strike to the CAA, because it’s “an immediate hazard to the safety of an aircraft operation”.

CAA Deputy Director Air Transport and Airworthiness, Mark Hughes, says such reporting will help to identify key risk areas.

“It will also ultimately help the CAA, together with other agencies such as the police, develop some solutions.”

It’s relatively straightforward to report. Just call 0508 4 SAFETY (0508 472 338) which is staffed 24 hours.

That can be followed up by completing the CAA800 form *Laser Beam Exposure Questionnaire*, which again, is fairly simple and quick to fill out, being mainly a checklist.

Email it to isi@caa.govt.nz (ISI stands for ‘Inward Safety Information’). Go to www.caa.govt.nz/forms to find the CAA800 form.

“Giving us as much information as possible,” says Mark, “will help us understand the nature and impact of the laser strike threat, which will further help us develop mitigation strategies for New Zealand.”

Read Advisory Circular AC91-17 *Laser Illumination of Aircraft* to learn more about how to mitigate the effects of laser strikes. ■



B727 full motion simulator in Oklahoma, using a small laser directed into the cockpit. FAA 2003

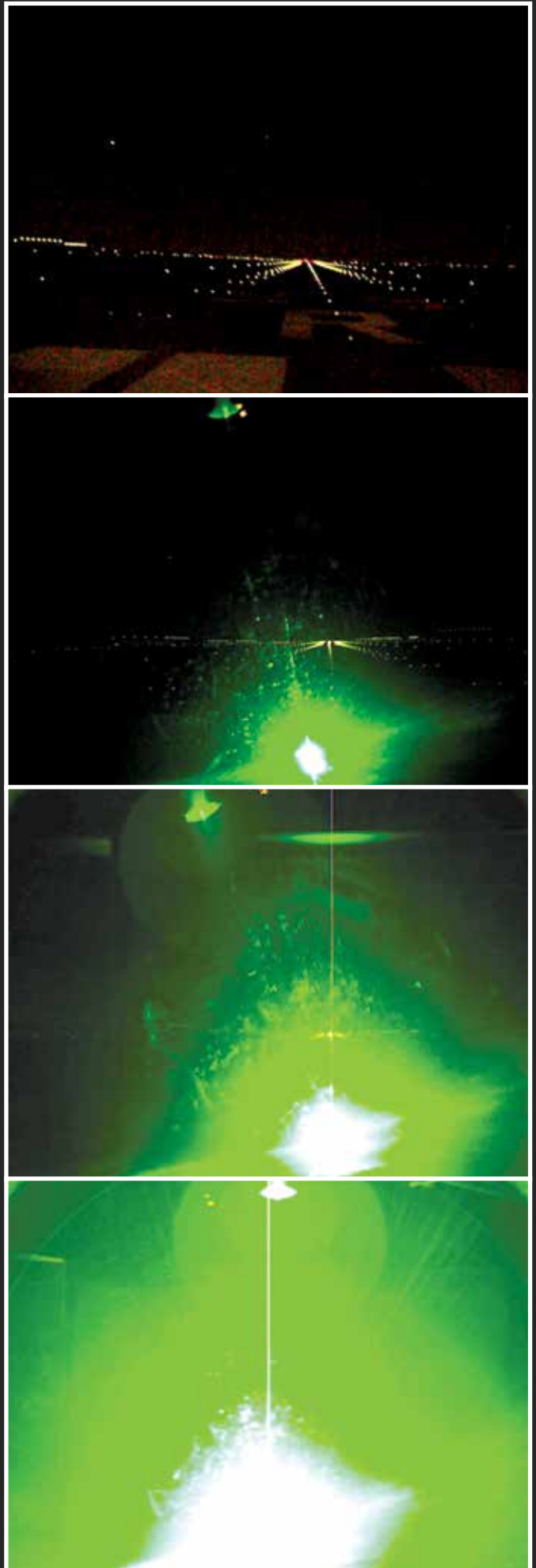


Photo courtesy of Leon McIn, United States Air Force.

'Uncontrolled' doesn't m

Proximity events at uncontrolled aerodromes continue to feature in the stats. Avoiding such occurrences comes down to the fundamentals that we all know, but actually have to *do*.

Between 2015 and 2017, there were 158 proximity events at uncontrolled aerodromes. Each year the number of events increases.

"The reasons," says Ryan Nicholl, CAA's team leader of 125/135 flight ops, "are largely down to a lapse in the basics – situational awareness, lookout, communication, and courtesy."

John Funnell, the head of the committee overseeing safety at Taupo aerodrome, offers even more succinct advice.

"It's all about using your eyes, ears, and the radio to broadcast your intentions. See, listen, and be heard."

CAA Air Transport Inspector, Chris Nicholls, would add to that list, preparedness for the circuit of unfamiliar aerodromes.

"Just 15 extra minutes on the ground before departure is worth bucketloads in safety," Chris says.

"Look at the AIP. Check the runway vectors. Check the direction of the circuit. What's the surrounding topography like? Going there on a Sunday – will there be gliding? Check airline timetables – what IFR flights are likely? Give a local a call and have a chat about what you can expect."

The South Canterbury aero club's CFI and manager, Aaron Pearce, agrees.

"We do have issues with itinerant pilots not following published procedure. Local pilots know their airport well, and most of them, if they're current, can jump in and go.

"But it's when itinerants don't want to use the grass runway – and decide instead to use a runway that's 90 degrees in conflict with the existing circuit – that things get interesting."

CAA chief meteorologist Peter Lechner flies a Grumman AA5 out of Paraparaumu aerodrome.

"It's not a pleasant experience ending up in airspace you are unsure about," he says. "So I try to prepare the night before."

"I check through all the relevant information in the quiet at home, studying the charts, the AIP, and of course, the weather information. As thoroughly as I can, I plan my flight, making sure I see where there might be issues, and deciding what I can do if those issues eventuate."

"The next day, I do another check on the weather, and on NOTAMs."

"If I leave all that homework to immediately before I fly, I don't do as good a job. At the aerodrome there's stuff happening around me, it's harder to concentrate, and you can be antsy to get into the air."

Mike Groome, airport manager at Taupo, says even an unexpected weather diversion to an unfamiliar aerodrome shouldn't cause problems.

"It should be part of preflight planning to anticipate not being able to land at your preferred aerodrome, deciding where else you could go, and what the procedures are there."

Mike says not all aerodromes welcome the standard overhead join.

Photo courtesy of Betty Shepherd



ean you

"Taupo has skydiving operations, so we want aircraft to join downwind, base or final. And that's very clearly stated in the AIP. But not all pilots consult the AIP."

Mike says a substantial number of incidents at Taupo revolve around itinerant helicopter pilots.

"They never seem to read NOTAMs!" he says. "We also have special procedures here that don't allow helicopters on certain parts of the aerodrome, but a few pilots don't read those either."

And sometimes, it's the locals

It's not always itinerant pilots who can heighten the risk of airborne conflict, however.

CAA's team leader of helicopter operations, Grant Twaddle, says sometimes local pilots have a sense of entitlement at their home aerodrome.

"Some think of the airfield as 'theirs' and can lack courtesy when it comes to itinerant aircraft. But everyone in that airspace has a perfect right to be there, and the 'entitled' local needs to show some consideration – if for no other reason than the itinerant aircraft may be bringing in the tourists the local relies on for sightseeing customers."

Grant says complacency is always a risk when pilots are used to flying into and out of their base aerodrome.

"We've had issues with the way some helicopter pilots operate. They've become casual to the point of breaching aerodrome and regulatory procedure, increasing the risk of a serious incident."

It's flying 101

Flying into an uncontrolled aerodrome requires all the basics to be done very well.

One of them is communication.

With operations from Air Nelson to training flights, at Timaru, Aaron Pearce is careful to model good communication to his students.

"When an Air Nelson Q300 is on approach, as soon as they call 'entering the MBZ', regardless of where our aircraft is on that MBZ, we will call them back and tell them that we're a club aircraft and it's a 'dual'. That relaxes the Air Nelson crew a wee bit, because they know it's a local aircraft, it probably knows what it's doing, and there's an instructor on board."

The team leader for the CAA's recreational aviation unit, Jeanette Lusty, says good communication starts even before the flight.

"Get permission to land from the owners of privately owned airstrips, including those operated by the Department of Conservation. It's courteous, but it's also about safety. Calling the airstrip owner ahead of time will let them know what's going to happen at what time in their airspace."

"Because ag work is often at low level, it's essential approaching aircraft, including ag, make the correct radio calls."

Grant Twaddle says even if a pilot uses their radio in the correct manner, they should never assume that means everyone else knows where they are and that they will stay out of the way.

"Pilots must be constantly looking outside the cockpit. And that lookout has to be a structured scan," he says.

"It's no use just quickly sweeping your eyes from side to side, and calling that 'looking out'. The brain won't meaningfully register anything outside the cockpit window."

"You have to look in one sector, focus on that sector, then look at another sector, focus on that, and so on. Scanning properly is very disciplined, and it's also incredibly important."

That advice is supported by Drew Howat, manager of Hokitika Airport. The radio frequency for Hokitika was changed in November 2017, as the area of its MBZ was enlarged.

"Some of our local pilots who were used to transmitting on 119.1," says Drew, "are continuing to monitor that, some are on the new MBZ frequency of 119.8. And some are on the FISCOP frequency of 118.5."

Continued over >>

Raglan aerodrome – there have been 24 reported occurrences there in the last three years.

"We're encouraging them to use the approved frequency, but their argument is that they want to use the one they believe 'everyone else' is on.

"It's a difficult situation, but our advice to them is that for safety, their lookout must be absolutely vigilant – almost treating all nearby aircraft as **NORDO**."

Good lookout and situational awareness often fall victim to a reliance on modern cockpit technology. And Aaron Pearce describes loss of situational awareness as a "huge factor" in near misses at Timaru.

"One of our more alarming incidents was a Cessna 172 versus a Beechcraft. The Beechcraft came in a hell of a lot more quickly than the 172 pilot was expecting.

"But the near miss was really down to both pilots losing situational awareness."

Part 91 mandates flying procedures at an uncontrolled aerodrome – particularly rules 91.223, 91.227, and 91.229.

But Ryan Nicholl says exercising a bit of etiquette never goes amiss.

"We can't cover off every aspect of flying at unattended aerodromes with rules. Sometimes it just comes down to being courteous in the circuit."

How user groups help

At Timaru, the establishment of a user group has made a big difference to the risk of airspace conflict, according to Aaron Pearce.

"It's opened up the lines of communication. There's definitely been an improvement in the way the airfield operates."

To illustrate, Aaron describes how two paramotor pilots came to a user group meeting; the first the rest of the aerodrome users knew of them.

"The paramotor pilots didn't realise how much general aviation there was at the aerodrome, and we didn't even know they existed!" he says.

"I've spent some time on the VNCs with them, so they understand the airspace better, and they've participated in the airspace review.

"There was a 'phantom' paramotor pilot that kept appearing in the MBZ, **NORDO**, and it was these two guys who tracked him down and talked to him about doing the right thing. That's much more effective than me doing it.

"All of that came from being a part of the user group."

At Wanaka, a wider user group has created a specialist airspace body.

User group president, Sue Telford, says the airspace committee meets as frequently as once a month.

"Regular and itinerant traffic coming and going from Wanaka have conflicting flight paths. The specific task of the airspace group is to make decisions that mitigate the risk posed by that."

With almost 40,000 movements a year at Taupo, the threat of airborne conflict is one of the biggest concerns of the independent safety committee there.

"If a pilot needs to be spoken to, it's not me who goes to have a quiet chat," says airport manager Mike Groome, "but a committee member.

"We've found peer pressure is much more effective in getting the safety message across."

"People can do odd things"

Aaron Pearce suggests instructors use the biennial flight review to go over circuit procedures.

"It's essential there's a conversation between instructor and pilot about the appropriate ways to vacate and join the circuit, and of course, the pilot needs to fly a standard overhead join."

Peter Lechner says keeping current is key to circuit safety.

"It's a bit like defensive driving. You do the best *you* can, and you try to anticipate what the others might do.

"Because people can do odd things." ■

Other *Vector* articles to read:

- » "Joining the Circuit at an Uncontrolled Aerodrome" (July/August 2008)
- » "So You Think You Can See and Avoid" (March/April 2015)
- » "Joining Uncontrolled" (March/April 2016)
- » "Q300s at Uncontrolled Aerodromes" (September/October 2016)
- » "Uncontrolled Aerodromes and Drones" (November/December 2016)

Go to www.caa.govt.nz, "Quick Links > Publications > *Vector* magazine".

Aftermath

In February 2014, Bruce Peterson's Aerospread company was plunged into crisis after one of its aircraft crashed, critically injuring the loader driver, and seriously injuring the pilot – who turned out to be flying illegally.



Photo courtesy of Aerospread

Just minutes after it took off on a 600-tonne topdressing sortie from the pilot's Hawke's Bay airstrip, Lima Tango Echo – a Cresco – slammed into the ground.

The pilot had been asked to return to his own airstrip because of high winds at the client's property. But he'd failed to maintain airspeed and height, and the aircraft had collided with a deer fence, propelling the nose into the ground. Both the pilot and loader driver received severe injuries on impact.

The pilot's family heard the crash and alerted emergency services.

It took 90 minutes to free the pilot and loader driver from the wreckage. They were flown to hospital for the first of several operations.

"Our world turned upside down in a flight of just three minutes and 53 seconds," says Bruce Peterson, managing director of the family-owned top dressing company, Aerospread.

"There's quite a bit to do, when you get a phone call with news like that," he says, understatedly.

By 6:30 am, about 20 minutes after that phone call, Bruce had stood down all staff from flying duties, notified the CAA, and contacted his insurer.

He phoned NZAAA executive officer, John Sinclair. "I got great advice from John," says Bruce. "He was calm and solid during a time of real confusion. It was the first of many conversations I had with him over the next few days."

While the 'nuts and bolts' were being taken care of, Bruce was also dealing with the panic and anxiety of the pilot's and driver's families. The driver, Billy, was particularly badly injured and was in the operating theatre for more than 12 hours.

The first reporter rang. It opened the door to relentless media hounding, particularly of Bruce, as spokesperson of the company and employer of the injured men.

"Fortunately, we had some media guidelines for lots of different scenarios. They included pre-written press releases where we just filled in some blanks. It was great to have those ready to go, because I had so many other things to think about."

And all the while, one half of his flying fleet was lying broken in some anonymous paddock, now 'evidence' in the upcoming CAA investigation.

"LTE was my pride and joy," says Bruce. "I'd done 10,500 hours in that aeroplane. We couldn't move it until the CAA had been down and done their thing. So it just had to stay there."

In the meantime, Bruce and his wife Helen were often at the hospital with the families of the pilot and driver.

"A couple of days in and the pilot was in a stable condition, but Billy got an infection and was in a critical condition. He was put on life support."

Bruce remembers with some bitterness, how, along with the support and help he was receiving from many people, some others could not have cared less.

"Quite sobering, really."

He found dealing with the CAA "not a horrible experience".

"I had absolutely no problem opening up the whole company to the CAA. There might have been some unsigned document somewhere, but we knew we were 99.9 per cent spot on."

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"I think that sent a clear signal to CAA that we had nothing to hide, and that kept the relationship between us pretty positive."

Aerospread managed to get a Cresco on loan, and with its other aircraft flying, it was back in business.

Then another setback. The company's second pilot began to struggle mentally with the accident and needed time away to "get his head around things".

So Bruce took on the pilot's flying duties, but continued to pay him over the next three weeks.

"Things undoubtedly started to load up on me a bit," he says, again with understatement.

Four weeks after the accident and the pilot was recovering well, although Billy was still battling away in intensive care.

The time for formal interviews with the CAA arrived. As did a bombshell.

"The pilot wasn't allowed to carry passengers. He'd had a heart attack and had a restriction on his medical.

"When Billy's family was told about this, all their grief and anger shot out at me, as the operator and Billy's employer. But the CAA team was awesome and took the family aside and explained how the situation had come about."

So how *had* the situation developed?

"Well, I'd cocked up, because I didn't know," says Bruce. "I didn't know about the restriction on the medical. We had the right documentation and I'd sighted it all: ag competency checks signed off by other E-cats, log books, current pilot licence, and medical.

"But the thing I didn't do was sight the *original* medical certificate. The pilot had sent me photocopies and I hadn't seen the reverse which detailed the limitation on carrying passengers.

"I had even asked him about his health and he'd said only that he was on cholesterol pills."

Bruce says his biggest mistake was trusting the man.

"I'd known him for 15 years. I'd flown with him in a previous company, and it never, ever entered my mind that he would lie.

"So when your employer asks to see the original copy of your medical and your licence, don't be offended, they really need to know. And if you're employing someone, ask to see original documentation."

But such reflections were for the future. Bruce had here-and-now worries. The second pilot resigned 'effective immediately'



Photo courtesy of Aerospread

to take up work elsewhere. The pilot involved in the accident left hospital and was formally charged. Again that focused media attention on the company, and on Bruce.

Billy came out of ICU, but remained in hospital for another four operations.

It would be another 67 days before he too would leave hospital. And when he did he was released only to a retirement home because he needed somewhere that could cater to his still high needs.

"It wasn't pleasant for him," says Bruce. "He couldn't walk, he had plates in his back. He was in bed 20 hours a day."

The memory of it still triggers emotion in Bruce. "All Billy had done (to deserve this) was turn up for work."

So while Bruce was dealing with revelations about his pilot, an impending court case, and the emotion surrounding Billy's slow and painful recovery, he was also cobbling together an operation to satisfy customers. While at first very sympathetic, they now just needed the 'fert' on their land.

And he was up for some serious bills.

"Of course, Billy got ACC, but it was only 80 per cent of his wage. His wife had had to become his caregiver and support.

It was unacceptable to me that they should also be on a reduced income. So Aerospread kept Billy on full pay and topped up payments for his ongoing bills to try to ease the huge load on his family.

"But the way the system works, you have to pay your injured employee, and then ACC pays you back the 80 per cent. It was six months before we saw any money.

"Eventually, Billy and his family had to find another home for him, one with wheelchair access including wheelchair-accessible showers. That kind of place isn't easy to find and doesn't come cheap.

"So, if you want to do the right thing, there are a whole heap of costs not covered by the insurance."

Apart from helping Billy's family financially (the story has a happy ending, in that Billy was finally able to return to work mid-2016), there were plenty of other bills.

"There was the lease of replacement aircraft," says Bruce, "accommodation and living expenses for a stand-in pilot and crew, legal and accounting costs, insurance excess, and loss of earnings."

And over seven months, it took \$1.1 million to rebuild LTE.

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Bruce counts himself lucky that Aerospread was able to financially weather being down one aircraft for so long.

"We were fortunate that we'd put money into assets that we could sell to help us stay out of too much debt."

Not only does the business have to be able to stay afloat financially, the CEO needs to be very resilient, Bruce believes.

"All your staff and their families, and your own family, are affected in all sorts of different ways. Stuff just comes from everywhere and anywhere, and it all loads up on you, particularly in a small operation. The pressure is huge, and you have to take a bit of time to look after your own needs."

Holding the line

Apart from the rather scary realisation that it takes a wad of money for a business to survive such an accident, and it takes a wad of personal strength for the CEO to cope with the emotional turmoil accompanying it, what else has Bruce learned?

The pilot pleaded guilty to a charge of flying in breach of his medical certificate by carrying a passenger, and flying in a manner that caused unnecessary endangerment. Bruce realised that a range of hidden failures had, over the years, crept into the pilot's flying.

"We do thousands of hours on our own. We've got to be disciplined and hold ourselves to account. We've got to drag ourselves above the minimum standards.

"But for this pilot, complacency had crept in over the years, 'oh, I won't put her into flight idle for takeoff, I'll do that after I get airborne, she'll be right.'

"'Oh, I don't need to tell the driver that I'm not allowed a passenger, I won't say anything, she'll be right.'

"'Oh, I can hop around the back of that fog and drop down, she'll be right. Been doing it for years, it won't happen to me.'

"Well," says Bruce grimly, "it bloody does happen.

"I've learned that passing a competency check does not mean I don't have bad habits creeping into my flying. I know I have to fly across that ridge at 100 kts, and during the competency check I do that. But maybe after a while, I'll pull that back to 90 kts, and then 80 kts. She'll be right...

"The rules are there for a good reason. If lower standards become the norm over time, an accident like this can absolutely be the outcome. It's up to each of us to maintain the safety margins and follow the rules.

"I've also learned about the value of onboard tracking. It costs less than a dollar an hour, and it saves lives. The paramedics were at the accident site 26 minutes after the emergency call. Without that tracking, Billy could have died.

"I've learned that belonging to an industry organisation, like the NZAAA, is worth all the subs I'll pay for the rest of my life, because of the thousands of dollars' worth of advice I got when I needed it the most.

"I've learned that planning ahead for something like this is time well spent. Being able to pluck out those prepared media releases, it was just fantastic, given everything going on at the time.

"I've learned you need to come to terms with how ACC works, and how much your insurer will pay. I've learned an employer needs to be financially secure, because there are a lot of bills.

"I've learned not to be shocked by people who won't care what you're going through.

"And I've learned that the CAA aren't the ogres I'd always heard. Well, not all the time," he grins. ■

Photo courtesy of Aerospread



Bruce Peterson.

The World-Beating Jarrod Wood

The Air New Zealand line engineer may have won gold at a global work skills competition, but he's "still learning every day".

Eleven years ago, Jarrod Wood told his grandfather that he didn't have the smarts for aircraft maintenance.

"I thought it was literally some form of rocket science. But Grandad – who was with me at a careers night at school – said, 'You're here now, you may as well go and talk to those air force engineers'."

In October 2017, the now 25-year old became the first New Zealander to win the aircraft maintenance category at the biennial WorldSkills competition in Abu Dhabi.

"When they called out 'New Zealand' (co-winning with Finland), I could see the Kivis down the corner of the stadium going absolutely nuts," Jarrod says.

"Because, in 10 years with WorldSkills, it was the first aircraft maintenance gold that they'd had, and all the experts in the New Zealand contingent were crying. It was a massive deal for them.

"It felt like winning the Olympics."

Jarrod credits his Air New Zealand workmates and mentors for much of his world-beating expertise.

"I work alongside people I believe to be among the best engineers in the world, so I'm still learning every day. We're a close-knit team, and everyone's there to lend a hand as soon as there's a situation – like four, five people will turn up and you have all this expertise to call on.

"It's trained into us and built into us that aviation safety is the highest priority there is. All the guys I work alongside, we're all here for the same reason – to keep everyone safe.

"I follow 'the book' 100 per cent. The book's the Bible. Everyone develops their own way of doing things, but I think winning the tournament was a good reflection of following the procedures I've been trained in over the years.

"At Abu Dhabi, I heard another competitor say that we're all in this game because what we do keeps everyone safe. It was great to hear that same high perspective from another country."

The pressure in Abu Dhabi was huge. Four days of competition; seven skills tested (from composite repair to fabricating a wiring loom); 125,000 spectators, compared with about six in Hamilton; food poisoning on 'sheet metal repair day'; and 16 competitors, many of whom to Jarrod seemed way more confident and at home in the competitive atmosphere than he felt.

"It was the most mentally and physically drained I'd ever been," says this former New Zealand ice hockey rep. "But each day, my WorldSkills mentor, Mike Naus, would say, 'You're tracking well. Just focus, follow our plan'."

"I thought Ireland had probably won. I thought I might get sixth or seventh. I told myself I was really rapt just to be there.

"Then they called all medal winners onto the stage. So I knew I'd won something and just assumed it was bronze.

"When they said, 'And the bronze medal goes to...' I started to move forward. And they said '...Korea'. I was really shocked. Silver! That's awesome!

"Then they announced the co-gold winners as New Zealand and Finland. And the place erupted..."

Despite winning a world title at such a young age, Jarrod says life is full of goals. He can't compete in WorldSkills again, but would like to stay involved, perhaps as a mentor. This year he wants to get an aircraft rating.

"I'm really lucky to have found a career I'm passionate about," he says. "Aircraft engineering is exactly the right path for me right now."

Good old Grandad. ■

If you, or someone you know, wants to learn more about engineering as a career, go to www.careers.govt.nz, and key in 'aircraft maintenance engineer' in the jobs database.

ELTs



An emergency locator transmitter can greatly improve your chances of survival in an emergency. But fitting or using an ELT incorrectly can put lives at risk.

In accidents between 2010 and 2014, it's believed that ELTs worked less than half the time they were expected to.

While there are many factors involved in these failures, improper installation is one thing that can be avoided.

An ELT must be installed by a Licensed Aircraft Maintenance Engineer (LAME) in a way that will give it the best chance of survival.

Advisory Circular AC43-11 *Emergency Locator Transmitters* gives further guidance on installation and design requirements.

False alarms

False alarms are a significant problem for the Rescue Coordination Centre (RCCNZ). Approximately 85 per cent of ELT alerts to RCCNZ are false alarms.

It is important that they're not mishandled during maintenance and testing, or activated accidentally during flight. All false activations should be notified to RCCNZ as soon as possible.

Live testing of 406 MHz is not permitted unless coordinated with RCCNZ, and tests on 121.5 MHz should be no longer than three audio sweeps, not exceeding 20 seconds. Switching off immediately after three sweeps is a good habit to get into. Check *AIP New Zealand GEN 3.6* for recently updated testing criteria.

Register and use

It is recommended that you activate your ELT as soon as a distress situation exists, if at all possible.

Your ELT must be registered with RCCNZ, because the more information they have about the aircraft, the better chance they have of finding you. That can be done at beacons.org.nz. Remember to inform them if the aircraft changes hands too. ■

ADS-B Update

With the proposal to make ADS-B mandatory in controlled airspace, we answer some of the most frequently asked questions from the recent New Southern Sky roadshow.

What standards should I be looking for in ADS-B equipment?

If you're thinking ahead or need to replace your transponder now, there are three key things to keep in mind:

- » For your transponder, look for TSO-C166(b).
- » For your GNSS receiver, look for TSO-C145 or 146.
- » Make sure your transponder and GNSS receiver are compatible.

You can now buy all-in-one ADS-B units that include the transponder and a GNSS receiver.

Can we use UAT in New Zealand?

Universal access transceivers (UAT), as used in the United States, will not meet New Zealand standards, so when you buy ADS-B equipment, make certain that it operates on 1090 MHz, not 978 MHz.

Is there going to be any assistance with cost to equip with ADS-B?

The cost of equipment and certification are high on the list of concerns identified by the CAA's Future Surveillance Implementation Working Group. Several ideas are being considered, including reducing the time and cost of approval, and reducing or spreading the cost of equipping with ADS-B. We will keep you updated on the progress of this work.

Are there enough licensed engineers to install ADS-B?

The CAA is assessing capacity and considering ideas to reduce the burden on engineers, including a staged approach, or incentivising early upgrades.

For more information

See www.caa.govt.nz/nss for more FAQs and information. ■

Sky's the limit for **SBAS** technology

Satellite-Based Augmentation System (SBAS) technology is seen as the future to delivering highly accurate positioning, and its benefits are about to be tested here.

Many countries around the world already take advantage of first generation SBAS technology on a daily basis.

But representatives from the aviation industry here will be among the first to test extra satellite signals and multiple GNSS constellations available in second generation SBAS, as part of a trial across New Zealand and Australia.

SBAS technology provides accurate and high integrity lateral and vertical guidance for landing procedures at aerodromes where the cost of alternative procedures requiring ground infrastructure cannot be justified. This is the case for many regional and remote aerodromes in both New Zealand and Australia. What this translates into is a decrease in the likelihood that a flight will be cancelled or diverted due to weather, or that multiple attempts at landing will be required.

The New Zealand-based aviation trial is being led by Airways with partners Aeropath, Auckland Rescue Helicopter Trust, IQ Aviation, and HeliOtago. It will evaluate first generation SBAS at controlled, and selected uncontrolled aerodromes and heliports. The overall goal is to assess and quantify the benefits to the aviation system in the New Zealand context.

The Director of New Southern Sky (NSS), Steve Smyth, says it's great to see a wide range of NSS stakeholders participate in the trial.

"The investment of significant time, equipment, and expertise reflects the potential value of the safety and operational benefits envisaged from an SBAS service."

The programme, funded by the Australian and New Zealand governments, is working with more than 30 organisations and businesses from 10 industry sectors across the two countries, to test the service and identify the economic and social benefits of improved positioning technology.

See more information about the Australasian SBAS trial at www.linz.govt.nz/sbas. ■



Rose Wood Retires

"If I never see another sausage roll, that will be fine!" The inspiration behind AvKiwi is leaving the CAA after 20 years.

Thousands of kilometres on the road. Tens of thousands of sausage rolls cooked in aero club kitchens for the post-seminar bash. Hundreds of AvKiwi Safety Seminars starting with, "Hi, I'm Rose Wood, I'm the team leader of Safety Promotion and the AIP editor..." The indefatigable Rose Wood is hanging up her oven gloves, and moving into retirement.

"AvKiwi is the thing of which I'm most proud," says Rose, reflecting on 20 years with the Authority.

"We've built a trusted brand, to the point where the community has had the confidence to share their stories with us of when they stuffed up, and allowed us to use those in the AvKiwis. They know we're not going to abuse that trust.

"And the audiences who've turned out! It can be a wet, cold Monday night, they've been to work, come home, had tea, and just want to relax. And here they are turning out to the local aero club to hear how to be safer pilots.

"It's really humbling."

The Safety Promotion editor, Peter Singleton, has accompanied Rose on many AvKiwi journeys, and to many airshows.

"I've never known anyone to work so hard and so tirelessly, and she does that because of her passion for aviation safety," he says.

Carlton Campbell, veteran presenter of AvKiwi seminars, describes a situation highlighting Rose's strengths.

"It was a Sunday, there was no equipment at the venue – despite being shipped from the CAA days before – and the courier was closed.

"Rose had the entire city alive and energised to find everything we needed so the show could go on."

Peter Singleton says her team will miss her terribly.

"But her amazing work really will endure for a long time." ■

Compatible Modifications

As more complex modifications become the norm, the interactions between different systems also become more complex. Before modifying, make sure you know whether your mods will work together.

Modifications are generally approved independently of each other, with the assumption that the installation modifies a 'stock-standard' aircraft.

Installers sometimes do not fully take into account the interaction and compatibility of their modification with other systems, unless the installation documentation explicitly refers to it.

The installer of any modification, whether through a supplemental type certificate (STC) or not, should always consider compatibility.

"This good practice is applicable to any modifications on an aircraft," notes CAA Airworthiness Engineer, Alessio Caldara.

Avionics

Avionics modifications are increasingly popular, but the interaction between devices needs careful consideration.

GNSS antennas can, for example, affect the performance of ADS-B Out equipment.

An autopilot system can be affected by modifications that change flight characteristics like lift, drag, weight, or thrust.

Electrical load analysis is also essential.

"The electrical load drawn by avionics also needs to be considered," says Alessio, "because adding additional systems may reduce the amount of power available in an emergency."

For issues such as wiring separation and chafing, the OEM's recommendations for Electrical Wiring Interconnect System (EWIS) must also be considered.

It's not just hardware interoperability that can cause problems. Software updates on one system may also unintentionally impact on another, or a software upgrade might be necessary to ensure compatibility.

Unintended consequences

Sometimes the compatibility issues are less than obvious.

Think of the heat generated by a searchlight that you may have installed next to float bags on a helicopter, or a structural change that stops de-icing boots from expanding.

Even two systems that are totally unrelated may be causing harm to each other.

"These problems are not unique to New Zealand," says Alessio. "In 2016, the FAA released its AC 20-188 *Compatibility of Changes to Type Design Installed on Aircraft*, which provides engineering guidance to installers around compatibility."

Responsibilities

The owner or operator of an aircraft should always ensure that a compatibility determination is made when they request a modification.

That is best discussed before the installation, because the work could result in an aircraft that isn't able to be returned to service.

Installers need to assess the functional and operational compatibility of the modification. If that's outside their ability, they need to seek engineering support from a third party like the STC holder, or a Part 146 Aircraft Design Organisation.

Compatibility assessments should also be made for every optional configuration offered by your mods, or when an aircraft is converted for operation in different roles.

"The Acceptable Technical Data can be used for installation on your aircraft only after the modification has been declared compatible with the present aircraft configuration," says Alessio.

Non-compatible installations may require additional design changes, changes to aircraft limitations, or changes to the flight manual. ■

Statistics Reporting

Operating statistics form an important part of the data that the CAA uses to determine where safety interventions are needed. So they have a significant role to play.

They allow us to calculate a rate of occurrences for each sector – this figure will be distorted if we do not receive accurate and timely information.

These obligations are in Part 12 and Part 19 – make sure you're aware of them because they're your responsibility.

Therefore you should incorporate the deadlines into your quality management system or safety management system. The table below shows dates for hire or reward operations.

Report	Period Covered	Due Date
1st Quarter	1 Jan through 31 Mar	1 May
2nd Quarter	1 Apr through 30 Jun	1 Aug
3rd Quarter	1 Jul through 30 Sep	1 Nov
4th Quarter	1 Oct through 31 Dec	1 Feb

We recommend you complete your returns as soon as possible after the quarter ends.

Non hire or reward aircraft must provide a return for the calendar year by 1 February.

Correction

On page 25 of the January/February 2018 *Vector*, we incorrectly stated one of the SMS deadlines. Apologies for this error.

The correct date is 30 July 2018 for Group 2 operations to **submit** their implementation plans.

Aviation Safety Advisers

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

Don Waters (North Island)

Mobile: +64 27 485 2096
Email: don.waters@caa.govt.nz

Carlton Campbell (South Island)

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How to Get Aviation Publications

AIP New Zealand

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

Pilot and Aircraft Logbooks

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

Rules, Advisory Circulars, Airworthiness Directives

These are available free from the CAA website. Printed copies can be purchased from 0800 GET RULES (0800 438 785).

Planning an Aviation Event?

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

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

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

CAA Cut-off Date	Aeropath (Airways) Cut-off Date	Effective Date
11 Apr 2018	18 Apr 2018	21 Jun 2018
9 May 2018	16 May 2018	19 Jul 2018
6 Jun 2018	13 Jun 2018	16 Aug 2018

See www.caa.govt.nz/aip to view the AIP cut-off dates for 2018.

Report Safety and Security Concerns

Available office hours (voicemail after hours).

0508 4 SAFETY
(0508 472 338)

isi@caa.govt.nz

For all aviation-related safety and security concerns.

Accident Notification

24-hour 7-day toll-free telephone

0508 ACCIDENT
(0508 222 433)

www.caa.govt.nz/report

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

Accident Briefs

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

Gippsland GA200C

Date and Time:	07-Dec-2017 at 08:05
Location:	Parnassus
POB:	1
Damage:	Minor
Nature of Flight:	Agricultural
Pilot Licence:	Commercial Pilot Licence (Aeroplane)
Age:	49 yrs
Flying Hours (Total):	6200
Flying Hours (on Type):	5100
Last 90 Days:	120

While spraying in a steep gully on a downhill run, an impact was felt and heard. The remaining load was dumped, a visual check by the pilot failed to identify any damage, and the flying characteristics were unchanged.

The aircraft landed back on the airstrip, where a visual inspection found damage to the left wing leading edge near the wing tip. The aircraft had struck a cabbage tree which was not seen by the pilot.

The maintenance provider was contacted and an engineer travelled to the airstrip to inspect and repair the aircraft. Spraying operations were able to continue later on the same day.

[CAA Occurrence Ref 17/7778](#)

Guimbal Cabri G2

Date and Time:	12-Sep-2015 at 09:15
Location:	Rolleston
Damage:	Substantial
Nature of Flight:	Training solo
Pilot Licence:	Private Pilot Licence (Aeroplane)
Age:	51 yrs
Flying Hours (Total):	22
Flying Hours (on Type):	22
Last 90 Days:	21

As the pilot came into a hover during the flare for landing, the aircraft started yawing to the left. The student did not correct this yaw and when the aircraft passed through approximately 150–180 degrees, the yaw quickened to a point where the student lost control of the aircraft. The aircraft completed just over two full 360 degree rotations to the left before impacting the ground. The student was uninjured.

It was identified that the fenestron tail rotor system of the helicopter requires pilots to anticipate control inputs in advance of the 'normal' requirements for a conventional tail rotor system. Caution should therefore be exercised when completing type ratings and conversions.

[CAA Occurrence Ref 15/4404](#)

Cessna A152

Date and Time:	07-Nov-2017 at 09:01
Location:	Whanganui
POB:	1
Damage:	Minor
Nature of Flight:	Training Solo

A dual circuit lesson was initially carried out on sealed runway 29, but the last three circuits were completed on the grass vector 32 due to a wind change. This was the first time the student pilot had used runway 32.

The student had completed their first solo flight four days prior, with an additional two dual flights in the interim.

Following completion of the dual circuits, the instructor assessed that the student had met the standards set for further solo circuits and authorised the student for one further circuit. During the landing phase, the student pilot bounced the aircraft.

The student lacked the experience to manage the bounce and over-corrected, resulting in a porpoise action and loss of control. The aircraft landed heavily and came to rest on the intersection of grass runway 32 and 29L with damage to the nose wheel, propeller and engine cowls.

Remedial training was given to the student in areas such as decision-making, going around, and circuits using the grass runway.

[CAA Occurrence Ref 17/7006](#)

Tecnam P2002 Sierra

Date and Time:	06-Dec-2017 at 12:35
Location:	Thames
Damage:	Substantial
Nature of Flight:	Training Solo

A student pilot completed a series of dual circuits, followed by three solo circuits. Having completed their fourth circuit, they lost directional control after touchdown. The student pilot attempted to go around, but the aircraft veered off the runway into long grass. The port wing, propeller, and nose undercarriage were damaged, but no injuries were sustained.

The instructor commented that the most likely cause for the loss of directional control was the student's lack of rudder/nosewheel steering input to counter the runway camber and the natural yawing tendency of the aircraft when full power was applied.

[CAA Occurrence Ref 17/7686](#)

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, www.caa.govt.nz, "Accidents and Incidents".

Key to abbreviations:

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

Hughes 369FF

Rotor Blade

Part Model:	369FF
Part Manufacturer:	MD
Part Number:	369D21102-523
ATA Chapter:	6210
TSI Hours:	69.3
TTIS Hours:	1314.7

During the pre-flight inspection, the pilot identified a crack in the underside of one of the main rotor blades.

Additional inspection requirements for blades with this part number and others are referenced in Airworthiness Directive (AD) DCA/HU369/88. The AD describes the requirements to record torque events and complete the associated inspection detailed in MD Helicopters, Inc. Maintenance Manual CSP-HMI-2.

The main rotor blade was replaced with a serviceable part.

[CAA Occurrence Ref 17/1622](#)

Robinson R44 II

Cylinder Section

Part Model:	IO-540AE1A5
Part Manufacturer:	Lycoming
Part Number:	Cylinder Kit P/N 05K
ATA Chapter:	8530
TSO Hours:	150
TTIS Hours:	150

The engine suffered a significant power loss during tests, following a bulk strip to rectify a failed conrod bush. Investigation revealed that the No. 3 cylinder inlet valve had failed at the keeper location and the valve head had contacted the piston.

Maintenance investigation and examination of the failed valve found a possible manufacturing flaw. The valve was marked with Codes E415, 17104N. The valve stem failed directly under the tip at the keeper location.

A new cylinder kit was installed, all other valves were inspected and no further faults were found. Subsequent test runs on the engine gave satisfactory results and the engine has been returned to service. The manufacturer has been advised.

[CAA Occurrence Ref 17/1999](#)

Eurocopter AS 350 BA

Droop Stop Retainers

Part Model:	AS350BA
Part Manufacturer:	Airbus
ATA Chapter:	6200
TTIS Hours:	4073

During shutdown, the main rotor blade tip path appeared abnormally low. Upon further examination, the droop stop ring was found detached and resting on the main rotor mast.

The engineering investigation found that the droop ring stirrups had failed. Airbus Helicopters opened an investigation into the incident and advised the company to conduct a hard landing inspection as a precaution. The main rotor mast was repaired, and damaged components replaced.

The failed components have been shipped to Airbus Helicopters France, and the investigation into possible causes is ongoing. Airbus Helicopters will advise the CAA upon closure of their investigation.

[CAA Occurrence Ref 17/4732](#)

Britten-Norman BN2A-20

ATA Chapter:	8500
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Following initial taxi for departure, the aircraft was holding position on the taxiway when the left engine shut down as the pilot pulled throttles to idle.

The pilot restarted the left engine and noticed that it was idling extremely low – below 500 rpm. The engines were warm and the aircraft had been idling for at least three to four minutes. When it was increased to 1200 rpm, the engine idled without issue.

When the pilot throttled back to full idle on both engines, the left engine shut down again. The aircraft was taxied back to the terminal and checked by maintenance personnel.

Ground runs were carried out and no fault was found. On the next scheduled maintenance check, the left hand mixture control lever was found to be slightly stiff and a valve was changed on the fuel control unit.

The fault did not reoccur, but the left-hand idle speed was later reported erratic. On inspection, one manifold drain valve was found to be sticking open, causing a possible variation in idle mixture. The valves were cleaned and refitted, the idle speed and mixture were checked, and satisfactory ground runs were carried out.

[CAA Occurrence Ref 17/5812](#)

Airworthiness and Maintenance Workshop

(Formerly called the Maintenance Controller Course)

Many owners and operators wish to increase their understanding of the requirements for the maintenance of their aircraft. The Airworthiness and Maintenance Workshop is designed for a wide range of aviation participants, from airline maintenance planners to private aircraft owners.

The course has been redesigned to be even more effective and dynamic. It is now tailored to better cater to the different participant groups, rather than Part 135 operators alone. The exam portion has also been dropped, allowing for more time to focus on a variety of topics. There is a limit of 18 participants for each workshop to allow for interaction.

Wellington 18–19 April 2018

Christchurch 29–30 May 2018

Hamilton 11–12 July 2018

For more information, or to reserve your place, visit www.caa.govt.nz, "Quick Links > Seminars and Courses".

Aviation Event Seminar



What: Introduction to, among other things, the new obligations of the display director of aviation events.

Why: After the Shoreham Airshow tragedy in 2015, many overseas regulators tightened rules. Together, the CAA and the New Zealand Airshow Association are introducing changes for New Zealand.

Where: CAA, 15th floor, Asteron Centre (opposite Wellington Railway Station), 55 Featherston Street, Wellington.

When: 9 am to 4 pm, Thursday 24 May 2018. Registration at 8:30 am.

Who: Anyone who wants to organise an aviation event needing authorization should attend.

Register: By emailing sforaadmin@caa.govt.nz by 23 April 2018.

Don't wait: There's limited seating and seminars like this are often oversubscribed.

SMS Safety Summit

An industry-led summit on 9 May 2018 will allow industry professionals to get together, learn from others in industry, and collaborate with regard to Safety Management.

Among the topics being discussed are safety culture and the importance of CEO involvement.

The summit will include speakers from industry sharing their experiences and challenges with implementing and operating an SMS. Additionally, Neil Richardson of the International Aviation Consultancy, Baines Simmons, will be speaking and running a dedicated CEOs forum.

The Summit will be hosted by Oceania Aviation with the support of the CAA.

Sudima Auckland Airport Hotel
9 May 2018 – SMS Safety Summit

For more information, see www.caa.govt.nz/sms

