May/June 2018

POINTING TO SAFER AVIATION

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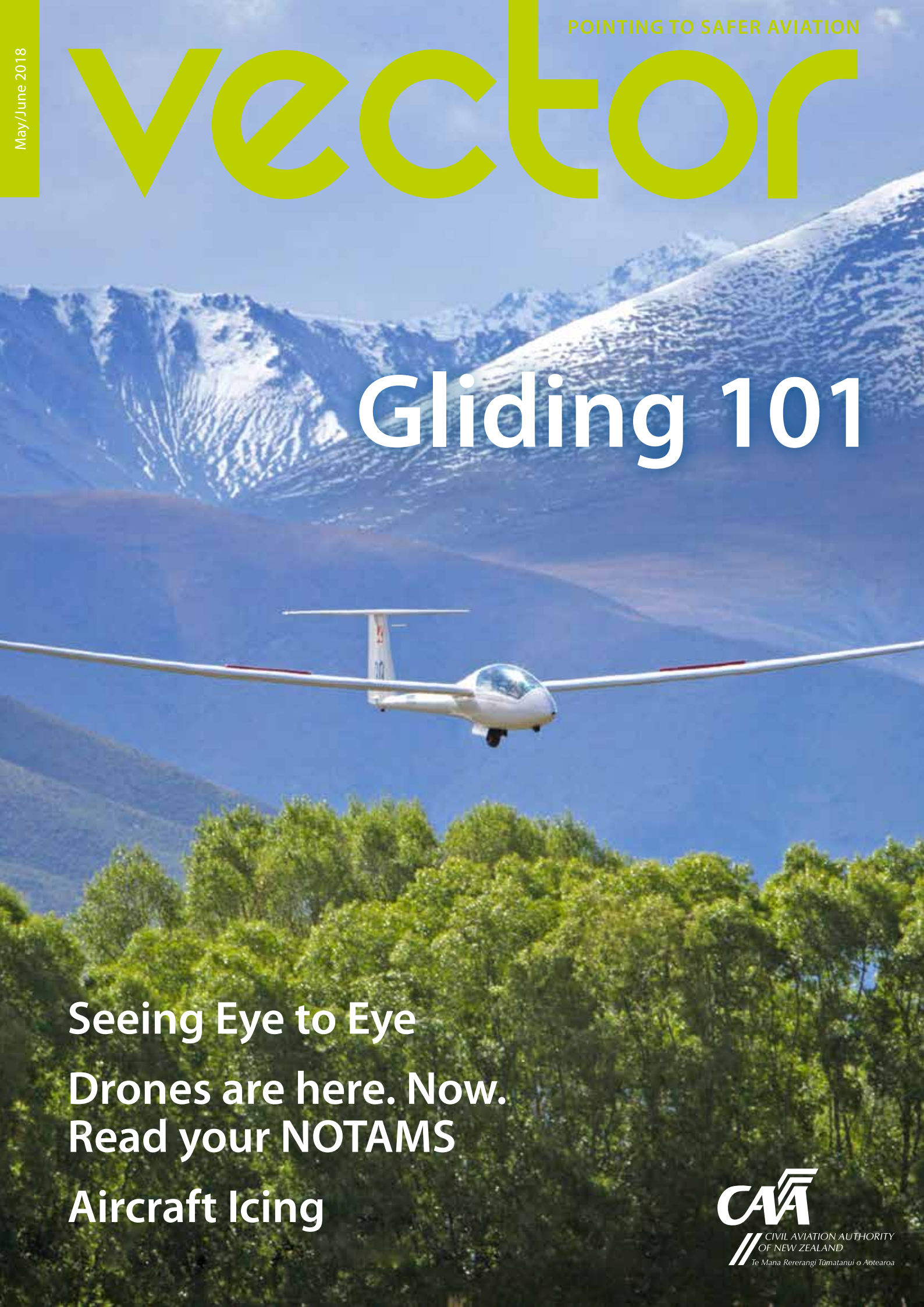

Gliding 101

Seeing Eye to Eye

Drones are here. Now.

Read your NOTAMS

Aircraft Icing

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

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In this issue...

Seeing Eye to Eye

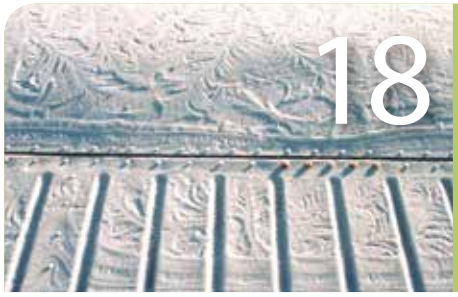
A Part 61 pilot, who's also a commercial drone operator, offers some tips to avoid catastrophe.

Drones are here. Now. Read your NOTAMS

The increase in RPAS activity means pilots can expect to come across them virtually anywhere. Many Part 102 operators are applying to have NOTAMs issued for their activity. Decrease the odds of a collision by reading them.

Gliding 101

Gliding is a breathtaking sport in its own right, and can build the flying skills of powered pilots. Our lead story, beginning on page 14, describes what you need to know to start out, and how to soar safely.



Aircraft Icing

It's not true that, during flight, propeller slipstream or air flow over the wings will blow aircraft surfaces clear of ice, frost, and snow. Why it's so important to do a thorough job of removing such contaminants, *before* takeoff.

Cover: Pilot-in-command Gavin Wills in his Duo Discus, with student Roger Shepherd, on short final at Omarama in November 2014. They were completing a 3.5 hr round trip to the other side of the Alps, around Mount Aspiring and the Tasman Glacier, and into the upper reaches of the Arawhata River.

Photo courtesy of Betty Shepherd

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

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

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From the **Director**

Unmanned aircraft or UA – to give drones their formal ICAO name – are an increasingly significant part of the aviation community and a growing focus of work at the Authority.

The rules governing UA use were introduced in 2015 as an interim step to provide adequate safety while the UA sector grew, and solutions to some of the safety risks were developed. Since then, the sector has certainly grown but unfortunately, not all the technology-based solutions are in place.

Our review of the existing rules found that parts of the current system work well. For instance, Part 102 certification appears to give operators the flexibility they need to conduct their business, and their tailored risk management plans give the CAA assurance that those operations are carried out safely.

Unfortunately, the same cannot be said for a very small proportion of irresponsible UA operators.

Recent reports of unmanned aircraft dangerously close to passenger aircraft at Auckland Airport reinforce my view that change may be needed to manage this risk. I also see the need for more safety promotion and education. As an example, we're preparing a digital media campaign to reach more UA users, and we're committed to finding other ways to engage more with the sector.

The Ministry of Transport is leading an all-of-government programme, aimed at striking the balance between economic growth, innovation, and safety. The CAA is contributing to this work, and you can expect to hear and see a lot more about this in future.

But for now, read the story (page 4) of the challenges faced by a Part 61 pilot who also flies an unmanned aircraft.

Regards

Graeme Harris

Aviation Safety Officer Course

Taupo

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Suncourt Hotel
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The number one function of any company is business success – safety is critical to business success.

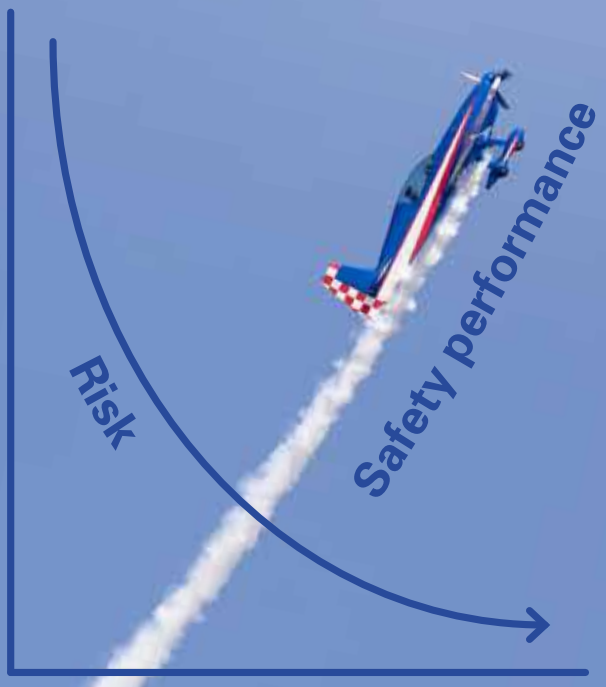
If your organisation operates commuter services, general aviation scenic operations, flight training, sport aviation, or engineering, you need an Aviation Safety Officer.

Attend this free two-day course to understand the role of a safety officer, or for those who are already in a safety role, to refresh your skills.

You will receive comprehensive guidance material and access to all the latest CAA safety resources and support.

Lunches are provided (but you will have to arrange and pay for your own accommodation, transport, and other meals).

To register, visit www.caa.govt.nz, "Quick Links > Seminars and Courses".



Take a step on the ladder to SMS

Seeing **Eye to Eye**

Part 61 pilot and commercial drone operator John Bampfylde fears there's a chasm in the understanding of the rules between traditional pilots and drone operators. He offers some tips for avoiding catastrophe.

All pilots enjoy the view from the cockpit and effortlessly covering distances. And most enjoy the speed, which seems greater when closer to the scenery.

We've all had those flights over mountain ranges – as the destination gets closer, you start the descent, and time it so the last ridge passes close by underneath, with the airfield in the distance on the plain ahead.

You're not worried about an engine failure because the ground's dropping away and it's flat for miles ahead. You get that little thrill of speed as the ridge top whizzes past and you can pride yourself on flying an efficient descent profile. That's being an economical pilot and a cool one, too.

Having done this and a few worse things besides, with experience ranging from hang gliding through to plane ownership, I think the relatively small changes in aviation I've seen over 35 years are about to be eclipsed by a very big change – drones.

I know, I know, you've heard it all before about drones but bear with me. This affects anyone who flies machines in uncontrolled airspace.

I run DroneMate, a company with a Part 102 certificate. Mostly, we do unglamorous surveying work, and while it's 'flying', it's not as Part 61 pilots know it.

The thing goes where you tell it to. When you stop telling it, it hovers. Then it waits until the battery reaches a set percentage and it flies itself back to its take-off spot and lands.

With most survey work, you programme in the survey area on your iPhone®, the software plots a flight grid over the area, you press the green 'start' icon and off the drone goes, coming back when it's done. No manual intervention required, usually.

3D model of cleared forest from 983 UAV images, accurate to a few centimetres in any dimension.

"There may be 1 kg bricks wandering about the sky quite close to the ground. Following a few simple rules will dramatically lower your risk of becoming entangled with them."

As you'd imagine from this, drones appeal to a different audience from pilots – generally people not versed in flying custom and practice.

That makes drones unpredictable to Part 61 pilots and planes unpredictable to drone operators.

A short time ago, we were surveying a steep, tree-covered ridge. Our team of three (operator, assistant, spotter with radio) had filed a NOTAM and were operating slightly below the height of the ridge line and up to 750 ft AGL, with the drone flying a zigzag pattern over the hillside.

Having just completed a survey, and with the drone back on the ground, a Cessna shot over the ridge above us and below where the drone had been five minutes before. It disappeared in a second or two, but it had that 'I'm going fast because I can spot the airfield in the distance and isn't flying fun!' look to it. I know that feeling.

Drones are changing the risk profile of general aviation and both sides need to understand the other's perspectives. Drones are spectacularly useful and are going to be everywhere soon but let's keep it real. All that talk about pizza delivery and Amazon drones may happen, but don't hold your breath. Let's talk about now.

Drones are transforming surveying. At 600 ft AGL and with a 20MP camera, a decent drone can survey an area of 75 hectares in 20 minutes (one battery). If done well, the survey will become a map accurate to centimetres over heights and distances, with ground resolution below 5 cm. Contours, slope angles, surface areas, volumetric calculations, plant analysis, plant counting, erosion, run off – all from a quick survey.

What would take a surveyor a day or so to do can be done more accurately and more safely in perhaps less than an hour. Surveys are now regularly carried out on farms, roads, rivers, construction sites, quarries, mines, and over towns.

When we say a 'decent' drone, we mean a standard 'out of the box' drone like a DJI Phantom 4. This has a 20MP camera, is the size of a shoebox but less visible in the air than a shoebox, weighs less than 1.5 kg and, at its heart, has a dense, brick sized, 1 kg battery.

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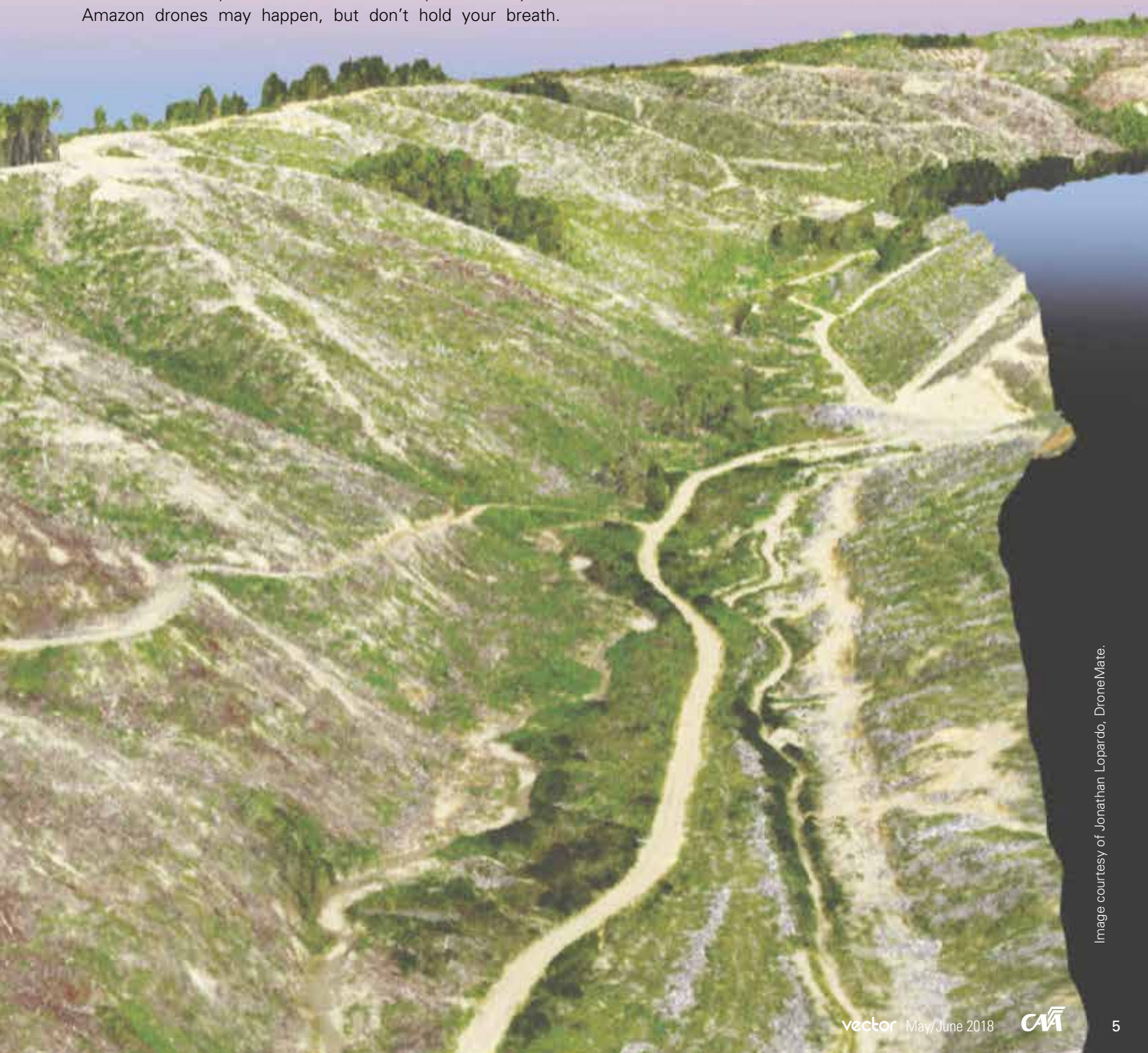

Image courtesy of Jonathan Lopardo, DroneMate.

Continued from previous page

Hitting it would not be like hitting a seagull, not even slightly. And it can easily – although illegally – be 5 km away from the operator and at 5000 ft.

In the pile of drone regulations, three loom over the rest. Thou shalt not (a) fly beyond line of sight, (b) fly over property where consent has not been granted, and (c) fly above 400 ft AGL.

General aviation is unfamiliar with the idea of (a) or (b). And many of us Part 61s observe the 500 ft AGL rule as a sort of 'area average' , rather than the actual height above the ridge we're flying over.

Compare that with a drone operator's interpretation. Standing at the very top of that same ridge, 120 m (400 ft) above them is their ceiling. And they will go there to get the best pictures.

There is, therefore, very little commonality of understanding between pilots and drone operators of the previously mentioned 'Big 3' drone rules. And that's not even considering the idiots who don't follow the rules at all.

Returning to our Cessna. Our top gun, 'Maverick', perhaps with their mate, 'Goose', in their low-flying, tree-skimming C152 appearing from the other side of the ridge won't give the drone operator or spotters a chance to do much.

The options – assuming there's time for options – are to (1) hover the drone and hope Maverick will see and avoid, or (2) head for the ground. The far quickest way to do that is an emergency cut-off that stops the motors.

Aside from destroying a drone and anyone standing below, damaged batteries can burn like a blowtorch, igniting whatever's next to them. Maverick's beat-up could cause a very big forest burn-up without him or Goose ever knowing.

Don't rely on the drone spotting you. The drone's camera has a lowish resolution live feed to the handset display that may be a small mobile phone screen. The camera has a narrow field of view and, if surveying, is pointing downwards anyway.

That Cessna was not our first incident that day. At the start of business, a nice looking Cessna taildragger crossed the valley a few hundred feet above the ridgeline and to one side of us. I guess they just hadn't seen our NOTAM.

This sort of incident is pretty regular. A couple of months before, we were carrying out a forest survey below 400 ft AGL – and it was therefore not NOTAMed. At the end of its spray run on the neighbouring paddock, a helicopter suddenly shot 100 ft overhead the drone operator.

Now, rule 101.213 requires drone operators to remain clear of all manned aircraft, and they also need to consider whether agricultural operations are likely in the area. That should be part of their normal safety assessment and risk management.

So ideally, the helicopter operator and us should have been able to discuss that we were both going to be there.

But you don't know what you don't know, and it's a good example of how manned aircraft and drone operators have to keep a constant lookout.

I believe that if the current gulf of understanding remains between GA pilot custom and practice, and drone operators, there will be major incidents.

So here are our top tips for not getting to know a drone too well.

Firstly, a 500 ft AGL lower limit really should mean 500 ft AGL directly below you at every second. If flying over valleys and ridges, make it 500 ft above the ridge tops, not the valleys. That will keep you clear of the vast majority of drones, including those surveying forests.

Secondly, look out for the words "Remotely Piloted…" in NOTAMs and check if the activity is on your route. That will keep you clear of the commercial drones above 500 ft AGL. (Before every Part 102 operation our operators log into the IFIS mobile app and check that our NOTAM is there, under "Warnings".)

Thirdly, if you see something going on involving diggers, machinery or earthworks, think very seriously about not overflying it below 1000 ft AGL.

Earthworks are a big drone magnet. Did you know a lot of open cut mines in Australia now have a drone in the air most of the time? This trend will only increase. Survey drones generally don't go much above 800 ft AGL and, even if you missed the NOTAM, do yourself a favour by being high and to one side of the digging.

Drones and light aircraft are going to have to co-exist and the current rules do a decent job of ensuring they shouldn't meet in the air.

It's the different cultures, levels of training, and customs of the two groups that lead to 'soft' interpretations of the rules that create most of the risk.

One day soon there may be pizzas and other paraphernalia being shipped around the skies and the whole issue of regulation will need a huge rethink.

But take heart. The spectacular rate of drone technological development is more than likely, I believe, to solve the potential airspace issues that will arise.

In the meantime, spare a thought that there may be 1 kg bricks wandering about the sky quite close to the ground. Following a few simple rules will dramatically lower your risk of becoming entangled with them. ■

Image courtesy of Jonathan Lopardo, DroneMate.

Drones are here. Now. **Read your NOTAMS**

Increasing RPAS activity in New Zealand skies highlights the critical need for pilots to know where they might encounter one.

The recent close calls between rogue drones and airliners at Auckland Airport have unsettled everyone.

No-one wants a collision. And yet there are numerous pilots who run the heightened risk of one. They're failing to consult NOTAMS, including those now being originated by drone operators notifying their RPAS activity.

Once an RPAS operator becomes certificated under Part 102, they may also apply to become an authorized NOTAM originator. Many of them have. That means, with just 24 hours' notice, they can apply to have a NOTAM issued.

Paula Moore, who's with the CAA's Aeronautical Services team, says that such a NOTAM just says, 'We're operating here.'

"That doesn't mean no aircraft can fly there – it's not restricted airspace. It just means you have to be extremely careful if you do."

Paula – who designates special use airspace for New Zealand – says *all* pilots need to read NOTAMs before they depart. "And if they are so equipped, again on their flight – just in case".

Clayton Hughes, the manager of the RPAS team at CAA, agrees. "It's problematic enough when RPAS operators don't follow the rules and pose a hazard to others.

"But when an operator does do the right thing, and notifies the rest of the aviation community of some activity, it's extremely frustrating that pilots don't refer to the bulletins designed to tell them about that activity."

Current flight testing in Canterbury of the pilotless aircraft 'Cora' – being developed as a future air taxi – is a good example of what pilots can expect more of in the future.

"This project," says Pete Sutherland, CAA's liaison with the Cora programme, "and others that may present similar risks in the future, highlight the need for all airspace users to be aware of growing RPAS activities within their area of operations."

CAA unmanned aircraft specialist Mark Houston says that Cora, and other similar sized unmanned aircraft, are equivalent to a Cessna 172 in size and mass, and their intended performance.

"The testing of such unmanned aircraft is now a part of the New Zealand aviation system, and keeping them separate from airborne crewed aircraft is clearly a vital safety requirement.

"It's a shared responsibility. RPAS operators legally flying their drones outside Part 101 need to inform the aviation community of that. But aircraft crews have to do their bit for safety by actually consulting NOTAMS and AIP Supplements."

"It doesn't matter what the activity is," says Paula Moore. "Whether it's for RPAS testing, live firing, police or fire emergencies, military training; or if the airspace has been designated as a restricted, danger or military operating area – pilots have to do the right thing and brief themselves.

"And remember, without approval from the administering authority, it's breaching rule 91.129 to fly in a restricted area, and breaching rule 91.133 in the case of a military operating area.

"So stay on the right side of the rules – and safety."

Further information

Accessing NOTAMs at ifis.airways.co.nz is free. Or use the IFIS Mobile app to get NOTAMs and weather information.

For free access to AIP Supplements, go to www.aip.net.nz. ■

Photo: iStock.com/fotogigi85

Animals on the Strip

If you're inexperienced, trying to 'monster' stock off an airstrip through a low level, high speed beat-up is dangerously risky.

In 2014, a pilot was killed and his two passengers seriously injured, during a manoeuvre to scare cows off an Otago airstrip.

The investigation by the Transport Accident Investigation Commission found that the aircraft stalled at a level too low to enable recovery.

Experienced and well-trained agricultural pilots safely move stock from rural runways before landing, all the time.

The risk spikes if an untrained and inexperienced 'urban' PPL, attempting to land on an unfamiliar airstrip, tries a beat-up to move the animals dotted around on it.

Long-time agricultural pilot Mark Houston – now a CAA unmanned aircraft specialist – says such a landing requires planning.

"Part of that is getting the landowner's permission and asking them to remove the stock for you, if that is practical.

"If they can't guarantee the strip will be clear, it might be necessary to land elsewhere."

CAA's Principal Safety Adviser Alan Moselen says if landing is unavoidable, the correct procedure to try to remove animals is a 'balked landing' under rule 91.311.

"A balked landing is basically one where the aircraft is configured for landing and then a decision to go around is made."

CAA Aviation Safety Adviser Carlton Campbell agrees that clearing animals from an airstrip requires a pretty standard response.

"It's a mixture of two manoeuvres that should be taught to any student. Firstly, the precautionary landing technique which is a stabilised low approach and overshoot.

"The second is the go-around below 50 ft – taught so the pilot can automatically respond to some debris on a runway for instance, or if the aircraft ahead blows a tyre."

Carlton says one of the greatest risks about landing on a rural airstrip is not knowing what the animals might do.

"You need some stock sense to anticipate what is going to happen. For instance, animals will run uphill more readily than downhill, so that's a factor if there's gradient on the surrounding land.

"Or you need to know that flying down the middle of the strip just splits the stock to each side. Young separated from their mothers will try to reach them … maybe as you are landing."

Mark agrees there's a huge amount to know about animal behaviour.

"Even if a runway is clear, but there are cows grazing nearby, by the time you turn to land, the noise of the plane may well have attracted them to the strip.

"Sheep will always run at the sound of an approaching aircraft, but cows will often just stand and watch you approach."

CAA's Principal Aviation Examiner David Harrison says if you're inexperienced, landing on a strip that may not be clear of animals really should be for emergencies only.

"That's where the threat to your life and to those of your passengers is greater than that from hitting the stock on landing.

"In all other cases, it's better to go around and land somewhere else." ■

The taxiway at Feilding aerodrome. The runway is fenced, with a cattle stop at each end to stop wandering stock, but allowing unimpeded movement by aircraft.

Photo © Graham Speirs, https://www.flickr.com/photos/gsairpics/33673810591/

Young Eagles – aviation passion *and* safety

Aero clubs throughout New Zealand are lining up to host a Young Eagles chapter. So what's in it for a club, the young people involved – and aviation safety?

In early March, 16 teenage pilots descended on Timaru Airport for the 2018 Flying New Zealand National Championships.

This compares with nine last year, and seven the year before.

David Saunders, national coordinator of the Young Eagles, says that, increasingly, young would-be pilots are realising the programme offers benefits over the more traditional route of aero club training.

"Obviously, they get to fly, but they also get to visit air traffic control, sometimes an engineering base, and they have specialists come and talk to them. They become acquainted with a much wider sphere of the aviation world," he says.

"They also learn where the careers are. It's not just about recreational flying any longer. The Young Eagles programme shows them where flying can take them professionally. In an era of large growth in aviation, that's really valuable."

As in previous years, the class of '18 competed in a range of tests at Timaru, from navigation skills to their ability to find defects in an aircraft.

Seventeen-year-old Holly Lyttle picked up the Nola Pickard Memorial Trophy, for garnering the most points from the competitions.

She says having to compete as a Young Eagle has been more effective in helping her learn safety messages than if she'd learned to fly outside the programme.

"For instance, the defect competition in Timaru showed me there's a lot to pay attention to, tiny details we have to look for when we preflight. I realised it really pays to know your aircraft."

William Winspear, from Auckland Aero Club, says there were a number of well-hidden defects.

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National coordinator David Saunders pointing out to Young Eagles at the Richard Pearse memorial, how Pearse's flying machine was more like a modern aircraft than the Wright Brothers' model.

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"It's about finding a reason *not* to fly. You have to be thorough enough to be able to find something that may put yourself and your passengers in jeopardy.

"When you can't find that 'something', you know the aircraft is safe to fly."

The Young Eagles at Timaru agreed that in the heat of a competition, a lesson is perhaps more effectively learned than when it's embedded in a classroom textbook.

"That's one of the advantages of belonging to Young Eagles," says David. "They haven't done anything that intense before, and they don't know what they don't know. But suddenly they realise, 'Hey, I do need to know this'."

David says the Young Eagles learn about SMS (safety management systems) right from the start.

"We emphasise risk mitigation. Young Eagles look for and think about things that could go wrong, and do what they can to make sure they don't go wrong. They eliminate the hazard, or minimise it."

David says Young Eagles have an added incentive to always fly safely.

"They have a lot of fun. But if they do something really stupid and ridiculous, and endanger themselves, or other pilots, or the club, or people on the ground, they're out."

One of six Ross Macpherson Memorial scholars at Timaru, Jonathan Mauchline, says the programme fills in the gaps between theory and practice.

"There are certain parts of flying that aren't necessarily covered by flight instruction – things that get covered in exam theory. But if you're in the early stages of flying, and haven't yet done exam theory, Young Eagles fills in those gaps with really practical lessons.

"I think Young Eagles also provides us with the opportunity to build relationships with people at other clubs, which will help us in the future."

What's in it for the clubs?

The benefits of a Young Eagles programme are not all one way.

"While it's introducing us to flying, and the aviation industry," says Macpherson scholar, Jack Dalbeth-Hudson, "it's also introducing a whole new branch of members to the aero club."

Currently, there are 16 aero clubs with a Young Eagles programme – nine of them have come on stream in just the last two years. Another four clubs are about to launch a programme, and a further three are showing interest.

The president of Flying New Zealand, Rob George, says the Young Eagles bring in energy and enthusiasm.

"Once someone has their PPL, and they've had a few adventures and ticked off a few things on the wish list, they sometimes lose a bit of motivation to fly.

"So having a Young Eagle on board often gives a good reason to stay involved with the club. The programme also generates hours for the aero club and those hours generate revenue."

The five or six Macpherson scholarships awarded each year (underwritten by the CAA, Airways, Avsure, and Aspeq) also channel up to $20,000 back into the aero clubs.

Rob says there are also long term benefits for an aero club in hosting a Young Eagles chapter.

"Some of the Young Eagles will be involved for just a year or two. Others stay in the aero club movement, and some others might initially drift away but a little later in life – cashed up – they come back because there's maybe some unfinished business for them."

Another benefit is that although the pronounced gender imbalance in aviation is reflected in the Young Eagles, there's growing female membership. South Canterbury Young Eagles, for instance, comprises seven young men and six young women.

"Overall, young women make up about a third of members, which is brilliant," says Rob. "That's the reason that aero club membership has a slightly higher percentage of women than the rest of the flying community."

David Saunders says the benefits to the aviation industry of the Young Eagles programme is also evident in the dropout rate between solo and PPL stage.

"About 20 per cent of club members who go solo will go on to get their Private Pilot Licence.

"Among Young Eagles, that rate climbs to about 50 per cent."

Josh Collecutt, C-cat instructor at Kapiti Districts Aero Club, and himself a former Young Eagle, is keen to start a chapter there.

"The greatest thing about being a Young Eagle was having the whole aviation field opened up to me, and helping me get a feel for what it is like to be part of such an exciting industry.

"I was already hooked on flying and it was the perfect way to become familiar with more of the aviation community and get some more experience.

"Being run by passionate, experienced and knowledgeable instructors helped to reinforce, not only the excitement and enjoyment to be had in aviation, but also the importance of a safe flying environment.

"I think Young Eagles come out with a very safe and sensible approach to flying." ■

Photo opposite page:
Young Eagles at the Richard Pearse memorial, north of Timaru, during the 2018 Flying NZ national champs.

Front row, left to right – Lucas Bilang, South Canterbury; Joseph Allen-Perkins, South Canterbury; Alesha Martin, South Canterbury (Ross Macpherson Memorial Scholar); William Winspear, Auckland (Club Young Eagle of 2017); Jack Dalbeth-Hudson, Bay of Islands (Ross Macpherson Memorial Scholar); Blair Stephenson, South Canterbury (Ross Macpherson Memorial Scholar); Lucy Laby, South Canterbury; Jonathan Mauchline, Wanganui (Ross Macpherson Memorial Scholar); Nathan Agnew, South Canterbury.

Second row – Adam Hancock, Mid Canterbury; Mariah Facey, South Canterbury (2nd, Jean Batten Memorial Trophy 2018); Holly Lyttle, South Canterbury (Winner, Nola Pickard Memorial Trophy 2018); Lucy Cooper, South Canterbury.

Third row – Ben Williams, South Canterbury (Ross Macpherson Memorial Scholar); Scott Wright, South Canterbury (Ross Macpherson Memorial Scholar).

Absent – Benjamin James, South Canterbury.

Farming Out

When there's more work on your plate than you can handle, sometimes you need to call on others to give you a hand. If you're subcontracting work to another aviation operator, what do you need to consider to comply with health and safety law?

Whether you call it farming out, or simply subcontracting, your health and safety responsibilities don't end there.

It's essential to have your own internal health and safety processes. But it's just as important to ensure that the operators you are working with also have strong health and safety processes.

All parties in a subcontracting arrangement need to be on the same page about health and safety, including the main contractor, subcontractor, and the client (often a farmer).

CAA Manager Health and Safety Riki Tahau says there is currently a gap between some operators' robust internal health and safety systems, and the process for ensuring that their subcontractors also have one.

This affects all sizes of operations. It could be a small helicopter operator that needs help to complete a job. So, they call on another operator nearby. While it may be a quick job to complete, it could still be high risk. The same considerations towards health and safety need to be made as for a larger job.

"They have a duty to do more than just call on another pilot to do the job," says Riki.

At the same time, it's important to ensure that you're in compliance with the Civil Aviation Rules when working with subcontractors.

For example, if you're a Part 137 operator and plan to bring in another operator's aircraft under your certificate, the aircraft must be added to your Approvals Specification. This must be accepted by the CAA before work begins.

Alternatively, if the subcontractor is operating under their own certificate while assisting you, then separate approval is not required.

Riki recommends that operators select a contractor that has the right knowledge and skills to undertake the job in a safe way. They should ensure that they have a good risk assessment process to understand what the risks and hazards are, and the ability to manage them.

Overlapping duties

When multiple operators work together, there can be an overlap in health and safety duties. While they have individual health and safety responsibilities, they also need to work together to cover areas where more than one operator has control or influence over the work being undertaken.

Under the Health and Safety at Work Act 2015 (HSWA), the person conducting a business or undertaking (PCBU) must ensure, as far as is reasonably practicable, the health and safety of their workers – whether they are direct employees or subcontractors.

Wires are a significant hazard in agricultural aviation, and need to be included in worksite risk assessments. In 2017 there were five agricultural wire strikes or near-collisions reported. Two have been reported so far in 2018.

For more on wire strike avoidance, see www.caa.govt.nz/wires.

The PCBU is also required to *consult*, *cooperate*, and *coordinate* with other PCBUs involved in a job, about risks and hazards that may be encountered while performing the work. These are known as the 'three Cs'.

By following the three Cs, it's possible to determine where there are gaps in knowledge or understanding about risks, such as wires on worksites, and the skills to manage them.

PCBUs can establish roles and responsibilities around training, information, and supervision. These can be broken up and shared between the operators. For example, training could be the responsibility of the company being contracted, while information could be the responsibility of the client.

Regardless of the split in responsibilities, pilots directly undertaking work ought to ask about potential hazards. Do a risk assessment upfront, with the main contractor and the client.

"Have a list of questions," says Riki. "Where can I refuel? Where don't you want me to go? Is there any other work going on around here? Are there any wires or other hazards?

"There can be hazards all over the place – wires on the property, ground conditions, terrain, and structures."

Other work in the area can also be hazardous, such as another pilot flying close by.

Sharing knowledge

If you know about a wire across a valley, for instance, share that knowledge – don't assume others are aware it's there.

"In the event of an accident," Riki says, "we would question why the primary operator didn't let their subcontractors know about the wires, we would question why the farmer didn't let them know, and we would also question why the pilot didn't ask the farmer.

"There's an overlap in responsibility. In the overlap everyone has a duty to do what's right. Doing what's right is letting everyone else know what can hurt them.

"It's about sharing knowledge and expertise, and not just assuming the other parties will know, or see, the potential dangers on a job.

"It's important to remember that operators have duties to all workers and others affected by their work – not just those they directly employ."

Interface agreements

A good way to capture overlapping duties is within a contract between operators and subcontractors that clearly identifies who is controlling the various risks at worksites. This is sometimes known as an interface agreement.

Riki says that the interface agreement doesn't have to be onerous. It can be short and simple. He recommends that the agreement is written down – even if just in an email.

"It makes it clear for each party what their expectations are," he says.

It's crucial to iron out how to do these agreements properly before entering into any subcontracting arrangement. Interface agreements are about ensuring that all parties understand their roles and responsibilities around health and safety.

Out of harm's way

Riki's most important message is that lives can be saved if time is spent upfront on addressing health and safety, even when your company might not be directly undertaking the work.

It comes down to caring about people.

"You wouldn't allow your own family to step into anything that could really hurt them. So we shouldn't reasonably expect anyone else to either.

"If there is threat of serious harm or worse, not only do operators legally need to manage it, but it's morally the right thing to do."

More information

For more information on your obligations and responsibilities under the HSWA, see the CAA's Health and Safety Unit website at www.caa.govt.nz/hsu. The *PCBU – Overlapping duties* fact sheet is available under "Resources > Forms and Guides".

WorkSafe also has information on overlapping duties and a 'quick guide'. See worksafe.govt.nz, "Managing health and safety > Getting started > Understanding the law > Overlapping duties". ■

Photo: iStock.com/simonbradfield

Gliding 101

Fans of gliding say doing it well takes more skill than powered flying. Certainly, powered pilots report that a few sessions of gliding improves their flying technique. Here's what the experts say about getting started, and soaring safely.

In December 1911 – just 10 months after New Zealand's first confirmed powered flight – 18-year old George Bolt soared over the Port Hills in Christchurch in a glider he had designed and built.

It's probable that to launch, he was just shoved off the top of the Cashmere Hills. Or towed behind a Model T. That was how they did it in those days.

George Bolt's glider probably had a glide ratio of about 10:1. Today, more than a century later, 60:1 is not uncommon.

Some gliders today have motors to launch themselves. Most have an electronic variometer (which measures rate of climb or descent, producing a rising sound on climb and deepening sound on descent). Many have computers that can sense wind direction and speeds, with moving maps that display airfields and strips within theoretical gliding distance, and alert pilots to local airspace restrictions.

George Bolt would be amazed.

But he would very much recognise the passion that today's glider pilots have for what they say is 'real flying': pitting themselves and their aircraft against nature, testing their ability to soar in harmony with changing and challenging environmental conditions. That part hasn't changed a bit.

The interaction between sun, wind, and terrain, and the effect of that interaction on air mass, is what good glider pilots understand well. They also know how to use the energy of moving air to extend their flight as far, or as fast, as possible.

The South Island is one of the world's premier places to soar and New Zealanders have set world records there.

Many flights of longer than 1000 km have been flown in New Zealand, and pilots here will regularly fly up to 500 km for an international badge programme. Flights higher than 20,000 ft are also not unusual in this country.

Launching into it

So you want to have a go.

Your first stop is the website of the national body, Gliding New Zealand (GNZ) at gliding.co.nz, which among other information, lists the details of the country's 22 gliding organisations.

Training, supervision of operations, and engineering are carried out by those organisations. But they are all affiliated to GNZ, which has been certificated by the CAA to oversee gliding operations in New Zealand under Part 149.

All clubs offer trial flights, the price of which begins at about $100, including a short-term club membership. During the trial flight with an instructor, you will actually get to fly the glider.

It's cheaper to train to solo stage than in powered flight, particularly if you use winch launching. Aero towing is still the more popular way of getting into the air – even though it costs more. A winch launch can get you only so high – typically, up to 2000 ft. So some days, if you're relying on a winch launch, you may not be able to fly very far, unless there's lift near the airfield.

Training is done in two-seat gliders, instructor and student usually sitting in tandem. After that, a pilot continues to develop flying skills in single-seat aircraft. Sometimes their instructor or cross-country coach will fly close by, in a kind of lead and follow fashion, using radio communication between them.

"If we are aero towing, we are, of necessity, teaching formation flying from day one," says Doug Hamilton, the CAA's gliding technical specialist. "As a comparison, in the air force you don't normally learn that until you've done 100 hours."

While three or four of the larger clubs operate every day in summer, most clubs operate only during the weekends. And because the sport is weather dependent, it can take a while to learn to fly a glider.

"You can't always go down to the gliding club," says Doug, "and say you're going to do an hour's gliding. If it's a flat, calm day, taking a winch launch, you might get only 10 minutes of flying. So you might need as many as six flights to clock up a total of one hour's flying."

To become a Qualified Glider Pilot (QGP), a written exam tests your knowledge of the Civil Aviation Act 1990, Civil Aviation Rules, navigation, meteorology, glider construction and maintenance, principles of flight, human factors, and radio procedures, among other skills. Similar to a PPL, in fact.

Where to from here?

Wellington Gliding Club President Brian Sharpe says with a QGP in hand, there are several further pathways for the pilot wanting to make the most out of their new skill.

"You might be happy to just enjoy the pleasure of being in the air and do your soaring locally. You might take up an interest in doing up, maintaining and flying a vintage glider – there is a dedicated group of such enthusiasts.

"Or there's an advanced training syllabus to get to the highest levels of skill that will enable you to soar cross country, perhaps setting your own tasks or possibly seeking an FAI (Fédération Aéronautique Internationale) Award, of which there are several, requiring increasing levels of skill.

"There are local and international competitions, where average speed is measured over predetermined courses typically of 200 to 400 km in length. These races can take two to four hours to complete.

"Average cross-country speeds of 120 km/h are not unusual, and highly skilled pilots may exceed 160 km/h in particularly good soaring conditions.

"Finally, if you are up for the challenge, there are national and world records to attempt. A number of New Zealanders have set world records, both in New Zealand and overseas."

Soaring safety

The safety record of gliding is "very good" according to GNZ's Executive Officer, Max Stevens.

"The 'per thousand flight hours' accident rate is actually very low. While it's not uncommon for people to do something like land in a paddock and break a wheel in a rabbit hole that they didn't see, when it comes to people actually getting hurt, the numbers are low."

Between 1995 and April 2018, there've been 132 gliding accidents in New Zealand, 14 of them fatal, and one of those resulting in a double fatality. (In the same period there have been 17 power glider accidents, two them resulting in one death each.)

"Yes, there is some risk," says Max, "as there is in any form of aviation sport, but I believe good training minimises that.

"You learn how to look out the window and fly the glider by what you see and feel, not by what you think the instruments are telling you.

"The fact that it is weather-dependent means that generally, gliders don't fly on bad weather days. That's a whole area of risk mitigated."

It's also a factor in gliding safety that almost no-one launches independently. It's not just a matter of trotting down to the Cessna to 'take her for a bit of a fly'.

Whether the day's conditions are safe for gliding is a joint decision of the pilot, the winch driver or the tow plane pilot, and club officials.

So even if the glider pilot wants to risk flying in marginal conditions, others will convince them otherwise.

Situational awareness is paramount in both gliding and powered flying, but in gliding, a slip is far less forgiving.

Doug Hamilton says he has shared a thermal with 25 other gliders during competitions.

"You have to have your eyes outside the canopy all the time," he says. "It's see and avoid. You're not looking at your instruments. It's the Mark One Eyeball.

"Many gliders in New Zealand have a collision avoidance system – the FLARM or Flight Alarm – which, as long as it's been installed properly and is operating correctly, is fine. But I would never stop looking out the window and depend only on the FLARM to get me out of any trouble. Like any other instrument, you don't always know if it's operating perfectly."

Buying your own

While clubs have gliders for hire, some enthusiasts want their own, possibly as part of a syndicate so costs are shared.

Most people buying their first glider probably buy them second-hand.

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"But it's amazing how well modern gliders can last," says Max Stevens. "The fibreglass gliders started to replace wood and fabric about 50 years ago, with a 3000-hour life. That means at 3000 hours, it gets a special inspection for structural fatigue. Now, many of the schedules go out to around 12,000 hours."

Before buying a glider, talk to everyone you can: at your club, at other clubs, their instructors, GNZ and their engineers.

"The community is relatively small in New Zealand, everybody seems to know everybody else," says Max.

"When people know that somebody is looking for a particular sort of glider, there's lots of people who'll help them out with advice."

Buying an older glider that is perfectly airworthy, and while not being high performance, quite safe to use, may cost anywhere between $10,000 and $20,000. Or a 'direct from the factory', two-seat, high performance motor glider might cost around $500,000.

When you have settled on the glider you want to buy, you have 14 days from the date of the purchase to submit to the CAA a change of possession form completed by you and the seller. There's also a fee, which is the seller's responsibility. A new Certificate of Registration will then be issued.

This change of possession process is not red tape. As the registered owner, among other safety notices, you could be sent important airworthiness information. You'll also be easier to contact in an emergency.

Maintenance

Gliders are a standard category aircraft, so those fresh from the manufacturers will have full certification, with the exception of one or two brands that are listed in the microlight category.

Training gliders have to be inspected every six months. For single-seaters, it's 12 months. That must be done by a GNZ-approved engineer to an approved maintenance programme.

After inspection, the glider is issued with a release-to-service document. It cannot be flown without one.

Qualified glider pilots can do some straightforward maintenance tasks, if they're also the owner or operator of the aircraft, but only those tasks listed in the GNZ Manual of Approved Procedures.

Peace. Quiet.

For GNZ president Karen Morgan, no other form of aviation comes close to gliding.

"On the one hand, gliding offers transferable skills that will help a pilot in any other form of aviation," she says.

"But it also, more than any other form of aviation, makes the most of New Zealand's environment.

"Only glider pilots – and to a lesser extent, balloonists – get to see so much of the country's beautiful scenery in such peace and quiet.

"And in circling flight, we get to enjoy New Zealand's mountains, lakes, and farmland, for so much longer." ■

Vortex Ring State

Vortex ring state is a serious hazard all helicopter pilots need to be aware of.

Vortex ring state occurs when a recirculation vortex envelops a helicopter's rotor system, causing significant loss of lift.

This can occur when the helicopter is descending at a reduced airspeed, and is most at risk of happening during downwind approaches. The likelihood of vortex ring state is increased with a helicopter at a heavier weight due to a higher power setting requirement.

The condition can be sudden, and it results in a rapid increase in rate of descent. Any increase in rotor thrust to reduce this further energises the vortices and increases the rate of descent.

The standard vortex ring state recovery technique requires pilots to reduce power by lowering the collective and accelerating forward away from the downwash. However in the low level environment this may not always be possible as it consumes valuable height.

Alternatively, the Vuichard Recovery technique can be used to move out of the vortex ring. This involves increasing collective to climb power, applying the appropriate pedal (generally left in American helicopters, and right in European helicopters) to keep the nose straight, and applying the appropriate cyclic (opposite to the pedal used).

Of course, avoiding vortex ring state is the best course of action. This requires pilots to:

» Remain alert to the conditions conducive to the formation of vortex ring state

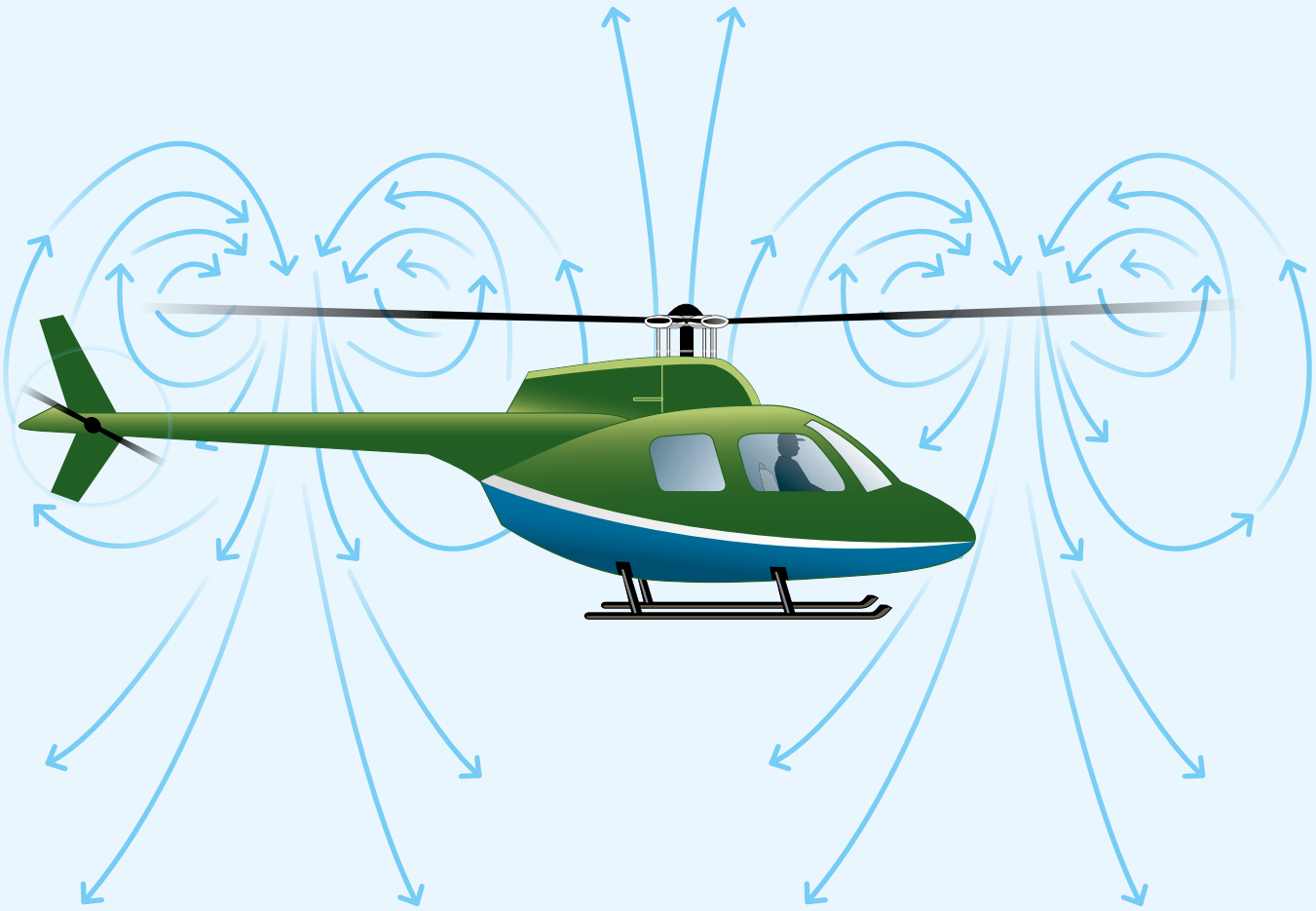
» Closely monitor the airspeed and rate of descent during the final approach

» Initiate recovery action at the first indication that they may be approaching vortex ring state.

More information

For more information on helicopter performance, see CAA's Good Aviation Practice booklet, *Helicopter Performance*. It's available on www.caa.govt.nz, "Quick Links > Publications > *Good Aviation Practice* booklets".

You can also order a free printed copy by emailing info@caa.govt.nz. ■



Aircraft **Icing**

As New Zealand heads into the cold weather, it's worth looking at how ice affects aircraft before they even leave the ground.

Ice can render an aircraft unflyable.

For that reason, rule 91.315 prohibits taking off if the aircraft has snow, ice, or frost sticking to the wings, stabilisers, or control surfaces.

CAA Aviation Examiner John Parker says the belief that propeller slipstream or air flow over the wings will blow the surfaces clean during flight is incorrect.

"You *must* remove all ice, snow, and frost from the aircraft before flying. Even a thin layer of ice can have a huge effect on the aircraft's performance.

"For instance, snow or ice on the upper wing surface substantially reduces lift and increases weight. The shape of the aerofoil is altered, and it becomes much less efficient.

"Frost and ice will also dramatically increase the stall speed."

During autumn and winter, aircraft are obviously best hangared to protect them from the elements. Aircraft left in the open should have their wings and engines covered.

If any snow, ice or frost does accumulate on the aircraft, push it into the sun and rub a cloth over it to make sure the critical surfaces are clear and dry.

Carlton Campbell, CAA Aviation Safety Adviser, says that inexperienced pilots may pour jugs of hot water over the canopy or windshield.

"But that will contribute to the ageing of the canopy or windshield, and increase the likelihood of it becoming cloudy or speckled, like ice under pressure.

"In temperatures lower than zero, don't use hot water on the aircraft wings either, as it will likely freeze instantly, making the job of de-icing much harder."

Helicopters and cold weather

Even small amounts of ice on rotor blades can set up vibrations which could lead to loss of control.

Any snow ingested into a helicopter turbine may cause a flameout. Particle separators can prevent that, but they in turn can become blocked with snow and ice.

Grant Twaddle, CAA team leader of heli ops, says that in icy conditions, helicopter pilots might find one skid is more attached to the ground than the other.

"You need to be careful that the difference in adhesion doesn't roll the helicopter over, when you take off."

When water becomes ice

Expansion of water as it becomes ice can damage the internal structure of wings, control surfaces, and fuselage bulkheads.

As Carlton Campbell explains, "Torrential overnight rain will get into all sorts of places, and if the rain is followed by a hard frost – causing the rainwater to freeze around the control linkages of the aircraft – it can cause breakages or control issues.

"If the preflight omits a trim check, it might be only after becoming airborne that the pilot discovers the trim hinges are jammed with ice."

The air inside fuel tanks of aircraft left outside on a clear night may condense and freeze. If, at the time of fuel drain testing, the ambient air temperature is still below freezing, drains may well be frozen solid.

Again, push the aircraft into the sun and wait for the ice to melt, before testing.

John Parker says keeping fuel tanks full reduces the chance of condensation forming.

"But it's essential that even full fuel tanks be checked for water by draining some fuel into a tester."

More reading

The *Aircraft Icing Handbook* is free to download from the CAA website, www.caa.govt.nz, "Quick Links > Publications > *Good Aviation Practice booklets*". ■

Reading the **Weather**

MetService is launching a new product that will make it easier for pilots to understand the weather.

From late June, the GRAFOR (Graphical Aviation Forecast), along with the recently released Graphical NZ SIGWX (GNZSIGWX) chart, will replace the existing text ARFOR. This change will swap pages of text for graphics.

Imagine you are flying from Napier across Cook Strait to Golden Bay. You go to MetFlight to get a weather briefing, making sure not to skimp on weather reports and forecasts. You print out the necessary en route ARFORS and TAFs, as well as any neighbouring forecasts that could become important later on.

Figuring out what weather is affecting which area, and what differences there are between each region, can take a lot of time. You also notice this morning's ARFORs are only valid out to 0100Z (1:00 pm NZ Standard Time), and you were planning a later arrival into Takaka. Will the forecast change drastically in the next issue? What weather should you expect in the afternoon?

Surely there's a better way? Welcome to the GRAFOR.

MetService meteorologist and recreational pilot, Tui McInnes, says the GRAFOR is the culmination of two years' work, developed alongside the GNZSIGWX, and marks a significant step forward in how weather information is presented to pilots.

"The objective for MetService is to provide better methods of communicating weather more efficiently and in a style that is easy for users to understand," says Tui.

The new GRAFOR product, alongside the GNZSIGWX, will provide the same level of information as the current ARFOR, displayed spatially on a map.

Clouds, weather, visibility, freezing level, and fronts are all depicted on the GRAFOR, providing a visual reference of the weather situation and forecast. The entire country is viewable on one map, making the weather briefing succinct and easy to follow.

> *"The objective for MetService is to provide new methods of communicating the weather more efficiently and in a style that is easy for users to understand."*

Wind information will be available in the same format as is currently used, and will be called Aviation Area Winds (AAW). Below is an example of how the Alps winds may appear.

Tui explains how the new GRAFOR graphic works (see next page).

"The full map shows New Zealand, sectioned off to separate areas of similar weather. Each area has an accompanying text box, stating both coverage and height of forecast cloud, the forecast weather and corresponding visibility reduction. In each text box, the worst weather expected is noted.

"Also included on the map are the position of any fronts and their forecast movement, and spot freezing levels."

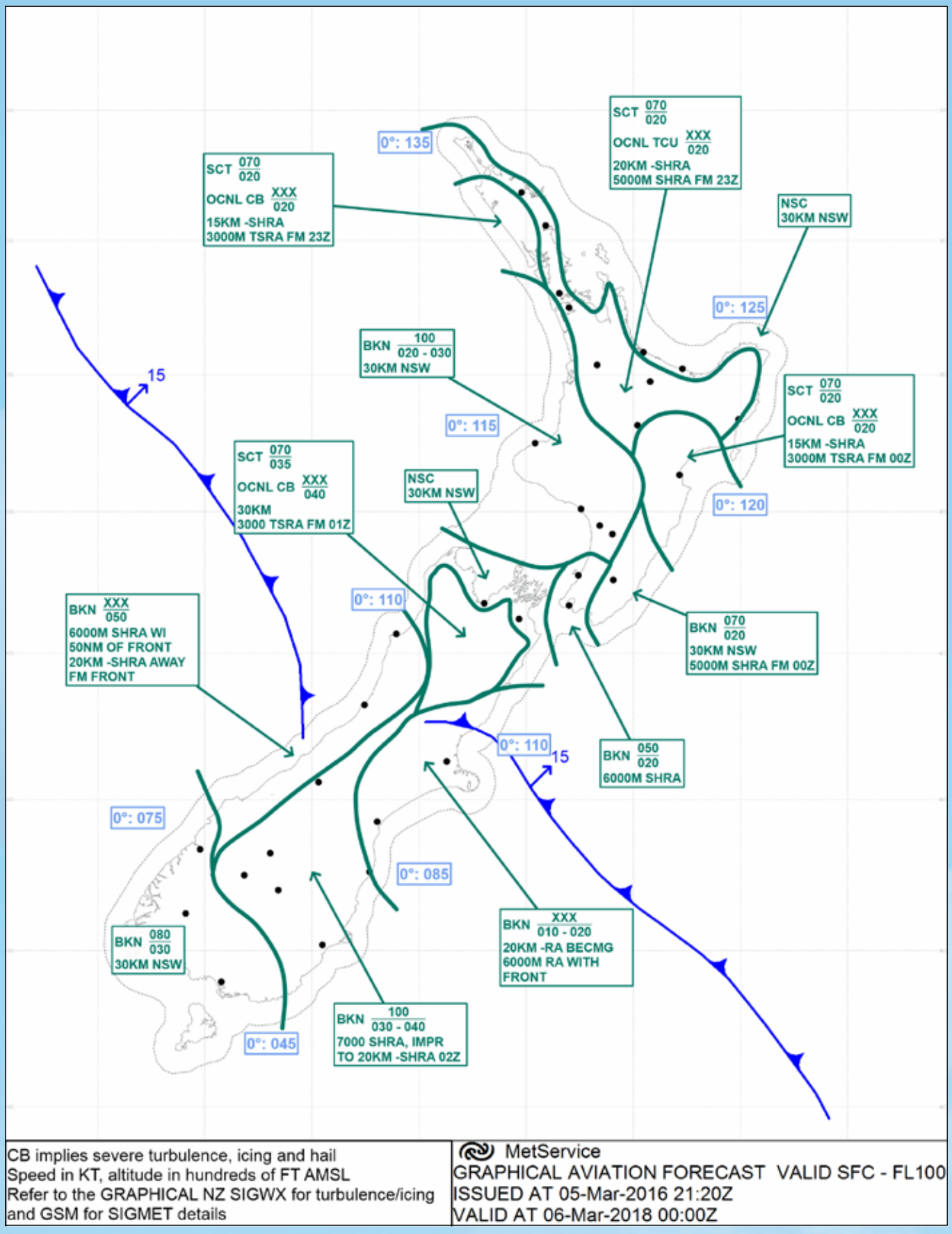
Continued over ››

Aviation Area Winds

AVIATION AREA AL VALID 1800 to 0600 UTC

BECOMING		0000	0600
3000	16010		
5000	17010 PS03	14020 PS03	
7000	17015 ZERO		14015 PS01
10000	16010 MS05		

Example of the new GRAFOR



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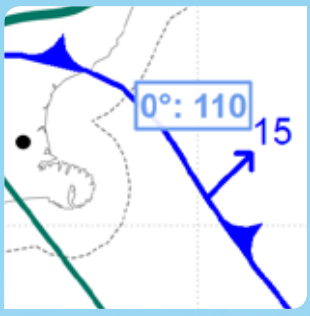
The two following examples were taken from the full map on page 20. The new GRAFOR provides all heights in flight levels, or hundreds of feet.

The example below shows a forecast for the area around Dargaville. It indicates scattered cloud with bases of 2000 ft and tops of 7000 ft and occasional cumulonimbus clouds with bases of 2000 ft and tops above 10,000 ft.

The forecast weather is 15 km visibility in light showers before reducing to 3000 m in thunderstorms from 23Z.

Below we have a frontal example taken from the area around Christchurch. It depicts a cold front, moving northeast at 15 kt, and a spot freezing level of 11,000 ft.



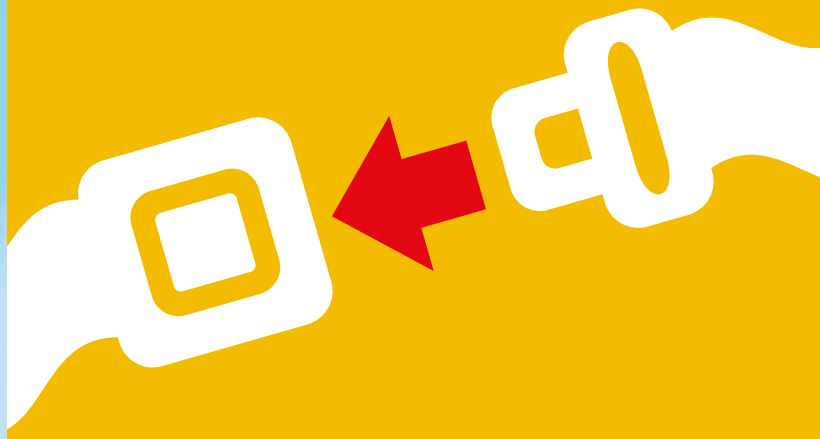
So what is the difference now for you and that trip to Golden Bay?

You get a weather briefing from MetFlight, or your usual MetService portal, and print off the GRAFOR and GNZSIGWX maps and AAW valid for the time you are planning to fly.

Even a brief glance at the map shows you where the inclement weather is, helping you more easily plan the safest and most efficient route.

At any one time, there will be three maps available, each with a six-hour validity, covering a total period of 18 hours.

"This extends the current coverage by a considerable margin," says Tui, "enabling better decision making especially for long cross-country flights. We expect this will make things easier for pilots." ■



Buckle Up

Injuries and fatalities sustained in some aviation accidents may have been prevented, or reduced in severity, if seat belts had been worn correctly.

It's important to remember that passenger and crew seat belts and harnesses are only effective when they are securely fastened and properly adjusted.

The Transport Accident Investigation Commission's investigation into the 2014 Eurocopter AS350-B2 accident at Mount Alta found that the injuries sustained by the helicopter's occupants might have been reduced had their seat belts been fitted tightly. In this accident, five of the seven occupants were ejected from the helicopter. There was one fatality, and three received serious injuries.

Under rule 91.207 *Occupation of seats and wearing of restraints*, the pilot-in-command (PIC) of an aircraft must require each passenger to fasten their seat belt during the critical phases of flight, or when the aircraft is flying at a height of less than 1000 feet above the surface. This also applies at any other time that the PIC considers it necessary. This applies to all operators, regardless of aircraft size.

Educating all passengers on the importance of correct seat belt use should form a key part of the safety briefing before every flight.

It's also important that seat belts and harnesses are properly maintained. CAA inspectors have recently seen seat belts and harnesses that were damaged, twisted, frayed, and even installed upside down. The condition of seat belts and harnesses should be checked on an ongoing basis by the operating crew; not only during maintenance. ■

Normalisation of **Deviance**

How is it that trained pilots and other aviation professionals can deviate from required operating practice?

In New Zealand, a flight was chartered to take a VIP to an important meeting. The VIP arrived late, but the crew got them to the destination on time. The VIP wrote to the CEO praising the pilots for their sterling service. The feedback was passed on in person by the CEO – big smiles all round. Unbeknown to management, the crew had skipped most of the pre-flight and take-off checks.

That's just one episode psychologist Keith McGregor can recall, during his many years studying organisational and human factors.

Keith was an air force psychologist for 12 years before becoming a consultant with the Transport Accident Investigation Commission (TAIC).

Keith says analysis of both accident and non-accident flights will often reveal deliberate deviations from standard operating practices, despite no critical need to do so.

Flying below minima has been a contributing factor in fatal accidents in New Zealand with investigators sometimes discovering it had become normalised practice.

American sociologist Diane Vaughan coined the term 'normalisation of deviance' and defined it as "the gradual process through which unacceptable practice or standards become acceptable. As the deviant behaviour is repeated without catastrophic results, it becomes the social norm for the organisation."

Photo: iStock.com/markgabrenya

Vaughan developed her theory when she was investigating the space shuttle Challenger accident which exploded shortly after liftoff on 28 January 1986. She observed that the cause of the disaster was related to the practice of NASA officials allowing space shuttle missions despite a known design flaw with the O-rings in the solid rocket boosters.

Normalisation of deviance, non-conformity, call it what you like. But chances are you probably know or have heard of someone who behaves this way. Perhaps you saw something you knew to be unsafe, but did nothing about it? Maybe it's you?

Maybe you are the VFR pilot pushing the limits flying in less than ideal VFR weather. The pilot who doesn't want to put the defect in the tech log that grounds the aircraft and upsets the boss? The engineer who is rushed for time and signs off the paperwork saying the duplicate inspection was done, even though you know it wasn't done completely?

"The desire or need to 'fit in', to please others, or to keep the boss happy is understandable. The reward or feelings of satisfaction you get from completing a task quickly is appealing."

CAA analyst Joe Dewar says it's seen in a range of accidents and incidents in New Zealand, that people have operated outside of standard procedures or operating limitations.

"A classic case would be an aircraft which is certified to carry no more than x-amount of weight for a given set of conditions. But despite this, the decision might frequently be made to load beyond this. And this might be done more and more often. For a number of flights this might have been fine. But suddenly conditions change – perhaps in air temperature or wind intensity – and the aircraft is now overweight for the conditions. Its performance completely changes and it cannot be controlled. In that instance, the overloading has been normalised over a period of time… and then bang."

TAIC's investigation into one fatal crash found the pilot was reported to have carried out unnecessary low flying on scenic flights on a number of occasions – possibly to give the passengers a thrill – over several years.

TAIC found the operator did not adequately supervise the pilot, independently investigate an allegation of the pilot low flying, or establish a system to control or monitor the pilot's performance and compliance with safety requirements.

Falling into the trap

Why do trained pilots and aviation professionals fall into this cycle?

Keith McGregor says in considering the VIP flight, the pilots knew what they were doing was wrong and no doubt reassured themselves it was a 'one-off'.

"But they were rewarded with praise from the boss, and faced with a similar situation in the future, the probability that they would repeat the deviance had been slightly increased. For humans, one of the most powerful forms of feedback is attention, and in this case they received plenty."

Joe Dewar says commercial pressures can be a major contributing factor.

"The incentive is there for pilots to operate outside standard procedures or limitations, and cost is a big part of that."

Keith says diligently following standard operating practices can involve operational and commercial penalties.

"Flights may be delayed, cancelled or diverted, and significant extra costs may be incurred, and that can result in a good deal of grief for the pilot."

CAA Air Transport Inspector Pete Wilson has a Masters in Human Factors and Safety Assessment in Aeronautics and has flown for airlines overseas.

Pete says while most work environments encouraged strict adherence to safety practices, not all were conducive to achieving this.

"At one place, pilots weren't recording defects in the aircraft technical log – so much so I got called in to see the chief pilot to be told I was putting too many defects in. When I pointed

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out I was the only pilot putting things in the tech log and nothing would get fixed otherwise, he realised there was a problem with the culture."

Pete says pressure – be it due to commercial needs or concern about how your peers regard you – is hard to ignore.

"The desire or need to 'fit in', to please others, or to keep the boss happy is understandable. The reward or feelings of satisfaction you get from completing a task quickly is appealing.

"No organisation is immune – 'normalisation of deviance' has been shown to exist right across the aviation spectrum, from NASA to airlines, military jet display teams, maintenance organisations, biz-jet operators, right down to the smallest sightseeing company."

Keith says from a psychological perspective, acting safely is a self-defeating behaviour.

"The fundamental thing is the extent to which senior management are genuinely aware of what happens. What sort of workarounds are people doing in order to get the job done?"

"If you do it right, nothing happens – which means the behaviour is not reinforced, but take a shortcut to get finished earlier, and bingo, the unsafe behaviour is rewarded.

"Without even realising it, you start cutting corners and now that process will basically become normalised because it gets reinforced."

Reinforce the positive

Joe Dewar says the roots of 'normalisation of deviance' usually lie in the environment in which they occur.

He says where there is less structure and supervision within an organisation, it's a phenomenon that occurs much more readily.

So CEOs and managers need to look at what they're doing at the organisational level.

"Instead of solely focussing on occurrences, if you're the CEO or a Senior Person you also need to keep an eye on things consistently being performed correctly. So for example, do you have oversight of whether your pilots always follow the same checklist each flight? Do the aircraft fly within limits? It's good safety management to pay attention to these procedural aspects of operations, to avoid drifting into failure."

In his investigation work with TAIC, Keith says it was amazing how often there was a 180-degree difference between what management told them was happening on the ground, versus what the people on the ground told them.

"The fundamental thing is the extent to which senior management are genuinely aware of what happens. What sort of workarounds are people doing in order to get the job done?"

He says managers forget that when an organisation acts safely, nothing actually happens.

"Every organisational survey you do, you see people in the open comments section saying 'the only time we hear from our managers is when something's gone wrong'. There should be a huge onus on management to actively pay attention to safe behaviours and focus on what people are doing well."

Mitigation strategies

Pete says neutral observers are usually better at spotting bad news, so things like audits are a good opportunity to pick up on whether poor practices may be creeping in.

He says management needs to be clear about what the standards are, and reward whistle blowers.

"Also, think about how your behaviour is shaped by others you observe and vice versa. Imagine an experienced pilot in a small company exhibiting poor standards or behaviour – how likely is it others will copy them?"

Keith says empowering others to speak up is an effective way to stop unsafe behaviours becoming normalised.

"Establish an agreement with other pilots for instance, that they will ask you to explain the reason for any deviation they notice and vice versa. We are generally better at spotting other peoples' deviations than our own. If you actually ask them to do it, they're more likely to be upfront."

Keith says pilots should be encouraged to take ownership of their actions.

Joe agrees that a deep-seated sense of responsibility should be at the core of pilot training.

"When pilots are trained, the critical importance of the pre-flight checklist should be engrained, for example. That means even when there is no pat on the back for doing it, you recognise you always have to do it." ■

Assessment of **FDT Schemes**

The CAA introduced a procedure in 2017 to ensure consistent application of Flight and Duty Time (FDT) rules.

Operators certificated under Parts 115, 121, 125, or 135 are required to establish FDT schemes. These schemes define limits on flight, duty, and rest times of flight crew.

While some operators will be able to incorporate the 'off the shelf' scheme provided in Advisory Circular AC119-2 *Air Operations – Fatigue of Flight Crew*, one size doesn't fit all. So operators are encouraged to develop their own scheme to suit their operation.

When a scheme differs from AC119-2, the operator must demonstrate that their scheme provides an equivalent, or better, level of safety than AC119-2, based on fatigue science and risk management. The CAA suggests that operators engage a fatigue expert to support their scheme before submission to the CAA, to reduce associated certification costs.

While the CAA will assess FDT schemes as part of an Air Operator Certificate application, all operators should review their scheme for compliance with AC119-2 beforehand.

When assessing non-standard schemes, the CAA applies the *Assessment of Flight and Duty Time Schemes Procedure*. This states the expectations of the CAA, and the process used to assess such schemes. This is an interim procedure until the wider Fatigue Risk Management Project is concluded.

Before working on a custom FDT scheme, it's important to understand the requirements under the procedure, and to allow sufficient time for the scheme's verification.

For more information on fatigue management including the interim FDT assessment procedure, see www.caa.govt.nz/fatigue.

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.

For more information, see:
www.caa.govt.nz/general-aviation/aviation-events.

CAA Cut-off Date	Aeropath (Airways) Cut-off Date	Effective Date
6 Jun 2018	13 Jun 2018	16 Aug 2018
4 Jul 2018	11 Jul 2018	13 Sep 2018
1 Aug 2018	8 Aug 2018	11 Oct 2018

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

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
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Neil Comyns
(Maintenance, South Island)
Mobile: +64 27 285 2022
Email: neil.comyns@caa.govt.nz

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.

Kawasaki BK117 B-2	
Date and Time:	03-Feb-2018 at 14:30
Location:	Paekakariki
POB:	1
Nature of Flight:	Other aerial work
Pilot Licence:	Commercial Pilot Licence (Helicopter)
Age:	37 yrs
Flying Hours (Total):	1380
Flying Hours (on Type):	750
Last 90 Days:	13

After conducting lifting operations, the pilot identified evidence of contact with foliage and missing paint from the lower surface of a main rotor blade.

The hazard brief for the second of two sites had not been updated since the last job was last completed in December 2017, and it did not identify the location and height of vertical obstacles. No hazards, beyond those identified in 2017, were discussed.

The internal investigation identified that reliance on the previous risk assessment, without evaluating the site for hazards, prevented the identification of the hazards presented by a tree line. The use of the 50 ft long line also significantly reduced the safety margin and would not have been used if a 100 ft long line had been available on the site.

To improve the risk assessment process for Part 133 jobs, the Chief Pilot will review the work packs to ensure that pilots have identified the significant hazards and controls and have a plan to carry out the job in a safe manner. Pilots will ensure that suitable equipment is available for the jobs to be carried out.

CAA Occurrence Ref 18/665

Guimbal Cabri G2	
Date and Time:	07-Apr-2016 at 21:10
Location:	Whakatane
POB:	2
Damage:	Substantial
Nature of Flight:	Training dual
Pilot Licence:	Commercial Pilot Licence (Helicopter)
Age:	54 yrs

The instructor failed to anticipate the decay in RPM and the requirement to anticipate the required throttle/power input during an autorotation exercise at night. The resulting impact with the ground caused extensive damage to the helicopter without injury to the crew.

CAA Occurrence Ref 16/1625

ZK-GPE PZL-Swidnik PW-5 "Smyk"	
Date and Time:	01-May-2016 at 14:50
Location:	Tauranga
POB:	1
Injuries (Fatal):	1
Damage:	Destroyed
Nature of Flight:	Private other
Flying Hours (Total):	19
Flying Hours (on Type):	0
Last 90 Days:	4

The student glider pilot was conducting a first solo flight on type in the single-seat PW-5 glider. Observers witnessed the glider overfly the intended runway for landing, commence a left turn and descend at a high rate, striking the ground. The pilot initially survived the accident, but passed away the following day from injuries received.

The CAA safety investigation found that the accident occurred as a result of the pilot losing control of the glider during a steep left turn after a discontinued landing approach. Due to the low altitude when the loss of control occurred, the pilot was unable to recover before the glider struck the ground. The investigation also identified that the student pilot had minimal prior solo flight experience.

Complying with CAA Safety Recommendation 17A1007, Gliding New Zealand amended its Instructors Training Manual, after the safety investigation identified a lack of guidance material regarding single-seat glider conversion.

A full report is on the CAA website.

CAA Occurrence Ref 16/1970

Robinson R44 II	
Date and Time:	23-Mar-2015 at 12:00
Location:	Pongoroa
POB:	1
Damage:	Substantial
Nature of Flight:	Agricultural
Pilot Licence:	Commercial Pilot Licence (Helicopter)
Age:	46 yrs
Flying Hours (Total):	1606
Flying Hours (on Type):	1328
Last 90 Days:	118

While the helicopter was spreading fertiliser with an underslung bucket, the clutch failed at approximately 30 ft. As the pilot tried to manage the descent by controlling RPM with the throttle, the helicopter descended onto the bucket, resulting in damage to the tail rotor gearbox and tail boom. No contributing factors could be found to establish the cause.

CAA Occurrence Ref 15/1326

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
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

Cessna 172R

Radiator

Part Model:	CD-135
Part Manufacturer:	Continental Motors
Part Number:	20-7520-H032701
ATA Chapter:	7100
TSI Hours:	5
TTIS Hours:	10

The aircraft is fitted with a liquid-cooled Centurion diesel engine.

The maintenance provider reported that over the previous 110 flight hours the aircraft has required five radiator replacements due to cracking/coolant leaks. It was originally suspected that there was a quality issue with the radiators.

Further information suggests that an engine defect which possibly allowed combustion gases into the cooling system may have been the cause of the radiator defects.

CAA Occurrence Ref 17/5957

Pacific Aerospace Cresco 08-600

The engine surged during a topdressing run, then flamed out. The pilot carried out a successful forced landing into a paddock, without injury or damage to the aircraft.

Maintenance investigation determined that the engine had flamed out due to fuel starvation.

Incorrect non-return valves had been fitted to the forward sump tank. As the fuel load reduced during flight, the non-return valves prevented fuel flowing into the forward sump tank from the wing tanks, resulting in a lack of fuel to the engine.

The maintenance provider identified a number of causal factors which led to the occurrence and have put a number of corrective actions in place to prevent reoccurrence.

CAA Occurrence Ref 17/6010

Hughes 369E

While in cruise flight, the pilot observed an increase in rotor and engine RPM, and a high-pitched noise from the engine. The pilot executed a precautionary descent and landing.

The initial engineering investigation identified contamination on the engine chip plugs and engine oil scavenge filter. On further investigation, the 2 1/2 bearing was found to be damaged, and there was a misalignment detected in the 2 1/2 bearing setup. No other faults were identified. The gearbox had been in use 755.4 hours since last overhauled, and 90.2 hours since the last 100-hour engine inspection.

The owner elected to overhaul the engine gearbox.

CAA Occurrence Ref 17/1608

Hughes 269C

During cruise flight, the pilot heard a bang accompanied by vibration. The pilot executed a precautionary landing and shut down without further incident.

The engineering investigation found that two flywheel to driveshaft bolts had backed out and departed the flywheel. The pilot confirmed that the bolts were installed and secured by safety wire during pre-flight checks.

The last installation of the flywheel occurred during the 1200-hour inspection. The flywheel had been installed for 11.8 hours when the failure occurred. The flywheel to driveshaft bolts are required to be re-torqued during the 600-hour inspection, and the maintenance organisation practices include an additional re-torque 10 hours after installation. As a result of the failure, the flywheel and associated hardware required replacement.

CAA Occurrence Ref 17/205

Diamond DA20-C1

Elevator Trim Pins

Part Manufacturer:	Diamond DA20-C1
Part Number:	MS171540
ATA Chapter:	2732
TTIS Hours:	286.5

The maintenance provider found that the roll pins securing the springs in the elevator trim system were cracked. The cracks appeared to propagate from the point of contact with the elevator control rod. The roll pins were replaced with new items.

Further inspections of the other aircraft in the fleet also found the same defect.

A 300-hour inspection/replacement maintenance procedure has been introduced for the roll pins, but the cause of the cracking has not yet been determined.

Transport Canada and Diamond Aircraft have been advised and are continuing to investigate the defect.

CAA Occurrence Ref 17/3962

SMS NEW ZEALAND NOTICEBOARD

GROUP 2

PARTS

115
119/135
137
139*
141
145**
146
147
148

*Not serving international operations

**Supporting other than Part 121 and 125 air operations

Remember **SMS implementation plans for GROUP 2** organisations are to be submitted to the CAA by **30 July 2018**

GROUP 2 organisations should have received a reminder from the CAA regarding the 30 July 2018 deadline for submission of SMS implementation plans.

Please don't leave it to the last minute. It is in your interest to submit your plan earlier to have a better chance of getting your preferred date for implementation.

If you require more information, please get in touch with your usual CAA contact, or email **sms@caa.govt.nz**.

What's in an implementation plan

Advisory Circular AC100-1 *Safety Management*, Section 3, and the accompanying annexes detail the requirements of an acceptable implementation plan. The implementation plan is a road map describing how the organisation intends to implement processes that meet the requirements of Part 100 and associated organisation certification rules. Therefore, the implementation plan should be a strategy for managing SMS implementation including adequate resourcing, a realistic timeline, and a proposed date for implementing your SMS.

You do not need an SMS manual at this stage

You are not required to submit an SMS manual or exposition amendments at this stage – these are to be submitted at your date for implementation (at least 60 days before your SMS certification).

Implications of not submitting a plan acceptable to the Director

The Civil Aviation Rules transitional provisions require that the GROUP 2 implementation plans must be submitted by 30 July 2018. These plans will then be assessed by the CAA and, if they are acceptable to the Director, a date for implementation will be set.

Failure to submit a plan, or submitting a plan that is not acceptable to the Director, will result in appropriate regulatory action being taken. This action could take the form of one or more of the following:

- a finding
- certificate limitations and/or conditions
- certificate suspension.

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