Pointing to safer aviation

Autumn 2021

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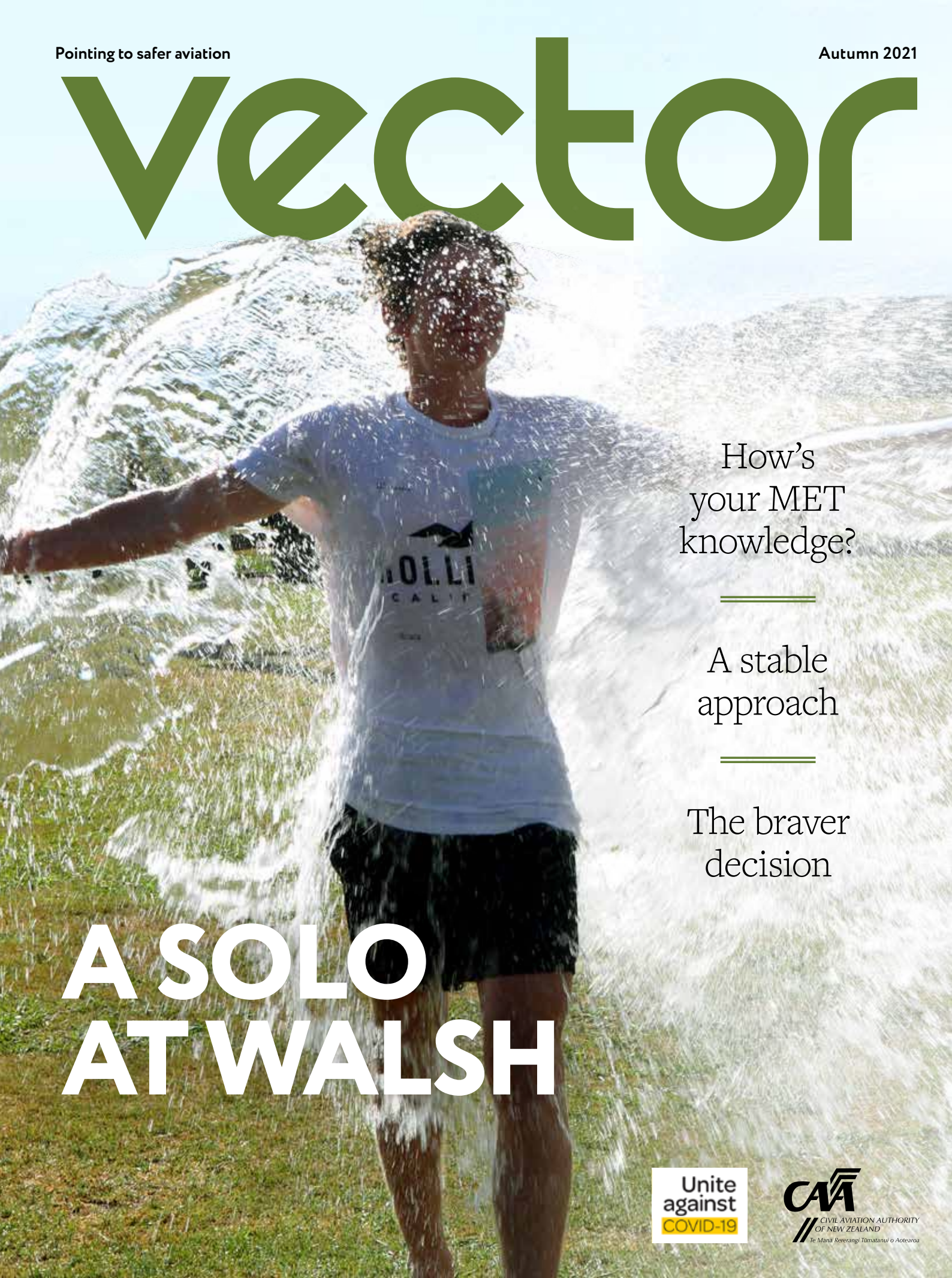

How's your MET knowledge?

A stable approach

The braver decision

A SOLO AT WALSH

Unite against COVID-19

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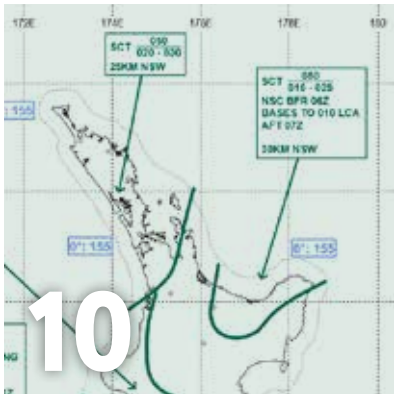
Te Mana Rererangi Tūmatanui o Aotearoa



// HOW'S YOUR MET KNOWLEDGE?

// A STABLE APPROACH

// THE BRAVER DECISION

Cover photo: Sixteen-year old Tom Catto, from Te Puna, fresh from his first circuit solo, receives the ritual bucketing from his fellow ab initio students.
See our cover story, "A solo at Walsh" on page 4.
Photo courtesy of Scouts New Zealand.

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// A SOLO AT WALSH

vector

CIVIL AVIATION AUTHORITY OF NZ

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

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

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// The number 5 conrod failed with the engine at full power, due to it having been slightly bent some time previously. The end result was a destroyed engine on the takeoff roll.

Photo courtesy of CAA/Colin Grounsell

HYDRAULIC LOCK DOESN'T AFFECT JUST RADIAL ENGINES

You need to be careful when you're priming horizontally opposed engines because excess fuel can cause a hydraulic lock.

A hydraulic lock in a cylinder is not limited to radial type engines and this has been highlighted in four relatively recent occurrences here in New Zealand.

Teledyne Continental Motors (TCM) states that the most common cause of hydraulic lock is over-priming during start.

This results in fuel pooling in the inlet manifold in the vicinity of the number 5 and 6 cylinders. The excess fuel is then drawn into the cylinder when the engine starts.

This can result in catastrophic failure of the engine. In one recent instance, the aircraft was about to take off from an island and fly over water – not a happy place to be for an engine failure. (See defect 19/501 at aviation.govt.nz > aircraft > GA-defect-reports, and key '2019' into 'year'.)

TCM service bulletin SB96-11B provides information and advice for a suspected hydraulic lock. The CAA has also published continuing airworthiness notice 85-003 recommending operators and maintainers comply with the TCM service bulletin.

This issue is most likely to affect tricycle gear aircraft where the engine is horizontal or slightly nose-down. The inlet manifold drains for excess fuel may not be effective if the aircraft is parked in a slightly nose-down position.

The engine may start, but if hydraulic lock has occurred, there could be damage, usually in the form of a bent conrod. This could later result in catastrophic engine failure.

To summarise:

- Be familiar with your aircraft's engine and its start-up procedures.
- With tricycle gear aircraft fitted with TCM engines, have the aircraft on level ground for starting, or if that isn't possible, be extra cautious about priming.
- If more priming than usual seems to be needed, best to take a break and check excess fuel has drained away.
- If you suspect that a hydraulic lock may have occurred, now or in the past, consult the service bulletins and your maintenance provider.

Any comments or queries about this story, contact **colin.grounsell@caa.govt.nz**.

A SOLO AT WALSH

// 'Soloist' Chris Tang gets the ritual soaking.

Photo courtesy of Scouts New Zealand

Twenty-two of the country's best instructors, 70 teenagers, huge spirit, two weeks to a solo at Matamata. Why the annual Walsh Memorial Scout Flying School is "addictive" and the huge emphasis on safety contributing to that.

A delighted Anna Haine and her Walsh instructor, Simon Davies after Anna's solo.

Photo CAA/Pen Mackay

For two weeks every January, Matamata is the busiest aerodrome in the Southern Hemisphere.

With an average of 800 movements a day – sometimes a thousand – off five runways, the air traffic controllers in their mobile tower are constantly on their toes as they shepherd as many as 12 novice aviators at any one time around the circuit.

The seven air traffic controllers are volunteers, as are the school's instructors, as is everyone else associated with the 55-year old event. Many of them leave family behind and take annual leave to work up to 15-hour days to – as one instructor put it – "give their all for the kids". They come back year after year.

"Many of us feel we got a lot out of GA, and we want to give something back," says A-cat and flight examiner Penny Mackay. "We love encouraging the kids into an industry we've spent our lives in."

Newly minted Tauranga C-cat, Tom Shaw, was an ab initio student at Walsh. He came back the following year as a 'returned student', to learn more flying and with more responsibilities in helping run the camp. Then the following year he returned as a student flight leader, helping to run the camp.

"The place is addictive. You talk to anyone here and they'll tell you it's the best two weeks of the year. It's the people who make the place. Everyone is so positive, so helpful. I've learned so much as a new instructor. I'm sort of filling in for when other instructors are away for some reason, so I'm teaching lots of different students who are in different parts of their flight training, and I'm learning lots of different teaching techniques.

"If I have any questions, I have the best instructors in New Zealand right here. I'm so lucky."

The school's CFI, Steve Scott – an Air New Zealand Q300 captain – relishes the personal growth he sees in the 16–19 year olds over the two weeks of flying instruction. "They arrive and they don't know anybody. They're shy and they shuffle around staring at their feet. Then they're here for two weeks, learning to fly and learning some good life skills. They go solo and when they step out of the plane, it seems to me they're about a foot taller, they look you in the eye, the new confidence is obvious.

"We have a saying at Walsh, 'A parent drops off a child, and two weeks later, we give them back a young adult'."

Safety – teaching and learning

Safety at the school is paramount. "We've assembled the best experience in instructing that we can," says school director John Hamilton. "We have about five A-cats and about 17 really experienced B-cats. Where else in New Zealand are you going to find that depth of expertise all in the one place at the one time?"

The CFI also brings in four to five C-cats each year. "It's developing talent for the future," says John. "It gives them the opportunity to instruct in a very busy, compressed setting. They benefit hugely by being exposed to that."

Penny Mackay says the instructors learn from each other. "The instructors here come from every field of aviation – airlines, 135 ops, training institutions – such a mixed group. It's nice to talk aviation with people who have a passion for it. It's really a unique opportunity."

The instructors are not the only ones to learn: the air traffic controllers learn how to deal with a massive amount of traffic in a short period of time.

Wellington-based air traffic controller Phil Craig ("I'm a relative newbie really. I've been controlling at the Walsh for only 23 years") says there's a real mix of aviation expertise in the circuit at any one time. »

"We appreciate that the ab initio students don't know anything when they first get here. The returned students do know the lie of the land, and some of them have trained in between Walsh schools, but some haven't. We have C-cats who're brand new, instructing in this environment for the first time and we have B-cats and A-cats with a wealth of expertise. So we're dealing with a whole range of experience here."

Phil says what the students can achieve and what the air traffic controllers can teach them is what brings him back each year. "Also," he says smiling, "we try to poach as many as we can off the pilot fraternity. We get about one student a year who decides on an ATC career".

The school has had almost six decades to bed down procedures and it runs like a well-oiled machine. The event's organisers believe they have the most robust safety processes in place that they can, although they regularly review and improve them. After a collapsed nosewheel on a hard landing a few years ago the instructors gathered to sort out how to avoid a recurrence.

"The result of that discussion," says Steve Scott, "is that when the students start their circuit training, I occasionally stand beside the touchdown point with a green flag and a red flag. A nice two-wheel landing with the nose high gets the green; a red flag means 'raise that nose more next time'."

"The kids get totally into it," says Tom Shaw. "It's a good challenge – 'Impress Steve Scott and we'll be good'. It's a brilliant idea because it's turned this issue into a really positive learning experience for them."

"You learn about safety from, like, day one," says 16-year old Tom Catto, from Te Puna, near Tauranga. "The first thing I remember my instructor saying about safety was, 'Don't stick your head in the propeller'," he laughs. "We were being taught how to tie up the plane and people were going underneath and then sticking their heads where the propeller would be circling and, yeah, we kind of got told why that was a really bad idea.

"Then I forgot about always wearing shoes and got told off for going for a run in bare feet.

"Definitely a lot of health and safety goes into this. They mean what they say."

Tracey Gore, a B-cat from Waikato Aviation, is at her fourth Walsh as an instructor, but was an ab initio student then a returned student. "I can relate to the students because I was once in their shoes and flew my first solo at Walsh.

"I'm always aware of the formidable responsibility I have as an instructor when I walk out to the plane with the student. It always runs through my head that a parent has left their young adult in my care, to operate an aircraft.

Photo CAA/Pen Mackay

Walsh CFI Steve Scott with ZK-FML, a Piper PA-38 Tomahawk, the first of what's hoped to be a fleet of dedicated Walsh aircraft with the highest possible specs. The Hawaiian-style shirt is intentional. Many of the returning students, camp leaders and instructors were wearing them the day *Vector* visited. "The ab initios are stressed enough with everything they have to learn in such a short time, and then the prospect of a solo at the end of it all, " says Steve. "So the Hawaiian shirt thing just kind of relaxes the vibe a bit. If I had my way, we'd wear them every day".

// The temporary 'tower' at Walsh.

// Janet Taylor (foreground) and Kate Lindsey on duty at Walsh. A team of seven volunteer air traffic controllers manage up to 1000 movements a day.

// We have a saying at Walsh, 'A parent drops off a child, and two weeks later, we give them back a young adult'. //

"That extends to their welfare on the ground. Are they getting enough sleep? Are they fitting in with the other students okay? Are they enjoying themselves? I often check in and work with them to make sure they're getting any support they might need."

WASSI

The immense responsibility of introducing 44 ab initio students (the remaining 26 this year were returnees) to flying an aircraft motivated former Walsh CFI, Mark 'Woody' Woodhouse, to form the Walsh Aviation Support Society Inc – 'WASSI'.

The society is responsible for raising funds to create a fleet of dedicated Walsh aircraft with the highest possible specs, even including a special paint pattern and colour that air traffic controllers find the easiest to identify.

"I feel deeply that we have the care of people's loved ones," says Woody, "and we have the responsibility to put them in the safest possible machines."

Generous contributions to WASSI mean the first dedicated Walsh aircraft, ZK-FML – a Piper PA-38 Tomahawk – took its place on the flight line this year. The second – a Cessna 152 Aerobat – is being rebuilt by JEM Aviation in Blenheim and will fly at Walsh in 2022. WASSI has identified a third possibility – another Tomahawk, in the United States.

"We're aiming for a fleet of 14 two-seaters and one four-seater," says Woody. "They'll be leased out around the country but they'll always be available for Walsh each January.

"Every year of the 27 I've been involved with Walsh, I've felt that our aircraft could be even better than they were. I want to put my hand on my heart and say that our instructors, our procedures *and* our aircraft are the best they can possibly be.

"I can't stop everything happening, but I can do everything I can to prevent it."

Discipline. Leadership. Addiction.

While 'going solo' is important, it's not all there is to Walsh.

"I feel much more disciplined in myself," says 17-year old Hugh Lee, from Auckland. "You learn a lot about punctuality and attention to detail. They say all the time here, 'early is on time, on time is too late'. I've been waking up at 5.30 and I'm going to keep doing that when I get home.

"You learn that you have to do exactly as the procedures and your instructor says. It's the first time in my life I've accepted that close enough is probably not good enough."

Hugh says he has a "new dream", possibly an air force career. "It's really opened my mind. I'm going to have something to look forward to each morning at 5.30. Yeah, that's what's going to get me up in the morning I think."

All the students are expected to do their fair share of duties – helping in the kitchen, cleaning ablutions, support work on the flight line, among them. Those returning for a third consecutive year – the student leaders – virtually run the camp. »

"We guide them and mentor them if they need it," says John Hamilton, "but we pretty much stay out of their way. It's a successful formula."

The addiction

Tracey Gore agrees with Tom Shaw that the school "is addictive".

"To watch the students build in confidence as they train, and then their quiet pride when they've gone solo, you realise what you've been a part of is life-changing for them. There aren't too many opportunities to change someone's life in such a positive way."

Tracey says the teamwork that has Walsh running smoothly is the most marked impression she has of the school. "I take that sense of teamwork and its value, not just back to my job, but everywhere in my life. It's not just the instructors and the controllers. Everyone pitches in, and all together we make this a successful, fun, and safe two weeks. It shows me that a team put together successfully can do wonders."

The solo

"About 90 percent go solo," says John Hamilton. "They have to have completed three consecutive, absolutely top-notch approach and landings with their instructor first.

"If they have hiccups, particularly on takeoff and landing, they keep going until they run out of flying time. The instructors are very conscious that the student only gets the opportunity to go solo when they meet the standard required, and not just because they're trying to meet a target of two weeks."

Motueka Aero Club CFI and Air New Zealand 787 first officer, Jonathan Westenra says, 'You don't know if a student will go solo. But if there's improvement, and when they've done three safe circuits in succession, you say, 'I'm going to hop out now and you can go and do a circuit by yourself'.

"You tell the tower the student is on their first solo and you know the air traffic controllers will usher them safely round the circuit. So you hop out of the plane to turn them loose and you watch them climb away and you think, 'well, it's all up to you now'.

"You've taught them engine failure after takeoff, how to go round, what do about radio or electrical failures. But I'm still 'with' them as I watch them fly, 'keep straight on downwind, watch your airspeed on base leg, hold it off on landing'."

After they land, Jonathan says, the instructor hops back in and taxis the aircraft to the flight line. "They're so excited, we don't want a bad ending to a momentous occasion."

The instructor accompanies their student into the flight ops office to complete post-flight paperwork. "Then they leave their watch and cellphone in the office," says Jonathan, "and head outside to be hit by 14 buckets of water."

While most of the students say they're concentrating too much to be either frightened or aware of the significance of what they're doing, they're also told to relax. Tom Catto says he took that to heart and sang *Hakuna Matata* all the way round, "You know, just to keep up a cheerful mood.

"But there's a lot of talking to yourself as well, running through all the checks. When you say it out loud, it makes it a lot more obvious to you."

Sixteen-year old Anna Haine from Auckland says when people started going solo, she began to stress. "I'm a bit competitive so just the fact that people had already done theirs made me worried."

But Anna's time did come – on family day so her parents were watching as well.

"Simon (Davies, Anna's instructor) did a really good job of making sure I knew all the emergency procedures, just in case. So when I went up I was confident I could fix any mistakes that I'd make and also if something went wrong with the aircraft.

"It was kind of surreal. I got the clearance to take off and I knew what I wanted to do but I turned around to double check with Simon and he wasn't there.

"It was a bit busy and I was really concentrating, but once I had the aeroplane trimmed out, I was sitting there like, 'Oh my goodness this is so cool!'"

John Hamilton says the care for the students doesn't stop when everyone strikes camp at the end of the two weeks.

// GOING SOLO

The night before, with the opportunity to go solo not at all guaranteed, Tom and his instructor Grant Reidy, had 'walked the circuit' – a hose on the ground – Tom yet again going through checks, flying technique and correcting errors. It was virtually dark and everyone else had drifted away for Saturday night's activities.

"I think Tom kept going even after I left," says Grant. "He then obviously thought about it overnight, and his flying the next morning was awesome."

"I didn't think I'd solo," says Tom. "I was coming in a bit low on my first circuit, perfect on my second, and too high on my third."

Grant says although Tom was a bit low, then a bit high, "he corrected perfectly. I knew he was ready."

"I will have sat down with every student and asked them what their hopes and plans and ambitions are, and then we'll give them support as they move through their careers. We give them mentors and contacts of people who can help.

"They have the phone number of at least one person they can ring during the year and ask questions. That applies to whatever career they choose. Only about 30-40 percent go into an aviation career. So they get life mentors as well as aviation mentors.

"Whatever career you choose, once you've been to Walsh, you're a Walshie for life."

// A-cat Penny Mackay and ab initio Hugh Lee head out in the calm of early morning for what could have been just another three circuits of Matamata aerodrome. About 20 minutes later "something clicked" and Hugh was flying on his own.

Photo CAA/Pen Mackay

// Penny: "Hugh had been very unsure of his own decisions and I wasn't convinced he'd take control enough to go solo. Then about ten days into training, he'd been mucking about with the trim during the preflight to the point where I became impatient and said, 'Hugh just leave it. It'll be fine, we can sort it out during the flight if we have to.' He carried on with the other checks, then suddenly he stopped and said, 'No Penny, I'm not happy with the trim, I'm going back to it.' Inside I did a fist-pump. I knew he was ready to be a pilot-in-command."

// Hugh: "Penny had said to me, 'Don't be disappointed if you don't solo'. So I really didn't expect to. When my friend Chris soloed earlier in the morning I was pleased for him but pretty despondent for myself. But Penny and I headed out as usual, and something just clicked in those circuits and she said, 'I think you're ready'. It was sheer concentration the whole way round. When I landed, it felt like victory."

HOW'S YOUR MET KNOWLEDGE?

By Tui McInnes, MetService meteorologist and pilot

Thinking of taking a few mates away for the day? You book the plane, get your passengers organised, plan the route, calculate your fuel, determine weight and balance, gather your maps and then preflight the plane. But wait! What's the weather doing?

Like anything when planning a flight, a good place to start is with the big picture.

Monitor the weather a few days out from your flight, to get a sense of what the weather's doing. Look at the prognostic MSL (mean sea level) isobaric charts and see what weather patterns are around the country. Are we under a large high or is there a deepening low moving in from the sub-tropics? Are there any fronts moving up the country? These could all affect what you'll encounter on your flight.

Knowing the weather patterns and types of weather associated is crucial. A high means calm, clear, weather right? Well, often it can mean low cloud and fog – even drizzle! A front could mean the difference between VFR conditions or scud running!

Many websites now provide easy and intuitive access to a variety of weather models. These can really help with painting the bigger picture, but there are limitations. As we all know, New Zealand's terrain significantly modulates our weather. Put a rocky island in the middle of an ocean and you wreak all kinds of havoc for weather models.

Very good weather models still lack capability in many areas and this is where the meteorologists come in. For example, models will systematically under-forecast the strength of wind in and around Cook Strait due to too-low resolution. Low cloud? The raw model data might give an indication of potential, but the physics calculations are still far too primitive for high accuracy.

So always make sure you visit metservice.com and MetFlight to get the latest meteorologist-prepared forecasts.

Once we have our overall picture, let's zoom in and be more specific.

Forecasts

- **SIGMET** – Firstly we'll look at the SIGMETs – either through text or the Graphical SIGMET Monitor (GSM). This will inform us of any severe weather which could impact our decision to fly.
- **Graphical SIGWX** – Next up is the map showing us potential significant weather phenomena which our flight may take us through. This includes turbulence, icing, mountain waves and thunderstorms (CBs).
- **GRAFOR** – So far, so good? We can start looking a bit more at the detail. The GRAFOR will show us any cloud, precipitation and corresponding visibilities around the country and give us an idea of what conditions to expect.

- **Aviation Area Winds** (**AAW**) – What are the winds doing aloft? Will there be a headwind, or will you be graced with a tailwind?
- **TAF** – Finally, let's look at the airports. The TAF provides a forecast at the airport with specific values for wind, visibility, weather and cloud (valid within an 8 km radius). Don't forget to look at any enroute airports for both the TAF and METAR, and if your departure or arrival locations don't have either, ensure you look closely at the GRAFOR.

Observations

It's not just the forecast that's important. You've got to remember to check the forecast with what's actually happening. As good as meteorologists are, we can't always get things right. There are a number of observation resources on MetFlight:

- **Satellite imagery** – Obtained from a geostationary satellite (a satellite that maintains a fixed position over Earth), there are two main products, visible and infra-red. Satellite images will give you an idea of where there's cloud, how much, how it's moving and even what the cloud top heights are.
- **METAR and AWS** (**automatic weather station**) **reports** – These go hand-in-hand with the TAF, providing regular reports of the wind, visibility, weather, cloud, temperature, dewpoint and QNH. Comparing these with the TAF and GRAFOR gives an idea of how the forecasts are performing.
- **Webcams** – MetService operates many webcams around the country (available through MetFlight) and there are many other webcams available online. Using these together with the METAR/AWS, TAF and GRAFOR you can get a true idea of what the weather's currently doing and give you a good mental picture of what to expect.

As we all know, weather can be unpredictable and even the best forecast can change dramatically. Afternoon convection can bubble up from friendly looking cumulus clouds to colossal cumulonimbus with thunderstorms, seemingly in minutes. It's the bane of current generation weather models. Low-pressure systems can vary immensely in tracks, drastically changing the distribution of significant weather.

Why MetService?

While there are many sources of weather information out there, MetService is the national meteorological organisation certificated by the CAA to provide aviation weather forecasts and observations. Ensuring you're using accurate and reliable weather information is critical when you're planning a flight.

If you want to set up an account with MetService's two aviation platforms – MetFlight or MetJet – contact us at **aviationsales@metservice.com**.

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

And to help improve your MET knowledge, email **publications@caa.govt.nz** for a free copy of the Good Aviation Practice booklet, *VFR Met*.

West of Christchurch near Arthur's Pass, at 20,000 ft. Mt Binser in the left foreground.

The cloud is predominately stratocumulus (the 'bumpier' looking clouds) but there's evidence of mountain wave/lenticular clouds (smoother clouds) with the possibility of a weaker frontal cloud on the horizon. Based on this it's likely that at lower levels the conditions may be slightly turbulent. The mountain waves are what could be the most hazardous, however, as these can appear calm at times and then abruptly produce significant turbulence and downdraughts.

Photo courtesy of MetService

BATTERIES – FOLLOW MANUFACTURER INSTRUCTIONS!

The era of electric aircraft is upon us. Operators *must* follow manufacturer instructions to minimise the risk of battery fires that could end in tragedy.

In November 2017, a glider pilot was killed in an accident near Kaikohe aerodrome after a fire broke out in one of his aircraft's battery packs.

A CAA safety investigation[1] concluded the battery fire would have resulted in fumes and smoke filling the cockpit and "degrading the pilot's performance and ability to control the aircraft…".

The investigation concluded the pilot was likely trying to return to Kaikohe aerodrome for an emergency landing. But during its descent, his aircraft "exceeded speed limitations which maintain the structural integrity of the glider, leading to the structural failure of the wings and the subsequent inflight break up".

While the safety investigation hasn't been able to definitively conclude why the batteries failed, it identified three possibilities:

- The batteries were damaged at some stage, possibly during an earlier wheels-up landing.
- Arcing occurred between battery cells, possibly caused by penetration of one or more of the cells by metallic debris.
- During charging and discharging cycles the pilot did not follow the manufacturer battery management guidelines.

The investigation found there was no documentation provided to the CAA, maintenance provider or appropriate Part 149 organisation regarding the wheels-up landing, so there was no documented evidence of possible damage done during that landing.

The investigation was also unable to identify any evidence of inter-cell arcing, but could not, therefore, exclude it.

What the investigation did discover, however, was that the pilot did not follow manufacturer instructions regarding the battery charging regimen.

The safety investigation report states, "…while the pilot was out of the country, for periods of two to three months each year, the glider was disconnected from its charger and stored in its trailer. This practice is not consistent with the battery management guidance in the *Flight manual and maintenance manual*".

CAA investigator David Oliver says if an operator doesn't fly the aircraft for an extended period, they need to check manufacturer procedures as to the appropriate handling of the idle battery.

"But they may not do this for a number of reasons – they think it's inconvenient, or costs too much. Or they don't have the appropriate training.

"Whatever reason it was that this pilot did not follow manufacturer instructions for the care of the aircraft

1 To read report 17/7177, go to aviation.govt.nz > safety > safety reporting > fatal accident reports.

Photo supplied by the UK AAIB (Air Accidents Investigation Branch)

// Lithium polymer battery fire on board glider G-GSGS in West Sussex, UK, August 2017.

// If a battery-related event occurs in flight it can be the smoke that's the danger – even without any fire present. //

battery in his absence, that potentially did cause it to malfunction."

The CAA's gliding specialist Doug Hamilton also says operators of any electric-powered aircraft must be diligent about following manufacturer instructions.

"Pilots of microlight aircraft, for instance, can do their own maintenance without full oversight so they really must care properly for their aircraft batteries.

"Using the wrong charger, or the wrong process, overcharging, undercharging, wrong timing or wrong rates, or the batteries being stored or discharged not according to manufacturer instructions – these can all cause significant problems."

In October 2020, New Zealand's first electric aircraft entered service – a Pipistrel Alpha Electro, which will be used as a trainer. There's also an electric microlight undergoing flight testing. The Part 149 organisations, the Recreational Aircraft Association of New Zealand (RAANZ) and the Sport Aircraft Corporation (SAC), are preparing for an era of battery-powered aircraft.

SAC's Operations Officer Dave Readman says with new electric aircraft propulsion technology, SAC is re-evaluating its aircraft type rating procedures and training manuals.

"These new machines use LiPo (lithium-ion polymer) battery technology and electric motor propulsion.

"It's an advanced and generally unknown area of aviation. So we think it's very important operators have a solid understanding of manufacturer procedures regarding battery handling, charging, storage and maintenance.

"LiPo batteries are generally safer and more environmentally friendly than many other batteries like NiCd and NiMH. But if they're charged, discharged, stored, maintained, or handled improperly, they can become extremely dangerous."

Easwaran 'Ice' Krishnaswamy, of RAANZ, agrees, telling *Vector*, "Impact/puncture and overcharging are two common causes of battery fires.

"Lithium batteries contain chemicals that break down to make oxygen. This fuels the fire and leads to a condition known as 'thermal runaway', making it harder to extinguish.

"A toxic, normally colourless (although sometimes seen as white smoke) gas called hydrogen fluoride is released from »

the burning battery. When it comes into contact with human tissue it becomes hydrofluoric acid and causes serious chemical burns."

A test pilot for the electric autonomous vehicle Cora project, Ice says it's extremely important to stick to manufacturer instructions when charging, using/discharging and storing lithium batteries.

"Get advice from the battery designer and/or its manufacturer when something abnormal happens, because battery designs, and what they're intended to power, may and do differ.

"When in doubt," he says, "swap it out."

Gliding NZ's National Airworthiness Officer Mike Strathern says the massive amount of energy stored in aircraft batteries means maintenance providers and operators have to be "very, very careful with their care".

"They've got a fuse of up to 300 amps – far more than in a vehicle battery – you can short them out really easily. They're very expensive, pilots are not typically trained electricians, and battery care is an area that even most engineers are not used to working in.

"For all these reasons, batteries must be handled 'by the book'."

Early detection

The safety investigation found the Kaikohe glider's *Flight manual and maintenance manual* provided the following guidance on battery system fires, "Land and abandon the aircraft as soon as possible".

So the CAA is also calling for participants, when they're maintaining or modifying their aircraft, to give some thought to early fire detection, containment and fire proofing systems.

David Oliver says pilots are fairly limited in what they can do if any sort of a fire breaks out.

"If a battery-related event occurs in flight it can be the smoke that's the danger – even without any fire present."

Doug Hamilton says that an inflight battery fire presents the pilot with a critical problem.

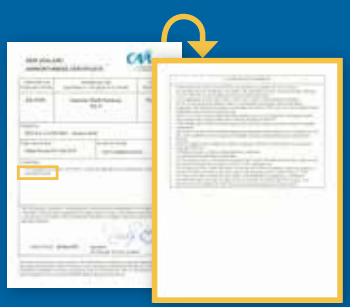
"Most gliders and microlights, for instance, are made of highly flammable composite material. It melts quickly, and at the same time produces highly toxic fumes.

"But if you can identify what's happening earlier, it may give you life-saving moments to get out, or even make an emergency landing," he says.

Comments or queries?
Email **warren.hadfield@caa.govt.nz**

TWO SIDES TO AN AIRWORTHINESS CERTIFICATE

A surprising number of aircraft owners don't realise the back of an airworthiness certificate contains important information.



Always read the rear of a certificate of airworthiness listing all the aircraft's operating limitations and requirements.

If you're the owner or operator of an aircraft with a special category airworthiness certificate, there'll be a list of conditions printed on the rear of the certificate of airworthiness. And there's a reference to them on the front.

Those conditions include operating limitations and requirements you need to comply with to be able to operate your aircraft.

CAA aviation safety advisor John Keyzer recalls that a couple of years ago the owner of a limited category aircraft wanted to change his three-bladed propeller to a four-bladed propeller. His mate had done this, and a later model of his aircraft had also been manufactured with a four-bladed prop.

The owner had no idea there was a list of conditions on the rear of the aircraft's airworthiness certificate that he had to comply with, to modify his aircraft and continue operating it.

"When I pointed this out," says John, "he quickly realised there was a process that had to be followed.

"In some circumstances, changes like this may require the aircraft going back on a test programme under a special category experimental airworthiness certificate."

If you're the owner or operator of a type-certificated aircraft, you probably don't need to worry too much.

There are no such conditions on the back of the airworthiness certificates for type-certificated aircraft, which are issued in the standard or restricted categories.

Comments or queries? Email **john.keyzer@caa.govt.nz**

SMS SCALABILITY

How can complex, non-complex, large, medium, or small businesses all comply with the same requirements in the SMS evaluation tool? Our SMS specialists offer some tips.

Georgina Steadman-Evans

It *can* seem difficult for a small two-person business to come to terms with scaling down the requirements of the SMS evaluation tool. You might think some items are not applicable or others are too large for your operation. But I can guarantee you all the items in the SMS evaluation tool can be scaled to the size of your business.

For large complex businesses such as Air New Zealand, there'll be many metrics to measure safety performance – goals, objectives, targets and indicators – as there's plenty of measurable data available to the airline. Smaller businesses may feel that by comparison, they simply don't produce enough data that can be measured.

My advice is to look at the hazards you've identified and choose the one hazard posing the most risk to your business. Look at its controls and measure those as part of your safety performance.

Here's an example: mechanical failure in aircraft (hazard); operational flight check (control). The next step is to identify how you'll measure your control.

Monitor the operational flight checks that have identified defects or maintenance errors. If you start to see a rising trend in defects or errors for a particular maintenance provider, assign actions at your next safety meeting: for example, your safety manager or an expert external resource to conduct an audit/investigation of the maintenance organisation.

Measure areas of importance because then you will get more from measuring your safety performance.

Simon Carter

The bottom line for any safety management system is that the system must work for you and should not be an onerous task. It should, instead, just form part of your overall management process.

If you're a small paper-based organisation – whether you've gone through SMS certification or your organisation has this coming up this year – review how many forms you're using and ask yourselves, 'Can we simplify our processes?' Some organisations have effectively combined their reporting, investigation and auditing requirements into one form. The same thinking applies if you have a digital platform – keep your electronic presentations simple.

As Georgina has said, look at your risk controls. Ask yourselves, 'Do we have an operational directive in the manual or a SOP to cover that risk? Or are we relying on a general entry in the risk register because it's what we think we do or would like to do?' A spot check in the field against the SOP is an easy way of auditing a risk control.

Although it's important to monitor your reported safety occurrences for trends, ensure you're also looking toward what could go wrong or what could have an adverse effect on your operation. This can be done through encouraging proactive reporting and discussions at both the toolbox meeting level and the management review level.

Managing safety proactively is the essence of SMS.

For your free copy of the Good Aviation Practice booklet, *How to be a safety manager,* email **publications@caa.govt.nz**.

For any comments or queries about this article, email **sms@caa.govt.nz**.

Photo: iStockphoto.com/tumsasedgars

Photo: Garmin

ADS-B CHANGES
WHAT YOU NEED TO KNOW

The Minister of Transport has signed off changes to the rules relating to using ADS-B in all controlled airspace. One of those amended rules sets the date at which this becomes mandatory – to 31 December 2022.

The move to Automatic Dependent Surveillance – Broadcast as the primary means of air traffic surveillance is one of the most significant aviation system changes in more than 30 years.

Providing up to 45 percent more airspace coverage than the existing secondary surveillance radars, the ability to find aircraft far more quickly in an emergency, and increased situational awareness through ADS-B IN, the technology is a fundamental improvement to aviation safety.

But what does it mean to you? And why should you be equipping with ADS-B as soon as possible?

ADS-B Grant Scheme Technical Advisor Tom Gormley answers frequently asked questions about the major changes that all operators and pilots should be aware of.

When does the rule come into effect?

The amended rule is in force now.

The most important thing to note is that the date from which it becomes mandatory for all aircraft to transmit ADS-B data in controlled airspace is now **midnight on 31 December 2022**. This is a full year beyond the previously proposed date. The delay is primarily due to the effects of the COVID-19 pandemic.

What issues might I have if I delay equipping until the second half of 2022?

We really recommend that you equip as soon as possible. We're regularly in contact with avionics workshops throughout the country, and most are reporting they're already extremely busy. By the time we approach the final six months of 2022, I'd expect the workshops to be even busier.

If you leave it to the last minute and try to get booked into a workshop in the last six months, there's every chance you won't be equipped in time – and you won't be able to fly in controlled airspace.

What if I don't equip with ADS-B before 31 December 2022, but I later need to enter controlled airspace?

You'll be unable to enter controlled airspace. The move to ADS-B as the primary method of surveillance in controlled airspace has long been signalled, and you now have an extra year to get your aircraft equipped. Don't get complacent however – the clock is ticking.

What's happening with ADS-B IN? There doesn't appear to be any mention of it in the rule changes.

ADS-B IN is not mandated but it is a fantastic tool to improve situational awareness – those aircraft with ADS-B IN can display other aircraft transmitting ADS-B data. This is a big incentive to install ADS-B OUT and IN even if you don't use controlled airspace, because it will be a safety benefit to the wider general aviation sector. But remember that ADS-B IN is an addition to, not a replacement for, a robust visual lookout.

The ADS-B grant scheme offers up to $500 plus GST to equip with ADS-B IN, and some pieces of equipment cost around $500.

Are there any changes to the way I should operate my transponder?

The rule has been changed to ensure that ADS-B data is being transmitted at all times in controlled airspace. You must now be transmitting ADS-B data from the moment your aircraft begins to move under its own power. That's likely to be quite a change from the norm of transmitting just prior to takeoff.

If your aircraft is equipped with an ADS-B system, we encourage you to check the operating handbook for the equipment to make sure it's being operated correctly at all times.

I've already equipped with ADS-B. How do I operate the transponder up to 31 December 2022?

If you're in transponder mandatory airspace – controlled or uncontrolled – and unless you're able to operate the transponder in Mode A/C or S, you must transmit ADS-B data.

Although not mandatory, we strongly encourage transmission of ADS-B data in all other airspace to benefit the whole aviation sector. Don't forget that aircraft with an ADS-B IN receiver are able to 'see' other aircraft transmitting ADS-B data.

Is the CAA providing any financial assistance to help me equip with ADS-B?

The government-funded ADS-B grant scheme is providing up to $2,500 plus GST for ADS-B OUT and an additional $500 plus GST for ADS-B IN. If you're wanting to apply, **nss.govt.nz/adsb** has plenty of information. Also check the back cover of this issue of *Vector*.

A final message

It's simple – get equipped as soon as you can and start transmitting ADS-B data at all times. Given the lead time for installing an upgrade, 31 December 2022 is not that far away.

Any queries? Email **adsb@caa.govt.nz**.

Image courtesy of FAA

A STABLE APPROACH

Vector gathered together four A-cats, with tens of thousands of landings between them, to get their advice on how to land according to best practice, rather than just 'arrive'.

The number of runway excursions, overruns, and heavy landings has risen significantly in the past four years.

The rate of occurrences, by 100,000 annual hours flown nationally, has nearly doubled from 5 to almost 10 percent.

Anticipate what's about to happen

Marc Brogan, CAA flight examiner and A-cat instructor: "I would argue that all those problematic landings actually start some miles back, when, for some reason, the pilot begins to get behind the aircraft.

"The whole idea of a stable approach is that all the way down, the pilot knows what's going to happen next.

"But if maybe half an hour previously, they'd had to deal with an inflight issue, and at 200 feet, they're still distracted and unhappy about that, they're chasing the aircraft."

David Harrison, CAA principal flight examiner, and A-cat instructor: "Consider your work cycle down the approach to be aim point, aspect (the angle of your flightpath to the runway – ideally 3 degrees), centreline and speed. You should be monitoring these constantly.

"So you're systematically checking your aim point to make sure you're going to land where you want to. On an short strip that's *really* important. You're making sure it's consistent and not going up and down the windscreen. While doing that your aspect should remain unchanged as well.

"You're tracking your centreline with drift applied if required, and you're checking your speed is within appropriate limits.

"So that's the work cycle. And that doesn't change down the whole approach. By the time you get to the decision point and then beyond, all those items should be pretty much nailed.

"If they're not, it's time to think about going around and having another go."

Katrina Witney, CAA flight examiner and A-cat instructor: "It's really about workload management and effective decision-making. If you're behind the aircraft, you need to recognise this early: 'I'm not keeping up. I've got to get this aircraft under control'.

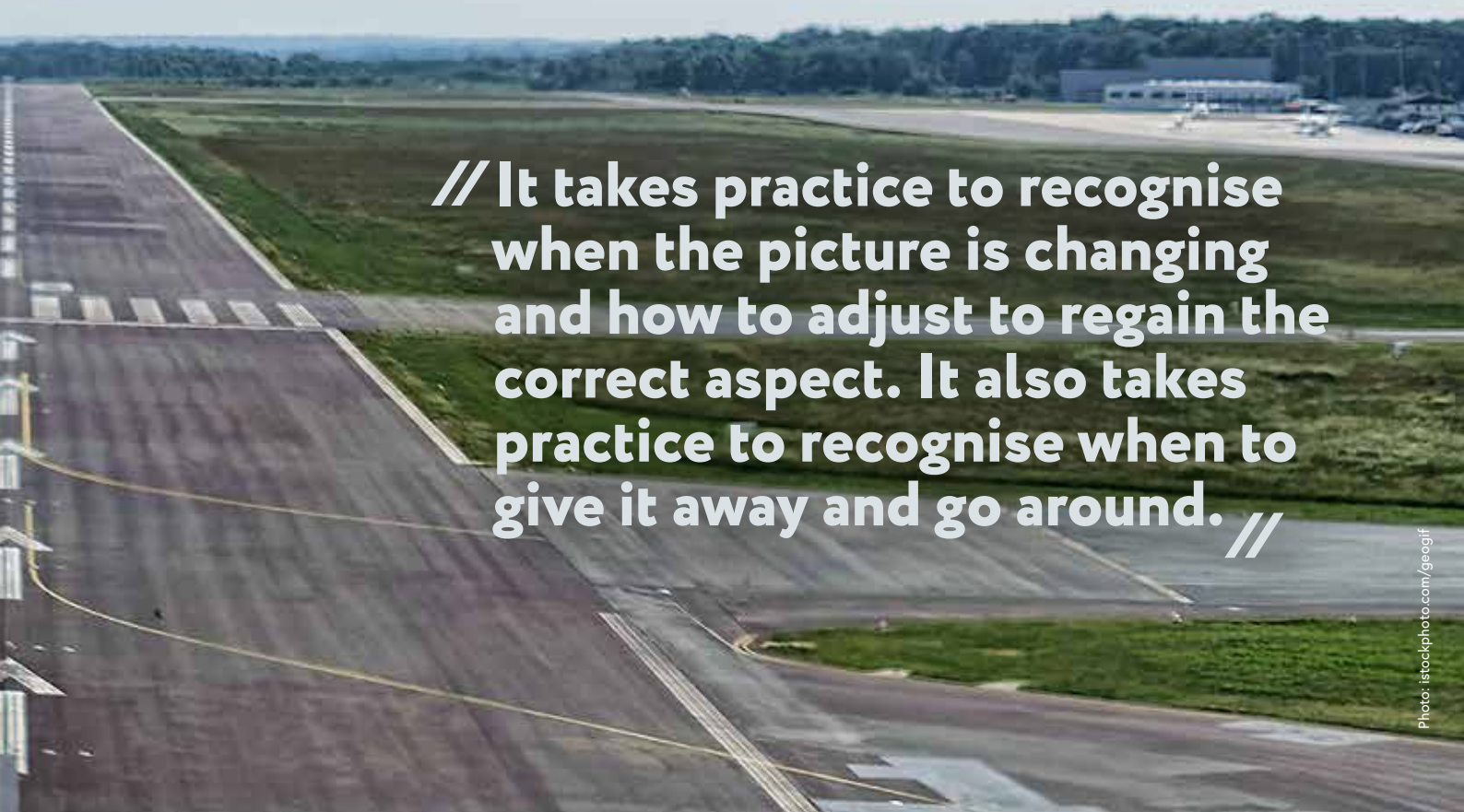
"But some keep flying the approach, because they hope, in some way, it's going to get better in the next 50 to 100 feet, and they can catch up.

"But they almost never do."

Anticipate the go-around

John Parker, former CAA flight examiner and A-cat instructor: "I think in GA it's really easy to fall into the mistake of 'We're going to land, whatever happens'. Especially if it's your home runway.

"But the go-around should be seen, not as an emergency manoeuvre, but as a normal procedure for non-standard conditions. 》



// It takes practice to recognise when the picture is changing and how to adjust to regain the correct aspect. It also takes practice to recognise when to give it away and go around. //

Photo: istockphoto.com/geogif

"The go-around should be the *first* thing any pilot on final considers. 'What is my go-around point? Do I go left or right? Is there rising ground. Are there trees?'

"Don't decide on a plan for the go-around in the flare – it's a bit late then."

Marc: "It's one of the bigger issues in GA at the moment – that 'This flight will end on *this* landing'. But no landing is a given.

"The desired objective is to put the aircraft where you want it. But maybe an aeroplane taxis out from the hold point and gets in your way, or there's unexpected wind shear – it's never guaranteed that you're going to land."

Katrina: "I think the issue I see most often is a lack of focus at the decision point.

"People go through the motion of using it. They might say 'The wind sock's correct' or 'The runway's clear' or 'The decision to land is yes' ... but they're not really seeing those things and therefore, not processing what is actually happening. They're mechanical with their checklist. They're not asking, 'Am I *actually* on speed?' Am I *really* stable?'

IFR to VFR

David: "Many pilots don't think about the conversion from IFR to VFR. They break out of cloud at the decision altitude, and they're mentally unprepared for what's in front of them.

"Nine and half times out of ten, the candidates I see tend to look up, see the runway and immediately look down on to the instruments again, because that's what they've been doing for the last hour.

// There's no point flying a controlled crash. //

"They don't make that transition into the normal visual approach work cycle already highlighted.

"They should have been thinking about the weather they're about to experience and anticipating what they'll do in those conditions. Then, once they're visual, flying a normal VFR approach for those conditions."

Marc: "The other thing about instrument approaches, is that high level winds can sometimes catch people out. They can get pushed in on approach. So they carry a tailwind part of the way down and that can throw them. So again they need to be thinking ahead. When they get the weather 20-30 miles back they need to be thinking about how they're going to configure the aeroplane and anticipate the VFR landing conditions after they get visual with the runway.

"And whether you're IFR or VFR, make that decision to go around early if you need to.

"There's no point flying a controlled crash."

The stable approach

John Parker: "The recognised approach is a 3 degree angle, although traditionally, light aircraft may use a slightly steeper approach than that.

"Light aircraft tend to aim to touch down on the runway numbers – the runway designator – or an imaginary spot on the grass past the fence.

"The aim is to keep this imaginary spot or numbers in the same place in the windscreen – both laterally and vertically.

"It takes practice to recognise when the picture is changing and how to adjust to regain the correct aspect.

It also takes practice to recognise when to give it away and go around."

The Flight Safety Foundation *Approach and landing accident reduction toolkit* includes the following elements of a stabilised approach:

- The aircraft is on the correct flight path, requiring only small heading or pitch changes to maintain it. (Generally the aircraft is maintaining a constant flight path using the 3:1 principle – for every three nautical miles flown over the ground, the aircraft should descend 1000 feet.)
- Speed is not less than VREF (note: VREF is the calculated minimum speed at the 50 ft point for a normal landing.
- Aircraft is correctly configured for landing.
- Power setting is appropriate for configuration.
- All briefings and checklists have been completed.

The criteria may differ slightly between operators, but the basic principles are the same.

Comments or queries? Email **marc.brogan@caa.govt.nz**.

A NEW HAZARD – BIRD-SCARING LASERS

A GCH Aviation pilot was blasted by a laser in August 2020 while flying above Canterbury. It's the second time the pilot has seen laser beams sweeping the sky there.

Pilots who fly in rural areas need be aware of the possibility of farmers now using bird-scaring laser technology.

A helicopter pilot was dazzled by laser beams emanating from an Ashburton grain shed during the evening of 16 August 2020.

"It lasted about 10 seconds," says Matthew Boulcott, pilot for GCH Aviation. "I didn't experience the worst effects I know a laser strike can have, but the sudden blast of glare affected my vision and was definitely a distraction."

Matthew says it's the second time he's seen laser beams sweeping the airspace above Canterbury, although the first occurrence was far enough away to have no effect on him.

Acting head of aviation safety at the CAA, Dean Winter, says laser strikes are an increasing hazard to pilots.

"The number of laser strikes reported to the CAA has been growing since 2015. In August of that year, there were eight; in August 2020, there were 26.

"While, in this instance, the laser strike seems inadvertent, it does illustrate the care with which farmers must deploy laser technology."

In this case, the coordinates noted by the pilot led police officers to the farmer concerned, who was using laser beams to scare birds away from stored grain.

Some of the laser beams were escaping the open bay of the grain shed.

After, as the police report notes drily, "education was given", the farmer was apologetic for the potential tragedy they had unwittingly created.

If you experience a laser strike, report it to the CAA so we can alert pilots to any trends.

Look for form CAA800 *Laser beam exposure questionnaire* on **aviation.govt.nz/forms**.

// LASER BEAM EXPOSURE

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 gone.

And, as with anything startling, it can be disruptive to the pilots' decision-making; it can completely disorient them, or even incapacitate them.

// Laser beam technology is now being used to scare birds away from grain stores.

Photo: iStockphoto.com/ManonLabe

THE **BRAVER** DECISION

It's almost part of our DNA to be drawn to heroic skill under fire, especially when lives are saved. So how should organisations respond to a reckless decision to fly that has a great outcome? And how do we respond to a robust decision not to fly, even though that means money will be lost? Or worse, lives?

In the late afternoon of mid-January 1982, a United States Park Police helicopter crew rescued five people from the icy water of Washington DC's Potomac River. They were survivors of an Air Florida 737-200 flight that had ended at the 14th St Bridge, only 30 seconds after departing Reagan National Airport.

The Maryland State Police (MSP) helicopter service – one aircraft of which was just 10 NM away at Andrews Air Force Base – refused to fly. They were especially trained and equipped for rescue, so why the refusal? Well, that day, visibility was zero, the temperature was -4 degrees Celsius and cloud was down to 200 ft. It was snowing.

The US Park Police (USP) helicopter crew were hailed as heroes and eventually received the Department of Interior Valour medal, the Coast Guard Silver Lifesaving Medal, the Carnegie Hero Medal and the HAI Crew of the Year award.

Silence greeted the MSP pilot's decision not to go.

Bruce Webb, Director of Aviation Education at Airbus Helicopters (North America) wants that to change.

"Lives being saved is always something to be celebrated. I don't doubt that in any emergency situation, each team involved does what it thinks is right.

"But the right call is not always the easy call, and sometimes choosing to fly can have unwelcome consequences."[1]

Zero praise

In this specific incident, there were myriad factors in play: the terrible conditions, 10,000 gallons of jet fuel in the river – which is why the rotors didn't ice up – and several people lining the shores. The rescue was performed without incident, but in Bruce Webb's experience, the outcome – and the opinions about it – could have been so different.

"In this case, because the outcome was such a success, the rescuers were lauded as heroes who made a life-saving decision. If you have an accident in challenging circumstances, many people tend to place blame on the pilot for making a bad decision.

"But what we don't see as often are teams being acknowledged for making a difficult decision *not* to go. I would've liked the MSP crew to have heard, 'We know it was a tough decision, so thank you for doing the responsible thing and not risking more lives'.

"It takes a lot of internal fortitude, an understanding that you can't endanger other people, and real maturity to make such a decision. And yet, most times we don't acknowledge it, let alone praise it."

Jason Frost-Evans, pilot and CAA investigator, agrees, saying there's also subtle pressure on commercial pilots to fly, even if their employer never says anything out loud about what's at stake.

"Your scenic flights bring in revenue, you get to build your hours, the passengers get to see a glacier, the bus driver gets their finder's fee. If you decline the flight, the potential passengers carry on down the road and the opportunity for all those gains is lost. So perhaps you fly – against your better (weather) judgement. You don't have any difficulty, so next time you're less concerned. Eventually flying in poor conditions becomes expected and 'normal'."

1 NTSB investigation AAR-11-04.

Photo: iStockphoto.com/invizbk

So Jason says a tough decision to not fly, or to divert, or to return – the result of a solid assessment of the risk involved – should have some overt response.

"Say thanks," he says. "Don't just let it slide."

The outcome versus the decision

Jason likens a good outcome from a poor decision to winning the lottery.

"We don't see lotteries as a great investment, because the outcome is down to luck rather than skill. If you win, no-one says, 'That was a sound investment!' They say, 'Man, you're so lucky!' Because it was against the odds."

"And of course, buying a lottery ticket," Jason adds, "which is highly likely to be unsuccessful but you're happy to risk it, is just a loss of five dollars. Attempting a flight in unsatisfactory conditions, could well endanger lives."

Countering the pressure to fly

Matt Harris, CAA's chief advisor on human factors, says saving someone's life is a powerful motivator to choose to fly. "Pilots have told researchers they would take more risks than they were usually comfortable with, 'When you think you're in search and rescue mode, when you think that you're going to save somebody, you'll push things'."

Matt says that rescue mode can also influence a pilot's assessment of their own hazards such as fatigue, or personal mimimas.

Organisational psychologist and ex-RNZAF squadron leader, Keith McGregor, says for these reasons, a go/no-go decision shouldn't be down solely to the pilot.

"While the ultimate decision does rest with the pilot, these decisions cannot be divorced from the culture of their organisation.

"The organisation should have already discussed how they'll deal with such a situation if and when it occurs and have clear policies to guide decisions. While the pilot makes the call to not fly or abandon a flight, it must be the organisation that takes responsibility for that decision."

Keith says a 'mission controller' would maintain a less emotional evaluation of the proposed rescue and help the pilot to make a go/no-go decision, a decision to abandon it, or have the authority themselves to call the mission off.

"It's a similar situation to police pursuits in New Zealand. A 'pursuit controller' is now in constant contact with the police driver but removed from the heat of the chase.

// "It takes a lot of internal fortitude, an understanding that you can't endanger other people, and real maturity to make such a decision (not to fly). And yet, most times we don't acknowledge it, let alone praise it."
Bruce Webb, Airbus Helicopters (North America)

// The right call is not always the easy call, and sometimes choosing to fly can have unwelcome consequences. //

They help the driver to decide to abandon the chase or they themselves can directly call off the pursuit."

Jason Frost-Evans says it's also important that senior pilots don't respond to a no-go decision by a less experienced pilot with, 'Hey great decision – now I'll give it a go instead'.

"That just tells the junior pilot they lack the necessary experience. Senior pilots should be modelling and supporting good decisions. If the weather's too poor to fly, it's too poor to fly."

Jason says using a risk analysis tool, such as the FRAT (www.aeronauticalsafety.com > Downloads > EHEST – Pre-Flight Risk Management Checklist), can also help with making an objective go/no-go decision.

"We're not so good, as humans, in adding up all the little risks – conditions marginal, a little bit of fatigue, the aircraft a little bit not airworthy – so something external like the FRAT can make clear that all these little risks actually add up to high risk."

How to respond to the poor decision-great outcome flight

As for the USP pilot in 1982, it might seem churlish to berate him for his decision – he did save five lives after all – but does that mean there's no response at all?

Jason says it *is* hard to know how to respond appropriately.

"But I think it's fitting to question the thinking behind the decision to fly. Would they have flown to assist one person with a cardiac event or a broken arm, given the same weather conditions?

"If not, how is the risk acceptable for five people – or 50?

"Ask yourself that if this flight resulted in an accident, 'could I justify my decision to the person's family'?"

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

OCCURRENCES DASHBOARD

These are the number and type of occurrences reported to the CAA, 1 October 2020 to 31 December 2020.

	Occurrence type
23	**Accident**
22	**Aerodrome incident**
361	**Airspace**
314	**Aviation-related concern** (for example, complaints about low flying)
413	**Bird**
4	**Dangerous goods**
219	**Defect**
10	**Hang glider accident**
397	**Incident** (anything not fitting into any other category, for example, a go-around)
4	**Navigation installation occurrence** (for example, a transmitter failure)
6	**Parachute accident**
4	**Promulgated information occurrence** (for example, significantly incorrect weather information)

AVIATION SAFETY ADVISORS

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

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

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

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

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

Photo courtesy of WAF

// Pictured from left to right: Angela Cronin (WAF deputy coordinator), Janet Taylor (WAF coordinator), peer support volunteers Thyra Blaom and Hiria Rae.

SUPPORT FOR WOMEN IN AVIATION

Under the umbrella of NZALPA's Aviation Peer Assistance Network, the Women's Assistance Forum (WAF) is a support network and an information hub for women in aviation.

As with the Aviation Peer Assistance Network (see "Peer assistance network – a safe harbour" *Vector* Nov–Dec 2017) the women who volunteer to support other women in the aviation industry are pilots, air traffic controllers and flight service staff. They've all spent many years in aviation. They say they've had amazing experiences but they're also very aware of the challenges the industry can present.

The WAF says any hardship need not be faced alone.

"If you need any information or guidance," says WAF coordinator Janet Taylor, "or just a supportive chat regarding pregnancy, IVF, childcare, infant feeding, menopause, sexual harassment, ideas to help with work/life balance, women-specific medical matters, and so on, reach out to us on **0800 PAN 100**.

"We also have access to an experienced female medical examiner who can provide confidential advice about health and wellbeing-related matters to anyone who needs it.

"And anyone concerned about privacy should know that all our volunteers stick to strict confidentiality principles."

For more information visit **www.pan.org.nz**.

REGISTER NOW FOR OUR SAFETY EDUCATION WORKSHOPS

AIRWORTHINESS AND MAINTENANCE WORKSHOP

Two days, $375 including GST, per person.

For owners and operators, increase your understanding of the requirements for maintaining your aircraft.

- **Wellington**
  17–18 March 2021
  CAA, Asteron Centre
- **Christchurch**
  01–02 June 2021
  Airport Gateway Motel

AVIATION SAFETY FUNDAMENTALS WORKSHOP

Two days, $375 including GST, per person.

Previously known as the Aviation Safety Officer course, this workshop is designed to teach you about the principles of aviation safety, and the importance of having an aviation safety programme.

- **Auckland**
  22–23 March 2021
  Heartland Hotel
  Auckland Airport
- **Christchurch**
  17–18 May 2021
  Airport Gateway Motel

SAFETY MANAGEMENT SYSTEMS WORKSHOP

Two days, $375 including GST, per person.

This workshop is designed to give you the knowledge and skills to implement and maintain an effective SMS in your own organisation.

- **Auckland**
  24–25 March 2021
  Heartland Hotel
  Auckland Airport
- **Christchurch**
  19–20 May 2021
  Airport Gateway Motel

OCCURRENCE INVESTIGATION WORKSHOP

One day, $195 including GST, per person.

This workshop is designed to give you the knowledge and skills to investigate an occurrence.

- **Auckland**
  26 March 2021
  Heartland Hotel
  Auckland Airport
- **Christchurch**
  21 May 2021
  Airport Gateway Motel

For more information, and to register, visit
aviation.govt.nz > safety > education and events

Sign up to our 'education and events' email notification list at aviation.govt.nz/subscribe to be informed when we add new workshop dates. If you're already a subscriber, follow the links on the page to update your subscription details.

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

ACCIDENT BRIEFS

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

SkyStar Kitfox IV	
Date and time:	05-Sep-2020 at 17:00
Location:	Fitzgerald Glade
POB:	2
Nature of flight:	Private other
Pilot licence:	Class 2 microlight
Age:	31 yrs
Flying hours (total):	400
Flying hours (on type):	150
Last 90 days:	15

A partial engine failure occurred while within gliding distance of the operator's airstrip. The pilot turned toward the airstrip and shortly afterwards lost all power from the engine. A landing without power was carried out, and on touchdown the right main landing gear axle broke off causing the aircraft to nose over. The pilot was uninjured. The subsequent investigation did not identify any mechanical issues with the engine. The pilot believed that the power loss was caused by fuel starvation as a result of vapour lock in the fuel system. The aircraft type has had several suspected vapour lock-induced power loss incidents, caused by vapour lock in fuel lines from the main tanks, particularly at low fuel levels and/or high ambient temperatures. The aircraft had about 45 minutes of fuel (15 minutes plus 30 minute reserve) remaining at the time of the incident. The main landing gear axle attachment design was also identified as a weak point, and newer aircraft have an improved design.

CAA Occurrence Ref 20/4519

Robinson R44 II	
Date and time:	14-Apr-2019 at 08:25
Location:	Ōtaki
POB:	1
Damage:	Minor
Nature of flight:	Agricultural

The pilot was conducting aerial spraying when the helicopter struck an electric fence wire. He was aware of the location of the wire and had avoided it during the other spray runs. He could not explain why he 'cut the corner' and hit the wire during that particular run.

He managed to execute an emergency landing. However, the helicopter suffered extensive damage to the front canopy and a rotor blade.

CAA Occurrence Ref 19/2728

Ibis Magic GS-700	
Date and time:	13-Jul-2020 at 16:00
Location:	Wanaka
POB:	1
Nature of flight:	Private other
Pilot licence:	Private pilot licence (A)
Age:	59 yrs
Flying hours (total):	718
Flying hours (on type):	94

The Ibis Magic was on its first flight since the Rotax 9L2uls was overhauled by a Part 149 Inspection Authority (IA) maintainer. The pilot and local AME conducted a preflight inspection and 45-minute ground run before the pilot departed.

After 40 minutes flying, the oil pressure dropped, the cockpit filled with smoke and the engine ran roughly. The pilot shut down the engine and planned a forced landing into an airstrip he was familiar with.

He identified that sunstrike was a possibility so altered his approach accordingly. However, on short final he had to avoid recently installed fence posts and had to fly into the sun, losing his visual reference.

The pilot made a hard landing which caused the nose gear leg to shear off, a prop strike and damage to the wing.

Two AMEs determined the engine failed from oil starvation due to incorrect rings fitted to the pistons. This resulted in oil escaping into the combustion chambers and the engine using excessive amounts of oil. The incorrect rings and fitting of these rings were completed by the IA maintainer.

This incident demonstrates the importance of major engine maintenance being performed by suitably qualified and experienced people.

The CAA safety investigator found that the pilot identified possible threats before and during the flight, and that his decisions resulted in a safe outcome for him.

CAA Occurrence Ref 20/3532

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GA DEFECTS

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

KEY TO ABBREVIATIONS:

AD = airworthiness directive
NDT = non-destructive testing
P/N = part number
SB = service bulletin
TIS = time in service
TSI = time since installation
TSO = time since overhaul
TTIS = total time in service

Cessna 208B

The C208 had a double comms transmitting failure while inbound to Kaitaia, so the pilot squawked code 7600. Airways contacted the pilot by mobile phone and passed on relevant traffic information which was a Dash 8 outbound from Kerikeri. The flight continued as per flight plan and Comm 2 was later able to be used. The Comm 1 issue was likely caused by an internal failure in the G1000 GIA63W module, as the radio worked well after this module was replaced.

The exact cause of the failure remains unknown. It is standard Garmin practice to replace complete modules, rather than repair individual internal components. No defect could be found with Comm 2 that would result in the pilot's temporary inability to transmit.

CAA Occurrence Ref 19/5311

Cessna U206G

Exhaust valves

Part manufacturer:	Superior
Part number:	SA52006-A20F
ATA chapter:	8530
TTIS hours:	540.4

On climb-out the engine began to backfire with loss of power. Unable to produce sufficient power to climb or hold level, the pilot landed the aircraft back on the water and then taxied to the jetty.

The maintenance investigation found that the exhaust valves in No 2 & 3 cylinders were very tight and required hammering to remove from the guide. The No 5 exhaust valve was tight but could be removed without significant effort. The remaining valves moved freely in the guide.

All of the exhaust valves were removed in situ and the guides reamed, even the good valves removed some material from the guide. It was therefore taken that the guides were reamed to tight from new and therefore did not have the correct clearance. At overhaul the new cylinders were not disassembled to double-check. (As new they naturally would not be disassembled by the overhauler).

From now on with new cylinders going onto an overhauled engine the maintenance provider will insist on a valve to guide clearance check before fitment.

CAA Occurrence Ref 19/4844

Piper PA-38-112

Carburettor

ATA chapter:	7320

On 13 June 2019, the pilot of a Piper PA-38-112 reported rough running.

During the maintenance investigation, the carburettor was removed and the housing and bowl separated. No internal FOD was found. The float level was checked and found incorrect (1/8" low). The float level was adjusted. The carburettor was reassembled and tested in accordance with the manufacturer's manuals. The carburettor was refitted and the aircraft returned to service.

CAA Occurrence Ref 19/5537

Cessna 172S

Inlet Duct, Sparkplug

TSI hours:	13.9
TSO hours:	2190

The pilot reported that the engine briefly stuttered on climb and again once more in the hold.

The maintenance investigation found that the air intake duct was disconnected from FCU inlet clamp. The duct was found crushed where the flexible hose connection is hose clamped to the duct. This was then repaired and refitted. One spark plug was also replaced due to a cracked insulator. The fuel distributor was removed, diaphram inspected, piston cleaned and polished, re-assembled and re-fitted. Cylinder leak rates checked and were fine. Exhaust and inlet manifolds inspected, no defects found. Ground run and check flight carried out satisfactory, aircraft returned to service.

CAA Occurrence Ref 19/6125

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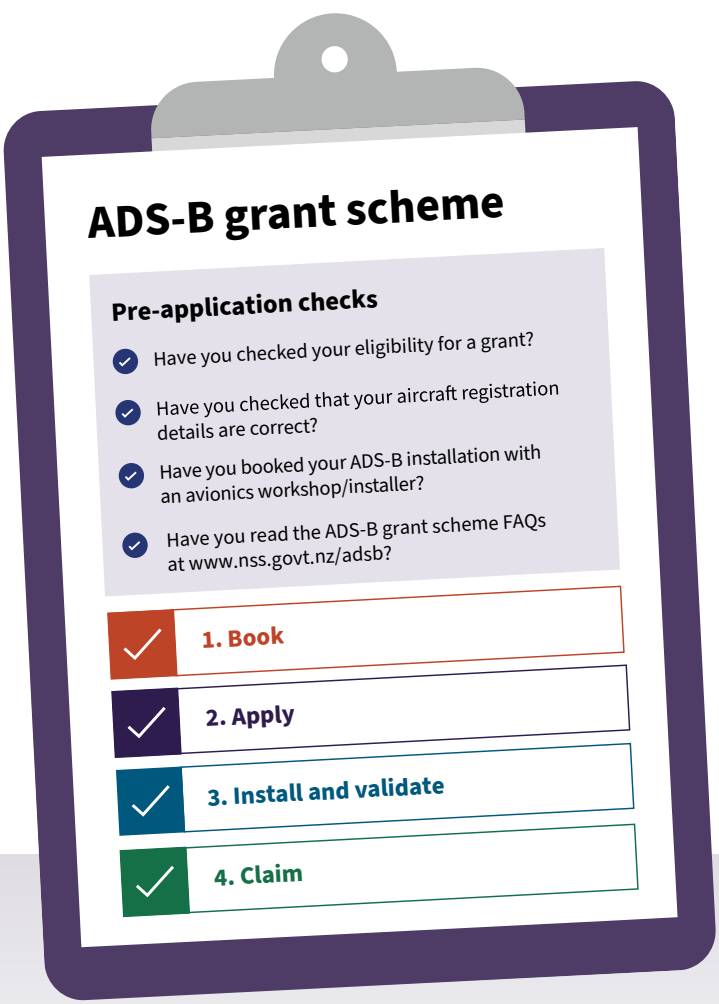

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