September/October 2017

POINTING TO SAFER AVIATION

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Amateur-built Aircraft

So You Want to Fly a Gyro?

Exercise Southern Katipo

Airspace Changes 2017

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

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Vector provides a brief summary of the 2017 airspace changes, effective 9 November and reminds you to order your new charts well ahead.

Cover: The Falcomposite Furio LN 27 RG, a fully aerobatic kitset aircraft developed and produced in New Zealand, with a cruise speed in excess of 175 knots. You could build this yourself, see the article on page 4.

Photo courtesy of Falcomposite / Rob Neil.

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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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Publication Content
Unless expressly stated as CAA policy, the views expressed in *Vector* do not necessarily reflect the policy of the Civil Aviation Authority. Articles are intended to stimulate discussion, and nothing in *Vector* is to be taken as overriding any New Zealand civil aviation legislation, or any statements issued by the Director of Civil Aviation, or the Civil Aviation Authority of New Zealand.

Reader comments and contributions are welcome and may be published, but the Editor reserves the right to edit or abridge them, and not to publish those that are judged not to contribute constructively towards safer aviation. Reader contributions and correspondence regarding the content of *Vector* should be addressed to: *Vector* Editor, PO Box 3555, Wellington 6140, or email: **info@caa.govt.nz**.

Free Distribution
Vector is distributed to all New Zealand flight crew, air traffic controllers, aircraft maintenance engineers, aircraft owners, most organisations holding an aviation document, and others interested in promoting safer aviation.

For flight crew and air traffic controllers, an aviation medical certificate must be held, and a New Zealand address given, to receive *Vector*.

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Flying **Drone Aware**

The increasing popularity of Remotely Piloted Aircraft Systems (RPAS) or 'drones' brings with it a greater need for awareness from all aviation participants.

Growing numbers of unmanned aircraft mean growing numbers of occurrence reports, but the reports aren't all about drones behaving badly.

It's important to remember that RPAS pilots have just as much right to use New Zealand airspace as other aviation participants.

All aviators need to be alert to their potential presence, particularly in areas set aside specifically for their use.

There are a number of 'danger areas' across the country in which RPAS operations may be taking place. Danger areas for model flying are marked on the visual navigation charts (VNC) like this:

"The testing of new and emerging technology, or operations that involve flights extending beyond visual line of sight are also conducted within temporary restricted areas," says CAA RPAS specialist, Mark Houston.

Information about where and when these types of RPAS activities will take place is available through NOTAMs and AIP Supplements.

"It is really important that pilots check the VNC, NOTAMs and AIP Supplements carefully as part of every preflight briefing. These danger and restricted areas are not always active," says Mark.

Manned aircraft are able to fly through danger areas, but a pilot must first assess the risk doing so poses to their aircraft.

Don't forget that as well as RPAS, a danger area could have been specified for a range of other activities from quarry blasting to live firing, or even efflux.

Entry to an active restricted area requires prior approval from the designated administering authority. Information about this, including appropriate contact details, is contained in the en-route section of the AIP.

CAA Aviation Related Concern Investigating Officer, Roger Shepherd, suggests that danger and restricted areas can easily be avoided altogether.

"It's easy to fly around or over them, as they may only be half a mile wide and normally have a vertical height limit. They're not going to be any major impediment to whatever track you were going to take."

On first sight, a danger area may not appear to be active. A pilot could think a quarry isn't blasting because they don't see any smoke. But relying only on such visual cues is unreliable at best. With RPAS, it's entirely possible that you won't see them until it's too late.

While the location of danger and restricted areas is published, the existence of specially allocated council areas may not be.

To give clarity to the RPAS community, some councils are designating tracts of their land specifically for the purpose of drone or model aircraft use.

Recently, a helicopter mistakenly landed in such an area, forcing a local drone operator to avoid an incident by quickly bringing their RPAS to the ground.

"Conventional aircraft operators have to research the land they're going to operate from. Although there isn't anything explicitly requiring them to get landholder permission to land, there are clear safety reasons why they should do so," says Roger.

"By contacting the landowner, a pilot may find out that a farmer has a wire across their paddock, or that a council has approved a park for RPAS flying.

"It's just common sense and common courtesy, and is good basic airmanship."

Check with your local council for more information on their RPAS policies, or see the Airshare web site, www.airshare.co.nz, "My Flights > Property Owner Consent Information". ■

Photo: iStock.com/shootdiem

Amateur-built Aircraft

What better way to indulge a passion for aviation than to build your own aircraft? Here's what you need to know.

We've been brought up on the notion that New Zealand is a nation of tinkerers. Nothing proves this better than the number of aviation enthusiasts choosing to build their own aircraft.

While a project like this may hold great appeal, there are a few things to consider before diving head-first into your spanner set.

The Three Fs

The Sport Aircraft Association (SAANZ) web site lists the three essential components of success for an amateur-built aircraft as being Finance, Facilities, and Family.

The upfront costs of such a project may seem clear at first, but have you factored in certification, training, tooling, or the potential impact of a change to your financial situation?

Many a home build has been derailed by an unexpected injury, redundancy, or the addition of a new family member.

While these events may be difficult to predict, it pays to allow appropriate contingencies.

Bill Sisley, SAANZ President and constructor of Europa XS ZK-CHV, notes that a project can at least be deferred.

"Fortunately, an aeroplane can be built in ten months, or ten years, so can be pushed back into the shed when money runs out."

What about the facilities you're planning to use? While you don't initially need a space large enough for the whole aircraft, you will need a space large enough for completed parts of the aircraft.

"We find people building in their front rooms, with bits of aeroplane all through the house, which is fine if it doesn't get in the way. A lot of modern aircraft though, are built in jigs and need more room, whereas space maybe isn't as important when building in wood and fabric," notes Bill.

Whether it's a dedicated workshop space, or the family car playing second fiddle as the garage is taken over by engines and ailerons, the aircraft will need to be built somewhere.

Arguably, the most important of the three factors is family. Such a project could easily take years to complete, putting pressure on relationships and consuming spare time.

David Gill, CAA Team Leader Registration and Airworthiness, notes it is not uncommon for a project to remain incomplete after 20 years.

Photo courtesy of Penny Belworthy.

"People will often complete 80 per cent of an aircraft, but those last details like wiring and the interior can take as long again," he says.

Bill says the process should be inclusive.

"We believe there is room for the rest of the family to share in both the building, and the enjoyment of flying. It's a partnership, rather than just one person being isolated and stuck in the shed."

A Simple Process

The CAA process for amateur-built aircraft has been simplified greatly, and no longer requires notification of intent, or staged inspections.

"It's now a very simple process, based on the American system. The CAA inspects the finished aircraft for the things we consider will make it safe, and it is then proved by flight testing," says David.

Design and Build

The freedom of flight draws many to the skies, but there is also a generous amount of freedom allowed in the design and build phase of an aircraft project. One SAANZ member is even building a steam engine for his Pietenpol.

"The law on home-building used to be fairly restrictive, but now allows people to build almost anything they like. A builder must use best practice, and demonstrate that components like the wings are suitable for the aircraft, but otherwise there is total freedom," says Bill.

Designing an aircraft from scratch is best left to those who have prior experience, or some experience in aircraft engineering. It is also a longer process that may require additional testing.

Kitsets are a popular choice, however, as they allow builders to get into the air sooner, and potentially with less technical knowledge.

The 'Special Category – Amateur-built' airworthiness certificate is applied to aircraft built for the education and recreation of the builder themselves. Because of this, the CAA requires that at least 51 per cent of the construction be carried out by the builder.

If you're building from a kitset, make sure it's an appropriate 51 per cent kit.

Those looking for more of a challenge can opt to build an aircraft from plans. This may prove cheaper than a kitset, but can also take longer to complete.

Whichever way you've decided to build your aircraft, it is worth talking to SAANZ about your options. Their mentoring programme will also be a great help to a new builder.

"The main thing is to communicate with others, and share your progress," says Bill.

David agrees with this. "There is an awful lot of information available through user groups and SAANZ. Some aircraft may not be well supported by the manufacturer, but there are probably people building them around the world who can help."

Registration and Inspection

Amateur-built aircraft must be registered before their Special Category airworthiness certificate can be issued.

To do so, fill out a CAA 24047/01 *Application for Registration of an Aircraft* form, which can be found in the 'Forms' section of the CAA web site, and submit with the appropriate fee.

Registration marks and an identification plate must then be affixed to the aircraft, along with any required markings and placards. See AC21-4 *Special Category – Amateur-built Aircraft Airworthiness Certificates* for further guidance on this.

Once registered, the constructor may apply for a Special Category airworthiness certificate in the Experimental subcategory, via Form CAA 24021/06 *Application for a Special Category Airworthiness Certificate*.

Documentation submitted to the CAA at this stage could include drawings or photographs, a notarised CAA 2115 *Eligibility Statement Amateur-built Aircraft form*, and a letter identifying the aircraft, proposed testing area, and test pilot.

Continued over ⟩⟩

The Jodel D9 and Clutton FRED (Flying Runabout Experimental Design) amateur-built aircraft of the Belworthy family.

» Continued from previous page

Trish Stephens flying her Van's RV-6A, originally built in 2003 by Kent Aston. Trish says it's great for aerobatics up to Sportsman level.

It is essential that all major structural components, control runs, and systems be photographed before the final skin or fabric is applied, if this will otherwise prevent visual inspection.

"We encourage people to take photographs of anything that will be covered later. The more detail that is recorded, the easier it is for us to check," says David.

Stage inspections, while no longer mandatory, are still recommended for those areas.

This evidence can be documented in a construction record, eg, the EAA *Service and Maintenance Manual*, or the *Construction Record for Amateur-built Aircraft* from SAANZ.

It is worth remembering that the owner is solely responsible for the safe and sound construction of the aircraft.

Before the CAA inspection you should also have the following documentation ready:

- CA006 Tech log
- CAA1464 AD log
- CAA2101 Airframe log
- CAA2158 Engine log
- CAA2110 Propeller log
- CAA2102 and CAA2173 Weight and Balance form
- CAA2129 Radio station approval form
- An approved maintenance programme
- Evidence of inspections signed by the constructor, describing all inspections conducted during construction, including mentor visits and vital point inspections.

Logbooks and forms are available from www.caa.govt.nz, "Quick Links > Forms".

Getting Airborne

Once the aircraft is ready to fly, registered, and certified, it's time for test flights.

Amateur-built aircraft are initially test flown using a Special Category – Experimental airworthiness certificate.

During this phase, the aircraft will be subject to operating limitations and a specific flight evaluation area.

Aeroplanes and rotorcraft with type-certified engine and propeller combinations are required to log at least 25 hours of flight time, or 40 hours if non-certified.

Amateur-built gliders, balloons and airships built from kits must fly for at least 10 hours of satisfactory operation, including at least five takeoffs and landings.

The minimum standards for test pilots are specified in AC21-4 *Special Category – Amateur-Built Aircraft Airworthiness Certificates*.

Recommended flight evaluation procedures can be found in FAA Advisory Circular 90-89A *Amateur-built and Ultralight Aircraft Flight Testing Handbook*. SAANZ can also provide flight test record documentation.

The test pilot must be a person approved by the Director of Civil Aviation who holds a valid pilot licence.

Taxi tests are recommended as a first step, for the test pilot to gain familiarity with the characteristics of the engine and ground handling.

It is also important to ensure emergency equipment and personnel are readily available for test flights.

Once certified, an aircraft registered as Special Category – Amateur-built must be flown by a pilot with, at minimum, an RPL or PPL. An aircraft registered as a microlight can be flown by a pilot holding a Pilot Certificate from an appropriate Part 149 organisation.

Ongoing Maintenance

Maintenance of an amateur-built aircraft requires an approved programme in accordance with rule 91.607 *Approval of maintenance programmes*.

The aircraft constructor may themselves be issued a CAA Maintenance Approval, but it is strongly recommended that they first gain practical experience under the guidance of a licensed aircraft maintenance engineer.

A limited degree of pilot maintenance is also allowed under rule 43.51 *Persons to perform maintenance*, but all other maintenance must be carried out and certified by persons approved or licensed under Part 66.

"We have an agreement with the CAA that anybody who has built their own aircraft can attend a SAANZ training course and sit an Aspeq exam to be certified to maintain their own aircraft. Doing so is very cost effective," shares Bill.

Modifications may be made to the aircraft after it is completed, but must be notified to the CAA if they alter the primary structure, components, or aerodynamics. It is possible that further testing may be needed at that point.

"The CAA needs to be informed of modifications, and will then decide whether they need to be flight tested for approval. An aircraft is grounded immediately by a major modification, whereas minor modifications can be approved based on Acceptable Technical Data," says David.

For the many people whose aircraft has been registered as a microlight, rather than an amateur-built aircraft, the system is both simpler and more strict.

"People are allowed to do their own maintenance on a microlight, but they must adhere to the manufacturer's instructions. Amateur-built owners have more freedom to make changes, as long as they are flight tested," says David.

So, after the long hours and hard work, is it worth it? Bill Sisley has no doubt.

"It's extremely exciting when you've built your plane and it first goes up. That thrill doesn't go away for a long, long time." ■

CAA's New **Principal Aviation Examiner**

David Harrison is replacing Bill MacGregor as New Zealand's top examiner.

After two years as CAA's Training Standards Development Officer, David Harrison is moving three desks over in the licensing unit, to become Principal Aviation Examiner.

David is filling the role vacated by Bill MacGregor who is retiring, after almost four years, to Auckland.

David, originally from Britain, flew and instructed for the Royal Air Force. He has 3000 hours fast-jet time, principally on the Phantom and Tornado F3, and was both a weapons instructor and flying instructor.

He was also commander of the RAF's busiest flying training base at Linton-on-Ouse.

In New Zealand, he became a CFI and examiner with Hamilton's CTC Aviation (now L3 Flying Academy) followed by a stint with Aviation Services Limited (now Aspeq).

David is also a glider pilot.

In his time as Training Standards Development Officer, David has been enthusiastic and energetic about the vital role of good flight training in aviation safety, "particularly as the industry moves towards a risk-based approach," he says.

David says he will continue to have a strong focus on the maintenance of flying standards, and the key role of the flight examiner in that process.

"I will also continue, myself, to be an active examiner, to keep my perspective 'real'," he says. ■

ATC Assistance
Crossing Cook Strait

Cook Strait is the only area in the country where a radar information service is routinely provided to VFR flights in uncontrolled airspace, and for good reason.

With 14 miles at its narrowest point, a Cook Strait crossing can seem daunting. To provide some peace of mind, many would-be crossers contact Wellington Approach requesting a climb into controlled airspace, or a radar information service in Class G (uncontrolled) airspace.

The Wellington Approach team (122.3 MHz) tries to accommodate transponder-equipped VFR flights crossing the Strait, and when possible, clears VFR flights to climb into controlled airspace. Due to IFR flights operating into and out of Wellington, Woodbourne, and Paraparaumu, that isn't always possible.

If ATC workload allows, a radar information service in uncontrolled airspace may be provided as an alternative, for aircraft with a transponder.

As mentioned above, Cook Strait is the only area of the country where this service is offered to VFR flights outside controlled airspace. That's due to the low controlled airspace base (2500 feet) and distance being flown over water.

ATC Radar Services

To help clarify the differences in ATC radar services, a radar *control* service provides separation for IFR aircraft in Class C airspace, and a radar *information* service does not separate aircraft. A radar information service can, however, provide traffic avoidance advice to aircraft where necessary.

These radar services are primarily established for IFR air transport operations in controlled airspace.

When ATC tells an aircraft that it's been "identified", that notifies the pilot that a radar service is being provided. Should an emergency situation arise, being identified at a known location will help Air Traffic Services to provide assistance.

A radar information service may provide traffic information, including:

- a clock reference bearing relative to the traffic position
- range of the traffic
- direction the traffic appears to be proceeding in
- level of the traffic mode C readout (if the controller adds "unverified", this means the information may be incorrect due to the other flight not being in communication with the controller)
- other useful information such as "helicopter", should the traffic be squawking code 1500 (VFR helicopter); or relative speed (fast/slow)
- advice when the traffic is clear.

When traffic details (including flight plan and call sign) are not known by ATC, the controller may advise "unknown traffic", followed by the information that is available.

Should navigational assistance be provided, a radar service may:

- confirm that a track is clear of other airspace
- confirm correct traffic track to location/position
- provide distance to/from location
- provide track to/from location
- provide navigational information as required.

VFR advisory routes on Visual Navigation Chart C7.

Your Responsibilities

Radar might not detect all uncontrolled flight, but wherever possible, controllers will attempt to pass timely traffic information to identified aircraft. Don't let this lull you into a false sense of security.

As the pilot, you are still responsible for your separation and adherence to weather minima in uncontrolled airspace. The onus is on you to stay alert and continue communicating, navigating, maintaining a good lookout, and remaining in visual meteorological conditions. The basic principle of 'see and avoid' still applies.

Other flights operating in uncontrolled airspace (IFR or VFR) that aren't receiving a radar information service are unlikely to be on Wellington Approach frequency. So it's recommended you contact Christchurch Information on the FISCOM frequency (121.3 MHz), monitoring other frequencies as might be appropriate.

Importantly, a radar controller providing either radar service will require you to listen out and maintain communications on their frequency until you advise that the service is no longer required, or the controller advises that the radar service is terminated. In this case, Wellington Approach will use the phrase "radar service terminated". That will usually occur once you've crossed the Strait.

If Wellington Approach has issued you a squawk code, after service termination revert back to your normal code, or 1200 (if VFR fixed wing), while making sure you are at a correct cruising level for VFR flight.

More Information

For greater detail see *AIP New Zealand* ENR 1.6-5 ATS Surveillance Services. ■

SMS – Advice from **Heli Operators**

The first two helicopter operators to become SMS-certificated give their top tips for implementing SMS in any operation.

Taranaki-based Ice Aviation, and Rotor Force in the Hawkes Bay are two 'early adopters' of a Safety Management System. Both 'Group 2' organisations*, they are the first two helicopter operations to become SMS-certificated.

Here, Jim Finlayson from Ice Aviation, and Tracey Campbell, the SMS Manager for Rotor Force, give their top tips for SMS certification success.

It's Not That Hard

Tracey: It really isn't that difficult, particularly if you already have a good QA system. Don't reinvent the wheel. Use what you already have, just upgrade it to match what's needed.

Jim: Don't be daunted. It's not that onerous. Break it down into little segments, review what you already have and then look at what you need to add.

Where to Start

Tracey: Do the gap analysis first. That will identify what you already have, and what you need to meet the new requirements. Focus first on your critical operational risks, the high consequence events.

Jim: Most companies with a robust QA system will already be identifying hazards and managing risk and conducting safety investigations. Assess that first. You could find that all that needs to happen is for it to be properly written down. In today's world, you need to have something concrete for the auditor to assess.

Staff

Tracey: One person cannot do this alone. Joe Faram (CEO of Rotor Force) called all his contract pilots in for a day to explain what SMS was about and how they would be involved.

The system is only as good as the organisation's safety leadership and culture. Joe is really proactive in this area. His contractors respect him and if he believes in it, and walks the talk, they will too.

It would be a waste of time if somebody in leadership treats it as a box tick.

Jim: I have only one staff member – me. That made composing the implementation plan more difficult. I had to tailor guidance, obviously aimed at larger organisations, to my tiny business. That was the biggest challenge for me.

Now What?

Tracey: We'll be continually reassessing and improving Rotor Force's SMS, establishing and reviewing key safety performance indicators, making changes where required, and identifying trends by looking for reoccurring types of events, common causes or risks.

Jim: You have to keep at it. SMS is not about 'the manual'. It's not about certification. It's about on the ground, day-to-day, ongoing safety measures. There's only me in my operation, but to get a fresh eye, I have a safety manager who's a very experienced helicopter pilot and who has a background in safety management. My flight examiner is the safety manager for another heli company. So both are very focused on safety and neither is hesitant to tell me when they think I need to do something differently.

> *"Focus first on your critical operational risks, the high consequence events."*

Where to Get Help

Tracey: Joe brought me in to prepare an implementation plan because I have a background in system creation and management, as well as in workplace health and safety.

If you can't do it yourself, get someone in to do it for you. Ask other operators who they got in, what that person's background is and their experience, and what the operator thought of the implementation plan.

Jim: I was convalescing after a shoulder operation so could put the time into the implementation plan, myself. It took me about two weeks, full time.

But if you can't do it yourself, and you can't afford anyone else to do it, you can ask me, or people like me, for low cost – or, depending on the circumstances, even no cost – mentoring. I already have three participant operators that I'm advising. And Aviation New Zealand has put a call out to SMS-certificated operators to do something similar.

* To find out more about your obligations as a Group 2 organisation, go to www.caa.govt.nz/sms.

Photo courtesy of Rotor Force.

Special Tip

Tracey: If you're not sure what's required, my suggestion would be for someone from your organisation to go to a CAA workshop. I have a background in putting systems together but I still found the workshop useful. And it's free!

Jim: After I'd drafted the plan, I tested one part out, to make sure it was useful. Your emergency response plan for instance: a little desktop exercise might uncover that in reality, it wouldn't work, or wouldn't be useful. It will also show the auditors when they come to assess you at the beginning that you know for sure the system you have designed does work.

Final Words

Adrian Duncan (CAA Team Leader Airworthiness, Helicopter and Agricultural): The SMS certification of Rotor Force was relatively straightforward, because management had taken responsibility for the development of SMS from the start. They had also tailored the system to fit the size of their organisation and the specific nature of the activities it undertakes.

Joe Faram: Embrace SMS, don't resist it. View your safety management system as a tool to improve not just the safety, but the quality and control of your business. It will create efficiency, effectiveness, and profitability. With SMS you'll be constantly in tune with your business and that of your clients. ■

Summary

- Don't be daunted.
- Don't reinvent the wheel.
- Do the gap analysis first.
- The system is only as good as the organisation's safety leadership and culture.
- SMS is about on the ground, day-to-day, ongoing safety measures. It's not about 'the manual'.
- If you can't do it yourself, get someone (who knows what they're doing) to do it for you. Or contact Aviation New Zealand for SMS-certificated operators willing to mentor.
- Go to a CAA workshop, even if you think you know what to do.
- Test one part of your plan to see if, in reality, it works.
- Embrace SMS. It will improve not just the safety, but the quality and control of your business, its efficiency, effectiveness and profitability.

The Value of **Defect Reporting**

An engine failure on the runway can have an entirely different outcome to the same engine failure at 500 feet. Reporting defects, even seemingly innocuous ones, can prevent a minor incident from becoming a major accident.

One of the requirements under Part 12 *Accidents, Incidents, and Statistics* is the reporting of defects.

A defect incident is described as one "involving failure or malfunction of an aircraft or aircraft component, whether found in flight or on the ground."

"A defect could be something found at scheduled maintenance, or something that came to light through an Airworthiness Directive or Service Bulletin. It could be structural or mechanical, or resulting from a maintenance programme failure where a part goes beyond its overhaul time," says Michael Campbell, CAA Team Leader Safety Data Management.

One defect that recently came to light was the failure of non-conforming small end bushings in some Lycoming engines.

"We saw two failures in close succession, and felt a trend may have been emerging," says Alan Thomson, Business Development Manager at Oceania Aviation.

"We saw signs of bronze deposits in one engine, which only increased after a ten hour re-release to service. In the other instance, we noticed a loud tapping noise in an engine, and found the conrod bushing had badly migrated."

Following this discovery, Oceania had discussions with both Lycoming and CAA Aviation Safety Adviser, John Keyzer.

These discussions, and subsequent defect reports from other participants, resulted in the issue of Continuing Airworthiness Notice 85-008 in New Zealand.

Lycoming issued their own Service Bulletin 632 addressing the problem.

"An issue might not seem important today, but could become important in three months, or in five years. If you don't tell us about it now, we can never do anything about it," says Michael.

Photo: iStock.com/mediaphotos

Reporting the Defect

Defects can be reported through the *Here and Now* app available from Google Play or Apple iTunes, with the online reporting tool at www.caa.govt.nz/report, or the CA005D form.

If you're unsure of the reporting requirements, you can always call the CAA on 0508 4 SAFETY (0508 472 338) with your queries before submitting a report.

"We find that if somebody is worried enough about an issue to call us, it's usually worth reporting," says Michael.

After a report is received, it is assessed and classified by the safety analysis team.

It could, for example, be classified as a major defect, which was the failure of a complete system, or a critical defect which had immediate risk to life and limb.

"From there," says Michael, "it is distributed to CAA operational groups and investigators, who decide whether they want to take further action."

CAA Intelligence, Risk and Safety Analysis Manager, Jack Stanton, encourages those submitting a defect report to include as much detail as they can.

"It's useful to receive a nice clear description of the fault, with information like the part number, serial number, and ATA chapter.

"Photographs of defects are worth a thousand words, but only if they're in focus. Often people will take a photograph but so closely it's hard to tell which part of the aircraft you're looking at."

While it is true that most directives about defects are firstly issued by the State of Design or manufacturer concerned, the CAA in New Zealand still collects data that can be used by those foreign agencies to build a better picture of the problem.

"If we're seeing a significant issue with a foreign part, we can also initiate action and contact the appropriate State of Design directly," says Jack.

The distribution of this information globally proves the value of defect reporting, but also shows that a reporting system is effective only when it is supported by the participants.

As Alan notes, "A good defect reporting system increases awareness. If we're seeing a trend emerging we should be alerting the whole industry, because knowledge is power." ■

So You Want to **Fly a Gyro?**

Flying one isn't as simple as you may have been led to believe. In fact, its multi-stage takeoff requires some serious flying nous.

You can call it an autogyro, a gyrocopter, a gyroplane, or a gyro. Pronunciation aside, it's classed as a microlight, and there are key responsibilities for both pilot and aircraft owner.

The name 'autogyro' is derived from the use of an unpowered rotor to create lift. It's spun by the aerodynamic force created by air moving through the rotor disc.

Forward momentum comes from an engine-driven propeller, which, in most models, also powers a starter motor to get the rotor spinning pre-takeoff. As the rotor generates no thrust, there's no need for a tail rotor to provide counter thrust.

Making a further comparison, in a helicopter, the collective alters the pitch of the blades, but in the gyro, the angle of the disc formed by the blades is tilted to generate lift.

Gyros tend to have a poor reputation resulting from their past, when the designs were generally basic with low centre of gravity issues, a lack of horizontal stabilisers, control stick lag, and the fact that pilots taught themselves how to fly – a number adopting a 'quad bike' type mentality.

But times, they are a changin'.

In the last 10 to 20 years, the gyro has evolved to become a more stable and forgiving machine.

As a Pilot

If you're considering flying one, speak to as many pilots and maintainers as you can, before committing to a particular model and instructor. This will help you to make informed decisions.

Part 149 Organisations

Gyro pilots must hold a pilot certificate issued by a Part 149 (recreational) organisation, and a medical declaration issued by a general practitioner.

In addition to pilot certification, two Part 149 organisations, Recreational Aircraft Association of New Zealand (RAANZ) and Sport Aviation Corp (SAC), provide flight instruction and advice. The New Zealand Autogyro Association is also a good starting point. Check out their web site at www.autogyro.org.nz.

Tauranga-based Solo Wings' owner, Colin Alexander, is a gyro instructor, and LAME.

"We've found many pilots wanting to fly gyros are not cross-overs from other aviation sectors. They don't have much in the way of prior experience, so they need serious training.

"Having reference books, for example, Phil Harwood's publications, are essential for training, as is following a structured training syllabus," says Colin.

Elton Haakma, Chief Flying Instructor of Gyrate New Zealand, says many of Gyrate's students are new to aviation – in their 50s and 60s.

"They're successful business people who've always wanted to fly, and finally have a bit of time and money to give it a go.

"Training currency is a key issue, especially the frequency of training. Most of our students fit their training around a full-time job. So being busy people, a good number have trouble finding time to memorise checklists, study for exams, and practise their radio calls.

"Because of those irregular training schedules, and the peculiarity of the gyro, it often takes twenty or more hours to go solo, as the student needs to consolidate those skills. There can be a lot of movement in the yaw, roll, and pitch axis on takeoff and the landing flare. To head and track straight involves a bit of cross controlling. If I had a dollar for every time I said right foot, left stick, I'd be a rich man," says Elton.

But like all other sectors of aviation, continual learning is the prerequisite of success. After you're flying solo, it's always worth doing some refresher training.

"Even after just a couple of months of going off on their own, I'll start to notice little bad habits creeping into their standard operating procedures. Imagine a couple of years!" says Elton.

Photo courtesy of Mike Scoon.

Rotor Management

The gyro involves a fairly complicated multi-stage takeoff procedure. See *Gyro Takeoff Profile* diagram below.

The controls, however, are quite simple, says Bruce Anderson, Director of Gyrate NZ.

"The tricky part is getting your rotor management sorted when you are ground manoeuvring, and this is peculiar to gyros. Leading to the takeoff, the rotors need to be spooled up smartly, to avoid blade sailing. And subsequently, for a smooth departure, they need to reach a higher RPM in the takeoff roll."

Every make of gyro has a particular speed at which the rotor disc becomes centrifugally taut, says Mike Ross, New Zealand Autogyro Secretary/Treasurer.

"You really need to read the pilot operating handbook to fully understand and comply with what that speed is.

"Also, if you run into any issues on takeoff, just pull the power back and stop. Some pilots get into a panic if they, for example, get three quarters of the way down the runway and are still on the ground, even though their speed would normally see them airborne. They'll panic, pull back, the disc will bite the air hard, and the gyro will flip over on to its back," says Mike.

Technical Flying Skills

"What I'd like to get across," says Elton, "is that flying a gyrocopter is more like flying a fixed wing aircraft than a helicopter.

"When airborne, it feels easy and relaxed. That's because at height, it can slow down to zero airspeed without stalling or spinning out of control."

Forced landings without power involve a much simpler process than that for a fixed wing or helicopter. The gyro doesn't need to lower any collective to enter autorotation – it's already in it. It just needs an area the size of a tennis court to land.

"Recreational gyro pilots tend to be flying lower and slower than many aircraft," says Bruce Anderson, "so be extra vigilant about rising terrain, maintaining minimum heights, and exit plans.

"As soon as you've lost that minimum height, then you've lost the chance of recovery should something go wrong.

Bruce also dissuades pilots from trying to emulate what they see on YouTube.

"Mustering and demonstration flying takes a heap of skill, and whilst most modern gyros are pretty nimble, like all aircraft they're only as good as the flight control directions they are given.

"For those who have flown fixed-wing, their training has been all about avoiding the stall. The gyro's slow descent takes a little getting used to for some pilots.

"Given that, plus that we are typically travelling at slower speeds – 60 to 80 knots – and can be overtaken by faster aircraft, there is real benefit in broadcasting accurate position reports that local pilots understand," says Bruce.

Continued over ⟩⟩

Gyro Takeoff Profile

» Continued from previous page

Weather Considerations

With New Zealand's varied weather conditions, it pays to reduce your speed whenever encountering turbulence. Keep the disc loaded and avoid zero-G pushovers.

"Gyros, in fact," says Bruce Anderson, "can handle turbulence more comfortably than any fixed wing due to high rotor speed and small blade surface area."

As an Owner

As the gyro is classed as a microlight, it has to be registered with the CAA, and changes of ownership must be notified. One seater gyros are registered as Class 1 microlights, and two seaters are registered as Class 2, which also require a flight permit due to the additional duty of care associated with carrying a passenger.

The first question to ask yourself is whether your gyrocopter is airworthy. To make it *legally* airworthy, your gyro needs to be well maintained, with the correct documentation.

Maintenance

Gyro owners can perform their own routine maintenance – both a good and bad thing.

Bruce cautions that with flexibility comes added responsibility.

"We enjoy the more relaxed New Zealand microlight rules, but it's up to us to maintain our own high standard within those boundaries, both mechanically and personally. This isn't your car or tractor, so don't be lazy and think you'll get onto it later."

Solo Wings' Colin Alexander witnesses pilot maintenance shortfalls on a daily basis.

"A lot of people go flying, blissfully unaware that their maintenance is overdue.

"Details that are often missed are the aircraft's annual inspection, and the finite life of certain components, such as the engine rubber components, teeter bolt and bearings, engine, and rotors.

"If pilots are doing their own maintenance," continues Colin, "do they actually have the competence to do it? An engineer will often notice maintenance issues that an untrained eye won't."

Rule 103.105 *Documents to be carried* outlines flight permit responsibilities.

"You need to carry the flight permit in the aircraft. The inspection sticker on the aircraft is purely a revalidation of the permit.

"The permit must also be representative of the current state of the aircraft. A modification made without approval, contravenes the flight permit conditions. Modification approval can either be sought from a Part 149 organisation's technical officer, or the CAA," says Colin.

Airworthiness Directives

Class 2 microlight owners are required to keep logbooks for the aircraft, engine, and propeller, and must also comply with Airworthiness Directives (ADs). ADs for gyros are issued under the Microlight heading on the CAA web site.

See www.caa.govt.nz, "Airworthiness Directives > Microlight" and come to grips with the system. You can also subscribe to the CAA email notification service for "Airworthiness Directives", and "Airworthiness Issues", to keep up to date.

Also subscribe to, and regularly check, the manufacturer's service bulletins. It's important to make sure the aircraft remains compliant with all manufacturer requirements.

Microlight Owners Seminar

On 9 November 2017, the CAA is hosting a seminar to try to help microlight pilots gain more knowledge in a number of areas, including:

- certification and flight manuals
- maintenance and inspection requirements
- construction and endurance testing
- flight instruction
- airspace and minimum heights
- weather and operating limitations, and
- accidents and investigations.

See the CAA web site for more information. ■

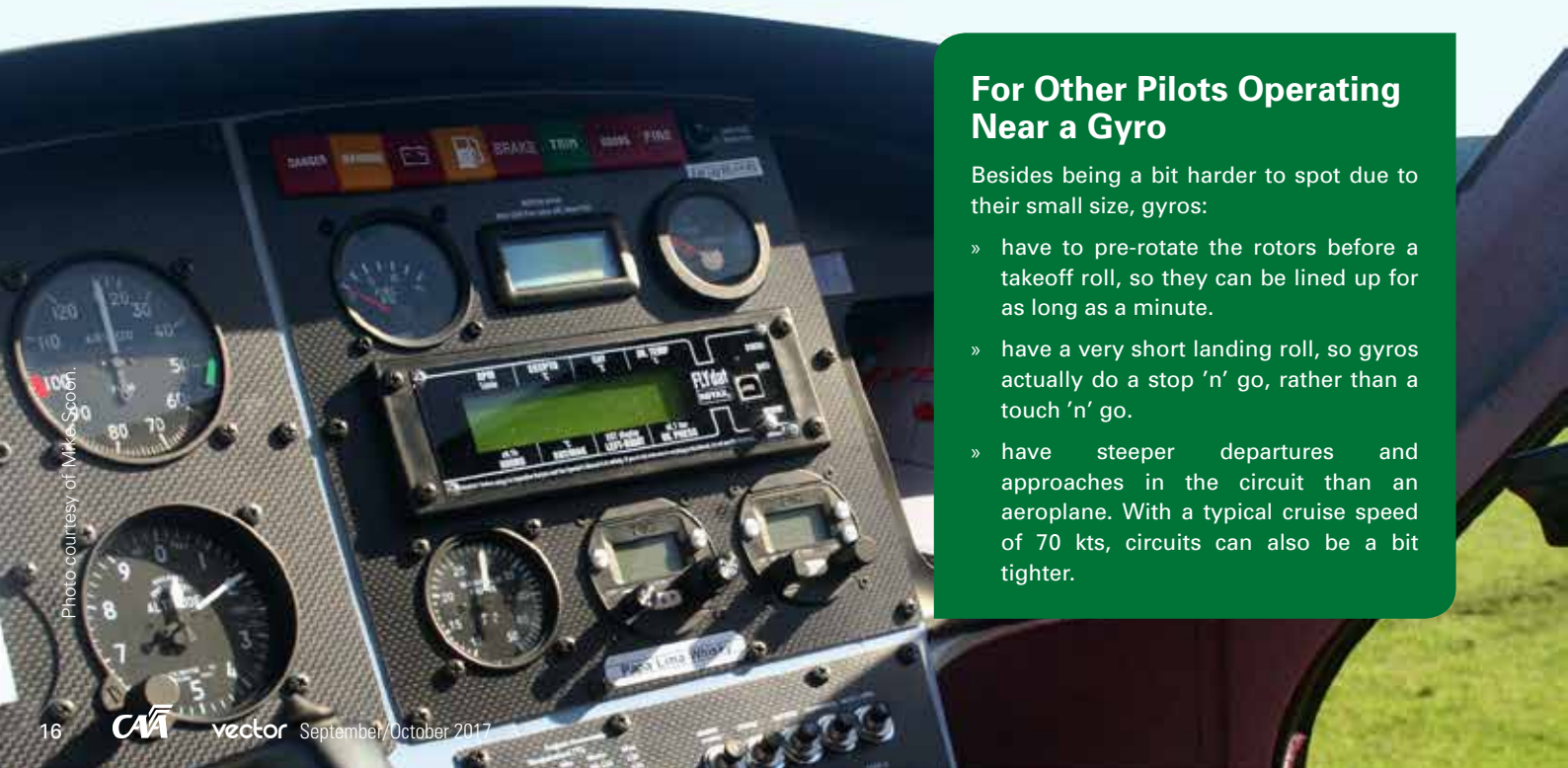


Photo courtesy of Mike Spoon.

For Other Pilots Operating Near a Gyro

Besides being a bit harder to spot due to their small size, gyros:

- have to pre-rotate the rotors before a takeoff roll, so they can be lined up for as long as a minute.
- have a very short landing roll, so gyros actually do a stop 'n' go, rather than a touch 'n' go.
- have steeper departures and approaches in the circuit than an aeroplane. With a typical cruise speed of 70 kts, circuits can also be a bit tighter.

Photo courtesy of the New Zealand Defence Force

Exercise **Southern Katipo**

The skies in the north of the South Island will be buzzing with military aircraft from mid-October to late November 2017. Read the AIP Supplements and check NOTAMs.

More than 2000 naval, land, and air personnel. Twelve countries. Four air forces. And drones.

From mid-October, the New Zealand Defence Force will be joined in Exercise Southern Katipo 2017 by personnel and equipment from Australia, the United States, Canada, Britain, France, Brunei, Malaysia, Timor Leste, Fiji, Tonga, and Papua New Guinea.

The American, Australian and French air forces will be flying C-17, C-130 Hercules, CASA 235, C27J, B200 King Air transport aircraft, Falcon Guardian and P-3K2 maritime aircraft, and NH90 and A109 helicopters.

The scenario in 2017 is that a fictional southwest Pacific country has requested international intervention to restore law and order.

"It's a very realistic scenario," says Southern Katipo's air planner, Squadron Leader Heather Peart, "given that New Zealand has previously undertaken stability and security operations in Bougainville, Tonga, the Solomon Islands and Timor Leste."

Flying activity in Southern Katipo – one of the country's largest military exercises – will start on 18 October, including low-level familiarisation flights in and around the exercise area by military aircraft.

Fixed-wing aircraft will be based at Ohakea and will conduct operations into Woodbourne, Westport and Greymouth aerodromes. They may also conduct parachuting and load-drop operations, and low-level flying to a minimum of 250 feet AGL within the exercise area, and within NZM306 Raumai, near Ohakea.

That means increased traffic flying over Cook Strait, but they'll be IFR and much higher than light aircraft.

The C-17 and C-130 will carry out low-level navigation sorties over the upper South Island throughout the exercise.

The helicopters will initially be based at Omaka aerodrome near Blenheim, and from late October are expected to be based at Westport aerodrome.

Intensive low-level helicopter operations can be expected throughout the exercise area, including around Kaikoura, Ward, Okiwi Bay, Dip Flat, Greymouth, Westport and Reefton.

The military helicopters will be based at Omaka during the period of expected grapevine frost protection. That will mean increased civilian helicopter activity at Omaka in the evenings, for fuelling and positioning, and in particular early morning flights operating around the aerodrome.

The NH90 helicopter is a medium wake turbulence category helicopter, so pilots of light aircraft operating near the NH90 should be aware of the effect that turbulence can have on their aircraft. It may be necessary to adjust the flight path of your light aircraft to avoid flying through the flight path of an NH90.

More details on wake turbulence can be found in the CAA-produced GAP booklet, *Wake Turbulence*. Email info@caa.govt.nz for a free copy. To view an online version, go to www.caa.govt.nz, "Quick Links > Publications > Good Aviation Practice booklets"

At a controlled aerodrome, either a caution or a separation standard will be applied between the helicopter and light aircraft, depending on the position of the affected aircraft.

Remotely piloted aircraft systems (or drones) operations can also be expected throughout the exercise, being used for reconnaissance and surveillance.

Check NOTAMS for any changes to the status of aerodromes associated with the exercise.

Temporary aerodrome control services will be provided at Omaka and Westport, and AIP Supplements will cover the operations at both aerodromes.

The status of NZM306 (Raumai) can be checked by monitoring the Ohakea FISB on 124.5 Mhz.

Although Southern Katipo will run officially until 17 November, military flights will not completely wind down until 25 November. ■

Airspace Changes 2017

It's time to get your new VNCs. They'll become available for purchase on 6 October, giving you time to get your head around the airspace changes effective 9 November.

To give you a heads-up, *Vector* has listed some of the main changes geographically from North to South. This is only a brief summary though, and to get the full picture, you'll have to consult the AIP Supplements and refer to the new charts.

All documents relating to the changes, including consultation, are available on the CAA web site, www.caa.govt.nz, "Airspace > Airspace Review".

New Plymouth Airspace Change

As we usher in a new era of satellite-based navigation, airspace needs to be updated to accommodate new performance based navigation (PBN) procedures. A number of airspace changes have been made to New Plymouth's airspace to contain new approaches – see the chart on the right.

New Plymouth's controlled airspace that's no longer required has been reclassified as Class G. The reduction in the size of the New Plymouth control zone also meant that the boundaries of the *Maui* and *Taranaki* common frequency zones (CFZs) have been realigned so they remain adjacent to the CTR.

Additionally, a raft of Class D airspace changes have been made to accommodate new PBN procedures. Make sure you review the latest charts and learn where the new boundaries lie so you don't bust controlled airspace.

Raglan CFZ Name Change

After a number of submissions, the Raglan CFZ name will be amended to "Blacksands".

Additionally, the Harbour, Peninsula, and Morrinsville CFZ boundaries have been amended to help reduce frequency confusion in the Waihi Gap area.

New GAA East of Mt Egmont

A new general aviation area NZG351 *Egmont*, east of Mt Egmont/Taranaki has been established to give glider pilots the means to fly during strong westerly conditions. It extends to 9500 feet and is expected to be active (by ATC approval only) approximately 25 afternoons a year.

Hokitika MBZ Split

It was decided to split NZB774 *Hokitika* into two MBZs, NZB777 *Hokitika* (with an updated code) and NZB778 *Hokitika East*. This change means the MBZs will now encompass Greymouth aerodrome.

NZB777 now extends from the surface to 7500 ft and the frequency has been changed to 119.8 MHz ("Hokitika traffic"). It's transponder mandatory from 1500 ft AGL, with a reporting interval of 5 minutes.

NZB778 *Hokitika East* comprises two tiers:

» lower limit 4500 ft, roughly 6 and 15 NM east of Hokitika aerodrome, and

» lower limit 7500 ft, roughly 15 NM to 30 NM east of Hokitika aerodrome.

These tiers are transponder mandatory from their respective lower limits, and both have an upper limit of 13,500 (lower limit controlled airspace). Both use the same frequency as B777 *Hokitika* – 119.8 MHz, "Hokitika traffic".

Christchurch

To ensure that the safety issues identified during consultation are addressed, the bulk of Christchurch airspace changes have been deferred until November 2018, with the exception of the amendment below.

To aid airspace management, the southern boundary of transit lane NZT858 *Eyrewell* (north of West Melton) has been amended.

Additionally, two new permanent general aviation areas, NZG951 *Springfield* (lower level controlled airspace to 9500 ft) and NZG952 *Coleridge* (lower level controlled airspace to 12,500 ft) have been created. These replace NZG976 *Hororata*. This is due to the relocation of the Canterbury Gliding Club to Springfield aerodrome. ■

New CFZ over Two Thumbs Range

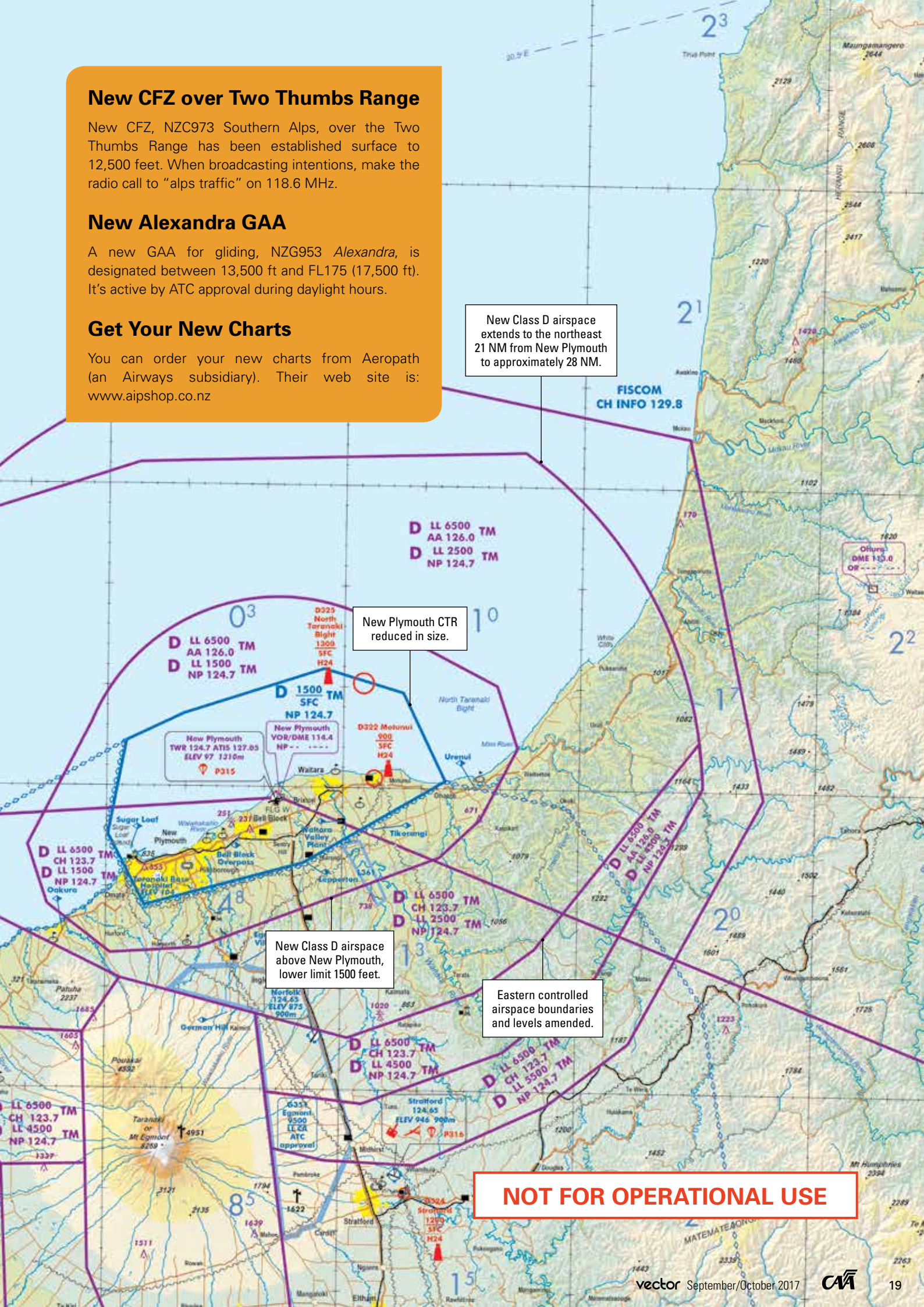
New CFZ, NZC973 Southern Alps, over the Two Thumbs Range has been established surface to 12,500 feet. When broadcasting intentions, make the radio call to "alps traffic" on 118.6 MHz.

New Alexandra GAA

A new GAA for gliding, NZG953 *Alexandra*, is designated between 13,500 ft and FL175 (17,500 ft). It's active by ATC approval during daylight hours.

Get Your New Charts

You can order your new charts from Aeropath (an Airways subsidiary). Their web site is: www.aipshop.co.nz



Director's Awards 2017

A training organisation with a point of difference, their CFI, and an individual who led Air New Zealand's response to many challenges were deserving recipients at the 2017 Director of Civil Aviation Awards.

CAA Flight Instructor Award

Craig Whyte, Chief Flight Instructor, Massey University School of Aviation

Coming from a family background of agriculture and engineering, aviation was perhaps not the most obvious career for a young Craig Whyte.

"Through Massey, I did my BAv, ATPL, C-cat and B-cat, then IFR and multi upgrades. I really enjoyed doing my ATPL in 2011, and was lucky to be trained in the King Air by an ex-Air New Zealand 747 captain."

Craig's passion for instruction led to his gaining an A-cat in 2005 and ultimately taking over as CFI at Massey.

"Once I started instructing, I really enjoyed it and decided to stay with it."

Craig has been in the position now for almost a decade, during which time he has been involved in projects ranging from the modernisation of the school's fleet, to the introduction of a scenario-based training syllabus.

"Scenario-based training assesses people's competencies for flying in a real world environment, rather than training them for a flight test."

The pride Craig feels in seeing his students achieve is obvious.

"I've seen students go from having done the odd trial flight, to being issued commercial and multi-engine instrument ratings. They're finishing at Massey and going on to airlines and charter companies, flying the likes of 777s and 787s.

"I really enjoy what I do, and am looking forward to helping develop the programme further into the future."

Award for an Organisation

Massey University School of Aviation

In almost 30 years, Massey University School of Aviation has grown to become a leading aviation research, tertiary education, and flight training provider in New Zealand.

Chief Executive Officer Ashok Poduval is rightly proud of what the school has built, offering qualifications from undergraduate to doctoral level.

"We are unique and, as far as I know, what we offer doesn't exist anywhere else in the Southern Hemisphere. Flight training integrated into a university academic programme is the high-profile aspect of the course, but is not all we do," he notes.

Among the school's unique offerings, career pathways offering paid work are available to select flight instructor graduates.

"The school also offers a Bachelor of Aviation Management, a post-graduate Master of Aviation with both research and professional practice pathways, and a PhD programme," he says.

Areas of PhD study have included the under-reporting of safety concerns, computer-based pilot training, and the interaction between maintenance engineers and pilots.

To stay ahead of the curve, the school now uses iPads as electronic flight bags, and upgraded their entire aircraft fleet in 2009.

"We went for a full suite of glass-cockpit aircraft, which was a bold step that we have not regretted. We were the first organisation in the country to have our entire fleet PBN-approved."

Photo courtesy of Massey University School of Aviation.

Massey introduced an SMS programme in 2012, long ahead of rule requirements, while also maintaining Part 141 certification and ISO 9001-2015 accreditation.

"The award is a credit to the entire team, and exemplifies their work."

Award to an Individual

Robert Fletcher, Former Air New Zealand Head of Operations Support

The 2017 Director's Award to an Individual goes to Robert (Bob) Fletcher, who forged a career with Air New Zealand over four decades, and contributed important work to New Zealand's aviation infrastructure.

His early move into an aircraft engineering apprenticeship opposed the career guidance he was offered at high school.

"I had a fairly academic schooling, and the teachers believed I should have been more 'aspirational'."

The traditional 10,000-hour apprenticeship gave Bob a solid grounding in engineering practice, which he later used to move into a wide-ranging series of backroom roles.

"The company sponsored me through university, and I came out as Dux of the mechanical school.

"I had aspirations of being a pilot at one stage, but realised the long haul travel and time away from home wasn't a lifestyle that appealed to me."

That's not to say that Bob hasn't spent his fair share of time around the flight deck of aircraft.

"I was on the first 747-200 doing demonstration flights for the CAA into Wellington as an alternate aerodrome. I will say the simulator didn't simulate maximum braking very well. We probably only used one third of the runway," he recalls.

With the arrival of the 747-400 came the need for an alternate runway with greater capacity than Wellington.

Bob was heavily involved in negotiation with the RNZAF to use Ohakea as an alternate, an agreement that has proven its worth over the years. One instance of fog alone in 2006 saw five widebody aircraft forced to divert there.

The work he put into the introduction of Cat III ILS at Auckland Airport is another of Bob's proudest achievements.

The implementation of this system reduced the impact of fog, reduced the need to rely on Ohakea, and strengthened the New Zealand aviation system as a whole.

In his time with the national carrier, Bob has also contributed to the development of Civil Aviation Rules, worked on developing a response to the ever-present volcanic ash threat, and was involved in world-first EDTO and ETOPS operations across 767 and 777 aircraft.

"The award was a pleasant surprise. Like many others, I sat quietly in the background working away, and was involved in a number of projects that hopefully benefited not only Air New Zealand, but also other operators."

In giving this award, Director of Civil Aviation, Graeme Harris, acknowledged Bob's outstanding career and commitment to maintaining the highest standards of aviation safety. ■

Bob Fletcher

Craig Whyte

Lithium Batteries – The Good, The Bad and The Ugly

Air transport operators need to be aware of the danger presented by lithium batteries, because often their passengers are not.

The Ugly

To date and globally, there have been more than 150 occurrences in the air involving lithium batteries, including fatal accidents. Consequently, both lithium ion and lithium metal batteries are considered Dangerous Goods when transported by air.

From cellphones to self-propelling baby strollers, lithium batteries are increasingly powering goods transported by aircraft.

There is a growing number of reports of such goods spontaneously combusting as the lithium battery contained in them explodes.

A current study of such incidents suggests that when an aircraft takes off, the noise of its engines and associated sonic vibrations may upset the internal structure of the batteries. That's thought to cause a battery to short circuit, heat up, and eventually burst into flame.

The likelihood of such an occurrence is still rare, but the consequences are, of course, potentially catastrophic.

Traditional extinguishers are impotent against a lithium battery fire, because if one cell of the battery catches fire, it'll generate heat in the others. Halon extinguishers may suppress the fire for a moment, but it will erupt again in the same, or another, cell. The only way to effectively put out a lithium ion battery fire is to submerge it in water.

One of the more common lithium powered products to explode is the electronic cigarette. E-cigarettes are forbidden in checked-in luggage, because if it's in the cabin and 'detonates', at least any smoke will be obvious to passengers and crew who can take action. But many people don't appreciate the danger, and such products are often not discovered unless a bag is screened and searched for a separate reason. They are usually an incidental find.

The Bad

There are many lithium batteries produced with no regard to manufacturing standards, including counterfeit batteries.

"They're the ones with realistic labels on them indicating they've been manufactured by a known and approved maker, but can be fake," says Clayton Hughes, the CAA's avionics specialist.

"But even properly manufactured batteries can be subject to failure, as mainstream device manufacturers have discovered."

Clayton says rough handling is another danger. "It can damage the lithium battery inside the product even though the outside looks fine."

The Good

Lithium batteries are increasingly popular because they're low-weight, high-density, and very high performance. For that reason some aircraft equipment is actually fitted with them, and approved lithium main aircraft batteries are now also available.

"But those batteries need to be TSO-certified, which includes safety testing. They come under airworthiness requirements and often have service life airworthiness limitations," says Clayton.

"They're also sited inside, or with, components which normally contain associated battery protection circuitry, reducing the risk of fire and explosion.

"Regulation of the manufacture and use of those batteries means they provide the least risk, as long as they're maintained according to the manufacturer's instructions."

The 'Regs'

CAA's dangerous goods specialist, Kate Madden, says it's sometimes hard for people to comprehend that the lithium batteries in their cameras, power tools and cellphones are considered Dangerous Goods when carried on aircraft.

"For obvious safety reasons, ICAO has regulations covering how lithium batteries are carried by air," she says, "including restrictions on the maximum power – or 'Watt hours' – of the battery, and where in the aircraft they may be carried.

"Lithium batteries fully contained in the equipment for which they were designed, and under a certain power limit, are allowed in the cabin or in checked-in luggage. But if in the cargo hold, the product they're powering must be fully switched off, not in 'hibernation' or sleep mode.

"Batteries must be taken on board the aircraft if they are packed externally to the equipment they are powering. The equipment, however, has to be stowed in checked-in luggage.

"Similarly, if the battery is on its own, and that includes power banks, it must be taken as carry-on, and individually protected by insulating the terminals to prevent short circuits.

"That can be done by placing the product in the original retail packaging, taping over the exposed terminals, or placing each battery in a separate plastic bag or protective pouch."

Kate says there are some batteries or products powered by batteries that cannot be carried anywhere on an aircraft.

"The capacity of lithium batteries is measured in Watt hours (Wh). If you have a 100 Wh battery, and your product uses one Watt an hour, it will last 100 hours. If it draws 100 Watts an hour, it will last an hour.

"The higher the capacity of the battery, the more lithium contained in it, the more dangerous it is.

"Batteries must have capacity of no more than 100 Wh to be carried anywhere on the aircraft. If the battery's capacity is more than 100 Wh, the operator should check ICAO's *Technical Instructions for the Safe Transport of Dangerous Goods by Air* and IATA's *Dangerous Goods Regulations*. Passengers with such batteries also need to seek operator approval to have them on the aircraft.

Some battery labels describe capacity in ampere hours (Ah) or milliampere hours (mAh) instead of Wh. You can calculate the Wh by multiplying the Ah by the voltage. If in mAh, multiply by voltage and divide by 1000.

If an air transport operation has a self-check in system, passengers need to be made very aware of what they can, or cannot take on board, and why. And why not.

Clayton Hughes recounts a story of a videographer who removed the battery from his camera and packed it in his checked-in luggage.

"The plane was delayed for ages, while they searched for his bag and removed the battery. They took it very seriously," he says.

The Advice

"In some ways," says Clayton Hughes, "the risk of lithium battery fires is, overall, decreasing because the major airlines are so aware of the issue.

"However, it's the small passenger operations that need to be very aware of the dangers, and to make sure their passengers are too.

Continued over ❯❯

The likelihood of such an occurrence is still rare, but the consequences are, of course, potentially catastrophic.

Photo: iStock.com/weerapatkiatdumrong

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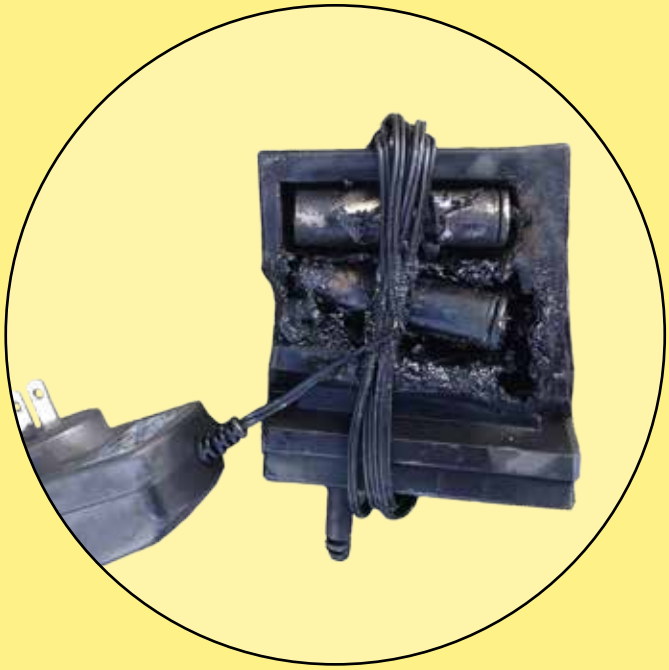


A potential catastrophe was averted when an alert ramp worker noticed a checked-in bag was smoking during loading of an aircraft in the US. They pulled the bag from the luggage trailer and called fire response.

"That might mean some really close questioning of passengers at the time of embarkation. Or noticing a comment from a passenger about their cellphone not charging very well, which can indicate a damaged battery. Or by having posters in prominent positions in the check-in area, or information posted to a web site or other publication."

It's important for operators to keep current with the increasing array of products powered by lithium batteries. They include motorised suitcases, or electronic bikes that can pass for ordinary ones.

"The Aviation Security Service (Avsec) web site, www.avsec.govt.nz, is a good place to start," says Kate Madden. "This is a fast-moving issue because of changing technology, and Avsec will have the most up-to-date information."

Clayton says pilots and operators should be proactive and alert.

"A pilot or operator of a small airline carrying the occasional piece of cargo should be very sure they know what is actually in that cargo.

"And if a pilot knows that a product has been recalled because of the risk of a lithium battery fire, don't wait for the regulators to make a comment, just don't carry it!"

For more information, read Part 92 *Carriage of Dangerous Goods* at www.caa.govt.nz. ■

Cliff Jenks

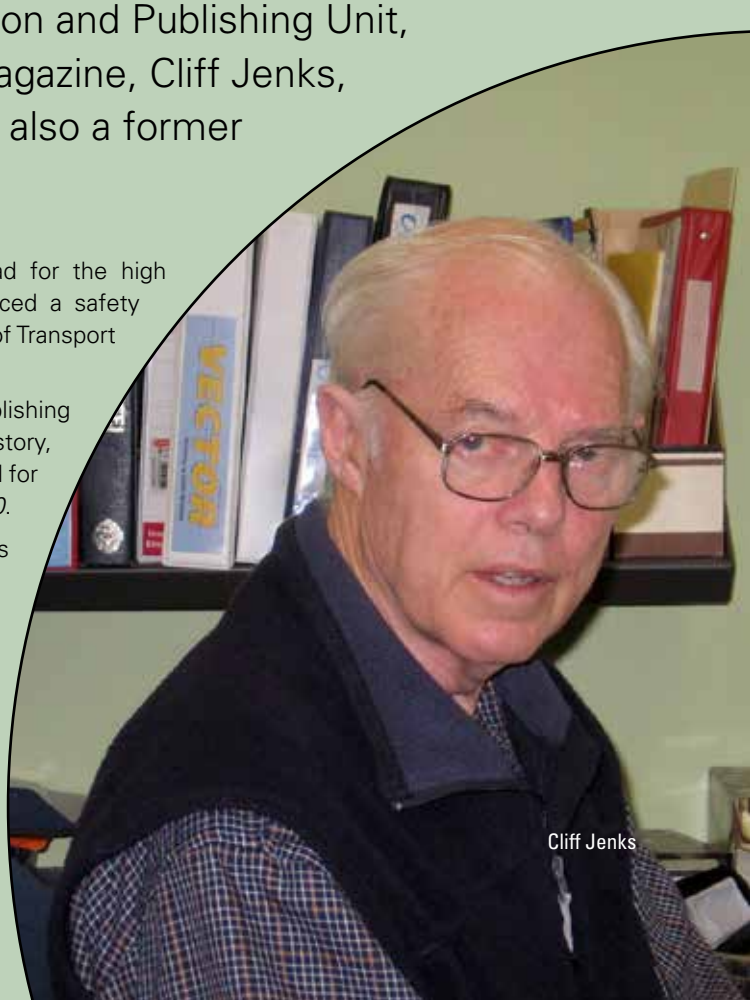
Former manager of CAA's Safety Education and Publishing Unit, and original managing editor of *Vector* magazine, Cliff Jenks, died on Sunday 6 August 2017. Cliff was also a former RNZAF Wing Commander.

Cliff was universally respected in New Zealand and abroad for the high standards he established for CAA publications. He produced a safety magazine, *Insight*, for the RNZAF before joining the Ministry of Transport Civil Aviation Division in 1985.

Flight Safety was the original CAA safety magazine, with Cliff establishing the new name of *Vector* in 1996. Cliff had a passion for aviation history, and also edited the Aviation Historical Society of New Zealand journal for many years. He co-authored *New Zealand Tiger Moths 1938 to 2000*.

He retired from the CAA in 2003, but even then continued to help us as a part-time adviser for a few years.

On his retirement, Cliff had this advice for instructors, "You never stop learning. It's a trite observation, but if you're an inexperienced instructor, then never make the mistake of thinking you know enough to get by. You should aspire to the highest, and when you get there I'm sure the people already there will say that you're never too old to learn." ■



Cliff Jenks

New Levies – What to Do, When, and Why

New operations safety levies are now in effect.

The levies are being introduced to better reflect the cost of the CAA's oversight of safety. They help ensure the right users are paying an appropriate amount for the oversight of their sectors. The levies will be based on operational activity returns that participants already submit (in most cases).

They include:

- Part 121, 125, and 135 operations that are not required to pay a passenger levy (use form CAA605);
- Part 121, 125, 135, and 129 freight-only operations (use form CAA605);
- Part 115 adventure aviation operations (use form CAA605); and
- Part 137 agricultural aircraft operations involved in the application of agricultural product (use form 24137/03).

In October, participants in the above sectors are required to complete a return of aircraft and agricultural operations statistics detailing the activities carried out from 1 July to 30 September 2017.

Please email your returns to stats@caa.govt.nz by 1 November 2017.

Later in November, participants will be sent an invoice based on their activity.

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

If you need any other assistance, tel 0508 4 SAFETY (0508 472 338)

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 web site, 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 web site. 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, 2017/18.

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

CAA Cut-off Date	Aeropath (Airways) Cut-off Date	Effective Date
27 Sep 2017	4 Oct 2017	7 Dec 2017
11 Oct 2017	18 Oct 2017	4 Jan 2018
8 Nov 2017	15 Nov 2017	1 Feb 2018

See **www.caa.govt.nz/aip** to view the AIP cut-off dates for 2017/18.

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.

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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 web site, www.caa.govt.nz, "Accidents and Incidents".
Some accidents are investigated by the Transport Accident Investigation Commission, www.taic.org.nz.

ZK-RAD Airborne Windsports Edge X 582	
Date and Time:	22-Apr-2017 at 07:54
Location:	Hokitika
POB:	2
Injuries (Minor):	2
Damage:	Destroyed
Nature of Flight:	Training Dual

Approximately 300 feet after takeoff, the engine power reduced to idle and simultaneously a small bang or tapping sound was heard with a vibration felt in the airframe, resulting in an immediate decision to turn back and land on the runway.

The instructor was not completely familiar with the handling characteristics of the trike, which had a higher wing loading than the one he was familiar with. Insufficient height was available to complete the turn back to the runway, resulting in a heavy landing on the aerodrome. A fire then broke out, which destroyed much of the aircraft.

Both on board received moderate injuries during the hard landing.

Investigation by the instructor revealed that the foot operated throttle inner cable had broken resulting in the loss of engine power. This was not the first time the instructor had experienced an inner throttle cable break. He suggested the following piece of advice, which has since been published in the June 2017 issue of the RAANZ Recreational Pilot e-zine online magazine.

On most trike foot-operated throttles, the cable has a sag in it between the throttle pedal and the carburettors. If any moisture gets in to the front of the cable, eg, when taxiing through wet grass, it will migrate to the lowest point of the cable and deterioration of the inner cable will begin. It is suggested that the inner cable be removed, inspected and lubricated at regular intervals.

CAA Occurrence Ref 17/2074

ZK-BRM De Havilland DH 82A Tiger Moth	
Date and Time:	01-Mar-2017 at 17:00
Location:	Omaka
POB:	2
Nature of Flight:	Private Other

The pilot was landing the Tiger Moth in a crosswind when he drifted to the runway edge and struck a runway marker board. As he climbed away, another pilot advised that a main wheel was damaged and that he should carry out a glide approach.

The pilot climbed to 2,500 feet and shut down the engine for a glide approach. Unfortunately, two other aircraft joined to land, forcing the Tiger Moth pilot to glide further downwind than intended. This resulted in him having to land in scrub just short of the airfield boundary.

The pilot is well aware now that he should have made his own decision about the action to take.

CAA Occurrence Ref 17/1103

ZK-HPC Robinson R44 II	
Date and Time:	11-Feb-2017 at 19:30
Location:	Tapanui
Nature of Flight:	Agricultural
Pilot Licence:	Private Pilot Licence (Helicopter)
Age:	35 yrs
Flying Hours (Total):	5157
Flying Hours (on Type):	2500
Last 90 Days:	80

During an agricultural operation, the pilot was spraying up and down a hillside. At the bottom of the hill the pilot performed a descending right hand turn towards rising ground.

The aircraft was heavier than the pilot anticipated and started to sink towards the hill. Unable to arrest the sink with collective the pilot jettisoned the remaining load and touched down with some forward speed.

The aircraft skid caught on a waratah and rolled forward and over, down the hill.

CAA Occurrence Ref 17/535

ZK-HXR Robinson R44 II	
Date and Time:	28-Jan-2017 at 07:59
Location:	Mahoenui
Damage:	Destroyed
Nature of Flight:	Other Aerial Work
Pilot Licence:	Private Pilot Licence (Aeroplane)
Age:	63 yrs
Flying Hours (Total):	13996
Flying Hours (on Type):	4687
Last 90 Days:	127

During the initial climb, the pilot observed that one of the two strops securing an external load of fence posts had slipped. One of the fence posts then fell from the centre of the bundle. The pilot initiated a descent to place the remaining load on the ground.

During the approach, more fence posts slipped from the remaining strop and the pilot jettisoned the load. After the load released, the pilot felt an impact in the rear of the helicopter and identified a loss of tail rotor authority. The pilot executed an emergency descent and landing, during which the helicopter rolled and was destroyed.

The engineering investigation found that the strop had wrapped around the tail rotor pitch links after being jettisoned.

Following the incident, the company created a requirement for pilots conducting external load operations to be briefed by a pilot who had attended a CAA-provided load rigging course. Additional controls were implemented in company lifting procedures, including strop selection, rigging, and personal protective equipment use. Refresher training on external load rigging and lifting was also conducted.

CAA Occurrence Ref 17/289

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 web site, 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

Piper PA-38-112

Engine Cylinder/Piston	
ATA Chapter	8530
TSO Hours:	2250

Soon after takeoff during a dual training flight, the engine started vibrating and reducing in power. The oil temperature was in the green range, but the oil pressure was sitting noticeably low in the yellow range, so a decision to turn back was made. As the aircraft passed over the threshold, the oil pressure was indicating in the red. The aircraft landed safely and was shut down once clear of the runway.

Maintenance investigation found that the number two cylinder piston and piston rings were damaged. The damage observed was consistent with detonation or pre-ignition and resulted in excessive blow-by, which caused a loss of engine oil from the breather and low oil pressure. The maintenance provider suspects that the detonation or pre-ignition was caused by a hot spot on the lower spark plug due to lead build up.

Due to the high time in service, the engine will be reconditioned.

CAA Occurrence Ref 17/2069

Cessna TU206A

Connecting Rod	
ATA Chapter	8520
TSO Hours:	980

While in the cruise at 8500 feet, a total engine power loss occurred without warning. The experienced pilot carried out a successful forced landing onto a private airstrip, without damage to the airframe or injuries.

The engine was removed from the aircraft and then disassembled by a certificated maintenance provider under CAA supervision.

Extensive internal mechanical damage was observed in the vicinity of the number five and six cylinders within the crankcase. The number five conrod was found separated approximately 35mm below the small end bearing, and the number six piston was found totally destroyed.

Due to the extent of the damage it was not possible to conclusively identify the initial point of failure, however the failure of the number five conrod is suspected.

CAA Occurrence Ref 17/2009

Cessna A185E

Axle	
ATA Chapter	3241

The right main wheel sheared off when the axle failed as the aircraft was taxiing for takeoff. Investigation revealed that the axle was made from aluminium and that the correct axle should have been steel. The left axle was also aluminium.

Inspection of the aircraft's log books could not identify when or how these axles came to be fitted on a C185.

The aircraft has undergone repairs for other damage incurred during this incident and was returned to service.

CAA Occurrence Ref 17/1834

Guimbal Cabri G2

Carburettor	
Part Number:	AV10-6110
ATA Chapter:	7320

The pilot reported experiencing an engine 'miss' associated with a brief right yaw while lowering the collective.

On investigation the maintenance provider suspected the problem may be due to the carburettor fitted to the aircraft. The maintenance provider replaced the carburettor and the problem has since been rectified.

The maintenance provider replaced the carburettor with an alternate P/N carburettor in accordance with the Lycoming Service Instruction No. 1523C, dated 15 November 2013 which rectified the problem.

CAA Occurrence Ref 16/5295

Eurocopter AS 350 BA

Cable	
Part Model:	268-024-02
Part Manufacturer:	On Board Systems
ATA Chapter:	2550
TTIS Hours:	1500

While conducting sling load operations, the manual release cable failed and resulted in an inadvertent release of the load.

The engineering investigation found that the outer cable failed at the point it enters the cable crimp. This removed the free play from the system, and allowed the inner cable to activate the mechanical release mechanism. It was suspected that storage conditions contributed to the outer cable degradation.

The cargo hook system had been in use for 618.5 hours since installation, and 56.5 hours since the last periodic inspection.

The manual release cable was replaced, and the engineer recommended that the owner replace the system with a hydraulic manual release. The company has elected to inspect the manual release cable during the 100-hour inspection.

CAA Occurrence Ref 16/4719

New Southern Sky Roadshow

20 November – 5 December 2017

new southern sky

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

The roadshow in late 2017 will outline the aim and objectives of the NSS programme, provide an overview of progress, and provide an opportunity to ask questions.

MONDAY 20 NOV

Auckland 12:30 pm

Avsec training room
6 Cyril Kay Road
Auckland Airport

Ardmore 6 pm

Ardmore Airport
Conference Centre
Ardmore Airport
Corsair Lane
Papakura

TUESDAY 21 NOV

North Shore 11 am

North Shore Aero Club
270/284 Postman Road
Dairy Flat

WEDNESDAY 22 NOV

Tauranga 9 am

Tauranga Aero Club
Tauranga Airport
240 Aerodrome Road

Hamilton 3 pm

Runway Lounge
Terminal Building
Hamilton Airport

THURSDAY 23 NOV

Palmerston North 11 am

North Classroom
Milson Flight
Systems Centre
Airport Drive

FRIDAY 24 NOV

New Plymouth 10 am

Novotel
Hobson Street

MONDAY 27 NOV

Nelson 5 pm

Nelson Monaco Hotel
6 Point Road
Monaco

TUESDAY 28 NOV

Christchurch 5 pm

Canterbury Aero Club
Aviation Drive
Christchurch Airport

WEDNESDAY 29 NOV

Dunedin 6 pm

Mercure Hotel
30 Duke Street

THURSDAY 30 NOV

Queenstown 7 pm

St Margaret's Church
50 Ross Street
Frankton

TUESDAY 05 DEC

Wellington 2 pm

Civil Aviation Authority
15th Floor
Asteron Centre
55 Featherston Street

Further details are available on the NSS web site **www.nss.govt.nz**, where you can register to attend.

The above schedule is subject to operational requirements and may have to be amended. Check the NSS web site for any changes.

ALSO

Approach 18: The NSS team, including Airways and Aeropath, will come together again to present Approach 18, a free two day seminar at the CAA in Wellington where you'll be brought up to date with all things in the Performance Based Navigation (PBN) world: 20 to 21 March 2018. Go to **www.nss.govt.nz to register**.

NSS Conference 2018: The second NSS conference will be held at the Beca Conference Centre, Pitt Street, Auckland 15 to 16 May 2018. Places are limited. To avoid disappointment register early at **www.nss.govt.nz**.