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POINTING TO SAFER AVIATION

vector

Autumn Ag Ops

Cleared for Takeoff

Before You Go

Fly to the Conditions

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

vector

In this issue...

Cleared for Takeoff

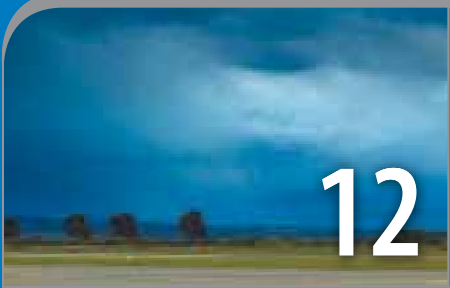
Some specific words and phrases are used in ATC clearances to make sure that radio calls are not misinterpreted – for example, the word "takeoff". It's a pilot's job to maintain focus and listen out for these key words.

Autumn Ag Ops

This time of the year sees an increase in demand for aerial agricultural services, especially fertiliser application. In this article, experienced operators share their thoughts on safety and the operating environment.

Before You Go

The preflight inspection is a vital part of your preparation for flight, and the article, assisted by this year's Young Eagles, walks us through a preflight of a generic light aeroplane.



Fly to the Conditions

You don't have to be a meteorologist to understand what forces influence the weather, and use that understanding to make sound flight decisions. Form the BIG picture by gathering and interpreting appropriate weather information, and stick to your personal minimums when flying.

Cover: This MD500N (no tail rotor) is configured for agricultural spraying. See *Autumn Ag Ops* on page 4.

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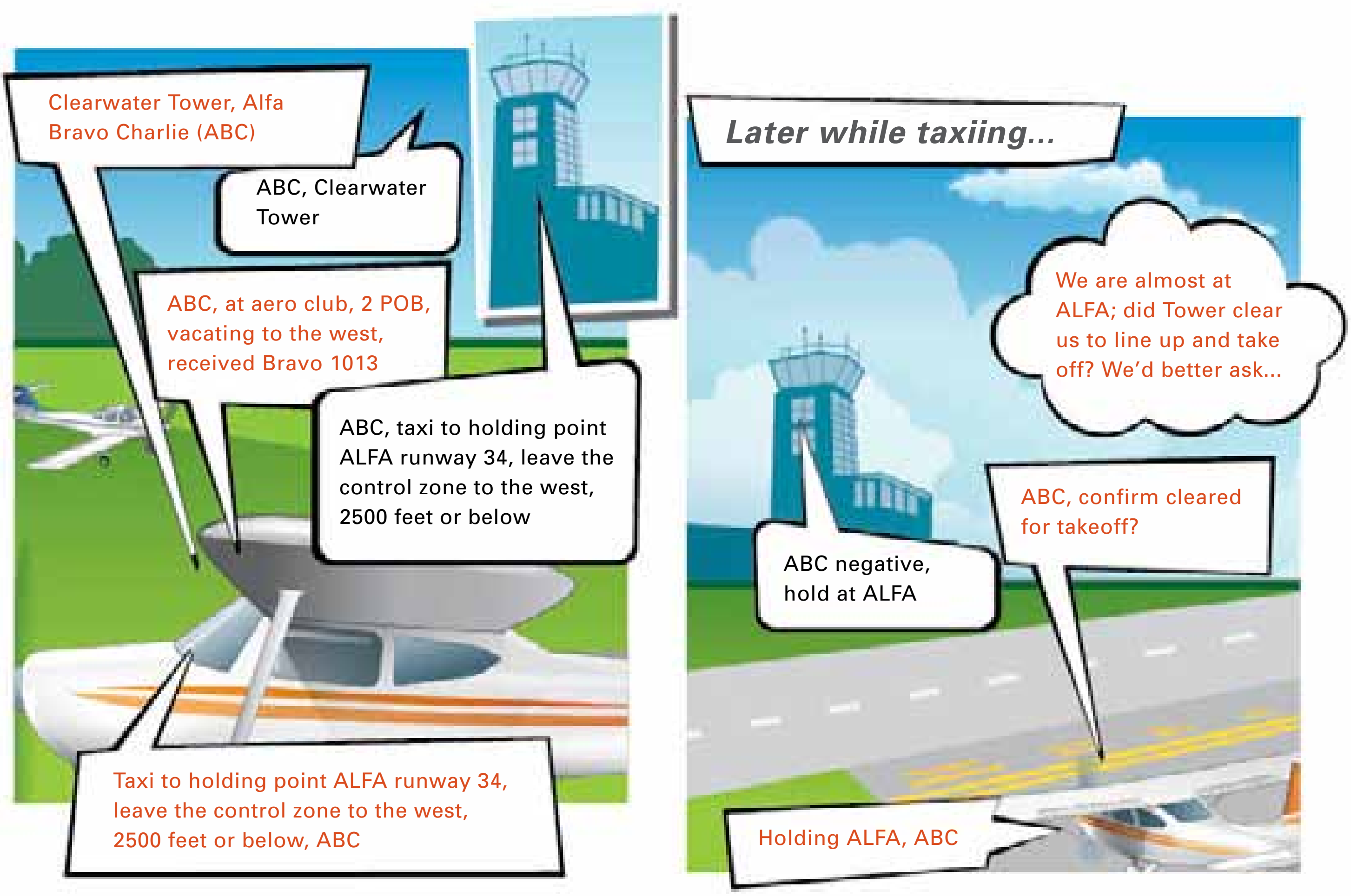


Cleared for Takeoff

When receiving a taxi instruction at a controlled aerodrome, listen out for the clearance limit and never depart without hearing the words, "Cleared for takeoff".

It's essential to realise that a departure instruction does not give the pilot-in-command authority to line up, and subsequently, an instruction to line up does not give a pilot authorisation to take off. In the above example, the taxi limitation specified was holding point ALFA. Although the pilot was unsure of the instruction limit, radioing Air Traffic Control (ATC) to clarify the limit was the correct action to take. This cleared up any confusion and prevented a possible runway incursion.

Specific phraseologies are used in certain clearances to ensure that radio transmissions are not misinterpreted. For example, ATC will only ever use the word "takeoff" as part of a clearance for takeoff. If ATC refers to an aircraft takeoff in another context, they will use the word "departure" or similar. It's a pilot's job to maintain focus and listen out for these key words.

Conditional Line-up

When receiving a taxi or line up instruction, you must also ensure that you understand any requirements and comply with them. Once again, if you mishear a clearance or instruction, or don't understand it, make sure you speak up.

A light aircraft was instructed to line up behind another aircraft on short final, but proceeded to taxi onto the runway in front of the other aircraft. The aircraft on final conducted a go-around.

In this example, the conditional line-up instruction was either misunderstood or misheard. The controller would have said, "Call sign, behind the (aircraft type) on final, line up behind". A conditional line-up instruction of this nature will contain the key word "behind" at the beginning of the instruction, and the controller will reiterate "behind" at the end of the transmission.

It's equally important to maintain your focus after landing and when taxiing to the apron. After the cockpit workload has reduced significantly, it's easier to become complacent and misinterpret important clearances and instructions given by ATC.

Improve Your Radio Talk

The CAA's Good Aviation Practice booklet, *Plane Talking*, is a handy guide to good radio operating practice.
Email: info@caa.govt.nz for a free copy. ■

Autumn **Ag Ops**

Agricultural operations at this time of the year usually see a strong demand for the aerial application of fertiliser. Grass growth needs a helping hand to re-establish after the dry summer months.

The 80 helicopter and 20 fixed wing Part 137 operators throughout the country will now be considering the many operational and safety aspects of this busy period of activity.

They may need to ask themselves, "are we ready for the season?"

Gary Langman, CAA Senior Technical Specialist, Agricultural, is a very experienced fixed wing pilot, manager and previous owner/operator, who knows that good planning is the key to taking the stress out of this seasonal situation.

"The diversity of agricultural operations in recent times means that an operator has to have at his disposal the right people and machinery to do the job effectively and profitably.

"Safety needs to be the prime consideration, and this requires all participants to actively contribute to the operational requirements," says Gary.

A helpful checklist to cover these many requirements might include, but not be limited to:

» People - in your operation

» Machine - the equipment needed to complete the task

» Environment - the physical operational considerations

People

This group includes operations staff, pilots, ground crew, engineering support, transport operators, customers and most importantly, family. The people directly involved with the operation might be a small team of pilot/owner and ground crew, or a large organisation.

Shaun Burton is Chief Pilot for Ravensdown Aerowork and a very experienced agricultural pilot and flight instructor. He knows what this time of year means.

"Operations staff must have safety as their priority, as they have many obligations. They need to ensure that the status of the crews (air and ground) is maintained, the paperwork is completed, the CAA requirements are met, scheduling of pilot medicals, training schedules and assessments are completed along with customer liaison for work requirements and the operating environment. We also get our own engineering contacts confirmed and then handle the many other items and issues that can arise.

"The concentrated nature of the seasonal and customer demands requires specific actions by crew. The pilots need to ensure that they are safe during the daily flight operations, and can manage the organisational issues that invariably occur after flight. I monitor the stress and fatigue levels of the crews and can then advise them of the operating conditions likely to be encountered and how this will affect our

Photo courtesy of Nigel White

operating requirements," says Shaun.

Gary Langman also reminds us that the weather conditions, both actual and forecast, can generate stress.

"The ability to work is all about the weather – wind, rain, cloud and what will happen tomorrow or the day after. Know and use your personal weather limitations, especially in relation to airstrip work and flight in controlled airspace," says Gary.

Pilots could use the pre-season period to review their personal requirements of licence and medical validity, currency on type, currency on operations, chemical rating validity and that competency assessments have been carried out. It is also timely to ensure consents, notifications and other approvals required by operators and pilots are to hand. If you are also the holder of an E-category flight instructor rating, remember your personal requirements for currency, competency, and ability to conduct Agricultural Rating Competency checks.

Graeme Martin, General Manager of Super Air, works closely with all crew attached to their operation.

"We need to be 'work fit' in this business especially at times of high demand for our services and changeable weather and daylight conditions. We use the industry standards and applicable guidelines as part of our Operations Manual and require crews to utilise the information and standard operating procedures.

"We must all be risk-aware and vigilant in our operations, especially through fatigue management and risk assessment, whether it is the preflight check or an unfamiliar airstrip.

"This coming autumn could result in a late, high demand for our products and services after a prolonged dry spell. Any subsequent moisture will provoke our customers to consider applying fertiliser and the concentrated period places significant pressure on us all," says Graeme.

Ground crew could also review the "I'M SAFE" checklist to use the prompts in determining their own state of fatigue, stress and hydration as their contribution to operational safety.

As part of good operator practice, especially the requirement for crew resource management, the loader should be able to discuss with the operator, pilot or other ground crew, their fatigue and hydration levels. Take the time available during forced breaks for refuelling, weather disruptions, or breakdowns, to look out for each other and take food and drink as appropriate.

In support of these operations are the various chemical and fertiliser suppliers with associated transport operators. Although the seasonal demands for their products are planned well ahead, the ability to deliver their product is always dependent on weather and customer demands.

Probably the most important people in support of the operations are the family members of the crews. They often see little of each other when the work demands maximum flight and duty times, but nevertheless provide emotional support and stability. But the personal requirements of managing a family can be the source of stress factors that will affect safe performance at work.

Hallett Griffin from Griffin Ag-Air is a very experienced pilot/operator engaged in fixed-wing aerial spraying and fertiliser operations.

"I have always had the personal safety requirement to get myself and the plane home every night.

"With the seasonal demands, it is important to monitor fatigue and stress and our company has strong views on duty times and loading the aircraft. If the pilot has had a long day, and we set 12 hours duty as the normal maximum, then they start later the next day to make sure they have had adequate rest. We also do not see the need to overload the aircraft because of the increased risk to the pilot and ultimately the operator," says Hallett.

Machine

Just like the people element, the necessary equipment to do the job needs careful planning to make sure it is safe to operate and adequate for the task.

In consultation with the crews, the aircraft, loaders and role equipment need to be considered for the season, especially gear that may not have been used for some time. This should include safety equipment such as fire extinguishers and first aid kits. Operational equipment will include tool boxes, radios, cell phones, windsocks, spare parts and reserves of consumables such as hydraulic fluid and oils.

Engineering support for aircraft and equipment is vital, and service providers need to be aware of the expected workload at this time of the year. The operator should be in a position to indicate to them the approximate times, dates and places for routine and scheduled maintenance. Don't forget after-hours troubleshooting and repairs. For the aircraft, this means planning for scheduled and non-scheduled maintenance, and for calendar time and cycle-lifed component replacement of engines, propellers, rotors and undercarriage legs among other items. Don't forget loader licensing and servicing, pump filters, fuel hose condition and delivery system maintenance.

If there is a need to lease an aircraft for the season, remember the 28-day rule and consequent ownership changes. There will also be a requirement to amend your Part 137 certificate and operations specifications.

Environment

Most other factors affecting your ability to complete the season and beyond rely on the environmental considerations you need to consider.

With the season changing, so does the daylight time available to complete your work. This combined with variable weather patterns and product delivery delays can cause economic pressures with increased fatigue and stress levels.

Other environmental factors will include on-farm conditions at application areas, airstrips, farm roads and tracks.

Operators and crews should inspect loading areas, fertiliser bins and storage facilities with reference to the Civil Aviation Authority of New Zealand and Department of Labour produced Safety Guideline, *Farm Airstrips and Associated Fertiliser Cartage, Storage and Application* published in December 2006.

John Sinclair, Executive Officer for the New Zealand Agricultural Aviation Association and the New Zealand Helicopter Association is also a very experienced helicopter operator.

"One of the key issues for operational safety is the continuing education of the industry participants. Crews need to take ownership of operational problems and seek a solution for themselves and their industry.

"We are working very closely with various units of the CAA. Our association is very interested in the extremely valid information flows and data being produced. The data is part of a major risk analysis project for agricultural aviation in New Zealand, which is a very exciting approach to flight safety and business development for all participants.

"By taking some time to sort the priorities, the rewards from a busy time will be safe operations and financial gains which is good news for everyone," says John.

So, can you as an operator, pilot, ground crew, engineer and family member say 'I'M SAFE' and ready for the autumn season?

Further Information

Safety Guideline: *Farm Airstrips and Associated Fertiliser Cartage, Storage and Application* is currently out of print but can be accessed on the CAA web site, www.caa.govt.nz, see "General Aviation."

A poster with the I'M SAFE message is available free from the CAA Aviation Safety Advisers or by emailing info@caa.govt.nz. ■

Waving the Magic Wand

The relatively recent development of a hand-held, wand-type sprayer, for use with helicopters, has highlighted certain requirements for the use of this equipment.

The wand sprayer has proven to be an effective treatment for the destruction of self-sown pine tree seedlings, known as 'wildings', in many remote areas of New Zealand. The treatment method requires the machine to hover over the top of the wilding so the wand operator can spray a measure of chemical directly through the wand to the top of the pine.

Steve Kern, CAA Manager, Helicopter and Agricultural Operations, explains, "The CAA position on wand spraying is that it is most definitely an agricultural aircraft operation and as such, Part 137 applies. This means that if it is a commercial operation, a Part 137 certificate is required. We also expect the pilot to hold an agricultural rating (Grade 1 or 2) and a chemical rating, and the wand operator to hold an approved handler certificate.

"Our view is that the wand operator is a passenger performing a necessary role in the agricultural operation, and as such can be carried under Part 137.

"We do not expect the operator to also hold a Part 119/135 certificate. However, we expect the operator to have formally documented wand spraying procedures, acceptable to the CAA, showing how risk is mitigated and to facilitate carriage of the wand operator.

"Another point to note is that the wand spraying equipment in use should be approved by a design organisation," says Steve.

When thinking of helicopters in agricultural operations, it is easy to assume they carry out only spraying, but helicopters are playing an increasing role in applying fertiliser, as seen in this example. Photo: Gavin Conroy

Before You Go

Preparation for flight can involve many steps, but arguably the most important is a diligent preflight inspection. In carrying out a preflight, a pilot is not only complying with rule 91.201 *Safety of aircraft*, but also building confidence that the aircraft is airworthy and safe for flight.

Here, we look at 'preflighting' a generic light aeroplane. While specific items may vary slightly between types, the inspection generally follows a sequence of starting in the cockpit, then walking round the aircraft. Some flight manuals have a labelled diagram of the walk-around; others may simply have a list. If there is a published procedure, use this as a minimum standard, adding any items that you have learnt from experience.

Where to Start

Having already done your own personal "I'M SAFE" checks, you can begin the inspection while walking out to the aeroplane, for instance, a simple check of the windsock will give you an idea of which way you will need to taxi out, and any potential obstructions. You might also notice that the aeroplane is tied down, or that the wheels are chocked.

The inspection generally begins in the cockpit. Items to check include the aircraft documents, indicated fuel quantity, magnetos OFF, internal control lock(s) removed, and setting the flaps as required for the walk-around. The most obvious document to check is the Technical Log, which may tell you that the aircraft is out of hours, or that there is a 'no-fly' defect. The fuel gauges will give an idea of quantity, but confirm by dipstick if applicable; the mag check makes for safer propeller handling; removing the control lock will enable checking of the control surfaces; and lowering the flaps allows checking of areas not normally visible when retracted. Ensure there is nothing in the way of the flaps before lowering them.

Where the control surfaces could bang about in the wind, you could leave the internal lock in place and on returning to the cockpit (after removing any external locks), perform a full-and-free and correct-sense check. Occasionally, we hear of an aircraft taking off with controls rigged in reverse or even disconnected.

Round the Aircraft

If the aircraft has a fuel dipstick, take that on the walk-around, with the fuel drain receptacle. A torch can be handy for looking into hard-to-see areas. The sequence may first take you along the trailing edge of one wing, where you check the flaps, ailerons and upper and lower wing surfaces. Some ailerons are 'finger traps', so be careful in these areas. Check the wingtip for 'hangar rash', the condition of the navigation light, and strobe light, if fitted.

We check the leading edge for damage, operation of the stall warning vane if applicable, unobstructed fuel vents and pitot/static head(s), removing any covers from these. On a high-winged aeroplane, we might need a stand or stepladder to access the fuel caps – don't forget to put it away when finished, or that 'clunk' when you taxi off might signal the end of your flight. While you're up at the fuel caps, this is the ideal time to check the wing upper surfaces and the cabin top. Know where all the fuel drain points are, and where to dispose of fuel samples.

At the main undercarriage, check the tyres, or what you can see of them. Under-inflation can be hard to detect, so if in doubt, use a pressure gauge or seek advice. Look at brake condition, hydraulic line integrity, and oleo extension. You should know how many fingers' worth of oleo extension should show at normal weights. While 'down and dirty' have a look at the wing lower

At the 2013 Flying New Zealand competitions, the Young Eagles learnt about the preflight inspection.

They then carried out 'preflights' on a Piper Tomahawk, and a Zenair Zodiac that was the aircraft for the CAA preflight inspection competition.

See the article on page 10.

Nicole Patterson checks the aircraft documentation. In this competition scenario, the wrong Airworthiness Certificate was in the aeroplane and there was no Technical Log.

Beware the finger traps some ailerons can pose. Keep a firm grip on the trailing edge while checking pushrods, locknuts and the like, as demonstrated by Nari Casley.

surface, if it's a low-winged aeroplane, for damage, 'working' rivets and suspicious oil stains. It's a good idea to carry a rag on a preflight, so you can not only do a spot of cleaning on the way round, but also check later to see if the stains have reappeared. Some low-winged aeroplanes have a fuel sump in the wing centre section, with the sump drain operated from inside the cabin. This is where you will definitely need a second pair of hands to obtain a usable fuel sample.

At the 'engine room' you check the engine oil level, as well as visually checking everything you can see, including the firewall for distortion in the area of the nose landing gear mounts. Some aircraft have the fuel strainer drain handle located near the oil filler cap – it can be a stretch to hold your drain cup in the right place and pull the handle at the same time, so you might need some assistance. Check the propeller for leading edge damage, spinner security, and on a constant-speed prop, oil leakage from the hub. Nicks in the prop act as stress risers, and can lead to fatigue cracking and sudden departure of a section of blade. Treat the propeller as 'live' at all times – several pilots have been rudely surprised over the years when they have pulled the prop through with the magnetos either on or defectively earthed. If your aircraft is equipped with a vacuum pump, avoid turning the prop backwards, because this can damage the pump vanes.

Birds' nests can be a major problem during spring. It is surprising how quickly a pair of starlings can stow what looks like half a bale of hay under the engine cowling or wherever else they choose. Often, a wisp of grass is the only external clue to what's inside. Even if you use bungs to keep birds out, still check for nests, as these guys don't give up easily.

The check of the other wing is similar to the first, plus or minus any features found on only one wing (eg, pitot head). This leads us back to the fuselage, which we check for general condition, damage, and security of antennas, lockers and panels. Don't forget to have a good look underneath both the fuselage and tailplane, as damage sometimes goes undetected through many preflights. Check the empennage as appropriate, removing any external control locks. Back to the fuselage again, then the cockpit.

At some point in the walk-around, take a front or rear 'long view'. If the aeroplane appears lopsided, it may be just uneven ground, but it could also signal a flat tyre or oleo strut, or even structural damage. You might notice also if you forgot to replace a fuel cap, or left the dipstick on top of the wing.

Interruptions

Part-way through, the cellphone rings, or someone comes over to ask something. There's a good chance you could lose your place and miss something vital, so either start over again, or return to a point you know that you have checked. It's a good idea to get the preflight over before your passengers arrive, as this could disrupt your carefully planned routine entirely.

Check the Ground Too

During your walk-around, check the ground underneath for signs of oil, fuel, or hydraulic fluid leaks. Any suspicious stains should be investigated and the cause remedied before flight.

Found Something?

If you do find a defect, enter it in the Technical Log. If the aeroplane is obviously still safe to fly, continue, but if the defect needs attention, check with your engineering provider or instructor. Don't let your urge to get going override your good judgement.

Do remember that the preflight inspection is a visual check, not a 100-hour inspection. There's only so much you can look at, but once you've done so, you can have confidence that the aeroplane will get you to your destination safely.

After Flight

Don't forget your after-flight actions, including updating the Technical Log, refuelling if required, and especially having a quick look around for fresh leaks and possible damage. If you have written up a defect, it pays to mention that to operations or engineering, rather than leave it for the next pilot to find – or miss.

Useful guidance on refuelling and fuel handling can be found in the GAP booklet *Fuel Management*, and on tying an aircraft down, in the GAP booklet *Secure Your Aircraft.* Both are available on the CAA web site, www.caa.govt.nz, under "Publications" or free of charge from info@caa.govt.nz. ■

Keep clear of the propeller arc, as shown by Nicole Patterson, and take care when checking the leading edge – there can be sharp-edged nicks present.

The flat tyre might be obvious, but what about that stain on the ground by the left main wheel?

Young **Eagles**

Young Eagles is a programme run by Flying New Zealand that aims to give young people a first flight experience in a light aircraft. The programme fosters enthusiasm for aviation and a good safety culture.

The Young Eagles also have opportunities to participate in related activities such as visits to control towers, maintenance workshops, and aircraft museums. Some former Young Eagles have continued their training to become commercial pilots.

The Young Eagles can apply for the annual Ross Macpherson Memorial Flying Scholarships. Each scholarship is worth $2000 toward flight training at the winning Young Eagle's aero club. In addition, the winner of a written test is awarded the Nola Pickard Trophy.

This year there were five scholarships awarded:

» Nicole Patterson – Waikato

» Isaac O'Kell – Tauranga

» Halley Sims – Hawke's Bay and East Coast

» Tiana Mihaere – North Otago

» Christopher Cooper – Canterbury

The Pickard Memorial Trophy was awarded to Christopher Cooper.

The awards are presented at the national competitions of Flying New Zealand and this gives the Young Eagles more opportunities to learn and gain experience. This year, at Motueka in February, they learnt about the preflight inspection from Chris Rawlings and Max Dixon from Hawke's Bay and East Coast Aero Club. Then they were judged carrying out a preflight on a Piper Tomahawk. To reinforce the exercise, they then participated in the CAA preflight inspection competition.

Flying New Zealand's Young Eagles coordinator, Chris Rawlings, said the results were very close with only two points separating first place and second place equal.

"Young Eagles has been growing steadily over the years after it's introduction in New Zealand in 1994. There are more and more young persons that have joined the clubs to get a feel of what aviation is all about and learning from those of us that have that passion to fly. I encourage any young person between the age of 12 and 17 years to contact their nearest aero club and inquire about the programme," says Chris.

The Young Eagles programme was launched in 1992 by the Experimental Aircraft Association in America to give interested young people an opportunity to go for a flight in a general aviation aeroplane.

The CAA is a major sponsor of the Young Eagles programme in New Zealand, together with Aviation Services Limited, and Aviation Cooperating Underwriters. In addition, products and services were donated by Downunder Pilot Shop, Hawker Pacific, Airways, Z Energy, and *Pacific Wings magazine*.

For more information, see www.flyingnz.co.nz/youngeagles.html, and www.youngeagles.org ■

The Young Eagles who attended the 2013 national competitions (from left): Isaac O'Kell, Nari Casley (Motueka), Tiana Mihaere, Nicole Patterson, Christopher Cooper, and Halley Sims.

From Defect to Airworthiness

An airworthy aircraft is one that complies with all the rule requirements relating to design, manufacture, maintenance, modification, repair and safety. It is an operator's responsibility to ensure the airworthiness of the aircraft and it is the pilot's responsibility to ensure the aircraft is airworthy before they fly it.

The pilot must ensure this pre-flight integrity by inspecting the aircraft documentation and, on completion of this check and the visual inspection of the machine prior to flight, record in the Technical Log, or equivalent document, any defects identified. This is also a requirement for any defects identified during the subsequent flight.

What is a Defect?

Civil Aviation Rules, Part 1 *Definitions and Abbreviations* defines a defect as: "A change in the state or quality of an aeronautical product, a product, or a component that makes it unfit for its intended purpose and not in an airworthy condition".

The pilot, on discovering a condition during their preflight inspection or in flight, has to now ask, "Has the condition altered the state or quality of the aircraft or reduced its airworthiness state?" If it has, then the condition found is clearly a defect, and needs to be recorded in the Technical Log at the time or on first landing, whichever is practical.

Defects take various shapes and types and can be obvious or very obscure. A flat tyre should be obvious on pre-flight, whereas an unserviceable light dimmer may not be detected on day operations, but will quickly become a defect on night IFR operations.

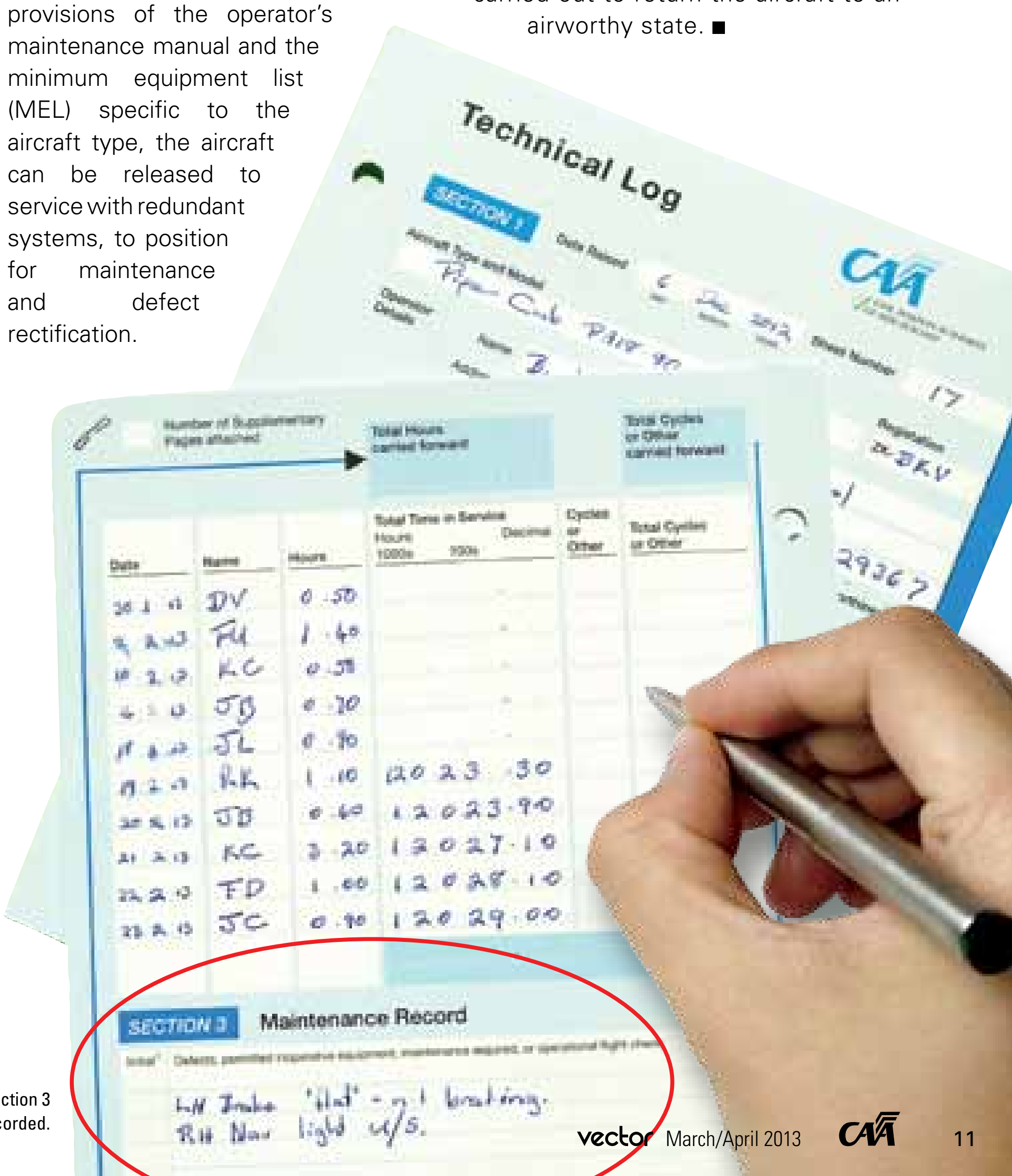
The pilot-in-command needs to make the determination of the defect status and then discuss this with the engineering support attached to the operation. If you find yourself in a remote location, the diagnosis of a problem and whether or not it constitutes a defect can be difficult and, in most cases, the engineer will arrange for an on-site inspection to be carried out.

If operating for a certificated organisation, the first point of contact will be the operation's maintenance controller who will provide advice and support for rectification of the defect, or defer the repair to a later date. Under the provisions of the operator's maintenance manual and the minimum equipment list (MEL) specific to the aircraft type, the aircraft can be released to service with redundant systems, to position for maintenance and defect rectification.

If you discover a condition that makes you ask the question, "is this a defect?", it possibly is.

Do not be tempted to continue operating. Talk to your operations group and engineer and detail the defect in the Technical Log, Section 3, Maintenance Record.

The next pilot to fly the machine will then have a record of the maintenance carried out to return the aircraft to an airworthy state. ■



A mocked-up example of a Technical Log showing Section 3 Maintenance Record where defects are recorded.

Fly to the **Conditions**

Assessing weather conditions, on the ground and in flight, can be one of the most challenging aspects of operating under visual flight rules (VFR) in general aviation.

VFR pilots who decide to fly when visibility and cloud ceiling are at or near the legal minimum are putting themselves at great risk. According to research conducted by the Australian Transport Safety Bureau, VFR pilots who flew into instrument meteorological conditions (IMC) were at the greatest risk of fatality or serious injury, with 76 per cent of accidents involving a fatality. Five cases of VFR into IMC were reported in New Zealand last year, but luckily none resulted in an accident.

GA pilots need to be able to recognise hazardous weather conditions, which could compromise their safety, in the flight planning stage as well as when flying en route. It's equally important to set and adhere to personal minimums and never allow external factors, such as time pressure, to influence a weather-related decision.

Recent Examples

» On a student's solo flight out of the circuit, he ended up flying in less than suitable conditions and became unable to locate the destination aerodrome. As he began to track over the mountains, the weather closed in and the cloud base became too low to backtrack.

The student attempted to land at other nearby aerodromes but was unable to, due to weather. Eventually, the student requested assistance from Air Traffic Control, who provided him with a special VFR clearance and talked him down to the nearest airport.

» A pilot requested diversion to his alternate en route due to bad weather. After being given the contact details for his alternate aerodrome tower, ATC observed the aircraft maintaining 4000 ft and tracking right past the alternate aerodrome.

On being contacted by the tower, the pilot advised that he was above cloud and unable to descend. An overflying B1900 crew advised that there were some clear patches in an area nearby. The pilot tracked towards the reported clear patches and was able to descend clear of cloud.

Suggested Planning Stages

You don't have to be a meteorologist to understand what forces influence the weather, and use that understanding to make sound flight decisions. Form the 'big' picture by comprehending the weather information, rather than just reading through it.

As a guide, check the NOTAMs and AIP Supplements first, to make sure you aren't flying to an aerodrome that is closed, or flying through temporary restricted airspace, or an aviation event.

In addition, check the mean sea level (MSL) analysis charts and SIGMETs. Also check the satellite images (visible and infrared), and make sure that these images confirm what the MSL charts are telling you.

It's also important to look at the ARFORs and the TAFs for the route. After assessing these, review the METARs (as well as SPECIs) and compare them with the TAFs to see if they confirm what you have seen in the forecasts. A forecast is just a prediction and isn't a guarantee. You should always build your own mental picture and take some time to understand the weather situation.

When assessing frontal activity, note any nearby fronts, even if they're not expected to be a factor for your flight. To check on a front's progress, look at weather conditions either side of the front and compare actual conditions to the forecast weather. If a front is forecast to pass your destination, call the airport before departing to see if this has already occurred.

When to Divert

Carlton Campbell, CAA Training Standards Development Officer, emphasizes the importance of making an early decision to either turn back or land.

"Don't let a gradual deterioration in the weather sucker you into continuing, hoping that conditions may improve. Make sure you keep assessing the weather conditions to keep within your minimum," says Carlton.

Fly to the conditions and when they change, consider turning back or diverting. Statistics (Australian Transport Traffic Bureau) show that 66 per cent of VFR into IMC accidents and incidents occur after the mid-point of a flight. Make sure you constantly monitor the weather en route, both in front and behind you. If any of the following indicators change during flight, take positive action.

Cloudbase - A reduction in the cloudbase height should indicate deteriorating conditions. Note that 91.311 *Minimum heights for VFR flights*, does not permit flight below 500 feet due to bad weather.

Visibility - Whenever you lose reference to the horizon, it indicates that weather conditions have deteriorated.

Cloud Colouring - A change in cloud colouring can indicate that conditions are improving or deteriorating during a flight. If the clouds are getting progressively darker, this should prompt you to make a diversion decision.

Terrain Clearance - It's easy to get caught out by a front approaching from behind, especially while flying over rising ground. Always keep a lookout behind and have a plan B. Your backup option can become your lifeline.

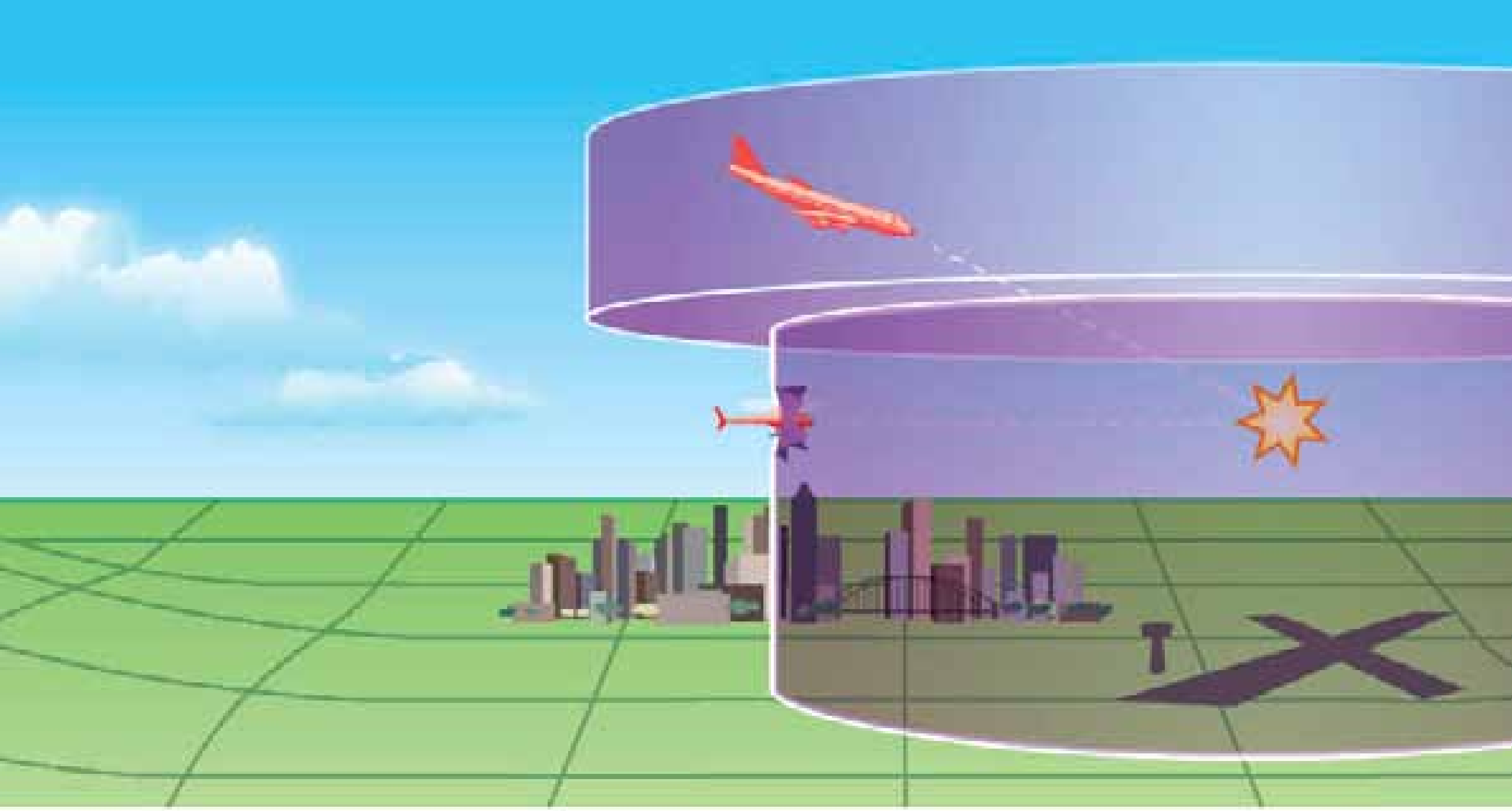
Wind Speed - An increase in wind speed may indicate the transition towards a low pressure system. Low pressure systems are typically associated with poor weather.

Cloud Type - If the clouds are high and uniform, eg, cirrus formations, this generally indicates stable weather conditions. If the cloud base is lower and is not uniform, this can indicate unstable weather conditions.

Wind Direction - When a change in wind direction is associated with an increase in cloud density, this usually indicates frontal passage, which is associated with poor weather conditions.

Rain - If you notice haziness in the distance, continued VFR flight may not be possible.

Remember that a flight is only ever as safe as the pilot's last decision. Don't ever wait and hope – you need to make positive decisions and stick to your personal minimums. ■



Busting Airspace

Unauthorized entry of controlled airspace is almost a daily occurrence, with over 130 incidents reported to the CAA from 1 November 2012 to 20 February 2013.

Another concern is the number of aircraft not following, or deviating from a clearance, resulting in an airspace infringement. There have been 106 reports of this during the same period, and a good number of them can be attributed to VFR aircraft taking off without a clearance.

Typical Incursions

1. Entering controlled class airspace without a clearance.

   The Aircraft was observed in the CTA/C at 2000 ft without a clearance. Air Traffic Control (ATC) had opposite direction instrument flight rules traffic at 2000 ft being radar vectored for an approach.

If a pilot is tracking near or towards a controlled airspace boundary, a controller will respond to a request on their frequency to help avoid airspace infringement. Controllers are unable to issue directional guidance to aircraft outside of controlled airspace, so any assistance provided would probably be limited to a description of the extent of controlled airspace and its position relative to the aircraft.

2. Not following or deviating from a clearance.

   While operating controlled VFR, the aircraft was cleared to descend to 4000 ft, but descended below 4000 ft, infringing the control zone.

If you have trouble hearing a clearance, or don't understand it, make sure you speak up. Refer to the article, "*Cleared for Takeoff*" on page 3 for more information.

Also be aware that if you are operating controlled VFR, any deviations you need to make to maintain VFR clear of cloud or terrain, must be requested. It's your responsibility to remain in visual meteorological conditions and follow your clearance.

Andrew Aldridge, Airways National Air Safety Incident Coordinator, addresses an area of particular concern.

"We see a number of very concerning cases where aircraft that are detected inside controlled airspace respond by turning off their transponders and not answering radio calls addressed to them. This is extremely dangerous because the aircraft no longer appears on ATC radar, or on the traffic collision avoidance system displays of the commercial aircraft, leaving no defences against a mid-air collision," says Andrew.

If you infringe controlled airspace, the safest course of action is to make sure that the transponder is activated and respond to any radio calls addressed to you. The controller can then ensure that you do not come into conflict with other traffic, allowing you to leave controlled airspace safely.

Airspace occurrences are frequently reported to the CAA by Airways (as required). As the pilot in command, you have responsibility to report

New Zealand Airspace Incursions

2008	280
2009	304
2010	250
2011	302
2012	349
2013	85*

*Occurrences at the time *Vector* went to print.

any airspace incursions that occur. To report an incident, use the online reporting form on the CAA web site, www.caa.govt.nz/report.

Avoiding a Bust

CAA investigations have established that there are several common causes of airspace incursions. These are:

» A lack of preflight planning and preparation.

Some pilots do not spend enough time flight planning and studying the route they are going to fly. Lack of planning will make it more difficult to anticipate any possible diversionary action that may be necessary during the flight (perhaps due to weather or an operational consideration, eg, unexpected radio failure).

When flying in unfamiliar airspace, it may take time to form a mental picture of airspace boundaries, particularly if the airspace is complex. As a general rule, the more time spent studying and planning, the smoother the flight should be.

» Poor map reading and folding.

It's important to fold navigation charts in a logical way so that it's easy to view the next sequential section of the chart when you need to. If you are unfamiliar with the airspace boundaries associated with your flight path, don't rely on a rushed in-flight review of the visual navigation charts (VNCs), as you may misread the charts or miss some vital information. To avoid missing important information on an adjacent folded section of a visual navigation chart, some pilots choose to pencil this information onto the face up section, eg, FISCOM frequencies and altitude restrictions.

» Failing to check NOTAMs and AIP Supplements.

Before every flight, it is essential to read current NOTAMs and AIP Supplements for the areas you will be operating in. If any special use airspace, such as military operating areas, danger areas, or restricted areas are active, identify where they are on your VNC and how you will adjust your planned route to avoid them. You can check Airways internet flight information service, www.ifis.airways.co.nz, for free NOTAM updates.

CAA Safety Investigator Operational Support, Justin Vincent, emphasises the importance of using complete, up-to-date AIP publications.

"Unfortunately, many pilots are using older versions of the AIP, and many rely on incomplete printed AIPNZ copies from the web. A number of pilots aren't even aware of AIP Supplements which tend to cover bigger airspace issues, or restrictions".

» Loss of situational awareness.

Make sure you maintain positional and situational awareness so you know where you are in relation to any airspace or control zone boundaries. Always check the VNCs to confirm the exact position of airspace boundaries.

» Use of global positioning systems (GPS).

Without a clearance, an aircraft was displayed in controlled airspace at 10,000 ft and climbed to 12,600 ft. The pilot said his GPS did not show that he was inside controlled airspace.

Carlton Campbell, an A-category flight instructor, flight examiner, and CAA Standards Development and Training Officer, believes there have been instances where over-reliance, sole use, or other GPS-related issues have been identified as the main contributing factor to safety occurrences.

"A popular GPS feature is the 'Direct To' function, but unlike the promulgated route structures, this can take you in a straight line to the destination without considering restricted or controlled airspace, terrain, or other obstacles. To avoid relying on this feature, pre-programme the GPS with accurate flight plan information and waypoints before the flight," Carlton says. ■

RNAV and RNP
Operational Approvals

By now, operators should be well down the path of obtaining operational approval for RNAV (area navigation) and RNP (required navigation performance) operations, as many current procedures and approval to use them will be no longer valid from 14 November 2013.

In the November/December 2012 issue of *Vector,* we described the changes to the designations of a number of IFR routes and mentioned that operating approval would be required to utilise these routes. The January/February 2013 issue gave a brief overview of the components of the operational approval process.

What is the Difference?

RNAV operations normally take place in a surveillance environment, the operator being responsible for navigation accuracy, and the ATS (air traffic services) provider ensuring track adherence and separation through monitoring. Outside surveillance coverage, ATS will apply procedural separation. RNAV 1 operations take place in terminal areas and require a ±0.5 NM track tolerance, and RNAV 2 operations are in the enroute environment, with a ±1.0 NM track tolerance.

RNP operations are not confined to a surveillance environment, and the operator is responsible for ensuring navigational integrity by onboard performance monitoring and alerting. Most IFR-approved GNSS (global navigation satellite system) receivers with RAIM (receiver autonomous integrity monitoring) meet the monitoring and alerting requirement. RNP 1 and RNP 2 operations apply to terminal and enroute environments respectively, with the same tolerances as RNAV 1 and 2.

What's Changing?

Existing RNAV GNSS STARs (standard instrument arrivals) and SIDs (standard instrument departures) will be replaced by RNAV 1 or RNP 1 procedures on 14 November 2013, but may be used up until that date in accordance with existing GNSS IFR terminal approvals. Aircraft currently approved for GNSS IFR enroute operations may operate on routes now designated RNAV 2, but after 14 November, must have specific RNAV 2 approval as explained in Advisory Circular AC91-21 *RNAV 1, RNAV 2, RNP 1, RNP 2 RNP APCH and BARO NAV – Operational Approvals.*

Operators using existing RNAV (GNSS) approaches may continue to do so in accordance with existing approvals but, to utilise to utilise approaches designated RNP APCH, will require specific approval in accordance with AC91-21. There is no carry-over credit available for current RNAV (GNSS) approach approvals, so the full application process will need to be undertaken.

The Application Process

At first read, the list of material to be submitted for an operational approval appears quite daunting. A second read doesn't really 'undaunt' things much, so to help, the items listed in the AC are as follows:

» **A covering letter** from the person submitting the application on the operator's behalf, and including purchase order details.

- A completed **Form CAA 24091/07**, which includes the organisation details, approvals sought, aircraft and equipment details, aircraft documentation, how continued airworthiness is addressed, training and competency details, and exposition references as applicable.
- Form **CAA 2129** *Aircraft Radio Station Equipment Approval Levels*, details of which are found in AC43-10.
- For operations in RNP airspace, a **procedures manual** as per the requirements of rule 91.246(e) and Part 3 of AC91-21. Part 119 AOC holders can include the procedures in their operations manual or standard operating procedures, but note the additional requirements listed in AC91-21, Part 3, for inclusion of the relevant parts of ICAO Document 9613 *Performance-Based Navigation (PBN) Manual* (4th edition is current). At this time, the CAA is unable to provide this material, due to copyright issues, but if the situation changes, details will be published on the CAA web site. In the meantime, the only avenue open is to purchase a copy (at US$231) from ICAO, through the ICAO shop at www.icao.int. Hint; it's item number 562 on the list of Documents, or very close if items have since been added or deleted.
- Copies of the relevant sections or supplements of the **Aircraft Flight Manual** or equivalent document, where these can show system operation and limitations, or otherwise demonstrate compliance of the system.
- **Continued airworthiness instructions**: rule 91.519 requires a maintenance programme for testing and inspecting each instrument and item of equipment applicable to RNP operations. Check if these are listed in an Aircraft Flight Manual Supplement.
- **Approved minimum equipment list (MEL),** if applicable, or an MEL for approval in accordance with rule 91.539 and the relevant requirements listed in AC91-21, Part 2.
- **Foreign AC or acceptable means of compliance (AMC)** data issued or approved either by the original equipment manufacturer (OEM) or a Part 146 design organisation. For example, if it can be shown that the requirements of the relevant US ACs have already been met, this will save a lot of work. See Part 2 of AC91-21 for details.
- **NZ compliance data.** This is also listed in the previous reference, and again, must be issued or approved either by the OEM or a Part 146 organisation.
- **Electrical load analysis.** This is covered in a separate article on page 18, but see AC43-14 *Avionics, Installations – Acceptable technical data* for guidance. Note that although the AC relates only to unpressurised aircraft of 5700 kg or less, with 10 or fewer passenger seats, use this as a guide for all cases.
- **System safety analysis.** This is to demonstrate navigation system integrity, in accordance with the relevant section of Part 2 of AC91-21. This is not required if the applicant can show that the OEM systems are already compliant, and have not changed since aircraft delivery.

Pilot Requirements

In order to perform any of the types of operation covered in this article, a pilot must have been trained and certificated in accordance with the GNSS Theory Course Syllabus set out in Appendix III to AC61-7 … *Instrument rating*, and will require the appropriate logbook endorsements for each operation and equipment type. Part 119 organisations will need to incorporate the training and checking procedures for these operations and associated equipment in the relevant parts of their expositions.

Challenges

While operators of larger aircraft, ie, those operating under Part 121 or 125 will have the infrastructure and support to cope with the workload to comply with the RNAV and RNP requirements set out in AC91-21, some private and Part 135 operators may not be so fortunate.

If you haven't done so already, now would be a good time to assess what upgrades to equipment and pilot qualifications will permit you to continue on RNAV/RNP operations after 14 November 2013, and get your approval application under way. Consult your maintenance provider early, and discuss your requirements, whether they be advice on equipment installation or help with preparing an electrical load analysis, for example.

Enquiries on any aspect of AC91-21 can be directed to Ray Harvey, Airworthiness Engineer, at ray.harvey@caa.govt.nz, or Jack Snow, Technical Specialist Operation Approval at jack.snow@caa.govt.nz, tel (both): +64 4 560 9400. ■

Electrical Load Analysis

As listed in the article RNAV and RNP – Operational Approvals, an electrical load analysis (ELA) is one of the items to be submitted with the RNAV/RNP operational approval application.

The purpose of the load analysis is to demonstrate that the aircraft battery system is capable of sustaining 30 minutes or 60 minutes operation (as applicable to the aircraft type certificate) in the event of failure of the primary power source. Generator or alternator failure leaves you with what's left in the battery to get you home, and if you are committed to an RNAV (GNSS) or RNP approach, you need to know that your navigational equipment is going to last the distance.

For an unpressurised aeroplane of 5700 kg maximum certificated takeoff weight, with 10 or fewer passenger seats, the ELA must show that the electrical load is less than 85 per cent of the maximum continuous operating rating of the power generating system, as well as the 30-minute battery capacity. See AC43-14 *Avionics, installations – Acceptable technical data* for details.

Before you organise an ELA, it would pay to check if the aircraft is still in the same configuration as it was at delivery from the original equipment manufacturer (OEM), and the OEM has stated compliance with the relevant standards listed in AC91-21. If it does, then a new ELA is not required, although you will need to be prepared to show evidence that this is the case.

CAA Airworthiness Engineer, Ray Harvey, urges anyone conducting an ELA to think carefully about which emergency aircraft systems they include in their analysis, and strongly recommends the inclusion of pitot heaters, transponders, and encoding altimeters. Note that the latter two items are mandatory in controlled airspace.

"Some of the original certification standards that older aircraft were assessed against didn't require the ELA to include certain aircraft systems that are now considered critical to flight safety by current standards," says Ray

US FAR (Federal Aviation Rule) 23.1323 (d), Amendment 42 can be used as an example to illustrate Ray's comment. The rule states that, "if certification for instrument flight rules or flight in icing conditions is requested, each airspeed system must have a heated pitot tube or an equivalent means of preventing malfunction due to icing". Aircraft that were originally certificated before Amendment 42 to the rule were not required to include a pitot heater in their original ELA certification.

Basic Principles

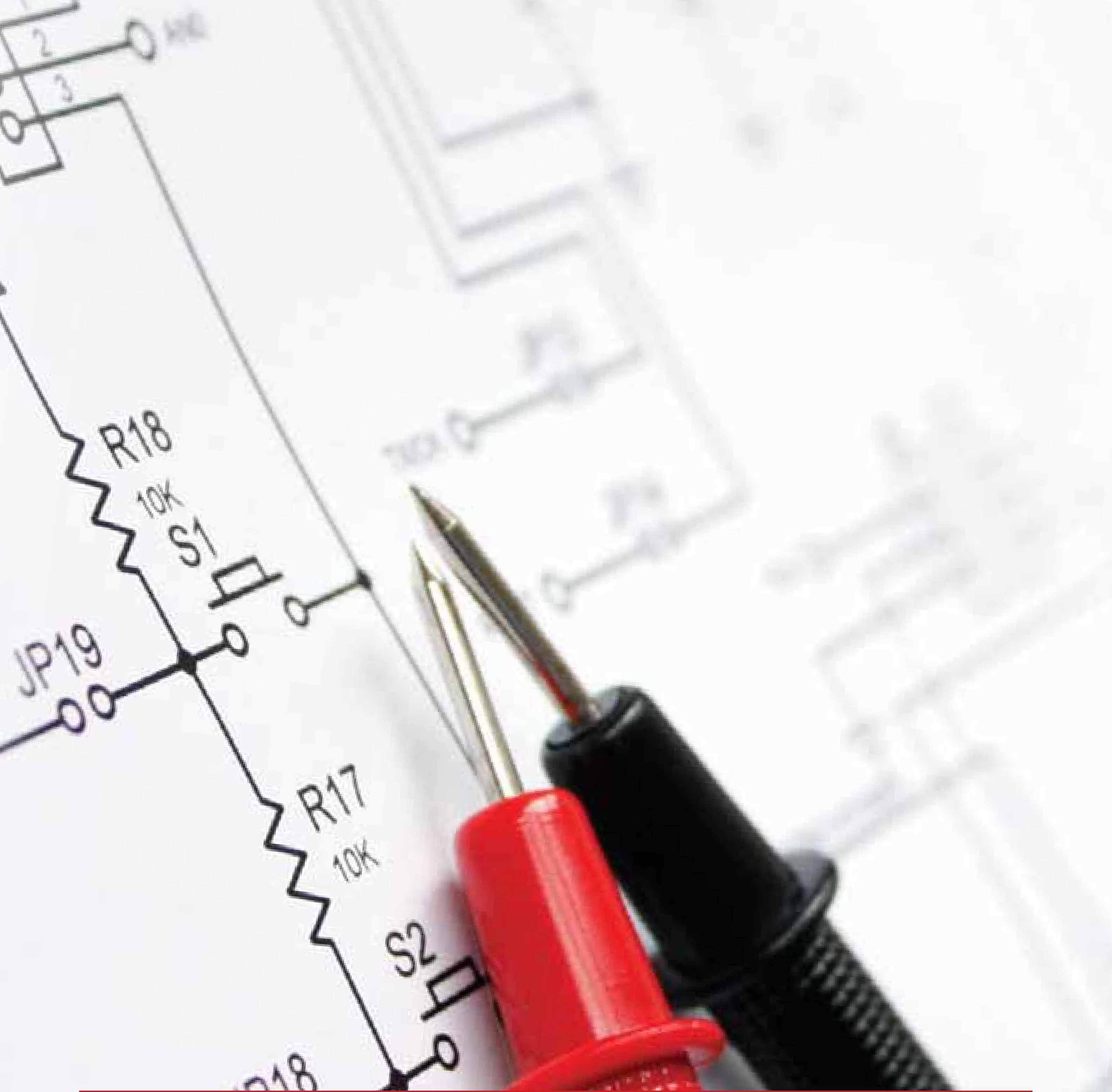
An ELA basically consists of listing every item of electrical equipment and its associated power requirement. Some items may have more than one power requirement depending on the phase of flight, eg, an undercarriage motor will typically draw more power during the retraction cycle than during extension. Transient demands need also to be considered, when their short-term demands may adversely affect system voltage.

The ELA Report should be laid out in five sections:

1. **Introduction.** This would normally include a brief description of the aircraft type, the electrical system operation; power source description, operating logic, and list of electrical equipment.
2. **Assumptions and Criteria.** These are normally based on the most severe operating conditions, ie, night IMC and icing conditions – a particularly relevant consideration in New Zealand.
3. **AC and DC Load Analysis – Tabulation of Values.** This section comprises connected load table; phase of flight; condition of power sources; calculations as appropriate; and additional considerations such as load shedding.
4. **Emergency and Standby Power Operation.** Standby power may be provided by an emergency generator, or by the aircraft battery. Depending on whether load shedding is automatic (eg, the non-essential bus relay opening when a generator fails), or manual, different criteria may need to be applied. The type of battery and its discharge curve also need to be considered.
5. **Summary and conclusions.** This should provide evidence that the available generator or battery power is sufficient for abnormal or emergency operations in the most severe operating conditions.

Guidance material for compiling the various sections can be found in Australian Advisory Circular AC 21-38(0), available on the CASA web site, www.casa.gov.au. An alternative is the UK CAA Airworthiness Information Leaflet AIL/0194, available on www.caa.gov.uk, the content of which is very similar, and can be tailored to suit the degree of technical complexity of the aircraft type.

Any queries on the ELA can be directed to Ray Harvey, email ray.harvey@caa.govt.nz, or tel: +64 4 560 9400.



Something for the Pilot

The ELA might make disconcerting reading for a pilot at the 'light' end of the market, operating a piston-engined twin on night IFR freight runs. While in theory the ELA might come up with an adequate safety margin, what you actually get in practice could be quite different, and it may depend on you. We mentioned load shedding earlier – if a pilot does not recognise a failure straight away, the electrical system will continue attempting to draw a normal load until non-essential items are switched off. If the sole power source by this time is only the battery, a vital consideration is the voltage below which the battery relay will not operate, and how long it will take for the battery to drain to that level.

If it does happen, this would not be a good time to start studying the electrical system to see what is required to restore power. A thorough knowledge of the system at type rating time and with subsequent regular refreshers could be absolutely essential to your survival. For instance, your aircraft may have a switching system that bypasses the battery relay, and connects essential services directly to the battery upstream of the battery relay. Examples are the alternator field circuits, which may enable you to get an alternator back on line; or the avionics, which typically have a reasonably wide voltage range in which they will operate. You need to know this type of thing in advance, and have that essential night flight item, your torch within easy reach. ■

Maintenance Controller Course

The 2013 Maintenance Controller Course will give participants the skills to ensure aircraft are operated and maintained in compliance with Civil Aviation Rules. Enrolment is now open.

Avia Air Charter Maintenance Controller, Stephanie Coffey, is responsible for ensuring all company aircraft and equipment are maintained to the highest condition level and state of readiness.

"The role of a maintenance controller is important to ensure that aircraft are safe and available when required to fly. My role involves coordination of scheduled and unscheduled maintenance with our maintenance provider, ensuring that our pilots carry out preflight inspections to approved maintenance schedules, and that all required airworthiness documentation is completed in a timely manner. Reportable defects are advised to the CAA," says Stephanie.

Don't let the course title fool you, Maintenance Controller Courses are suitable for a wide range of aviation participants. No matter what your background is – whether you work for an airline maintenance provider or if you are a private aircraft owner wanting to expand your knowledge – you will benefit by coming to this course.

The Maintenance Controller Course is in two parts that are designed to complement each other and help you get the most out of the time you invest. This course won't turn you into a maintenance controller overnight, but it will provide you with all the tools you need.

Part one is a pre-workshop self-paced learning module that you can complete from the comfort of your own home. This theory-based section of the course aims to introduce you to, or refresh your knowledge of, the Civil Aviation Rules that provide the framework for aviation safety in New Zealand. To complete the pre-workshop segment of this course, you will be required to have a working Internet connection so you can access the CAA web site.

Once you've got the theory out of the way, it's time to put all the knowledge into practice. Part two consists of a two-day workshop where participants can acquire some practical experience and discuss a broad range of topics.

After being assessed as 'competent' in the required course units, participants will be issued with a National Certificate in Aeronautical Engineering (Maintenance Controller). This is a Level 4 NZQA accredited qualification.

Courses for 2013

Queenstown 1 – 2 May
Hotel Novotel
Queenstown Lakeside

Tauranga 5 – 6 June
Trinity Wharf Hotel

Wellington 10 – 11 July
Civil Aviation Authority
of New Zealand

Auckland 21 – 22 August
Jet Park Hotel and
Conference Centre

Register Online

It's never been easier to register and pay for a Maintenance Controller Course. An enrolment form and direct bank deposit information can be accessed on the CAA web site, www.caa.govt.nz.

Select "Seminars and Courses – Maintenance Controller Course". ■

Stephanie Coffey is Maintenance Controller for Avia Air Charter. Here, she oversees a check on their Piper Navajo Panther with Greg Bowen.

Introducing…

Since the launch of Part 115 *Adventure Aviation – Certification and Operations*, 38 organisations have become certificated operators.

One aspect of becoming certificated is the review at regular intervals by the CAA Adventure Aviation Team, where organisations will be audited for continued compliance with the Civil Aviation Rules. It will also be a valuable time for the CAA inspectors to meet the people that make up this dynamic sector of aviation in New Zealand. Many operators in adventure aviation are new to some aspects of certification, including the audit process.

As a Part 115 operator, two of the CAA people you are likely to meet in the field are:

Mac McCarthy

Flight Operations Inspector, Adventure Aviation

Joining the CAA in 2011, Mac brings a wealth of aviation knowledge and experience to his role.

Following a successful career in the British army, primarily on parachute operations, Mac was involved in the design, manufacture and testing of parachute equipment including the tandem-type rigs used in the adventure aviation business today.

He has also completed a PPL(H) and CPL(A) when operating a skydive centre for some years in Masterton and is qualified to conduct parachute and hot air balloon maintenance and repair.

"The regulator has a strong role to play to ensure safety is the prime consideration for Part 115 adventure aviation operators. With my varied experience I can help interpret the requirements for participants in this sector and to achieve this goal of safety with efficiency," he says.

Jeanette Lusty

Team Leader, Flight Operations, Adventure Aviation

Since joining the CAA in 2012, Jeanette has been able to bring to the audit and surveillance role, a variety of life and business skills thanks to her experience in various business ventures and as a private pilot.

"Growing up on a Southland farm we had to be able to manage many jobs and tasks so we learnt very quickly about decision making, machinery and efficiency," she says.

Jeanette successfully ran Nelson Helicopters for 10 years as CEO/owner and continued to be a strong advocate for the helicopter industry through work with local councils and aviation support groups and with personal priorities of honesty, responsibility and best practice. These will help produce desirable safety outcomes to the Adventure Aviation industry and CAA.

"With most of the certified Part 115 operators relatively new to the system, it will be my job to ensure that the audit process is understood, and is effective in promoting safe operations," she says. ■

ELT Activation – Real or Not

Figures supplied by Rescue Coordination Centre New Zealand (RCCNZ) show a high ratio of inadvertent emergency locator transmitter (ELT) activations to actual distress activations over the past two calendar years.

As a comparison, the figures for emergency position-indicating radio beacons (EPIRB – the maritime equivalent of the ELT) and personal locator beacon (PLB) activations are also shown.

Of particular concern is the number of inadvertent ELT activations in relation to the number registered – not that impressive when compared to the EPIRB statistics.

Inadvertent ELT activations can occur for a number of reasons, including hard landings, jolts during ground handling, and activation during installation or maintenance. Often, the first indication is a call from RCCNZ to the registered contact person, checking if there is an emergency. If you do realise, however, that a beacon has been set off accidentally, notify RCCNZ immediately on 04 577 8030 and then switch it off. If you can't remember the number right away, the alternative is to call the Police on 111 and have them relay the message to RCCNZ.

In flight, the pilot will be alerted by the beacon indicator light on the instrument panel, and the response is similar: first, report the activation to Air Traffic Services, then turn the beacon off.

All beacons must be registered with RCCNZ, and the emergency contact details kept up to date. When an ELT is moved from one aircraft to another, not only should the change be recorded in the aircraft maintenance log, but RCCNZ must also be advised of the change. If an owner leases an aircraft to another operator, the new emergency contact details must be notified to RCCNZ. In the activations listed in the table, an unspecified, but 'high' number involved unregistered beacons, causing much unnecessary work in tracking down the owner.

In a real in-flight emergency, activating your ELT early may be a lifesaver. For instance, if you know you are committed to a forced landing, turn the beacon on at the same time as you select 7700 on the transponder. That will give the beacon time to transmit a valid signal (this occurs approximately 50 seconds after activation) and will ensure that emergency services are alerted even if the beacon is subsequently damaged in the accident sequence.

For information on beacon registration see the web site www.beacons.org.nz. ■

Activations	ELT	EPIRB	PLB
2011 Inadvertent	76	47	10
2011 Genuine	13	21	63
2012 Inadvertent	60	62	18
2012 Genuine	6	24	90

ELTs currently registered with RCCNZ: 3,551, an increase of about 240 in the last 12 months.

Aircraft on the New Zealand register, January 2013: 4559.

EPIRBs currently registered with RCCNZ: 14,175, an increase of about 450 in the last 12 months.

PLBs currently registered with RCCNZ: 16,313, an increase of 1,353 in the last 12 months. (no distinction as to usage).

Nominations Called For

The Director of Civil Aviation is now calling for nominations for this year's Director's Awards, and Flight Instructor Award. This is your opportunity to reward a stand-out person, or organisation, which has made an overwhelming contribution to aviation safety.

These awards are presented to an individual, an organisation, and a flight instructor, whose actions have directly resulted in increased safety standards. The awardees are recognised for displaying professionalism, raising safety awareness, and encouraging others in industry to do the same.

Ensure that those who have made such a significant contribution receive the recognition that they deserve by nominating them for an award. Please send in a few paragraphs on why your nominee should be considered, to CAA's Manager Safety Promotion, Bill Sommer.

Email: Bill.Sommer@caa.govt.nz
Fax: +64 4 569 2024
Post: PO Box 3555,
Wellington 6140

The last date for nominations is Monday 20 May 2013.

The awards will be presented to the winners at the Aviation Industry Association annual awards dinner, to be held on 20 June, in Dunedin.

The first Director's Award was presented in 1995, and the CAA Flight Instructor Award in 2005.

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 obtained from your training organisation, or 0800 GET RULES (0800 438 785).

Rules, Advisory Circulars (ACs), Airworthiness Directives

All 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 Airways published cut-off date.

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

CAA Cut-off Date	*Airways Cut-off Date*	*Effective Date*
15 Apr 2013	22 Apr 2013	27 June 2013
13 May 2013	20 May 2013	25 Jul 2013
10 Jun 2013	17 Jun 2013	22 Aug 2013

See **www.caa.govt.nz/aip** to view the AIP cut-off dates for 2012–2013.

Aviation Safety Advisers

Aviation Safety Advisers are located around New Zealand to provide safety advice to the aviation community. You can contact them for information and advice.

Don Waters (North Island)
Tel: +64 7 376 9342
Fax: +64 7 376 9350
Mobile: +64 27 485 2096
Email: Don.Waters@caa.govt.nz

Murray Fowler (South Island)
Tel: +64 3 349 8687
Fax: +64 3 349 5851
Mobile: +64 27 485 2098
Email: Murray.Fowler@caa.govt.nz

John Keyzer (Maintenance, North Island)
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Fax: +64 9 267 8063
Mobile: +64 27 213 0507
Email: John.Keyzer@caa.govt.nz

Bob Jelley (Maintenance, South Island)
Tel: +64 3 322 6388
Fax: +64 3 322 6379
Mobile: +64 27 285 2022
Email: Bob.Jelley@caa.govt.nz

Aviation Safety & Security Concerns

Available office hours (voicemail after hours).

0508 4 SAFETY
(0508 472 338)
isi@caa.govt.nz

For all aviationzrelated 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-JFN Zenair Zodiac 601 UL

Date and Time:	01-Apr-12 at 13:00
Location:	Kaipara Harbour
POB:	2
Injuries (Fatal):	2
Damage:	Destroyed
Nature of flight:	Private Other
Flying Hours (Total):	629
Flying Hours (on Type):	27
Last 90 Days:	27

The aircraft was en route from Paraparaumu to Dargaville, when the pilot transmitted a MAYDAY call, indicating that he had experienced an engine failure in the South Kaipara Head area.

During the attempted forced landing, the aircraft stalled and spun, catching fire on ground impact. Both occupants were killed.

A full report is available on the CAA web site.

CAA Occurrence Ref 12/1417

ZK-HIG Eurocopter AS350B2

Date and Time:	23-Nov-11 at 10:30
Location:	Viaduct Basin
POB:	1
Injuries (Minor):	1
Damage:	Destroyed
Nature of flight:	Other aerial work
Age:	56 yrs
Flying Hours (Total):	8000
Flying Hours (Type):	3500
Last 90 Days:	100

The helicopter was performing a two-stage lifting operation, which involved erecting a 25-metre tower then placing a star on top of it, forming the basis for the Telecom Christmas Tree. When the pilot operated the hook release after the first lift, the line did not fall away from the helicopter, so he descended the helicopter to a hover about 15 ft agl. The rigging supervisor grasped the line to pull it free, but as it was still attached to the top of the tower, this action swung the line into the rotor arc.

The resulting blade strike immediately caused a rotor imbalance, and the severity of the vibration caused the helicopter to literally shake itself to pieces and fall to the ground.

Although the machine was destroyed, the pilot and associated personnel standing nearby were uninjured.

CAA Occurrence Ref 11/5227

ZK-NSD Cessna 152

Date and Time:	08-Sep-10 at 13:30
Location:	Kaikoura
POB:	2
Injuries:	0
Damage:	Substantial
Nature of flight:	Private Other
Pilot Licence:	Commercial Pilot Licence (Aeroplane)
Age:	23 yrs
Flying Hours (Total):	313
Flying Hours (on Type):	256
Last 90 Days:	24

On a cross-country flight, the pilot encountered poor weather conditions, requiring deviations from his planned track and significantly increasing his time in the air. This resulted in fuel exhaustion, with the pilot carrying out a precautionary landing at the first indications of a power loss.

The pilot landed with a slight tailwind component and was unable to stop the aircraft before it collided with a fence. The undercarriage, propeller, one wing tip, and the tailplane were damaged. Further damage was caused to the elevators by cattle, as the aircraft was left unprotected.

CAA Occurrence Ref 10/3468

ZK-WMO Micro Aviation B22 Bantam

Date and Time:	10-Oct-11 at 16:30
Location:	Springs Junction
POB:	1
Injuries:	0
Damage:	Minor
Nature of flight:	Private Other
Flying Hours (Total):	195
Flying Hours (on Type):	180
Last 90 Days:	30

En route from Springs Junction to Reefton, the pilot flew into an area of cold weather and light drizzle. The engine power slowly reduced until the engine failed. The pilot carried out a forced landing onto a snowgrass-covered hill, damaging the cockpit pod and nose wheel assembly.

The pilot had activated a personal locator beacon during the forced landing, and was rescued by helicopter at approximately 6 pm. The engine was tested after recovery and no defect could be found. The engine is not equipped with carburettor heat and carburettor icing is thought to be the likely cause.

CAA Occurrence Ref 11/4579

ZK-NEQ Bombardier DHC-8-311

Date and Time:	09-Feb-11 at 14:50
Location:	Woodbourne
POB:	42
Injuries:	0
Damage:	Minor
Nature of flight:	Transport Passenger A to B

The aircraft was on a scheduled flight from Hamilton to Wellington. On approach to Wellington, the landing gear did not extend when it was selected down. The pilots carried out a go-around in order to carry out the relevant Quick Reference Handbook (QRH) procedures. The 'Alternate Gear Extension' procedure succeeded in lowering the main landing gear, but not the nose gear.

The pilots decided to divert to Woodbourne and land with the nose landing gear retracted. No-one was injured in the landing. The damage to the aeroplane was confined to the area around the nose landing gear and the lower forward fuselage. Before departure from Hamilton, a faulty 'inhibit' switch in the cockpit caused a loss of hydraulic pressure to the nosewheel steering, but the crew, after consulting the Minimum Equipment List (MEL), determined that the aircraft could depart without operative nosewheel steering.

Operating pressure for the nosewheel steering is supplied by the 'extend' side of the nosewheel hydraulic supply line. Investigation established that there was nothing mechanically wrong with the alternate landing gear extension system. The nose landing gear did not extend because the pilots did not pull hard enough on the handle that should have released the uplock, allowing the gear to lower under gravity and lock down.

Safety actions and recommendations resulting from the investigation included flight simulator modification to make the uplock handle force more realistic; the design of aircraft checklists; and modification of the MEL to require a hydraulic system check in the event of a nosewheel steering fault. The full report is available on the TAIC web site www.taic.org.nz (ref 11-002).

CAA Occurrence Ref 11/529

ZK-SKA Meteor S.p.A. Sky Arrow 450T

Date and Time:	15-Mar-09 at 11:10
Location:	Inangahua Junction
POB:	1
Injuries (Fatal):	1
Damage:	Destroyed
Nature of flight:	Private Other
Flying Hours (Total):	13723
Flying Hours (on Type):	641
Last 90 Days:	10

Witnesses saw the aircraft in a high-speed, steep descent towards a topdressing strip. The aircraft did not recover from the descent, and struck the ground short of the airstrip. The pilot was killed in the impact. The subsequent CAA investigation found a fatigue failure in the elevator control system, which had deprived the pilot of pitch control.

A full report is available on the CAA web site.

CAA Occurrence Ref 09/919

ZK-HXQ Bell 206B

Date and Time:	26-Sep-11 at 14:00
Location:	Waitotara
POB:	1
Injuries:	0
Injuries (Serious):	2
Damage:	Substantial
Nature of flight:	Agricultural
Pilot Licence:	Commercial Pilot Licence (Helicopter)
Age:	50 yrs
Flying Hours (Total):	4205
Flying Hours (on Type):	2900
Last 90 Days:	33

While approaching to land during an agricultural operation, the helicopter suddenly and uncontrollably yawed to the right. The pilot was able to make a successful forced landing although the helicopter was substantially damaged.

Engineering investigation found that one of the tail rotor driveshaft segments had failed. The aft yoke, which is normally bonded to the driveshaft tube, had separated at the bond line, rotating freely on the tube, resulting in loss of drive to the tail rotor. Despite extensive testing, no reason for the failure could be determined due to the damage sustained during the failure. BHT has advised that the new driveshafts have a riveted joint at the yoke in addition to the bonding, and they are pursuing a service bulletin to address the older driveshafts already in service.

CAA Occurrence Ref 11/4317

ZK-DIV Piper PA-32-260

Date and Time:	09-Aug-11 at 15:45
Location:	Doughboy Bay
POB:	2
Injuries:	0
Damage:	Substantial
Nature of flight:	Transport Passenger A to B
Pilot Licence:	Commercial Pilot Licence (Aeroplane)
Age:	28 yrs
Flying Hours (Total):	2000
Flying Hours (on Type):	420
Last 90 Days:	14

After takeoff from the beach in Doughboy Bay (on the west coast of Stewart Island), the pilot found that the aircraft was not going to out-climb high ground at the far end of the beach.

The surface wind of 25 to 30 knots was causing downdraughts in the lee of the high ground, and during the pilot's attempt to manoeuvre clear, the aeroplane struck the sea surface. Both the pilot and passenger were able to vacate the aircraft, which remained afloat for some time, and stood on the wing before deciding to swim to the shallows and wade ashore. Before leaving the aircraft, the pilot had activated both the ELT and the tracking system alarm, this action resulting in prompt activation of rescue services.

CAA Occurrence Ref 11/3510

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

Cessna U206F

Cylinder

Part Manufacturer:	Allied Engine Components
Part Number:	AEC631397
ATA Chapter:	8530
TSI hours:	1186

When carrying out mandatory service bulletin MSB 06-2 the maintenance provider identified cracking in four cylinders. This problem is known by the manufacturer who is aware that the cylinders are susceptible to fatigue cracking.

The manufacturer has issued service bulletins to inspect a specific serial number range of cylinders at regular intervals for cracking. The recent report of cracking has, however, affected cylinders outside of this serial number range.

The cracked cylinders have been replaced with serviceable parts and the aircraft returned to service. The manufacturer has been informed.

CAA Occurrence Ref 12/361

Piper PA-18A-150

Aileron cable fitting

Part Number:	MS20667-4
ATA Chapter:	3210

During preflight inspection, the pilot identified a crack in one of the aileron cable end fittings. The aircraft was immediately grounded. Further inspection identified additional cracking on another aileron cable end fitting.

The fittings were sent for analysis to determine the failure mechanism. Investigation established that they had cracked due to chloride stress corrosion cracking (CSCC). It was likely that the swaging process induced tensile stresses in the material and that these stresses may have been augmented in time due to corrosion built up over the time that the cables had been in service. New aileron cables with serviceable end fittings were installed and the aircraft returned to service.

CAA Occurrence Ref 12/726

NZ Aerospace FU24-950

Main gear scissor link bolt

ATA Chapter:	3210

The main gear lower scissor link bolt failed on landing, resulting in separation of the wheel assembly from the undercarriage leg. The aircraft sustained minor damage. The bolt was replaced with a heavier-duty one, and torqued to 40 foot-pounds.

CAA Occurrence Ref 12/306

Alpha R2160

Stabilator bearing assembly

Part Model:	Stabilator bearing
Part Manufacturer:	Alpha Aviation Ltd
Part Number:	21.23.34.000
ATA Chapter:	2740
TTIS Hours:	50.22

The pilot reported that the stabilator had excessive movement within the attachment bearing assembly. Investigation by the maintenance provider and the manufacturer found that this batch of bearings had been swaged into their respective brackets after the brackets had been painted, instead of beforehand, as advised by the manufacturer. The paint thickness may have prevented an effective swage being formed.

Contributing to the defect was the possibility that the aircraft (an early production aircraft) may have been manufactured with the bearings installed out of alignment, a condition identified and rectified on later production aircraft. The aircraft fin was removed and misalignment of the stabilator brackets and pivot lugs was evident. Further investigation determined the exact extent of the misalignment and concluded that this was a contributing factor.

The dimensional misalignment, when fitting the stabilator and tightening the axle bolt, forced the lugs to push on the bearing unevenly, initiating movement within the bracket. The stabilator was originally installed using original French tooling. This tooling was later found to not provide satisfactory control over the positioning of the pivot lugs or bearing brackets.

After establishing the fault in the original tooling, new tooling and build processes had been undertaken by the manufacturer. The stabilator brackets were left as is, and the stabilator pivot lugs were replaced with new undrilled parts ensuring that correct alignment with brackets was achieved on installation. Any minor residual misalignment would be compensated for by the spherical bearing. The aircraft was reassembled and returned to service.

CAA Occurrence Ref 11/5895

Pitts S-1 Special
Landing/flying wires

ATA Chapter:	5710

During scheduled maintenance, the landing wire nuts were found to be seized and the rigging tension in the wires was well below the required value. Investigation determined that the wires were tensioned to approximately 100 lb, when the rigging tension should have been 675 plus or minus 75 lb. The seized nuts were also considered too small to take rigging loads considering the depth of thread on standard wire. The reason why the nuts had seized was considered to be due to either overtightening or overstressing of the nuts during the previous maintenance activity, or a lack of lubrication.

Information from the maintenance provider stated that it was necessary to put a lot of tension on one nut until the rigging tension is met before the locknut is tightened. The reasons why the wire tension was incorrect could be that the wires were not correctly tensioned during reassembly or previous maintenance activity and that the wires have slackened over time due to normal operation. The seized nuts were split off the threads and the threads inspected, identifying no defects.

The nuts were replaced with new items, and the wires reinstalled and correctly tensioned. The aircraft was returned to service.

CAA Occurrence Ref 12/201

Piper PA-31-350
Magneto

ATA Chapter:	7410

After installation of a new dual magneto, an engine ground run was performed. During the engine run, the magneto initially ran with good mag drops on both left and right sides, however once operating temperature was reached, the right portion of the dual magneto produced a dead cut. The mag was removed and the coils and capacitors tested without disassembly and found to be within limits. The rest of the mag was inspected and bench tested, and found satisfactory.

The mag was refitted to the engine and the engine ground run performed, with the same problem occurring. The mag was removed and run in a test rig while a heat source was applied. It ran normally initially, but the right portion failed as the temperature increased.

Strip examination found that the right mag coil was failing when warm. The coil was found to have a large crack which had been repaired by unapproved methods. The coil was removed and replaced with a serviceable unit and the aircraft returned to service.

The origin of the unapproved repair could not be ascertained. The maintenance organisation has mandated inspection instructions specifically for unapproved repairs and the reporting of any unapproved repair identified.

CAA Occurrence Ref 11/5821

Robinson R44 II
Inlet valve

Part Manufacturer:	Lycoming
Part Number:	OSK21120
ATA Chapter:	8530
TSI hours:	29
TTIS hours:	756

A partial power loss occurred during cruise flight. The pilot landed the helicopter immediately and shut the engine down. The No. 2 inlet valve had failed, causing significant damage to the piston and cylinder. The reason for the valve failure could not be determined. The manufacturer was informed of the failure.

CAA Occurrence Ref 12/405

Piper PA-31-350
Trim cable

Part Numbers:	41734-78
ATA Chapter:	2732

The pilot reported that the elevator trim jammed in flight. A successful landing was accomplished and the fault reported to the Maintenance Controller. Maintenance investigation found the trim cable had broken in the area of the elevator trim servo pulleys. The failure was determined to be due to excessive cable wear, both external and internal, owing to the small radius of the servo pulleys and the tight routing of the cable through these pulleys. Maintenance procedures were not sufficient to detect excessive wear of the trim cable in the area of the trim servo, as the excessive wear was limited to a very short length of cable and so difficult to identify in situ. The internal wear may be as much a problem as external wear and is undetectable during routine inspections. The Operator's Maintenance Manual was amended to include a 200-hour special inspection of all control surface trim cables in the area of the servo pulleys, specifying that the cable is required to be released and a detailed visual inspection is carried out for identification of any wear. A Continued Airworthiness Notice was introduced, to review all cables for age and tracking, to be incorporated into the Operator's Maintenance Manual. The failed cable was replaced with a serviceable item and the aircraft returned to service.

CAA Occurrence Ref 12/864

De Havilland DH 84 Dragon
Aileron cable

ATA Chapter:	2711

Shortly after takeoff, the pilot found that the aircraft would not turn right with normal control inputs. A right-hand circuit was achieved using rudder, asymmetric power, and limited aileron, with the ability to counter over-bank if required. The aileron cable tension was found to be insufficient, allowing the aileron quadrant sprocket to ride over the chain drive. No specific tension is specified in the maintenance manual. The aileron cable was re-tensioned and the aircraft returned to service. This is the only example of this aircraft type in NZ.

CAA Occurrence Ref 12/1253

Get the Mental Picture

If I can't picture it, I can't understand it. – Einstein

- **Have you ever come way too close for comfort to another aircraft?**
- **Have you ever landed after a flight and wondered, "How on earth did I get myself into that?"**
- **Have you ever lost track of what's going on around you, especially in busy airspace?**
- **Have you ever relied on luck to keep you safe?**

This year, the AvKiwi Safety Seminar is looking at collision avoidance, with specific emphasis on situational awareness – building and maintaining that all important mental picture of what's going on around you – because it's this incredibly important set of skills that will keep you out of the statistics.

But wait there's more! Not only will you gain amazing insight into how situational awareness can save your life, you will also come away with some skills to improve your situational awareness, and (as if that's not already enough) a CD-ROM to teach you even more about situational awareness, including some games to practise those skills on.

But wait, there's even more – for those of you with smartphones, and other such devices, we will be launching a situational awareness app, to help you continuously improve your situational awareness skills.

AvKiwi seminars are FREE to attend. A complete schedule of dates and locations is also on the CAA web site, www.caa.govt.nz.