Robinson Helicopter Overhauls

The story of an R22 overhaul by Heliflite Pacific at Ardmore

ONE OF the good things about Robinson helicopters is that there is comparatively little scheduled maintenance required until 2200 hours of engine time is reached or until 12 years has passed. One of the bad things though, is that pretty much everything then gets attended to at once. Depending on how carried away an owner gets with options such as cosmetics and avionics upgrades, etc., the bill could well nudge $200,000 just for an R22. That said, if you do opt for a 'factory quality' overhaul with 'new everything' then you will fly away in the equivalent of a factory new helicopter. Given that it should have been reassembled with New Zealand conditions and corrosion protection in mind, you might even convince yourself the result is better than factory new.

ZK-HII resplendent in its new paint scheme at Ardmore.

Overhauling an R22 is similar to an R44, although there are some components that are lifed differently. In both cases, there are a variety of options to take and decisions to make along the way. Aside from all the cosmetic choices, an R22 Beta can be turned partly or fully into a Beta II model, and an R44 Astro can be 'hydrauliced' and turned into a Raven. (Heliflite are one of only two companies worldwide who are sanctioned by the factory to convert Astros to Ravens.)

This article follows an R22 Beta (ZK-HII) overhaul by Heliflite Pacific Limited at Ardmore. This particular example was for a customer who wanted the aircraft returned to factory-new condition, based on a philosophy that the additional expense of doing so was a relatively small burden in the overall cost of overhaul and ownership. This approach ultimately results in savings throughout the life of the overhauled aircraft as unscheduled maintenance costs will be kept very low.

Such an approach also fits the philosophy of Heliflite. Manager Brett Sanders says that as a Robinson Distributor and also because of the standards that their staff apply, Heliflite "will always favour quality over price and are unlikely to ever be the cheapest option. Our approach is to keep prices reasonable and still do a job that looks as though it came straight out of the factory. The factory quote for labour in a typical overhaul is 220 hours but the reality is that the potential is there for that amount to be doubled. That said, we'll always try to accommodate a reasonable deal for the owner depending on their requirements and timeframe." Brett did also say that Heliflite will tend to be choosy about what overhaul jobs they do accept, simply because of the commitment that is also required from the owner in order to achieve a 'factory' result.

An R22 going through a Robinson factory overhaul would by default get virtually 'new everything', including plastics and wiring loom. They are effectively a new helicopter which is why the process at Robinson costs as much as it does (actually not all that much less than a new aircraft).

In Heliflite's case, Brett says generally they would go as far as to fit new plastics except for the door windows (which can't be replaced independently of the doors) and would also fit a new loom. The owner of HII recalls looking at the cabin when it was fully stripped except for the loom and thinking "I probably should replace that. It's the only thing that will be left that could ever cause any trouble." However it looked to be in good condition and cleaned up nicely, so it stayed. And caused trouble later, or at least a diode did. The point remains that it is a 'now or never' decision and the cost of troubleshooting electrical gremlins later might easily have covered the cost of a loom replacement when you had the chance.

The overhaul process begins with the aircraft being stripped essentially down to the last nut and bolt. All that will remain is a bare cabin on a portable undercarriage or cradle. Various components are scrapped by default, many are inspected/tested and/or overhauled, and many are set aside just for cosmetic attention and later reassembly.

Lifed and on-condition components

There are a variety of components that are multiple lifed (within limits) or that run on-condition, but it would be an optimistic owner that thought all such components would be able to be refitted to an overhauled machine. New Zealand is a harsh environment for corrosion and it's only at overhaul time that most owners realise just how much more effort they should have put into preventing corrosion during the life of the aircraft.

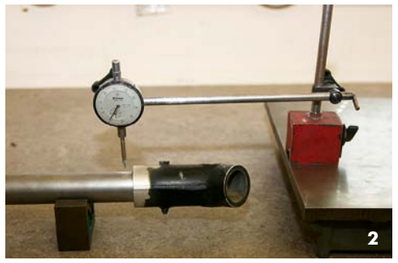
For example, on an R22 all of the undercarriage except the aft cross tube is on-condition, but it is very rare not to have to scrap out some parts and in the case of ZK-HII it was more economic to simply buy a whole new undercarriage as a kit from Robinson and then keep the one remaining good component as a souvenir of the additional costs involved. All the scrapped parts were due to corrosion pitting. From an owner's point of view it has to be said that the quality of the paint ex-factory isn't conducive to a life beyond 12 years and some owners may like to consider stripping it all and starting afresh before their expensive new undercarriage is re-assembled.

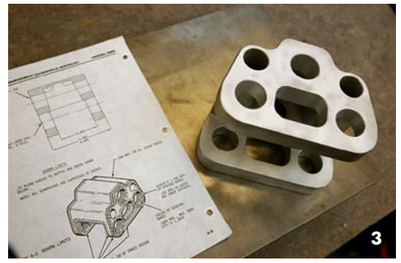
Frames are mostly double life items, though 50% of those tend to be scrapped due to corrosion and fretting issues. In some cases, stretched drive belts may have rubbed on the frame when un-tensioned and left wear marks that are beyond limits. (ZK-HII's frames all made it to a second life, thankfully.) It's a good idea to protect these areas of the frames for the future. And to always look under the aircraft when you clean it and attend to any areas needing regular corrosion protection.

Frames, undercarriage, and control components are all stripped, inspected and crack checked using magnetic particle and fluorescent dye testing. In the case of HII, these components were sent to Rotor and Wing Maintenance at Taupo for 'overhaul' and to Fieldair Engineering for NDT. (See separate articles on both companies in this issue of KiwiFlyer.) These parts are then re-protected using a variety of methods, including powder coating, primer fill and drain for some tubes and 2-pot epoxy painting. Assembly involving a series of sealants and jointing compounds further reduces the likelihood of corrosion attack in future service. These processes should often exceed the original assembly standard and provide the extra protection required in the NZ environment.

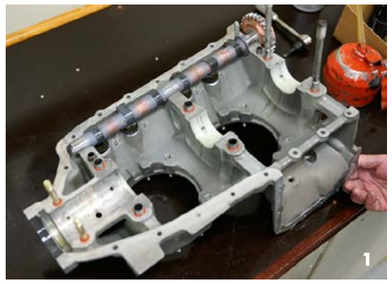
Most tailbooms are double life items, but the forward section(s) can be prone to internal corrosion pitting damage beyond repairable limits. Replacing a skin is not approved by the manufacturer and requires an approved repair scheme certified by a design organisation. Rotor and Wing Maintenance have such a scheme and may be able to save owners the significant cost of a full tailboom replacement. It is also a good time to make sure the quality of the internal painting and corrosion protection is up to a good standard. In ZK-HII's case, two forward sections had to be replaced, but this was substantially less expensive than replacing the whole boom and also provided the opportunity to fit an additional boom antennae mount which needed to be done anyway.

R22 rotor hubs are double lifed but usually fail at the first 12 year inspection due to corrosion pitting. Limits are as low





Captions: 1: Before the big project, with just enough hours left to fly down the road to Heliflite. **2:** Checking undercarriage components for corrosion limits. **3:** Rotor hub ready for inspection. **4:** Main transmission under inspection. **5:** Mast reassembled. **6:** Starting to look like a helicopter again as the tail goes back on. **7:** Engine in and Powerflow exhaust fitted. **8:** The loom was cleaned and retained rather than replaced, but all new terminal caps and P clamps were fitted, one of many finishing touches to make the aircraft look brand new again. **9:** Overhauled tail rotor assembly. **10:** Cowlings going on. Note the quality of the internal paint work. There's no chance of corrosion in the next 12 years. **11:** The view between the fuel tanks. They are only partially visible when cowls are open, but received the same degree of preparation and paint finishing from Pacific Aero Coatings as the rest of the aircraft.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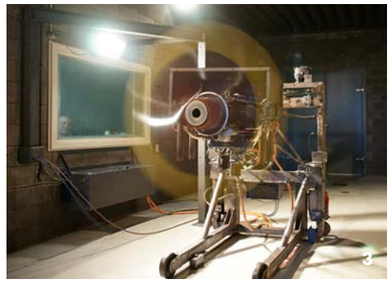
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as just 10 thou (~0.25mm) within 300 thou of any edges, and just half a thou (~0.01mm on the inside of any bearing bores). By the time that bubbling of the paint is found in service it is probable that the resultant pitting from the corrosion is beyond limits. This was the case for ZK-HII's rotor hub and its clean, bare, bead-blasted self now sits on the corner of a desk as a $2000 paperweight.

Transmissions are a mandatory return to factory overhaul item at 2200 hours, but can have a 12 year inspection if they are not in sync with rest of helicopter. 12 year inspection of the main rotor gearbox requires substantial disassembly and removal of the drive shaft for replacement of a sealed greased bearing located at the top of the mast. Also replaced are all seals and 'O' rings. Located in the top of the output gear carrier is a pocket prone to accumulating condensation and therefore corrosion. This area is protected by injecting a quantity of gearbox oil through a vent hole after installation. In the case of HII, both transmissions were inspected by Rotor and Wing Maintenance and returned to service.

Rotor blades and tail rotor blades are mandatory 12 year items regardless of hours. Those associated with the industry will know that a few years back Robinson stopped making stainless steel skinned blades and reverted to aluminium. This no doubt resolved any bonding difficulties but opens the door to corrosion issues instead, unless the blades are well cared for. During the years of stainless blades, many operators will have developed habits that could be considered neglectful in the case of alloy blades. The requirement for regular washing and salt removal is obvious, but it's also good practice to regularly wipe an approved corrosion preventing compound on the blade tips and especially right along the trailing edges.

The only items that must be returned to Robinson for factory overhaul aside from transmissions are clutch actuators, hydraulic equipment and engine tachometers. All other items can be attended to within NZ.

Captions:
1: Engine reassembly commences.
2: John Williams torquing cylinder heads.
3: The first start in the Aeromotive Test Cell.
4: Looking like brand new again, about to have its first (installed) start on the ground at Ardmore.
5: A new interior including new paint and a fully refurbished instrument panel, with GPS, PCAS, Spidertracks, and a Beta II cyclic installed.

Avionics

The engine and rotor tachometer is a mandatory overhaul item, but all other items are at the discretion of the owner. It may be time to consider trading in old radios and transponders and/or designing a new panel. That was the case in HII, which acquired a host of 'nice to have' extras such as touch screen GPS with integrated PCAS traffic, a phone kit, and spidertracks. Gyro instruments were overhauled. Given the radio display didn't work properly, the transponder was very old, and the A/H had ceased functioning, these decisions were reasonably easy to make. The result is that the panel looks and functions like brand new, helped by also opting to replace many of the actual panel components themselves. They are surprisingly inexpensive and Heliflite will nearly always take this option, especially for the circuit breaker panel which tends to get scuffed. Brett says they are even inclined to replace any circuit breakers that aren't visually up to standard, though they are always mindful of the costs involved. In the case of ZK-HII, new avionics were supplied and wired by Hawker Pacific at Ardmore, with final panel manufacture and fitting by Heliflite.

Whether replacing avionics or not, an overhaul is the best time to run some extra wiring for future purposes such as radios, antennae, hooks, GPS, charging sockets, etc. (On the subject of hooks, undercarriage reassembly time is the best time to provision for that too if there's ever a chance of wanting to fit one.)

The engine

HII's engine was overhauled by Aeromotive at Hamilton. The engine overhaul process is a standard one, although Aeromotive have several 'extras' they include under their Signature engine brand.

Stages of the process are: Receipt at Aeromotive with careful noting of all components and brackets received. Then the engine is stripped and de-greased. Relevant parts are magnaflux and fluorescent dye tested, and inspected in accordance with the manufacturer's data. Service bulletins and A/Ds are reviewed, then (if not a fixed price job), pricing is finalised and agreed upon. The engine is then overhauled (see separate Aeromotive article in this issue of KiwiFlyer) and reassembled. Aeromotive returned HII's engine looking like brand new, with high quality paint and very tidy assembly work clearly evident. Owners should consider whether to paint inlet manifolds and ceramic coat or paint exhaust manifolds at this point too. Now is the chance and it can be done for a very small marginal cost to the project. In fact, Aeromotive do now paint inlet manifolds but Greg Mundell at Aeromotive says that hardly any customers bother with exhaust manifold coatings.

Aeromotive will then run the engine in their test cell for at least 2.5 hours in accordance with the manufacturer's data, before undertaking a final inspection and handing the engine back to the customer.

Well prior to this however, owners should have given consideration to how long the engine will sit for before running again, as Aeromotive can inhibit it per manufacturer's recommendations if required. For long term storage this may involve running on inhibiting oil in the test cell, then applying a wax substance to the cylinders (which owners should reapply every month), using silica gel plugs, and potentially filling the engine with 10 litres of oil and storing it upside down to keep the camshaft immersed.

Running in is next and should follow the manufacturer's service instructions. As a rule of thumb, owners should fly above 75% power and not let the engine get hot or sit on the ground idling, which should be at a minimum of 1000-1200 rpm. Time on the ground should be kept to a minimum, but following the proper warm-up procedure and care must be taken to avoid shock cooling. Greg Mundell at Aeromotive says to go for long flights for the first 25 hours and to avoid circuits, minimising starting and stopping. It's actually a great excuse to get in the aircraft and go somewhere without thinking about the cost because – you have to do it for the sake of the engine and you can't trust the job to anyone else. That's what Mr. KiwiFlyer told Mrs. KiwiFlyer anyway.

Other considerations

There will always be other considerations to talk through at the time. For example, Heliflite prefer to replace all rod end bearings (which don't come in the Robinson overhaul kit from the factory), because the old (serviceable) ones likely won't last another life and controls will end up getting looser over time.

John Hobday at Rotor and Wing was able to supply a Beta II cyclic control for fitting to ZK-HII instead of its original Beta version. That and a Beta II new paint scheme make the helicopter visually indistinguishable from a Beta II unless you happen to notice the different engine or that there's no automatic carb heat system installed.

Also worth considering (and added to HII) is an aftermarket exhaust system, especially given that in the case of the R22, this must be replaced anyway. For a relatively small marginal cost, a Powerflow

ZK-HII looking and flying like brand new, over the Hauraki Gulf near Ardmore.


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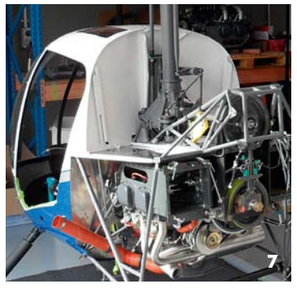
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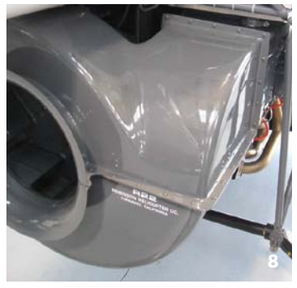
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Captions: 1&3: Cabin stripped to bare metal and fibreglass. **2&7:** The back of the cabin is hardly visible once reassembled and even Robinson only undercoat it, but Kim fully prepped and then finish painted it. **4&5:** The stripes weren't painted over the top, they are all individually laid on to the primer. **6:** On the way back to Heliflite from Pacific Aero Coatings. **8:** The fan shroud was fully prepped, colour matched, and repainted too.

system from Performance Aviation in Wanaka was fitted. In the case of the R22, this is expected to provide the helicopter with hot and high performance equivalent to the Beta II (which has a larger capacity engine). It also looks and sounds rather good indeed.

Lastly, what seemed like a 'no-brainer' decision for HII was to fit a throttle switch, again from Performance Aviation (see separate article in this issue). This simple and inexpensive device prevents the engine being started unless the throttle is closed, eliminating the risk and huge expense ($15k+) of an accidental start-up over-speed if the engine was ever to be started on an open throttle.

Paint and Cosmetics

Having spent a small fortune on everything mechanical and electronic in your helicopter, or plane, it seems a travesty not to make it look like new with fresh paint and upholstery. Heliflite's standards dictate that unless the paint is really very good, then it should be stripped and redone, inside and out. This is also a chance to do a much better job of corrosion protection than the factory ever would. Be aware though that there are paint jobs, and there are paint jobs. ZK-HII was completely stripped to bare metal and fibreglass by hand using friendly chemicals (with no mechanical sanding or blasting) and repainted using Superflite aircraft paint by Kim Thompson at Pacific Aero Coatings in Tauranga. You won't find anyone to apply more attention to detail or to do a better job.

Aircraft preparation and painting is not the same as car painting (even European car painting) and specialist aircraft paint products are not the same as automotive paint products. ZK-HII has been seen by many critical eyes post its overhaul and without exception, they all marvel at the quality of the paintwork. It looks a lot better than a new one. Fortunately for the owner, it was painted before Kim's reputation started spreading. Testament to that are several significant helicopter jobs that Kim has attended to since, including taking over part completed work from other painters that owners have been dissatisfied with – realising too late the false economy they had attempted to work within.

There are a multitude of parts that can be painted off the helicopter (Kim couldn't believe just how many for such a small aircraft as the R22), such that all surfaces and edges can be fully protected against future corrosion. Again, the standard if this approach is adopted, will likely well exceed that of a factory machine. Literally hundreds of screw heads and fastenings can also be attended to separately as well – and it's a worthy consideration to replace a lot of these with new. For the sake of a dollar each, it's another step towards making the aircraft look like brand new when the project is finished.

Heliflite prefer to refit overhauled helicopters with new factory interiors (perhaps excepting seats which may be covered locally), simply because then if the overhauled helicopter were to be parked alongside a new one, it would look exactly the same.

There's also the consideration of what to do about plastics and windows. Robinson front screens can be replaced, though it's not the easiest task. And door windows can only be replaced if the whole door is replaced too (there is a mod available to cut out the windows and bond in new ones but they won't look like new afterwards). If the plastics aren't too bad then most marks will be able to be carefully polished out, though don't expect this with actual scratches unless you're willing to risk distorting the view. Kim Thompson polished all of the plastics on ZK-HII and admittedly they were in good condition to begin with, but some who viewed the aircraft after Kim's efforts thought they were all new replacements.

Reassembly

It's in the reassembly process that attention to detail becomes most evident, and arguably where a lot of the aforementioned costs can get turned into additional value. Chief Engineer at Heliflite, Zack Erdos says that when they reassemble any aircraft, they are always thinking about how to make it last and always considering the future from a preventive maintenance point of view. Heliflite will always do more than the minimum, and be very conscious of attention to detail not only to make it look like new, but also to make it last even better than new. That was certainly the case with ZK-HII. Much of its assembly and the associated attention to detail was in the care of Engineer Dan Sumner at Heliflite, and he and the rest of the Heliflite team who all participated at some stage, are owed a big thanks from the owner for a job to be very proud of.

For more information

Contact Brett or Zack at Heliflite Pacific on 09 299 9442 or brett@heliflitepacific.com
Contact John Hobday at Rotor and Wing Maintenance on 07 378 8688 or rotorandwing@xtra.co.nz
Contact Greg Mundell at Aeromotive on 07 843 3199 or greg.mundell@aeromotive.co.nz
Contact Kim Thompson at Pacific Aero Coatings on 07 378 8688 or kim@pacificaerocoatings.com
Contact Matt Bailey at Performance Aviation on 021 744 588 or matt@performanceaviation.co.nz
Contact ZK-HII's owner at rotorflight@xtra.co.nz

Rotor and Wing Maintenance

Helicopter Overhaul and Role Equipment Specialists

FROM their early mission of maintaining working helicopters, Rotor and Wing Maintenance Ltd continues to offer a dependable service enhancing the safety, performance and reliability of helicopters and light aircraft, from their central North Island premises. Rotor and Wing was a start up company in 1980. The hangar and facilities have expanded over the years and the company is just completing its fifth extension. John and Shona Hobday remain at the helm.

Rotor and Wing's first Robinson Service Centre approval was gained back in the 1980s when Frank Robinson himself signed and presented certificates. Since then, the R44 Service Centre was approved and expanded. The R66 Service Centre has also been approved with early examples of the type now approaching 1000 hours flying time. The company has recently signed up with Rolls Royce to become a Service Centre for their RR300 engine installed in the R66.

Tracmap installation on an R44. Systems are also available for the R22, H300 and H500.

Fire-Fly Fire Lighter produced by Rotor and Wing.

The Team and Capabilities

Rotor and Wing's maintenance workshop is very well managed by Greg Newton who balances a variety of scheduled maintenance, airframe overhaul, and repair work. He is assisted by a capable team of engineers and tradesmen.

From the early days of turbine helicopters the company has also developed a considerable knowledge base and extensive experience to enhance the maintenance of the MD500 series and the Bell 206 JetRanger. The company has also had an ability to maintain the Eurocopter AS350 for some time. More recently they have introduced Nick Hockey, an experienced and skilled engineer to this capability.

Part 145 approval for both the component overhaul shop and the maintenance workshop was approved in 1997. The component overhaul shop, capably run by Murray Welch, has become a respected service for operators and other engineering maintenance providers.

In addition, John Hobday and Brad O'Brien design, develop and manufacture equipment that assists operators with a variety of tasks carried out with their machines. These include Tracmap installation systems, fire lighting systems, kayak racks, and more.

Robinson Helicopter overhauls

Over the years, Rotor and Wing have developed several processes to enhance the efficiency of Robinson helicopters' 2200 hour overhaul and 12 yearly inspection requirements.

John says that one of the keys to an efficient Robinson overhaul is to start planning well ahead of the job. "It can be a complex process and managing it for best cost involves a good deal of thought and decision making before parts are ordered," says John.

Often helicopters will have had major components changed during their previous 2200 hours flying time. Thus a decision needs to be made whether to order an overhaul kit (which can only be ordered as a complete kit) or alternatively, to order just the parts required for the overhaul and to refit the components still with time to run. Ordering parts separately can make for a more expensive overhaul and may also mean extra parts that are usually supplied within the kit are missed.

The time from order to despatch can take up to 1 month. Sea freight, although the most economical, can also take another month to arrive. So John says it pays to start planning 3 months prior to your overhaul requirement start date.

Many of the components fitted are Robinson Helicopter exchange components. A core charge is invoiced when these components are supplied, then upon return to Robinson of the time-expired component, a strip inspection for overhaul is carried out and parts are assessed for possible core credit. Any rejected parts have their value deducted from the core credit.

Operators need to be mindful that corrosion is ever-present in the New Zealand environment. Good overhaul and reassembly techniques can minimise the potential for future corrosion and associated costs. Rotor and Wing have proven processes including coatings and sealants to increase the overhauled helicopter's resistance to corrosion attack.

Rotor and Wing also provide a variety of in-house component overhaul services, including for frames and undercarriages. These services are offered to other maintenance providers to assist them with carrying out 2200 hour overhauls on their own customer's aircraft. In some cases Rotor and Wing have exchange frames, undercarriage, tail cone, etc. available which facilitate a faster turn-around for the overhaul process.

John says that the most economic and efficient overhauls are the one that happen methodically and in a short time; "Planning is the key. With the many years of overhaul experience we have, Rotor and Wing is now in a position to offer turn-around times of as little as 4 weeks."

John adds that "With a job that can be as large and variable as a full helicopter overhaul, keeping control of the project's costs may be an issue of concern for customers. We're confident enough of our processes to eliminate that concern completely and offer fixed price overhaul contracts if that is what the customer would like."

For more information

For Robinson overhaul enquiries, aircraft maintenance, or role equipment requirements, contact John on 07 378 8688, E: rotorandwing@xtra.co.nz or visit **www.rotorandwing.co.nz**

Warbird Ejection Seats Reactivation

and Maintenance by Warbird Egress Systems Limited

EMERGENCY aircrew escape systems have become mandatory equipment in high performance military aircraft since their first rudimentary designs were installed in Swedish and German aircraft of WWII. By the mid 1950s, UK company Martin-Baker had established itself as the world leader in the design and manufacture of ejection seats for aircraft such as the Hawker Hunter, BAe Strikemaster, and DH Vampire/Venom, to name a few. When the world's Air Forces retired these aircraft from service, the explosive charges were removed from the ejection seats and the aircraft sold off for scrap or to private owners wanting to fly them on a civilian register as 'Warbirds'.

Left: Glen Turner works on the seat in the de Havilland Venom at Ardmore.
Right: Glen fitting ejection seats into the ex-RNZAF Skyhawk fleet.

The RNZAF have had live ejection seat systems in various aircraft since 1955, but it is the civilian owners choice if they want to have a live system. The only other method of escape is bailing out, but that is generally next to impossible in most scenarios. New Zealand has seen many Warbirds on the register, but not until 1996 has a civilian owner wanted the egress system to be made 'live' in one, this being ex Singaporean Air Force single seat Hawker Hunter ZK-JIL. The maintenance team requested RNZAF Armaments Technician SGT Glen Turner to install the live seat system in ZK-JIL. Glen had spent more than four years servicing Strikemaster, Skyhawk and MB339 Macchi ejection seats during a posting to the Ohakea Seat Bay which included systems training in Italy on the new Martin-Baker seats for the MB339 in 1991. When researching the task, Glen discovered there were no regulations in NZ civilian aviation laws that governed the fitting and use of live ejection seats, so he drafted a set of rules and they were published by the NZCAA in December 1997 as AC43-21. The NZCAA issued Glen with a specific Maintenance Approval and he created his own Limited Liability company - Warbird Egress Systems NZ Ltd.

The servicing package that Glen offers also includes the sourcing, importation, storage and fitting of the explosive cartridges and rocket motors. Hawker Hunter ZK-JIL flew for the first time in NZ in March 2001, and because of that Glen has been involved with many other private ventures, including Hawker Hunters in Quebec/Canada and Brisbane/Australia, Vampires in NZ and USA, an EE Lightning in Mississippi/USA, F86 in Ardmore/NZ, DH Venom ZK-VNM at Ohakea/NZ and the Draken A4 Skyhawks in Florida/USA.

The business of servicing and supporting live ejection seat systems cannot be done alone, therefore Glen has joined the team of Safety Equipment Services Ltd (SES) in England (Martin-Baker's commercial agency), and was certified by Martin-Baker technical engineers for routine equipment servicing as part of the SES crew in 2008. Glen's company was recently appointed as SES's authorised agent and distributor in this Pacific area of operations.

Now nearing retirement from the RNZAF, Glen is looking to create a full time business from escape systems servicing and installations of various manufacturers' types, with more privately owned aircraft and a fleet of seats to manage as a long term project.

Contact Glen on 021 732 835, or email: egresssystem@egresssystemsnz.com

More than Maintenance at Fieldair Engineering

Fieldair Engineering Ltd. is more than just a specialist aircraft maintenance company – it has a multitude of support services that grew out of its own requirements, and are now very much central to how the organisation operates today. Fieldair Engineering Manager Phil Byrne says that "The key to our success is understanding the customers requirement and working collaboratively together to achieve the same goals".

Fieldair's aviation history

Fieldair was established in 1951 to maintain and overhaul the company's agricultural fleet, which eventually grew to more than 45 aircraft and helicopters. However when the market for agricultural topdressing began to rationalise, the company reinvented itself as a specialist aviation engineering business and freight transporter.

Fieldair Holdings Limited is the holding company for both Airfreight NZ Ltd and Fieldair Engineering Ltd which currently employs about 85 staff including 17 full-time pilots on contract, most of whom are engineers and based primarily at the company's headquarters at Palmerston North Airport. There are also engineering bases at Christchurch and Auckland International Airports, with Hamilton's new aviation painting facility (APS Ltd.) a recent joint venture.

Fieldair is part of the Freightways group of companies and plays a vital role delivering freight throughout New Zealand with its fleet of CV580s and CV5800 aircraft. This fleet transports up to 65 tonnes every working night of the year, making sure that 'next day' delivery means just that.

Fieldair Engineering has continued to upgrade its facilities and today ranks amongst New Zealand's most capable aircraft maintenance companies, providing air transport and general aviation operators with access to a wide range of airframe, engine, instrument, electrical and manufacturing services.

Fieldair's Instrument Services Division can undertake all types of repair, overhaul and major upgrade work. Lower right: Heavy engine maintenance.

Quietly achieving: Avionics, Maintenance & Engines

Without much fuss, Fieldair has steadily grown its capabilities and has become renowned for being a company that likes to say 'Yes'. Fieldair has a stable, experienced workforce and excellent facilities, and is proud of its reputation for safety and service.

Phil says that with the largest and most capable avionics team in New Zealand, Fieldair's Instrument Services Division can boast customers from New Zealand, the South Pacific and right around the world – with customers returning for both reasons of price and quality. As a Garmin (one of many associate OEM's) Service Centre, retro fitting of glass cockpits into legacy aircraft has become a much more frequent occurrence. Original pricing and time to install 'glass' initially put many operators off these upgrades. But with the strong NZ dollar, improved installation kits and certified STCs now available to service centres, the time has never been better to talk to the 'ISD' team. ISD services include complete aircraft instrumentation repair and overhaul, compass and gyro instruments, annual avionics checks and complex upgrades.

Fieldair specialise in a range of maintenance work, including scheduled maintenance, annual inspections, modifications, overhauls, repaints, major structural repairs, role conversions and aircraft restoration.

Fieldair's electrical workshop provides quality repair and overhaul services for an extensive range of fixed-wing and helicopter components, including generator control units, starter generators, alternators, actuators, switches, motors, starters, fuel pumps and voltage regulators - very little is outside of their capability.

In addition, the company operates an engine shop, which services and maintains piston engines. Fieldair has been overhauling aircraft engines continuously since 1969 and has a reputation for reliability and high standards. They are a certified Lycoming Service Centre and can offer customers turnkey solutions.

Fieldair's main facilities at Palmerston North Airport.

The joint venture APS painting facility at Hamilton.

Strong Engineering & Electronic abilities

Probably unbeknown to the majority of NZ aviators, Fieldair provide a variety of additional engineering services. The company is CAA Part 148 certified and undertakes a wide range of general engineering projects, having extensive experience at manufacturing freight handling and containment systems for road and aviation transport - as well as passenger stairs, trolleys and other ground support equipment. They are specialists in short-run contracts in steel and aluminium alloys.

Fieldair has a ground handling and maintenance team as well as operating the local refuel department around the clock 24/7 on behalf of Air BP. As Phil says, "everywhere you look you can find one of our Fieldair team making it happen".

Successful tenders for Airport Companies and the RNZAF have played a significant role in Fieldair's expansion of general engineering services which are now located at a separate hangar away from Fieldair's main facility.

Fieldair's range of work includes making parts and modifying aircraft for role changes or equipment upgrades. Aircraft operators with any such requirements are invited to contact Fieldair – Phil says they are always happy to come and discuss requirements at your site to save you time. Recent jobs include E-link chargers for the Air NZ Link fleet and several role equipment assemblies for various helicopter operators.

Top: The main hangar fits all NZ operated turbo-prop aircraft. Lower: Nitrogen rigs manufactured for the RNZAF, and made-to-order freight equipment.

Part 145 approved and with Fieldair's ISO9001 quality accreditation also behind it, ISD repairs a vast array of precision equipment and instrumentation outside of aviation. They can also calibrate external customers tooling, pressure gauges and other electronic equipment in a timely and cost effective manner.

There's an international component to Fieldair's operation too. The re-generation of the ex-RNZAF Skyhawk fleet has involved the Fieldair avionics team from Palmerston North, ensuring that the complete avionic suites were made serviceable and shipped to the USA. Specialists from the team were required to accompany the equipment, then install and test it - and were delighted to see the first few aircraft fly prior to departure. Draken (the customer) was so pleased with the result that an on-going contract for this support has now been agreed and will operate for years to come.

Parts and Supply

Fieldair Engineering operates a fully stocked supply department, providing aircraft inventory, break-down spares, consumables and logistics solutions in direct support of their maintenance activities. The parts and supply team also provide advice and support to external customers maintaining other aircraft. Part 19F approved, Phil says the Fieldair team offer a dependable, prompt, and cost effective service that includes free advice on spares procurement, on-line parts searching of Fieldair's inventory, and 'same day' despatch service for in-stock items. He also says that assisting local operators in sourcing parts is common – "contact us anytime".

Flexible labour and contracting services

Fieldair Engineering is a large organisation with a wide range of skills and expertise. It has the ability to move staff within its various departments to make full use of their skills and experience when required. Phil says that "Another thing we have started creating is a labour pool for members of the aviation industry. In aviation you often require 'surge' labour for a particular large or urgent job. There are often a lot of independent contractors and it can take a lot of time to track them down. We're aiming to maintain a database of those contractors, as well as our own employees. It means we can better manage that pool of labour and this is starting to gain traction. We administer the contractors for other members of the aviation industry. It works for the contractor; it works for us; and it works for the organisations and companies that have that critical requirement."

Fieldair in the community

Fieldair is a major employer and is often called upon to engage with the local community, regularly hosting businesses and charitable groups in their large hangars. Staff are encouraged to be community contributors too, and Fieldair provides resources annually to support completion of the Cancer Society's Relay for Life, as well as towards cyclists by supporting the Tour de Manawatu each year.

For more information

Phil says that Fieldair is "seeing good signs of growth at the moment, especially in the avionics shop, contracted aircraft maintenance and the manufacturing department. Because of our scale and reputation, and the complete capability package we can offer, we're getting more approaches from companies and operators looking for support and engineering services throughout NZ."

For enquiries regarding any of Fieldair's services, contact Phil Byrne in the first instance on 09 357 1149, email: phil.byrne@fieldair.co.nz or visit **www.fieldair.co.nz**

FIELDAIR ENGINEERING LTD
Engineering for Aviation

Signature Engines from Aeromotive

AS WELL as providing a suite of other fixed-wing maintenance services, Aeromotive at Hamilton Airport have a comprehensive firewall forward capability, with the engine shop supported by peripheral bays for stripping, inspection and NDT, electrical, fuel and stores for all engine components.

Approved as a Lycoming Service Centre and a Centurion Service Centre, Aeromotive can cater for most piston engines in the market, whether in for complete overhaul or remedial work following a prop strike or overspeed, etc.

All overhaul work at Aeromotive is able to be carried out in-house, there being no requirement for outwork. Also on site is the only dedicated piston engine test cell in the country, making it easy to test-run and calibrate engines in a controlled environment following overhaul.


TIO-540 J2BD

Oceania Group Engine Overhaul Manager is Greg Mundell who also oversees all overhaul work through the Hamilton facility. At Aeromotive South in Timaru, engine work is headed up by Terry Wilson.

Aeromotive's standard overhaul product is branded 'Signature', a Signature Overhaul including various features to ensure premium quality and longevity of service.

Signature engines are fitted with new cylinder kits (rather than overhauling original components), and in the case of a flat tappet engine, a new cam and followers. In both cases, Greg says the value added exceeds the cost involved. Cylinders can be overhauled instead, but there's a risk they may only last for half a life ("and commercial operators don't want to have to worry about cylinder leak rates all the time"), and whilst experience says that used camshafts will be dimensionally fine, they will carry metallurgical fatigue and there is a reasonable probability that they will fail before the next engine TBO is achieved.

A new ignition harness will also be fitted as this is another low cost exercise at the time of overhaul versus being more expensive down the track once the engine has been installed.

Sparkplugs are usually replaced, though operators may choose to retain existing ones if they are low time and particularly if of an expensive type.

Aeromotive take pride in the appearance of their work. Greg says "We think if your engine overhaul costs you $30k then the engine should look like you just spent $30k on it. We go to a lot of effort and do the best job possible for appearance and future corrosion protection."

Customers can negotiate out of any of the mentioned Signature range options if they wish, but Greg says the engine won't then be Signature branded or carry the same warranty.

Greg is happy to quote for fixed price overhaul work, with Signature quotes being based on the existing crankshaft and crankcase being reusable. A large range of exchange engines can be drawn from the wider Oceania Group if required, or if customers want to retain their own engine then a 10 day turnaround is available by arrangement.

Other maintenance opportunities

Of course with Aeromotive's wider capabilities all under the same roof, it makes sense to not only bring the engine, but the rest of the aircraft as well. Any other repairs or work required, including Cessna SIDs inspections can then be efficiently accomplished at the same time.

Greg says that operators should also consider overhaul of their engine mounts, cables, and baffles (the latter being required as part of the engine warranty conditions).

It's also a good time to complete any upcoming major checks, such as for fuel tanks (10yr) on Pipers, etc.

If the engine arrives for overhaul still attached to the aircraft, then Aeromotive will dynamically balance the prop, though this is usually done after 10-15 hours of run-in time because the engine operations for balancing aren't conducive to the running in process.

For more information

Also in this issue of KiwiFlyer is an article on the overhaul of a Robinson R22, with more information on the engine overhaul process including the stages of overhaul, inhibition for storage, and running in requirements.

To find out more about the services and options offered by Aeromotive, contact Greg Mundell on 07 843 3199 or email: greg.mundell@aeromotive.co.nz **www.aeromotive.co.nz**

JEM Aviation

Maintenance and Restoration Specialists

ENCOURAGED by the planned opening of the Omaka based Aviation Heritage Centre, JEM aviation opened its doors in 2006 and has grown steadily on a diet of antique and warbird aircraft restoration and maintenance.


Jay McIntyre, owner of JEM Aviation.

The dedicated team of four is led by company director, licensed engineer and I.A., Jay McIntyre. Jay says that "the JEM team come from varying backgrounds resulting in innovative approaches to problem solving and a range of highly useable skills not often seen in workshops these days."


Omaka Real Flying CLub's Tiger Moth BER, based at Omaka and under the care of the JEM Aviation team.


Yak-3 ZK-VVS, restored to as-new flying condition by JEM Aviation. See the feature in KiwiFlyer Issue 24.

While most commonly associated with perhaps the more exotic end of the aircraft spectrum, JEM is equally at home maintaining the pride and joy of any owner. Jay explains; "GA aircraft haven't historically made up the bulk of our work load but we are enjoying seeing the numbers grow as owners realise there are other options to their traditional maintainer. We welcome all aircraft owners and operators to come and discuss the options with us."

Fabric work is a speciality and along with that comes painting. "Our reputation as a 'finisher', based on completed projects including Cub, Auster, Cherokee, Yak-3 and various Nanchang's is seeing a steady increase in repaint enquiries. We are committed to the highest quality and to this end have invested significantly in this area of the business." A second hangar within the Omaka Aviation Heritage Centre Airpark has been purchased with the view of becoming a dedicated paint-shop.

Painting is only the finishing touch however, and full rebuild capabilities from the smallest part to complete aircraft are offered. In addition JEM has the ability to overhaul 'Special' category engines. Jay says they are very lucky to have two dedicated aircraft machinists within the Blenheim region, giving quick turn around and clear communication. Additionally, a specialist company literally on the back doorstep means easy access to procedures such as plating, NDT and propeller services.

The JEM team loves a challenge and are becoming known throughout Australasia for their accommodating attitude, proficient skills and can-do attitude. "As an enthusiast myself, I am rewarded when an aircraft owner leaves happy," says Jay. "Customers enjoy regular communication and the JEM Aviation team work closely to ensure projects are completed efficiently, competently and with respect to their budget and expectations." Jay says that no aircraft is too great or small; "Consider us as your aircraft maintenance provider or restoration project specialist".

For more information

Contact Jay McIntyre by phone on 03 578 3063, email: jay@jemaviation.co.nz or visit **www.jemaviation.co.nz**

contributed by Judith Hill, Sales Manager Propulsion and Specialist Services, Safe Air

Innovative Propeller and Specialist solutions from Safe Air at Blenheim

Lead hand, Darren Goodall, displays the latest Hartzell Top Prop kit, available through SAFE AIR.

SAFE AIR Limited, located at Blenheim Airport, is the largest facility of its kind in the southern hemisphere and the only OEM-approved services provider for Hamilton Sundstrand, McCauley and Hartzell propellers.

For over 60 years, from its inception as the cargo carrier Straits Air Freight Express (operating Bristol freighters across Cook Strait), to the present day One-Stop aircraft, propulsion and specialist services Maintenance, Repair and Overhaul facility in New Zealand, SAFE AIR has re-invented itself many times to better serve the needs of a dynamic aviation industry.

From Argosies to A-4 Skyhawk fighter jets, and Cessnas to C130Js, SAFE's history includes decades of exciting accomplishments ensuring the safe operations of aircraft. The company's scope runs from single piston-engine planes common at local aeroclubs, to charter cargo and passenger aircraft serving the tourist market, and right through to Air Force helicopter and heavy-lift aircraft readiness.

We are a unique operation by anyone's standards, and continue to provide innovative solutions to the varied enquiries we receive from customers all over the world, and here at home in New Zealand.

Right now, we are working on aircraft, engines and propellers from repeat customers in Thailand, Pacific Islands, USA, Germany and Australia, with interest pending from South America and Canada.

With a deep commitment to servicing the RNZAF ongoing requirements, whether it be a ramp-up to maximum capacity to accommodate fleet upgrades, or ramp-down in recognition of a reduced work scope, SAFE has developed a reputation for excellence in aviation. We are first and foremost customer-focused, and have adapted the various departments to meet customer priorities, always ensuring compliance and safety are paramount.

Propeller and Composites Services

When Don McKenzie completes a propeller job, he wants the customer to say "Wow" when they open the box on receipt. In his 20 years with SAFE, Don has completed overhauls on propellers from Mosquitos, Spitfires, and multiple blade types too many to list.

The SAFE Specialised Composites Bay does great work undertaking the evolving processes required to ensure blades are airworthy. There is more to a blade overhaul than meets the eye and it takes highly-trained personnel to achieve the standards set by our OEMs. Paul Fry and Shane Matthews, resident composite wizards at SAFE have some 25 years between them in the Composites Bay, and SAFE is the only Hartzell-approved facility in Australasia able to change the leading edge guards on Hartzell blades.

Electroplating and Engineering Services

Tony Little, Manager Specialist Services, oversees the largest electroplating bay in the southern hemisphere. We're very proud of the breadth of services we offer; from chrome to nickel, copper, cadmium and silver, ours is the pre-eminent location for all plating, and under one roof. The plating resource is utilised by many of our maintenance services, such as on propeller shafts, hubs, and engine parts. Many parts come in just for plating services.

In conjunction with the specialist plating bay, we offer the gamut of capabilities around machining, metal forming, grinding, welding, shot-peening, heat treatment and painting to name a few. Together with non-destructive testing, calibration, balancing, and optical alignment, SAFE is a power-house of aircraft solutions for most repair, maintenance and often manufacturing work, from single parts to ongoing multiple-aircraft servicing.

Left: Precision measuring by Don McKenzie. Centre: The largest Electroplating Bay under one roof in the southern hemisphere. Right: Electroplating in progress.

One such instance was a *small* job we did for a US customer who was looking to set up a training facility. They needed a couple of dozen A-4 Skyhawks to be dragged out of the desert and refurbished to flight-worthy status. Over a period of 12 months, Jock Cameron, Mike Spooner and several others were among the SAFE personnel who changed fuel hoses, repaired engines, prepared the aircraft and signed them off for flight. With this, SAFE continues to service the engines and remains involved as a valued resource for the US company's operations.

Engineering Design Services

Another area we are particularly proud of is our Engineering Design capability. We offer a total package: design, manufacture, install, test, certify and maintainance of a comprehensive range of complete turn-key solutions for a single aircraft or an entire fleet. David Goodwin, Manager, ED, oversees a single source solution where SAFE manages all aspects of the entire project including through-life support once operational. Past designs and modifications include GPS installations, glass cockpit and avionics upgrades, Cockpit Voice Flight Data Recorder installations, fuselage and wing structural design and more.

Our Customers' Experience

Our One-Stop story wouldn't be complete without a short flight down memory lane: Concerning one of the final missions of the Bristol Freighter into the Chatham Islands, pilot Craig Emeny related that his Cessna 180 was "not behaving very well" and he was reluctant to leave the island. At the time, the local pub ran out of beer, with the publican anxious that "if the boys take the top shelf they'll go crazy." So they chartered a Bristol flight to save their sanity and sure thing, the Bristol arrived with two tonnes of beer on board! But that wasn't the end of the story – Craig needed his Cessna returned to the mainland, so the boys all got together and stripped off the wings, loaded the Cessna into the Bristol, and it flew as cargo back to Blenheim, where it was reassembled.

Craig continues to utilise SAFE's expertise in servicing his Convair 580 turbines and gearboxes. SAFE sources parts from all over the world and Craig is very happy with the relationship. "It means not having to ship overseas, and the guys go out of their way to make things happen," reports Craig.

This is just one of the accolades SAFE personnel receive on an ongoing basis. It is not uncommon to open emails expressing thanks and appreciation for the "excellent service and great price."

So let me allow a customer to have the last word: "The fact that we were able to do this and now have our maintenance back on, is in no small part due to the efforts of your team."

Today, SAFE remains alive and well, undergoing another transformation to reposition for whatever the aviation industry requires next, and continuing to provide customers with a unique combination of services, talent, and can-do attitude. We look forward to supporting all aviators in whatever way we can.

SAFE AIR was instrumental in preparing these Skyhawks for flight readiness.

Performance Aviation

Innovative thinking delivers mods for performance and safety

Performance Aviation Limited have been operating since July 2006 when Matt Bailey set up operations at Wanaka Airport. Matt and his team undertake a diverse range of helicopter and fixed-wing maintenance and overhaul, with a variety of helicopters on the books (they are one of the largest Robinson maintenance bases in the South Island) and a list of fixed-wing aircraft that include P-51 Mustang, L-39 Albatros jet, PAC 750XL, and more. Recently, Performance Aviation was approved as a Guimbal Cabri Service Centre, now caring for a Cabri based near Tekapo.

Performance Aviation are a Guimbal Service Centre.

Cost effective mods available

It was always Matt's plan to offer more than basic aircraft maintenance and to this end, the company has either developed themselves, or acquired agencies for a variety of mods that are now available to cost effectively improve the performance of aircraft and offer good returns on investment for operators.

These approved modifications are available to all operators and their maintenance providers, giving Performance Aviation a customer reach well beyond their local patch.

Electronic Ignition kits for Lycoming and Continental.

Electroair Electronic Ignition Kits

Performance Aviation have recently been appointed as Australasian dealers for Electroair, who produce the EIS-41000 series of electronic ignition kits which are fully STC'd for most Lycoming and Continental four cylinder engines. Electroair kits include all parts (except for switches and circuit breakers which tend to be client specific) to replace the direct drive (typically right hand) magneto.

Powerflow exhaust system fitted on Robinson R22.

Electroair say that replacing one magneto with the EIS-41000 will typically improve fuel economy on average by 10-15% (many operators have reported consistent fuel savings of 1gph or greater). Additionally there will be an improvement in horsepower, smoother engine operation, and improved high altitude performance.

Matt says that customers can also expect easier starting and longer spark plug life with less fouling. Most parts on the EIS-41000 are not life limited, contributing towards lower maintenance costs and an expectation that the system will comfortably pay for itself within the first 1000 hours.

See the article in KiwiFlyer Issue 30 for more information. Matt says an Electroair kit has now been fitted to an aircraft at a major flight training school in the North Island. Their early report has been of a noticeable difference on start-up, the engine being easier to start and running smoother on the ground.

For more detailed information, visit the Electroair website, www.electroair.net

Powerflow Exhaust Systems

Performance Aviation are the preferred Powerflow exhaust systems dealer in the Pacific region, and have fitted dozens of the systems to local aircraft. Powerflow are an extremely popular four cylinder Lycoming performance enhancement with thousands now flying around the world.

With the support of Powerflow, Performance Aviation developed a fully STC'ed Robinson R22 Beta exhaust system that provides operators with a hot and high performance considered near equivalent to a R22 Beta II. Their testing showed that owners should expect to save 5 litres of fuel per hour if they operate at the performance levels they would be accustomed to. Or they can trade that fuel saving for the noticeably increased performance that is available, particularly in hot and high conditions. Carb heat is also significantly improved thanks to a more efficient collector and shroud design.

Another expectation is to not replace the system at 2200 hours (for US$2500+) as is the case with standard systems.

Start-up Over-speed Protection for Robinson R22 Helicopters.

This simple mechanism is also in development for the R44. Matt says he just needs a few wise owners to sign up which would underwrite the STC process. KiwiFlyer thinks this device is one of the cheapest insurance options you could buy because…

The start-up over-speed protection system designed by Performance Aviation prevents the engine from being started unless the throttle is closed. Most start-up over-speeds occur because the throttle has been turned to the wrong stop, i.e. full open. In such a case, the resulting overspeed will almost certainly go straight through the upper limit that necessitates a bulk engine strip. By the time that's done for an R22 there likely won't be change from $15,000 or $20,000 in the case of an R44. Even if you think you would never do that yourself, consider the other people who might fly your helicopter from time to time, and who will pay if it does happen. The mod only costs a few hundred dollars to buy and doesn't take long to fit. Start-up over-speeds happen more often than you might think. Robinson agents Heliflite Pacific at Ardmore say they attend to at least one a year.

For more information

Contact Matt Bailey at Performance Aviation by phone on 021 744 588, email: matt@performanceaviation.co.nz
www.performanceaviation.co.nz
www.facebook.com/performanceaviation

KANNAD ELT battery replacements due commencing Jan 2014

Lloyd Klee of Aviation Safety Supplies based at Tauranga advises that KANNAD ELTs and PLBs are coming up for battery replacements commencing January 2014. It is a good idea for operators to look now and see exactly when theirs will fall due so it can be booked in to ensure that parts are in stock and that a fast turnaround time can be provided. This is usually 48 hours subject to the availability of batteries. If required, Lloyd says he does have a number of exchange units available.

Aviation Safety Supplies are the only KANNAD approved Part 145 repair station in New Zealand and offer a 24 month warranty on all KANNAD products that they re-battery and re-certify. Lloyd also provides customers with a free RCC registration check.

Lloyd says there is now quite a major issue to contend with in that, effective October 2013, most airlines have refused to carry bulk stocks of lithium metal batteries. Thus there is a high chance of batteries being difficult to obtain when you want them. Unless the circumstances change, this will mean that higher quantities of batteries will need to be imported by sea freight at less frequent intervals, ultimately at higher cost and with the risk that if forecasts aren't accurate then we will have older rather than newer batteries available to ELT owners. Hence the advantage of checking when yours is due and booking its replacement some time in advance. KANNAD ELTs do need to be returned to an approved facility for battery replacement as specialised software and testing equipment is needed for the job.

For more information

For all enquiries on ELT and PLB products, accessories and antennae for helicopter or fixed wing applications, contact Lloyd Klee (details below). Aviation Safety Supplies also stock ELT and PLB testing equipment as well as a wide range of other safety products including life jackets and collision avoidance systems.

Aviation and Performance Parts

NZ's leading aerospace hardware specialists

WHENEVER aircraft hardware is required, commercial organisations and homebuilders all turn to Aviation and Performance Parts. Owned and managed by Lianne Bergin, and based on Auckland's North Shore, the company has a proud history of delivering all manner of essential aircraft items to its customers who include airlines, maintenance organisations, aero clubs, home builders, and also car enthusiasts.

Aviation and Performance Parts range includes all manner of Pilot Supplies, Accessories, Aircraft Seats, Aircraft Engine Parts, Air Frame Parts, Avionics, Batteries, Books, Covering Materials, Decals, Ducting, Electrical Components and Mounts, Filters, Fuel System Parts, Grips, Hardware, Headsets and Intercoms, Hinges, Hoses, Instruments (engine and flight), Jet Parts, Lock Wire, Metal Supplies (steel and aluminium), Paint, Pulleys, Seals, Switches, Aviation Tools, Trim Systems, Wheels, Wire, Wood, and much more.

They are direct importers and have a large warehouse of both certified and non-certified stock onsite for immediate despatch. CAA Part 19F certified, there is full track and trace systems in place for serialised parts. A range of Cessna aircraft parts are also stocked, as is a very large variety of AN, MS and NAS hardware.

Aviation and Performance Parts are the New Zealand Aircraft Spruce and Specialty distributor, with weekly shipments of parts coming in from this huge US supplier. See www.aircraftspruce.com for the many thousands of items they have available.

Shipping is easily arranged all over the country and to the South Pacific Islands, and local customers are welcome to call into the showroom at Mairangi Bay. Lianne says there is no minimum order quantity or value. If you need just one nut or washer, it will be supplied with a smile. The same goes for advice. Lianne and her team have many years of experience in the industry and are happy to help with any questions people have regarding their project requirements.

For more information

Aviation and Performance Parts' goal is to provide high quality parts on time for a reasonable price. To find out more about how the team can support your requirements, contact Lianne on 09 476 0984, e: sales@apparts.co.nz or visit **www.apparts.co.nz**

More Capability at Central Aero Engineering

Central Aero Engineering at Hamilton Airport continues to steadily grow with two new staff in the main workshop, plus an additional team member for sister company Central Aero Electrical next door. Joining Paul Waterhouse and Steve Grainger are Hamish Ross who is working towards becoming licenced, and licenced engineer Kanda Sami currently in a part-time role. Instead of Paul answering the phone, callers are now greeted by Maureen Griffiths in the office, freeing Paul up to spend more time with customers and in the hangar. And joining Martin Ross at Central Aero Electrical Limited is Zoran Dordic, whose East European background has been of great assistance with Russian YAK Manuals

Paul says the new staff are a welcome addition to the company, bringing more capability to an already long list of services, and more diverse experiences with which to support clients.

Top: Steve Grainger working on a hydraulic pump and reservior unit change for a JetRanger. Above: Kanda Sami and Hamish Ross working together on Cessna SIDs remedial maintenance.

In the hangar

Supporting the claim of diverse capabilities, in the hangar when KiwiFlyer visited at the end of November were a Bell JetRanger for 3000hr component inspections as well as a hydraulic pump and reservoir unit change, a Robinson R22 for a belt change and another for an actuator change, an amateur built Arion Lightning about to start flight testing, and a Cessna 172 in for SIDs inspections and refurbishment. There was also a Robinson R44 about to head out with new bladder tanks fitted (this being the fifth completed by Central Aero to date).

That diversity suggests that if Central Aero are specialised in anything, it is customer service. To that effect, one of Paul's comments for this article was to reinforce the offer that aircraft operators are welcome to phone up anytime, simply to ask a question or for advice on any aircraft issue – regardless of whether they are existing customers or not.

Wide capabilities

Central Aero Engineering's capability list is wide indeed and now includes relatively recent equipment additions of test equipment to allow 24 month avionics checks to be carried out on site, plus a new set of scales for providing a weight and balance service.

With experience on Robinson, Bell, and Eurocopter types to name a few, Central Aero can provide comprehensive maintenance services for piston and turbine helicopters, including for Robinson 2200hr/12yr overhauls which they have previously carried out.

Fixed wing maintenance is also regularly conducted, with recent workload mostly involving Cessna SIDs programme compliance. With compliance deadlines getting closer, Paul reminds owners who haven't taken action that they need to do so very soon to avoid grounding their aircraft. Central Aero can repair much of the potential damage and wear that will be found in-house. The most recent project in this regard was a Cessna 185 which was completely stripped inside and out, then repainted and reassembled for a perfect first flight. Paul says the owner was thrilled.

Central Aero have significant workshop resources for sheetmetal fabrication and repair and Paul says they continue to work with design organisations in support of mods development. One such project was the construction of sample components for Beech floor beam reinforcements.

Another string to the Central Aero bow is the provision of rebuild and restoration services, and of supervision services for restoration projects, a grand example being the stunning looking Ryan STM in the next hangar.

Paul can also provide qualified maintenance control services, with appropriate licence coverage and experience relating to the operators aircraft.

For other maintenance facilities, Paul offers a maintenance auditing service when required. He is often called upon to conduct airworthiness reviews for other providers who prefer someone from outside their organisation to see and comment on maintenance processes.

And it doesn't end there. Hot air balloon inspection and repairs are on the list, as are gliders, autogyros, microlights, LSAs, and quite a lot more as well. See www.centralaero.co.nz for Central Aero's full capability details.

Import and CoA services are also provided from "anywhere" to NZ, and following this process, a Piper Cub will be arriving in the hangar early next year, ex the USA.

Central Aero Electrical Limited

Operating from the hangar next door, Martin Ross, Principal of Central Aero Electrical Ltd., has also been adding capability to his business. With new employee Zoran Dordic, he is now offering more electronics repair services (especially for obsolete parts that manufacturers might no longer support), as well as helicopter actuator overhauls. Martin is the go-to person for all odd and unusual electrical requirements, especially for elderly aircraft such as Tiger Moths and WWII varieties. Over the years he has acquired many service manuals for older aircraft for which he says he has undetaken a lot of recent magneto and overhaul work.

Martin has also been building up a large stock of tested and exchange units for a variety of aircraft. These include Starter Generators, GCUs, Voltage Regulators, Reverse Current and Over Voltage Relays, Whelen Strobe Units, H369 Actuators, as well as various 14V and 28V Alternators and Starters. Call for details.

For more information

Paul says that "If you're thinking maintenance, then think Central Aero. We'll be pleased to help whether it be just for friendly advice, or to book a job in." Contact Paul on 021 418 677, email: paul@centralaero.co.nz or visit www.centralaero.co.nz

Martin Ross at Central Aero Electrical can be contacted on 027 733 0208 or by email: centralaero@clear.net.nz

NZ's Radiola Aerospace a world leader

With a fascinating history and product offering, and significant success on the international stage, one would think that Radiola Aerospace would be more well-known to New Zealand aviators. In this country though, the aviation services that Radiola offers are in the main provided by state-owned monopoly Airways New Zealand, to a degree thus restricting local recognition of Radiola's capability and achievements.

SPECIALISING in the delivery of systems and services that enable aircraft to land in safety, day or night, in all weather and environments, Radiola Aerospace is a significant exporter of New Zealand talent and technology to international military and civil aviation customers. The company is a major international provider of ground-based aeronautical radio navigation aids and communications systems, flight inspection and flight validation and other support services.

GPS survey prior to flight inspection.

Navigation and Communication Systems

Radiola Aerospace has long standing experience in the delivery, maintenance and support of ground-air communications systems, and traditional ground-based navigation systems such as ILS, VOR, DME, and NDB. The company also delivers tailored GPS-based solutions that enable precise tracking, monitoring and control of airborne and ground-based assets in both low and high threat environments. Systems can be supplied as turn-key, ready to work in any environment, including for demanding tactical and military requirements. Communications systems can be delivered as stand-alone or in support of navigational aids, and include VCCS, HF, VHF/UHF and microwave, all for fixed or mobile requirements. Meterological systems as well as airfield lighting and signage solutions are also supplied by the company.

Flight Inspection and Flight Validation Systems

Flight inspection and flight validation represent important steps in the delivery of ground and space-based navigation solutions. Radiola uses specialist test equipment to ensure that navigation aids are performing to the exacting standards required of them.

Now operating five flight inspection systems, Radiola is equipped to supply flight inspection teams who are skilled in various languages and cultures and can deploy at short notice to many different countries. The company also partners with local organisations to establish their own local flight inspection capabilities when required.

A Radiola base in Nottingham in the United Kingdom provides flight inspection services to Europe, North Africa and the Middle East utilising the Diamond DA42 (specially modified for Radiola in a partnership arrangement with Diamond Aircraft). These aircraft are fitted with Radiola's AT 940 flight inspection package which provides commissioning, special, engineering and periodic flight inspection of ILS, NDB, AGL/PAPI, VOR, PAR, PSR/SSR, DME, and TACAN navigation aids.

Flight validation of an instrument approach, including RNP AR procedures, is a final part of the formal regulatory approval process. It confirms the procedure complies with international design standards, provides the required terrain and obstacle clearances, and is safely flyable with an acceptable pilot workload. These, and periodic revalidation of published instrument approaches are critical components to assure the flying safety of travelling public. Checks may also include runway markings, lighting systems, and wind direction indicators. Radiola's worldwide experience in this process is extensive with more than 1500 procedures validated to date.

Military Solutions

It may surprise many readers to find that Radiola Aerospace has a long history of supporting military operations not only at home but also deployed in hostile environments. The company has completed contracts for the RAAF, RNZAF, USAF, USACE and USMC, delivering customised systems in locations including Iraq, Afghanistan, Timor L'este, as well as Australia and New Zealand.

Airfield Lighting Systems

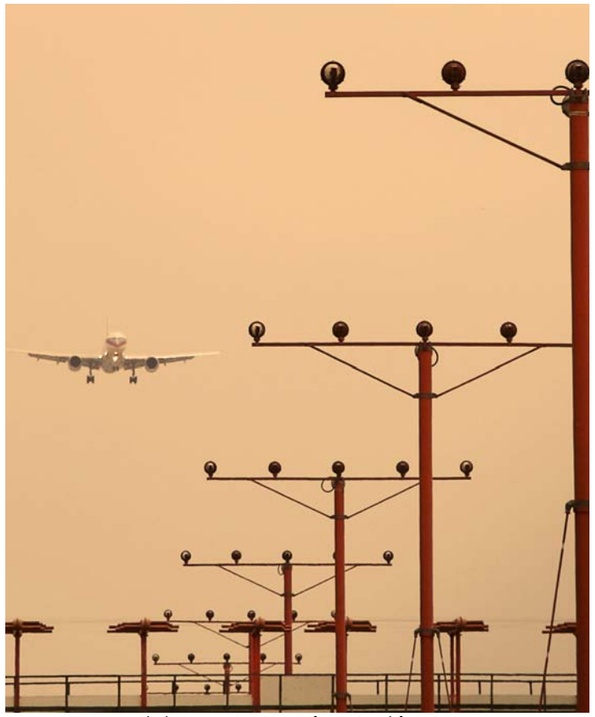
Radiola also deliver fully compliant airfield lighting solutions, tailored to individual situations. These include cabled and solar systems, incandescent or LED runway and taxiway lighting, control and pilot activation systems, as well as WDI, RTIL/REIL, PAPI and ALS systems. Services may include anything from design advice and support through to full turnkey project management.

A strategy of quality

Tracing its origins back to the formation of AWA in New Zealand in 1913 (AWA supplied the first ATC radar system to CAANZ), Radiola has participated in the international marketplace since 1995. The company has now operated in more than 60 countries, with consistent growth in capability and capacity during this time - all funded from operating profits and with no cross-subsidisation from other operations. This is in fact very praiseworthy. As Executive Director Richard Thompson says, "We've never been in a position, nor wished to receive 'gifted revenue' from captive markets to fund development." That's something he says the company does unfortunately see in some markets, often alongside reducing standards and rising costs for operators. Richard says that Radiola's strategy is to compete strictly on quality rather than cost and it's a strategy that stands the company in good stead with authorities and regulators around the world. For example, Radiola is one of only three companies certificated to provide Flight Inspection Services in the United Kingdom by the UK CAA. Its quality driven strategy also sees Radiola win projects against stiff international competition, often against Air Navigation Service providers or Civil Aviation Authorities which operate as monopolies in their own countries.

A history of leadership

Radiola Aerospace has achieved several firsts in its fields of operation. These have included introducing advanced aircraft and electronic technology to create significant flight inspection efficiencies and full standards compliance. Radiola was the first to use portable flight inspection systems under a regulatory approval, and also the first to use the Diamond DA42 aircraft for flight inspection. Richard says that in all cases, others have followed their lead. He says the company was also instrumental in the development of the latest generation flight inspection systems from Airfield Technology in the U.S. The 'AT 940' was developed to meet specifications set by Radiola who were the first to purchase and deploy the system.



Flight inspection is a safety critical function.

Diversely skilled, multi-tasking staff

By necessity, Radiola projects are frequently complex and integrated. 100% owned by its staff, Radiola's team includes navigation engineers who are specialised in ground based navigation solutions, advanced satellite precision tracking solutions and communications networks. The company's Flight Inspectors have more than 100 years of experience inspecting and calibrating navigation aids all over the world. All Radiola staff have diverse skillsets and are expert at multi-tasking in international environments, often under difficult conditions.

For more information

To find out more about the benefits this innovative, private company delivers to its customers, contact Richard Thompson on 04 238 0113, e: richardt@radaero.com or visit **www.radaero.com**

Company Milestones

RADIOLA Aerospace Limited was established as a stand-alone company in 2003. At that time it took over the assets, contracts and staff of the defence and aerospace division of Radiola Corporation which had been formed in 1990 in a management buy-out of the major divisions of AWA NZ. AWA, a company formed by Marconi and Telefunken in 1913, had a long history of supplying systems to NZCAA and defence forces.

Today, Radiola Aerospace is a staff-owned, internationally recognied company specialising in the sale, installation and support of ground-based aeronautical radio navigation aids and communications systems, and the provision of flight inspection and flight validation services.

Historical milestones include:

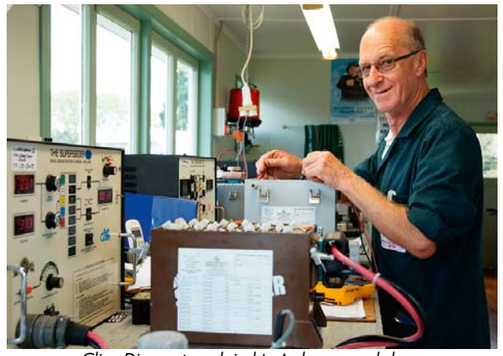
1913	Formation of AWA in New Zealand.
1950	AWA supplies first ATC radar system to CAANZ.
1987	AWA supplies three VOR-TACAN systems to RNZAF.
1991	Radiola is certified to ISO:9001.
1995	4 ILS/DME systems supplied and installed for RNZAF.
1996	CAANZ Part 171 certication.
1996	Awarded long term contract to operate and maintain RNZAF ILS/DME and provide flight inspection services.
1998	First offshore contracts for navaids; HF ATC for Fiji CAA and ILS/DME, lighting and flight insp. for Vanuatu CAA.
2000	RNZAF contracts for VORTAC ops and maintenance.
2003	Management and staff purchase the defence and aerospace division of Radiola to form Radiola Aerospace Limited.
2003	Flight insp. services to Samoa, Fiji, Tunisia, Bangladesh.
2005	Flight inspection services to ICAO.
2008	100% owned Australian subsidiary formed.
2008	Awarded 3 year CASA contract to provide NPA flight validation services at 300 aerodromes.
2009	ASSI certifies Radiola Aerospace under OTAR PART 173 for flight inspection in British Overseas Territories.
2010	100% owned United Kingdom subsidiary formed.
2011	CASA flight validation services contract extended 3 years.
2011	CAA United Kingdom certifies Radiola under CAR CAP670 for flight inspection services.

Flight inspection crew on deployment in Angola, Africa in 2013.

It all starts with the battery

Aviation Ni-Cad Services celebrates 30 years in business at Ardmore

IT WAS 1983 when Clive Dixon left his employment at Marine Helicopters and started contracting his services to companies based at Ardmore Airfield. Seeing a niche opportunity, he soon acquired a charger/analyser and that year undertook 60 nickel cadmium battery services for his customers. The service proved popular and before long Clive was working solely on nickel cadmium battery servicing, leasing his current premises at Ardmore in 1989.



Clive Dixon at work in his Ardmore workshop.

Still fiercely independent and working on his own more often than not, Aviation Ni-Cad Services Limited now holds NZCAA Part 145 C3 and Part 19F S1 and S2 certificates. Clive says he was "probably the first one-man-band organisation to get Part 145 certification", which was "tricky at the time as I obviously couldn't carry out self-audits, but I organise an auditor from my customer base to do that for me."

Nowadays Clive has "several of the best charger/analysers available," and undertakes some 400 battery services every year for customers all over New Zealand. Compared to most other operations that service batteries as an add-on part time service, Aviation Ni-Cad Services Limited is a specialist company that does nothing else but batteries.

Customers first

Clive prides himself on customer focus and has always offered a 24/7 service. If the lights are on at 3am, it could well be Clive getting an urgent job done for someone who needs their battery back the next day. It's an approach which has secured a wide customer base that includes Eagle Air, Air Nelson, Airwork, Eurocopter, plus numerous helicopter and business jet operators. One customer even ships batteries from Australia back to NZ for servicing because of the poor experience they have had in Australia.

Nickel cadmium battery servicing requirements

All nickel cadmium batteries require servicing on a regular basis. "It's the same philosophy as replacing oil in an engine," says Clive. Depending on the battery and the aircraft manufacturer, servicing may be required every 3 or 6 months, and overhaul every 12 months. A typical service involves capacity testing, deep cycling (usually 2 to 3 and sometimes 4 times), and the checking of temperature sensors. An annual overhaul requires a complete strip down and inspection, with each of the 20 cells having 15 items of hardware to check.

In the early days of nickel cadmium battery use in New Zealand, batteries were often seriously damaged by lack of servicing because at the time, many operators didn't consider it necessary. Regular servicing prolongs the life of batteries, and with a typical value in the order of $9000, prolonging the life is a good idea.

The major reason for deep cycling is to overcome what is termed the 'memory effect' caused by the positive plate charging slightly slower than the negative plate. This is due to constant voltage charging on the aircraft. On the bench recharging is carried out by a constant current recharger which brings the two plates up to capacity together.

Clive has examples of nickel cadmium batteries that (thanks to being looked after and serviced regularly), have remained in service for between 10 and 15 years.

The advantage of nickel cadmium batteries

Nickel cadmium batteries were developed because of their capacity for high power output, making them ideal for starting turbine engines where they can typically deliver 10-20 times as much power as an equivalent lead-acid battery. Clive says that turbine overhaul engineers can tell which engines have been spooled up by nickel cadmium versus lead acid batteries.

Another nickel cadmium battery benefit is that if a single cell fails, it can be replaced individually with a new or PWS (part worn serviceable) matched cell.

Spare parts available

Aviation Ni-Cad Services hold the largest stock of nickel cadmium battery parts in New Zealand including a wide variety of replacement cells, sensors, cases, lids and hardware. It is also possible to combine previously tested sets of cells of the same type from two or more batteries. This can save money or having to completely replace the whole battery, especially for an operator using multiples of the same type.

For more information

For all enquiries, contact Clive by phone on 09 299 7133, fax 09 299 7743, or email: tcdixon@xtra.co.nz

Helicopter Services from Annett Aviation

Matt Annett has been involved with helicopter maintenance since leaving school. After 8 years with Lakeland Helicopters working on R22s, H300 and 500s, Jetrangers and Hueys, in 2006 he left New Zealand for an OE in the United Kingdom. There he acquired further experience on Robinson overhauls and various Eurocopter types before returning here in 2008. Working as a Contractor initially, in 2011 Matt saw an opportunity to set up in Tauranga where a demand for helicopter services wasn't being met.

Sharing a hangar with Neil Laing (who happens to have been Chief Engineer at Lakeland Helicopters back when Matt was there), Annett Aviation now has a dozen machines on its books, including R22, R44, AS350, and the two Guimbal Cabri G2s located in Whakatane. Annett Aviation is an approved Service Centre for Guimbal Helicopters. Soon there will also be a BO105, Matt having sourced it in Texas for an existing R44 customer. Involved from the start in that acquisition, Matt says he looked at several before finding a suitable one and completing pre-purchase inspections, then arranging its packaging support and import to New Zealand. It is now due to arrive here in the next month. Once in Tauranga, it is planned to undergo an 8 year inspection and be given a new coat of paint by neighbouring company Pacific Aero Coatings.

When KiwiFlyer visited recently, Matt and co-worker Greg (also a LAME) were reassembling the Philips Trust AS350 rescue helicopter after stripping it for painting and undertaking other mechanical work at the same time. Other recent jobs in the hangar include several R44 bladder tanks and some tidy-up work on an Iroquois from Portugal destined for Hunter Valley firefighting.

Matt Annett working on the Philips Trust AS350 rescue helicopter after stripping it for re-painting and other mechanical work.

Group 1 and 2 rotorcraft as well as Arriel and RR250 rated, Matt says that the business has built up progressively and now has a 50/50 split of private and commercial customers, covering operators from tourism, through rescue and agricultural applications. Matt also has a helicopter PPL and can therefore fly when he needs to.

Getting rotors right

A particular strength of the business is rotor smoothing and tuning. Neil and Matt have a reputation for persevering in order to "get it right", with Matt adding that "We're always aiming for zero rather than whatever limit might be deemed to be acceptable. We apply that philosophy to all of our work and are always trying to go that little bit extra with attention to detail. It's worth it for job and customer satisfaction and is also an approach we like to think can potentially make the difference between a good day, or a not so good day for an operator."

Matt says that Tauranga can now be considered a one-stop centre for helicopter maintenance, with all general maintenance available from themselves, avionics work available from Dave Gardner at Skytrack Aviation, premium painting services from Kim Thompson at Pacific Aero Coatings, and ARAs from Gareth McCurdy. As Matt says, "Tauranga is a great place for helicopter operators to come for maintenance – stay for a holiday."

For more information

For more information contact Matt Annett on 027 266 5505, or email: matt@annettaviation.co.nz

Barry Cordage Helicopter Longline and Cargo Nets now distributed by Aeromarsters Powervamp

HELICOPTER operators in New Zealand now have access to the world renowned helicopter longline and cargo net products from Barry Cordage in Canada. Since 1978 Barry Cordage has manufactured a wide range of rope and netting related products, most of which are used across half of the world's countries and on all 5 continents. "The thing I found about Barry Cordage and their people is that they listen to what the industry wants and they find the most cost appropriate and cost effective solutions. They have the scale of a huge company but maintain the personalised approach and values of something much smaller. These guys are here to genuinely help and they base their reputation on finding the right solutions. These guys don't 'say', these guys 'do' , and it's suppliers like these that we want to work with," says Tony Marsters of Aeromarsters Powervamp.

Barry Cordage are the creators of the Double Zipper Helix Longline which significantly reduces vibrations and oscillations frequently observed with heavier longlines at higher flying speeds. They also produce weighted end covers which allows increased flight performance without a load. They are innovators in the market with the result that Barry Cordage longline accessories are often copied by other manufacturers - because the Barry designs have been proven on mission, time and time again.

Committed to quality and safety, Barry Cordage products include custom tow lines and bridle assemblies, cargo nets, longlines and barrel slings.

Contact Tony at Aeromarsters Powervamp for any enquiries relating to longline and sling systems, or for more information on any of the growing range of products represented in NZ by Aeromarsters Powervamp. Contact details are at right.

Flight Care Tauranga

WITH 40 years of aircraft maintenance behind him, Chief Engineer at Flight Care Tauranga, Dale Trust has more than enough experience to offer light aircraft owners practical advice and solutions for all aspects of aircraft care.

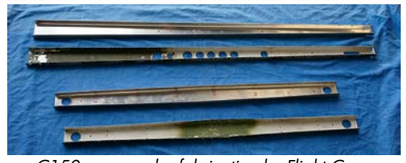
Previously operating his own company Heliplane Services at Thames, Dale's employment by Flight Care added a wide range of maintenance ratings and capability to their existing Tauranga operations. Typical work involves all manner of maintenance and repair to light fixed wing GA and microlight category aircraft. Heavier aircraft are catered for at the company's Napier base.

Flight Care Tauranga's customers include private owners and companies from Ashburton to Kerikeri, flying everything from warbirds to composite microlights, and from helicopters to light twins. Many customers followed Dale from Thames and are happy to bring their aircraft to Tauranga for, in Dale's words, "friendly and economical service – and Tauranga is a very nice place to come for the day as well".

Dale says they have a very solid knowledge base particularly when it comes to Cessna SIDs inspections and also have a Cessna 100 and 200 series airframe jig on hand if required. He adds that "in particular, we aren't afraid of the big jobs and can undertake rectification of extensive corrosion if required". He also continues to develop various repair schemes for Cessna components, aiming on achieving these at half the replacement cost of equivalent new components. One example of such a project in progress is for corrosion pitting on undercarriage legs which would otherwise be unserviceable and cost thousands to replace. "We're able to fabricate a lot of bits and pieces that can cut replacement costs in half," says Dale, a typical example being C150 spars that were on the bench when KiwiFlyer visited recently.

To discuss any light aircraft maintenance requirements, particularly if seeking an experienced opinion on difficult issues, contact Dale Trust at Flight Care Tauranga on 07 572 3670 or e: tga@flightcare.co.nz

"Not afraid of the big jobs". C150 in the Flight Care hangar for SIDs inspections and extensive corrosion and fatigue rectification work (above and below).



C150 spars under fabrication by Flight Care.

contributed by Jill McCaw

Cross Country Soaring: Challenge and Reward

A lot of people get past their first solo and then drift away from gliding, but they're missing out on the best part. Cross country soaring needn't be scary at all.

Gliding New Zealand (GNZ) wants to encourage cross country soaring as a way of increasing our membership. I think that's a great idea.

THE question you folks are probably asking is why?

Cross country soaring is what makes gliding such a challenging and exciting sport and so different from any other sort of aviation. In gliding we can't pick a destination, file a flight plan and just fly there. There are so many variables involved and no two flights are ever the same. Two pilots, setting out to do the same task and leaving half an hour apart can have completely different experiences. Pilots flying together who make slightly different decisions, a turn left, instead of a turn right can make the difference between completing a task, going home, or even landing out.

It is worth repeating the fact that a glider has no motor. It is the developed skill and experience in reading the sky that allows the glider pilot to find sources of lift. Added to that is individual piloting experience and ability to centre turns in thermals, plus experience and confidence in flying close to terrain (to ride ridge lift). This all makes staying aloft a completely different experience for each pilot. As well, there is the fact that as you fly away from your airfield you have to have somewhere else you can land. Landing is inevitable for all flights, but in gliding a change in weather conditions or a miscalculation of those conditions can have a pilot looking for a landing site in a hurry.

Gliders can land on a dime, but that too comes down to a pilot's currency and skill level. I'm only now, after a few years of quietly making my way back into the sport, feeling that I would be happy to land in a paddock or unfamiliar airfield. This summer I'm thinking I'm ready to renew my cross country rating and start tip toeing out after the big boys and girls. That ability to land, where I want, every single time, was my major stumbling block to cross country flying. It's a really scary thing, to cut the umbilical cord of being within glide range of the airfield I took off from.

I'm not alone with that thought. It is in fact a very common scary thing and from questioning people who have left gliding after getting to solo, it has become clear that it's one of the things that has never really be addressed. The training syllabus brought people to QGP and (Glider Pilot's License) GPL and then they were left on their own.

My own club in Canterbury has recognised this for a while and held beginner cross country courses. Well known pilot Jerry O'Neill has taught his famous "cone of safety" rule. Visualise the glider, at whatever altitude, as the top of a cone of air, the sides of which are proscribed by the glide angle of the aircraft. In the case of the little Grob Single Astir I fly, that's around 32:1. So allowing myself 1000 feet for a safe circuit that gives me an distance of 39 kilometres I can fly before I must land (I can show you my workings if you like, but online conversions of feet to metres help a lot). So at 5,000 feet 39 kilometres is the radius of the base of my cone and as long as I have at least one safe landing area, within that I can fly on. The cone shifts with me, the radius changes with my height but the slope never does and the cone must always contain a landing area. I may have to turn back to that landing area but that's fine. Homework and planning comes into this. Because while a glider can land on a dime, paddocks full of inquisitive cattle are only a last resort (cows eat gliders), as are rocky river flats, paddocks with mature crops and areas that may have sprouted grape vines since you last visited. In fact you can't land in grape country, or kiwi fruit country, at all. A paddock you can aero tow out of is a bonus, and if not, easy access to get the trailer in is good. But these are secondary considerations to landing the glider safely. (It's expensive but gliders can be helicoptered out of inaccessible valleys. It makes for wonderful photo opportunities.)

The point of all of this is, that flying out into the big scary unknown, is a lot less scary if you are prepared. And once you have learnt how to do it, and do it successfully, and landed out successfully or even gone around your course and got home, you are on the path to a lifetime's enjoyment of soaring. You can and will go anywhere, when the weather Gods and your skill permit. And it will be glorious.

Cross country flights, be they short or long, always challenge and reward those who fly them. They are what makes gliding truly a sport and what keeps glider pilots coming back for more. If you're interested in trying it out yourself, please contact your local club. Club contact details can be found on the GNZ website.

I'm Jill McCaw, editor and publisher of SoaringNZ. For subscriptions, Google SoaringNZ where the first 18 issues of the magazine are now up and free to view on my website.